

**STATE OF NEW HAMPSHIRE
INTER-DEPARTMENT COMMUNICATION**

DATE: May 12, 2021

FROM: Andrew O'Sullivan *A.O.*
Wetlands Program Manager

AT (OFFICE): Department of
Transportation

SUBJECT: Dredge & Fill Application
Deerfield, 24477

Bureau of
Environment

TO: Karl Benedict, Public Works Permitting Officer
New Hampshire Wetlands Bureau
29 Hazen Drive, P.O. Box 95
Concord, NH 03302-0095

Forwarded herewith is the application package prepared by NH DOT Bureau of Bridge Design for the subject major impact project. The project is located along Route 107 in the Town of Deerfield, NH. The proposed work consists of replacing the existing bridge that carries NH 107 over Freeses Pond in Deerfield, NH (Bridge #137/116).

This project was reviewed at the Natural Resource Agency Coordination Meeting on April 15, 2020. A copy of the minutes has been included with this application package. A copy of this application and plans can be accessed on the Departments website via the following link: <http://www.nh.gov/dot/org/projectdevelopment/environment/units/program-management/wetland-applications.htm>.

NHDOT anticipates and request that this project be reviewed and permitted by the Army Corp of Engineers through the State Programmatic General Permit process. A copy of the application has been sent to the Army Corp of Engineers.

Mitigation is not required for the project.

The lead people to contact for this project are David Scott, Bureau of Bridge Design (271-2731 or David.Scott@dot.nh.gov) or Andrew O'Sullivan, Wetlands Program Manager, Bureau of Environment (271-0556 or Andrew.O'Sullivan@dot.nh.gov).

A payment voucher has been processed for this application (Voucher # 645745) in the amount of \$1,237.60.

If and when this application meets with the approval of the Bureau, please send the permit directly to Andrew O'Sullivan, Wetlands Program Manager, Bureau of Environment.

AMO:amo

cc:

BOE Original

Town of Deerfield (4 copies via certified mail)

Lamprey River Advisory Committee (1 copies via certified mail)

David Trubey, NH Division of Historic Resources (Cultural Review Within)

Carol Henderson, NH Fish & Game (via electronic notification)

Maria Tur, US Fish & Wildlife (via electronic notification)

Beth Alafat & Jeanie Brochi, US Environmental Protection Agency (via electronic notification)

Michael Hicks & Rick Kristoff, US Army Corp of Engineers (via electronic notification)

Kevin Nyhan, BOE (via electronic notification)

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Deerfield 24477

Bridge #137/116

Freeses Pond Bridge Replacement Deerfield, New Hampshire

PREPARED FOR
NHDOT
7 Hazen Drive
Concord, NH 03302
603.271.2731

PREPARED BY
VHB, Inc.
2 Bedford Farms Drive, Suite 200
Bedford, NH 03110
603.391.3900

April 2021

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**STANDARD DREDGE AND FILL
WETLANDS PERMIT APPLICATION**
Water Division/Land Resources Management
Wetlands Bureau
[Check the Status of your Application](#)



RSA/Rule: RSA 482-A/Env-Wt 100-900

APPLICANT'S NAME: New Hampshire Department of Transportation **TOWN NAME:** Deerfield

Administrative Use Only	Administrative Use Only	Administrative Use Only	File No.:
			Check No.:
			Amount:
			Initials:

A person may request a waiver to the requirements in Rules Env-Wt 100-900 to accommodate situations where strict adherence to the requirements would not be in the best interest of the public or the environment. A person may also request a waiver of the standards for existing dwellings over water pursuant to RSA 482-A:26, III (b). For more information, please consult the [request form](#).

SECTION 1 - REQUIRED PLANNING FOR ALL PROJECTS (Env-Wt 306.05; RSA 482-A:3, I(d)(2))	
Please use the Wetland Permit Planning Tool (WPPT) , the Natural Heritage Bureau (NHB) DataCheck Tool , the Aquatic Restoration Mapper , or other sources to assist in identifying key features such as: priority resource areas (PRAs) , protected species or habitats , coastal areas, designated rivers, or designated prime wetlands.	
Has the required planning been completed?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Does the property contain a PRA? If yes, provide the following information:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<ul style="list-style-type: none"> • Does the project qualify for an Impact Classification Adjustment (e.g. NH Fish and Game Department (NHF&G) and NHB agreement for a classification downgrade) or a Project-Type Exception (e.g. Maintenance or Statutory Permit-by-Notification (SPN) project)? See Env-Wt 407.02 and Env-Wt 407.04). <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No • Protected species or habitat? <ul style="list-style-type: none"> ○ If yes, species or habitat name(s): Blanding's Turtle (<i>Emydoidea blandingii</i>) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No ○ NHB Project ID #: NHB20-1449 • Bog? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No • Floodplain wetland contiguous to a tier 3 or higher watercourse? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No • Designated prime wetland or duly-established 100-foot buffer? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No • Sand dune, tidal wetland, tidal water, or undeveloped tidal buffer zone? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 	
Is the property within a Designated River corridor? If yes, provide the following information:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<ul style="list-style-type: none"> • Name of Local River Management Advisory Committee (LAC): Lamprey River Advisory Committee • A copy of the application was sent to the LAC on Month: <input type="text"/> Day: <input type="text"/> Year: <input type="text"/> 	

irm@des.nh.gov or (603) 271-2147

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For dredging projects, is the subject property contaminated? • If yes, list contaminant: [REDACTED]	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Is there potential to impact impaired waters, class A waters, or outstanding resource waters?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
For stream crossing projects, provide watershed size (se Wetland Permit Planning Tool or Stream Stats): [REDACTED]	
SECTION 2 - PROJECT DESCRIPTION (Env-Wt 311.04(i))	
Provide a brief description of the project and the purpose of the project, outlining the scope of work to be performed and whether impacts are temporary or permanent. DO NOT reply "See attached"; please use the space provided below.	
<p>The NH Department of Transportation (NHDOT) proposes to permanently impact 1,525 SF (36 LF) in the bed of Freeses Pond and 786 SF (26 LF) in the banks of the Pond to replace the existing bridge that carries NH 107 over Freeses Pond in Deerfield, NH (Bridge #137/116). Additionally, 719 SF (10 LF) of temporary impacts to the bed of Freeses Pond, along with 64 SF (4 LF) of temporary impact to the banks is proposed to result from the in-water erosion control measures around the inlet and outlet (i.e., steel sheet piles) and clean water bypass.</p> <p>The bridge is in "serious" condition, structurally intolerable, and has been on the NHDOT's Red List since 2010. The structure exhibits heavy rust, scaling, plate gaps, and a sagging roofline with cracked stone walls. The project proposes to replace the existing bridge with a 10-foot rise by 14-foot span precast concrete box culvert with precast wingwalls and headwall-mounted guardrail. This project will result in permanent impacts to the bed and bank of Freeses Pond to install rip-rap at the inlet and outlet and stabilize the existing eroded slope. Temporary impacts to the bed of Freeses Pond will result from the erosion control measures (i.e., steel sheet piling).</p> <p>An inspection of the bridge in July 2020 identified that immediate repair was needed. The bridge was temporarily closed, and the Department performed repairs within the roadbed by spanning the culvert with temporary 50-foot-long steel beams and steel plates which were buried and paved over. These were installed with a large buffer, which is defined by the span, to allow the banks to slough to a natural configuration in case of potential collapse. These measures will provide temporary stabilization so that the bridge can remain open to traffic until the permanent replacement can be constructed. The temporary structure will be salvaged back to the Department post construction.</p>	
SECTION 3 - PROJECT LOCATION	
Separate wetland permit applications must be submitted for each municipality within which wetland impacts occur.	
ADDRESS: State of NH, NH Route 107 Right-of-Way	
TOWN/CITY: Deerfield	
TAX MAP/BLOCK/LOT/UNIT: N/A	
US GEOLOGICAL SURVEY (USGS) TOPO MAP WATERBODY NAME: Freeses Pond <input type="checkbox"/> N/A	
(Optional) LATITUDE/LONGITUDE in decimal degrees (to five decimal places):	
	43.156734° North
	-71.238725° West

