

**TOWN OF GRAY**  
**PLANNING BOARD**  
**AGENDA • FEBRUARY 8, 2024**

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**Planning Board  
Regular Meeting**

**Henry Pennell Municipal Complex  
24 Main St. Gray, Maine**  
**And via Teams videoconferencing:  
<http://tinyurl.com/2bbt86xr>**

**7:00 PM**

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**I. MEETING COMMENCES**

Roll Call

**II. MINUTES APPROVAL**

Minutes approval: Jan 11, 2024

**III. INFORMATION EXCHANGE**

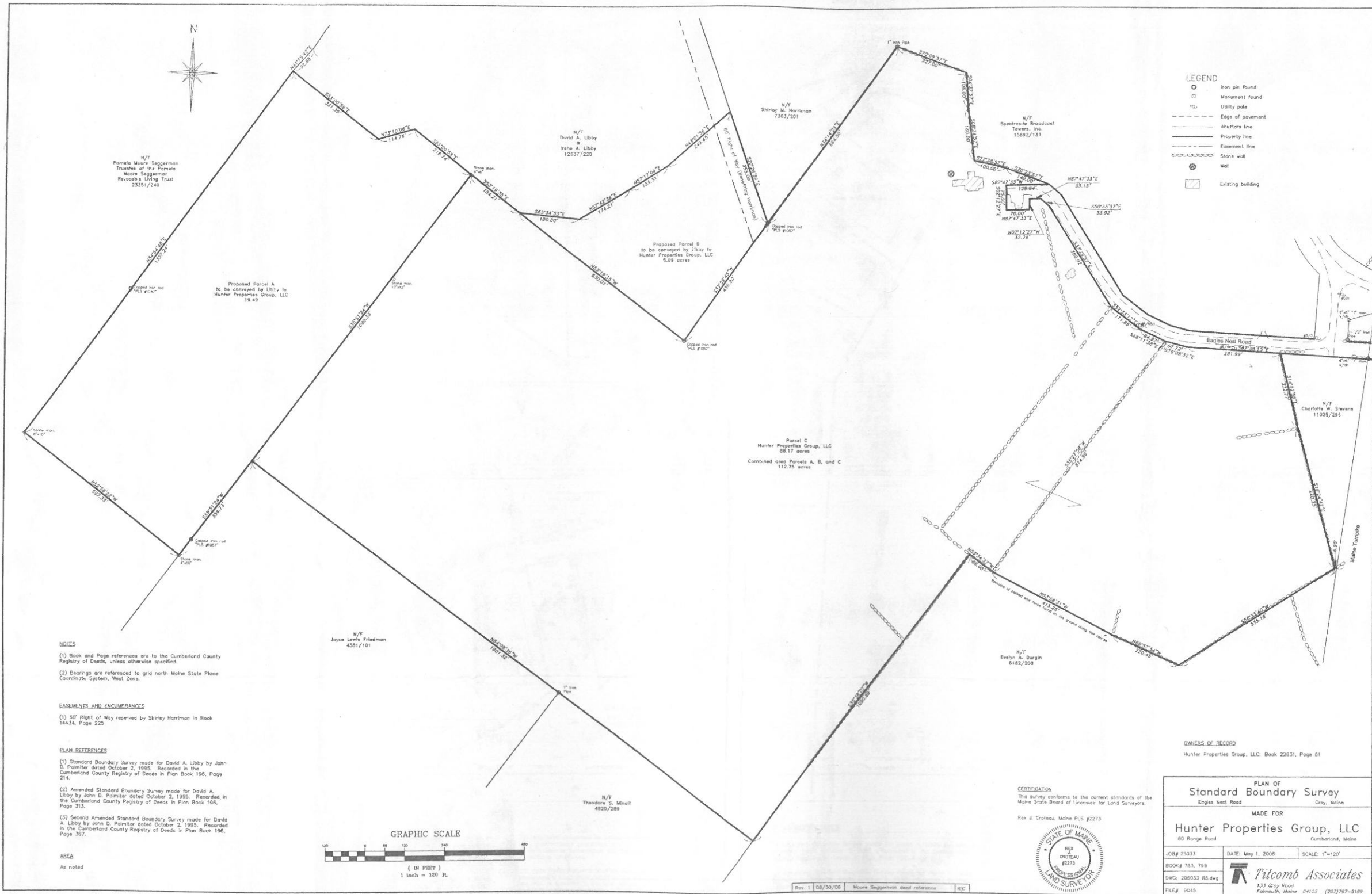
**IV. CONTINUED BUSINESS**

Aerie Estates Amendment to Eagles Ridge Subdivision – Preliminary and Final Plan Review

A request by Sebago Realty, LLC, represented by D.H. Roma Consulting Engineers, for preliminary review and final plan review of a proposal to create a 14-lot residential open space subdivision on the 41+/- acre parcel off Eagles Nest Road, at Tax Map 63, Lot 35-24, on the remaining land in the Eagles Ridge Subdivision, in a Rural Residential and Agricultural zoning district. The proposal is subject to major subdivision plan review.

**V. ADJOURNMENT**

*\* The Town of Gray is an equal opportunity employer and complies with all applicable equal access to public accommodations law. If you are planning to attend a Town Council or Town committee or board meeting and need assistance with a physical disability, please contact the Town Manager's office at least 48 hours in advance of the meeting to have the Town assist you. 657-3339. TTY 657-3931.*



**NOTES**

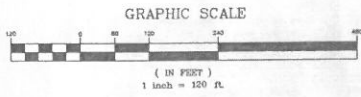
- (1) Book and Page references are to the Cumberland County Registry of Deeds, unless otherwise specified.
- (2) Bearings are referenced to grid north Maine State Plane Coordinate System, West Zone.

**EASEMENTS AND ENCUMBRANCES**

- (1) 50' Right of Way reserved by Shirley Harriman in Book 14434, Page 225

**PLAN REFERENCES**

- (1) Standard Boundary Survey made for David A. Libby by John D. Palmier dated October 2, 1992. Recorded in the Cumberland County Registry of Deeds in Plan Book 196, Page 216.
- (2) Amended Standard Boundary Survey made for David A. Libby by John D. Palmier dated October 2, 1995. Recorded in the Cumberland County Registry of Deeds in Plan Book 196, Page 313.
- (3) Second Amended Standard Boundary Survey made for David A. Libby by John D. Palmier dated October 2, 1995. Recorded in the Cumberland County Registry of Deeds in Plan Book 196, Page 367.



**LEGEND**

○	Iron pin found
□	Monument found
⊕	Utility pole
---	Edge of pavement
---	Abutters line
---	Property line
---	Easement line
---	Stone wall
⊙	Well
▣	Existing building

**LEGEND**

○	5/8" Capped iron rod set	---	Edge of pavement	---	Barbed wire fence
□	Monument set	---	Curb (bituminous, unless noted)	---	Stockade fence
○	Iron pin found	---	Edge of gravel	---	Chain link fence
□	Monument found	---	Trees line	---	Guard rail
○	Catch basin	---	1' contour	---	Stone wall
○	Sewer manhole	---	5' contour	---	Deciduous tree
○	Drain manhole	---	Property line	---	Coniferous tree
○	Gas valve	---	Abutters line	---	Existing building
○	Water shutoff	---	Easement line		
○	Fire hydrant	---	Underground steam		
○	Utility pole	---	Underground sewer		
○	Light pole	---	Underground water		
○	Coy wire	---	Overhead utility wires		
○	Sign	---	Underground gas		
		---	Underground telephone		

**CERTIFICATION**  
 This survey conforms to the current standards of the Maine State Board of Licensure for Land Surveyors.  
 Rex A. Crofton, Maine P.L.S. #2273  
 REGISTERED PROFESSIONAL LAND SURVEYOR

**OWNER OF RECORD**  
 Hunter Properties Group, LLC; Book 22631, Page 61

**PLAN OF Standard Boundary Survey**  
 Eagles Nest Road  
 Gray, Maine

**MADE FOR**  
 Hunter Properties Group, LLC  
 60 Range Road  
 Cumberland, Maine

DATE: May 1, 2008  
 SCALE: 1"=100'

**Pitcomb Associates**  
 123 Gray Road  
 Falmouth, Maine 04105 (202)797-8199

**REVISIONS**

NO.	DATE	DESCRIPTION

**PROJECT MANAGER**  
**LICHT**  
 ENVIRONMENTAL DESIGN, LLC  
 35 FRANK CIRCLE, GRAY, ME 04039 (207)749-4924

**ENGINEER**  
**Blais**  
 CIVIL ENGINEERS  
 780 BROADWAY, 50, PORTLAND, ME 04106 (207)767-7300  
 © 2012 BLAIS CIVIL ENGINEERS, P.A.

**BOUNDARY SURVEY**  
**EAGLES RIDGE SUBDIVISION**  
**EAGLES NEST ROAD**  
 PREPARED FOR:  
**BLACKWATER DEVELOPMENT, LLC.**  
 2320 CONGRESS STREET,  
 PORTLAND, MAINE 04102

**LATEST REVISION** (SEE REV. BOOK)  
 DATE: JULY 24, 2013  
 DRAWN/CHECKED BY: M/V/N/T/C/S/B  
 SCALE: SEE SHEET  
 CONTOUR INTERVAL: 2'  
 BCE PROJECT NO.: 21133

**REF-1**



## PLANNING BOARD/STAFF REVIEW COMMITTEE APPLICATION TOWN OF GRAY MAINE

### PROPERTY TO BE DEVELOPED

Property Location/Address	Property Map/Lot
Zoning District	Lot Acreage
Owner Name	Tax Sheet
Owner Address	Owner Phone

### APPLICANT

Name (IF different than owner)	Contact Phone Number
Mailing Address	Alternate Phone Number
Mailing City/State/Zip	Fax Number
Email Address	

### AGENT/CONSULTANT

Name	Contact Phone Number
Mailing Address	Alternate Phone Number
Mailing City/State/Zip	Fax Number
Email Address	

### PROJECT

The undersigned requests that the Town of Gray Planning Board consider the following application for:

- |  |  |
|--|--|
| <input type="checkbox"/> <b>Subdivision</b><br><input type="checkbox"/> Sketch Plan Review<br><input type="checkbox"/> Preliminary Plan Review (Major)<br><input type="checkbox"/> Final Plan Review (Major)<br><input type="checkbox"/> Minor<br><br><input type="checkbox"/> <b>Site Plan Review</b><br><input type="checkbox"/> Pre-Application Conference<br><input type="checkbox"/> Minor<br><input type="checkbox"/> Major<br><br><input type="checkbox"/> <b>Shoreland Zoning Permit</b> | <input type="checkbox"/> <b>Other (specify)</b><br><input type="checkbox"/> Conditional Use<br><input type="checkbox"/> Amendment<br><input type="checkbox"/> Extension<br><input type="checkbox"/> Workshop<br><input type="checkbox"/> Contract Zone Request |
|--|--|

**Project Description / Comments:**

<b>Applicant Signature</b> <span style="background-color: black; color: black;">[REDACTED]</span>	<b>Date</b> 1-16-24
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# TOWN OF GRAY MAINE

## FINAL SUBDIVISION PLAN APPLICATION SUBMISSION CHECKLIST

Subdivision Name Aerie Estates - Amendment to Eagles Ridge Subdivision Date 1-16-2024

This checklist has been prepared to assist applicants in developing their applications. It should be used as a guide in assembling the information necessary for a complete application. The checklist, however, does not substitute for the requirements of **Article 8** of the Subdivision Ordinance. The Planning Board will also use the checklist to ensure your application is complete. Indicate if the information has been submitted or if a waiver is requested. If you feel that information is not applicable to your project, please indicate in the second column. The perimeter survey, subdivision plan and engineering plans may be contained on the same drawing. Detailed engineering drawings such as road profiles, drainage swales and erosion/sedimentation plans, however, may best be presented on a separate sheet or sheets.

Note that this checklist only covers the submission requirements for a *final* plan. There is an additional checklist for *preliminary* plan submission, which should have been completed previously. Neither checklist addresses the standards that the subdivision plan must meet. For review standards refer to **Article 13**. You should have completed Checklist F-1D at preliminary plan.

FINAL SUBDIVISION PLAN SUBMISSION REQUIREMENTS	Submitted by Applicant	Not Applicable	Applicant Requests to be Waived	Review by Planner/ Engineer	Waived by Planning Board
<b>401.8.1 PROCEDURE</b>					
A. Submittal of draft Final Plan within 6 months of approval of the Preliminary Plan OR submittal of request for an extension to the filing deadline	X				
B. Filing of appropriate Final Plan application fee & peer review escrows	X				
C. Prior to submittal of Final Plan application, the following approvals shall be obtained where applicable: 1. Maine DEP permit(s) 2. Maine DHS permit(s) if public water system 3. Maine DHS permit(s) if engineered subsurface wastewater disposal system 4. Army Corps of Engineers if Section 404 permit required 5. Maine DOT Traffic Movement Permit and/or Highway Entrance/Driveway Access Permit (The Board may require a letter from the various agencies verifying if their regulations do or do not apply)	X				
D. If applicable per Section 401.7.2.C.23, confirmation that Maine Historic Preservation Office received a copy of the proposed plan and mitigation measures	X				
E. Written Approval of Town E911 Officer	Form Attached				
K. Performance Guarantee requirements specified in Article 11	X				

<b>FINAL SUBDIVISION PLAN SUBMISSION REQUIREMENTS</b>	<b>Submitted by Applicant</b>	<b>Not Applicable</b>	<b>Applicant Requests to be Waived</b>	<b>Review by Planner/ Engineer</b>	<b>Waived by Planning Board</b>
<b>401.8.2.A SUBMISSIONS</b>					
One or more maps or drawings at scale of not more than 1"=100'; subdivision more than 100 acres, not larger than 1"=200'	X				
Plans not larger than 24" x 36" with 2" border on binding side; 1" for borders elsewhere	X				
Block for Planning Board signatures	X				
One reproducible, stable based transparency of the recording plan to be recorded at the Registry of Deeds, and 14 full sized paper copies of all the final plan sheets and any supporting documents	X				
<b>401.8.2.B FINAL PLAN INFORMATION</b>					
B.1 Final Plan Application and Submission Checklist	X				
B.2 Name of Subdivision, Name of Town and Assessor's Map and Lot Number(s)	X				
B.3 Total acres in subdivision; location of property lines, existing building(s), vegetative cover type and other essential physical features	X				
B.4 Type of sewage disposal proposed	X				
B.5 Type of Water Supply	X				
B.5.a Gray Water District approval of water system design		X			
B.5.b Fire Chief letter on hydrants or other fire protection measures	X				
B.5.c Well driller or hydrologist letter on ground water supply and quality	X				
B.6 Date plan prepared, north point, graphic map scale	X				
B.7 Names and addresses of record owner, applicant, plan preparer(s) and adjoining property owners	X				
B.8 Location of any zoning boundaries affecting the property		X			
B.9 If different than Preliminary Plan submittal, any deed restrictions on proposed new lots or dwellings	X				

Gray Final Subdivision Submissions Checklist—Project Name \_\_\_\_\_ Date \_\_\_\_\_

<b>FINAL SUBDIVISION PLAN SUBMISSION REQUIREMENTS</b>	<b>Submitted by Applicant</b>	<b>Not Applicable</b>	<b>Applicant Requests to be Waived</b>	<b>Review by Planner/ Engineer</b>	<b>Waived by Planning Board</b>
B.10 Location and size of existing and proposed sewers, water mains, culverts and drainage ways on and adjacent to proposed subdivision	X				
B.11 Location, name and widths of existing and proposed streets, easements, building lines, parks and open spaces on or adjacent to subdivision tied to survey points and certified by a registered land surveyor	X				
B.12 Street design plans	X				
B.13 Location and dimensions of streets, public improvements and open space in subdivision from Official Map, Comprehensive Plan or Capital Improvements Program	X				
B.14 Parcels proposed for dedication to public use; condition(s) of dedication; written documentation of management of subdivider-retained parcels; legal sufficiency to convey title(s) to Town		X			
B.15 100-year flood elevations		X			
B.16 Location and method of construction debris disposal	X				
B.17 Copies of all plans & studies contained in preliminary plan approval	X				
B.18 Copies of all outside agency reviews & permits	X				
<b>PRELIMINARY SUBDIVISION PLAN CONDITIONS OF APPROVAL MET</b>	<b>Submitted by Applicant</b>	<b>Not Applicable</b>	<b>Applicant Requests to be Waived</b>	<b>Received by Planning Board</b>	<b>Waived by Planning Board</b>
<b>Date of Preliminary Approval</b> <u>PENDING</u>					





# ROAD NAME APPROVAL APPLICATION TOWN OF GRAY MAINE

**For Office Use Only**  
 Date Received: \_\_\_\_\_  
 Received by: \_\_\_\_\_

## APPLICANT CONTACT INFORMATION

Name		E-Mail Address	
Street Address		City/State/Zip	
Mailing Address		Mailing City/St/Zip	
Phone Number		Work Phone	

## ROAD INFORMATION

Owner of Road (if private)	
Location/Length of road (left or right off existing road)	
Proposed Name of Road	
Second Choice Name of Road	
Reason for Name	
Applicant Signature	[REDACTED]

**Submission of this Form does NOT constitute approval of Road Name. See Applicant note on reverse side.**

## MUNICIPAL USE ONLY

Map:	Lot:	Sub:	Odd:
Number Range	High:	Low:	Even:

## MUNICIPAL OFFICIALS APPROVAL

### Assessor Approval

Signature/Title:	Date:	<input type="checkbox"/> YES <input type="checkbox"/> NO
Comments:		

### Public Safety Approval

Signature/Title:	Date:	<input type="checkbox"/> YES <input type="checkbox"/> NO
Comments:		

### Code Enforcement Approval

Signature/Title:	Date:	<input type="checkbox"/> YES <input type="checkbox"/> NO
Comments:		

### Public Works Director Approval

Signature/Title:	Date:	<input type="checkbox"/> YES <input type="checkbox"/> NO
Comments:		

### Town Planner Approval

Signature/Title:	Date:	<input type="checkbox"/> YES <input type="checkbox"/> NO
Comments:		

### Town Manager Approval

Signature/Title:	Date:	<input type="checkbox"/> YES <input type="checkbox"/> NO
Comments:		

# DM ROMA

CONSULTING ENGINEERS

January 16, 2024

**Re: Performance Guarantee Estimate  
Aerie Estates Subdivision**

The following represents an estimate of values for the site improvements requiring a guarantee in accordance with Section 401.11 of the Subdivision Ordinance for the above referenced project.

<u>DESCRIPTION</u>	<u>UNIT</u>	<u>QTY</u>	<u>UNIT COST</u>	<u>TOTAL COST</u>
Site Clearing & Grubbing	LS	1	\$7,500	\$7,500
Site Excavation	CY	2,600	\$12	\$31,200
Common Borrow	CY	1,100	\$12	\$13,200
Aggregates – Gravel	CY	1,290	\$32	\$41,280
Asphalt Pavement	T	390	\$125	\$48,750
Stormwater Filter Basin	EA	2	\$16,000	\$32,000
Underground Electrical	LF	910	\$25	\$22,750
Storm Drain Pipe	LF	160	\$52	\$8,320
Erosion Control	LS	1	\$12,000	\$12,000
Riprap	CY	520	\$30	\$15,600
Loam & Seed	LS	1	\$22,000	\$22,000
			<b>TOTAL</b>	<b>\$254,600</b>

Upon your review of this information, please let us know if you have any questions or require any additional information.

Sincerely,

DM ROMA CONSULTING ENGINEERS



Dustin M. Roma, P.E.  
President

**DECLARATION OF EASEMENTS, COVENANTS  
AND RESTRICTIONS**

**AERIE ESTATES SUBDIVISION**

WITNESS THIS DECLARATION OF EASEMENTS, COVENANTS AND RESTRICTIONS, made this \_\_\_\_<sup>th</sup> day of February, 2024 by Sebago Realty, LLC of Windham, Maine (hereinafter referred to as the “Declarant”).

WHEREAS, Declarant has subdivided a certain parcel of land situated off Eagles Nest Road in the Town of Gray, County of Cumberland and State of Maine into a fourteen (14) lot residential development known as Aerie Estates – an Amendment to Eagles Ridge Subdivision (the “Subdivision”); and

WHEREAS, the Subdivision is more particularly depicted on a Subdivision Plan prepared for Declarant by DM Roma Consulting Engineers, approved by the Town of Gray Planning Board on \_\_\_\_\_, 2024, and recorded in the Cumberland County Registry of Deeds in Plan Book \_\_\_\_\_, Page \_\_\_\_\_ (the “Plan”); and

WHEREAS, Declarant is the owner of the property that is subject of the Subdivision and depicted on the Plan as Lots 1 through 14, the right-of-way of Aerie Drive, extending from Eagles Nest Road, and the Open Space, as hereafter defined (collectively, the “Property”), said Property having been acquired by Declarant by deed recorded in the Cumberland County Registry of Deeds in Book 40431, page 320.

WHEREAS, Declarant desires to provide for the improvement of the Property in accordance with a harmonious plan for the relative location of residential structures, accessory structures, garages, rights-of-way, easements, roads, stormwater features, landscaping and general land use, all to assure the owners of Lots (as hereinafter defined), their heirs and assigns, that the use, benefit and enjoyment of the individual Lots, stormwater facilities, landscaping, easements and roads will not conflict with the harmonious plan; and

WHEREAS, Declarant desires to create a residential area of the Property providing for the greatest possible degree of health, safety, environmental beauty and amenity for the Lot owners and inhabitants thereof, and to effect the foregoing purposes, desires to subject the Property to protective covenants and easements and to the provisions for a homeowners association for the administration and enforcement of same, the maintenance and improvement of certain stormwater facilities, landscaping, and the establishment, collection and disbursement of assessments, all as set forth hereinafter, each and all of which are for the benefit of the Subdivision and of each Lot subject to the protective covenants and easements hereinafter set forth, maintaining and improving certain rights-of-way, landscaping, and other stormwater facilities, and otherwise carrying out the functions of a homeowners association and the provisions and objectives of this Declaration;

[1]

NOW, THEREFORE, Declarant hereby declares that the Property shall be held, occupied, improved, transferred, sold, leased and conveyed subject to the protective covenants and restrictions, the reservations and exceptions, the stormwater rights, landscaping, and easements and the provisions of a homeowners association hereinafter set forth, all of which are declared to be in furtherance of a uniform scheme for the development of the Property and that said protective covenants, reservations, easements and provisions for a homeowners association are intended to enhance and protect the value and desirability of the Property as a whole, to mutually benefit each of the Lots located thereon, to create mutual equitable servitudes upon each of the Lots in favor for each and all other Lots therein and to create reciprocal rights and privities of contract and estate between all persons acquiring or owning any interest in any portion of the Property, including Declarant, and Declarant's grantees, successors, administrators and assigns, and shall be deemed to run with the land and be a burden and benefit to and enforceable by all such persons, including Declarant and Declarant's grantees, successors, administrators and assigns, and by the Association (as hereinafter defined).

#### ARTICLE I DEFINITIONS

The following words shall, as used herein, have the following meanings, unless the context plainly requires otherwise:

1. Association. The homeowner's association named "Aerie Estates Homeowners Association", which Declarant has organized as a nonprofit incorporated association for administering and enforcing the protective covenants and easements hereinafter set forth, maintaining and improving certain rights-of-way and other common facilities and otherwise carrying out the functions of a homeowner's association and the provisions and objectives of this Declaration.
2. Declarant. Sebago Realty, LLC, as previously mentioned, and any successor or assign to all Declarant's rights, title and interest in and to the Property.
3. Lot(s). Lots 1 through 14, inclusive as shown on the Plan which may hereafter be conveyed by Declarant.
4. Open Space. That portion of the Property shown on the Plan as "Open Space Parcel", more particularly described on the attached Exhibit A.
5. Owner(s). The record owners, whether one or more persons or entities, of the fee simple title to any Lot, but not including Declarant.
6. Plan. Subdivision Plan prepared for Declarant by DM Roma Consulting Engineers, approved by the Town of Gray Planning Board on \_\_\_\_\_, 2024 and recorded at the Cumberland County Registry of Deeds in Plan Book \_\_\_\_\_, Page \_\_\_\_\_, as said Subdivision Plan may be amended by the Town of Gray Planning Board.

7. Property. All land subject to the Subdivision as shown on the Plan, including Lots 1 through 14, the Road, and the Open Space.
8. Road. The generally fifty (50) foot wide corridor entitled “Aerie Drive” and further shown on the Plan, more particularly described on the attached Exhibit B.
9. Stormwater Facilities. Any stormwater ditches, culverts, buffers, swales, containment berms, level spreaders, ponds, detention basins or related facilities, that are located within the Road, Open Space or within easements contained within the Lots as shown on the Plan.

ARTICLE II  
SUPPLEMENTAL DECLARATIONS

This Declaration may be amended from time to time by supplemental declarations duly executed by Declarant, or, after management of the Property has been transferred to the Association pursuant to Article VII, Section 8, by the Association, pursuant to a vote of the Owners in accordance with the bylaws of the Association, and recorded in the Cumberland County Registry of Deeds. No such amendment shall render invalid any use of Subdivision land within the Property existing in accordance with this Declaration at the time of recording such supplemental declaration, and any such amendment shall be reasonably consistent with the uniform scheme of development established by this Declaration and the Subdivision approved by the Town of Gray.

ARTICLE III  
RESERVATIONS AND EASEMENTS

There is hereby excepted and reserved to Declarant for so long as Declarant owns any portion of the numbered Lots, and thereafter to the Association, the following:

1. Road and Open Space. A right-of-way for all purposes over, across and through the Road, together with the right to install and maintain all utilities and lines, water systems, storm drainage lines and ditches adjacent to, within or under the traveled portion of said Road. Declarant specifically reserves the right to convey the Road to the Association, and the Association shall accept such conveyance.
2. Underground Utilities. Declarant reserves the right to grant easements for utility and drainage purposes to enter onto any Lot within fifteen (15) feet of the Road boundary line for the purpose of constructing, reconstructing, installing, replacing and maintaining an underground or above ground utility and/or drainage structure therein and to extend, connect to and use in common any previously installed utility and/or drainage structure by the Owner, providing that promptly after such entry, the surface of the ground shall be restored to substantially the same condition as it was in prior to such entry.

3. Other. (a) Declarant reserves the right to maintain on any Lot owned by Declarant such advertising signs as may comply with applicable governmental regulations, which may be placed at any location on the Lot and may be relocated or removed all at the sole discretion of Declarant. This easement shall continue until Declarant has conveyed all Lots to owners other than Declarant.

(b) The Property shall be and hereby is, made subject to easements in favor of Declarant, to grant to appropriate utility and service companies, cable companies and governmental agencies or authorities for such utility and service lines and equipment as may be necessary or desirable to serve any portion of the Property. The easements created hereunder shall include but not be limited to, the rights of Declarant to grant to the providing utility or service, governmental agency, or authority to install, lay, maintain, repair, relocate and replace power, cable, electrical wires, phone lines, pipes or conduits, drainage ditches, ducts over, under, through, along and on the Property. Notwithstanding the foregoing provisions of this Article, any such easements shall be located either in substantially the same location as such facilities or similar facilities existed at the time of the first conveyance of a Lot by Declarant, or so as not to materially interfere with the use of the Lot by its occupants.

(c) The lots shall be and hereby are made subject to an easement in favor of Declarant and its agents, employees, and independent contractors thereof for the purpose of the inspection, upkeep, maintenance, repair, construction, or replacement if applicable of any improvements or Stormwater Facilities located thereon pursuant to its rights to enforce the provisions of this Declaration.

(d) The right to exercise throughout the Property any rights or powers hereinafter conferred upon the Association or by supplemental declarations.

#### ARTICLE IV COMMON RIGHTS

1. Common Rights of Owners to Road. Every Owner shall have a non-exclusive right to use the Road for the purposes of vehicular and pedestrian access, and the installation, use, maintenance and repair of underground wires, cables, conduits and pipes for utility services, in the location of such utility facilities originally constructed or such other area as the Association may designate from time to time, including electricity, gas, drinking water, sprinkler system water, storm water, sanitary sewer, telephone, cable and other utilities as may from time to time be necessary or desirable. Such right shall be an easement appurtenant to and shall pass with the title to every Lot. Each Owner may use the Road in accordance with the foregoing purposes, but only without hindering or encroaching upon the lawful rights of other Owners. No Owner shall obstruct, hinder, or interfere with, or permit the obstruction, hindrance or interference with the free and uninterrupted use of the Road for access by all Owners and their families and guests. Use of the Road shall be subject to any Rules and Regulations as

shall be established from time to time by the Association's Board of Directors. Owners and their family members, tenants, licensees, and invitees are prohibited from parking vehicles or storing any personal property within the Road, except as expressly permitted by such Rules and Regulations adopted by the Association's Board of Directors.

2. Common Rights of Owners to Open Space. Every Owner shall have a non-exclusive right to use during daylight hours the Open Space as shown on the Plan. Use of the Open Space shall be subject to any Rules and Regulations as shall be established from time to time by the Association's Board of Directors. Declarant specifically reserves the right to convey any portion of the open space to the Association, and the Association shall accept such conveyance, subject to all rights, easements, covenants and restrictions applicable thereto as set forth in this Declaration. Declarant further reserves the right to retain fee title to the Open Space, in which event any Open Space retained by the Declarant shall remain subject to all rights, easements, covenants and restrictions applicable thereto as set forth in this Declaration, including the rights and obligations of the Association set forth herein.

#### ARTICLE V MAINTENANCE

1. Stormwater Collection. The stormwater collection facilities associated with the Road (i.e., storm drains, culverts, swales, berms, riprap aprons, stormwater filter ponds and stormwater buffers) will be maintained by the Association. The Association shall maintain the facilities in a clean operating condition by street sweeping, removing debris, flushing the storm drains as necessary to maintain flow. Maintenance required for any such Stormwater Facilities will include, but will not be limited to:
  - (a) Periodic inspection of the Stormwater Facilities for conditions that may affect their operation or structural integrity.
  - (b) Periodic removal of debris, i.e., brush, leaves or trash that may become lodged in culverts or ditches.
  - (c) Repair of any damaged areas, including the associated swales and stormwater filter pond areas.

The Town of Gray also has the right to enter said areas for emergency repairs to Stormwater Facilities

2. Road. The Road shall be maintained by the Association. The Association shall maintain the entire roadway and infrastructure to include, but not limited to, roadway travel surface, road shoulders, roadside ditching, underground and aboveground

utilities, stormwater and erosion control features, snow plowing, winter sand application, and all repairs and maintenance.

ARTICLE VI  
PROTECTIVE COVENANTS AND RESTRICTIONS

1. Open Space. The Open Space shall be used only for non-commercial recreation, agriculture, or conservation purposes, except for easements for underground utilities or as otherwise depicted on the Plan or specifically provided for in this Declaration.
2. Residential Use. All Lots shall be used solely for residential purposes and the usual and natural uses in connection therewith in accordance with the Town of Gray ordinances. Lots 1 through 13 shall not be further subdivided without the written consent of Declarant. Only one single family dwelling unit shall be erected on Lots 1 through 13 and no multiple dwelling units shall be erected on Lots 1 through 13 without the written consent of Declarant.
3. Structures. No structure, building, decks, or porches shall be erected, altered, placed, or permitted to remain on any Lot until its design, siting on the Lot, utility siting, exterior siding, roofing and trim materials, all auxiliary structures, and exterior colors are approved by Declarant. Auxiliary structures, such as private garages, cabanas, pergolas, fences, or swimming pools and the like shall be permitted, provided that such auxiliary structures shall be consistent with the residential nature of the Lot and receive Declarant written approval. Each Lot shall have no less than a two-car garage that must be built at the same time as the residential structure. Declarant reserves the right to approve exterior design of the proposed structures. Each structure proposed must have a minimum living square footage of 1,300 square feet for a single-story residence and 1,800 square feet for a two-story residence, unless otherwise approved at Declarant's sole option.
4. Chimneys and Foundations. Any fireplace or chimney located on the exterior of any structure shall be of brick, stone, or wood construction. Except for the minimal exit piece protruding from the wall or roof, as applicable, no cinder block or metal chimneys shall be allowed on the exterior of any structure. Each structure on a Lot shall be supported by a solid masonry foundation or slab.
5. Time of Construction. When the construction of the buildings on a Lot is once begun, work thereon must be prosecuted diligently and must be completed within (1) year. Lots shall be loamed and seeded at the completion of construction but, in any event, completed within (9) months of the issuance of a certificate of occupancy by the Town of Gray.
6. Septic Systems. The septic system on each Lot shall be of the size, type, layout, and location and in compliance with all applicable federal, state and local laws, rules, ordinances and regulations.

7. Compliance with Plan and Ordinances. All construction activities, including the siting of buildings, shall be in accordance with terms and conditions set forth on the Plan and all local, state and federal laws, codes, ordinances, and regulations.
8. Driveways. All driveways shall be paved with bituminous pavement within one (1) year of the issuance of a certificate of occupancy by the Town of Gray for the residential structure on the lot.
9. Mobile Homes or Temporary Shelters. No mobile home, shack, modular home or other structure of temporary character shall be placed or used on any of the Lots as the residence or as an accessory building, or parked on any portion of the Road.
10. No Livestock. No live poultry, hogs, cattle, horses, or other similar livestock shall be kept on any Lot. No boarding or breeding kennels may be kept on any Lot, and invisible fences for all dogs are strongly encouraged.
11. Maintenance of Lots. All Lots shall be kept free from rubbish and trash of any kind. All yards and areas between the Lot lines and buildings shall be kept neat and uncluttered. Trash, garbage, and other waste shall be kept in sanitary containers. No external antennae towers or satellite dishes of any kind shall be erected on any Lot unless screened so as not to be visible from the Road and abutting Lots.
12. Trucks / Trailers. No trucks, business, or commercial vehicle(s) or similar vehicles shall be brought upon any Lot except one business vehicle normally used by an Owner in his/her business; provided however, no trucks, tractor trailers or such similar vehicles with more than two (2) axles shall be kept on any Lot or at the Property, including the Road. The prohibitions contained herein shall not be construed to prevent the use of trailers, vehicles, or temporary structures during the period of actual construction.
13. Professional Use. In addition to residential use, any professional use in accordance with local ordinances which does not create traffic substantially greater than that of normal residential use shall be permitted on a Lot so long as the primary use of the Lot is residential.
14. Nuisances. No Owner shall do or permit to be done any act in the Subdivision or on a Lot which may be, or is, or may become a nuisance as defined by state or local ordinances or regulations.
15. Signs. No sign of any nature or description shall be displayed or placed upon any part of the Property and any Lots except for a "For Sale" sign referring to a Lot or residence thereon, or a reasonable sign identifying the family name and address of the Owner, or a sign erected by the Declarant to identify the Subdivision.

16. Tree Cutting. Declarant reserves the right to approve any tree cutting activity within 15 feet of side and rear property lines.
17. Right to Waive Strict Compliance. Despite anything to the contrary contained in this Declaration, Declarant shall have the right in its reasonable discretion to waive strict compliance with any provision of this Declaration governing the construction of buildings on any Lots within the Subdivision. No such waiver shall be enforceable with respect to any such proposed construction, unless the waiver is duly executed and acknowledged by Declarant in writing and recorded in the Cumberland County Registry of Deeds.

ARTICLE VII  
HOMEOWNERS ASSOCIATION

1. “Association” shall mean and refer to Aerie Estates Homeowners Association, a non-stock, non-profit corporation organized and existing under the laws of the State of Maine.
2. “Member” shall mean and refer to each Owner (whether an individual person(s), corporation, partnership or other legal entity) or record of said Lots, but shall not mean and refer to an owner of record whose only interest in such Lot is as mortgagee under a real estate mortgage as security for the performance of an obligation, until and unless such owner shall have commenced proceedings under the laws of the State of Maine to foreclose such mortgage and shall have delivered a certificate to the office of the Secretary of the Association.
3. Each Owner of a Lot shall be a Member of the Association. However, each Lot is allocated only one (1) vote regardless of whether the Owner of the Lot is one or more individuals, a corporation, partnership, or other legal entity.
4. The purpose of the Association shall be to take title to the Road and the Open Space (upon conveyance by Declarant in accordance with Article IV, Section 2 above), and maintain, repair and replace the Road and Stormwater Facilities. Maintenance of the Road shall include, but not be limited to repairs, maintenance, snow plowing and snow removal. The Association’s purpose shall also include maintenance of any entry sign and/or landscaping.

The Association shall further be responsible for the operation and maintenance of the Stormwater Facilities and take title to all areas and features as determined by the Declarant.

5. The business affairs of the Association, including without limitation membership, election of officers and directors, voting rights, procedures and all other forms of corporate governance will be regulated and administered in accordance with the Bylaws of the Association. In the event of any inconsistency between the provisions

of this Declaration and the Bylaws concerning matters of corporate governance of the Association, the terms and provisions of the Bylaws shall prevail over any inconsistent terms and provisions of this Declaration. Despite the foregoing or any provision of the Bylaws to the contrary, however, Declarant shall have the reserved management rights described in Article VII, section 8 below.

6. The Board of Directors shall have the powers and duties necessary for the administration of the affairs of the Association and shall do all such acts and things except those which by law or by the Association's Bylaws may not be delegated to the Board of Directors by the Members. Such powers and duties of the Board of Directors shall include, but not be limited to, the following:
  - (a) Maintenance, repair, and replacement of the Road (Aerie Drive).
  - (b) Maintenance of the Stormwater Facilities.
  - (c) Maintenance of the entrance and landscaping to the Subdivision.
  - (d) Adoption and amendment of reasonable rules and regulations governing use of the Road.
  - (e) Opening of bank accounts on behalf of the Association and designating the signatories required therefore.
  - (f) Suspend the voting rights of any member during any period in which such member shall be in default in the payment of any assessment levied by the Association. Default shall be defined as that period commencing thirty (30) days following the date on which the assessment is due.
  - (g) To enforce covenants, conditions and restrictions stated in the Declaration of Restrictions and Covenants.
  - (h) Declare the office of a Director to be vacant in the event that such Director shall be absent from three (3) consecutive regular meetings of the Board of Directors.
  - (i) Cause to be kept a complete record of all acts of the Board of Directors and to present a statement thereof to the members at the annual meeting of members.
  - (j) To fix the amount of the annual assessment against each Lot at least thirty (30) days in advance of each annual assessment and to send notice of such assessment to every Owner thirty (30) days in advance of the date by which such assessment is due and payable.