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SECTION 4 - APPLICANT (DESIRED PERMIT HOLDER) INFORMATION (Env-Wt 311.04(a))		
If the applicant is a trust or a company, then complete with the trust or company information.		
NAME: NH Department of Transportation		
MAILING ADDRESS: 7 Hazen Drive		
TOWN/CITY: Concord	STATE: NH	ZIP CODE: 03301
EMAIL ADDRESS: David.Scott@dot.nh.gov		
FAX: [REDACTED]	PHONE: (603) 271-2731	
ELECTRONIC COMMUNICATION: By initialing here: <u>DSL</u> , I hereby authorize NHDES to communicate all matters relative to this application electronically.		
SECTION 5 - AUTHORIZED AGENT INFORMATION (Env-Wt 311.04(c))		
<input type="checkbox"/> N/A		
LAST NAME, FIRST NAME, M.I.: Walker, Peter		
COMPANY NAME: Vanasse Hangen Brustlin, Inc.		
MAILING ADDRESS: 2 Bedford Farms Drive (Suite 200)		
TOWN/CITY: Bedford	STATE: NH	ZIP CODE: 03110
EMAIL ADDRESS: pwalker@vhb.com		
FAX: [REDACTED]	PHONE: (603) 391-3900	
ELECTRONIC COMMUNICATION: By initialing here <u>PJW</u> , I hereby authorize NHDES to communicate all matters relative to this application electronically.		
SECTION 6 - PROPERTY OWNER INFORMATION (IF DIFFERENT THAN APPLICANT) (Env-Wt 311.04(b))		
If the owner is a trust or a company, then complete with the trust or company information.		
<input checked="" type="checkbox"/> Same as applicant		
NAME: [REDACTED]		
MAILING ADDRESS: [REDACTED]		
TOWN/CITY: [REDACTED]	STATE: [REDACTED]	ZIP CODE: [REDACTED]
EMAIL ADDRESS: [REDACTED]		
FAX: [REDACTED]	PHONE: [REDACTED]	
ELECTRONIC COMMUNICATION: By initialing here [REDACTED], I hereby authorize NHDES to communicate all matters relative to this application electronically.		

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SECTION 7 - RESOURCE-SPECIFIC CRITERIA ESTABLISHED IN Env-Wt 400, Env-Wt 500, Env-Wt 600, Env-Wt 700, OR Env-Wt 900 HAVE BEEN MET (Env-Wt 313.01(a)(3))

Describe how the resource-specific criteria have been met for each chapter listed above (please attach information about stream crossings, coastal resources, prime wetlands, or non-tidal wetlands and surface waters): All jurisdictional areas were delineated and classified in accordance with the requirements of Env-Wt 400. Wetlands and Freeses Pond top-of-bank and ordinary-high-water-mark were delineated by a VHB Certified Wetland Scientist in accordance with all Env-Wt 406 requirements. The proposed project will meet all requirements in Env-Wt 500. The project complies with the bank stabilization measures outlined in Env-Wt 514 and public highway requirements outlined in Env-Wt 527. Please refer to the narrative for more detail. Env Wt 600 and Env-Wt 700 are not applicable to the proposed project, as there are no coastal lands/tidal waters/tidal wetlands or prime wetlands within or near the project area. Env-Wt 900 is also not applicable to the proposed project; this structure functions as a wetland crossing rather than a stream crossing, as discussed at the April 15, 2020 Natural Resource Agency Coordination Meeting (see minutes provided in Appendix A).

SECTION 8 - AVOIDANCE AND MINIMIZATION

Impacts within wetland jurisdiction must be avoided to the maximum extent practicable (Env-Wt 313.03(a))* . Any project with unavoidable jurisdictional impacts must then be minimized as described in the [Wetlands Best Management Practice Techniques For Avoidance and Minimization](#) and the [Wetlands Permitting: Avoidance, Minimization and Mitigation Fact Sheet](#). For minor or major projects, a functional assessment of all wetlands on the project site is required (Env-Wt 311.03(b)(10))* .

Please refer to the application checklist to ensure that you have attached all documents related to avoidance and minimization, as well as functional assessment (where applicable). You can use the [Avoidance and Minimization Checklist](#), the [Avoidance and Minimization Narrative](#), or your own avoidance and minimization narrative.

**See Env-Wt 311.03(b)(6) and Env-Wt 311.03(b)(10) for shoreline structure exemptions.*

SECTION 9 - MITIGATION REQUIREMENT (Env-Wt 311.02)

If unavoidable jurisdictional impacts require mitigation, a mitigation pre-application meeting must occur at least 30 days but not more than 90 days prior to submitting this Standard Dredge and Fill Permit Application.

Mitigation Pre-Application Meeting Date: Month: 04 Day: 15 Year: 2020

N/A - Mitigation is not required

SECTION 10 - THE PROJECT MEETS COMPENSATORY MITIGATION REQUIREMENTS (Env-Wt 313.01(a)(1)c)

Confirm that you have submitted a compensatory mitigation proposal that meets the requirements of Env-Wt 800 for all permanent unavoidable impacts that will remain after avoidance and minimization techniques have been exercised to the maximum extent practicable: I confirm submittal.

N/A – Compensatory mitigation is not required

SECTION 11 - IMPACT AREA (Env-Wt 311.04(g))

For each jurisdictional area that will be/has been impacted, provide square feet (SF) and, if applicable, linear feet (LF) of impact, and note whether the impact is after-the-fact (ATF; i.e., work was started or completed without a permit).

For intermittent and ephemeral streams, the linear footage of impact is measured along the thread of the channel. *Please note, installation of a stream crossing in an ephemeral stream may be undertaken without a permit per Rule Env-Wt 309.02(d), however other dredge or fill impacts should be included below.*

For perennial streams/ivers, the linear footage of impact is calculated by summing the lengths of disturbances to the channel and banks.

Permanent impacts are impacts that will remain after the project is complete (e.g., changes in grade or surface materials).

Temporary impacts are impacts not intended to remain (and will be restored to pre-construction conditions) after the project is completed.

JURISDICTIONAL AREA		PERMANENT			TEMPORARY		
		SF	LF	ATF	SF	LF	ATF
Wetlands	Forested Wetland			<input type="checkbox"/>			<input type="checkbox"/>
	Scrub-shrub Wetland			<input type="checkbox"/>			<input type="checkbox"/>
	Emergent Wetland			<input type="checkbox"/>			<input type="checkbox"/>
	Wet Meadow			<input type="checkbox"/>			<input type="checkbox"/>
	Vernal Pool			<input type="checkbox"/>			<input type="checkbox"/>
	Designated Prime Wetland			<input type="checkbox"/>			<input type="checkbox"/>
	Duly-established 100-foot Prime Wetland Buffer			<input type="checkbox"/>			<input type="checkbox"/>
Surface Water	Intermittent / Ephemeral Stream			<input type="checkbox"/>			<input type="checkbox"/>
	Perennial Stream or River			<input type="checkbox"/>			<input type="checkbox"/>
	Lake / Pond	1525	36	<input type="checkbox"/>	719	10	<input type="checkbox"/>
	Docking - Lake / Pond			<input type="checkbox"/>			<input type="checkbox"/>
	Docking - River			<input type="checkbox"/>			<input type="checkbox"/>
Banks	Bank - Intermittent Stream			<input type="checkbox"/>			<input type="checkbox"/>
	Bank - Perennial Stream / River			<input type="checkbox"/>			<input type="checkbox"/>
	Bank / Shoreline - Lake / Pond	786	26	<input type="checkbox"/>	64	4	<input type="checkbox"/>
Tidal	Tidal Waters			<input type="checkbox"/>			<input type="checkbox"/>
	Tidal Marsh			<input type="checkbox"/>			<input type="checkbox"/>
	Sand Dune			<input type="checkbox"/>			<input type="checkbox"/>
	Undeveloped Tidal Buffer Zone (TBZ)			<input type="checkbox"/>			<input type="checkbox"/>
	Previously-developed TBZ			<input type="checkbox"/>			<input type="checkbox"/>
	Docking - Tidal Water			<input type="checkbox"/>			<input type="checkbox"/>
TOTAL		2311	62		783	14	

SECTION 12 - APPLICATION FEE (RSA 482-A:3, I)

<input type="checkbox"/> MINIMUM IMPACT FEE: Flat fee of \$400.	
<input type="checkbox"/> NON-ENFORCEMENT RELATED, PUBLICLY-FUNDED AND SUPERVISED RESTORATION PROJECTS, REGARDLESS OF IMPACT CLASSIFICATION: Flat fee of \$400 (refer to RSA 482-A:3, 1(c) for restrictions).	
<input checked="" type="checkbox"/> MINOR OR MAJOR IMPACT FEE: Calculate using the table below:	
Permanent and temporary (non-docking): 3094 SF	× \$0.40 = \$1,237.60
Seasonal docking structure: 0 SF	× \$2.00 = \$0
Permanent docking structure: 0 SF	× \$4.00 = \$0
Projects proposing shoreline structures (including docks) add \$400 = \$0	
Total = \$1,237.60	

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The application fee for minor or major impact is the above calculated total or \$400, whichever is greater = \$ 1,237.60

SECTION 13 - PROJECT CLASSIFICATION (Env-Wt 306.05)

Indicate the project classification.

<input type="checkbox"/> Minimum Impact Project	<input type="checkbox"/> Minor Project	<input checked="" type="checkbox"/> Major Project
---	--	---

SECTION 14 - REQUIRED CERTIFICATIONS (Env-Wt 311.11)

Initial each box below to certify:

Initials: DLS _____ _____	To the best of the signer's knowledge and belief, all required notifications have been provided.
------------------------------------	--

Initials: DLS _____ _____	The information submitted on or with the application is true, complete, and not misleading to the best of the signer's knowledge and belief.
------------------------------------	--

Initials: DLS _____ _____	The signer understands that: <ul style="list-style-type: none"> • The submission of false, incomplete, or misleading information constitutes grounds for NHDES to: <ol style="list-style-type: none"> 1. Deny the application. 2. Revoke any approval that is granted based on the information. 3. If the signer is a certified wetland scientist, licensed surveyor, or professional engineer licensed to practice in New Hampshire, refer the matter to the joint board of licensure and certification established by RSA 310-A:1. • The signer is subject to the penalties specified in New Hampshire law for falsification in official matters, currently RSA 641. • The signature shall constitute authorization for the municipal conservation commission and the Department to inspect the site of the proposed project, except for minimum impact forestry SPN projects and minimum impact trail projects, where the signature shall authorize only the Department to inspect the site pursuant to RSA 482-A:6, II.
------------------------------------	--

Initials: _____ _____ _____	If the applicant is not the owner of the property, each property owner signature shall constitute certification by the signer that he or she is aware of the application being filed and does not object to the filing.
--------------------------------------	---

SECTION 15 - REQUIRED SIGNATURES (Env-Wt 311.04(d); Env-Wt 311.11)

SIGNATURE (OWNER): _____ David L Scott _____	PRINT NAME LEGIBLY: NHDOT/David Scott	DATE: May 3, 2021
SIGNATURE (APPLICANT, IF DIFFERENT FROM OWNER): _____	PRINT NAME LEGIBLY: _____	DATE: _____
SIGNATURE (AGENT, IF APPLICABLE): _____ Peter J Walker _____	PRINT NAME LEGIBLY: Peter J. Walker	DATE: 4/5/21

SECTION 16 - TOWN / CITY CLERK SIGNATURE (Env-Wt 311.04(f))

As required by RSA 482-A:3, I(a),(1), I hereby certify that the applicant has filed four application forms, four detailed plans, and four USGS location maps with the town/city indicated below.

TOWN/CITY CLERK SIGNATURE: *See exemption below. _____	PRINT NAME LEGIBLY: _____
---	------------------------------

TOWN/CITY: Deerfield	DATE: <input type="text"/>
----------------------	----------------------------

***Per RSA 482-A:3, I(a)(1), applications and fees for projects by agencies of the state may be filed directly with the department, with 4 copies of the application, plan, and map filed at the same time with the town or city clerk.**

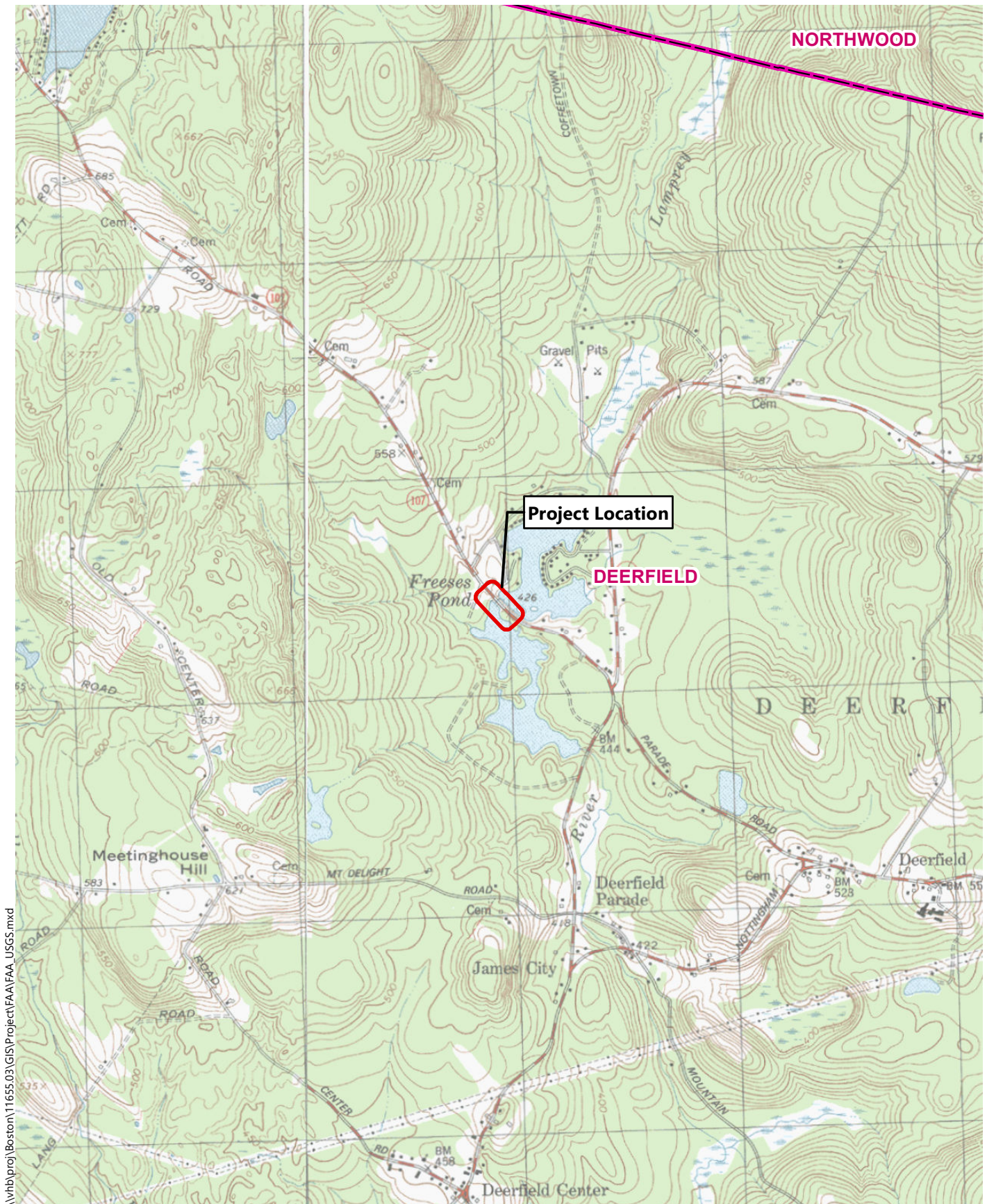
DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3, I(a)(1)

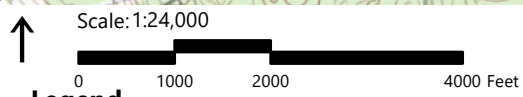
1. IMMEDIATELY sign the original application form and four copies in the signature space provided above.
2. Return the signed original application form and attachments to the applicant so that the applicant may submit the application form and attachments to NHDES by mail or hand delivery.
3. IMMEDIATELY distribute a copy of the application with one complete set of attachments to each of the following bodies: the municipal Conservation Commission, the local governing body (Board of Selectmen or Town/City Council), and the Planning Board.
4. Retain one copy of the application form and one complete set of attachments and make them reasonably accessible for public review.