- (k) To file a lien with the Cumberland County Registry of Deeds against the land of any Member whose assessment has not been paid within forty-five (45) days of the date such assessment is due.
7. The Association may place a lien on any Lot if the Owner of the Lot shall fail to pay dues properly assessed by the Association or for damages due to violations of the covenants and restrictions set forth in this Declaration. A lien may be placed on a Lot by recording in the Cumberland County Registry of Deeds a sworn statement by an Association officer stating the basis of the lien. A copy of such lien shall be mailed to the Owner at the address given to the Association by the Owner. The Association may charge interest on the amount of any unpaid assessment or lien claim at a rate to be set by the Association, but not to exceed eighteen percent (18%) per annum. Should any lien not be paid by the Owner within one (1) year of recording of the lien in the Registry of Deeds, the Association shall have the power to foreclose the lien in the same manner as a lien under the Maine Condominium Act using the Maine civil action foreclosure procedure for real estate mortgages.
  8. Declarant shall have all powers of the Association until the earlier of the following two events:
    - (a) When fourteen (14) of the Lots have been conveyed by Declarant or its successor to individual Owners; or
    - (b) At any point when at least eight (8) of the Lots have been sold, Declarant may, at its option, turn over management of the Property to the Association.

ARTICLE VIII  
SEVERABILITY

Each provision contained herein shall be independent and separate, and in the event, that any one or more shall for any reason be held to be invalid and unenforceable, all the remainder hereof shall, nevertheless, remain in full force and effect.

ARTICLE IX  
MISCELLANEOUS

1. Nothing in this Declaration should be deemed or construed as any warranty, covenant or promise that the Town of Gray will accept the Road or the Stormwater Facilities.
2. Notice. Any notice required to be sent under the provisions of this Declaration shall be deemed to have been properly sent, and notice thereby given, when mailed via U.S.P.S. certified mail, return receipt requested, with the property postage affixed: if to an Owner, to the address of the Owner as provided to the Association (or if none, to the address of the

Owner as maintained by the Town of Gray Assessing Department); and if to the Association, to the address of the Member then currently serving as President of the Association.

3. Successors. The provisions of this Declaration shall be binding upon all parties having or acquiring any right, title or interest in the Property or any part thereof and shall be for the benefit of each Owner and his/her heirs, successors and assigns.
4. Occupants Bound. All provisions of the Declaration and of any use restrictions and Rules and Regulations or use restrictions promulgated pursuant thereto which govern the conduct of Owners and which provide for sanctions against Owners shall also apply to all occupants of any Lot.

IN WITNESS, WHEREOF, Sebago Realty, LLC has executed this Declaration as of the date first above written.

WITNESS:

Sebago Realty, LLC

\_\_\_\_\_

By: \_\_\_\_\_  
Dustin Roma, its Member

STATE OF MAINE  
CUMBERLAND, ss.

\_\_\_\_\_, 2024

Personally, appeared before me the above-named Dustin Roma of Sebago Realty, LLC, and acknowledged the foregoing instrument to be his free act and deed in his said capacity and the free act and deed of said Sebago Realty, LLC.

\_\_\_\_\_  
Notary Public

\_\_\_\_\_  
Print Name

My Commission Expires: \_\_\_\_\_

## STORMWATER MANAGEMENT REPORT

**AERIE ESTATES SUBDIVISION  
EAGLE'S NEST ROAD  
GRAY, MAINE**

A. Narrative

Sebago Realty, LLC, the applicant, is proposing to develop a 41.3±-acre parcel off of Eagles Nest Road in Gray, Maine. The project site is identified as Lot 35-24 on Town of Gray Assessors Map 63, and the owner of record is Blackwater Development, LLC as indicated on a deed recorded in the Cumberland County Registry of Deeds Book 25394 page 303 on August 17, 2007. The 41± acre project site is currently undeveloped and consists of natural woodland. The site primarily drains southeasterly through a series of natural drainage channels that are tributary to the Piscataqua River which then flows to the Presumpscot River.

The applicant is proposing a total of 14 lots to be subdivided. The project consists of a 13-lot residential open space subdivision with Lot 14 being created as a 12-acre back lot. The development will include the construction of a new roadway approximately 1,035 ft in length that will be built to the Rural Public Easement Street standard. All lots in the subdivision will require private wells and private on-site subsurface wastewater disposal fields. All electrical and data utilities will be installed underground.

B. Alterations to Land Cover

Sebago Realty LLC will be building the roadway improvements and selling vacant lots to home builders. The proposed project will include approximately 1.8 acres of total land disturbance to build the roadway, stormwater management features and to grade the roadway side slopes. The project will create approximately 20,285± square feet of paved subdivision road, approximately 4,316± square feet of gravel shoulders for the roadway construction. While the project applicant does not intend to construct the houses as part of the project, for the purposes of this report the lots have been designed with typical residential structures and driveways; the project lot development will create approximately 26,407± square feet driveway, for a sum of 51,008± square feet of impervious area of driveway, road way and gravel shoulders. Lot development design also includes 23,888± square feet of proposed building roof area, as well as a total landscape area of 313,940± square feet.

The Town of Gray's Subdivision Ordinance indicates that the project's stormwater design will be required to meet the Basic, General and Flooding Standards of the Chapter 500 Stormwater Management rules.

The site varies in slope from moderately sloped (5-12%) with steeper slopes around the northerly perimeter of the site and adjacent to a natural drainage channel in the northeasterly portion of the site. Soils on the property were determined utilizing the Class-A High Intensity Soil Survey performed by Mark Hampton Associates. The soils boundaries and hydrologic soils group (HSG) designations are indicated on the Watershed Maps within the design plan set and the Preliminary Subdivision application package includes the Class-A High Intensity Soil Survey (also included in Attachment 1), as well as test pit data performed by Mainly Soils, LLC.

### C. Methodology and Modeling Assumptions

The proposed stormwater management system has been designed utilizing Best Management Practices to maintain existing drainage patterns. The goal of the storm drainage system design is to provide attenuation of the peak rates of runoff leaving the site. The method utilized to predict the surface water runoff rates in this analysis is a computer program entitled HydroCAD, which is based on the same methods that were originally developed by the U.S. Department of Agriculture (USDA), Natural Resources Conservation Service, and utilized in the TR-20 modeling program. Peak rates of runoff are forecasted based upon land use, hydrologic soil conditions, vegetative cover, contributing watershed area, time of concentration, rainfall data, storage volumes of detention basins and the hydraulic capacity of structures. The computer model predicts the amount of runoff as a function of time, with the ability to include the attenuation effect due to dams, lakes, large wetlands, floodplains and constructed stormwater management facilities, including basins and level spreaders. The input data for rainfalls with statistical recurrence frequencies of 2-, 10-, 25- and 50-years was obtained from the Northeast Regional Climate Center's extreme precipitation tables for the project site.

### D. Basic Standards

The project is required by the MDEP and the Town to provide permanent and temporary Erosion Control Best Management Practices. These methods are incorporated into the project design and outlined in detail in the plan set.

### E. General Standard

The project design results in a proposed creation of more than 1 acres of impervious area (0.56± acres total project impervious area) and less than 5 acres of developed area (1.24± acres of land disturbance associated with roadside ditches, stormwater ponds and grading for a total developed area of 2.14± acres) within a non-lake watershed; therefore the proposed project is required by the MDEP and the Town of Gray to meet the General Standards outlined in the MDEP Chapter 500 to provide water quality treatment. Since the project intends to develop less than 60% of the total parcel area, the project is required to provide treatment for no less than 90% of the new impervious surface and 75% of the total developed area associated with the project. This standard will be met by incorporating three grassed underdrained soil filter basins (FB-1, FB-2 and a future basin FB-3) to address the proposed project's storm water management design as well as drip edges along all fourteen (14) of the residential buildings shown for the purposes of the project. The stormwater treatment calculations indicate that the project's storm water design is estimated to provide water quality treatment for more than 90% of the new impervious surface and more than 84% of the new developed area. Calculations illustrating compliance with the treatment standards can be found in the project plans on sheet WS-2, Watershed Map: Developed Conditions and are included as Attachment 2 in this report. Calculations confirming the proposed BMPs, namely FB-1, and FB-2, have been adequately sized and designed are also included in Attachment 2.

Minimum sizing information is included for Filter Basin FB-3, which is to be constructed on Lot 14. Due to the availability of construction options on Lot 14, FB-3 is proposed to be constructed with the construction of the residence on Lot 14. In the event an alternate building envelop is developed, FB-3 will need to be constructed to the treat the new proposed driveway and landscaped areas.

F. Flooding Standard

The Town of Gray requires the project to detain, retain or result in the infiltration of stormwater from the 24-hour storms of the 2-year, 10-year and 25-year frequencies such that the peak flows of stormwater from the project site do not exceed the peak flows of stormwater prior to undertaking the project. Additionally, the Town requires that all proposed culverts be sized to adequately convey the design flows generated by a 50-year 24-hour storm event.

The project’s stormwater design incorporates three (3) filter basins to generally to maintain these peak stormwater flows to pre-developed project conditions. The proposed project design has been modeled to evaluate and analyze the stormwater runoff characteristics of the site prior to construction of the project and upon completion of all proposed construction activities.

Study Point 1 (SP-1) is located at the southeasterly corner of the project property. This study point represents a location where stormwater generated from areas both off-site and on-site drain through the site via a wetland complex before being discharged from the property at a location where series of natural drainage channels converge. Stormwater discharged at this location continues to be conveyed through the interconnected wetland complex that is onsite and is then conveyed to the south into an unnamed tributary of the Piscataqua River and ultimately into the Presumpscot River. Sub-basin watershed area for SP-1 is made up of both existing and proposed onsite development areas and offsite areas, and consists of developed land, and undeveloped woodland.

Study Point 2 (SP-2) is located along the westerly edge of a wetland associated with a natural drainage channel that exists in the northeasterly portion of the site. Stormwater discharged at this location is then conveyed to the south, and into an unnamed tributary of the Piscataqua River then ultimately into the Presumpscot River. Sub-basin watershed area for SP-2 is made up of both existing and proposed onsite development areas and offsite areas, and consists of developed land, and undeveloped woodland.

The following table summarizes the analysis:

Study Point	2-Year (cfs)		10-Year (cfs)		25-Year (cfs)	
	Pre	Post	Pre	Post	Pre	Post
SP1	17.64	13.78	34.80	33.96	48.97	48.28
SP2	10.33	7.71	20.14	20.13	28.26	27.94

As illustrated in the table above, the proposed project’s design as modeled indicates the project’s design will reduce the post-developed peak discharge at each study point in the 2-, 10- and 25-year storm events.

To ensure that stormwater culverts have been sized to be capable of safely conveying the 50-year storm from the developed condition, a 50-year storm event HydroCAD model is included with this report. The results of this portion of the model also illustrates the flows and velocities we expect to see in the road swale which will be constructed with rip rap armoring.

The HydroCAD output has been provided in Attachment 3 of this report. The watershed maps showing pre-development and post-development drainage patterns are included in the plan set.

G. Maintenance of common facilities or property

The applicant will be responsible for the maintenance of the stormwater facilities until a homeowner’s association is established. The Inspection, Maintenance and Housekeeping Plan for the project has been created and has been included in Attachment 4 of this report.

Prepared by:  
DM ROMA CONSULTING ENGINEERS



J.P. Connolly  
Senior Project Engineer

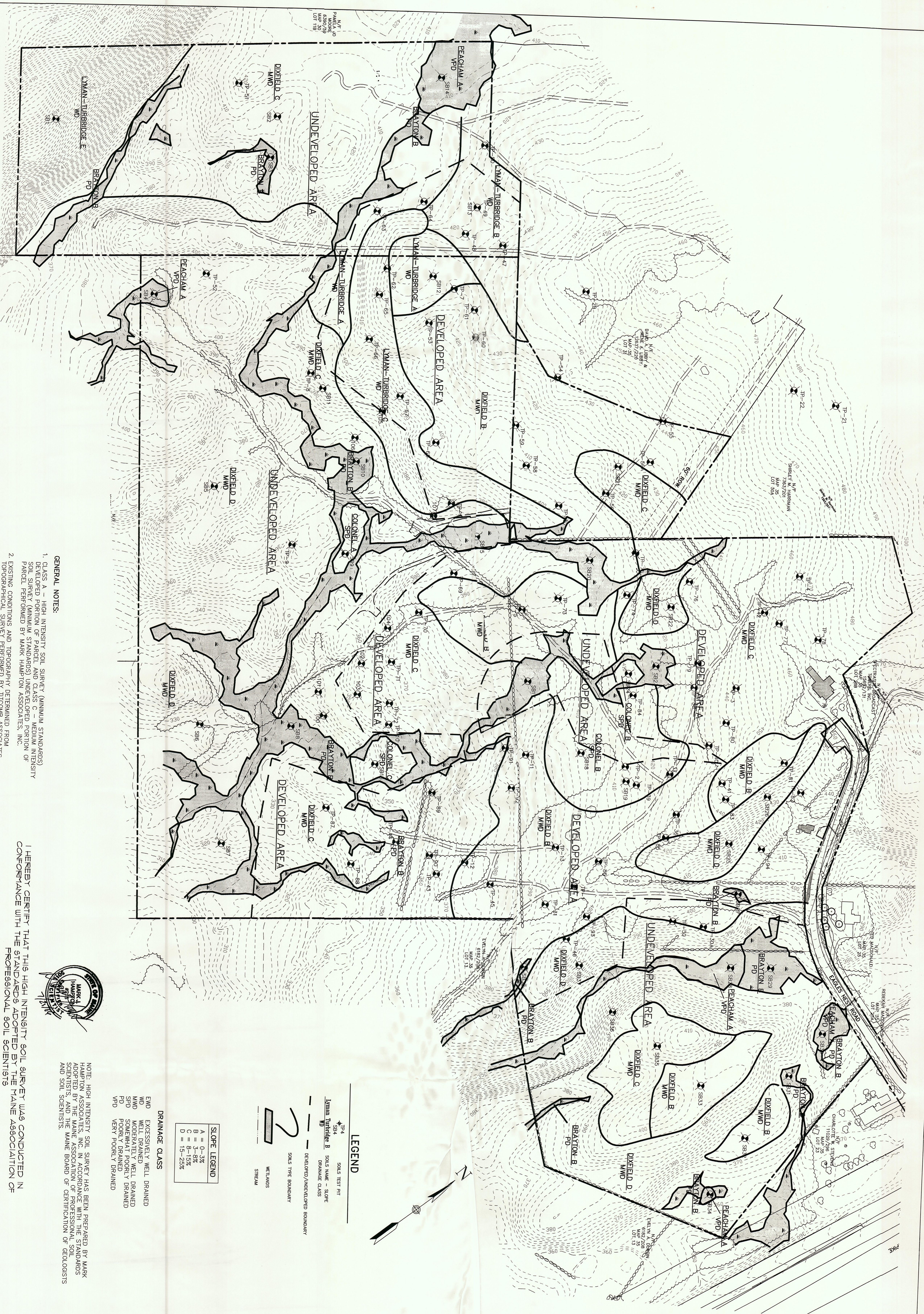
Dustin M. Roma P.E.  
President

1-16-2024

# **ATTACHMENT 1**

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## **HIGH INTENSITY SOILS MAP**



- GENERAL NOTES:**
1. CLASS A - HIGH INTENSITY SOIL SURVEY (MINIMUM STANDARDS) DEVELOPED PORTION OF PARCEL AND CLASS C - MEDIUM INTENSITY SOIL SURVEY (MINIMUM STANDARDS) UNDEVELOPED PORTION OF PARCEL PERFORMED BY MARK HAMPTON ASSOCIATES, INC.
  2. EXISTING CONDITIONS AND TOPOGRAPHY DETERMINED FROM TOPOGRAPHICAL SURVEY PERFORMED BY TITCOMB ASSOCIATES.
  3. REFERENCE THE "SOIL NARRATIVE" REPORT - EAGLE NEST SUBDIVISION - GRAY, MAINE - MARCH 2005 BY MARK HAMPTON ASSOCIATES, INC.



I HEREBY CERTIFY THAT THIS HIGH INTENSITY SOIL SURVEY WAS CONDUCTED IN CONFORMANCE WITH THE STANDARDS ADOPTED BY THE MAINE ASSOCIATION OF PROFESSIONAL SOIL SCIENTISTS

NOTE: HIGH INTENSITY SOIL SURVEY HAS BEEN PREPARED BY MARK HAMPTON ASSOCIATES, INC. IN ACCORDANCE WITH THE STANDARDS OF THE MAINE ASSOCIATION OF PROFESSIONAL SOIL SCIENTISTS AND SOIL SCIENTISTS AND SOIL SCIENTISTS.

**LEGEND**

SOILS TEST PIT

SOILS NAME - SLOPE DRAINAGE CLASS

UNDEVELOPED/DEVELOPED BOUNDARY

SOILS TEST PIT

WELLS

STREAM

**SLOPE LEGEND**

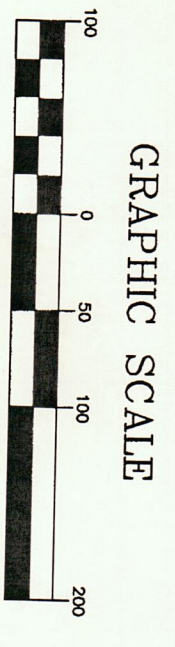
A	0-3%
B	3-8%
C	8-15%
D	15-25%

**DRAINAGE CLASS**

EWD	EXCESSIVELY WELL DRAINED
WLD	WELL DRAINED
MWD	MODERATELY WELL DRAINED
SPD	SOMEWHAT POORLY DRAINED
POD	POORLY DRAINED
VPD	VERY POORLY DRAINED

MARK J. HAMPTON, C.S.S.# 216, L.S.E.# 263

DATE



Designed	FJL	Revision	Date
Drawn	PJP	REV PER TOWN PEER REVIEW COMMENTS	2/29/08
Checked	FJL	FINAL MAJOR SUBDIVISION SUBMISSION	4/24/08
Scale	1"=100'		
Date	1-25-08		

**EAGLES RIDGE SUBDIVISION**  
EAGLE NEST ROAD, GRAY, MAINE

PREPARED FOR:  
BIKWATER DEVELOPMENT, LLC  
320 CONGRESS STREET  
ORLAND, MAINE 04102

**MEDIUM & HIGH INTENSITY SOIL SURVEY**

Job No. 1954102/1  
Drawing  
**2**

Stantec Consulting Services Inc.  
22 Free Street, Suite 205  
Portland, ME U.S.A.  
04101-3900  
Tel. 207.775.3211  
Fax. 207.775.6434

## **ATTACHMENT 2**

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# **STORMWATER TREATMENT CALCULATIONS & BMP SIZING CALCULATIONS**

**Stormwater Treatment Table**

	Total Watershed Area (SF)	New Roof Area (SF) **	New Paved/Gravel Area (SF)	New Landscaped Area (SF)	Existing/Offsite Impervious Area (SF)*	Existing/Offsite Landscaping Area (SF)*	Existing Undeveloped Area (SF)	Treatment Provided	New Impervious Area Treated (SF)	New Landscaped Area Treated (SF)	Treatment Device
WS-1	666,906	5,760	5,067	80,133	0	0	575,946	Yes	10,827	80,133	FB3 (FUTURE)
WS-11	94,000	4,764	15,546	60,491	0	0	13,199	Yes	20,310	60,491	FB2
WS-12	129,329	5,148	11,682	78,885	0	0	33,614	Yes	16,830	78,885	FB2
WS-2	53,322	369	2,196	8,261	4,715	12,716	25,065	Dripedge	369	0	Dripedge Only
WS-21	204,775	4,314	5,256	44,082	28	0	151,095	Dripedge	4,314	0	Dripedge Only
WS-22	19,535	834	4,751	13,949	0	0	0	Yes	5,585	13,949	FB1
WS-23	104,059	2,699	6,510	28,138	4,721	12,908	49,082	Yes	9,210	28,138	FB1
<b>Total</b>		<b>23,888</b>	<b>51,008</b>	<b>313,940</b>					<b>67,444</b>	<b>261,597</b>	

\* The project is not taking credit for the Existing / Offsite impervious and landscaped areas, but are included in the BMP sizing calculations for each treatment device.

\*\* All buildings shall install a roofline drip edge to provide treatment for the rooftop impervious surface.

The building's impervious area is included in the watershed and overall treatment calculations below, but not included in the BMP sizing calculations for each treatment device.

New Impervious Area =	74,896
New Impervious Area Requiring Treatment (90%)	67,407
Provided New Impervious Treatment=	67,444
	90% New Impervious Area Treated
New Developed Area =	388,837
New Developed Area Requiring Treatment (75%)=	291,628
New Developed Area Treated=	329,042
	85% New Developed Area Treated

## Underdrained Filter Basin Sizing Calculations

### Filter Basin 1

Tributary Impervious Area= 11,262 sf (WS-22 & 23 Impervious Area)  
 Tributary Landscaped Area= 42,088 sf (WS-22 & 23 Landscaped Area)

### Water Quality Volume (WQV) Calculation

---

WQV (Required) = 1"xImpervious Area + 0.4"xLandscaped Area

**WQV (Required) = 2,341 cf**

### Stage Storage Volume

Elevation	Area (sf)	Storage (cf)
395	1,992	0
396.5	2,981	3,650

Outlet Elevation = 394.00

Storage Volume Provided= 3,650 cf > Required

### Filter Bottom Calculation

---

Filter Area (Required) = 5%xImpervious Area + 2%xLandscaped Area

**Filter Area Required = 1,405 sf**

**Filter Area Provided = 1,418 sf > Required**

### Sediment Pre-treatment Sizing

---

Required Sediment Treatment Volume :

10 storms/year x sanded area (acres) x 500lbs/acre-storm / 90 lbs/cf

Tributary Pavement Requiring Sanding 11,262 sf

**Sediment Volume (Required) 14.4 cf**

**Runoff is collected in drainage swale & sediment forebay providing more than 40 cf of sediment storage.**

**23050 - POST**

Prepared by DM Roma Consulting Engineers

HydroCAD® 10.00-26 s/n 09237 © 2020 HydroCAD Software Solutions LLC

Type III 24-hr WQ-FB1 Rainfall=1.82"

Printed 1/16/2024

**Hydrograph for Pond FB1:**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	395.00	0.00	0.00	<b>0.00</b>
1.50	0.00	0	395.00	0.00	0.00	0.00
3.00	0.00	0	395.00	0.00	0.00	0.00
4.50	0.00	0	395.00	0.00	0.00	0.00
6.00	0.01	0	395.00	0.01	0.01	0.00
7.50	0.01	0	395.00	0.01	0.01	0.00
9.00	0.02	0	395.00	0.02	0.02	0.00
10.50	0.04	0	395.00	0.04	0.04	0.00
12.00	<b>0.61</b>	349	395.17	0.05	0.05	0.00
13.50	<b>0.18</b>	2,982	396.27	0.06	0.06	0.00
15.00	0.12	3,436	396.43	0.06	0.06	0.00
16.50	0.07	<b>3,616</b>	<b>396.49</b>	<b>0.06</b>	<b>0.06</b>	0.00
18.00	0.05	<b>3,633</b>	<b>396.49</b>	<b>0.06</b>	<b>0.06</b>	0.00
19.50	0.04	3,565	396.47	0.06	0.06	0.00
21.00	0.04	3,463	396.44	0.06	0.06	0.00
22.50	0.03	3,335	396.39	0.06	0.06	0.00
24.00	0.03	3,182	396.34	0.06	0.06	0.00
25.50	0.00	2,884	396.23	0.06	0.06	0.00
27.00	0.00	2,572	396.12	0.06	0.06	0.00
28.50	0.00	2,266	396.00	0.06	0.06	0.00
30.00	0.00	1,965	395.88	0.06	0.06	0.00
31.50	0.00	1,671	395.76	0.05	0.05	0.00
33.00	0.00	1,383	395.64	0.05	0.05	0.00
34.50	0.00	1,101	395.52	0.05	0.05	0.00
36.00	0.00	825	395.39	0.05	0.05	0.00
37.50	0.00	556	395.27	0.05	0.05	0.00
39.00	0.00	294	395.14	0.05	0.05	0.00
40.50	0.00	39	395.02	0.05	0.05	0.00
42.00	0.00	0	395.00	0.00	0.00	0.00
43.50	0.00	0	395.00	0.00	0.00	0.00
45.00	0.00	0	395.00	0.00	0.00	0.00
46.50	0.00	0	395.00	0.00	0.00	0.00
48.00	0.00	0	395.00	0.00	0.00	0.00
49.50	0.00	0	395.00	0.00	0.00	0.00
51.00	0.00	0	395.00	0.00	0.00	0.00
52.50	0.00	0	395.00	0.00	0.00	0.00
54.00	0.00	0	395.00	0.00	0.00	0.00
55.50	0.00	0	395.00	0.00	0.00	0.00
57.00	0.00	0	395.00	0.00	0.00	0.00
58.50	0.00	0	395.00	0.00	0.00	0.00
60.00	0.00	0	395.00	0.00	0.00	0.00
61.50	0.00	0	395.00	0.00	0.00	0.00
63.00	0.00	0	395.00	0.00	0.00	0.00
64.50	0.00	0	395.00	0.00	0.00	0.00
66.00	0.00	0	395.00	0.00	0.00	0.00
67.50	0.00	0	395.00	0.00	0.00	0.00
69.00	0.00	0	395.00	0.00	0.00	0.00
70.50	0.00	0	395.00	0.00	0.00	0.00
72.00	0.00	0	395.00	0.00	0.00	0.00



POND AT WQ VOL AT 16.5 HRS  
 EMPTY AT 42 HRS  
 DRAWDOWN TIME = 42-16.5 = 25.5 HRS

**23050 - POST**

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Type III 24-hr 25-Year Rainfall=5.77"

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**Summary for Pond FB1:**

[80] Warning: Exceeded Pond SD-2 by 1.01' @ 24.75 hrs (2.88 cfs 14,517 cf)

Inflow Area = 123,592 sf, 10.67% Impervious, Inflow Depth = 3.83"  
 Inflow = 9.67 cfs @ 12.16 hrs, Volume= 39,468 cf  
 Outflow = 8.84 cfs @ 12.22 hrs, Volume= 32,372 cf, Atte  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
 Secondary = 8.84 cfs @ 12.22 hrs, Volume= 32,372 cf

POND PEAK WS = 398.17  
 PROPOSED TOP OF BERM = 399.25  
 FREEBOARD: 399.25 - 398.17 = 1.08'  
 FREEBOARD MORE THAN REQ. 1'

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
 Peak Elev= 398.17' @ 12.22 hrs Surf.Area= 4,596 sf Storage= 9,958 cf

Plug-Flow detention time= 123.8 min calculated for 32,359 cf (82% of inflow)  
 Center-of-Mass det. time= 51.4 min ( 858.7 - 807.3 )

Volume	Invert	Avail.Storage	Storage Description			
#1	395.00'	14,068 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
395.00	1,992	178.2	0	0	1,992	
396.00	2,555	197.0	2,268	2,268	2,584	
398.00	4,456	275.5	6,923	9,191	5,573	
399.00	5,311	294.3	4,877	14,068	6,472	

Device	Routing	Invert	Outlet Devices
#1	Primary	392.20'	<b>15.0" Round 15-inch culvert X 0.00</b> L= 51.7' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 392.20' / 390.00' S= 0.0426 1/'' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	392.83'	<b>1.2" Vert. 1-1/8" DRILL HOLE</b> C= 0.600
#3	Device 2	392.83'	<b>4.0" Vert. 4" UD</b> C= 0.600
#4	Device 3	395.00'	<b>2.410 in/hr Exfiltration over Surface area</b>
#5	Device 1	396.50'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#6	Device 1	396.90'	<b>Neenah R4345 Beehive Grate Light Duty-req. structure</b> Head (feet) 0.00 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.50 0.60 0.70 0.80 0.90 1.00 Disch. (cfs) 0.000 0.900 1.600 2.500 3.500 4.000 4.600 5.300 6.800 7.500 8.100 8.600 9.100 9.600
#7	Secondary	397.50'	<b>6.0' long x 12.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

**23050 - POST**

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Type III 24-hr 25-Year Rainfall=5.77"

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**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=395.00' TW=0.00' (Dynamic Tailwater)

↑ 1=15-inch culvert ( Controls 0.00 cfs)

— 2=1-1/8" DRILL HOLE (Passes 0.00 cfs of 0.06 cfs potential flow)

↑ 3=4" UD (Passes 0.00 cfs of 0.59 cfs potential flow)

↑ 4=Exfiltration (Passes 0.00 cfs of 0.11 cfs potential flow)

— 5=Orifice/Grate ( Controls 0.00 cfs)

— 6=Neenah R4345 Beehive Grate Light Duty-req. structure( Controls 0.00 cfs)

**Secondary OutFlow** Max=8.80 cfs @ 12.22 hrs HW=398.17' TW=0.00' (Dynamic Tailwater)

↑ 7=Broad-Crested Rectangular Weir (Weir Controls 8.80 cfs @ 2.20 fps)

## Underdrained Filter Basin Sizing Calculations

### Filter Basin 2

Tributary Impervious Area= 27,227 sf (WS-11 & WS-12 Impervious Area)

Tributary Landscaped Area= 139,376 sf (WS-11 & WS-12 Landscaped Area)

### Water Quality Volume (WQV) Calculation

WQV (Required) = 1"xImpervious Area + 0.4"xLandscaped Area

**WQV (Required) = 6,915 cf**

### Stage Storage Volume

Elevation	Area (sf)	Storage (cf)
362	2,896	0
363.5	4,023	5,166

Outlet Elevation = 363.50

Storage Volume Provided= 5,166 problem

### Filter Bottom Calculation

Filter Area (Required) = 5%xImpervious Area + 2%xLandscaped Area

**Filter Area Required = 4,149 sf**

**Filter Area Provided = 4,505 sf > Required**

### Sediment Pre-treatment Sizing

Required Sediment Treatment Volume :

10 storms/year x sanded area (acres) x 500lbs/acre-storm / 90 lbs/cf

Tributary Pavement Requiring Sanding 27,227 sf

**Sediment Volume (Required) 34.7 cf**

<p><b>Runoff is collected in drainage swale providing more than 423 cf of sediment storage.</b></p>
---

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Type III 24-hr WQ-FB2 Rainfall=2.03"

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**Hydrograph for Pond FB2:**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	354.00	0.00	<b>0.00</b>	0.00
1.50	0.00	0	354.00	0.00	0.00	0.00
3.00	0.00	0	354.00	0.00	0.00	0.00
4.50	0.01	0	354.00	0.01	0.00	0.01
6.00	0.01	0	354.00	0.01	0.00	0.01
7.50	0.02	0	354.00	0.02	0.00	0.02
9.00	0.04	0	354.00	0.04	0.00	0.04
10.50	0.08	0	354.00	0.08	0.00	0.08
12.00	<b>1.12</b>	656	354.14	0.11	0.00	0.11
13.50	<b>0.41</b>	6,797	355.29	0.14	0.00	0.14
15.00	0.26	7,764	355.45	0.14	0.00	0.14
16.50	0.16	<b>8,112</b>	<b>355.50</b>	<b>0.14</b>	0.00	<b>0.14</b>
18.00	0.12	<b>8,093</b>	<b>355.50</b>	<b>0.14</b>	0.00	<b>0.14</b>
19.50	0.10	7,881	355.46	0.14	0.00	0.14
21.00	0.08	7,595	355.42	0.14	0.00	0.14
22.50	0.07	7,254	355.36	0.14	0.00	0.14
24.00	0.06	6,859	355.30	0.14	0.00	0.14
25.50	0.00	6,165	355.18	0.14	0.00	0.14
27.00	0.00	5,430	355.06	0.13	0.00	0.13
28.50	0.00	4,709	354.93	0.13	0.00	0.13
30.00	0.00	4,003	354.80	0.13	0.00	0.13
31.50	0.00	3,312	354.68	0.13	0.00	0.13
33.00	0.00	2,637	354.55	0.12	0.00	0.12
34.50	0.00	1,979	354.42	0.12	0.00	0.12
36.00	0.00	1,337	354.29	0.12	0.00	0.12
37.50	0.00	713	354.16	0.11	0.00	0.11
39.00	0.00	107	354.02	0.11	0.00	0.11
40.50	0.00	0	354.00	0.00	0.00	0.00
42.00	0.00	0	354.00	0.00	0.00	0.00
43.50	0.00	0	354.00	0.00	0.00	0.00
45.00	0.00	0	354.00	0.00	0.00	0.00
46.50	0.00	0	354.00	0.00	0.00	0.00
48.00	0.00	0	354.00	0.00	0.00	0.00
49.50	0.00	0	354.00	0.00	0.00	0.00
51.00	0.00	0	354.00	0.00	0.00	0.00
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54.00	0.00	0	354.00	0.00	0.00	0.00
55.50	0.00	0	354.00	0.00	0.00	0.00
57.00	0.00	0	354.00	0.00	0.00	0.00
58.50	0.00	0	354.00	0.00	0.00	0.00
60.00	0.00	0	354.00	0.00	0.00	0.00
61.50	0.00	0	354.00	0.00	0.00	0.00
63.00	0.00	0	354.00	0.00	0.00	0.00
64.50	0.00	0	354.00	0.00	0.00	0.00
66.00	0.00	0	354.00	0.00	0.00	0.00
67.50	0.00	0	354.00	0.00	0.00	0.00
69.00	0.00	0	354.00	0.00	0.00	0.00
70.50	0.00	0	354.00	0.00	0.00	0.00
72.00	0.00	0	354.00	0.00	0.00	0.00

POND AT WQ VOL AT 16.5 HRS  
 EMPTY AT 40.5 HRS  
 DRAWDOWN TIME = 40.5-16.5 = 24 HRS

**23050 - POST**

Prepared by DM Roma Consulting Engineers

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Type III 24-hr 25-Year Rainfall=5.77"

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**Summary for Pond FB2:**

Inflow Area = 223,329 sf, 9.79% Impervious, Inflow Depth = 3.86" for 25-Year event  
 Inflow = 16.80 cfs @ 12.20 hrs, Volume= 71,896 cf  
 Outflow = 11.86 cfs @ 12.37 hrs, Volume= 52,737 cf, Atten  
 Primary = 11.86 cfs @ 12.37 hrs, Volume= 52,737 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

POND PEAK WS = 357.82  
 PROPOSED TOP OF BERM = 359.5  
 FREEBOARD: 359.5 - 357.82 = 1.68'  
 FREEBOARD MORE THAN REQ. 1'

~~Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
 Peak Elev= 357.82' @ 12.37 hrs Surf.Area= 9,536 sf Storage= 26,487 cf~~

Plug-Flow detention time= 165.5 min calculated for 52,715 cf (73% of inflow)  
 Center-of-Mass det. time= 75.7 min ( 885.7 - 809.9 )

Volume	Invert	Avail.Storage	Storage Description			
#1	354.00'	38,766 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
354.00	4,505	403.7	0	0	4,505	
356.00	7,040	441.4	11,451	11,451	7,177	
356.50	7,710	450.8	3,686	15,137	7,881	
358.00	9,802	479.1	13,103	28,240	10,088	
359.00	11,267	497.9	10,526	38,766	11,630	

Device	Routing	Invert	Outlet Devices
#1	Primary	357.00'	<b>6.0' long x 12.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#2	Secondary	350.91'	<b>15.0" Round 15-inch culvert X 0.00</b> L= 29.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 350.91' / 349.40' S= 0.0507 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 2	351.83'	<b>1.7" Vert. 1-3/4" DRILL HOLE</b> C= 0.600
#4	Device 3	351.83'	<b>4.0" Vert. 4" UD</b> C= 0.600
#5	Device 4	354.00'	<b>2.410 in/hr Exfiltration over Surface area</b>
#6	Device 2	355.50'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#7	Device 2	356.10'	<b>Neenah R4345 Beehive Grate Light Duty-req. structure</b> Head (feet) 0.00 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.50 0.60 0.70 0.80 0.90 1.00 Disch. (cfs) 0.000 0.900 1.600 2.500 3.500 4.000 4.600 5.300 6.800 7.500 8.100 8.600 9.100 9.600

**23050 - POST**

Prepared by DM Roma Consulting Engineers

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Type III 24-hr 25-Year Rainfall=5.77"

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**Primary OutFlow** Max=11.83 cfs @ 12.37 hrs HW=357.82' TW=350.08' (Dynamic Tailwater)

↑1=**Broad-Crested Rectangular Weir** (Weir Controls 11.83 cfs @ 2.41 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=354.00' TW=349.40' (Dynamic Tailwater)

↑2=**15-inch culvert** ( Controls 0.00 cfs)

↑3=**1-3/4" DRILL HOLE** (Passes 0.00 cfs of 0.11 cfs potential flow)

↑4=**4" UD** (Passes 0.00 cfs of 0.59 cfs potential flow)

↑5=**Exfiltration** (Passes 0.00 cfs of 0.25 cfs potential flow)

↑6=**Orifice/Grate** ( Controls 0.00 cfs)

↑7=**Neenah R4345 Beehive Grate Light Duty-req. structure**( Controls 0.00 cfs)

## Underdrained Filter Basin Sizing Calculations

### **Filter Basin 3**

Tributary Impervious Area= 15,546 sf (WS-1 Impervious Area)  
Tributary Landscaped Area= 60,491 sf (WS-1 Landscaped Area)

#### Water Quality Volume (WQV) Calculation

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WQV (Required) = 1"xImpervious Area + 0.4"xLandscaped Area

**WQV (Required) = 3,312 cf**

#### Filter Bottom Calculation

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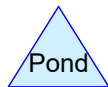
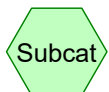
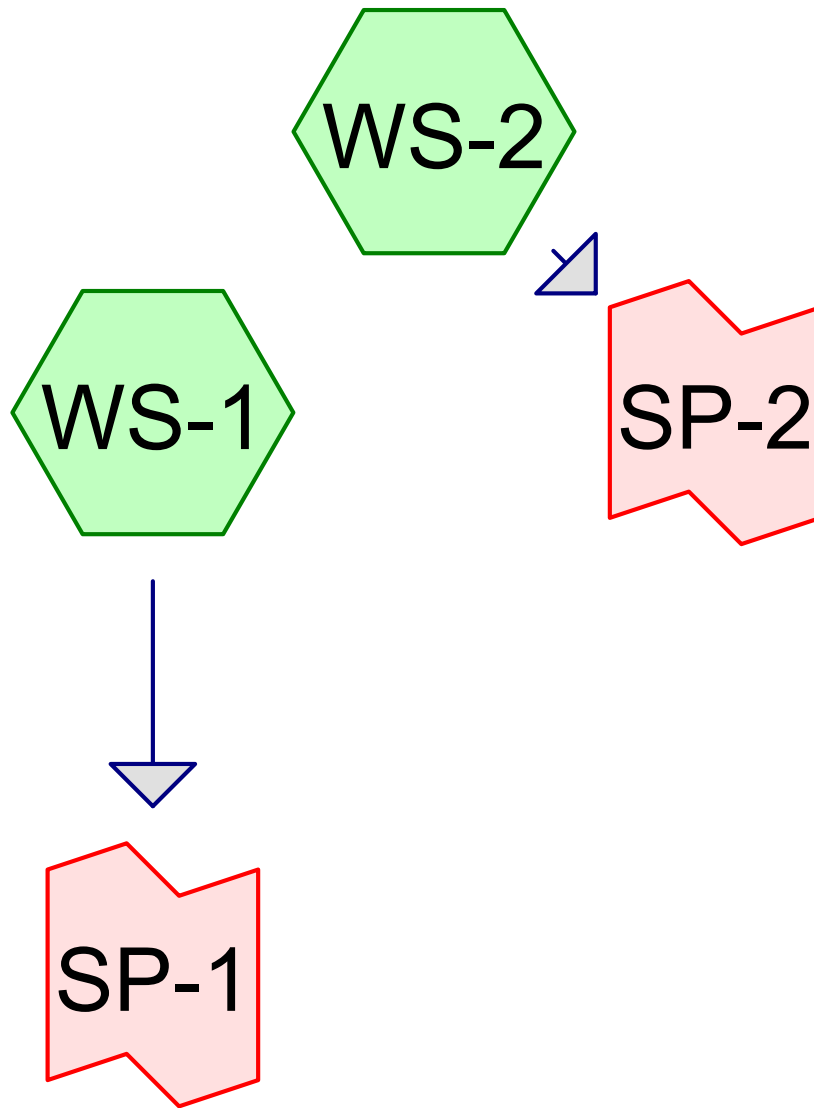
Filter Area (Required) = 5%xImpervious Area + 2%xLandscaped Area