DIRECTIONS FOR APPLICANT:

Submit the original permit application form bearing the signature of the Town/City Clerk, additional materials, and the application fee to NHDES by mail or hand delivery at the address at the bottom of this page. Make check or money order payable to "Treasurer – State of NH".



\\vhb\proj\Boston\11655.03\GIS\Project\FAA\FAA_USGS.mxd



Deerfield 24477 Bridge #137/166 | Deerfield, New Hampshire

- Legend**
- Project Area
 - Town Boundaries

USGS Locus Map

Source: USGS, VHB



STANDARD DREDGE AND FILL
WETLANDS PERMIT APPLICATION
ATTACHMENT A: MINOR AND MAJOR PROJECTS



Water Division/Land Resources Management
Wetlands Bureau

[Check the Status of your Application](#)

RSA/ Rule: RSA 482-A/ Env-Wt 311.10; Env-Wt 313.01(a)(1); Env-Wt 313.03

APPLICANT'S NAME: NH Department of Transportation **TOWN NAME:** Deerfield

Attachment A is required for *all minor and major projects*, and must be completed *in addition* to the [Avoidance and Minimization Narrative](#) or [Checklist](#) that is required by Env-Wt 307.11.

For projects involving construction or modification of non-tidal shoreline structures over areas of surface waters having an absence of wetland vegetation, only Sections I.X through I.XV are required to be completed.

PART I: AVOIDANCE AND MINIMIZATION

In accordance with Env-Wt 313.03(a), the Department shall not approve any alteration of any jurisdictional area unless the applicant demonstrates that the potential impacts to jurisdictional areas have been avoided to the maximum extent practicable and that any unavoidable impacts have been minimized, as described in the [Wetlands Best Management Practice Techniques For Avoidance and Minimization](#).

SECTION I.I - ALTERNATIVES (Env-Wt 313.03(b)(1))

Describe how there is no practicable alternative that would have a less adverse impact on the area and environments under the Department's jurisdiction.

The intent of this project is to replace the structurally deficient bridge no. #137/116 over Freeses Pond in order to protect public safety. Given the "serious" condition of this bridge, replacement of the bridge is the only alternate that would successfully meet the project goal of providing a safe facility for the public. Similarly, given its location within an established right-of-way, it is not possible to reduce impacts by adjusting the project location.

The replacement of the bridge involves headwall construction, top-mounted guardrail installation, rip-rap installation at the inlet and outlet, and slope improvement. The roadway alignment over the bridge and on the approaches will closely match existing conditions.

The bridge crosses over Freeses Pond. The bed and banks of this resource are under NHDES jurisdiction and cannot be avoided while still addressing the project need. However, impacts to this resource have been minimized to the maximum extent practicable. The area of impact was designed to be the minimum area required to access the structure and perform the work necessary to ensure the project's success. The bridge will be accessed using the existing public roadway (NH Route 107) and associated ROW; the existing ROW will be utilized for construction staging. The project will have temporary and permanent impacts within the open water habitat of Freeses Pond to stabilize the bridge and prevent scour. All project impacts will be limited to the existing ROW and easements acquired prior to construction commencement.

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SECTION I.II - MARSHES (Env-Wt 313.03(b)(2))

Describe how the project avoids and minimizes impacts to tidal marshes and non-tidal marshes where documented to provide sources of nutrients for finfish, crustacean, shellfish, and wildlife of significant value.

This section is not applicable to the proposed project, as there are no known tidal or non-tidal marshes within or near the project area.

SECTION I.III - HYDROLOGIC CONNECTION (Env-Wt 313.03(b)(3))

Describe how the project maintains hydrologic connections between adjacent wetland or stream systems.

This project will not negatively impact the hydraulic connections between adjacent wetland and/or stream systems and, therefore, will maintain the current hydraulic connections of Freeses Pond. The bridge replacement and associated inlet/outlet and slope stabilization will have no impact on the hydrology of the water body or surrounding features at ordinary high-water. The opening increase associated with the replacement of the 8.3 x 12.8-foot culvert with a 10 x 14-foot culvert will result in lowered flood elevations in the upstream portion of the pond, northeast of NH 107. However, HEC-RAS modeling indicates that tailwater effects from the dam are the primary factor influencing water elevations at the bridge. Therefore, increasing the hydraulic opening of the replaced bridge will provide hydraulic gains, with a culvert headwater elevation reduction of approximately 1.7 feet at the bridge during the 50- and 100-year flood events.

SECTION I.IV - JURISDICTIONAL IMPACTS (Env-Wt 313.03(b)(4))

Describe how the project avoids and minimizes impacts to wetlands and other areas of jurisdiction under RSA 482-A, especially those in which there are exemplary natural communities, vernal pools, protected species and habitat, documented fisheries, and habitat and reproduction areas for species of concern, or any combination thereof.

As previously mentioned, the project was designed to minimize impacts to the surrounding areas of NHDES jurisdiction to the maximum extent practicable while still achieving the project objective of replacing the structurally deficient bridge over Freeses Pond. Given the "serious" condition of the structure, replacement was deemed necessary. This alternative will avoid environmental impacts that would otherwise result from frequent, subsequent repair and rehabilitation work that would be required if the structurally deficient bridge was not fully replaced.

The limits of disturbance were minimized by utilizing the existing roadway (NH 107) and ensuring that as much work as possible is contained within the previously disturbed NH 107 right-of-way (ROW) which is approximately 150 feet wide (centered on NH 107). Limited impacts to the bed and banks of Freeses Pond are unavoidable but have been minimized. The rebuilt slopes along NH 107 adjacent to the bridge will be 2:1 or flatter to improve slope stability. These steep slopes reduce the project footprint and aid in the minimization of impacts.

There are no known exemplary natural communities or vernal pools within the project site. A Natural Heritage Bureau DataCheck (NHB20-1449) identified a record of Blanding's turtle in the project vicinity. NHF&G concurred that our proposed avoidance and minimization measures (i.e., contractor education and wildlife friendly erosion control matting) are appropriate to minimize potential impacts to this species. Refer to **Appendix G** for documentation.

The US Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) Report identified the potential presence of northern long-eared bat (NLEB) and small whorled pogonia within the project vicinity. Consultation with Susi von Oettingnen (USFWS) and the NLEB Determination Key through IPaC indicates that neither of these federally-protected species would be adversely impacted by the project.

SECTION I.V - PUBLIC COMMERCE, NAVIGATION, OR RECREATION (Env-Wt 313.03(b)(5))

Describe how the project avoids and minimizes impacts that eliminate, depreciate or obstruct public commerce, navigation, or recreation.

The intent of this project is to replace the structurally deficient bridge over Freeses Pond which will yield long term benefits to public commerce, navigation, and recreation through increased capacity of the bridge to safely accommodate traffic demands. The project has also been designed to reduce negative impacts to the public during construction through the establishment of a detour to provide motorists with an alternative route. Therefore, this project is anticipated to have minor temporary impacts to public transportation that are limited to the duration of construction. No long-term or permanent negative impacts to public commerce, navigation, or recreation will result from this proposed project.

SECTION I.VI - FLOODPLAIN WETLANDS (Env-Wt 313.03(b)(6))

Describe how the project avoids and minimizes impacts to floodplain wetlands that provide flood storage.

According to the NHDES Wetlands Permit Planning Tool (WPPT), Freeses Pond is a floodplain wetland mapped within the project area. This project has been designed to avoid and minimize impacts to this resource to the maximum extent practicable, however, some impacts are unavoidable while still accomplishing the project objectives (i.e., public safety improvements). Furthermore, the project is located within the FEMA Zone A 100-year floodplain of Freeses Pond. This area also provides flood storage; however, as previously mentioned, the overall limits of disturbance associated with this project have been minimized to the maximum extent practicable in order to avoid any impacts to surrounding resources that are not absolutely necessary in order to accomplish the project purpose and need. Additionally, because the replacement structure has a larger hydraulic opening than the existing structure, flood elevations upstream of the crossing would be reduced, an element of the project that is supported by the public.