**Filter Area Required = 1,987 sf**

## **ATTACHMENT 3**

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### **HYDROCAD CALCULATIONS**



**Routing Diagram for 23050 - PRE**  
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**23050 - PRE**

Type III 24-hr 2-Year Rainfall=3.12"

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Page 2

Time span=0.00-48.00 hrs, dt=0.03 hrs, 1601 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment WS-1:**

Runoff Area=884,471 sf 0.00% Impervious Runoff Depth=1.28"  
Flow Length=2,268' Tc=27.0 min CN=79 Runoff=17.64 cfs 94,118 cf

**Subcatchment WS-2:**

Runoff Area=387,340 sf 2.43% Impervious Runoff Depth=1.32"  
Flow Length=725' Tc=14.2 min CN=WQ Runoff=10.33 cfs 42,613 cf

**Link SP-1:**

Inflow=17.64 cfs 94,118 cf  
Primary=17.64 cfs 94,118 cf

**Link SP-2:**

Inflow=10.33 cfs 42,613 cf  
Primary=10.33 cfs 42,613 cf

**Total Runoff Area = 1,271,811 sf Runoff Volume = 136,731 cf Average Runoff Depth = 1.29"**  
**99.26% Pervious = 1,262,399 sf 0.74% Impervious = 9,412 sf**

**23050 - PRE**

Type III 24-hr 10-Year Rainfall=4.61"

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Time span=0.00-48.00 hrs, dt=0.03 hrs, 1601 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment WS-1:** Runoff Area=884,471 sf 0.00% Impervious Runoff Depth=2.47"  
Flow Length=2,268' Tc=27.0 min CN=79 Runoff=34.80 cfs 181,984 cf

**Subcatchment WS-2:** Runoff Area=387,340 sf 2.43% Impervious Runoff Depth=2.52"  
Flow Length=725' Tc=14.2 min CN=WQ Runoff=20.14 cfs 81,370 cf

**Link SP-1:** Inflow=34.80 cfs 181,984 cf  
Primary=34.80 cfs 181,984 cf

**Link SP-2:** Inflow=20.14 cfs 81,370 cf  
Primary=20.14 cfs 81,370 cf

**Total Runoff Area = 1,271,811 sf Runoff Volume = 263,354 cf Average Runoff Depth = 2.48"**  
**99.26% Pervious = 1,262,399 sf 0.74% Impervious = 9,412 sf**

**23050 - PRE**

Type III 24-hr 25-Year Rainfall=5.77"

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Time span=0.00-48.00 hrs, dt=0.03 hrs, 1601 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment WS-1:** Runoff Area=884,471 sf 0.00% Impervious Runoff Depth=3.47"  
Flow Length=2,268' Tc=27.0 min CN=79 Runoff=48.97 cfs 256,126 cf

**Subcatchment WS-2:** Runoff Area=387,340 sf 2.43% Impervious Runoff Depth=3.53"  
Flow Length=725' Tc=14.2 min CN=WQ Runoff=28.26 cfs 113,986 cf

**Link SP-1:** Inflow=48.97 cfs 256,126 cf  
Primary=48.97 cfs 256,126 cf

**Link SP-2:** Inflow=28.26 cfs 113,986 cf  
Primary=28.26 cfs 113,986 cf

**Total Runoff Area = 1,271,811 sf Runoff Volume = 370,111 cf Average Runoff Depth = 3.49"**  
**99.26% Pervious = 1,262,399 sf 0.74% Impervious = 9,412 sf**

**Summary for Subcatchment WS-1:**

Runoff = 48.97 cfs @ 12.38 hrs, Volume= 256,126 cf, Depth= 3.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs  
Type III 24-hr 25-Year Rainfall=5.77"

Area (sf)	CN	Description
884,471	79	Woods/grass comb., Good, HSG D
884,471		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	150	0.1116	0.17		<b>Sheet Flow, Seg A to B</b> Woods: Light underbrush n= 0.400 P2= 3.12"
5.8	497	0.0815	1.43		<b>Shallow Concentrated Flow, Seg B to C</b> Woodland Kv= 5.0 fps
1.6	157	0.1037	1.61		<b>Shallow Concentrated Flow, Seg C to D</b> Woodland Kv= 5.0 fps
0.9	425	0.0870	7.88	345.28	<b>Channel Flow, Seg D to E</b> Area= 43.8 sf Perim= 87.7' r= 0.50' n= 0.035 Earth, dense weeds
1.1	308	0.0325	4.82	278.06	<b>Channel Flow, Seg E to F</b> Area= 57.7 sf Perim= 115.5' r= 0.50' n= 0.035 Earth, dense weeds
1.7	390	0.0205	3.82	199.64	<b>Channel Flow, Seg F to G</b> Area= 52.2 sf Perim= 104.6' r= 0.50' n= 0.035 Earth, dense weeds
0.8	341	0.0674	6.94	239.33	<b>Channel Flow, Seg G to H</b> Area= 34.5 sf Perim= 69.1' r= 0.50' n= 0.035 Earth, dense weeds
27.0	2,268	Total			

**Summary for Subcatchment WS-2:**

Runoff = 28.26 cfs @ 12.19 hrs, Volume= 113,986 cf, Depth= 3.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs  
Type III 24-hr 25-Year Rainfall=5.77"

Area (sf)	CN	Description
353,050	79	Woods/grass comb., Good, HSG D
* 9,412	98	Paved areas
24,878	80	>75% Grass cover, Good, HSG D
387,340		Weighted Average
377,928		97.57% Pervious Area
9,412		2.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	38	0.0396	1.47		<b>Sheet Flow, Seg A to B</b> Smooth surfaces n= 0.011 P2= 3.12"
11.3	110	0.1231	0.16		<b>Sheet Flow, Seg B to C</b> Woods: Light underbrush n= 0.400 P2= 3.12"
0.5	290	0.1184	9.19	270.27	<b>Channel Flow, Seg C to D</b> Area= 29.4 sf Perim= 58.9' r= 0.50' n= 0.035 Earth, dense weeds
1.9	182	0.0991	1.57		<b>Shallow Concentrated Flow, Seg D to E</b> Woodland Kv= 5.0 fps
0.1	105	0.1522	12.15	202.89	<b>Channel Flow, Seg E to F</b> Area= 16.7 sf Perim= 33.5' r= 0.50' n= 0.030 Earth, grassed & winding
14.2	725	Total			

**Summary for Link SP-1:**

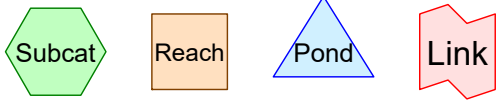
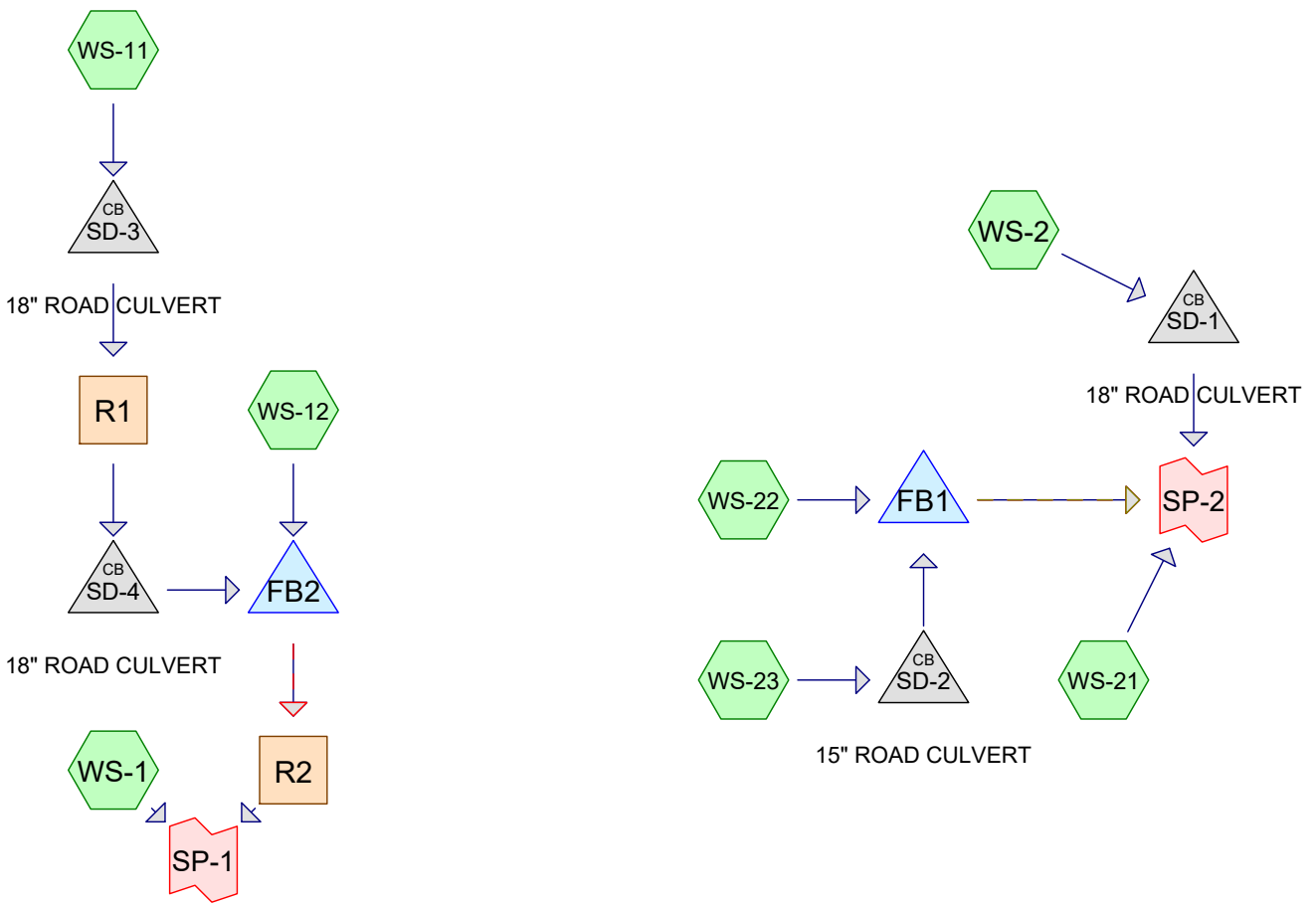
Inflow Area = 884,471 sf, 0.00% Impervious, Inflow Depth = 3.47" for 25-Year event  
 Inflow = 48.97 cfs @ 12.38 hrs, Volume= 256,126 cf  
 Primary = 48.97 cfs @ 12.38 hrs, Volume= 256,126 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs

**Summary for Link SP-2:**

Inflow Area = 387,340 sf, 2.43% Impervious, Inflow Depth = 3.53" for 25-Year event  
 Inflow = 28.26 cfs @ 12.19 hrs, Volume= 113,986 cf  
 Primary = 28.26 cfs @ 12.19 hrs, Volume= 113,986 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs



**Routing Diagram for 23050 - POST**  
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Type III 24-hr 2-Year Rainfall=3.12"

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Time span=0.00-72.00 hrs, dt=0.03 hrs, 2401 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment WS-1:** Runoff Area=666,906 sf 0.86% Impervious Runoff Depth=1.31"  
 Flow Length=2,263' Tc=27.1 min CN=WQ Runoff=13.59 cfs 72,754 cf

**Subcatchment WS-11:** Runoff Area=94,000 sf 12.06% Impervious Runoff Depth=1.65"  
 Flow Length=622' Tc=17.2 min CN=WQ Runoff=2.85 cfs 12,888 cf

**Subcatchment WS-12:** Runoff Area=129,329 sf 8.14% Impervious Runoff Depth=1.51"  
 Flow Length=596' Tc=13.4 min CN=WQ Runoff=4.01 cfs 16,326 cf

**Subcatchment WS-2:** Runoff Area=53,322 sf 13.01% Impervious Runoff Depth=1.52"  
 Flow Length=539' Tc=7.5 min CN=WQ Runoff=1.98 cfs 6,757 cf

**Subcatchment WS-21:** Runoff Area=204,775 sf 2.87% Impervious Runoff Depth=1.36"  
 Flow Length=295' Tc=12.3 min CN=WQ Runoff=5.93 cfs 23,246 cf

**Subcatchment WS-22:** Runoff Area=19,534 sf 17.46% Impervious Runoff Depth=1.76"  
 Tc=6.0 min CN=WQ Runoff=0.87 cfs 2,863 cf

**Subcatchment WS-23:** Runoff Area=104,058 sf 9.40% Impervious Runoff Depth=1.51"  
 Flow Length=726' Tc=13.0 min CN=WQ Runoff=3.24 cfs 13,086 cf

**Reach R1:** Avg. Flow Depth=0.45' Max Vel=3.02 fps Inflow=2.85 cfs 12,888 cf  
 n=0.069 L=126.3' S=0.1085 '/ Capacity=189.18 cfs Outflow=2.85 cfs 12,888 cf

**Reach R2:** Avg. Flow Depth=0.32' Max Vel=2.99 fps Inflow=1.59 cfs 29,220 cf  
 n=0.035 L=902.7' S=0.0580 '/ Capacity=196.95 cfs Outflow=1.53 cfs 29,220 cf

**Pond FB1:** Peak Elev=397.06' Storage=5,470 cf Inflow=3.85 cfs 15,949 cf  
 Primary=2.16 cfs 15,952 cf Secondary=0.00 cfs 0 cf Outflow=2.16 cfs 15,952 cf

**Pond FB2:** Peak Elev=356.23' Storage=13,070 cf Inflow=6.73 cfs 29,214 cf  
 Primary=0.00 cfs 0 cf Secondary=1.59 cfs 29,220 cf Outflow=1.59 cfs 29,220 cf

**Pond SD-1: 18" ROAD CULVERT** Peak Elev=392.80' Inflow=1.98 cfs 6,757 cf  
 15.0" Round Culvert n=0.013 L=40.4' S=0.0495 '/ Outflow=1.98 cfs 6,757 cf

**Pond SD-2: 15" ROAD CULVERT** Peak Elev=397.60' Inflow=3.24 cfs 13,086 cf  
 15.0" Round Culvert n=0.013 L=55.6' S=0.0360 '/ Outflow=3.24 cfs 13,086 cf

**Pond SD-3: 18" ROAD CULVERT** Peak Elev=379.71' Inflow=2.85 cfs 12,888 cf  
 18.0" Round Culvert n=0.013 L=46.9' S=0.0277 '/ Outflow=2.85 cfs 12,888 cf

**Pond SD-4: 18" ROAD CULVERT** Peak Elev=364.71' Inflow=2.85 cfs 12,888 cf  
 18.0" Round Culvert n=0.013 L=27.8' S=0.0108 '/ Outflow=2.85 cfs 12,888 cf

**Link SP-1:** Inflow=13.78 cfs 101,974 cf  
 Primary=13.78 cfs 101,974 cf

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*Type III 24-hr 2-Year Rainfall=3.12"*

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**Link SP-2:**

Inflow=7.71 cfs 45,954 cf  
Primary=7.71 cfs 45,954 cf

**Total Runoff Area = 1,271,924 sf   Runoff Volume = 147,919 cf   Average Runoff Depth = 1.40"**  
**95.78% Pervious = 1,218,284 sf   4.22% Impervious = 53,640 sf**

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Type III 24-hr 10-Year Rainfall=4.61"

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Time span=0.00-72.00 hrs, dt=0.03 hrs, 2401 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment WS-1:** Runoff Area=666,906 sf 0.86% Impervious Runoff Depth=2.51"  
 Flow Length=2,263' Tc=27.1 min CN=WQ Runoff=26.55 cfs 139,418 cf

**Subcatchment WS-11:** Runoff Area=94,000 sf 12.06% Impervious Runoff Depth=2.91"  
 Flow Length=622' Tc=17.2 min CN=WQ Runoff=5.11 cfs 22,830 cf

**Subcatchment WS-12:** Runoff Area=129,329 sf 8.14% Impervious Runoff Depth=2.76"  
 Flow Length=596' Tc=13.4 min CN=WQ Runoff=7.41 cfs 29,730 cf

**Subcatchment WS-2:** Runoff Area=53,322 sf 13.01% Impervious Runoff Depth=2.76"  
 Flow Length=539' Tc=7.5 min CN=WQ Runoff=3.64 cfs 12,271 cf

**Subcatchment WS-21:** Runoff Area=204,775 sf 2.87% Impervious Runoff Depth=2.57"  
 Flow Length=295' Tc=12.3 min CN=WQ Runoff=11.41 cfs 43,904 cf

**Subcatchment WS-22:** Runoff Area=19,534 sf 17.46% Impervious Runoff Depth=3.05"  
 Tc=6.0 min CN=WQ Runoff=1.52 cfs 4,965 cf

**Subcatchment WS-23:** Runoff Area=104,058 sf 9.40% Impervious Runoff Depth=2.75"  
 Flow Length=726' Tc=13.0 min CN=WQ Runoff=5.99 cfs 23,838 cf

**Reach R1:** Avg. Flow Depth=0.59' Max Vel=3.51 fps Inflow=5.11 cfs 22,830 cf  
 n=0.069 L=126.3' S=0.1085 '/' Capacity=189.18 cfs Outflow=5.11 cfs 22,830 cf

**Reach R2:** Avg. Flow Depth=0.59' Max Vel=4.49 fps Inflow=7.83 cfs 52,562 cf  
 n=0.035 L=902.7' S=0.0580 '/' Capacity=196.95 cfs Outflow=7.75 cfs 52,562 cf

**Pond FB1:** Peak Elev=397.34' Storage=6,475 cf Inflow=7.06 cfs 28,803 cf  
 Primary=6.31 cfs 28,805 cf Secondary=0.00 cfs 0 cf Outflow=6.31 cfs 28,805 cf

**Pond FB2:** Peak Elev=356.69' Storage=16,619 cf Inflow=12.28 cfs 52,560 cf  
 Primary=0.00 cfs 0 cf Secondary=7.83 cfs 52,562 cf Outflow=7.83 cfs 52,562 cf

**Pond SD-1: 18" ROAD CULVERT** Peak Elev=393.23' Inflow=3.64 cfs 12,271 cf  
 15.0" Round Culvert n=0.013 L=40.4' S=0.0495 '/' Outflow=3.64 cfs 12,271 cf

**Pond SD-2: 15" ROAD CULVERT** Peak Elev=398.93' Inflow=5.99 cfs 23,838 cf  
 15.0" Round Culvert n=0.013 L=55.6' S=0.0360 '/' Outflow=5.99 cfs 23,838 cf

**Pond SD-3: 18" ROAD CULVERT** Peak Elev=380.12' Inflow=5.11 cfs 22,830 cf  
 18.0" Round Culvert n=0.013 L=46.9' S=0.0277 '/' Outflow=5.11 cfs 22,830 cf

**Pond SD-4: 18" ROAD CULVERT** Peak Elev=365.12' Inflow=5.11 cfs 22,830 cf  
 18.0" Round Culvert n=0.013 L=27.8' S=0.0108 '/' Outflow=5.11 cfs 22,830 cf

**Link SP-1:** Inflow=33.96 cfs 191,980 cf  
 Primary=33.96 cfs 191,980 cf

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*Type III 24-hr 10-Year Rainfall=4.61"*

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**Link SP-2:**

Inflow=20.13 cfs 84,980 cf

Primary=20.13 cfs 84,980 cf

**Total Runoff Area = 1,271,924 sf   Runoff Volume = 276,956 cf   Average Runoff Depth = 2.61"**  
**95.78% Pervious = 1,218,284 sf   4.22% Impervious = 53,640 sf**

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Type III 24-hr 25-Year Rainfall=5.77"

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Time span=0.00-72.00 hrs, dt=0.03 hrs, 2401 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment WS-1:** Runoff Area=666,906 sf 0.86% Impervious Runoff Depth=3.52"  
 Flow Length=2,263' Tc=27.1 min CN=WQ Runoff=37.25 cfs 195,544 cf

**Subcatchment WS-11:** Runoff Area=94,000 sf 12.06% Impervious Runoff Depth=3.96"  
 Flow Length=622' Tc=17.2 min CN=WQ Runoff=6.94 cfs 31,029 cf

**Subcatchment WS-12:** Runoff Area=129,329 sf 8.14% Impervious Runoff Depth=3.79"  
 Flow Length=596' Tc=13.4 min CN=WQ Runoff=10.17 cfs 40,867 cf

**Subcatchment WS-2:** Runoff Area=53,322 sf 13.01% Impervious Runoff Depth=3.79"  
 Flow Length=539' Tc=7.5 min CN=WQ Runoff=5.00 cfs 16,856 cf

**Subcatchment WS-21:** Runoff Area=204,775 sf 2.87% Impervious Runoff Depth=3.59"  
 Flow Length=295' Tc=12.3 min CN=WQ Runoff=15.91 cfs 61,237 cf

**Subcatchment WS-22:** Runoff Area=19,534 sf 17.46% Impervious Runoff Depth=4.11"  
 Tc=6.0 min CN=WQ Runoff=2.05 cfs 6,687 cf

**Subcatchment WS-23:** Runoff Area=104,058 sf 9.40% Impervious Runoff Depth=3.78"  
 Flow Length=726' Tc=13.0 min CN=WQ Runoff=8.24 cfs 32,780 cf

**Reach R1:** Avg. Flow Depth=0.68' Max Vel=3.80 fps Inflow=6.94 cfs 31,029 cf  
 n=0.069 L=126.3' S=0.1085 '/ Capacity=189.18 cfs Outflow=6.93 cfs 31,029 cf

**Reach R2:** Avg. Flow Depth=0.68' Max Vel=4.93 fps Inflow=11.40 cfs 71,898 cf  
 n=0.035 L=902.7' S=0.0580 '/ Capacity=196.95 cfs Outflow=11.27 cfs 71,898 cf

**Pond FB1:** Peak Elev=397.55' Storage=7,275 cf Inflow=9.67 cfs 39,468 cf  
 Primary=8.25 cfs 39,429 cf Secondary=0.15 cfs 41 cf Outflow=8.40 cfs 39,470 cf

**Pond FB2:** Peak Elev=357.16' Storage=20,547 cf Inflow=16.80 cfs 71,896 cf  
 Primary=1.02 cfs 719 cf Secondary=10.38 cfs 71,180 cf Outflow=11.40 cfs 71,898 cf

**Pond SD-1: 18" ROAD CULVERT** Peak Elev=393.77' Inflow=5.00 cfs 16,856 cf  
 15.0" Round Culvert n=0.013 L=40.4' S=0.0495 '/ Outflow=5.00 cfs 16,856 cf

**Pond SD-2: 15" ROAD CULVERT** Peak Elev=400.57' Inflow=8.24 cfs 32,780 cf  
 15.0" Round Culvert n=0.013 L=55.6' S=0.0360 '/ Outflow=8.24 cfs 32,780 cf

**Pond SD-3: 18" ROAD CULVERT** Peak Elev=380.62' Inflow=6.94 cfs 31,029 cf  
 18.0" Round Culvert n=0.013 L=46.9' S=0.0277 '/ Outflow=6.94 cfs 31,029 cf

**Pond SD-4: 18" ROAD CULVERT** Peak Elev=365.62' Inflow=6.93 cfs 31,029 cf  
 18.0" Round Culvert n=0.013 L=27.8' S=0.0108 '/ Outflow=6.93 cfs 31,029 cf

**Link SP-1:** Inflow=48.28 cfs 267,443 cf  
 Primary=48.28 cfs 267,443 cf

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*Type III 24-hr 25-Year Rainfall=5.77"*

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**Link SP-2:**

Inflow=27.94 cfs 117,563 cf

Primary=27.94 cfs 117,563 cf

**Total Runoff Area = 1,271,924 sf   Runoff Volume = 385,001 cf   Average Runoff Depth = 3.63"**  
**95.78% Pervious = 1,218,284 sf   4.22% Impervious = 53,640 sf**

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Type III 24-hr 25-Year Rainfall=5.77"

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**Summary for Subcatchment WS-1:**

Runoff = 37.25 cfs @ 12.37 hrs, Volume= 195,544 cf, Depth= 3.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
Type III 24-hr 25-Year Rainfall=5.77"

Area (sf)	CN	Description
575,946	79	Woods/grass comb., Good, HSG D
80,133	80	>75% Grass cover, Good, HSG D
* 5,760	98	Prop. roofs
* 5,067	96	Gravel driveway
666,906		Weighted Average
661,146		99.14% Pervious Area
5,760		0.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	150	0.1116	0.17		<b>Sheet Flow, Seg A to B</b> Woods: Light underbrush n= 0.400 P2= 3.12"
5.8	497	0.0815	1.43		<b>Shallow Concentrated Flow, Seg B to C</b> Woodland Kv= 5.0 fps
0.4	97	0.0670	4.17		<b>Shallow Concentrated Flow, Seg C to D</b> Unpaved Kv= 16.1 fps
1.4	145	0.1174	1.71		<b>Shallow Concentrated Flow, Seg D to E</b> Woodland Kv= 5.0 fps
0.4	157	0.0765	7.18	248.36	<b>Channel Flow, Seg E to F</b> Area= 34.6 sf Perim= 72.4' r= 0.48' n= 0.035 Earth, dense weeds
0.4	178	0.0898	7.78	261.58	<b>Channel Flow, Seg F to G</b> Area= 33.6 sf Perim= 70.2' r= 0.48' n= 0.035 Earth, dense weeds
1.1	308	0.0325	4.82	278.06	<b>Channel Flow, Seg G to H</b> Area= 57.7 sf Perim= 115.5' r= 0.50' n= 0.035 Earth, dense weeds
1.7	390	0.0205	3.82	199.64	<b>Channel Flow, Seg H to I</b> Area= 52.2 sf Perim= 104.6' r= 0.50' n= 0.035 Earth, dense weeds
0.8	341	0.0674	6.94	239.33	<b>Channel Flow, Seg O to P</b> Area= 34.5 sf Perim= 69.1' r= 0.50' n= 0.035 Earth, dense weeds
27.1	2,263	Total			

**Summary for Subcatchment WS-11:**

Runoff = 6.94 cfs @ 12.23 hrs, Volume= 31,029 cf, Depth= 3.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
Type III 24-hr 25-Year Rainfall=5.77"

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Type III 24-hr 25-Year Rainfall=5.77"

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Area (sf)	CN	Description
13,199	79	Woods/grass comb., Good, HSG D
60,491	80	>75% Grass cover, Good, HSG D
* 8,969	96	Gravel road shoulder & driveway
* 6,577	98	Paved road
* 4,764	98	Prop. roofs
94,000		Weighted Average
82,659		87.94% Pervious Area
11,341		12.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	70	0.0994	0.08		<b>Sheet Flow, Seg A to B</b> Woods: Dense underbrush n= 0.800 P2= 3.12"
0.9	12	0.2893	0.22		<b>Sheet Flow, Seg B to C</b> Grass: Dense n= 0.240 P2= 3.12"
0.2	81	0.1234	5.66		<b>Shallow Concentrated Flow, Seg C to D</b> Unpaved Kv= 16.1 fps
1.1	459	0.0755	6.87	124.48	<b>Trap/Vee/Rect Channel Flow, Seg D to E</b> Bot.W=1.00' D=2.50' Z= 2.0 & 3.0 ' Top.W=13.50' n= 0.069 Riprap, 6-inch
17.2	622	Total			

**Summary for Subcatchment WS-12:**

Runoff = 10.17 cfs @ 12.18 hrs, Volume= 40,867 cf, Depth= 3.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
Type III 24-hr 25-Year Rainfall=5.77"

Area (sf)	CN	Description
33,614	79	Woods/grass comb., Good, HSG D
* 0	98	Exist. Paved areas
* 0	80	Exist, >75% Grass cover, Good, HSG D
* 6,300	96	Gravel road shoulder & driveway
* 5,382	98	Paved road
78,885	80	>75% Grass cover, Good, HSG D
5,148	98	Unconnected roofs, HSG A
129,329		Weighted Average
118,799		91.86% Pervious Area
10,530		8.14% Impervious Area
5,148		48.89% Unconnected

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Type III 24-hr 25-Year Rainfall=5.77"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	150	0.0657	0.20		<b>Sheet Flow, Seg A to B</b> Grass: Dense n= 0.240 P2= 3.12"
0.0	13	0.0463	4.37		<b>Shallow Concentrated Flow, Seg B to C</b> Paved Kv= 20.3 fps
1.0	433	0.0811	7.55	163.57	<b>Trap/Vee/Rect Channel Flow, Seg C to D</b> Bot.W=1.00' D=2.75' Z= 3.0 & 2.0 ' Top.W=14.75' n= 0.069 Riprap, 6-inch
13.4	596	Total			

**Summary for Subcatchment WS-2:**

Runoff = 5.00 cfs @ 12.11 hrs, Volume= 16,856 cf, Depth= 3.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
Type III 24-hr 25-Year Rainfall=5.77"

Area (sf)	CN	Description
25,065	79	Woods/grass comb., Good, HSG D
* 3,927	98	Exist. Paved areas
* 788	98	Exist. Roofs
* 12,716	80	Exist, >75% Grass cover, Good, HSG D
* 342	96	Gravel road shoulder & driveways
* 1,854	98	Paved road
8,261	80	>75% Grass cover, Good, HSG D
* 369	98	Prop. roofs
53,322		Weighted Average
46,384		86.99% Pervious Area
6,938		13.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	150	0.1320	0.39		<b>Sheet Flow, Seg A to B</b> Grass: Short n= 0.150 P2= 3.12"
0.8	265	0.1270	5.74		<b>Shallow Concentrated Flow, Seg B to C</b> Unpaved Kv= 16.1 fps
0.1	65	0.1490	13.73	61.77	<b>Trap/Vee/Rect Channel Flow, Seg C to D</b> Bot.W=2.00' D=1.00' Z= 2.0 & 3.0 ' Top.W=7.00' n= 0.030 Earth, grassed & winding
0.1	59	0.0673	15.55	320.69	<b>Trap/Vee/Rect Channel Flow, Seg D to E</b> Bot.W=2.00' D=2.50' Z= 2.0 & 3.0 ' Top.W=14.50' n= 0.030 Earth, grassed & winding
7.5	539	Total			

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Type III 24-hr 25-Year Rainfall=5.77"

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**Summary for Subcatchment WS-21:**

Runoff = 15.91 cfs @ 12.17 hrs, Volume= 61,237 cf, Depth= 3.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
Type III 24-hr 25-Year Rainfall=5.77"

Area (sf)	CN	Description
151,095	79	Woods/grass comb., Good, HSG D
* 28	98	Exist. Paved areas
* 0	80	Exist, >75% Grass cover, Good, HSG D
* 3,715	96	Gravel road shoulder & driveway
* 1,541	98	Paved road
44,082	80	>75% Grass cover, Good, HSG D
* 4,314	98	Prop. roofs
204,775		Weighted Average
198,892		97.13% Pervious Area
5,883		2.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	150	0.0800	0.22		<b>Sheet Flow, Seg A to B</b> Grass: Dense n= 0.240 P2= 3.12"
0.1	57	0.1754	6.74		<b>Shallow Concentrated Flow, Seg B to C</b> Unpaved Kv= 16.1 fps
0.7	88	0.1587	1.99		<b>Shallow Concentrated Flow, Seg C to D</b> Woodland Kv= 5.0 fps
12.3	295	Total			

**Summary for Subcatchment WS-22:**

Runoff = 2.05 cfs @ 12.09 hrs, Volume= 6,687 cf, Depth= 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
Type III 24-hr 25-Year Rainfall=5.77"

Area (sf)	CN	Description
0	79	Woods/grass comb., Good, HSG D
* 2,174	96	Gravel road shoulder & driveways
* 2,577	98	Paved road
13,949	80	>75% Grass cover, Good, HSG D
* 834	98	Prop. roofs
19,534		Weighted Average
16,123		82.54% Pervious Area
3,411		17.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Tc &lt;6.0 min</b>

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Type III 24-hr 25-Year Rainfall=5.77"

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**Summary for Subcatchment WS-23:**

Runoff = 8.24 cfs @ 12.18 hrs, Volume= 32,780 cf, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
Type III 24-hr 25-Year Rainfall=5.77"

Area (sf)	CN	Description
49,082	79	Woods/grass comb., Good, HSG D
* 4,721	98	Exist. Paved areas
* 0	98	Exist. Roofs
* 12,908	80	Exist, >75% Grass cover, Good, HSG D
* 4,153	96	Gravel road shoulder & driveways
* 2,357	98	Paved road
28,138	80	>75% Grass cover, Good, HSG D
* 2,699	98	Prop. roofs
104,058		Weighted Average
94,281		90.60% Pervious Area
9,777		9.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	38	0.0396	1.47		<b>Sheet Flow, Seg A to B</b> Smooth surfaces n= 0.011 P2= 3.12"
11.3	110	0.1231	0.16		<b>Sheet Flow, Seg B to C</b> Woods: Light underbrush n= 0.400 P2= 3.12"
0.4	214	0.1088	8.65	254.21	<b>Channel Flow, Seg C to D</b> Area= 29.4 sf Perim= 60.6' r= 0.49' n= 0.035 Earth, dense weeds
0.5	140	0.0982	5.05		<b>Shallow Concentrated Flow, Seg D to E</b> Unpaved Kv= 16.1 fps
0.2	64	0.1254	5.70		<b>Shallow Concentrated Flow, Seg E to F</b> Unpaved Kv= 16.1 fps
0.2	160	0.0623	14.35	260.08	<b>Trap/Vee/Rect Channel Flow, Seg F to G</b> Bot.W=1.00' D=2.50' Z= 2.0 & 3.0 ' Top.W=13.50' n= 0.030 Earth, grassed & winding
13.0	726	Total			

**Summary for Reach R1:**

Inflow Area = 94,000 sf, 12.06% Impervious, Inflow Depth = 3.96" for 25-Year event  
Inflow = 6.94 cfs @ 12.23 hrs, Volume= 31,029 cf  
Outflow = 6.93 cfs @ 12.24 hrs, Volume= 31,029 cf, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
Max. Velocity= 3.80 fps, Min. Travel Time= 0.6 min  
Avg. Velocity= 1.32 fps, Avg. Travel Time= 1.6 min

Peak Storage= 231 cf @ 12.24 hrs  
Average Depth at Peak Storage= 0.68'  
Bank-Full Depth= 2.75' Flow Area= 21.7 sf, Capacity= 189.18 cfs

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Type III 24-hr 25-Year Rainfall=5.77"

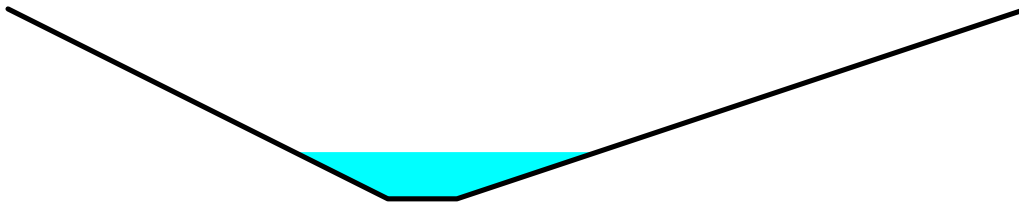
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1.00' x 2.75' deep channel, n= 0.069 Riprap, 6-inch  
 Side Slope Z-value= 2.0 3.0 '/' Top Width= 14.75'  
 Length= 126.3' Slope= 0.1085 '/'  
 Inlet Invert= 377.50', Outlet Invert= 363.80'



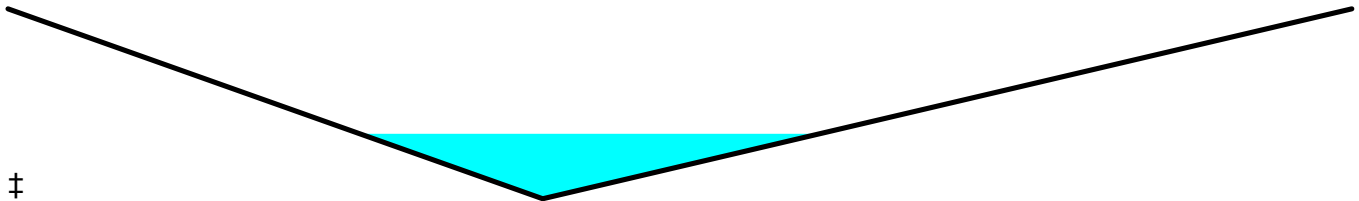
**Summary for Reach R2:**

Inflow Area = 223,329 sf, 9.79% Impervious, Inflow Depth = 3.86" for 25-Year event  
 Inflow = 11.40 cfs @ 12.39 hrs, Volume= 71,898 cf  
 Outflow = 11.27 cfs @ 12.43 hrs, Volume= 71,898 cf, Atten= 1%, Lag= 2.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
 Max. Velocity= 4.93 fps, Min. Travel Time= 3.1 min  
 Avg. Velocity = 1.75 fps, Avg. Travel Time= 8.6 min

Peak Storage= 2,062 cf @ 12.43 hrs  
 Average Depth at Peak Storage= 0.68'  
 Bank-Full Depth= 2.00' Flow Area= 19.5 sf, Capacity= 196.95 cfs

Custom cross-section, Length= 902.7' Slope= 0.0580 '/'  
 Constant n= 0.035 Earth, dense weeds  
 Inlet Invert= 349.40', Outlet Invert= 297.00'



‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)		
0.00	346.00	0.00		
7.77	344.00	2.00		
19.53	346.00	0.00		

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0	0.00
2.00	19.5	20.0	17,630	196.95

**Summary for Pond FB1:**

Inflow Area = 123,592 sf, 10.67% Impervious, Inflow Depth = 3.83" for 25-Year event  
 Inflow = 9.67 cfs @ 12.16 hrs, Volume= 39,468 cf  
 Outflow = 8.40 cfs @ 12.24 hrs, Volume= 39,470 cf, Atten= 13%, Lag= 5.1 min  
 Primary = 8.25 cfs @ 12.24 hrs, Volume= 39,429 cf  
 Secondary = 0.15 cfs @ 12.24 hrs, Volume= 41 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
 Peak Elev= 397.55' @ 12.24 hrs Surf.Area= 3,978 sf Storage= 7,275 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 151.4 min ( 958.6 - 807.3 )

Volume	Invert	Avail.Storage	Storage Description		
#1	395.00'	14,068 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
395.00	1,992	178.2	0	0	1,992
396.00	2,555	197.0	2,268	2,268	2,584
398.00	4,456	275.5	6,923	9,191	5,573
399.00	5,311	294.3	4,877	14,068	6,472

Device	Routing	Invert	Outlet Devices
#1	Primary	392.20'	<b>15.0" Round 15-inch culvert</b> L= 51.7' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 392.20' / 390.00' S= 0.0426 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	392.83'	<b>1.2" Vert. 1-1/8" DRILL HOLE</b> C= 0.600
#3	Device 2	392.83'	<b>4.0" Vert. 4" UD</b> C= 0.600
#4	Device 3	395.00'	<b>2.410 in/hr Exfiltration over Surface area</b>
#5	Device 1	396.50'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#6	Device 1	396.90'	<b>Neenah R4345 Beehive Grate Light Duty-req. structure</b> Head (feet) 0.00 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.50 0.60 0.70 0.80 0.90 1.00 Disch. (cfs) 0.000 0.900 1.600 2.500 3.500 4.000 4.600 5.300 6.800 7.500 8.100 8.600 9.100 9.600
#7	Secondary	397.50'	<b>6.0' long x 12.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

**Primary OutFlow** Max=8.24 cfs @ 12.24 hrs HW=397.54' TW=0.00' (Dynamic Tailwater)

- ↑ 1=15-inch culvert (Passes 8.24 cfs of 12.84 cfs potential flow)
- ↑ 2=1-1/8" DRILL HOLE (Orifice Controls 0.08 cfs @ 10.40 fps)
- ↑ 3=4" UD (Passes 0.08 cfs of 0.90 cfs potential flow)
- ↑ 4=Exfiltration (Passes 0.08 cfs of 0.22 cfs potential flow)
- ↑ 5=Orifice/Grate (Orifice Controls 0.39 cfs @ 4.51 fps)
- ↑ 6=Neenah R4345 Beehive Grate Light Duty-req. structure (Custom Controls 7.77 cfs)

**Secondary OutFlow** Max=0.14 cfs @ 12.24 hrs HW=397.54' TW=0.00' (Dynamic Tailwater)

- ↑ 7=Broad-Crested Rectangular Weir (Weir Controls 0.14 cfs @ 0.54 fps)

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**Summary for Pond FB2:**

Inflow Area = 223,329 sf, 9.79% Impervious, Inflow Depth = 3.86" for 25-Year event  
 Inflow = 16.80 cfs @ 12.20 hrs, Volume= 71,896 cf  
 Outflow = 11.40 cfs @ 12.39 hrs, Volume= 71,898 cf, Atten= 32%, Lag= 11.3 min  
 Primary = 1.02 cfs @ 12.39 hrs, Volume= 719 cf  
 Secondary = 10.38 cfs @ 12.39 hrs, Volume= 71,180 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
 Peak Elev= 357.16' @ 12.39 hrs Surf.Area= 8,604 sf Storage= 20,547 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 234.0 min ( 1,043.9 - 809.9 )

Volume	Invert	Avail.Storage	Storage Description			
#1	354.00'	38,766 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
354.00	4,505	403.7	0	0	4,505	
356.00	7,040	441.4	11,451	11,451	7,177	
356.50	7,710	450.8	3,686	15,137	7,881	
358.00	9,802	479.1	13,103	28,240	10,088	
359.00	11,267	497.9	10,526	38,766	11,630	

Device	Routing	Invert	Outlet Devices
#1	Primary	357.00'	<b>6.0' long x 12.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#2	Secondary	350.91'	<b>15.0" Round 15-inch culvert</b> L= 29.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 350.91' / 349.40' S= 0.0507 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 2	351.83'	<b>1.7" Vert. 1-3/4" DRILL HOLE</b> C= 0.600
#4	Device 3	351.83'	<b>4.0" Vert. 4" UD</b> C= 0.600
#5	Device 4	354.00'	<b>2.410 in/hr Exfiltration over Surface area</b>
#6	Device 2	355.50'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#7	Device 2	356.10'	<b>Neenah R4345 Beehive Grate Light Duty-req. structure</b> Head (feet) 0.00 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.50 0.60 0.70 0.80 0.90 1.00 Disch. (cfs) 0.000 0.900 1.600 2.500 3.500 4.000 4.600 5.300 6.800 7.500 8.100 8.600 9.100 9.600

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**Primary OutFlow** Max=1.02 cfs @ 12.39 hrs HW=357.16' TW=350.08' (Dynamic Tailwater)

↑1=**Broad-Crested Rectangular Weir** (Weir Controls 1.02 cfs @ 1.04 fps)

**Secondary OutFlow** Max=10.38 cfs @ 12.39 hrs HW=357.16' TW=350.08' (Dynamic Tailwater)

↑2=**15-inch culvert** (Passes 10.38 cfs of 14.02 cfs potential flow)

↑3=**1-3/4" DRILL HOLE** (Orifice Controls 0.17 cfs @ 11.05 fps)

↑4=**4" UD** (Passes 0.17 cfs of 0.96 cfs potential flow)

↑5=**Exfiltration** (Passes 0.17 cfs of 0.48 cfs potential flow)

↑6=**Orifice/Grate** (Orifice Controls 0.29 cfs @ 5.97 fps)

↑7=**Neenah R4345 Beehive Grate Light Duty-req. structure**(Custom Controls 9.92 cfs)

**Summary for Pond SD-1: 18" ROAD CULVERT**

Inflow Area = 53,322 sf, 13.01% Impervious, Inflow Depth = 3.79" for 25-Year event  
 Inflow = 5.00 cfs @ 12.11 hrs, Volume= 16,856 cf  
 Outflow = 5.00 cfs @ 12.11 hrs, Volume= 16,856 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 5.00 cfs @ 12.11 hrs, Volume= 16,856 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
Peak Elev= 393.77' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	392.00'	<b>15.0" Round 18-INCH CULVERT</b> L= 40.4' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 392.00' / 390.00' S= 0.0495 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

**Primary OutFlow** Max=4.94 cfs @ 12.11 hrs HW=393.75' TW=0.00' (Dynamic Tailwater)

↑1=**18-INCH CULVERT** (Inlet Controls 4.94 cfs @ 4.02 fps)

**Summary for Pond SD-2: 15" ROAD CULVERT**

Inflow Area = 104,058 sf, 9.40% Impervious, Inflow Depth = 3.78" for 25-Year event  
 Inflow = 8.24 cfs @ 12.18 hrs, Volume= 32,780 cf  
 Outflow = 8.24 cfs @ 12.18 hrs, Volume= 32,780 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 8.24 cfs @ 12.18 hrs, Volume= 32,780 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
Peak Elev= 400.57' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	396.50'	<b>15.0" Round 15-INCH CULVERT</b> L= 55.6' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 396.50' / 394.50' S= 0.0360 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

**Primary OutFlow** Max=8.16 cfs @ 12.18 hrs HW=400.55' TW=397.50' (Dynamic Tailwater)

↑1=**15-INCH CULVERT** (Inlet Controls 8.16 cfs @ 6.65 fps)

**Summary for Pond SD-3: 18" ROAD CULVERT**

Inflow Area = 94,000 sf, 12.06% Impervious, Inflow Depth = 3.96" for 25-Year event  
 Inflow = 6.94 cfs @ 12.23 hrs, Volume= 31,029 cf  
 Outflow = 6.94 cfs @ 12.23 hrs, Volume= 31,029 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 6.94 cfs @ 12.23 hrs, Volume= 31,029 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
 Peak Elev= 380.62' @ 12.23 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	378.80'	<b>18.0" Round 18-INCH CULVERT</b> L= 46.9' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 378.80' / 377.50' S= 0.0277 ' S= 0.0277 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

**Primary OutFlow** Max=6.92 cfs @ 12.23 hrs HW=380.61' TW=378.18' (Dynamic Tailwater)  
 ↑1=18-INCH CULVERT (Inlet Controls 6.92 cfs @ 3.91 fps)

**Summary for Pond SD-4: 18" ROAD CULVERT**

Inflow Area = 94,000 sf, 12.06% Impervious, Inflow Depth = 3.96" for 25-Year event  
 Inflow = 6.93 cfs @ 12.24 hrs, Volume= 31,029 cf  
 Outflow = 6.93 cfs @ 12.24 hrs, Volume= 31,029 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 6.93 cfs @ 12.24 hrs, Volume= 31,029 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
 Peak Elev= 365.62' @ 12.24 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	363.80'	<b>18.0" Round 18-INCH CULVERT</b> L= 27.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 363.80' / 363.50' S= 0.0108 ' S= 0.0108 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

**Primary OutFlow** Max=6.93 cfs @ 12.24 hrs HW=365.61' TW=356.96' (Dynamic Tailwater)  
 ↑1=18-INCH CULVERT (Inlet Controls 6.93 cfs @ 3.92 fps)

**Summary for Link SP-1:**

Inflow Area = 890,235 sf, 3.10% Impervious, Inflow Depth = 3.61" for 25-Year event  
 Inflow = 48.28 cfs @ 12.39 hrs, Volume= 267,443 cf  
 Primary = 48.28 cfs @ 12.39 hrs, Volume= 267,443 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs

**Summary for Link SP-2:**

Inflow Area = 381,689 sf, 6.81% Impervious, Inflow Depth = 3.70" for 25-Year event  
Inflow = 27.94 cfs @ 12.16 hrs, Volume= 117,563 cf  
Primary = 27.94 cfs @ 12.16 hrs, Volume= 117,563 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs

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Time span=0.00-72.00 hrs, dt=0.03 hrs, 2401 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment WS-1:** Runoff Area=666,906 sf 0.86% Impervious Runoff Depth=4.48"  
 Flow Length=2,263' Tc=27.1 min CN=WQ Runoff=47.32 cfs 249,232 cf

**Subcatchment WS-11:** Runoff Area=94,000 sf 12.06% Impervious Runoff Depth=4.95"  
 Flow Length=622' Tc=17.2 min CN=WQ Runoff=8.65 cfs 38,798 cf

**Subcatchment WS-12:** Runoff Area=129,329 sf 8.14% Impervious Runoff Depth=4.77"  
 Flow Length=596' Tc=13.4 min CN=WQ Runoff=12.76 cfs 51,457 cf

**Subcatchment WS-2:** Runoff Area=53,322 sf 13.01% Impervious Runoff Depth=4.77"  
 Flow Length=539' Tc=7.5 min CN=WQ Runoff=6.27 cfs 21,217 cf

**Subcatchment WS-21:** Runoff Area=204,775 sf 2.87% Impervious Runoff Depth=4.56"  
 Flow Length=295' Tc=12.3 min CN=WQ Runoff=20.14 cfs 77,792 cf

**Subcatchment WS-22:** Runoff Area=19,534 sf 17.46% Impervious Runoff Depth=5.11"  
 Tc=6.0 min CN=WQ Runoff=2.53 cfs 8,315 cf

**Subcatchment WS-23:** Runoff Area=104,058 sf 9.40% Impervious Runoff Depth=4.76"  
 Flow Length=726' Tc=13.0 min CN=WQ Runoff=10.34 cfs 41,287 cf

**Reach R1:** Avg. Flow Depth=0.75' Max Vel=4.02 fps Inflow=8.65 cfs 38,798 cf  
 n=0.069 L=126.3' S=0.1085 '/ Capacity=189.18 cfs Outflow=8.64 cfs 38,798 cf

**Reach R2:** Avg. Flow Depth=0.78' Max Vel=5.37 fps Inflow=16.05 cfs 90,260 cf  
 n=0.035 L=902.7' S=0.0580 '/ Capacity=196.95 cfs Outflow=15.79 cfs 90,260 cf

**Pond FB1:** Peak Elev=397.72' Storage=7,973 cf Inflow=12.12 cfs 49,602 cf  
 Primary=9.20 cfs 48,663 cf Secondary=1.56 cfs 940 cf Outflow=10.76 cfs 49,604 cf

**Pond FB2:** Peak Elev=357.42' Storage=22,828 cf Inflow=21.02 cfs 90,255 cf  
 Primary=4.34 cfs 4,487 cf Secondary=11.71 cfs 85,773 cf Outflow=16.05 cfs 90,260 cf

**Pond SD-1: 18" ROAD CULVERT** Peak Elev=394.43' Inflow=6.27 cfs 21,217 cf  
 15.0" Round Culvert n=0.013 L=40.4' S=0.0495 '/ Outflow=6.27 cfs 21,217 cf

**Pond SD-2: 15" ROAD CULVERT** Peak Elev=402.53' Inflow=10.34 cfs 41,287 cf  
 15.0" Round Culvert n=0.013 L=55.6' S=0.0360 '/ Outflow=10.34 cfs 41,287 cf

**Pond SD-3: 18" ROAD CULVERT** Peak Elev=381.21' Inflow=8.65 cfs 38,798 cf  
 18.0" Round Culvert n=0.013 L=46.9' S=0.0277 '/ Outflow=8.65 cfs 38,798 cf

**Pond SD-4: 18" ROAD CULVERT** Peak Elev=366.21' Inflow=8.64 cfs 38,798 cf  
 18.0" Round Culvert n=0.013 L=27.8' S=0.0108 '/ Outflow=8.64 cfs 38,798 cf

**Link SP-1:** Inflow=63.10 cfs 339,493 cf  
 Primary=63.10 cfs 339,493 cf

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*Type III 24-hr 50-Year Rainfall=6.84"*

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**Link SP-2:**

Inflow=35.09 cfs 148,613 cf  
Primary=35.09 cfs 148,613 cf

**Total Runoff Area = 1,271,924 sf   Runoff Volume = 488,098 cf   Average Runoff Depth = 4.60"**  
**95.78% Pervious = 1,218,284 sf   4.22% Impervious = 53,640 sf**

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**Summary for Subcatchment WS-1:**

Runoff = 47.32 cfs @ 12.37 hrs, Volume= 249,232 cf, Depth= 4.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
Type III 24-hr 50-Year Rainfall=6.84"

Area (sf)	CN	Description
575,946	79	Woods/grass comb., Good, HSG D
80,133	80	>75% Grass cover, Good, HSG D
* 5,760	98	Prop. roofs
* 5,067	96	Gravel driveway
666,906		Weighted Average
661,146		99.14% Pervious Area
5,760		0.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	150	0.1116	0.17		<b>Sheet Flow, Seg A to B</b> Woods: Light underbrush n= 0.400 P2= 3.12"
5.8	497	0.0815	1.43		<b>Shallow Concentrated Flow, Seg B to C</b> Woodland Kv= 5.0 fps
0.4	97	0.0670	4.17		<b>Shallow Concentrated Flow, Seg C to D</b> Unpaved Kv= 16.1 fps
1.4	145	0.1174	1.71		<b>Shallow Concentrated Flow, Seg D to E</b> Woodland Kv= 5.0 fps
0.4	157	0.0765	7.18	248.36	<b>Channel Flow, Seg E to F</b> Area= 34.6 sf Perim= 72.4' r= 0.48' n= 0.035 Earth, dense weeds
0.4	178	0.0898	7.78	261.58	<b>Channel Flow, Seg F to G</b> Area= 33.6 sf Perim= 70.2' r= 0.48' n= 0.035 Earth, dense weeds
1.1	308	0.0325	4.82	278.06	<b>Channel Flow, Seg G to H</b> Area= 57.7 sf Perim= 115.5' r= 0.50' n= 0.035 Earth, dense weeds
1.7	390	0.0205	3.82	199.64	<b>Channel Flow, Seg H to I</b> Area= 52.2 sf Perim= 104.6' r= 0.50' n= 0.035 Earth, dense weeds
0.8	341	0.0674	6.94	239.33	<b>Channel Flow, Seg O to P</b> Area= 34.5 sf Perim= 69.1' r= 0.50' n= 0.035 Earth, dense weeds
27.1	2,263	Total			

**Summary for Subcatchment WS-11:**

Runoff = 8.65 cfs @ 12.23 hrs, Volume= 38,798 cf, Depth= 4.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
Type III 24-hr 50-Year Rainfall=6.84"

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Area (sf)	CN	Description
13,199	79	Woods/grass comb., Good, HSG D
60,491	80	>75% Grass cover, Good, HSG D
* 8,969	96	Gravel road shoulder & driveway
* 6,577	98	Paved road
* 4,764	98	Prop. roofs
94,000		Weighted Average
82,659		87.94% Pervious Area
11,341		12.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	70	0.0994	0.08		<b>Sheet Flow, Seg A to B</b> Woods: Dense underbrush n= 0.800 P2= 3.12"
0.9	12	0.2893	0.22		<b>Sheet Flow, Seg B to C</b> Grass: Dense n= 0.240 P2= 3.12"
0.2	81	0.1234	5.66		<b>Shallow Concentrated Flow, Seg C to D</b> Unpaved Kv= 16.1 fps
1.1	459	0.0755	6.87	124.48	<b>Trap/Vee/Rect Channel Flow, Seg D to E</b> Bot.W=1.00' D=2.50' Z= 2.0 & 3.0 ' Top.W=13.50' n= 0.069 Riprap, 6-inch
17.2	622	Total			

**Summary for Subcatchment WS-12:**

Runoff = 12.76 cfs @ 12.18 hrs, Volume= 51,457 cf, Depth= 4.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
Type III 24-hr 50-Year Rainfall=6.84"

Area (sf)	CN	Description
33,614	79	Woods/grass comb., Good, HSG D
* 0	98	Exist. Paved areas
* 0	80	Exist, >75% Grass cover, Good, HSG D
* 6,300	96	Gravel road shoulder & driveway
* 5,382	98	Paved road
78,885	80	>75% Grass cover, Good, HSG D
5,148	98	Unconnected roofs, HSG A
129,329		Weighted Average
118,799		91.86% Pervious Area
10,530		8.14% Impervious Area
5,148		48.89% Unconnected

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	150	0.0657	0.20		<b>Sheet Flow, Seg A to B</b> Grass: Dense n= 0.240 P2= 3.12"
0.0	13	0.0463	4.37		<b>Shallow Concentrated Flow, Seg B to C</b> Paved Kv= 20.3 fps
1.0	433	0.0811	7.55	163.57	<b>Trap/Vee/Rect Channel Flow, Seg C to D</b> Bot.W=1.00' D=2.75' Z= 3.0 & 2.0 ' Top.W=14.75' n= 0.069 Riprap, 6-inch
13.4	596	Total			

**Summary for Subcatchment WS-2:**

Runoff = 6.27 cfs @ 12.11 hrs, Volume= 21,217 cf, Depth= 4.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
Type III 24-hr 50-Year Rainfall=6.84"

Area (sf)	CN	Description
25,065	79	Woods/grass comb., Good, HSG D
* 3,927	98	Exist. Paved areas
* 788	98	Exist. Roofs
* 12,716	80	Exist, >75% Grass cover, Good, HSG D
* 342	96	Gravel road shoulder & driveways
* 1,854	98	Paved road
8,261	80	>75% Grass cover, Good, HSG D
* 369	98	Prop. roofs
53,322		Weighted Average
46,384		86.99% Pervious Area
6,938		13.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	150	0.1320	0.39		<b>Sheet Flow, Seg A to B</b> Grass: Short n= 0.150 P2= 3.12"
0.8	265	0.1270	5.74		<b>Shallow Concentrated Flow, Seg B to C</b> Unpaved Kv= 16.1 fps
0.1	65	0.1490	13.73	61.77	<b>Trap/Vee/Rect Channel Flow, Seg C to D</b> Bot.W=2.00' D=1.00' Z= 2.0 & 3.0 ' Top.W=7.00' n= 0.030 Earth, grassed & winding
0.1	59	0.0673	15.55	320.69	<b>Trap/Vee/Rect Channel Flow, Seg D to E</b> Bot.W=2.00' D=2.50' Z= 2.0 & 3.0 ' Top.W=14.50' n= 0.030 Earth, grassed & winding
7.5	539	Total			

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**Summary for Subcatchment WS-21:**

Runoff = 20.14 cfs @ 12.17 hrs, Volume= 77,792 cf, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
Type III 24-hr 50-Year Rainfall=6.84"

Area (sf)	CN	Description
151,095	79	Woods/grass comb., Good, HSG D
* 28	98	Exist. Paved areas
* 0	80	Exist, >75% Grass cover, Good, HSG D
* 3,715	96	Gravel road shoulder & driveway
* 1,541	98	Paved road
44,082	80	>75% Grass cover, Good, HSG D
* 4,314	98	Prop. roofs
204,775		Weighted Average
198,892		97.13% Pervious Area
5,883		2.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	150	0.0800	0.22		<b>Sheet Flow, Seg A to B</b> Grass: Dense n= 0.240 P2= 3.12"
0.1	57	0.1754	6.74		<b>Shallow Concentrated Flow, Seg B to C</b> Unpaved Kv= 16.1 fps
0.7	88	0.1587	1.99		<b>Shallow Concentrated Flow, Seg C to D</b> Woodland Kv= 5.0 fps
12.3	295	Total			

**Summary for Subcatchment WS-22:**

Runoff = 2.53 cfs @ 12.09 hrs, Volume= 8,315 cf, Depth= 5.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
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Area (sf)	CN	Description
0	79	Woods/grass comb., Good, HSG D
* 2,174	96	Gravel road shoulder & driveways
* 2,577	98	Paved road
13,949	80	>75% Grass cover, Good, HSG D
* 834	98	Prop. roofs
19,534		Weighted Average
16,123		82.54% Pervious Area
3,411		17.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Tc &lt;6.0 min</b>

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**Summary for Subcatchment WS-23:**

Runoff = 10.34 cfs @ 12.18 hrs, Volume= 41,287 cf, Depth= 4.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
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Area (sf)	CN	Description
49,082	79	Woods/grass comb., Good, HSG D
* 4,721	98	Exist. Paved areas
* 0	98	Exist. Roofs
* 12,908	80	Exist, >75% Grass cover, Good, HSG D
* 4,153	96	Gravel road shoulder & driveways
* 2,357	98	Paved road
28,138	80	>75% Grass cover, Good, HSG D
* 2,699	98	Prop. roofs
104,058		Weighted Average
94,281		90.60% Pervious Area
9,777		9.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	38	0.0396	1.47		<b>Sheet Flow, Seg A to B</b> Smooth surfaces n= 0.011 P2= 3.12"
11.3	110	0.1231	0.16		<b>Sheet Flow, Seg B to C</b> Woods: Light underbrush n= 0.400 P2= 3.12"
0.4	214	0.1088	8.65	254.21	<b>Channel Flow, Seg C to D</b> Area= 29.4 sf Perim= 60.6' r= 0.49' n= 0.035 Earth, dense weeds
0.5	140	0.0982	5.05		<b>Shallow Concentrated Flow, Seg D to E</b> Unpaved Kv= 16.1 fps
0.2	64	0.1254	5.70		<b>Shallow Concentrated Flow, Seg E to F</b> Unpaved Kv= 16.1 fps
0.2	160	0.0623	14.35	260.08	<b>Trap/Vee/Rect Channel Flow, Seg F to G</b> Bot.W=1.00' D=2.50' Z= 2.0 & 3.0 ' / Top.W=13.50' n= 0.030 Earth, grassed & winding
13.0	726	Total			

**Summary for Reach R1:**

Inflow Area = 94,000 sf, 12.06% Impervious, Inflow Depth = 4.95" for 50-Year event  
Inflow = 8.65 cfs @ 12.23 hrs, Volume= 38,798 cf  
Outflow = 8.64 cfs @ 12.24 hrs, Volume= 38,798 cf, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
Max. Velocity= 4.02 fps, Min. Travel Time= 0.5 min  
Avg. Velocity = 1.41 fps, Avg. Travel Time= 1.5 min

Peak Storage= 272 cf @ 12.24 hrs  
Average Depth at Peak Storage= 0.75'  
Bank-Full Depth= 2.75' Flow Area= 21.7 sf, Capacity= 189.18 cfs

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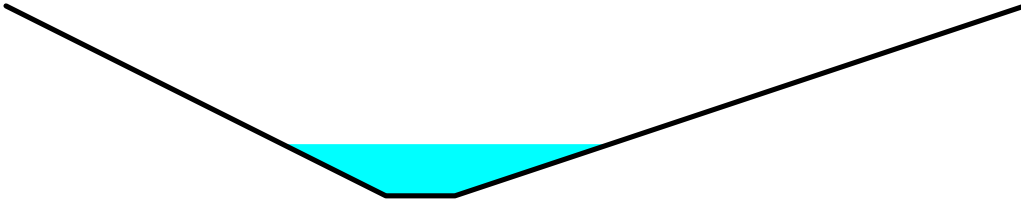
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1.00' x 2.75' deep channel, n= 0.069 Riprap, 6-inch  
 Side Slope Z-value= 2.0 3.0 '/' Top Width= 14.75'  
 Length= 126.3' Slope= 0.1085 '/'  
 Inlet Invert= 377.50', Outlet Invert= 363.80'



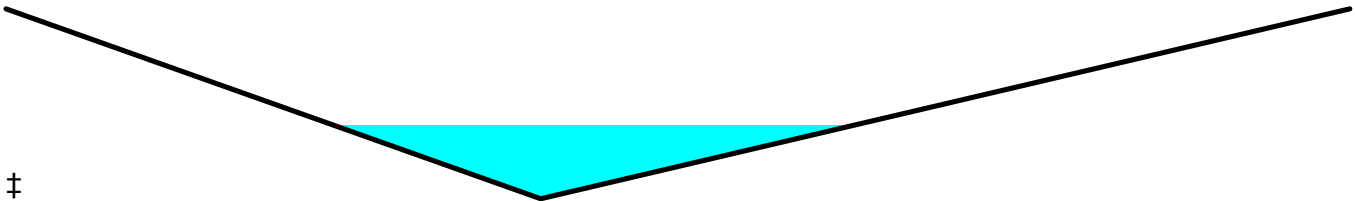
**Summary for Reach R2:**

Inflow Area = 223,329 sf, 9.79% Impervious, Inflow Depth = 4.85" for 50-Year event  
 Inflow = 16.05 cfs @ 12.34 hrs, Volume= 90,260 cf  
 Outflow = 15.79 cfs @ 12.38 hrs, Volume= 90,260 cf, Atten= 2%, Lag= 2.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
 Max. Velocity= 5.37 fps, Min. Travel Time= 2.8 min  
 Avg. Velocity = 1.80 fps, Avg. Travel Time= 8.4 min

Peak Storage= 2,656 cf @ 12.38 hrs  
 Average Depth at Peak Storage= 0.78'  
 Bank-Full Depth= 2.00' Flow Area= 19.5 sf, Capacity= 196.95 cfs

Custom cross-section, Length= 902.7' Slope= 0.0580 '/'  
 Constant n= 0.035 Earth, dense weeds  
 Inlet Invert= 349.40', Outlet Invert= 297.00'



‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	346.00	0.00
7.77	344.00	2.00
19.53	346.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0	0.00
2.00	19.5	20.0	17,630	196.95

**Summary for Pond FB1:**

Inflow Area = 123,592 sf, 10.67% Impervious, Inflow Depth = 4.82" for 50-Year event  
 Inflow = 12.12 cfs @ 12.16 hrs, Volume= 49,602 cf  
 Outflow = 10.76 cfs @ 12.23 hrs, Volume= 49,604 cf, Atten= 11%, Lag= 4.6 min  
 Primary = 9.20 cfs @ 12.23 hrs, Volume= 48,663 cf  
 Secondary = 1.56 cfs @ 12.23 hrs, Volume= 940 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
 Peak Elev= 397.72' @ 12.23 hrs Surf.Area= 4,155 sf Storage= 7,973 cf

Plug-Flow detention time= 126.8 min calculated for 49,583 cf (100% of inflow)  
 Center-of-Mass det. time= 127.2 min ( 929.2 - 802.0 )

Volume	Invert	Avail.Storage	Storage Description		
#1	395.00'	14,068 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
395.00	1,992	178.2	0	0	1,992
396.00	2,555	197.0	2,268	2,268	2,584
398.00	4,456	275.5	6,923	9,191	5,573
399.00	5,311	294.3	4,877	14,068	6,472

Device	Routing	Invert	Outlet Devices
#1	Primary	392.20'	<b>15.0" Round 15-inch culvert</b> L= 51.7' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 392.20' / 390.00' S= 0.0426 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	392.83'	<b>1.2" Vert. 1-1/8" DRILL HOLE</b> C= 0.600
#3	Device 2	392.83'	<b>4.0" Vert. 4" UD</b> C= 0.600
#4	Device 3	395.00'	<b>2.410 in/hr Exfiltration over Surface area</b>
#5	Device 1	396.50'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#6	Device 1	396.90'	<b>Neenah R4345 Beehive Grate Light Duty-req. structure</b> Head (feet) 0.00 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.50 0.60 0.70 0.80 0.90 1.00 Disch. (cfs) 0.000 0.900 1.600 2.500 3.500 4.000 4.600 5.300 6.800 7.500 8.100 8.600 9.100 9.600
#7	Secondary	397.50'	<b>6.0' long x 12.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

**Primary OutFlow** Max=9.19 cfs @ 12.23 hrs HW=397.72' TW=0.00' (Dynamic Tailwater)

- 1=15-inch culvert (Passes 9.19 cfs of 13.07 cfs potential flow)
- 2=1-1/8" DRILL HOLE (Orifice Controls 0.08 cfs @ 10.59 fps)
- 3=4" UD (Passes 0.08 cfs of 0.91 cfs potential flow)
- 4=Exfiltration (Passes 0.08 cfs of 0.23 cfs potential flow)
- 5=Orifice/Grate (Orifice Controls 0.43 cfs @ 4.93 fps)
- 6=Neenah R4345 Beehive Grate Light Duty-req. structure (Custom Controls 8.68 cfs)

**Secondary OutFlow** Max=1.54 cfs @ 12.23 hrs HW=397.72' TW=0.00' (Dynamic Tailwater)

- 7=Broad-Crested Rectangular Weir (Weir Controls 1.54 cfs @ 1.19 fps)

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**Summary for Pond FB2:**

Inflow Area = 223,329 sf, 9.79% Impervious, Inflow Depth = 4.85" for 50-Year event  
 Inflow = 21.02 cfs @ 12.20 hrs, Volume= 90,255 cf  
 Outflow = 16.05 cfs @ 12.34 hrs, Volume= 90,260 cf, Atten= 24%, Lag= 8.5 min  
 Primary = 4.34 cfs @ 12.34 hrs, Volume= 4,487 cf  
 Secondary = 11.71 cfs @ 12.34 hrs, Volume= 85,773 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
 Peak Elev= 357.42' @ 12.34 hrs Surf.Area= 8,968 sf Storage= 22,828 cf

Plug-Flow detention time= 194.7 min calculated for 90,223 cf (100% of inflow)  
 Center-of-Mass det. time= 195.2 min ( 999.8 - 804.6 )

Volume	Invert	Avail.Storage	Storage Description			
#1	354.00'	38,766 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
354.00	4,505	403.7	0	0	4,505	
356.00	7,040	441.4	11,451	11,451	7,177	
356.50	7,710	450.8	3,686	15,137	7,881	
358.00	9,802	479.1	13,103	28,240	10,088	
359.00	11,267	497.9	10,526	38,766	11,630	

Device	Routing	Invert	Outlet Devices
#1	Primary	357.00'	<b>6.0' long x 12.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#2	Secondary	350.91'	<b>15.0" Round 15-inch culvert</b> L= 29.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 350.91' / 349.40' S= 0.0507 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 2	351.83'	<b>1.7" Vert. 1-3/4" DRILL HOLE</b> C= 0.600
#4	Device 3	351.83'	<b>4.0" Vert. 4" UD</b> C= 0.600
#5	Device 4	354.00'	<b>2.410 in/hr Exfiltration over Surface area</b>
#6	Device 2	355.50'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#7	Device 2	356.10'	<b>Neenah R4345 Beehive Grate Light Duty-req. structure</b> Head (feet) 0.00 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.50 0.60 0.70 0.80 0.90 1.00 Disch. (cfs) 0.000 0.900 1.600 2.500 3.500 4.000 4.600 5.300 6.800 7.500 8.100 8.600 9.100 9.600

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**Primary OutFlow** Max=4.31 cfs @ 12.34 hrs HW=357.42' TW=350.17' (Dynamic Tailwater)

↑1=**Broad-Crested Rectangular Weir** (Weir Controls 4.31 cfs @ 1.71 fps)

**Secondary OutFlow** Max=11.70 cfs @ 12.34 hrs HW=357.42' TW=350.17' (Dynamic Tailwater)

↑2=**15-inch culvert** (Passes 11.70 cfs of 14.34 cfs potential flow)

↑3=**1-3/4" DRILL HOLE** (Orifice Controls 0.18 cfs @ 11.31 fps)

↑4=**4" UD** (Passes 0.18 cfs of 0.98 cfs potential flow)

↑5=**Exfiltration** (Passes 0.18 cfs of 0.50 cfs potential flow)

↑6=**Orifice/Grate** (Orifice Controls 0.32 cfs @ 6.45 fps)

↑7=**Neenah R4345 Beehive Grate Light Duty-req. structure**(Custom Controls 11.21 cfs)

**Summary for Pond SD-1: 18" ROAD CULVERT**

Inflow Area = 53,322 sf, 13.01% Impervious, Inflow Depth = 4.77" for 50-Year event  
 Inflow = 6.27 cfs @ 12.11 hrs, Volume= 21,217 cf  
 Outflow = 6.27 cfs @ 12.11 hrs, Volume= 21,217 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 6.27 cfs @ 12.11 hrs, Volume= 21,217 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
Peak Elev= 394.43' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	392.00'	<b>15.0" Round 18-INCH CULVERT</b> L= 40.4' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 392.00' / 390.00' S= 0.0495 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

**Primary OutFlow** Max=6.19 cfs @ 12.11 hrs HW=394.39' TW=0.00' (Dynamic Tailwater)

↑1=**18-INCH CULVERT** (Inlet Controls 6.19 cfs @ 5.05 fps)

**Summary for Pond SD-2: 15" ROAD CULVERT**

Inflow Area = 104,058 sf, 9.40% Impervious, Inflow Depth = 4.76" for 50-Year event  
 Inflow = 10.34 cfs @ 12.18 hrs, Volume= 41,287 cf  
 Outflow = 10.34 cfs @ 12.18 hrs, Volume= 41,287 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 10.34 cfs @ 12.18 hrs, Volume= 41,287 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
Peak Elev= 402.53' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	396.50'	<b>15.0" Round 15-INCH CULVERT</b> L= 55.6' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 396.50' / 394.50' S= 0.0360 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

**Primary OutFlow** Max=10.25 cfs @ 12.18 hrs HW=402.49' TW=397.67' (Dynamic Tailwater)

↑1=**15-INCH CULVERT** (Inlet Controls 10.25 cfs @ 8.35 fps)

**Summary for Pond SD-3: 18" ROAD CULVERT**

Inflow Area = 94,000 sf, 12.06% Impervious, Inflow Depth = 4.95" for 50-Year event  
 Inflow = 8.65 cfs @ 12.23 hrs, Volume= 38,798 cf  
 Outflow = 8.65 cfs @ 12.23 hrs, Volume= 38,798 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 8.65 cfs @ 12.23 hrs, Volume= 38,798 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
 Peak Elev= 381.21' @ 12.23 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	378.80'	<b>18.0" Round 18-INCH CULVERT</b> L= 46.9' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 378.80' / 377.50' S= 0.0277 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

**Primary OutFlow** Max=8.62 cfs @ 12.23 hrs HW=381.20' TW=378.25' (Dynamic Tailwater)  
 ↑1=18-INCH CULVERT (Inlet Controls 8.62 cfs @ 4.88 fps)

**Summary for Pond SD-4: 18" ROAD CULVERT**

Inflow Area = 94,000 sf, 12.06% Impervious, Inflow Depth = 4.95" for 50-Year event  
 Inflow = 8.64 cfs @ 12.24 hrs, Volume= 38,798 cf  
 Outflow = 8.64 cfs @ 12.24 hrs, Volume= 38,798 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 8.64 cfs @ 12.24 hrs, Volume= 38,798 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
 Peak Elev= 366.21' @ 12.24 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	363.80'	<b>18.0" Round 18-INCH CULVERT</b> L= 27.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 363.80' / 363.50' S= 0.0108 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

**Primary OutFlow** Max=8.63 cfs @ 12.24 hrs HW=366.20' TW=357.29' (Dynamic Tailwater)  
 ↑1=18-INCH CULVERT (Inlet Controls 8.63 cfs @ 4.88 fps)

**Summary for Link SP-1:**

Inflow Area = 890,235 sf, 3.10% Impervious, Inflow Depth = 4.58" for 50-Year event  
 Inflow = 63.10 cfs @ 12.37 hrs, Volume= 339,493 cf  
 Primary = 63.10 cfs @ 12.37 hrs, Volume= 339,493 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs

**Summary for Link SP-2:**

Inflow Area = 381,689 sf, 6.81% Impervious, Inflow Depth = 4.67" for 50-Year event  
Inflow = 35.09 cfs @ 12.17 hrs, Volume= 148,613 cf  
Primary = 35.09 cfs @ 12.17 hrs, Volume= 148,613 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs

## **ATTACHMENT 4**

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# **INSPECTION, MAINTENANCE & HOUSEKEEPING PLAN**



**INSPECTION, MAINTENANCE, AND HOUSEKEEPING PLAN**  
(Prepared by Jayson Haskell, PE #13002)

**AERIE ESTATES SUBDIVISION  
EAGLES NEST ROAD  
GRAY, MAINE**

**Responsible Party**

Owner:           Sebago Realty, LLC.  
                      391 Roosevelt Trail  
                      Windham, Maine 04062

The owner/applicant is responsible for the maintenance of all stormwater management structures and related site components and the keeping of a maintenance log book with service records until a homeowner's association is established. Once the association is established, maintenance will be the responsibility of the homeowners. Records of all inspections and maintenance work performed must be kept on file with the owner and retained for a minimum of five years. The maintenance log will be made available to the Town and Maine Department of Environmental Protection (MDEP) upon request. At a minimum, the maintenance of stormwater management systems will be performed on the prescribed schedule.

The procedures outlined in this plan are provided as a general overview of the anticipated practices to be utilized on this site. In some instances, additional measures may be required due to unexpected conditions. *The Maine Erosion and Sedimentation Control BMP and Stormwater Management for Maine: Best Management Practices* Manuals published by the MDEP should be referenced for additional information.