SECTION I.VII - RIVERINE FORESTED WETLAND SYSTEMS AND SCRUB-SHRUB – MARSH COMPLEXES (Env-Wt 313.03(b)(7))

Describe how the project avoids and minimizes impacts to natural riverine forested wetland systems and scrub-shrub – marsh complexes of high ecological integrity.

Aside from the limited impacts to the bed and banks of Freeses Pond, no additional wetland areas will be impacted by the proposed project activities. A wetland delineation was performed by Kristopher Wilkes (NH CWS #288) on January 18, 2019, where a wetland area landward of the delineated top of bank was identified along the northern bank, located upstream and northeast of the project bridge. This wetland was classified as a Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Flooded (PFO1C). The project was designed to fully avoid impacts to this forested wetland, which is located greater than 200 feet east of the project culvert at the closest point. Furthermore, unavoidable impacts to Freeses Pond (Palustrine, Unconsolidated Bottom, Mud, Permanently Flooded, dike/impounded - PUB3Hh) have been minimized to the maximum extent practicable.

SECTION I.VIII - DRINKING WATER SUPPLY AND GROUNDWATER AQUIFER LEVELS (Env-Wt 313.03(b)(8))

Describe how the project avoids and minimizes impacts to wetlands that would be detrimental to adjacent drinking water supply and groundwater aquifer levels.

The proposed project activities will not impact drinking water supply or groundwater aquifer levels. The PFO1C wetland is hydraulically connected to Freeses Pond via a narrow channel along the north side of the wetland; season water level fluctuations (spill over/flooding) was evident at the time of the delineation. The hydraulic capacity of Freeses Pond (PUB3Hh) will not be negatively impacted. As previously mentioned, the hydraulic opening of the replaced culvert will be slightly larger than that of the existing culvert, resulting in a hydraulic improvement within the project area. Additionally, the implementation of soil erosion and sediment controls will help to preserve water quality throughout construction.

SECTION I.IX - STREAM CHANNELS (Env-Wt 313.03(b)(9))

Describe how the project avoids and minimizes adverse impacts to stream channels and the ability of such channels to handle runoff of waters.

Freesees Pond is a dam controlled impoundment of the Lamprey River which has modified the river into a surface water within the project area. There is no longer a flowing stream beneath the project bridge, as the existing culvert equalizes water levels and acts as a wetland crossing in this instance. Therefore, this crossing is regulated as wetland crossing, not a stream crossing. Refer to the **Natural Resource Agency Coordination Meeting Minutes** provided in **Appendix A**.

The proposed bridge replacement design minimizes unavoidable impacts to the bed and banks of the pond to maximum extent practicable. Soil erosion and sediment control measures are proposed and will be implemented during construction. These measures include natural buffer/perimeter controls (i.e., silt fence, erosion control mix sox/berm, etc.) along the upland limits of disturbance, perimeter control (i.e., cofferdam, turbidity curtain, etc.) along the natural resource areas (i.e., Freesees Pond), and a clean water bypass structure. These measures will help preserve water quality throughout construction. Furthermore, since the hydraulic capacity of the stream crossing will be maintained at ordinary high-water, the ability of the pond to handle runoff of waters will not be impacted by the proposed activities.

SECTION I.X - SHORELINE STRUCTURES - CONSTRUCTION SURFACE AREA (Env-Wt 313.03(c)(1))

Describe how the project has been designed to use the minimum construction surface area over surface waters necessary to meet the stated purpose of the structures.

The proposed bridge replacement has been designed to use the minimum construction surface area over Freeses Pond necessary to meet the project purpose and need. The minimum amount of rip-rap required to adequately stabilize the replaced structure will be installed at the inlet and outlet of the bridge to minimize permanent bed and bank impacts. Temporary impacts associated with the erosion control measures and clean water bypass occupy the minimum area required to ensure effectiveness while providing construction crews with adequate space to conduct the proposed work efficiently.

SECTION I.XI - SHORELINE STRUCTURES - LEAST INTRUSIVE UPON PUBLIC TRUST (Env-Wt 313.03(c)(2))

Describe how the type of construction proposed is the least intrusive upon the public trust that will ensure safe docking on the frontage.

As described above, impact minimization was considered during the design of the proposed bridge replacement, establishing the smallest work area to the maximum extent practicable while still providing the contractors with sufficient space to efficiently conduct the proposed work. With the project objective of replacing the structurally deficient bridge to protect public safety, the no-action alternative is not an option. Furthermore, the increase in the hydraulic opening associated with the replacement of the 8.3 x 12.8-foot culvert with a 10 x 14-foot culvert will result in lowered flood elevations in the upstream portion of the pond, northeast of NH 107. HEC-RAS modeling indicates that backwater effects from the dam are the primary factor influencing water elevations at the bridge. Therefore, increasing the hydraulic opening of the replaced bridge will provide marginal hydraulic gains, with a culvert headwater elevation reduction of approximately 1.7 feet at the bridge during the 50- and 100-year flood events. This reduction in the frequency and likelihood of flooding within the project area will benefit the public.

SECTION I.XII - SHORELINE STRUCTURES – ABUTTING PROPERTIES (Env-Wt 313.03(c)(3))

Describe how the structures have been designed to avoid and minimize impacts on ability of abutting owners to use and enjoy their properties.

The proposed bridge replacement work will not impact the abutting properties, as it will be contained within the existing NH 107 ROW, with limited fee-based acquisitions on adjacent parcels to accommodate the replacement of the existing wingwalls that extend beyond the ROW limits, rip-rap at the inlet and outlet, and slope improvements. Furthermore, the replaced bridge and culvert will closely match the existing one and not yield negative visual impacts to the abutters. No impacts to the ability of abutting owners to use and enjoy their properties will result from this project, aside from the temporary duration of construction activities. The slight hydraulic gain from the proposed larger culvert may even improve the ability of abutting owners to use and enjoy their properties through the reduced risk of localized flooding events.

SECTION I.XIII - SHORELINE STRUCTURES – COMMERCE AND RECREATION (Env-Wt 313.03(c)(4))

Describe how the structures have been designed to avoid and minimize impacts to the public’s right to navigation, passage, and use of the resource for commerce and recreation.

The replacement of the structurally deficient bridge that conveys NH 107 over Freeses Pond will improve public safety and support the continued use of this bridge for navigation and transportation. Since the proposed design of the replaced bridge will closely match that of the existing structure, the existing suitability of Freeses Pond within the project area for navigation, passage, commerce, and recreation will not be impacted post-construction.

SECTION I.XIV - SHORELINE STRUCTURES – WATER QUALITY, AQUATIC VEGETATION, WILDLIFE AND FINFISH HABITAT (Env-Wt 313.03(c)(5))

Describe how the structures have been designed, located, and configured to avoid impacts to water quality, aquatic vegetation, and wildlife and finfish habitat.

The project was designed to avoid potential impacts to water quality via temporary sedimentation during the short duration of construction activities through the use of erosion control measures, both in-water and on land. Silt fence or silt sock (at the discretion of the contractor) will be placed on land around the proposed limits of disturbance to prevent sediment-laden runoff from leaving the project area during construction. Upon completion of the proposed work, the land will be stabilized and re-vegetated with a native seed mix that compliments the existing conditions of the site. Sandbag cofferdams or turbidity curtains (at the discretion of the contractor) will be utilized within Freeses Pond to isolate the proposed work areas at the inlet and outlet of the bridge during the replacement activities. These erosion control measures will contain the potential turbid waters and preserve the water quality of the surrounding and downstream aquatic habitat areas. Additionally, a clean water bypass is proposed to allow water flow and aquatic organism passage throughout construction. The proposed culvert will have a buried invert with 12 inches of simulated stream infill to restore the benthic habitat and facilitate continued/unimpeded wildlife passage. Lastly, a 200-foot downstream mixing zone has been requested to monitor and control construction-related pond turbidity. Refer to **Appendix O** for more information.