**During Construction**

- 1. Inspection and Corrective Action:** It is the contractor's responsibility to comply with the inspection and maintenance procedures outlined in this section. Inspection shall occur on all disturbed and impervious areas, erosion control measures, material storage areas that are exposed to precipitation, and locations where vehicles enter or exit the site. These areas shall be inspected at least once a week as well as 24 hours before and after a storm event generating more than 0.5 inch of rainfall over a 24-hour period and prior to completing permanent stabilization measures. A person with knowledge of erosion and stormwater control, including the standards and conditions in the permit, shall conduct the inspections.

2. **Maintenance:** Erosion controls shall be maintained in effective operating condition until areas are permanently stabilized. If best management practices (BMPs) need to be repaired, the repair work should be initiated upon discovery of the problem but no later than the end of the next workday. If BMPs need to be maintained or modified, additional BMPs are necessary, or other corrective action is needed, implementation must be completed within seven calendar days and prior to any rainfall event.
3. **Construction vehicles and equipment:** Construction vehicles and equipment shall not be driven or stored within the stormwater basins. To ensure the basins function as designed perpetually, prohibiting vehicles and equipment from these areas will limit the risk of inhibiting the function of the basins due to compaction.
4. **Documentation:** A report summarizing the inspections and any corrective action taken must be maintained on site. The log must include the name(s) and qualifications of the person making the inspections; the date(s) of the inspections; and the major observations about the operation and maintenance of erosion and sedimentation controls, materials storage areas, and vehicle access points to the parcel. Major observations must include BMPs that need maintenance, BMPs that failed to operate as designed or proved inadequate for a particular location, and location(s) where additional BMPs are needed. For each BMP requiring maintenance, BMP needing replacement, and location needing additional BMPs, note in the log the corrective action taken and when it was taken. The log must be made accessible to MDEP and Town staff, and a copy must be provided upon request. The owner shall retain a copy of the log for a period of at least three years from the completion of permanent stabilization.

### Housekeeping

1. **Spill prevention:** Controls must be used to prevent pollutants from construction and waste materials on site to enter stormwater, which includes storage practices to minimize exposure of the materials to stormwater. The site contractor or operator must develop, and implement as necessary, appropriate spill prevention, containment, and response planning measures.
2. **Groundwater protection:** During construction, liquid petroleum products and other hazardous materials with the potential to contaminate groundwater may not be stored or handled in areas of the site draining to an infiltration area. An "infiltration area" is any area of the site that by design or as a result of soils, topography and other relevant factors accumulates runoff that infiltrates into the soil. Dikes, berms, sumps, and other forms of secondary containment that prevent discharge to groundwater may be used to isolate portions of the site for the purposes of storage and handling of these materials. Any project proposing infiltration of stormwater must provide adequate pre-treatment of stormwater prior to discharge of stormwater to the infiltration area, or provide for treatment within the infiltration area, in order to prevent the accumulation of fines, reduction in infiltration rate, and consequent flooding and destabilization.

- 3. Fugitive sediment and dust:** Actions must be taken to ensure that activities do not result in noticeable erosion of soils or fugitive dust emissions during or after construction. Oil may not be used for dust control, but other water additives may be considered as needed. A stabilized construction entrance (SCE) should be included to minimize tracking of mud and sediment. If off-site tracking occurs, public roads should be swept immediately and no less than once a week and prior to significant storm events. Operations during dry months, that experience fugitive dust problems, should wet down unpaved access roads once a week or more frequently as needed with a water additive to suppress fugitive sediment and dust.
- 4. Debris and other materials:** Minimize the exposure of construction debris, building and landscaping materials, trash, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials to precipitation and stormwater runoff. These materials must be prevented from becoming a pollutant source.
- 5. Excavation de-watering:** Excavation de-watering is the removal of water from trenches, foundations, coffer dams, ponds, and other areas within the construction area that retain water after excavation. In most cases the collected water is heavily silted and hinders correct and safe construction practices. The collected water removed from the ponded area, either through gravity or pumping, must be spread through natural wooded buffers or removed to areas that are specifically designed to collect the maximum amount of sediment possible, like a cofferdam sedimentation basin. Avoid allowing the water to flow over disturbed areas of the site. Equivalent measures may be taken if approved by the Department.
- 6. Authorized Non-stormwater discharges:** Identify and prevent contamination by non-stormwater discharges. Where allowed non-stormwater discharges exist, they must be identified and steps should be taken to ensure the implementation of appropriate pollution prevention measures for the non-stormwater component(s) of the discharge. Authorized non-stormwater discharges are:

  - (a) Discharges from firefighting activity;
  - (b) Fire hydrant flushings;
  - (c) Vehicle washwater if detergents are not used and washing is limited to the exterior of vehicles (engine, undercarriage and transmission washing is prohibited);
  - (d) Dust control runoff in accordance with permit conditions and Appendix (C)(3);
  - (e) Routine external building washdown, not including surface paint removal, that does not involve detergents;
  - (f) Pavement washwater (where spills/leaks of toxic or hazardous materials have not occurred, unless all spilled material had been removed) if detergents are not used;
  - (g) Uncontaminated air conditioning or compressor condensate;
  - (h) Uncontaminated groundwater or spring water;
  - (i) Foundation or footer drain-water where flows are not contaminated;
  - (j) Uncontaminated excavation dewatering (see requirements in Appendix C(5));
  - (k) Potable water sources including waterline flushings; and

(l) Landscape irrigation.

- 7. Unauthorized non-stormwater discharges:** Approval from the Town does not authorize a discharge that is mixed with a source of non-stormwater, other than those discharges in compliance with Section 6 above. Specifically, the Town's approval does not authorize discharges of the following:
- (a) Wastewater from the washout or cleanout of concrete, stucco, paint, form release oils, curing compounds or other construction materials;
  - (b) Fuels, oils or other pollutants used in vehicle and equipment operation and maintenance;
  - (c) Soaps, solvents, or detergents used in vehicle and equipment washing; and
  - (d) Toxic or hazardous substances from a spill or other release.

### **Post Construction**

- 1. Inspection and Corrective Action:** All stormwater measures, must be maintained by the owner in effective operating condition. A qualified inspector hired by the owner shall at least annually inspect the stormwater management facilities. This person should have knowledge of erosion and stormwater control including the standards and conditions of the site's approvals. The following areas, facilities, and measures must be inspected, and identified deficiencies must be corrected. Areas, facilities, and measures other than those listed below may also require inspection on a specific site.
- A. Vegetated Areas:** Inspect vegetated areas, particularly slopes and embankments, early in the growing season or after heavy rains to identify active or potential erosion problems. Replant bare areas or areas with sparse growth. Where rill is evident, armor the area with an appropriate lining or divert the erosive flows to on-site areas able to withstand the concentrated flows.
  - B. Ditches, Swales, and Open Channels:** Inspect ditches, swales, and other open channels in the spring, late fall, and after heavy rains to remove any obstructions to flow, remove accumulated sediments and debris, control vegetative growth that could obstruct flow, and repair any erosion of the ditch lining. Vegetated ditches must be mowed at least annually or otherwise maintained to control the growth of woody vegetation and maintain flow capacity. Repair any slumping side slopes as soon as practicable. The channel must receive adequate routine maintenance to maintain capacity and prevent or correct any erosion of the channel's bottom or side slopes.
  - C. Culverts & Storm Drains:** Inspect culverts & storm drains in the spring, late fall, and after heavy rains to remove any obstructions to flow; remove accumulated sediments and debris at the inlet, at the outlet, and within the conduit; and to repair any erosion damage at the storm drain's outlet.

- D. Roofline Drip edges:** The drip edges should be inspected semi-annually and following major storm events for the first year and every six months thereafter. The reservoir crushed stone should drain within 24 to 48 hours following a major storm event. If ponding exceeds 48 hours, the stone reservoir course shall be removed and the filter bed be rototilled to reestablish the soil's filtration capacity. If water ponds in the reservoir course for more than 72 hours, the top several inches of the filter shall be replaced with fresh material. Inspect for debris and sediment build up at surface and remove as needed. The drip edges are part of the stormwater management plan and cannot be paved over or altered in anyway.
- E. Underdrained Filter Basin:** The filter basin is not intended to function as snow storage areas. Inspector to verify that winter plowing operations are not dumping or pushing snow into the basins. The basin shall also not be used for vehicle or heavy equipment storage. Basin should be inspected after several major storm events (0.5 inches rainfall over 24 hours) to determine drawdown time during the first year. Basin to be inspected every six months thereafter with at least one inspection after a major storm event.

The basin should drain dry within 24 to 48 hours following a one-inch storm. If ponding exceeds 48 hours, the top of the filter bed must be rototilled to reestablish the soil's filtration capacity. If water ponds on the surface of the bed for more than 72 hours, the top several inches of the filter shall be replaced with fresh material. Inspect for debris and sediment build up in the forebay and basin and remove as needed. Mowing of the basin can only occur semi-annually to a height of no less than 6 inches utilizing a hand-held string trimmer or push-mower. Any bare areas or erosion rills shall be repaired with new filter media or sandy loam then seeded and mulched. The basin should also be inspected annually for destabilization of side slopes, embankment settling and other signs of structural failure.

- F. Emergency Spillway:** Spillways should be inspected semi-annually and following major storm events for the first year and every six months thereafter to remove any obstructions to flow. Any woody vegetation growing through riprap lining must be removed. Replace riprap on areas where any underlying filter fabric is showing through the stone or where stones have been dislodged.
- G. Regular Maintenance:** Clear accumulations of winter sand along roadway and parking areas once a year, preferably in the spring. Accumulations on pavement may be removed by pavement sweeping. Accumulations of sand along pavement shoulders may be removed by grading excess sand to the pavement edge and removing it manually or by a front-end loader.
- H. Documentation:** Keep a log (report) summarizing inspections, maintenance, and any corrective actions taken. The log must include the date on which each inspection or maintenance task was performed, a description of the inspection findings or

maintenance completed, and the name of the inspector or maintenance personnel performing the task. If a maintenance task requires the clean-out of any sediments or debris, indicate where the sediment and debris was disposed after removal. The log must be made accessible to Town staff upon request. The permittee shall retain a copy of the log for a period of at least five years from the completion of permanent stabilization. Attached is a sample log.

### **Duration of Maintenance**

Perform maintenance as described.

## INSPECTION AND MAINTENANCE LOG – GENERAL INSPECTION

### AERIE ESTATES SUBDIVISION EAGLES NEST ROAD GRAY, MAINE

The following stormwater management and erosion control items shall be inspected and maintained as prescribed in the Maintenance Plan with recommended frequencies as identified below. The owner is responsible for keeping this maintenance log on file for a minimum of five years and shall provide a copy to the Town upon request. Inspections are to be performed by a qualified third-party inspector and all corrective actions shall be performed by personnel familiar with stormwater management systems and erosion controls.

Maintenance Item	Maintenance Event	Date Performed	Responsible Personnel	Comments
Vegetated Areas	Inspect slopes and embankments early in Spring.			
Ditches, swales and other open channels	Inspect after major rainfall event.			
	Inspect for erosion or slumping and repair			
	Mowed at least annually			
Storm Drains	Inspect semiannually and after major rainfall.			
	Repair erosion at inlet or outlet of pipe.			
	Repair displaced riprap.			
	Clean accumulated sediment in culverts when >20% full.			
Roofline Dripedges	Check after each rainfall event to ensure that the stone reservoir drains within 24-48 hours.			
	Replace top several inches of filter if reservoir does not drain within 72 hours.			
	Inspect and remove sediment or debris build up on the surface of the stone			
	Inspect semi-annually for erosion or sediment accumulation and repair as necessary.			
Regular Maintenance	Clear accumulation of winter sand in paved areas annually.			

## INSPECTION AND MAINTENANCE LOG – UNDERDRAINED FILTER BASIN

### AERIE ESTATES SUBDIVISION EAGLES NEST ROAD GRAY, MAINE

The following stormwater management and erosion control items shall be inspected and maintained as prescribed in the Maintenance Plan with recommended frequencies as identified below. The owner is responsible for keeping this maintenance log on file for a minimum of five years and shall provide a copy to the Town and MDEP upon request. Inspections are to be performed by a qualified third-party inspector and all corrective actions shall be performed by personnel familiar with stormwater management systems and erosion controls.

Maintenance Item	Maintenance Event	Date Performed	Responsible Personnel	Comments
Underdrained Filter Basin	Check after each rainfall event to ensure that pond drains within 24-48 hours.			
	Replace top several inches of filter if pond does not drain within 72 hours.			
	Mow grass no more than twice a year to no less than 6 inches in height.			
	Inspect semi-annually for erosion or sediment accumulation and repair as necessary.			
	Inspector to verify basin not utilized for snow storage			
	Inspector to verify basin not utilized for vehicle or heavy equipment storage.			
Outlet Control Structure	Inspect to ensure that structure is properly draining.			
	Remove accumulated sediment semiannually.			
	Inspect grates/inlets and remove debris as needed.			
Emergency Spillway	Inspect and remove obstructions as necessary.			
	Remove woody vegetation.			
	Replace riprap as necessary.			

# AERIE ESTATES

(SECOND AMENDMENT TO EAGLES RIDGE SUBDIVISION)  
 AERIE DRIVE, OFF EAGLES NEST ROAD  
 GRAY, MAINE

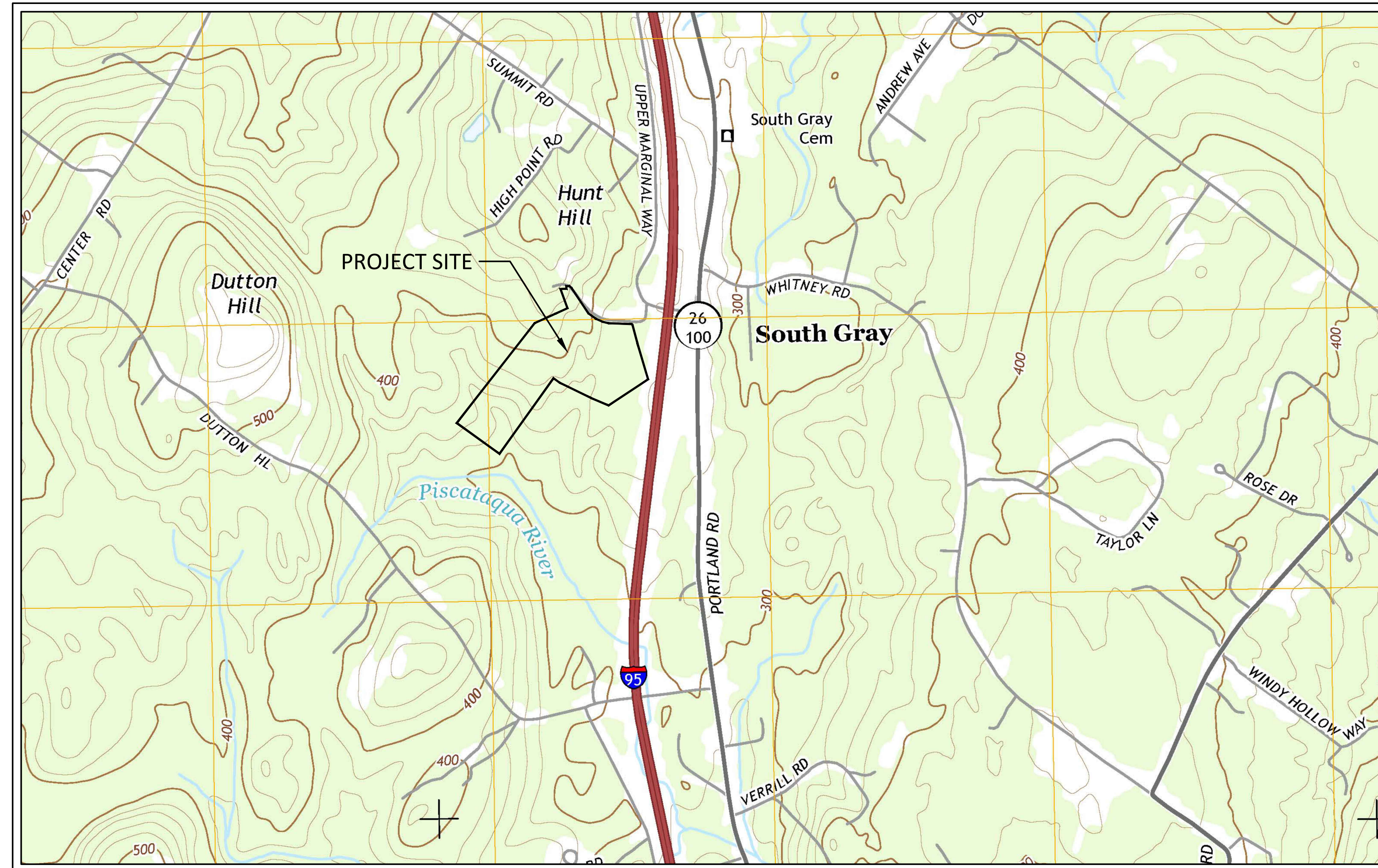
CONSULTANTS

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CIVIL ENGINEER DM ROMA CONSULTING ENGINEERS

LAND SURVEYOR SURVEY, INC

SITE EVALUATOR MAINELY SOILS, LLC



PROJECT VICINITY MAP  
 SCALE 1" = 1,000'

PERMITTING PLAN SET - NOT FOR CONSTRUCTION  
 JANUARY 29, 2024

PREPARED BY:

**DM ROMA**

CONSULTING ENGINEERS  
 P.O. BOX 1116  
 WINDHAM, ME 04062  
 (207) 591-5055

**APPLICANT & RECORD OWNER:**

SEBAGO REALTY, LLC  
 PO BOX 1116  
 WINDHAM, ME 04062

AERIE ESTATES SUBDIVISION  
 DRAWING SHEET INDEX

PAGE NO.	DESCRIPTION
1	TITLE SHEET
2	BOUNDARY SURVEY
3	SUBDIVISION PLAN
4	ROADWAY PLAN
5	STORMWATER MANAGEMENT DETAILS
6	ROADWAY PROFILE
7	CONSTRUCTION DETAILS
8	CONSTRUCTION DETAILS

12-20-18 AMENDMENT TO SUBDIVISION PLAT PREVIOUSLY APPROVED BY THE GRAY PLANNING BOARD ON MAY 22, 2014 AND RECORDED IN THE CCRD PLAN BOOK 214 PGS 432-433.

This Plan Amendment requests a waiver from the Town of Gray Subdivision Ordinance Chapter 401.13.2.C.4 - Sufficient Water Supply standard which states, "For underground reservoirs, a minimum storage capacity of 10,000 gallons shall be provided. Additional storage of 2,000 gallons per lot or principal building shall be provided." The applicant requests that this standard be waived to allow the currently installed 30,000 gallon cistern located within the Utility Easement adjacent to Lot 1 to be considered to provide adequate Fire Protection for the 14-Lot Eagles Ridge project. This waiver request is supported by a letter from the Gray Fire Chief dated December 4, 2018.

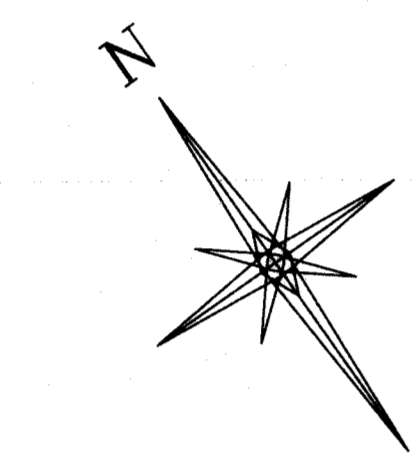
Approval of this waiver request hereby voids and supersedes Note #17 on this plan sheet.

Waiver Request Approved by the Gray Planning Board:

Dated: 1/10/2019

DATE: 1/10/2019

- LEGEND**
- Monument - found
  - Iron marker - found
  - Monument - to be set
  - Iron marker - to be set
  - Property line (locus)
  - - - Property line (abutter)
  - - - Proposed Right of Way and Lot lines
  - - - Edge of pavement
  - - - Building setback line
  - - - Stone wall
  - - - Easement line
  - - - N/F
  - - - 1234/567
  - - - Dead reference (Book/Page)
  - - - Wetlands delineation
  - - - Wetlands



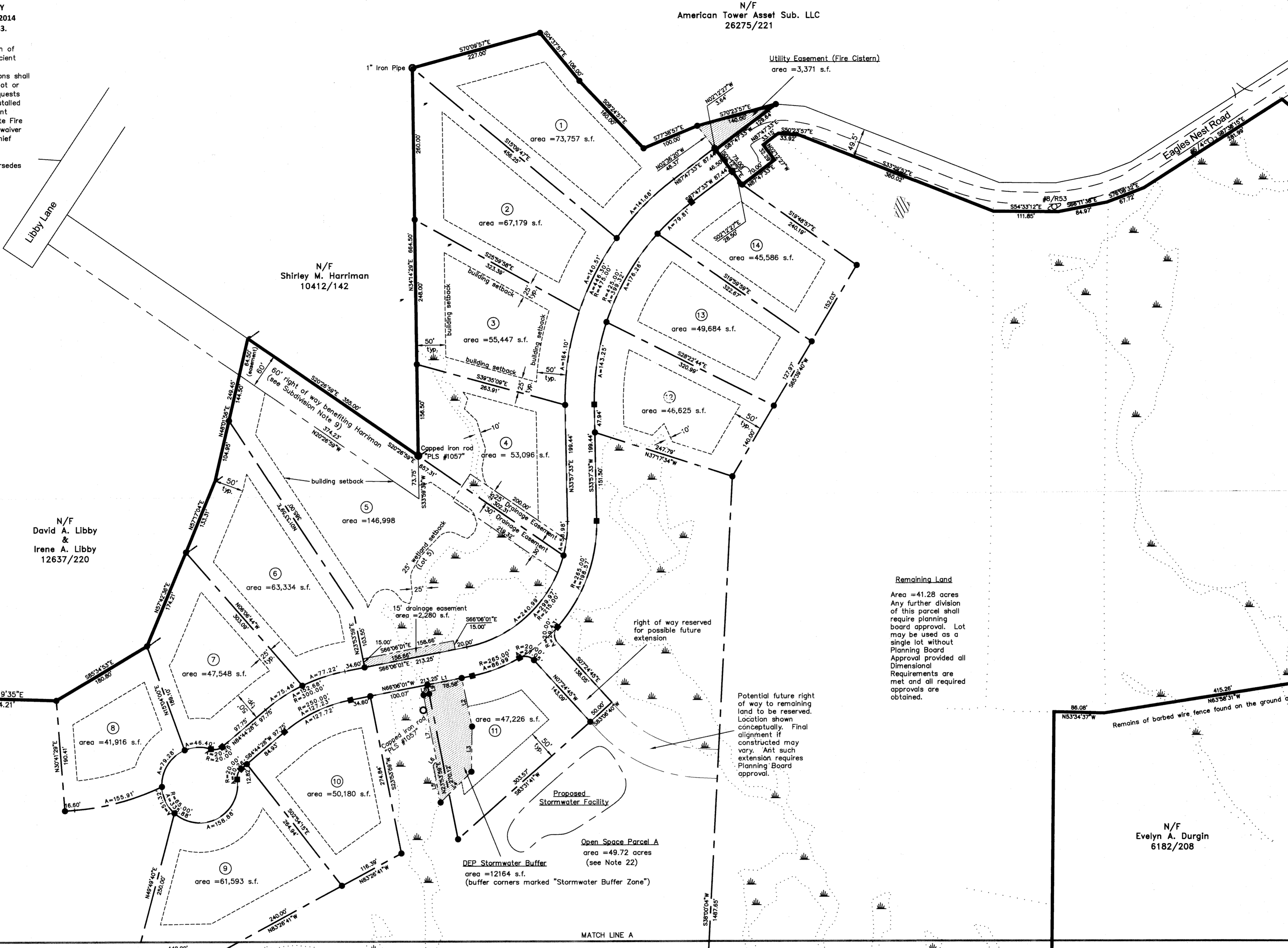
**Stormwater Buffer Line Table**  
Lot 11 / Parcel A

LINE	BEARING	DISTANCE
L1	S66°06'01"E	80.00'
L2	S23°00'43"W	85.00'
L3	S35°51'14"W	78.00'
L4	S80°13'38"W	75.00'
L5	N23°53'59"E	65.00'
L6	N70°24'45"E	10.00'
L7	N23°53'59"E	115.00'
L8	S66°06'01"E	10.00'
L9	N23°53'59"E	16.00'

Stone mon. 12"x12"

Open Space Parcel A area = 50.13 acres (see Note 22)

- SUBDIVISION NOTES**
- Eagles Ridge Subdivision is located on the Town of Gray Assessors Map 63 lots 35-312, 35-27, 35-26 and 35-24, total area of property is 112.75 acres.
  - Project is proposed as a Cluster Subdivision per the Town of Gray Subdivision Ordinance, Chapter 401.13.13.
  - Lots shall be serviced by individual wells and subsurface wastewater disposal systems.
  - Final installation of SSWD (septic) systems and wells shall meet State Plumbing Code (CMR 10-144, Chapter 241) standards. SSWD disposal fields shall be located entirely in the well exclusion zones as shown on Sheet C-102 updated to 9/09/14 unless the property owner provides documentation from a qualified hydro-geologist that another location is practically necessary and both the Town Planner and LPI agree. Wells and SSWD locations for Lots 9, 10, and 11 are fixed unless changed in accordance with this note.
  - Approval of this plan includes by reference the entire set of plans entitled "Eagles Ridge Subdivision, Eagles Nest Road, Gray, Maine" (total of 18 Sheets) as referenced in the Sheet Index on the Cover Sheet prepared by Blais Civil Engineers and Light Environmental Design, LLC, and Titcomb Associates last revised September 9, 2014.
  - Wetlands and vernal pools delineated by Stantec Consulting (formerly Woodlot Alternatives), Topsham, Maine.
  - Test pits 1-56a by Frederic Licht, PE, LSE. Test pits 57-94 by Mark Hampton, CSS, LSE.
  - Access to lots 1-14 shall be from internal roadways.
  - The 60-foot row benefiting Harriman does not provide any legal access rights to this subdivision.
  - Project is subject to a DEP Chapter 500 Stormwater Permit No.L-23209-NJ-D-N dated March 13, 2014 and NRPA PBR #19 for buffers to vernal pool #3. Wetland impacts are less than 4,300 square feet.
  - Maximum lot impervious area, developed areas and limits of clearing are implemented by the DEP Stormwater Permit (note 10), refer to site data table for allowable impervious/developed areas per lot. The Town of Gray has the ability but not the obligation to enforce clearing and impervious areas on individual lots. See Table 1, Sheet S-101 for specific lot requirements.
  - Further subdivision of any lots, open space or remaining land parcel is not permitted without further planning board approval.
  - All notes and references appearing on this plan Sheet S-100 shall apply to Subdivision Plat Sheet S-101 dated 9/09/14.
  - Project is subject to the Eagles Ridge Homeowner's Association documents. Responsibilities of the HOA include ownership and maintenance of the proposed subdivision roadway, stormwater management facilities and Open Space Parcel.
  - All roads in this subdivision shall remain private roads to be accepted or maintained by the town except for roads that meet requirements for winter maintenance under a public easement. (see note 16).



Open Space Parcel A area = 50.13 acres (see Note 22)

- 16) The proposed subdivision 50-foot row and roadway is being proposed as a "Rural Public Easement Street" for public winter maintenance under the town's private road public easement policy as defined in the Subdivision Ordinance Table 401.13.16-2 and Section 401.13.16.B.2.g.i.
- 17) Project proposes to provide a 30,000 gallon fire cistern and a dry hydrant at the proposed Stormwater Management Wet Pond to provide adequate fire suppression service.
- 18) All electric and cable utilities shall be installed underground.
- 19) Driveway plans required for Lots 5, 6, 8, 9 and 10 to be stamped by a professional Engineer and reviewed by the CEO prior to issuance of building permits for those Lots. Driveway location for Lot 9 is fixed per plans. All driveways must meet the standards of the Town of Gray Street Ordinance, Chapter 400.
- 20) Lot 11 is subject to a DEP Stormwater Forested Buffer and Declaration of Restrictions to be recorded in the Cumberland County Registry of Deeds with the Lot 11 deed (refer to DEP Stormwater Permit note 10).
- 21) The applicant intends to utilize a so-called Conditional Agreement in lieu of posting a financial performance guarantee for the construction of the road in the development, as allowed under Section 401.11.1.C of the Gray Subdivision Ordinance. This Agreement specifically prohibits the sale of lots and/or issuance of building permits until the required infrastructure improvements have first been completed or, alternatively, a suitable financial surety has been fully established with the Town. Any person or firm intending to acquire title to any lot in the subdivision should first verify the status of this Agreement with Town staff before buying a lot.
- 22) Open Space Parcel A shall be owned by the Eagles Ridge Homeowner's Association (HOA) or the developer until turned over to the HOA as specified in the HOA Articles of Incorporation and as specified in Subdivision Ordinance § 401.13.6.E. The open space shall not be used for future building lots except as approved by the Planning Board. Accessory structures for recreational or conservation use may be erected subject to any required building permits.
- 23) All lots are to be served by individual drilled wells. Developer shall provide evidence of a positive well test sufficient for residential use installed on each lot prior to the sale of each lot. Wells shall not be constructed within 100 feet of the traveled way of a street if located downgradient from the street, or within 50 feet of a street if located uphill of the street.
- 24) Approval of this project includes the reconstruction of the so-called "90 degree" curve in Eagles Nest Road as detailed on Subdivision Plan Sheet 1 of 1 "Offsite Road Improvements".
- 25) Prior to the issue of the 8th building permit for any principle residential structure and/or dwelling unit on any lot in the subdivision, or within 2 years of the Planning Board signing of this subdivision plat, whichever comes first, the proposed offsite improvements at the Route 100/Upper Marginal Way intersection as referenced in the Planning Board Conditions of Approval, shall be substantially completed and fully operational. Within 30 months of the signing of the recording plat, the improvements shall be fully completed.

**PLAN REFERENCES**

- Standard Boundary Survey made for David A. Libby by John D. Palmier dated October 2, 1995. Recorded in the Cumberland County Registry of Deeds in Plan Book 196, Page 214.
- Amended Standard Boundary Survey made for David A. Libby by John D. Palmier dated October 2, 1995. Recorded in the Cumberland County Registry of Deeds in Plan Book 196, Page 313.
- Second Amended Standard Boundary Survey made for David A. Libby by John D. Palmier dated October 2, 1995. Recorded in the Cumberland County Registry of Deeds in Plan Book 196, Page 367.
- Standard Boundary Survey made for Blackwater Development, LLC by Titcomb Associates dated May 1, 2006.
- Plan of Eagles Ridge Subdivision made for Blackwater Development, LLC by Titcomb Associates dated September 18, 2013 and revised through September 9, 2014 as recorded in Plan Book 214, Page 433.

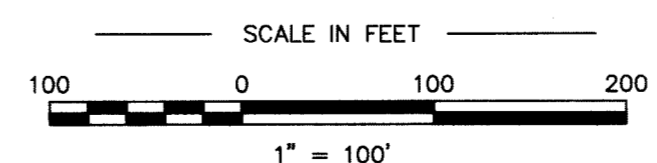
**SURVEY NOTES**

- Book and Page references are to the Cumberland County Registry of Deeds.
- Bearings are referenced to grid north, Maine State Plane Coordinate System, NAD83, West Zone.

**CERTIFICATION**

This survey conforms to the current standards of practice set forth by the Maine State Board of Licensure for Land Surveyors.

Rex J. Croteau, P.L.S. #2273



**Remaining Land**

Area = 41.28 acres  
Any further division of this parcel shall require planning board approval. Lot may be used as a single lot without Planning Board Approval provided all Dimensional Requirements are met and all required approvals are obtained.

Potential future right of way to remaining land to be reserved. Location shown conceptually. Final alignment if constructed may vary. Ant such extension requires Planning Board approval.

Open Space Parcel A area = 49.72 acres (see Note 22)

DEP Stormwater Buffer area = 12164 s.f. (buffer corners marked "Stormwater Buffer Zone")

State of Maine, Cumberland ss  
Registry of Deeds  
Received JANUARY 17 2019  
at 11:16 AM and recorded in  
Plan Book 219 Page 22  
Attest: \_\_\_\_\_  
Register

**EASEMENTS OF RECORD**

- 60' Right of Way reserved by Shirley Harriman in Book 14434, Page 225

**OWNERS OF RECORD**

Normand Berube Builders, Inc.  
Book 31921, Page 273

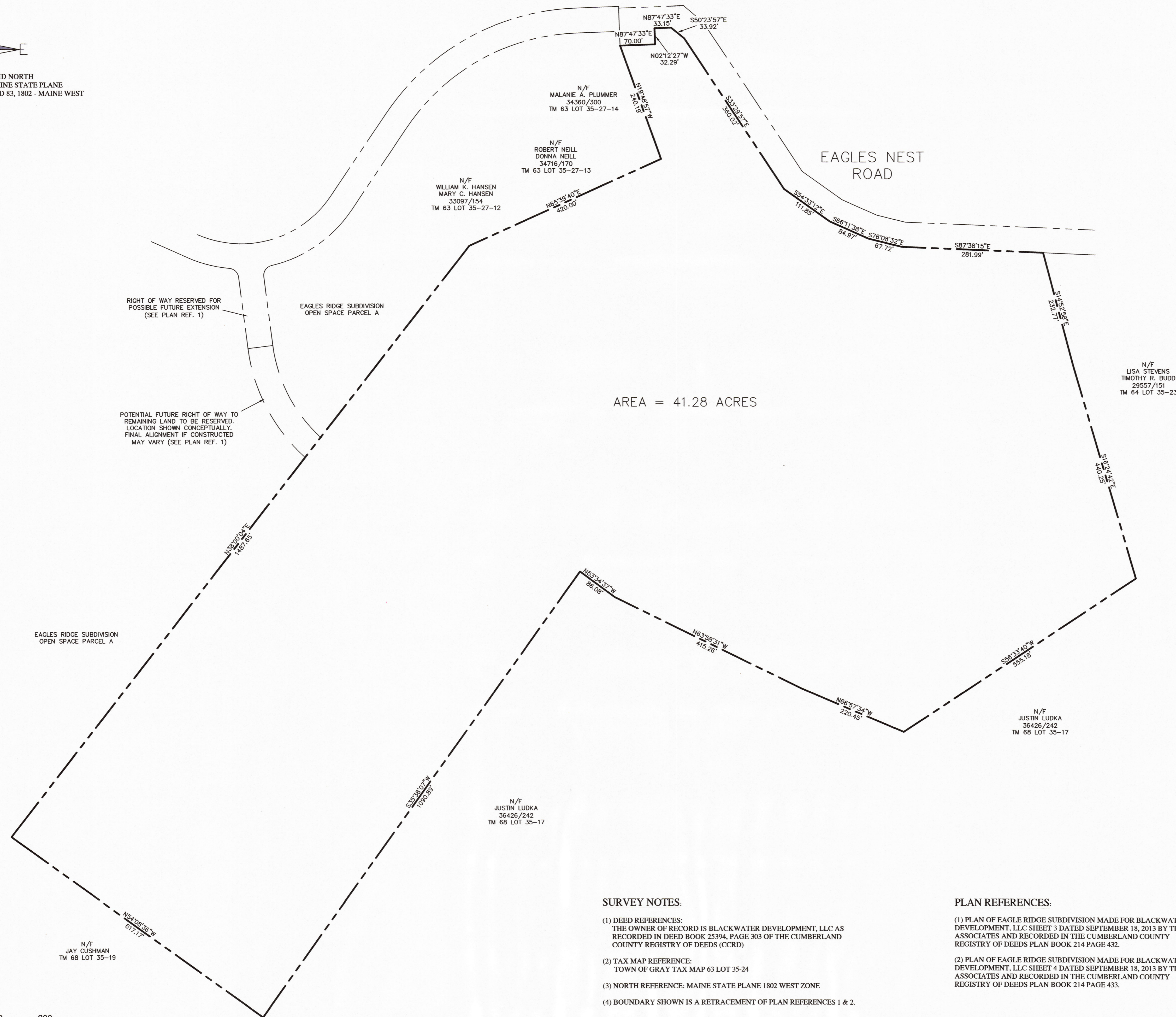
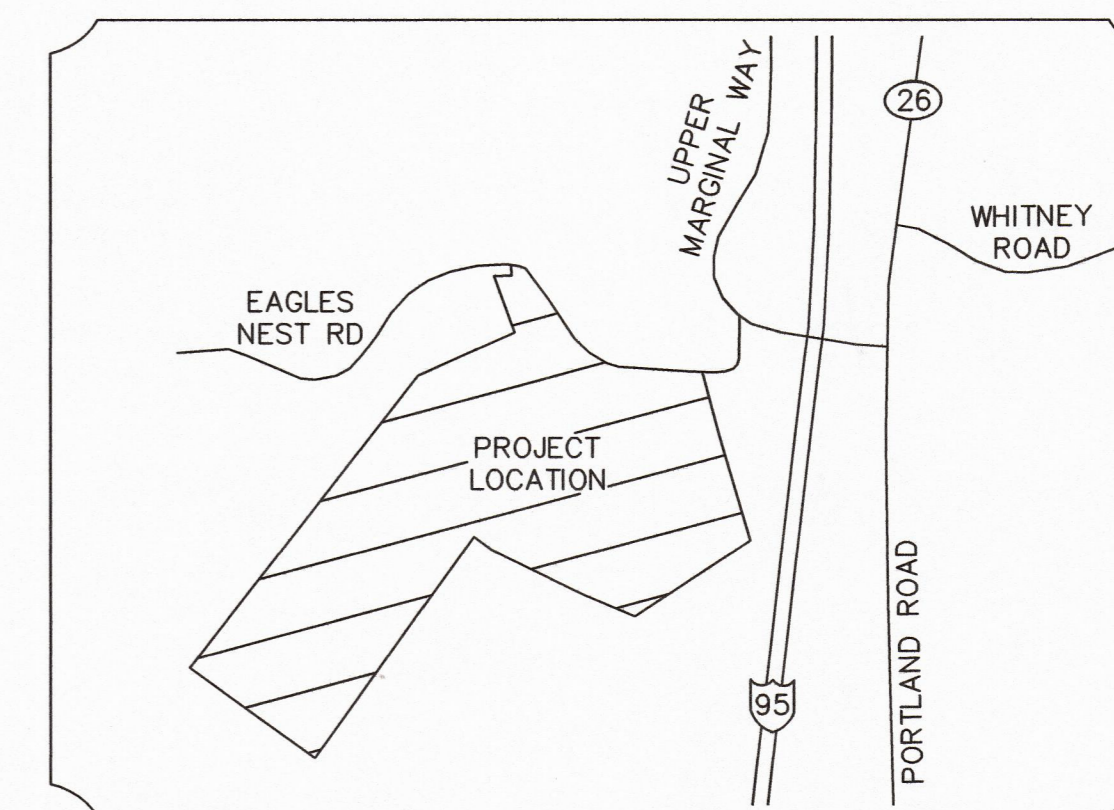
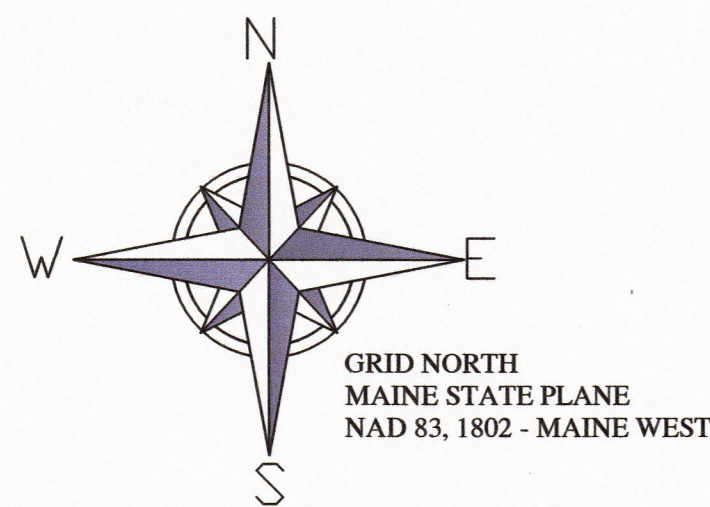
**AMENDED PLAN OF**  
**Eagles Ridge Subdivision**

Eagles Nest Road Gray, Maine

MADE FOR  
**Normand Berube Builders, Inc.**  
1040 Portland Road Saco, Maine

JOB #205033	DATE: December 20, 2018	SCALE: 1" = 100'
BOOK #783, 799	205033 Amended Subdiv	
FILE #9045	 Titcomb Associates 133 Gray Road, Falmouth, Maine 04105 (207)979-9199 www.titcombsurvey.com	

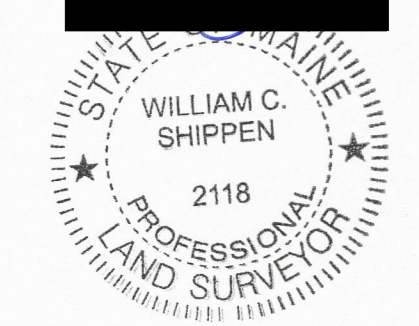




AREA = 41.28 ACRES

**CERTIFICATION:**  
I CERTIFY THAT THIS SURVEY CONFORMS TO THE STANDARDS OF THE MAINE BOARD OF LICENSURE FOR PROFESSIONAL LAND SURVEYORS AND IS CORRECT TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

WILLIAM C. SHIPPEN



**BOUNDARY SURVEY**

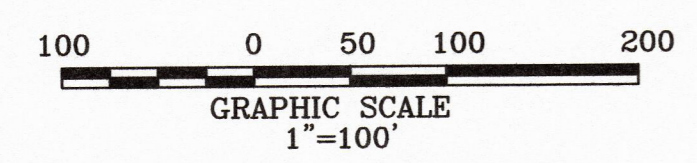
EAGLES NEST ROAD  
GRAY, ME

FOR: **DM ROMA CONSULTING ENGINEERS**  
(CLIENT)

SURVEY BY: **SURVEY, INC.**  
P.O. BOX 210  
WINDHAM, ME 04062  
(207) 892-2556  
INFO@SURVEYINCORPORATED.COM

- SURVEY NOTES:**
- (1) DEED REFERENCES:  
THE OWNER OF RECORD IS BLACKWATER DEVELOPMENT, LLC AS RECORDED IN DEED BOOK 25394, PAGE 303 OF THE CUMBERLAND COUNTY REGISTRY OF DEEDS (CCRD)
  - (2) TAX MAP REFERENCE:  
TOWN OF GRAY TAX MAP 63 LOT 35-24
  - (3) NORTH REFERENCE: MAINE STATE PLANE 1802 WEST ZONE
  - (4) BOUNDARY SHOWN IS A RETRACEMENT OF PLAN REFERENCES 1 & 2.

- PLAN REFERENCES:**
- (1) PLAN OF EAGLE RIDGE SUBDIVISION MADE FOR BLACKWATER DEVELOPMENT, LLC SHEET 3 DATED SEPTEMBER 18, 2013 BY TITCOMB ASSOCIATES AND RECORDED IN THE CUMBERLAND COUNTY REGISTRY OF DEEDS PLAN BOOK 214 PAGE 432.
  - (2) PLAN OF EAGLE RIDGE SUBDIVISION MADE FOR BLACKWATER DEVELOPMENT, LLC SHEET 4 DATED SEPTEMBER 18, 2013 BY TITCOMB ASSOCIATES AND RECORDED IN THE CUMBERLAND COUNTY REGISTRY OF DEEDS PLAN BOOK 214 PAGE 433.



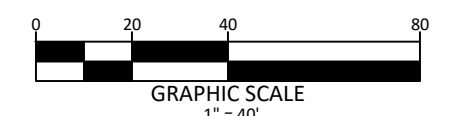
DWN: DRR  
DATE: AUGUST 2023  
CHK: WCS  
JOB NO. 23144



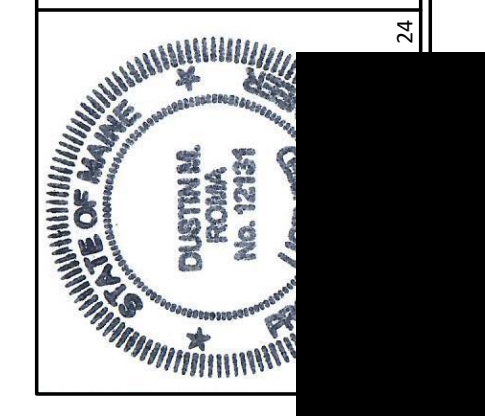


**LEGEND**

EXISTING	PROPOSED
--- PROPERTY LINE/R.O.W.	--- PROPERTY LINE/R.O.W.
--- ABUTTER PROPERTY LINE	--- ABUTTER PROPERTY LINE
--- TIE LINE	--- TIE LINE
--- SETBACK	--- SETBACK
--- EASEMENT LINE	--- EASEMENT LINE
○ GRANITE MONUMENT	○ GRANITE MONUMENT
○ IRON PIN/DRILL HOLE	○ IRON PIN/DRILL HOLE
--- CENTERLINE	--- CENTERLINE
--- BUILDING	--- BUILDING
--- EDGE OF PAVEMENT/CURB	--- EDGE OF PAVEMENT/CURB
--- EDGE OF GRAVEL	--- EDGE OF GRAVEL
--- EDGE OF CONCRETE	--- EDGE OF CONCRETE
--- SIGN	--- SIGN
--- EDGE OF WETLANDS	--- EDGE OF WETLANDS
--- EDGE OF WATER	--- EDGE OF WATER
--- CENTERLINE OF STREAM	--- CENTERLINE OF STREAM
--- FLOODPLAIN	--- FLOODPLAIN
---200---201--- CONTOUR LINE	---200---201--- CONTOUR LINE
--- TREELINE	--- TREELINE
TP- TEST PIT	TP- TEST PIT
--- CATCHBASIN	--- CATCHBASIN
○ DRAINAGE MANHOLE	○ DRAINAGE MANHOLE
--- CULVERT/STORMDRAIN	--- CULVERT/STORMDRAIN
--- UNDERDRAIN	--- UNDERDRAIN
--- HYDRANT	--- HYDRANT
○ WELL	○ WELL
○ UTILITY POLE	○ UTILITY POLE
○ LIGHT POLE	○ LIGHT POLE
--- OVERHEAD UTILITIES	--- OVERHEAD UTILITIES
--- UNDERGROUND UTILITIES	--- UNDERGROUND UTILITIES
--- TRANSFORMER PAD	--- TRANSFORMER PAD
--- GAS MAIN	--- GAS MAIN
○ GAS VALVE	○ GAS VALVE
--- RIPRAP	--- RIPRAP
--- SILT FENCE	--- SILT FENCE



- CONSTRUCTION NOTES:**
- ALL CULVERTS SHALL BE HDPE PIPE EQUAL TO ADS N-12.
  - DRIVEWAY CULVERTS FOR LOTS 1, 2, 4, 5, 8, 9, 10 AND 11 SHALL BE MINIMUM 15" DIAMETER. DRIVEWAY CULVERTS FOR LOTS 6, 7, 12 AND 13 SHALL BE MINIMUM 18" DIAMETER.
  - INSTALL EROSION CONTROL BLANKET ON ALL SLOPES GREATER THAN 15% AND UP TO A 2:1 SLOPE.
  - DRIVEWAYS TO ALL LOTS SHALL BE CONSTRUCTED TO DRAIN AWAY FROM THE ROADWAY SURFACE IN ACCORDANCE WITH SECTION 400.5.4.C.2 OF THE STREET ORDINANCE. THE DRIVEWAY SLOPE SHALL PITCH AWAY FROM THE ROAD AT A GRADE NOT LESS THAN 0.25" PER FOOT AND NOT MORE THAN 1" PER FOOT FOR A DISTANCE OF AT LEAST 4 FEET.



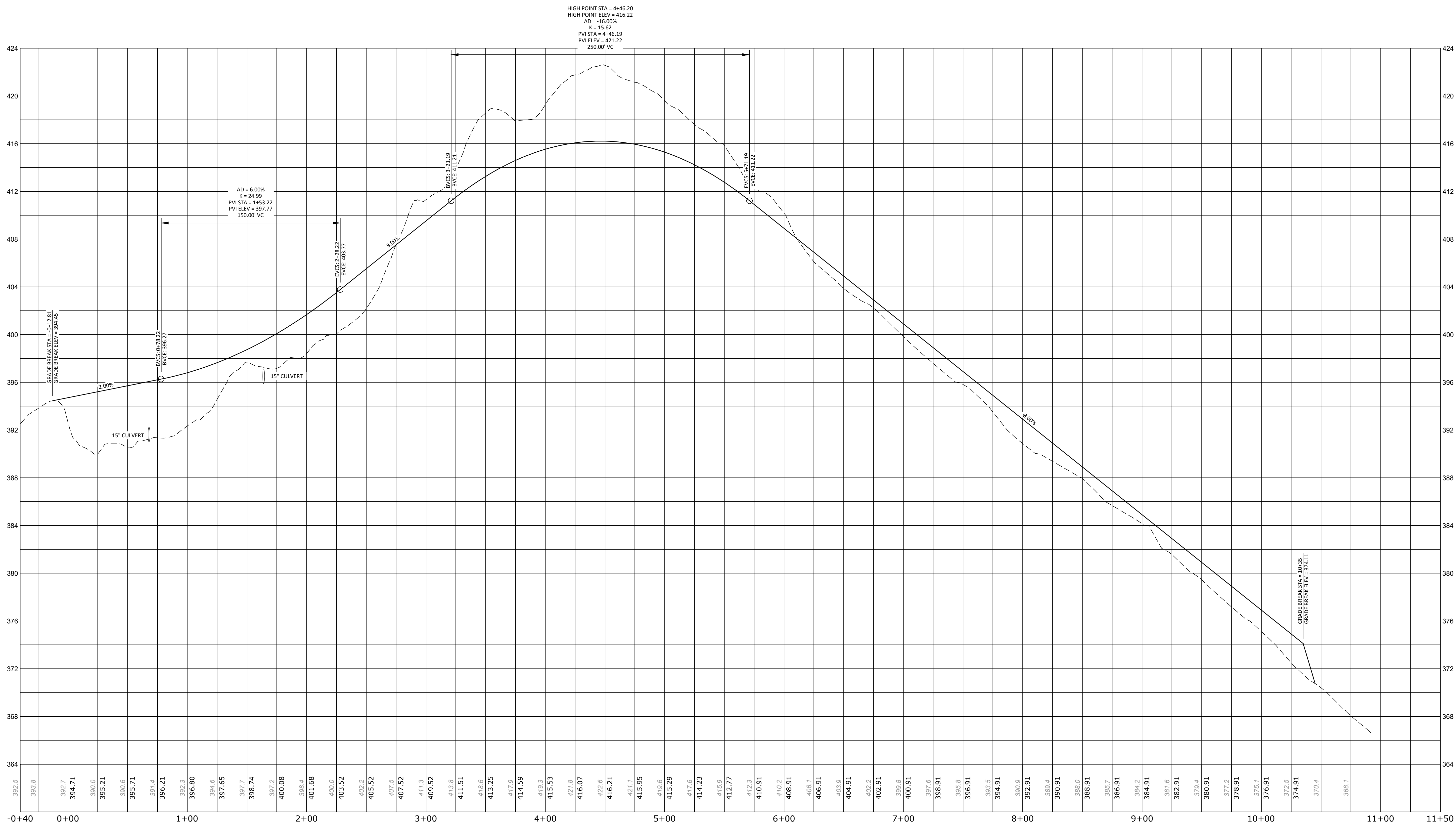
**DM ROMA**  
CONSULTING ENGINEERS  
P.O. BOX 1116  
WINDHAM, ME 04962  
(207) 591-5055

REV	DATE	BY	DESCRIPTION
B	10-24-23	JPC	ISSUED FOR REVIEW
C	11-13-23	JPC	REVISED PER REVIEW COMMENTS
D	11-22-23	JPC	REVISED PER REVIEW COMMENTS
E	12-4-23	JPC	REVISED PER REVIEW COMMENTS
F	1-2-24	JPC	REVISED PER REVIEW COMMENTS
G	1-16-24	JPC	REVISED PER REVIEW COMMENTS
H	1-29-24	JPC	REVISED PER REVIEW COMMENTS

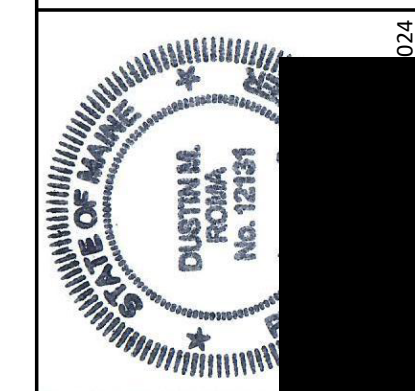
**ROADWAY PLAN**  
AERIE ESTATES SUBDIVISION  
AERIE DRIVE - OFF EAGLES NEST ROAD  
GRAY, MAINE  
FOR: **SEBAGO REALTY, LLC**  
P.O. BOX 1116  
WINDHAM, ME 04962

23050
JOB NUMBER:
1" = 40'
SCALE:
1-29-2024
DATE:
SHEET 4 OF 8
PP-1





ROADWAY PROFILE - AERIE DRIVE  
 SCALE 1"=40'H, 1"=4'V  
 GRAPHIC SCALE  
 1"=40'



**DM ROMA**  
 CONSULTING ENGINEERS  
 P.O. BOX 1116  
 WINDHAM, ME 04062  
 (207) 591-5055

REV	DATE	BY	DESCRIPTION
A	9-15-23	JPC	ISSUED FOR REVIEW
B	11-13-23	JPC	REVISED PER REVIEW COMMENTS
C	12-4-23	JPC	REVISED PER REVIEW COMMENTS
D	1-2-24	JPC	REVISED PER REVIEW COMMENTS
E	1-16-24	JPC	REVISED PER REVIEW COMMENTS
F	1-29-24	JPC	REVISED PER REVIEW COMMENTS

**ROADWAY PROFILE**  
 AERIE ESTATES SUBDIVISION  
 AERIE DRIVE - OFF EAGLES NEST ROAD  
 GRAY, MAINE  
 FOR:  
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23050  
 JOB NUMBER:  
 AS SHOWN  
 SCALE:  
 1-29-2024  
 DATE:  
 SHEET 6 OF 8  
**PP-3**

## EROSION AND SEDIMENTATION CONTROL NOTES:

EXCAVATION AND EARTHWORK SHALL BE COMPLETED SUCH THAT NO MORE THAN 1 ACRE OF THE SITE IS WITHOUT STABILIZATION AT ANY ONE TIME. LIMIT THE EXPOSED AREA TO THOSE AREAS IN WHICH WORK IS TO OCCUR DURING THE FOLLOWING 15 DAYS AND THAT CAN BE MULCHED IN ONE DAY.

IN ORDER TO EFFECTIVELY PREVENT AND CONTROL EROSION RELATED TO SOIL DISTURBANCE, THE FOLLOWING BEST MANAGEMENT PRACTICES (BMPs) SHALL BE EMPLOYED:

### 1. POLLUTION PREVENTION

MINIMIZE DISTURBED AREAS AND PROTECT NATURAL DOWNGRADIENT BUFFER AREAS TO THE EXTENT PRACTICABLE. CONTROL STORMWATER VOLUME AND VELOCITY WITHIN THE SITE TO MINIMIZE SOIL EROSION. MINIMIZE THE DISTURBANCE OF STEEP SLOPES. CONTROL STORMWATER DISCHARGES, INCLUDING BOTH PEAK FLOW RATES AND VOLUME, TO MINIMIZE EROSION AT OUTLETS. THE DISCHARGE MAY NOT RESULT IN EROSION OF ANY OPEN DRAINAGE CHANNELS, SWALES, STREAM CHANNELS OR STREAM BANKS, UPLAND, OR COASTAL OR FRESHWATER WETLANDS OFF THE PROJECT SITE.

WHenever practicable, no disturbance activities should take place within 50 feet of any protected natural resource. If disturbance activities take place between 50 feet and 500 feet of any protected natural resource, and stormwater discharges through the disturbed areas toward the protected natural resource, perimeter erosion controls must be doubled. If disturbance activities take place less than 30 feet from any protected natural resource, and stormwater discharges through the disturbed areas toward the protected natural resource, perimeter erosion controls must be doubled and disturbed areas must be temporarily or permanently stabilized within 7 days.

### 2. TEMPORARY SOIL STABILIZATION BMPs

TEMPORARY MULCHING SHALL BE APPLIED IMMEDIATELY TO ANY AREAS THAT HAVE BEEN TEMPORARILY OR PERMANENTLY SEED. ANY DISTURBED SOIL WITHIN 75' OF A STREAM, WATER BODY OR WETLAND MUST RECEIVE TEMPORARY MULCH WITHIN 48 HOURS FOLLOWING DISTURBANCE AND BEFORE ANY STORM EVENT. ALL OTHER AREAS SHALL RECEIVE TEMPORARY MULCH WITHIN 7 DAYS OF DISTURBANCE. AREAS WHICH CANNOT BE SEED DURING THE GROWING SEASON SHALL BE MULCHED FOR OVER-WINTER PROTECTION. THE FOLLOWING ARE ACCEPTABLE TEMPORARY MULCHING METHODS:

HAY OR STRAW MULCHES NEED TO BE AIR-DRIED, FREE OF UNDESIRABLE SEEDS AND COARSE MATERIALS. APPLICATION RATE MUST BE 2 BALES (70-90 POUNDS) PER 1000 SQ. FT. OR 1.5 TO 2 TONS (90-100 BALES) PER ACRE TO COVER 75-90% OF THE GROUND SURFACE. HAY OR STRAW CAN BE DRIVEN INTO THE GROUND WITH TRACKED EQUIPMENT IF SLOPES ARE LESS THAN 3%, OR CAN BE ANCHORED WITH JUTE, WOOD FIBER OR PLASTIC NETTING ON STEEPER SLOPES.

EROSION CONTROL MIX MUST CONSIST PRIMARILY OF ORGANIC MATERIAL AND WILL INCLUDE ANY OF THE FOLLOWING: SHREDDED BARK, STUMP GRINDINGS, COMPOSTED BARK OR OTHER ACCEPTABLE PRODUCTS BASED ON A SIMILAR RAW SOURCE. WOOD OR BARK CHIPS, GROUND CONSTRUCTION DEBRIS OR RECYCLED WOOD PRODUCTS. EROSION CONTROL MATS CAN BE USED AS WELL AS A STAND-ALONE REINFORCEMENT ON SLOPES OF 2:1 VERTICAL OR LESS AND DRAINING IN SHEET FLOW. IT CAN BE PLACED WITH A HYDRAULIC BUCKET, WITH A PNEUMATIC BLOWER OR BY HAND, AND MUST PROVIDE 100% SOIL COVERAGE.

EROSION CONTROL MIX SHALL MEET THE FOLLOWING SPECIFICATIONS:

- ORGANIC MATTER CONTENT SHALL BE BETWEEN 50-100%, DRY WEIGHT BASIS.
- MINERAL PORTION OF THE MIX SHOULD BE NATURALLY INCLUDED IN THE MIX WITH NO LARGER ROCKS (>4")
- ORGANIC PORTION NEEDS TO BE FIBROUS AND ELONGATED
- LARGE PORTIONS OF SILTS, CLAYS OR FINE SANDS ARE NOT ACCEPTABLE IN THE MIX
- IN STUMP GRINDING, THE MINERAL SOIL ORIGINATES FROM THE ROOT BALL AND SHOULD NOT BE REMOVED BEFORE GRINDING
- THE MIX SHOULD BE FREE OF REFUSE, MATERIAL TOXIC TO PLANT GROWTH OR UNSUITABLE MATERIAL (BARK CHIPS, GROUND CONSTRUCTION DEBRIS OR RECYCLED WOOD PRODUCTS)

WHEN USED AS MULCH, THE THICKNESS OF THE EROSION CONTROL MIX IS BASED UPON THE FOLLOWING:

LENGTH OF SLOPE	3:1 SLOPE OR LESS	BETWEEN 2:1 AND 3:1 SLOPE
LESS THAN 20 FT	2.0 IN.	4.0 IN.
BETWEEN 20 - 60 FT	3.0 IN.	5.0 IN.
BETWEEN 60 - 100 FT	4.0 IN.	6.0 IN.

CHEMICAL MULCHES AND SOIL BINDERS MAY BE USED AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL CONSULT WITH THE MANUFACTURER TO DETERMINE ADEQUATE APPLICATION RATES AND METHODS.

TEMPORARY MULCH SHALL BE INSPECTED FOLLOWING ANY SIGNIFICANT RAINFALL EVENT (GREATER THAN 0.5 INCH RAINFALL, TYP.). IF LESS THAN 90% OF THE SOIL SURFACE IS COVERED BY MULCH, ADDITIONAL MULCH SHALL BE IMMEDIATELY APPLIED. EROSION CONTROL MATS AND MULCH ANCHORING MUST BE INSPECTED AFTER RAINFALL EVENTS FOR DISLOCATION OR FAILURE, AND REPAIRED IMMEDIATELY. INSPECTIONS SHALL TAKE PLACE UNTIL 95% OF THE SOIL SURFACE IS COVERED WITH PERMANENT VEGETATION. WHERE MULCH IS USED WITH ORNAMENTAL PLANTINGS, INSPECT PERIODICALLY THROUGHOUT THE YEAR TO DETERMINE IF MULCH IS MAINTAINING COVERAGE OF THE SOIL SURFACE, AND REPAIR AS NEEDED.

TEMPORARY VEGETATION SHALL BE ESTABLISHED ON SOILS THAT WILL NOT BE BROUGHT TO FINAL GRADE FOR A PERIOD OF MORE THAN 30 DAYS. IF TEMPORARY VEGETATION CANNOT BE ESTABLISHED PRIOR TO THE END OF THE GROWING SEASON, PERMANENT VEGETATION SHALL BE PLANTED AT THE BEGINNING OF THE GROWING SEASON THE FOLLOWING YEAR. TO PREPARE THE SEEDBED, THE CONTRACTOR SHALL APPLY FERTILIZER AT A RATE OF 600 POUNDS PER ACRE OF 10-10-10 (N-P205-K20) OR EQUIVALENT AND LIMESTONE AT A RATE OF 3 TONS PER ACRE, IF NECESSARY. LOOSE SOIL TO A DEPTH OF 2 INCHES IN AREAS THAT HAVE BEEN COMPACTED BY CONSTRUCTION ACTIVITIES. GRASS SEED SHALL BE SELECTED BASED UPON THE TIME OF YEAR THE PLANTING WILL TAKE PLACE AS SUMMARIZED IN THE FOLLOWING TABLE:

SEED	LB. PER ACRE	RECOMMENDED SEEDING DATES
WINTER RYE	112	8/15 - 10/1
OATS	80	4/1 - 7/1 8/15 - 9/15
ANNUAL REGRASS	40	4/1 - 7/1

TEMPORARY SEEDING SHALL BE PERIODICALLY INSPECTED TO MAINTAIN AT LEAST 95% VEGETATIVE COVER OF SOIL SURFACE. IF ANY EVIDENCE OF EROSION OR SEDIMENTATION IS APPARENT, REPAIRS SHALL BE MADE AND OTHER TEMPORARY MEASURES SHALL BE USED IN THE INTERIM SUCH AS TEMPORARY MULCH, FILTER BARRIERS, ETC.

### 3. SEDIMENT BARRIER BMPs

PRIOR TO CONSTRUCTION TEMPORARY SEDIMENT BARRIERS SHALL BE INSTALLED AT THE DOWNGRADIENT EDGE OF ANY AREA TO BE DISTURBED AND ADJACENT TO ANY DRAINAGE CHANNELS WITHIN THE DISTURBED AREA. SEDIMENT BARRIERS INCLUDE ANY OF THE FOLLOWING:

FILTER BARRIER FENCE, ALSO CALLED SILT FENCE, SHALL BE INSTALLED WHERE SHOWN ON THE PLANS AND IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS. THE FILTER FABRIC SHALL BE A PERVIOUS SHEET OF PROPYLENE, NYLON, POLYESTER OR ETHYLENE YARN AND SHALL PROVIDE A MINIMUM OF 6 MONTHS USABLE CONSTRUCTION LIFE INCLUDING PROTECTION AGAINST ULTRA-VIOLET LIGHT. THE HEIGHT OF THE FENCE SHALL NOT EXCEED 36 INCHES INSTALLED AND POST SPACING SHALL NOT EXCEED 6 FEET. JOINTS IN THE FENCE SHALL BE AVOIDED TO THE EXTENT POSSIBLE, AND IF NECESSARY SHALL BE SPICED TOGETHER AT A SUPPORT POST WITH A MINIMUM 6 INCH OVERLAP. A TRENCH SHALL BE EXCAVATED APPROXIMATELY 6 INCHES WIDE AND 6 INCHES DEEP, AND THE BOTTOM 6-8 INCHES OF FABRIC SHALL BE "TOED-IN" TO THE TRENCH AND COMPACTED. THE TRENCH SHOULD BE UPHILL OF THE FABRIC PRIOR TO BURIAL.

EROSION CONTROL MIX BERMS ARE LINEAR BARRIERS COMPOSED OF EROSION CONTROL MIX AS SPECIFIED ABOVE. THE BERM MUST BE A MINIMUM OF 12 INCHES TALL AND 24 INCHES WIDE AT THE BASE IF UPHILL SLOPES ARE LESS THAN 5%. STEEPER SLOPES OR SLOPES GREATER THAN 20 FEET LONG MAY REQUIRE A BERM. EROSION CONTROL MIX BERMS SHALL BE PROHIBITED AT THE BASE OF A LONG OR STEEP SLOPE (5% OR GREATER) WITHOUT THE ADDITIONAL SUPPORT OF A FILTER FENCE INSTALLED ON THE DOWNHILL SIDE OF THE BERM.

SEDIMENT BARRIERS SHOULD BE INSTALLED DOWNGRADIENT OF SOIL OR SEDIMENT STOCKPILES AND STORMWATER SHOULD BE PREVENTED FROM RUNNING ONTO THE STOCKPILE. SEDIMENT BARRIERS SHALL BE INSPECTED AFTER ANY SIGNIFICANT RAINFALL EVENT (GREATER THAN 0.5 INCH RAINFALL) AND REPAIRED IMMEDIATELY IF THERE ARE ANY SIGNS OF EROSION OR SEDIMENTATION BELOW THE BARRIERS. IF THERE ARE SIGNS OF UNDERCUTTING AT THE CENTER OR EDGES OF THE BARRIER, OR IF LARGE VOLUMES OF WATER ARE IMPOUNDED BEHIND THE BARRIER, IT MAY BE NECESSARY TO REMOVE THE BARRIER WITH A TEMPORARY STONE CHECK DAM. SEDIMENT SHALL BE REMOVED ONCE IT REACHES HALF THE BARRIER HEIGHT. AFTER THE BARRIER IS REMOVED, ANY REMAINING SILT SHALL EITHER BE REMOVED OR GRADED TO CONFORM WITH THE EXISTING TOPOGRAPHY AND VEGETATED.

TEMPORARY EROSION CONTROL MEASURES ARE REMOVED ONCE THE SITE IS PERMANENTLY STABILIZED AND CONSTRUCTION ACTIVITY HAS BEEN COMPLETED.

### 4. STORM DRAIN INLET PROTECTION

STORM DRAIN INLETS THAT ARE MADE OPERATIONAL BEFORE THEIR DRAINAGE AREA IS STABILIZED SHALL BE PROTECTED WITH A FILTER UNTIL THE DRAINAGE AREA IS EITHER PAVED OR STABILIZED WITH 95% VEGETATIVE GROWTH. THE FOLLOWING ARE ACCEPTABLE BMPs ASSOCIATED WITH STORM DRAIN INLET PROTECTION:

MANUFACTURED SEDIMENT FILTERS ARE THE PREFERRED METHOD FOR PROTECTING CATCH BASIN INLETS IN PAVED OR GRAVEL ROADWAYS. THE FILTERS TYPICALLY CONSIST OF A FABRIC OR OTHER PERVIOUS MATERIAL THAT IS PLACED ABOVE OR BELOW THE GRATE THAT TRAPS SEDIMENT ON THE SURFACE AND ALLOWS WATER TO FLOW THROUGH THE GRATE. CONSIDERATIONS SUCH AS WEATHER CONDITIONS, SLOPES, TRIBUTARY WATERSHED AREA AND EXPECTED SEDIMENT ACCUMULATION SHOULD BE FACTORED INTO MAKING A DECISION ON ANY PARTICULAR PRODUCT, AND THE MANUFACTURER'S RECOMMENDATIONS ON INSTALLATION AND MAINTENANCE SHALL BE STRICTLY ADHERED TO.

### 5. STABILIZED CONSTRUCTION ENTRANCE/EXIT

TO REDUCE THE TRACKING OF SEDIMENT ONTO ROADWAYS, A STABILIZED CONSTRUCTION EXIT SHALL BE INSTALLED AT ALL POINTS OF EGRESS WHERE VEHICLES MAY TRAVEL FROM THE PROJECT SITE TO A PUBLIC ROAD OR OTHER PAVED AREA. THE STONE PAD SHALL CONSIST OF A MINIMUM 6-INCH DEPTH OF 2-3 INCH CRUSHED STONE, AND SHALL BE PLACED ON A GEOTEXTILE FABRIC. THE PAD SHALL EXTEND AT LEAST 50 FEET INTO THE PROJECT SITE AND BE A MINIMUM OF 10 FEET WIDE. THE EXIT SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, AND THE CONTRACTOR SHALL SWEEP PAVEMENT AT EXITS THAT HAVE EXPERIENCED ANY MUD-TRACKING PRIOR TO THE NEXT STORM EVENT. MAINTAIN THE PAD UNTIL ALL DISTURBED AREAS ARE STABILIZED.

### 6. DUST CONTROL

THE CONTRACTOR IS RESPONSIBLE FOR CONTROLLING DUST ON THE PROJECT SITE AND ON ADJACENT ROADWAYS. EXPOSED SOIL SURFACES SHALL BE MOISTENED PERIODICALLY WITH ADEQUATE WATER TO CONTROL DUST. GRAVEL SURFACES SHALL EITHER BE TREATED WITH AN APPLICATION OF CALCIUM CHLORIDE OR COVERED WITH CRUSHED STONE IF DUST CONTROL BECOMES DIFFICULT WITH NORMAL WATER APPLICATIONS.

### 7. LAND GRADING AND SLOPE PREPARATION

GRADING SHALL BE PLANNED SO AS TO MINIMIZE THE LENGTH OF TIME BETWEEN INITIAL SOIL EXPOSURE AND FINAL GRADING. ON LARGE PROJECTS THIS SHOULD BE ACCOMPLISHED BY PHASING THE OPERATION AND COMPLETING THE FIRST PHASE UP TO FINAL GRADING AND SEEDING BEFORE STARTING THE NEXT PHASE. ANY EXPOSED AREA THAT WILL NOT BE FINISH GRADED WITHIN 7 DAYS SHALL BE TREATED WITH MULCH OR PLANTED WITH TEMPORARY VEGETATION. PROVISIONS SHALL BE MADE TO SAFELY CONVEY SURFACE RUNOFF TO STORM DRAININGS, PROTECTED OUTLETS OR TO STABLE WATER COURSES TO ENSURE THAT SURFACE RUNOFF WILL NOT DAMAGE SLOPES OR OTHER GRADED AREAS. CUT AND FILL SLOPES THAT ARE TO BE STABILIZED WITH GRASS SHALL NOT BE STEEPER THAN 2:1. AREAS TO BE FILLED SHALL BE CLEARED, GRUBBED AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS OR OTHER OBJECTIONABLE MATERIALS. AREAS SHALL BE GRADDED TO A MINIMUM DEPTH OF 3 INCHES PRIOR TO PLACEMENT OF TOPSOIL. ALL FILLS SHALL BE COMPACTED AS REQUIRED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS. FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES AND CONDUITS, ETC. SHALL BE COMPACTED IN ACCORDANCE WITH LOCAL REQUIREMENTS OR CODES. ALL FILLS SHALL BE PLACED AND COMPACTED IN LAYERS NOT TO EXCEED 8 INCHES IN THICKNESS. FILL MATERIAL SHALL BE FREE OF STUMPS, BUILDING DEBRIS AND OTHER OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FILLS. FROZEN MATERIAL OR SOFT, MUCKY OR HIGHLY COMPRESSIBLE MATERIALS SHALL NOT BE INCORPORATED INTO FILL SLOPES OR STRUCTURAL FILLS. FILL SHALL NOT BE PLACED ON A FROZEN FOUNDATION. SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHALL BE HANDLED APPROPRIATELY. ALL GRADED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY FOLLOWING FINISHED GRADING.

### 8. TOPSOIL

IF POSSIBLE, TOPSOIL SHALL BE STOCKPILED ON THE PROJECT SITE AND REUSED. HIGH QUALITY TOPSOIL SHALL BE FRIABLE AND LOAMY (LOAM, SANDY LOAM, SILT LOAM, SANDY CLAY LOAM, CLAY LOAM), AND SHALL BE FREE OF DEBRIS, TRASH, STUMPS, ROCKS, ROOTS AND NOXIOUS WEEDS. AFTER THE AREAS TO BE TOPSOILED HAVE BEEN BROUGHT TO GRADE, AND IMMEDIATELY PRIOR TO SPREADING THE TOPSOIL, THE SUBGRADE SHALL BE LOOSENED BY SCRAPING TO A DEPTH OF AT LEAST 2 INCHES TO ENSURE BONDING WITH SUBSOIL. THE TOPSOIL SHALL BE UNIFORMLY DISTRIBUTED TO A MINIMUM COMPACTED DEPTH OF 4 INCHES. ANY IRREGULARITIES IN THE SURFACE RESULTING FROM TOPSOILING OR OTHER OPERATIONS SHALL BE CORRECTED IN ORDER TO PREVENT THE FORMATION OF DEPRESSIONS OR WATER POCKETS. IT IS NECESSARY TO COMPACT THE TOPSOIL ENOUGH TO ENSURE GOOD CONTACT WITH THE UNDERLYING SOIL, BUT UNDUCE COMPACTION IS TO BE AVOIDED.

### 9. PERMANENT SOIL STABILIZATION

IF THE AREA WILL NOT BE WORKED FOR MORE THAN ONE YEAR OR HAS BEEN BROUGHT TO FINAL GRADE, THEN PERMANENTLY STABILIZE THE AREA WITHIN 7 DAYS BY PLANTING VEGETATION, SEEDING, SOD, OR THROUGH THE USE OF PERMANENT MULCH, OR RIPRAP, OR ROAD SUB-BASE. IF USING VEGETATION FOR STABILIZATION, SELECT THE PROPER VEGETATION FOR THE LIGHT, MOISTURE, AND SOIL CONDITIONS; AMEND AREAS OF DISTURBANCE WITH TOPSOIL, COMPOST, OR FERTILIZER; PROTECT SEEDING AREAS WITH MULCH OR, IF NECESSARY, EROSION CONTROL BLANKETS; AND SCHEDULE SOODING, PLANTING, AND SEEDING SO TO AVOID DIE-OFF FROM SUMMER DROUGHT AND FALL FROSTS. NEWLY SEED OR SODDED AREAS MUST BE PROTECTED FROM VEHICLE TRAFFIC, EXCESSIVE PEDESTRIAN TRAFFIC, AND CONCENTRATED RUNOFF UNTIL THE VEGETATION IS WELL-ESTABLISHED WITH 90% COVER BY HEALTHY VEGETATION. IF NECESSARY, AREAS MUST BE REWORKED AND RESTABILIZED IF GERMINATION IS SPARSE, PLANT COVERAGE IS SPOTTY, OR TOPSOIL EROSION IS EVIDENT. ONE OR MORE OF THE FOLLOWING MAY APPLY TO A PARTICULAR SITE.

SEEDING AREAS: TO PREPARE THE SEEDBED, APPLY 10-20-20 FERTILIZER AT A RATE OF 800 POUNDS PER ACRE AND GROUND LIMESTONE AT A RATE OF 3 TONS PER ACRE. WORK THE FERTILIZER AND LIMESTONE INTO THE TOPSOIL TO A DEPTH OF 4 INCHES AND REMOVE ANY STONES, ROOTS OR OTHER VISIBLE DEBRIS. SELECT A SEED MIXTURE THAT IS APPROPRIATE FOR THE SOIL TYPE AND MOISTURE CONTENT AS FOUND AT THE SITE, AND FOR THE AMOUNT OF SUN EXPOSURE AND FOR LEVEL OF USE. REFER TO THE USDA SOIL CONSERVATION SERVICE OR THE LOCAL SOIL AND WATER CONSERVATION DISTRICT FOR APPROPRIATE SEED MIXTURES. APPLY SEED UNIFORMLY IN ACCORDANCE WITH SUPPLIER RECOMMENDATIONS AND IMMEDIATELY COVER WITH MULCH AS DESCRIBED IN THE TEMPORARY MULCHING SECTION OF THIS PLAN.

HYDROSEEDING SHALL BE DONE IN ACCORDANCE WITH SUPPLIERS RECOMMENDATIONS. FOR SEEDED AREAS TO BE PERMANENTLY STABILIZED, 90% OF THE DISTURBED SOIL SHALL BE COVERED WITH MATURE HEALTHY PLANTS WITH NO EVIDENCE OF WASHING OR RILLING OF THE TOPSOIL.