SECTION I.XV - SHORELINE STRUCTURES – VEGETATION REMOVAL, ACCESS POINTS, AND SHORELINE STABILITY (Env-Wt 313.03(c)(6))

Describe how the structures have been designed to avoid and minimize the removal of vegetation, the number of access points through wetlands or over the bank, and activities that may have an adverse effect on shoreline stability.

Based on the current plans, proposed tree clearing is limited to the removal of a four-stemmed red maple located adjacent to the upstream end of the bridge. The area within the limits of disturbance will be stabilized and re-vegetated with a native seed mix post-construction, as previously mentioned. All project activities will be contained within the previously disturbed right-of-way (ROW) and associated limited fee-based acquisitions. The proposed project has been designed to avoid and minimize the number of access points through jurisdictional areas by utilizing the existing roadway (NH 107). The purpose of the proposed rip-rap is to stabilize the replaced structure by preventing scour at the inlet and outlet. Additionally, slope improvements are proposed to restore and stabilize previously eroded areas, thus, improving the shoreline stability of Freeses Pond within the project area.

PART II: FUNCTIONAL ASSESSMENT
<p>REQUIREMENTS</p> <p>Ensure that project meets the requirements of Env-Wt 311.10 regarding functional assessment (Env-Wt 311.04(j); Env-Wt 311.10).</p>
<p>FUNCTIONAL ASSESSMENT METHOD USED:</p> <p>USACE Highway Methodology Workbook, dated 1993, together with the USACE New England District Highway Method Workbook Supplement, dated 1999.</p>
<p>NAME OF CERTIFIED WETLAND SCIENTIST (FOR NON-TIDAL PROJECTS) OR QUALIFIED COASTAL PROFESSIONAL (FOR TIDAL PROJECTS) WHO COMPLETED THE ASSESSMENT: Kristopher Wilkes (NH CWS #288)</p>
<p>DATE OF ASSESSMENT: January 18, 2019</p>
<p>Check this box to confirm that the application includes a NARRATIVE ON FUNCTIONAL ASSESSMENT:</p> <p><input checked="" type="checkbox"/></p>
<p>For minor or major projects requiring a standard permit without mitigation, the applicant shall submit a wetland evaluation report that includes completed checklists and information demonstrating the RELATIVE FUNCTIONS AND VALUES OF EACH WETLAND EVALUATED. Check this box to confirm that the application includes this information, if applicable:</p> <p><input checked="" type="checkbox"/></p> <p>Note: The Wetlands Functional Assessment worksheet can be used to compile the information needed to meet functional assessment requirements.</p>



**AVOIDANCE AND MINIMIZATION
WRITTEN NARRATIVE**
Water Division/Land Resources Management
Wetlands Bureau
[Check the Status of your Application](#)



RSA/ Rule: RSA 482-A/ Env-Wt 311.04(j); Env-Wt 311.07; Env-Wt 313.01(a)(1)b; Env-Wt 313.01(c)

APPLICANT'S NAME: NH Department of Transportation **TOWN NAME:** Deerfield

An applicant for a standard permit shall submit with the permit application a written narrative that explains how all impacts to functions and values of all jurisdictional areas have been avoided and minimized to the maximum extent practicable. This attachment can be used to guide the narrative (attach additional pages if needed). Alternatively, the applicant may attach a completed [Avoidance and Minimization Checklist \(NHDES-W-06-050\)](#) to the permit application.

SECTION 1 - WATER ACCESS STRUCTURES (Env-Wt 311.07(b)(1))
Is the primary purpose of the proposed project to construct a water access structure?
No. The primary purpose of this project is to replace the structurally deficient Bridge #137/116 that conveys NH Route 107 over Freeses Pond in Deerfield.
SECTION 2 - BUILDABLE LOT (Env-Wt 311.07(b)(1))
Does the proposed project require access through wetlands to reach a buildable lot or portion thereof?
Not applicable.
SECTION 3 - AVAILABLE PROPERTY (Env-Wt 311.07(b)(2))*
For any project that proposes permanent impacts of more than one acre, or that proposes permanent impacts to a PRA, or both, are any other properties reasonably available to the applicant, whether already owned or controlled by the applicant or not, that could be used to achieve the project's purpose without altering the functions and values of any jurisdictional area, in particular wetlands, streams, and PRAs?
<i>*Except as provided in any project-specific criteria and except for NH Department of Transportation projects that qualify for a categorical exclusion under the National Environmental Policy Act.</i>
Not applicable. This project is a NH Department of Transportation project that qualifies for a categorical exclusion under the National Environmental Policy Act.

SECTION 4 - ALTERNATIVES (Env-Wt 311.07(b)(3))

Could alternative designs or techniques, such as different layouts, different construction sequencing, or alternative technologies be used to avoid impacts to jurisdictional areas or their functions and values as described in the [Wetlands Best Management Practice Techniques For Avoidance and Minimization?](#)

No. Impacts to jurisdictional areas were avoided to the maximum extent practicable throughout the project design while still achieving project objectives. Replacement of the structurally deficient bridge and adequately stabilizing the new structure are crucial to public safety. Refer to the Attachment A - Minor and Major Projects form and the Supplemental Narrative for more detailed information.

SECTION 5 - CONFORMANCE WITH Env-Wt 311.10(c) (Env-Wt 311.07(b)(4))**

How does the project conform to Env-Wt 311.10(c)?

***Except for projects solely limited to construction or modification of non-tidal shoreline structures only need to complete relevant sections of Attachment A.*

The project conforms to Env-Wt 311.10(c), as follows:

- (1) *Use the results of the functional assessment to select the location of the proposed project having the least impact to wetland functions.*
The functions and values of Freeses Pond are uniform throughout the pond. Given the homogeneous functional assessment, limiting impacts to an area of lesser wetland functions was not an option. Furthermore, the project's goal of replacing a specific structurally deficient bridge resulted in no flexibility to change the project location.
- (2) *Design the proposed project to have the least impact to wetlands functions.*
The project location is set based on the historic ROW limits. Impacts to the bed and bank of Freeses Pond were minimized to the maximum extent practicable while still achieving project objectives. For example, the steepness of the rebuilt slopes will be 2:1 (or flatter) which will minimize the overall project footprint compared to a shallower slope.
- (3) *Where impact to wetland functions is unavoidable, limit the project impacts to the least valuable functions on the site while avoiding and minimizing impacts to the highest and most valuable functions.*
As previously mentioned, the functions and values of Freeses Pond are uniform throughout the pond. Given the homogeneous functional assessment, there are not areas of higher or more valuable functions than others within the project area.
- (4) *Include on-site minimization measures and construction management practices to protect aquatic resource functions.*
The overall limit of disturbance for the project was designed to be the minimum amount required while still achieving the project objectives of replacing the structurally deficient bridge to protect public safety. The steep slopes mentioned above is one way these impacts were minimized. Furthermore, erosion control best management practices (i.e., water bypass and steel sheet piles) will isolate the work area. This will prevent sedimentation of the surrounding area resulting from the construction activities and ensure aquatic organism passage and water flow are maintained to protect aquatic resource functions.

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Supplemental Narrative

1. Introduction

On behalf of the New Hampshire Department of Transportation (NHDOT or “the Applicant”), this Wetlands Permit Application was prepared by VHB pursuant to the New Hampshire Revised Statutes Annotated (RSA) Chapter 482-A, Fill and Dredge in Wetlands, and Wetland Bureau Code of Administrative Rules, Chapters Env-Wt 100 through Env-Wt 900, as applicable.

2. Site Description and Existing Conditions

Site Description

The project is located within a residential/rural area in Deerfield, NH. The project bridge crosses Freeses Pond which is an impoundment of the Lamprey River. Water flows north to south through the project area. A residential property abuts the right-of-way (ROW) to the northwest with a large maintained lawn area, along with a residential property located further from the project limits to the northeast. A small, frequently flooded peninsula to the northeast contains a wetland area, further described **Section 5.2** below. The remaining surrounding landscape is predominately upland forested areas dominated by pine and hemlock trees with other species interspersed and shrubs along the water edges. **Representative Site Photos** are provided in **Appendix L**.

Existing Bridge

Deerfield Bridge #137/116 carries NH Route 107 over Freeses Pond and is located approximately 0.5 mile north of the intersection with NH 43. The corrugated structural steel plate pipe arch bridge was built in 1973. It has a clear span of 12.8 feet with a vertical opening of 8.3 feet. The culvert is approximately 46 feet long with a rail-to-rail width of 32 feet. The structure is surrounded by mortared stone headwalls and wingwalls at each end. The wingwalls are flared approximately 45 degrees from the bridge. Rip-rap aprons are located at the inlet and outlet. The normal water level is approximately 2 feet below the crown of the arch.

The bridge was placed on the NHDOT’s Red List in 2010. In the 2018 NHDOT Inspection Report the culvert was given a Federal Sufficiency Rating of 39% and a condition rating of 3, indicating it is in “serious” condition. Heavy rust and scaling were noted on the culvert, as well as a sag in the roofline and plate gaps. Current water levels coincide with the seam in the culvert, leading to corrosion at the weakest point in the structure. The stone headwalls and wings were observed to be cracking, with several stones loose or missing.

An inspection of the bridge in July 2020 identified that immediate repair was needed. The bridge was temporarily closed, and the Department performed repairs within the roadbed by spanning the culvert with temporary 50-foot-long steel beams and steel plates which were buried and paved over. These were installed with a large buffer, which is defined by the span, to allow the banks to slough to a natural configuration in case of potential collapse. These measures will provide temporary stabilization so that the bridge can remain open to traffic until the permanent replacement can be constructed. The temporary structure will be salvaged back to the Department post construction.

Approach Roadway

NH 107 is a Tier 3 (regional) roadway with a 2016 AADT of 2400 vehicles per day (VPD). The roadway width is approximately 24 feet paved with lanes striped at approximately 11 feet. There are gravel shoulders on both sides of the roadway, approximately 4 feet wide. The bridge is located on a tangent horizontal alignment, with a 1.0% vertical grade sloping to the south. The horizontal alignment transitions into curves directly north and

south of the project limits. No closed drainage systems or underdrain are known within the project limits. Drainage in the area is comprised of surface runoff. Roadside barriers are comprised of standard w-beam guardrail, with timber posts. The 2018 NHDOT Inspection Report noted that the timber posts have begun decaying and 2 post locations were missing.

3. Proposed Project Description

The project proposes to replace the structurally deficient Bridge #137/116 that conveys NH 107 over Freeses Pond in Deerfield, NH. The project proposes to replace the existing culvert with a 10-foot rise by 14-foot span precast concrete box culvert with precast wingwalls and headwall-mounted guardrail. This box culvert will have a buried invert with 12 inches of simulated stream infill and provides additional hydraulic capacity above ordinary high water to improve conveyance for larger storm events. Features include 24-foot rail-to-rail width, 2% normal crown, and top-mounted guardrail along the culvert headwalls. Approach work is limited to the maximum extent practicable, with no change in pavement area and slight improvements to guardrail berms and grading. The minimum amount of rip-rap required to adequately stabilize the replaced structure will be provided at the inlet and outlet of the bridge. The bridge will be accessed from the roadway and most of the project impacts will occur within the existing NH 107 right-of-way (ROW), with limited fee-based acquisitions on adjacent parcels to accommodate the replacement of the existing wingwalls that extend beyond the ROW limits, rip-rap at the inlet and outlet, and slope improvements.

The proposed activities will result in limited permanent impacts to the bed and banks of Freeses Pond necessary to replace the structurally deficient bridge and install rip-rap stabilization at the inlet and outlet, along with slight grading of the subbase material and filling along eroded toe-of-slopes with material that meets NHDOT's Standard Specification requirements to support the guardrail. The rip-rap installation at the inlet will necessitate the removal of a four-stemmed red maple located adjacent to the upstream end of the bridge. Limited temporary impacts to the bed of Freeses Pond will result from erosion control measures, clean water bypass, and access, which will be restored to pre-construction condition upon completion of the work. One temporary and one permanent utility relocations are also required. This project is expected to be advertised in early 2022, with construction beginning in mid-spring, bridge closure in July and August, and construction completion in September 2022. Refer to the **Construction Sequence Narrative** provided in **Appendix M** for additional project implementation details.

4. Impact Analysis and Best Management Practices

4.1 Proposed Impacts

Permanent Impacts

The project will permanently impact 1,525 SF within the bed of Freeses Pond to replace the existing bridge and install rip-rap stabilization at the inlet and outlet, and will permanently impact approximately 786 SF within the bank of Freeses Pond to stabilize the eroded slopes through grading and fill.

Rip-rap Installation

Refer to the **Env-Wt 514 Bank/Shoreland Stabilization Worksheet** provided in **Appendix E** for more information regarding rip-rap details. The permanent streambed impact of this rip-rap installation is 1,525 SF. The rip-rap will also extend landward of the OHW line at the toe-of-slope and result in 786 SF of streambank impact.

Berm/slope stabilization

Slope improvements are required to stabilize the existing eroded areas in order to support the proposed activities, including the guardrail. This will involve slight grading of the subbase material and filling along eroded toe-of-slopes with material that meets NHDOT's Standard Specification requirements.

Temporary Impacts

The project will have limited temporary impacts (719 SF) within the bed of Freeses Ponds resulting from the in-water erosion control measures around the bridge inlet and outlet (i.e., steel sheet piles), along with 64 SF of temporary impact to the banks of Freeses Pond resulting from the clean water bypass structure.

Temporary impacts resulting from the perimeter control measure (i.e., steel sheet piles) is necessary to isolate the work area and prevent siltation of the surrounding habitat and downstream waters, making the 719 SF of temporary streambed impact unavoidable. A clean water bypass structure will be used to ensure adequate streamflow is maintained and aquatic fauna passage is not prohibited during construction. These erosion control measures will be removed upon completion of the proposed activities.

4.2 Mitigation and Best Management Practices

The rip-rap aprons at the inlet and outlet of the bridge are intended to stabilize and protect the proposed structure and are considered self-mitigating. The rip-rap was sized according to standard practice based on hydraulic analysis to be the minimum amount necessary to stabilize the bridge and achieve project objectives. Lori Sommer, NHDES, concurred with this determination during the Natural Resource Agency Meeting (NRAM) teleconference on April 20, 2020. The fill is intended to restore an eroded slope by stabilizing the guardrail berm and embankment in the least environmentally impactful manner. Refer to the **Natural Resource Agency Coordination Meeting Minutes** provided in **Appendix A**.

Despite the fact that Freeses Pond is a priority resource area (PRA) that will be permanently impacted by the proposed activities, as mentioned in **Section 5.1** below, compensatory mitigation in accordance with Env-Wt 313.04(a)(1) was determined not applicable to this project given the nature of the proposed improvements and NHDES concurrence.

Standard best management practices (BMPs) will be applied throughout project construction in accordance with applicable NHDES and NHDOT BMP Manuals to reduce the risk of erosion and sediment-laden run-off from entering Freeses Pond and adjacent wetlands. Perimeter controls such as silt fence and/or silt sock will be installed upslope of project wetlands and waterbodies to ensure that surface water run-off from un-stabilized areas does not carry silt, sediment, and other debris outside of the limits of work. Temporary diversion BMPs, such as steel sheet piles, flumes, and/or water pumps will be implemented within Freeses Pond to isolate dry work areas and minimize the risk of sedimentation downstream. All installed temporary erosion control measures shall be inspected daily and repaired/replaced as necessary.

Areas remaining unstabilized for a period of more than 30 days shall be temporarily seeded and mulched. Erosion control blankets shall be installed on all slopes that are greater than 3 feet horizontal and 1 foot vertical (3:1). Upon the completion of the proposed work, all disturbed and graded areas located upslope of the erosion control measures will be seeded and mulched as needed. Disturbed areas that have been seeded and mulched will be considered stable once 85-percent vegetative growth has been achieved. Refer to the **Erosion Control Plan** included as **Appendix Q** for further details.

Soil disturbance is anticipated to occur as a result of the culvert replacement and associated rip-rap stabilization. Only clean equipment that is free of plant material and debris shall be delivered to the project site and utilized during construction to prevent the transfer and establishment of invasive species. All machinery entering the project area will be inspected for foreign plant matter (i.e., stems, flowers, and roots.) and soil embedded in the tracks or wheels. If foreign plant matter or soil is present, the operator shall remove the plant material and soil from the machine using hand tools.