SOD STRIPS SHALL BE LAID AT RIGHT ANGLES TO DIRECTION OF SLOPE OR FLOW OF WATER STARTING AT LOWEST ELEVATION. JOINTS SHALL BE STAGGERED, AND ALL STRIPS SHALL BE ROLLED OR TAMPED INTO PLACE. ON SLOPES, SOD SHALL BE ANCHORED WITH STAPLES, WIRES OR PINS. IRRIGATE SODDED AREA IMMEDIATELY AFTER INSTALLATION. FOR SODDED AREAS TO BE PERMANENTLY STABILIZED, THE ROOTS OF THE SOD MUST BE COMPLETELY BOUND INTO THE UNDERLYING SOIL WITH NO SLUMPING OF THE SOD OR DIE-OFF.

PERMANENT MULCH IS A LONG TERM COVER THAT PROVIDES A GOOD BUFFER AROUND DISTURBED AREAS. THE EROSION CONTROL MIX SHALL CONSIST PRIMARILY OF ORGANIC MATERIAL AND MAY INCLUDE SHREDDED BARK, STUMP GRINDINGS OR COMPOSTED BARK. WOOD CHIPS, GROUND CONSTRUCTION DEBRIS, REPROCESSED WOOD PRODUCTS OR BARK CHIPS ARE NOT ACCEPTABLE. THE EROSION CONTROL MIX SHALL CONTAIN A WELL-GRADED MIXTURE OF PARTICLE SIZES AND MAY CONTAIN ROCKS LESS THAN 4 INCHES IN DIAMETER. EROSION CONTROL MIX MUST BE FREE OF REFUSE, PHYSICAL CONTAMINANTS AND MATERIAL TOXIC TO PLANT GROWTH.

RIPRAP STONE SHALL CONSIST OF SUB-ANGULAR FIELD STONE OR ROUGH UNEVEN QUARRY STONE OF APPROXIMATELY RECTANGULAR SHAPE. THE DEPTH OF STONE SHALL BE A MINIMUM OF 2.2 TIMES THE MAXIMUM STONE DIAMETER. A GRAVEL OR GEOTEXTILE FILTER BLANKET SHALL BE PLACED BETWEEN THE RIPRAP AND UNDERLYING SOIL SURFACE. GRAVEL FILTER BLANKETS SHALL MEET MOST TYPICAL UNDERDRAIN MATERIAL SPECIFICATIONS AND BE AT LEAST 6 INCHES THICK. GEOTEXTILE FILTER BLANKETS SHALL BE SPECIFIED BASED ON SITE CONDITIONS. RIPRAP SLOPES SHALL BE TOED INTO THE BASE OF THE EMBANKMENT BY EXCAVATING A TRENCH AT THE BOTTOM OF THE SLOPE AND INSTALLING A STABLE BASE OF RIPRAP TO GRADE.

DITCHES, CHANNELS AND SWALES ARE CONSIDERED PERMANENTLY STABILIZED WHEN THE CHANNEL HAS 90% COVER OF HEALTHY VEGETATION WITH A WELL-GRADED RIPRAP LINING, EROSION CONTROL BLANKET, OR WITH ANOTHER NON-EROSIVE LINING SUCH AS CONCRETE OR ASPHALT PAVEMENT. THERE MUST BE NO EVIDENCE OF SLUMPING OF THE CHANNEL LINING, UNDERCUTTING OF THE BANKS, OR DOWNCUTTING OF THE CHANNEL.

### 10. STORMWATER CHANNELS

EACH CHANNEL SHOULD BE CONSTRUCTED IN SECTIONS SO THAT THE SECTION'S GRADING, SHAPING, AND INSTALLATION OF THE PERMANENT LINING CAN BE COMPLETED THE SAME DAY. IF A CHANNEL'S FINAL GRADING OR LINING INSTALLATION MUST BE DELAYED, THEN TEMPORARY STABILIZATION MEASURES MUST BE USED TO DIVERT STORMWATER FROM THE CHANNEL. RIPRAP BARRIERS MUST BE INSTALLED IN THE CHANNEL TO SLOW THE WATER VELOCITY, AND A TEMPORARY LINING INSTALLED ALONG THE CHANNEL TO PREVENT SCOURING.

## WINTER EROSION AND SEDIMENTATION CONTROL NOTES:

THE WINTER CONSTRUCTION PERIOD TYPICALLY BEGINS IN EARLY NOVEMBER AND ENDS IN MID APRIL. IF A CONSTRUCTION SITE IS NOT STABILIZED WITH PAVEMENT, A ROAD GRAVEL BASE OR RIPRAP BY NOVEMBER 15, THEN THE SITE NEEDS TO BE PROTECTED WITH PERMANENT VEGETATION, WINTER EXCAVATION AND EARTHWORK MUST BE COMPLETED SUCH THAT NO MORE THAN 1 ACRE OF THE SITE IS WITHOUT STABILIZATION AT ANY ONE TIME. LIMIT THE EXPOSED AREA TO THOSE AREAS IN WHICH WORK IS TO OCCUR DURING THE FOLLOWING 15 DAYS AND THAT CAN BE MULCHED IN ONE DAY PRIOR TO ANY SNOW EVENT. AN AREA SHALL BE CONSIDERED DENUDED IF THE SUBGRADE GRAVEL IS INSTALLED IN THE ROADWAY AREAS OR THE AREAS OF FUTURE LOAM AND SEED HAVE BEEN LOANED, SEEDED AND MULCHED. A COVER OF EROSION CONTROL MIX IS THE PREFERRED TEMPORARY MULCH DURING WINTER CONDITIONS.

### 1. NATURAL RESOURCE PROTECTION

ANY AREAS WITHIN 75 FEET FROM ANY REGULATED NATURAL RESOURCES SHALL BE MULCHED BY DECEMBER 1 AND ANCHORED WITH PLASTIC NETTING OR PROTECTED WITH AN EROSION CONTROL COVER. DURING WINTER CONSTRUCTION, A DOUBLE ROW OF SEDIMENT BARRIERS (FOR EXAMPLE, SILT FENCE BACKED WITH HAY BALES OR EROSION CONTROL MIX) WILL BE PLACED BETWEEN ANY REGULATED NATURAL RESOURCE AND THE DISTURBED AREA. PROJECTS CROSSING THE REGULATED NATURAL RESOURCE SHALL BE PROTECTED A MINIMUM DISTANCE OF 100 FEET ON EITHER SIDE FROM THE EROSION. EXISTING PROJECTS NOT STABILIZED BY DECEMBER 1 SHALL BE PROTECTED WITH THE SECOND LINE OF SEDIMENT BARRIER TO ENSURE FUNCTIONALITY DURING THE SPRING THAW AND RAINS.

### 2. SEDIMENT BARRIERS

DURING FROZEN CONDITIONS, SEDIMENT BARRIERS MAY CONSIST OF EROSION CONTROL MIX BERMS OR ANY OTHER RECOGNIZED SEDIMENT BARRIERS AS FROZEN SOIL PREVENTS THE PROPER INSTALLATION OF HAY BALES OR SILT FENCES.

### 3. MULCHING

ALL AREAS SHALL BE CONSIDERED TO BE DENUDED UNTIL SEEDED AND MULCHED. HAY AND STRAW MULCH SHALL BE APPLIED AT A RATE OF 3 TONS PER ACRE (THAT IS THE NORMAL ACCEPTED RATE) AND SHALL BE PROPERLY ANCHORED. EROSION CONTROL MIX MUST BE APPLIED WITH A MINIMUM 4 INCHES THICKNESS. MULCH SHALL NOT BE SPREAD ON TOP OF SNOW. SNOW MUST BE REMOVED DOWN TO A ONE-INCH DEPTH PRIOR TO APPLICATION. AFTER EACH DAY OF FINAL GRADING, THE AREA WILL BE PROPERTY STABILIZED WITH ANCHORED HAY OR STRAW OR EROSION CONTROL MATTING. AN AREA SHALL BE CONSIDERED TO HAVE BEEN STABILIZED WHEN EXPOSED SURFACES HAVE BEEN EITHER MULCHED OR ADEQUATELY ANCHORED SO THAT GROUND SURFACE IS NOT VISIBLE THROUGH THE MULCH. BETWEEN THE DATES OF NOVEMBER 1 AND APRIL 15, ALL MULCH SHALL BE ANCHORED BY EITHER MULCH NETTING, TRACKING OR WOOD CELLULOSE FIBER. THE COVER WILL BE CONSIDERED SUFFICIENT WITH THE GROUND SURFACE IS NOT VISIBLE THROUGH THE MULCH. AFTER NOVEMBER 15T, MULCH AND ANCHORING OF ALL EXPOSED SOIL SHALL OCCUR AT THE END OF EACH FINAL GRADING WORKDAY.

### 4. SOIL STOCKPILING

STOCKPILES OF SOIL OR SUBSOIL WILL BE MULCHED FOR OVER WINTER PROTECTION WITH HAY OR STRAW AT TWICE THE NORMAL RATE OR WITH A FOUR-INCH LAYER OF EROSION CONTROL MIX. STOCKPILES SHALL BE COVERED WITH MULCH AND RE-SEED PRIOR TO ANY RAINFALL (0.5 INCH RAINFALL OR GREATER) OR SNOWFALL. SEDIMENT BARRIERS SHOULD BE INSTALLED DOWNGRADIENT OF SOIL OR SEDIMENT STOCKPILES AND STORMWATER SHOULD BE PREVENTED FROM RUNNING ONTO THE STOCKPILE. ANY SOIL STOCKPILE WILL NOT BE PLACED WITHIN 100 FEET FROM ANY REGULATED NATURAL RESOURCE.

### 5. SEEDING

BETWEEN THE DATES OF OCTOBER 15 AND APRIL 1, LOAM OR SEED WILL NOT BE REQUIRED. DURING PERIODS OF ABOVE FREEZING TEMPERATURES FINISHED AREAS SHALL BE FINE GRADED AND EITHER PROTECTED MULCH OR TEMPORARILY SEEDED AND MULCHED UNTIL SUCH TIME AS THE FINAL TREATMENT CAN BE APPLIED. IF THE DATE IS AFTER NOVEMBER 1 AND IF THE EXPOSED AREA HAS BEEN FLOORED, FINE GRADDED WITH A UNIFORM SURFACE, THEN THE AREA MAY BE DORMANT SEEDS AT A RATE OF 3 TIMES HIGHER THAN SPECIFIED FOR PERMANENT SEED AND THEN MULCHED. IF DORMANT SEEDING IS USED, ALL DISTURBED AREAS SHALL RECEIVE 4 INCHES OF LOAM AND SEED AT AN APPLICATION RATE OF 5 LBS PER 1,000 S.F. ALL AREAS INSUFFICIENTLY VEGETATED (LESS THAN 90%) IN THE SPRING SHALL BE REVEGETATED.

### 6. OVER-WINTER STABILIZATION OF DITCHES AND CHANNELS

ALL STONE-LINED DITCHES AND CHANNELS MUST BE CONSTRUCTED BY NOVEMBER 1. ALL GRASS-LINED DITCHES AND CHANNELS MUST BE CONSTRUCTED AND STABILIZED BY SEPTEMBER 1. IF A GRASS-LINED DITCH OR CHANNEL IS STABILIZED BY SEPTEMBER 1, THEN EITHER A SOD LINING SHALL BE INSTALLED PRIOR TO OCTOBER 1 OR THE DITCH MUST BE LINED WITH STONE RIPRAP BACKED BY AN APPROPRIATE GRAVEL BED OR GEOTEXTILE PRIOR TO NOVEMBER 1.

### 7. OVER-WINTER STABILIZATION OF DISTURBED SLOPES

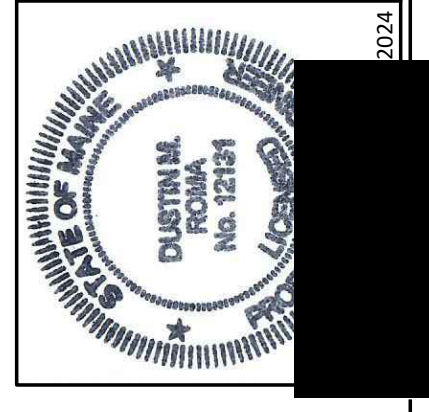
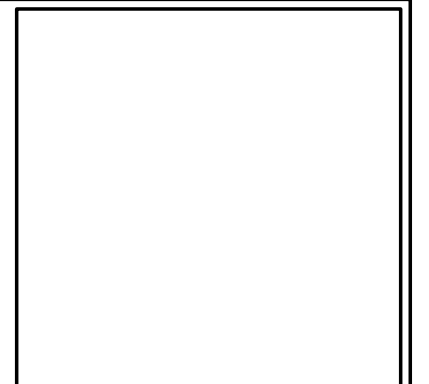
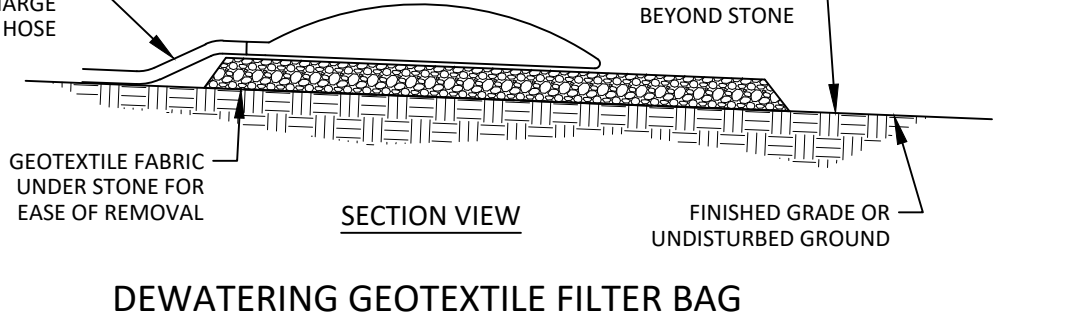
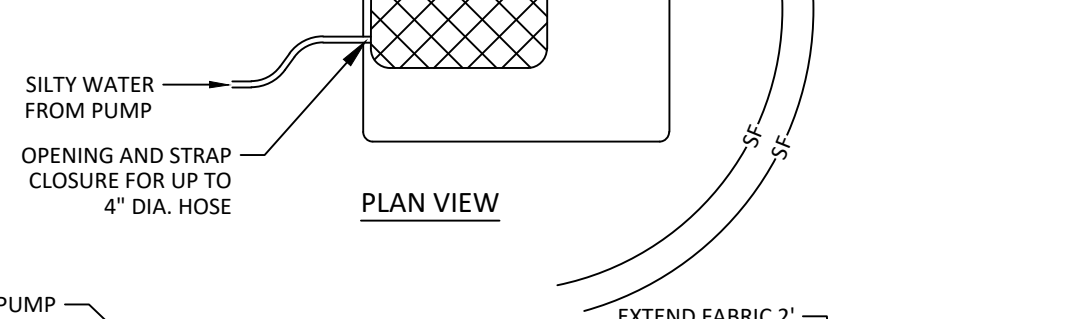
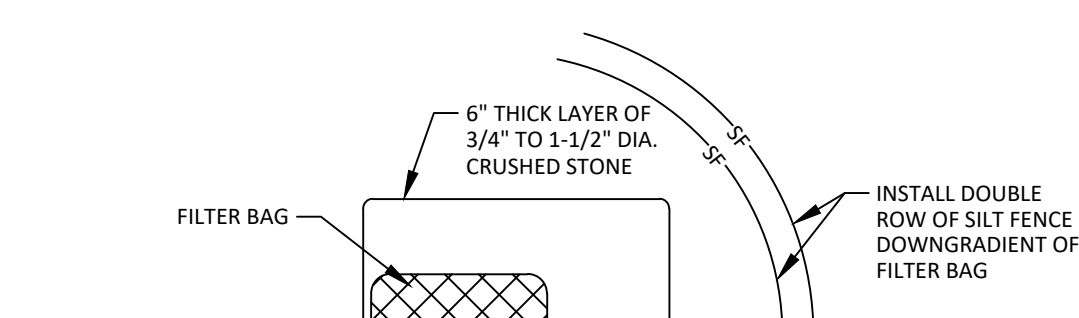
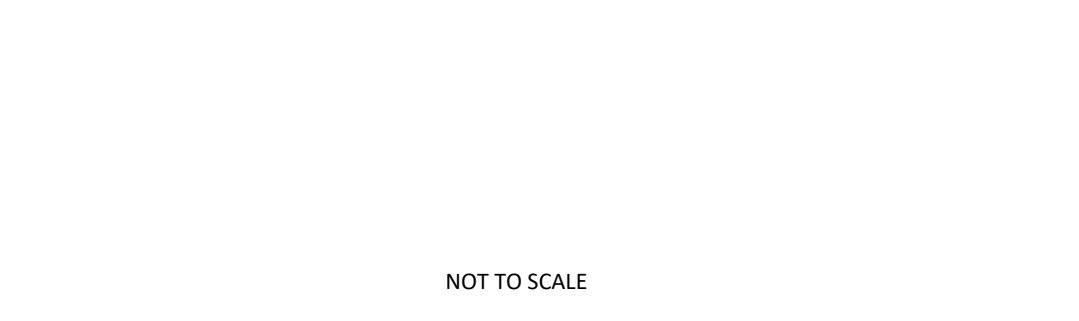
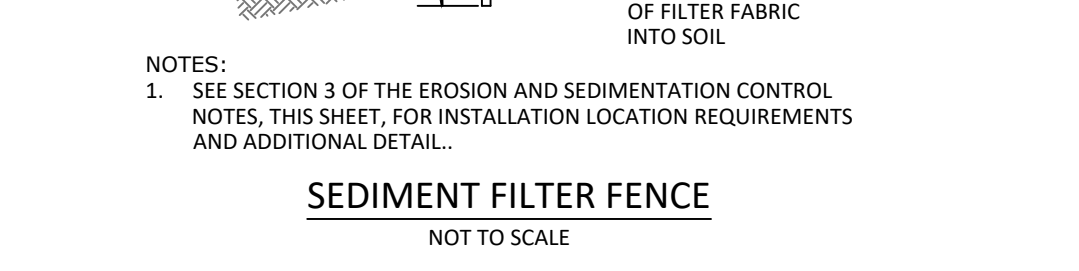
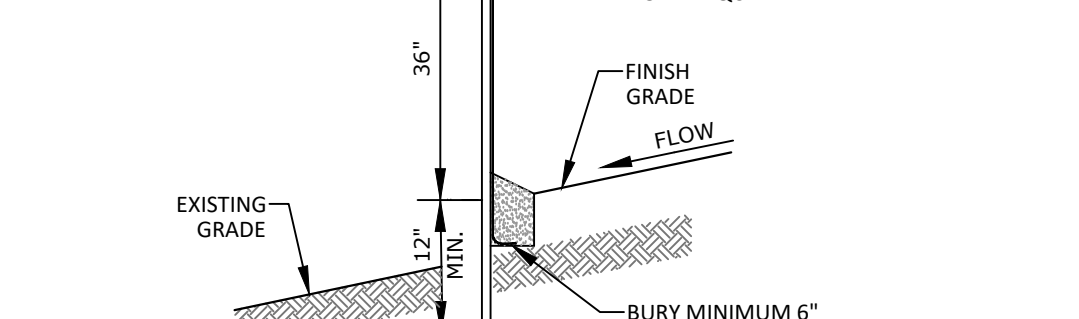
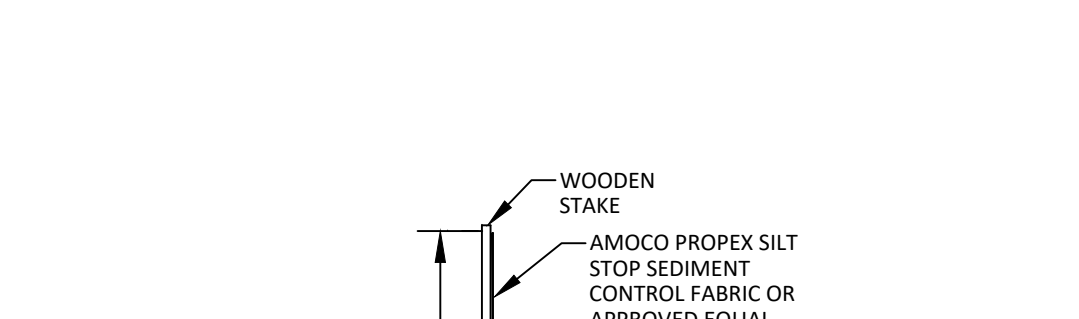
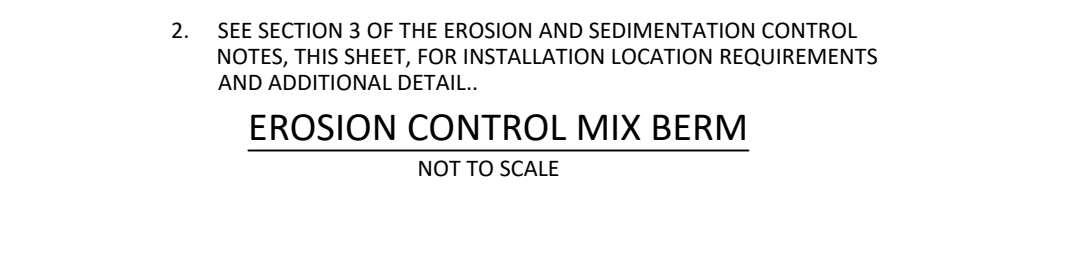
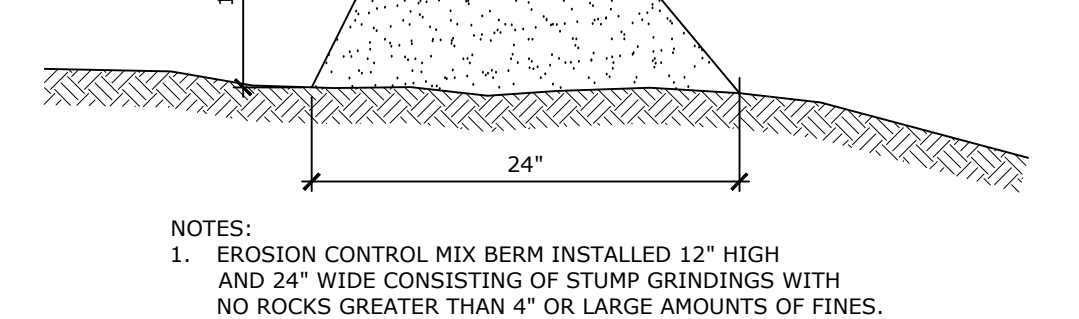
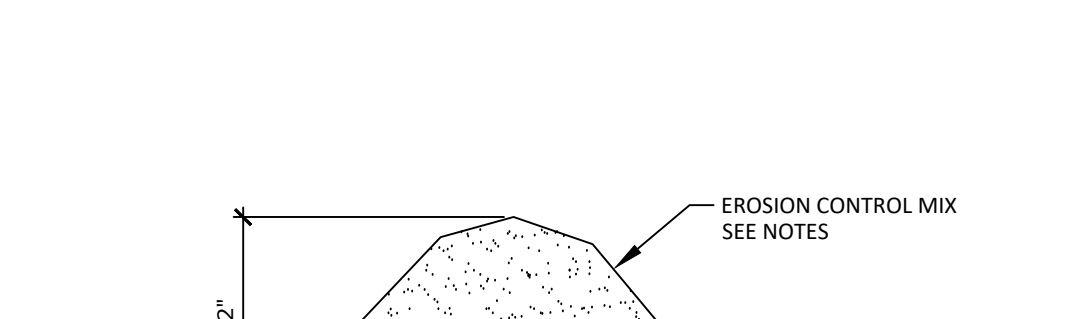
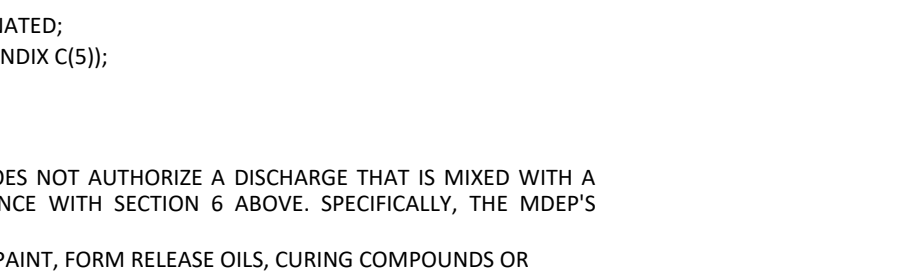
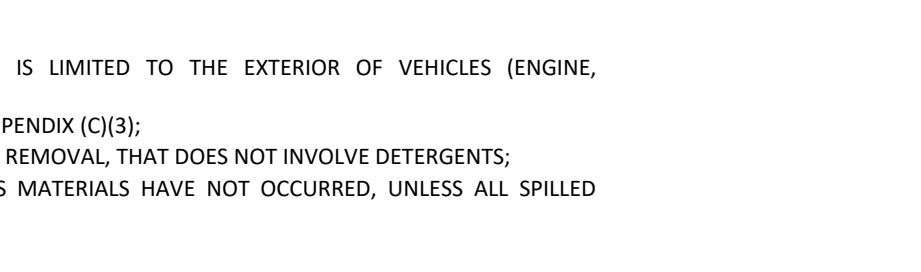
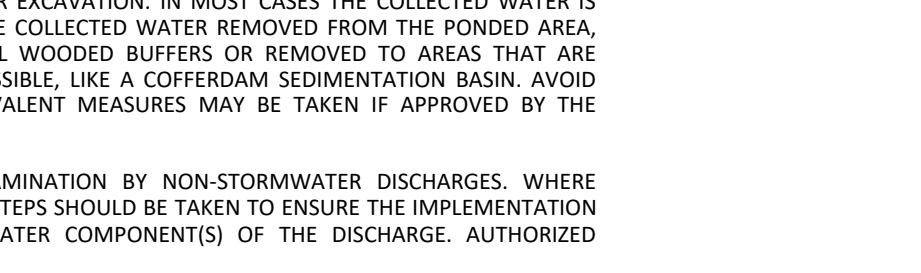
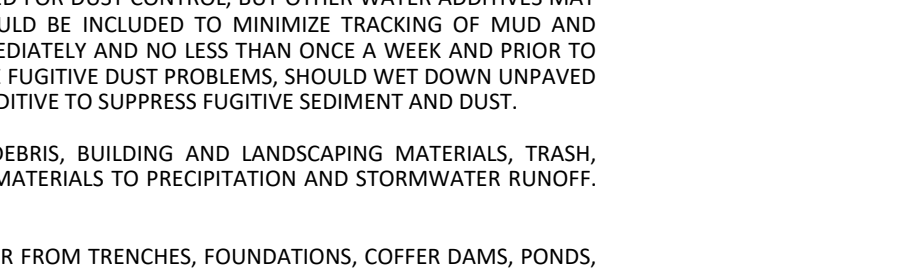
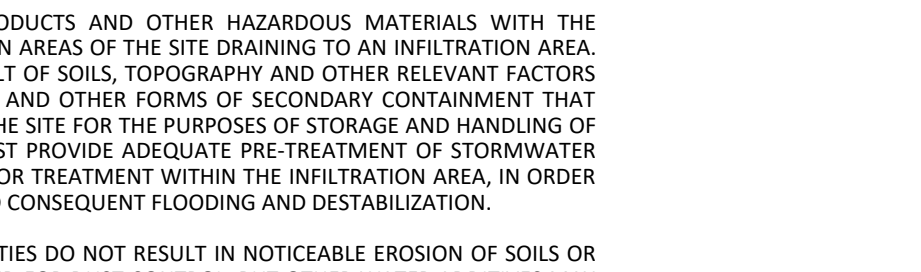
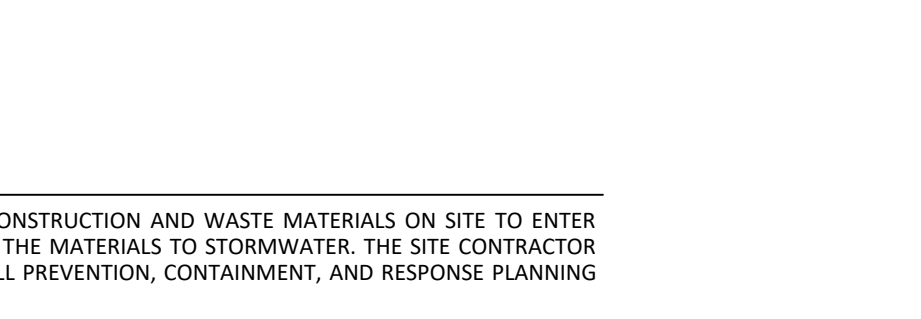
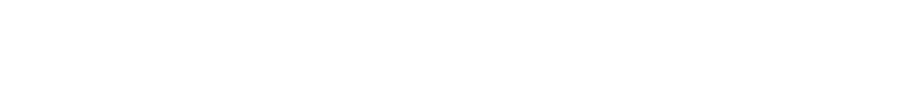
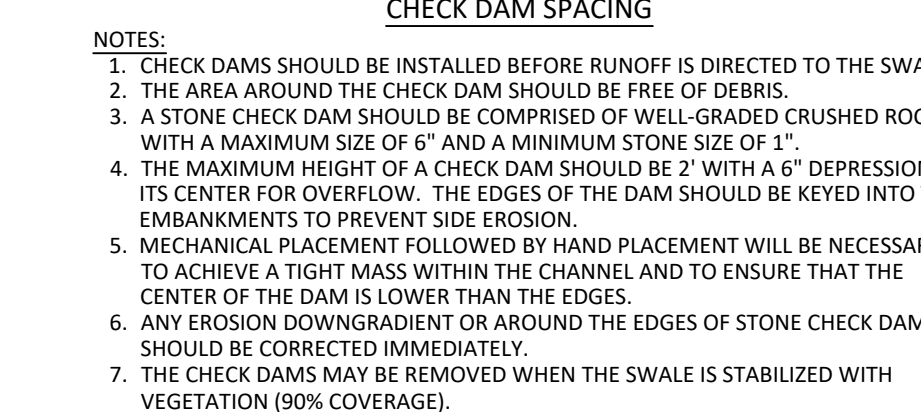
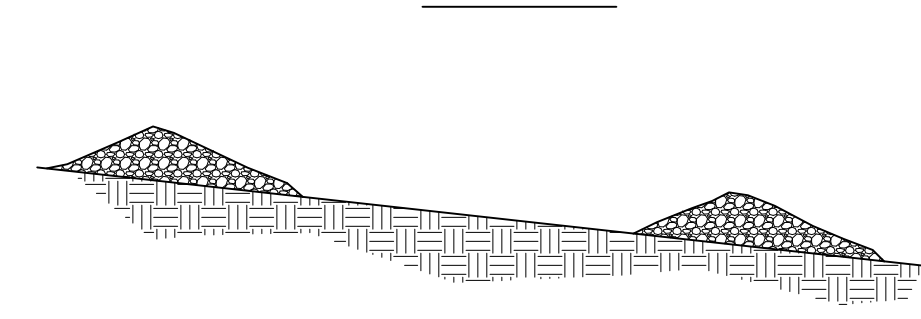
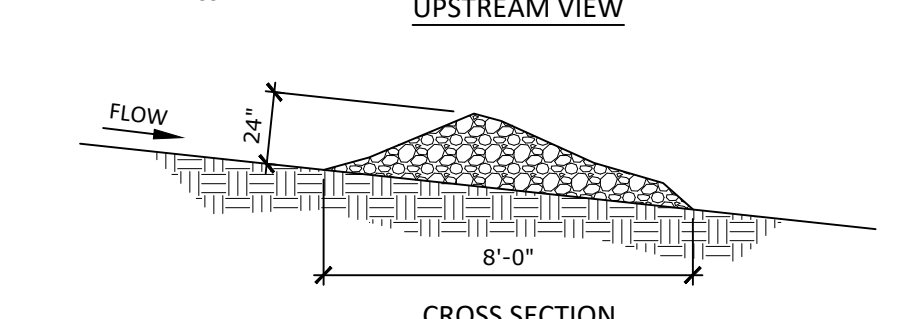
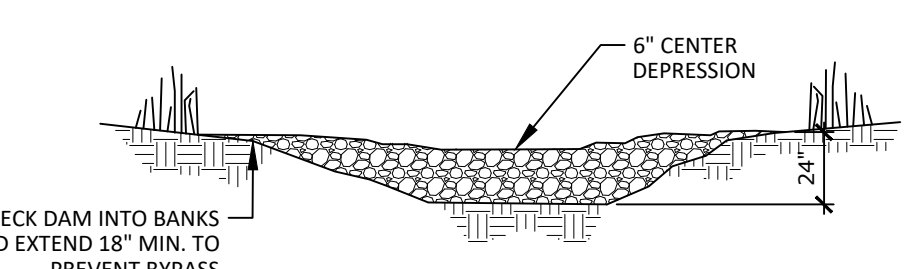
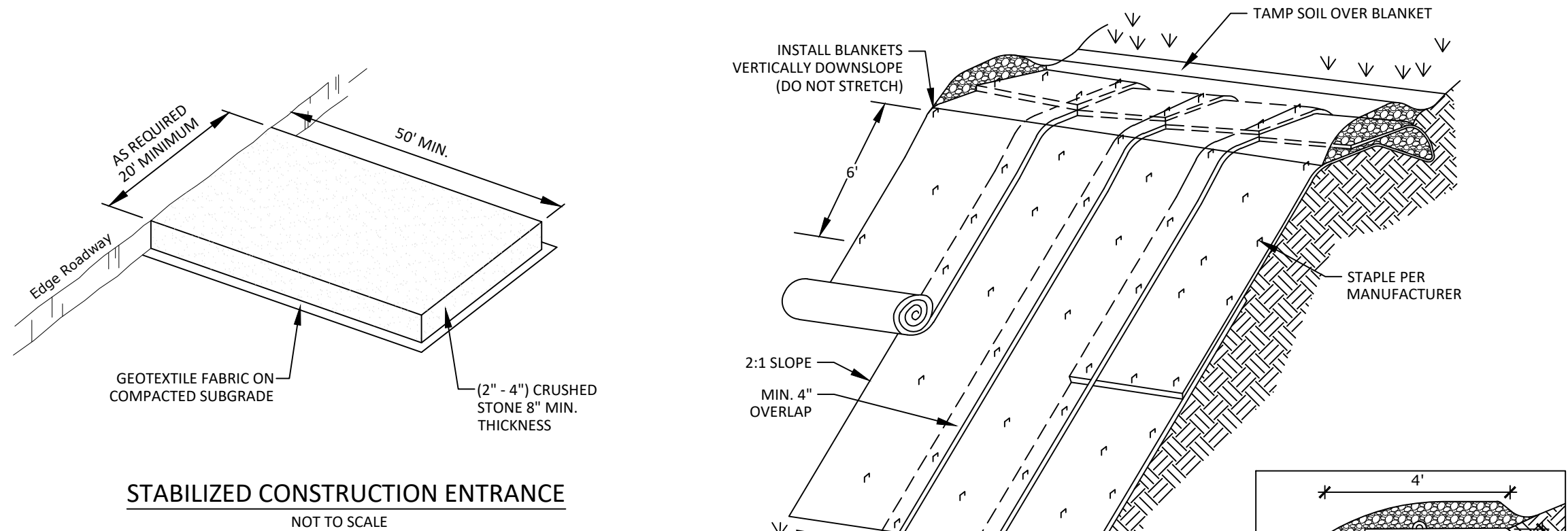
ALL STONE-COVERED SLOPES MUST BE CONSTRUCTED AND STABILIZED BY NOVEMBER 15. ALL SLOPES TO BE VEGETATED MUST BE SEEDED AND MULCHED BY SEPTEMBER 1. ALL AREAS HAVING A GRADE STEEPER THAN 8% SHALL BE CONSIDERED A SLOPE. IF A SLOPE TO BE VEGETATED IS NOT STABILIZED BY SEPTEMBER 1, THEN THE SLOPE SHALL EITHER BE STABILIZED WITH TEMPORARY VEGETATION AND EROSION CONTROL MATS BY OCTOBER 1, SOD BY OCTOBER 1, EROSION CONTROL MIX BY NOVEMBER 1 OR STONE RIPRAP BY NOVEMBER 15. SEE APPLICABLE SECTIONS UNDER EROSION AND SEDIMENTATION CONTROL NOTES FOR PROPER INSTALLATION METHODS.

### 8. OVER-WINTER STABILIZATION OF DISTURBED SOILS

BY SEPTEMBER 15, ALL DISTURBED SOILS ON AREAS HAVING A SLOPE LESS THAN 15% MUST BE SEEDED AND MULCHED. IF THE DISTURBED AREAS ARE NOT STABILIZED BY THIS DATE, THEN THE AREA SHALL EITHER BE STABILIZED WITH TEMPORARY VEGETATION BY OCTOBER 1, SOD BY OCTOBER 1, OR MULCH BY NOVEMBER 15. SEE APPLICABLE SECTIONS UNDER EROSION AND SEDIMENTATION CONTROL NOTES FOR PROPER INSTALLATION METHODS.

### 9. MAINTENANCE

MAINTENANCE MEASURES SHALL BE APPLIED AS NEEDED DURING THE ENTIRE CONSTRUCTION SEASON. AFTER EACH RAINFALL, SNOW STORM, PERIOD OF THAWING AND RUNOFF AND AT LAST ONCE A WEEK, THE SITE CONTRACTOR SHALL PERFORM A VISUAL INSPECTION OF ALL INSTALLED EROSION CONTROL MEASURES AND PERFORM REPAIRS AS NEEDED TO INSURE THEIR CONTINUOUS FUNCTION. FOLLOWING THE TEMPORARY AND/OR FINAL SEEDING AND MULCHING, THE CONTRACTOR SHALL, IN THE SPRING, INSPECT AND REPAIR ANY DAMAGES AND/OR BARE SPOTS. AN ESTABLISHED VEGETATIVE COVER MEANS A MINIMUM OF 90% OF AREAS VEGETATED WITH VIGOROUS GROWTH.



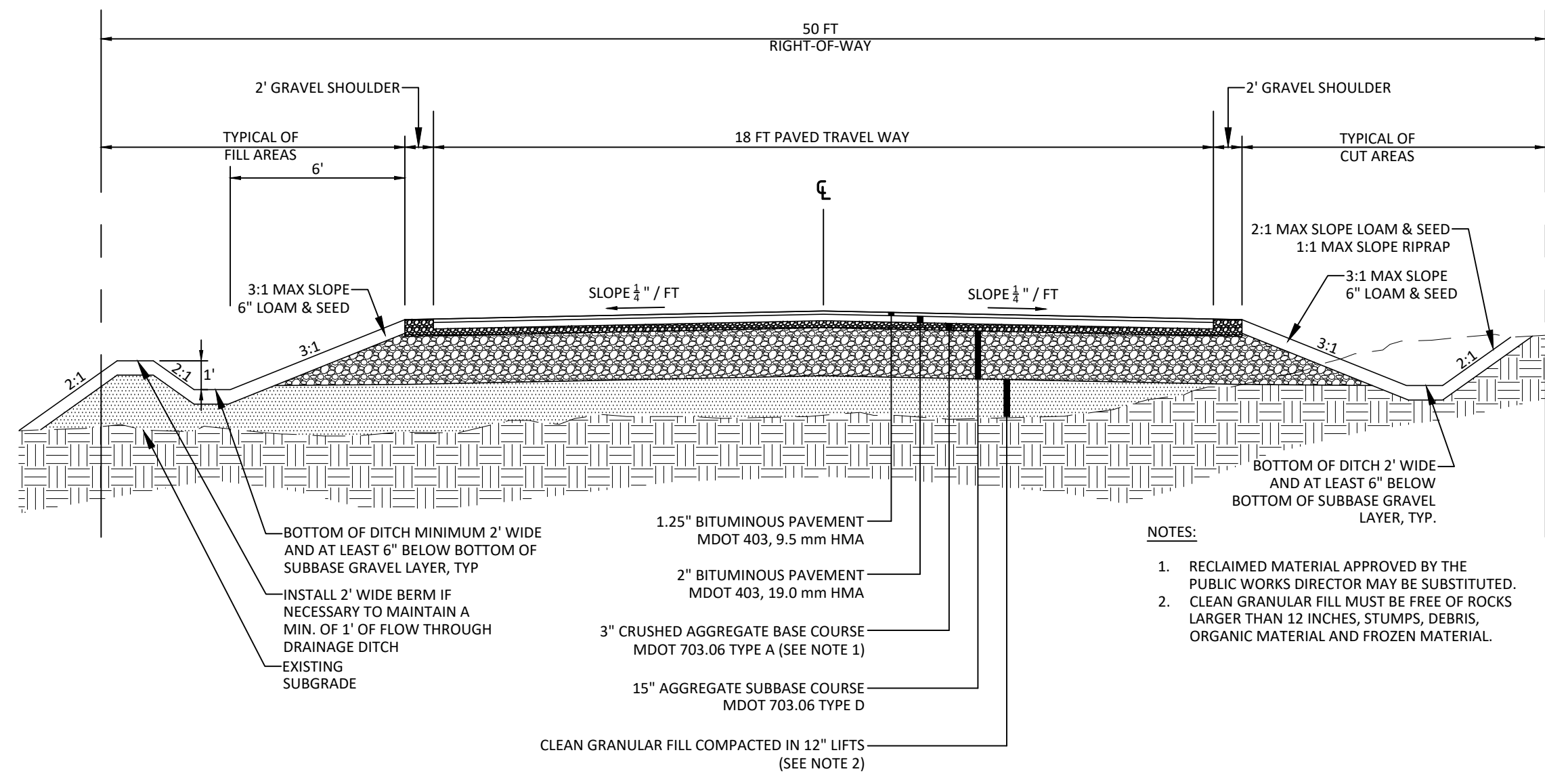
**DM ROMA**  
CONSULTING ENGINEERS  
P.O. BOX 1116  
WINDHAM, ME 04092  
(207) 591-5005

REV.	DATE	BY	DESCRIPTION
A	9-19-23	JPC	ISSUED FOR REVIEW
B	11-19-23	JPC	REVISED PER REVIEW COMMENTS
C	11-19-23	JPC	REVISED PER REVIEW COMMENTS
D	12-14-23	JPC	REVISED PER REVIEW COMMENTS
E	1-12-24	JPC	REVISED PER REVIEW COMMENTS
F	1-16-24	JPC	REVISED PER REVIEW COMMENTS
G	1-29-24	JPC	REVISED PER REVIEW COMMENTS

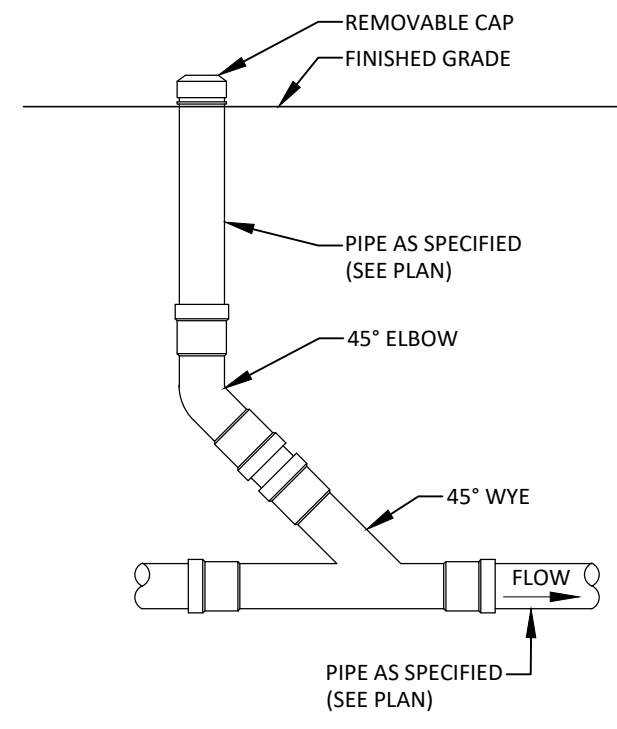
**DETAILS**  
AERIE ESTATES SUBDIVISION  
AERIE DRIVE - OFF EAGLES NEBROAD  
GRAY, MAINE  
FOR:  
**SEBAGO REALTY, LLC**  
PO BOX 1116  
WINDHAM, ME 04092

23050  
JOB NUMBER:  
AS NOTED  
SCALE:  
1-29-2024  
DATE:  
SHEET 7 OF 8

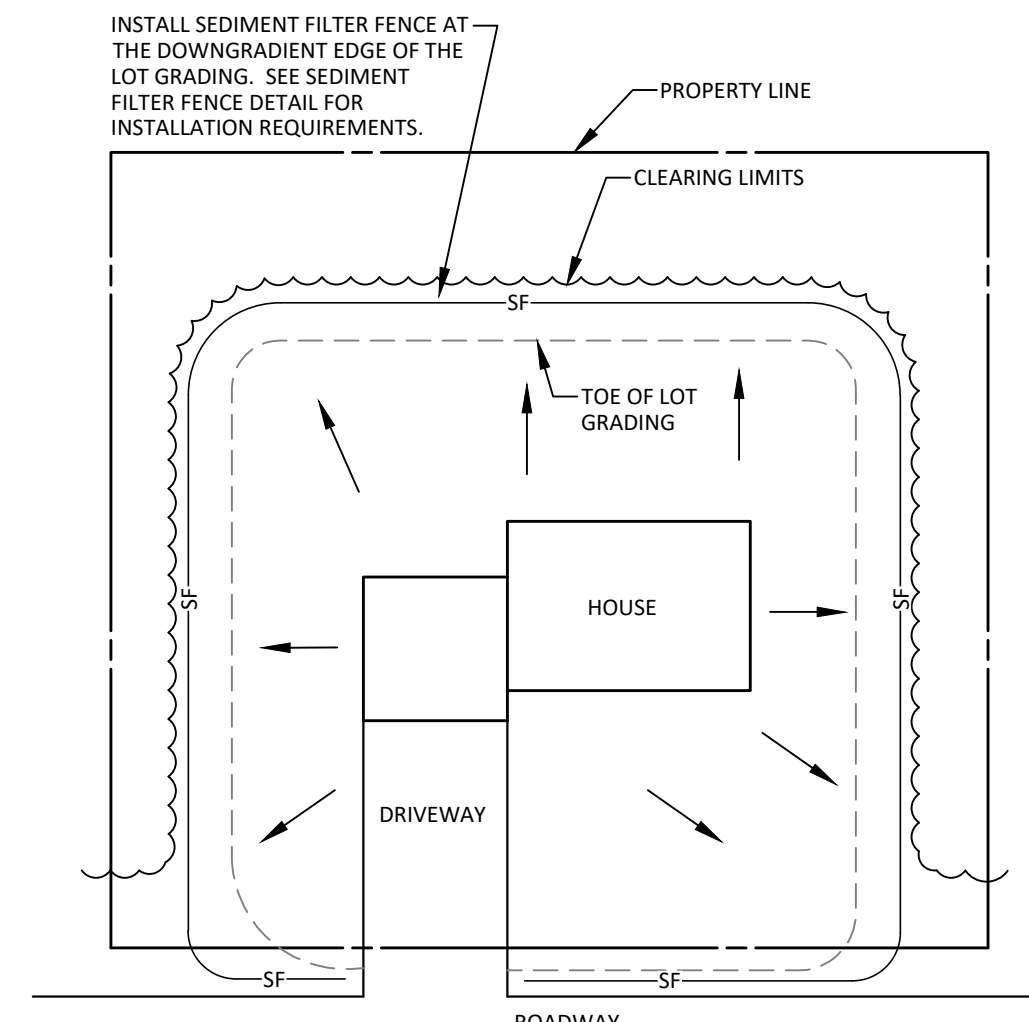
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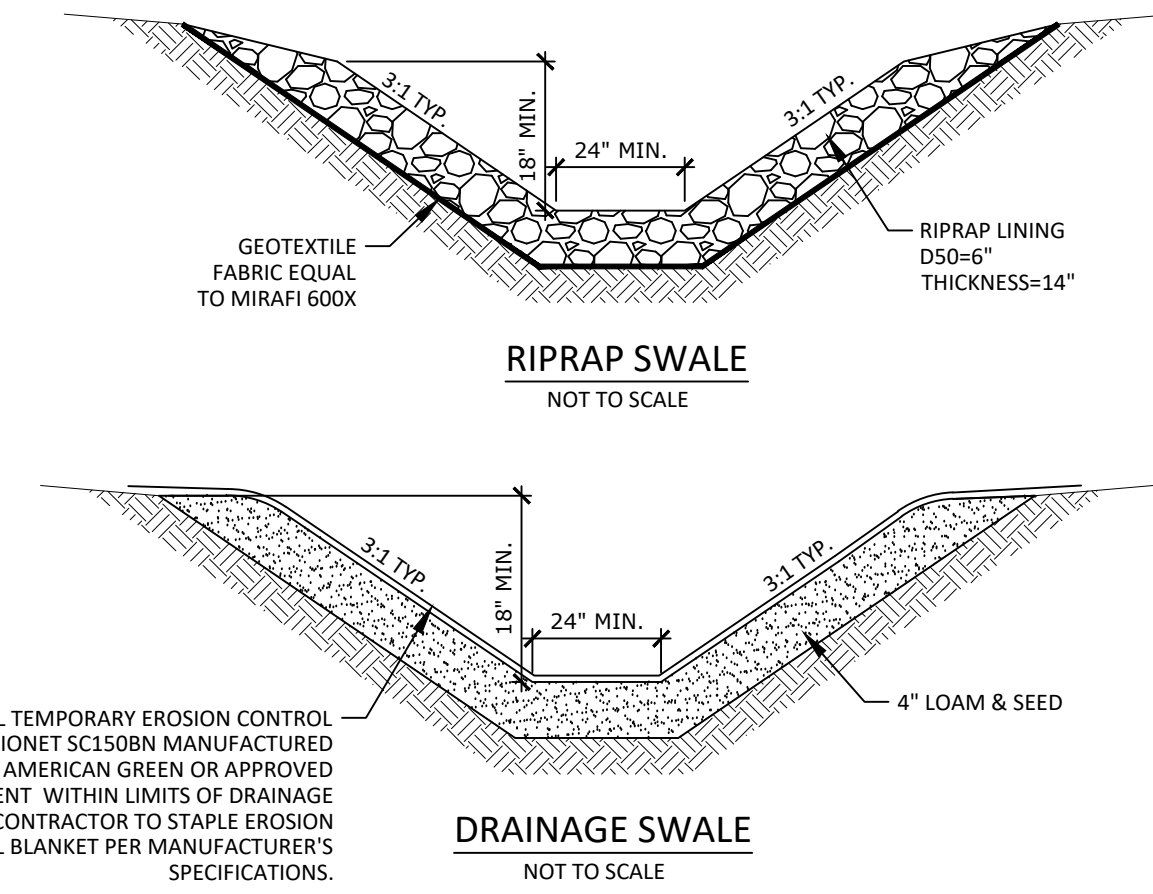
TYPICAL ROADWAY SECTION  
MODIFIED MINOR RURAL STREET STANDARD



UNDERDRAIN CLEANOUT DETAIL  
NOT TO SCALE

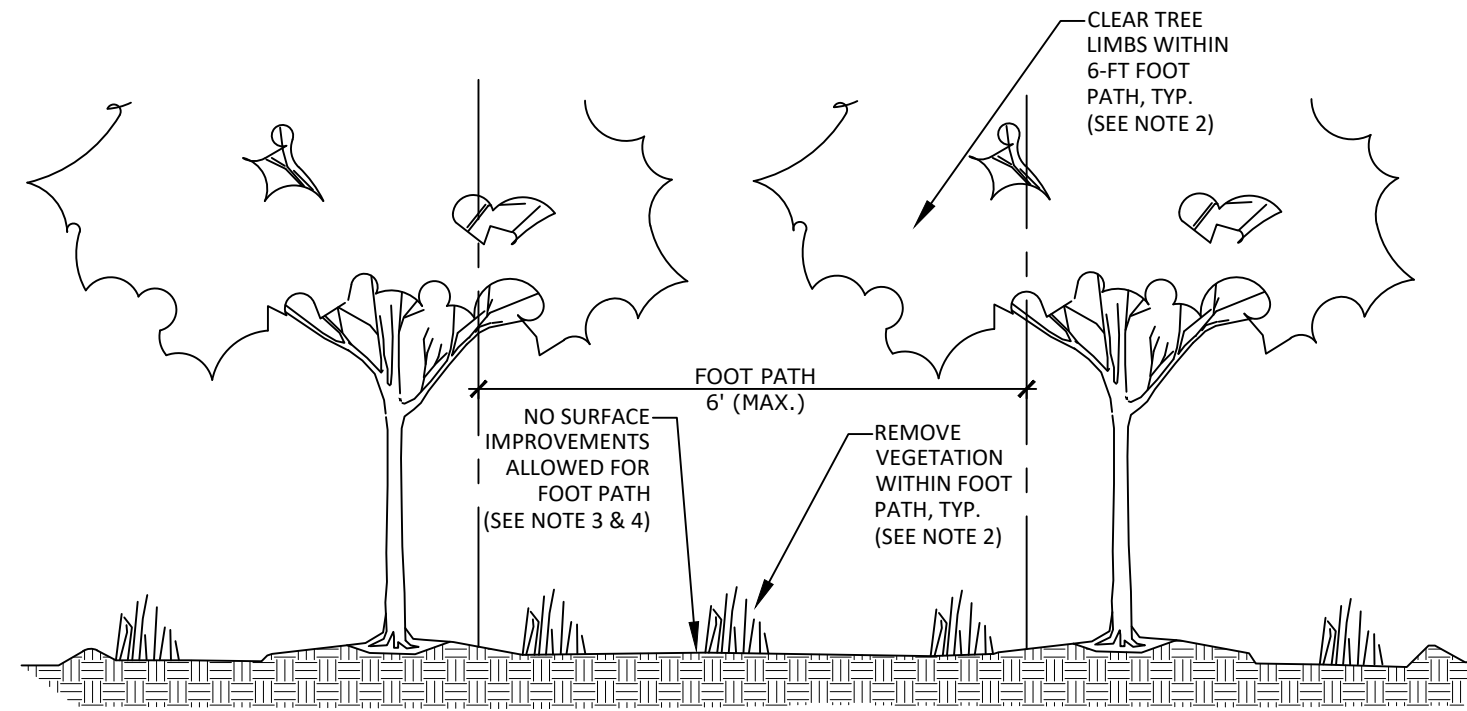


TYPICAL HOUSE LOT  
EROSION CONTROL DETAIL  
NOT TO SCALE



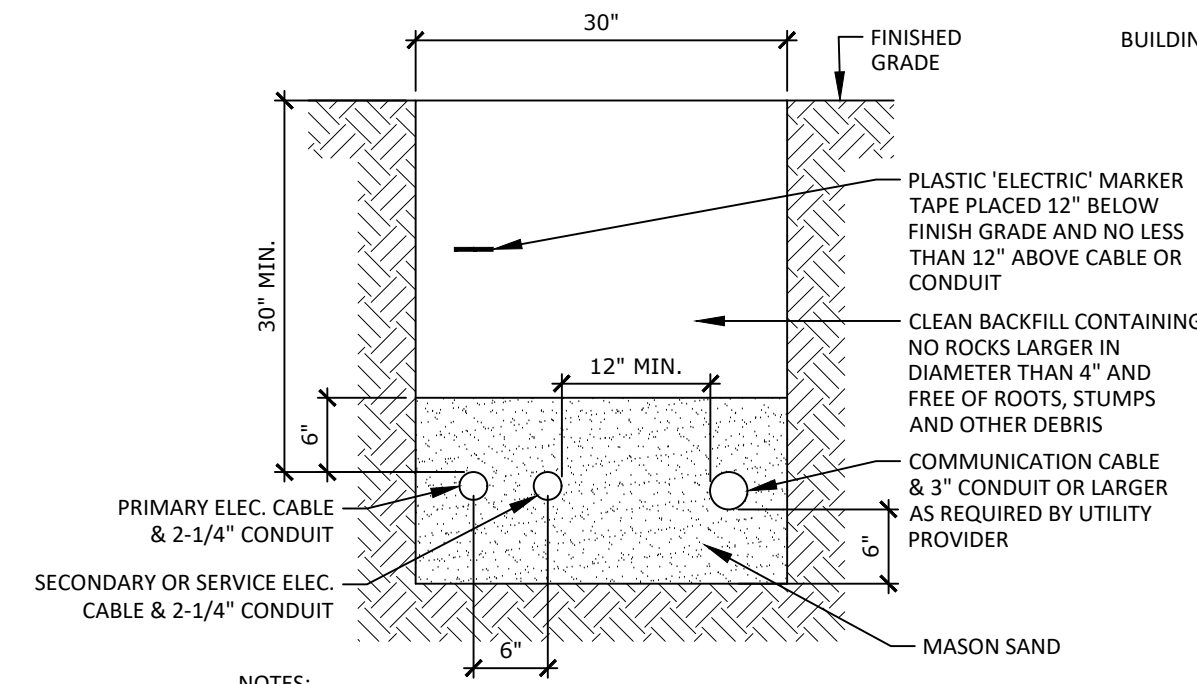
RIPRAP SWALE  
NOT TO SCALE

DRAINAGE SWALE  
NOT TO SCALE



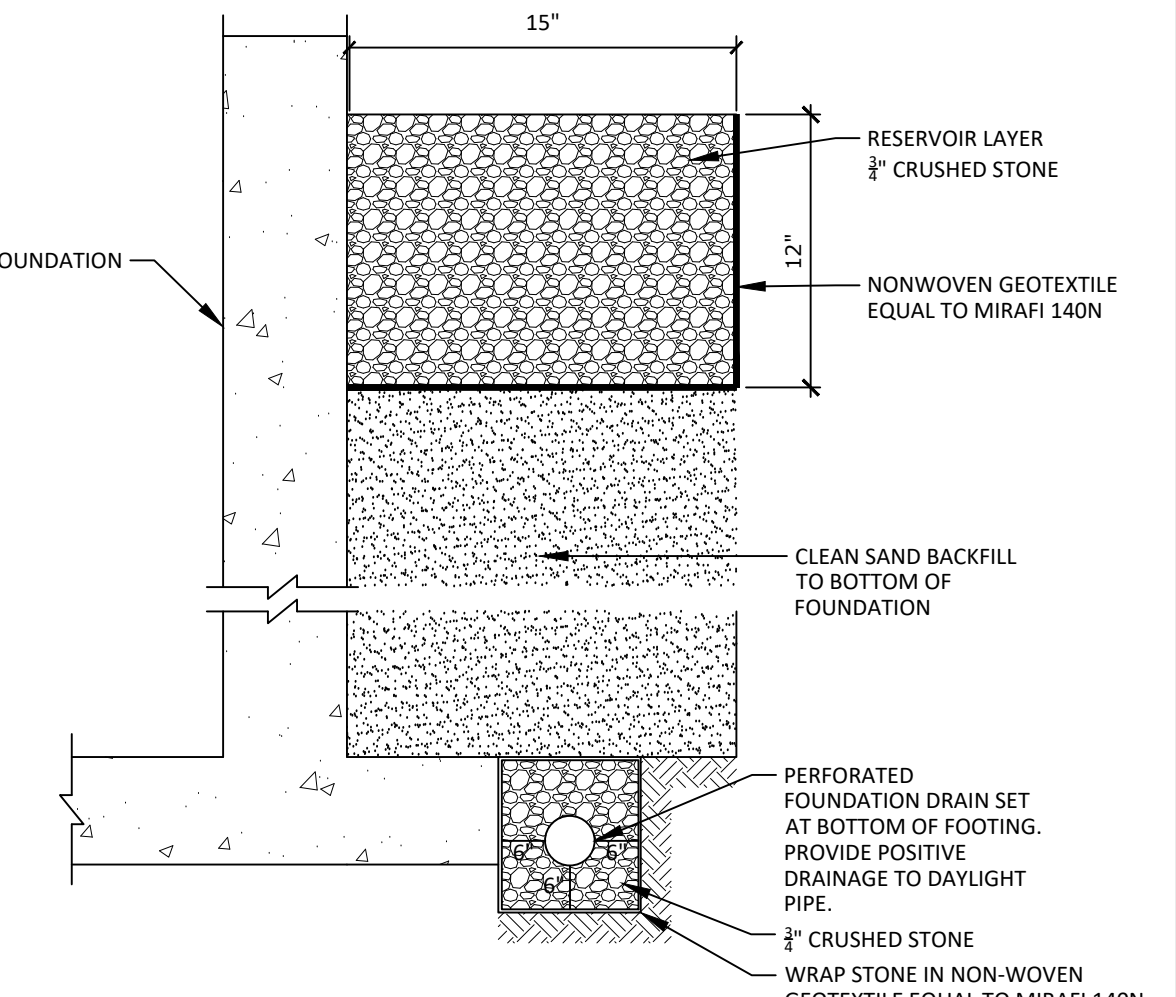
FOOT PATH DETAIL

- NOTES:
1. PROPOSED FOOT PATH THROUGH THE OPEN SPACE SHALL BE LOCATED SUCH THAT NO TREE CLEARING IS REQUIRED.
  2. CLEARING FOR FOOT PATH IS LIMITED TO REMOVING BRUSH AND VEGETATION, AND IF NECESSARY TRIMMING OF LIMBS ONLY.
  3. FOOT PATH SHALL NOT BE INSTALLED WITH ANY SURFACE IMPROVEMENTS OR EARTH DISTURBANCE (NO EXCAVATION OR PLACEMENT OF FILL, AND NO INSTALLATION OF GRAVEL/PAVEMENT).
  4. IN THE EVENT NO ALTERNATE FOOT PATH LOCATION IS ACCEPTABLE, 4-FT WIDE (MAX.) STAIRS MAY BE INSTALLED WHERE SLOPES EXCEED 15%.

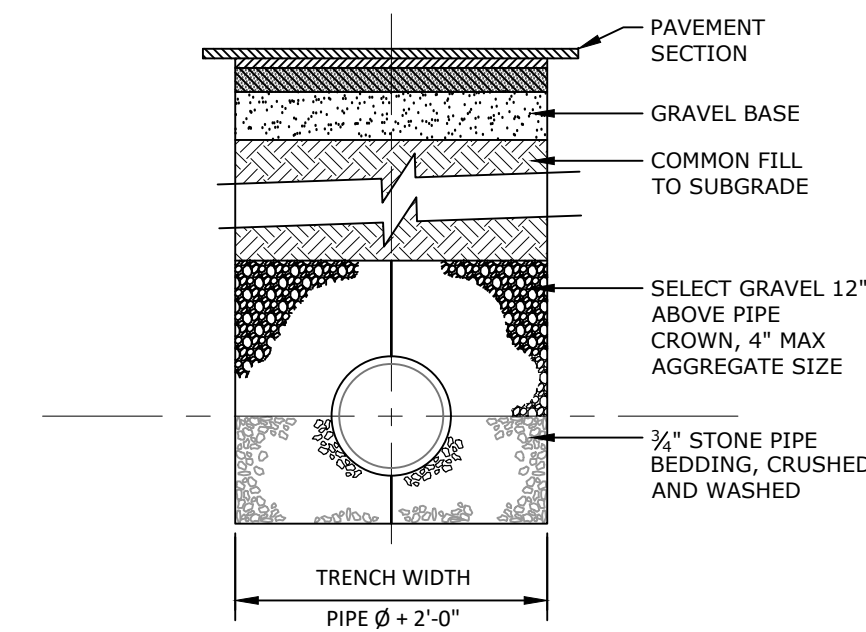


- NOTES:
1. CONDUIT SIZE AND MATERIAL AS SPECIFIED BY THE UTILITY PROVIDER.
  2. INSTALLATION SHOULD NOT ALLOW THE INTER-TWINGING OF CABLES.
  3. BEDDING AND BACKFILL SHALL BE FREE OF ROOTS, STUMPS AND OTHER DEBRIS.
  4. COMMUNICATION CABLE AND POWER CABLE SHALL HAVE NO LESS THAN 12 INCHES OF RADIAL SEPARATION.

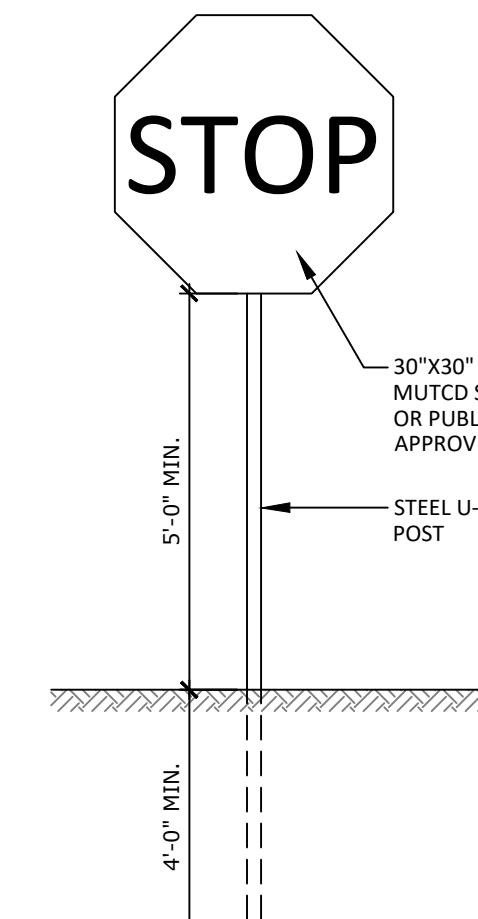
UTILITY TRENCH DETAIL  
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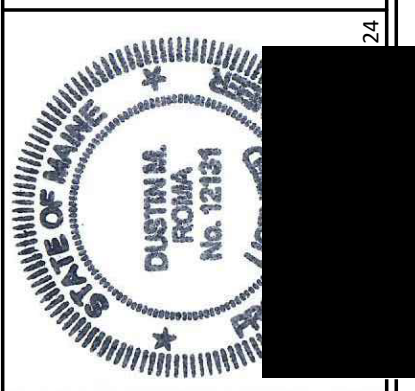
ROOF DRIP EDGE  
NOT TO SCALE



TYPICAL TRENCH SECTION  
NOT TO SCALE



STOP SIGN INSTALLATION  
NOT TO SCALE



**DM ROMA**  
CONSULTING ENGINEERS  
P.O. BOX 1116  
WINDHAM, ME 04062  
(207) 591-5055

REV	DATE	BY	DESCRIPTION
A	9-15-23	JPC	ISSUED FOR REVIEW
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**DETAILS**  
AERIE ESTATES SUBDIVISION  
AERIE DRIVE - OFF EAGLES NEST ROAD  
GRAY, MAINE  
FOR:  
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DATE:  
SHEET 8 OF 8  
D-2



January 29, 2024

Kristen Muszynski, Community Planner  
Town of Gray  
24 Main Street  
Gray, ME 04039

**Re: Response to Review Comments  
Aerie Estates – Second Amendment to Eagles Ridge Subdivision  
Sebago Realty, LLC - Applicant**

Dear Kristen:

Enclosed please find the following information associated with the proposed Aerie Estates - Second Amendment to Eagles Ridge Subdivision:

- Revised civil plan set for the design of the Subdivision and associated infrastructure.
- Stormwater and project area calculations request by the Town’s Peer review engineer.

We have received comments from Planning Staff in an email dated 1/23/2024, from the Town’s consulting engineer in an email dated 1/24/2024 and from the Town’s legal counsel in an email dated 1/29/2024 and offer the following response to address the comments contained therein:

Comments from Town Planner:

1. We have revised the plans to address all the comments contained in the “Updates to notes on Subdivision Plan” review bullets.
2. The common park areas have been delineated and noted on the plans
3. The trailhead area where the trail connects to Aerie Drive through the open space has been noted on the plans.
4. The location of existing stone walls have been added to the plans reflecting the locations shown on the existing condition plan for the original Eagles Ridge Subdivision. Note 25 was added to the Subdivision Plan that indicates stone walls do not represent property boundaries, and that they should be preserved if they do not impede development of the roadway or lots.
5. The detail for the footpath shown on Sheet D-2 has been revised to reference Open Space A.
6. We have added the potential vernal pool location on the abutting open space area of Eagles Ridge Subdivision and noted the associated 100-foot and 250-foot regulated areas that extend into our project on Lot 14. The stream with associated 75-foot regulated area has also been added to Lot 14. There is no proposed development shown on our plans within any of these additional regulated areas.
7. Conditions of Approval were added to the plans either in the form of additional General Notes or as listed Conditions of Approval.

Comments from Town Consulting Engineer:

*Comment 1: Provide a spillway calculation for the ponds utilizing the emergency spillway as the sole outlet for the 100-year storm to show that no overtopping of the berm occurs.*

Response 1: Attached is a HydroCAD model printout showing that the emergency spillways have been designed to pass the 100-year storm as the sole outlet without overtopping the berm.

*Comment 2: We recommend that a permanent stormwater easement be provided for the FB 1 inlet riprap section that is located within the limits of Lot 8.*

Response 2: We have added an easement on Lot 8 to include the riprap apron, swale and driveway culvert area that conveys stormwater from the roadside ditch to FB-1 through Lot 8.

*Comment 3: Provide a calculation showing that the development of the property is less than 60% of the contiguous land area owned by the applicant not including land with greater than 25% slopes and protected natural resources. This would meet the general standards of the Maine DEP's Chapter 500 for developments that treat 90% of impervious area 75% of total developed area.*

Response 3: Attached is a calculation sheet showing that the area of development represents approximately 32% of the contiguous land area owned by the applicant after deducting steep slopes, wetlands and potential vernal pool terrestrial habitat area.

*Comment 4: Per Maine DEP BMP, we recommend that the pond liner thickness be revised from 20 MIL to 30 MIL.*

Response 4: The detail has been revised to require 30 MIL thickness for the liner.

Upon your review of this information, please let us know if you have any questions or require any additional information.

Sincerely,

DM ROMA CONSULTING ENGINEERS



J.P. Connolly  
Senior Project Engineer

CC: Sebago Realty LLC

FILTER BASIN 1 100-YR SPILLWAY RUN

**23050 - POST**

Prepared by DM Roma Consulting Engineers

HydroCAD® 10.00-26 s/n 09237 © 2020 HydroCAD Software Solutions LLC

Type III 24-hr 100-Year Rainfall=8.18"

Printed 1/27/2024

**Summary for Pond FB1:**

[80] Warning: Exceeded Pond SD-2 by 1.02' @ 24.66 hrs (2.90 cfs 10,988 cf)

Inflow Area = 123,592 sf, 10.67% Impervious, Inflow Depth = 6.07" for 100-Year event  
 Inflow = 15.21 cfs @ 12.16 hrs, Volume= 62,554 cf  
 Outflow = 14.12 cfs @ 12.22 hrs, Volume= 55,458 cf, Atten  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
 Secondary = 14.12 cfs @ 12.22 hrs, Volume= 55,458 cf

POND PEAK WS = 398.42  
 PROPOSED TOP OF BERM = 399.25  
 BERM ABOVE PEAK 100 YR WS

~~Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
 Peak Elev= 398.42' @ 12.22 hrs Surf.Area= 4,807 sf Storage= 11,139 cf~~

Plug-Flow detention time= 94.9 min calculated for 55,458 cf (89% of inflow)  
 Center-of-Mass det. time= 41.0 min ( 837.5 - 796.5 )

Volume	Invert	Avail.Storage	Storage Description		
#1	395.00'	14,068 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
395.00	1,992	178.2	0	0	1,992
396.00	2,555	197.0	2,268	2,268	2,584
398.00	4,456	275.5	6,923	9,191	5,573
399.00	5,311	294.3	4,877	14,068	6,472

Device	Routing	Invert	Outlet Devices
#1	Primary	392.20'	<b>15.0" Round 15-inch culvert X 0.00</b> L= 51.7' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 392.20' / 390.00' S= 0.0426 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	392.83'	<b>1.2" Vert. 1-1/8" DRILL HOLE</b> C= 0.600
#3	Device 2	392.83'	<b>4.0" Vert. 4" UD</b> C= 0.600
#4	Device 3	395.00'	<b>2.410 in/hr Exfiltration over Surface area</b>
#5	Device 1	396.50'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#6	Device 1	396.90'	<b>Neenah R4345 Beehive Grate Light Duty-req. structure</b> Head (feet) 0.00 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.50 0.60 0.70 0.80 0.90 1.00 Disch. (cfs) 0.000 0.900 1.600 2.500 3.500 4.000 4.600 5.300 6.800 7.500 8.100 8.600 9.100 9.600
#7	Secondary	397.50'	<b>6.0' long x 12.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

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**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=395.00' TW=0.00' (Dynamic Tailwater)

- ↑ ~~1=15 inch culvert ( Controls 0.00 cfs)~~
- ↑ 2=1-1/8" DRILL HOLE (Passes 0.00 cfs of 0.06 cfs potential flow)
- ↑ 3=4" UD (Passes 0.00 cfs of 0.59 cfs potential flow)
- ↑ 4=Exfiltration (Passes 0.00 cfs of 0.11 cfs potential flow)
- 5=Orifice/Grate ( Controls 0.00 cfs)
- 6=Neenah R4345 Beehive Grate Light Duty-req. structure( Controls 0.00 cfs)

**Secondary OutFlow** Max=14.08 cfs @ 12.22 hrs HW=398.42' TW=0.00' (Dynamic Tailwater)

- ↑ ~~7=Broad-Crested Rectangular Weir (Weir Controls 14.08 cfs @ 2.55 fps)~~

FILTER BASIN 2 100-YEAR SPILLWAY RUN

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Type III 24-hr 100-Year Rainfall=8.18'

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Summary for Pond FB2:

Inflow Area = 223,329 sf, 9.79% Impervious, Inflow Depth = 6.11" for 100-Year event  
 Inflow = 26.34 cfs @ 12.20 hrs, Volume= 113,706 cf  
 Outflow = 22.50 cfs @ 12.30 hrs, Volume= 94,547 cf, Attenuation= 22.50 cfs @ 12.30 hrs, Volume= 94,547 cf  
 Primary = 22.50 cfs @ 12.30 hrs, Volume= 94,547 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

POND PEAK WS = 358.25  
 PROPOSED TOP OF BERM = 359.5  
 BERM ABOVE PEAK 100 YR WS

Routing by Dyn Stor Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs  
 Peak Elev= 358.25' @ 12.30 hrs Surf.Area= 10,166 sf Storage= 30,784 cf

Plug-Flow detention time= 126.4 min calculated for 94,508 cf (83% of inflow)  
 Center-of-Mass det. time= 57.5 min ( 856.7 - 799.2 )

Volume	Invert	Avail.Storage	Storage Description			
#1	354.00'	38,766 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
354.00	4,505	403.7	0	0	4,505	
356.00	7,040	441.4	11,451	11,451	7,177	
356.50	7,710	450.8	3,686	15,137	7,881	
358.00	9,802	479.1	13,103	28,240	10,088	
359.00	11,267	497.9	10,526	38,766	11,630	

Device	Routing	Invert	Outlet Devices
#1	Primary	357.00'	<b>6.0' long x 12.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#2	Secondary	350.91'	<b>15.0" Round 15-inch culvert X 0.00</b> L= 29.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 350.91' / 349.40' S= 0.0507 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 2	351.83'	<b>1.7" Vert. 1-3/4" DRILL HOLE</b> C= 0.600
#4	Device 3	351.83'	<b>4.0" Vert. 4" UD</b> C= 0.600
#5	Device 4	354.00'	<b>2.410 in/hr Exfiltration over Surface area</b>
#6	Device 2	355.50'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#7	Device 2	356.10'	<b>Neenah R4345 Beehive Grate Light Duty-req. structure</b> Head (feet) 0.00 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.50 0.60 0.70 0.80 0.90 1.00 Disch. (cfs) 0.000 0.900 1.600 2.500 3.500 4.000 4.600 5.300 6.800 7.500 8.100 8.600 9.100 9.600

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**Primary OutFlow** Max=22.48 cfs @ 12.30 hrs HW=358.25' TW=350.28' (Dynamic Tailwater)

~~1=Broad-Crested Rectangular Weir (Weir Controls 22.48 cfs @ 2.99 fps)~~

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=354.00' TW=349.40' (Dynamic Tailwater)

2=15-inch culvert ( Controls 0.00 cfs)

3=1-3/4" DRILL HOLE (Passes 0.00 cfs of 0.11 cfs potential flow)

4=4" UD (Passes 0.00 cfs of 0.59 cfs potential flow)

5=Exfiltration (Passes 0.00 cfs of 0.25 cfs potential flow)

6=Orifice/Grate ( Controls 0.00 cfs)

7=Neenah R4345 Beehive Grate Light Duty-req. structure( Controls 0.00 cfs)

PROJECT DEVELOPMENT CALCULATIONS:

	(square feet)	(acres)
GROSS LAND AREA:	1,798,333	41.3

AREAS DEDUCTED FROM DEVELOPMENT AREA CONSIDERATION:

STEEP SLOPES (25% OR GREATER)	109,695	
FORESTED WETLANDS (UNDEVELOPED)	208,018	
NON-FORESTED OR IMPACTED WETLANDS	1,444	
SIGNIFICANT HABITAT	244,656	
DEDUCTION TOTAL	563,813	12.9

NET LAND AREA CALCULATION

GROSS LAND AREA	1,798,333	41.3
DEDUCTION TOTAL	-	12.9
NET LAND AREA	1,234,520	28.3

PROPOSED PROJECT DEVELOPED AREA (PER STORMWATER MANAGEMENT REPORT)	388,837	8.9
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PERCENTAGE OF PROJECT AREA TO DEVELOPMENT AREA:	31.50%
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