4.3 Turbidity Mixing Zone, Sampling, and Control

NHDOT requests approval for a mixing zone pursuant to Clean Water Act Section 404(b)(1) Guidelines to ensure compliance with State Water Quality Standards as described in Env-Wq 1707. Details of the proposed turbidity best management plan includes a mixing zone, sampling, and control measures for in-water work provided in **Appendix O**.

5. Wetland and Surface Water Resources

Jurisdictional wetlands and surface waters within and adjacent to Bridge #137/116 were delineated by VHB Senior Environmental Scientist, Kristopher Wilkes (NH CWS #288) on January 18, 2019. Wetland delineation was performed in accordance with the procedures and standards outlined in the Corps of Engineers Wetland Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0 (January 2012). Wetland delineation also relied upon the Field Indicators for Identifying Hydric Soils in the United States, Version 8.1, published by the Natural Resource Conservation Service and the Field Indicators for Identifying Hydric Soils in New England, Version 4.0, published by the New England Interstate Water Pollution Control Commission. Dominant wetland vegetation was assessed using the Northcentral and Northeast Regional Wetland Plant List published by the U.S. Army Corps of Engineers. Lastly, wetlands were classified using the USFWS methodology Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979, revised 1985). The top-of-bank and ordinary-high-water of Freeses Pond were delineated in accordance with Env-Wt 103.50 and RSA 483-B:4(XI-e) using alpha-numerically coded blue and orange flagging tape, respectively. Site observations and field data collected during the delineation of Freeses Pond and associated wetlands adjacent to the subject crossing are summarized below. Refer to the **Representative Site Photographs** provided in **Appendix L** and the Existing Conditions Plan located within the **Wetland Impact Plans** provided in **Appendix P**.

5.1 Freeses Pond

Freeses Pond is a dam controlled impounded portion of the Lamprey River that flows north to south through the project area. This segment of the Lamprey River is designated under the New Hampshire Rivers Management and Protection Act (RSA 483) due to the significant natural and cultural resources it provides. Therefore, a copy of the application package will be sent to the Lamprey River Advisory Committee. Based on site observations at the time of the delineation, Freeses Pond is classified as Palustrine, Unconsolidated Bottom, Mud, Permanently Flooded, dike/impounded (PUB3Hh).

According to the NHDES Wetlands Permit Planning Tool (WPPT), there are no Class A waters, outstanding water resources, sand dunes, peatlands, prime wetlands, or tidal waters within the vicinity of the proposed activities. However, impacts to Freeses Pond will constitute PRA impacts, as this pond is a floodplain wetland adjacent to a tier 3 watercourse (i.e., Lamprey River). However, as discussed in **Section 4.2** above, this project does not

require mitigation. Furthermore, NHDES WPPT indicates that the project portion of the Lamprey River is not subject to the NHDES Shoreland Water Quality Protection Act (RSA 483-B) and, therefore, this project will not require separate authorization from the NHDES Shoreland Program.

It should be noted that although the segment of the Lamprey River from the Bunker Pond Dam in the Town of Epping to the confluence with the Piscassic River is listed in the National Wild and Scenic Rivers System, the project portion of the waterway does not hold this classification.

North Side of NH 107

The delineated bank of Freeses Pond along the north side of NH 107 exhibits steep slopes immediately to the east and west of the subject crossing. The pond bank transitions to a more gradual slope with emergent wetland plants present to the west of the subject crossing, specifically where the bank turns north and abuts two existing residential properties. Bank heights range from 4-5 feet immediately west of the subject crossing, and 2-3 feet immediately to the east. Minimal erosion and/or undercutting was observed along the bank surrounding the subject crossing. As the pond bank continues east and further away from the subject crossing, a more gradual and well-vegetated stable slope is present ranging from 3-5 feet in height.

Plant species observed at the time of delineation along the bank of Freeses Pond on the north side of NH 107 include white meadowsweet (*Spiraea alba*), reed canary grass (*Phalaris arundinacea*), species of aster (*Symphotrichum* spp.), cinnamon fern (*Osmundastrum cinnamomeum*), red maple (*Acer rubrum*), maleberry (*Lyonia ligustrina*), white pine (*Pinus strobus*), species of goldenrod (*Solidago* spp.), steeplebush (*Spiraea tomentosa*), soft rush (*Juncus effusus*), silky dogwood (*Cornus amomum*), narrow leaved cattail (*Typha angustifolia*), few staghorn sumac (*Rhus typhina*), tussock sedge (*Carex stricta*), high-bush blueberry (*Vaccinium corymbosum*), wintergreen (*Gaultheria procumbens*), eastern hemlock (*Tsuga canadensis*), sphagnum (*Sphagnum* spp.) at waters edge, bracken fern (*Pteridium aquilinum*), species of oak (*Quercus* spp.), American beech saplings (*Fagus grandifolia*), and creeping juniper (*Juniperus horizontalis*).

South Side of NH 107

The delineated bank of Freeses Pond along the south side of NH 107 exhibits gradual slopes that are approximately five feet high immediately west of the subject crossing and approximately two to three feet high immediately east of the subject crossing. No erosion was observed along the bank. Similar to the north side of the culvert - as the pond bank continues east and further away from the subject crossing, a more gradual and well-vegetated stable slope is present.

Plant species observed at the time of delineation along the bank of Freeses Pond on the south side of NH 107 include white meadowsweet, red maple, species of goldenrod and aster, reed canary grass, soft rush, white pine, steeplebush, high-bush blueberry, leatherleaf (*Chamaedaphne calyculata*), maleberry, creeping juniper, eastern hemlock, red pine (*Pinus resinosa*), sphagnum (at water's edge), American beech saplings, speckled alder (*Alnus incana*), tussock sedge, woolgrass (*Scirpus cyperinus*), narrow-leaved cattail, and cinnamon fern. Additionally, low-bush blueberry (*Vaccinium angustifolium*) and white pine were observed in upland areas above the bank, east of the culvert.

5.2 Wetlands

A floodplain wetland was delineated along the north side of NH 107, located greater than 200 feet east of the subject crossing at the closest point. The wetland is classified as Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Flooded (PFO1C). This wetland is hydrologically connected to Freeses Pond via a narrow channel along the north side of the wetland. Seasonally water level fluctuations (spill over/flooding) was evident throughout the wetland as the time of the delineation. Plant species observed within this wetland include white pine, high-bush blueberry, red maple, American wintergreen (*Gaultheria procumbens*), species of Lycopodium (*Lycopodium spp.*), sphagnum, soft rush, tussock sedge, meadowsweet, and reed canary grass. Given the distance of this wetland area from the project culvert, no impacts to this resource are anticipated and, therefore, no functional assessment was performed.

5.3 Freeses Pond Functions and Values

Freeses Pond is part of the Lamprey River watershed which drains approximately 137,600 acres (215 square miles) and consists of the mainstem of the Lamprey River, five large tributaries, and numerous smaller tributaries. This watershed includes 14 towns in New Hampshire and eventually empties into the Great Bay. Of the eight rivers flowing to Great Bay, the Lamprey River watershed contributes the greatest volume of freshwater to the estuary, providing diverse habitat for numerous species and playing a significant role in maintaining the overall health of the protected bay's environment. Therefore, Freeses Pond plays an important part in the water cycle and provides a multitude of functions and values. These functions and values were assessed based on guidance provided in the US Army Corps of Engineers (USACE) Highway Methodology Workbook, dated 1993, together with the USACE New England District Highway Method Workbook Supplement, dated 1999 in accordance with Env-Wt 311.10(a)(2)(a) (refer to the **Wetlands Function-Value Evaluation Form** provided in **Appendix K**). Principle functions and values of Freeses Pond include:

- Groundwater Recharge/Drinking Water – Freeses Pond provides opportunity for groundwater recharge and influences the drinking water supply in the region as water often penetrates groundwater through wetlands and the beds of rivers and waterbodies. The Freeses Pond Dam impounds the Lamprey River, slowing the water and retaining it for longer periods. This provide enhanced opportunity for groundwater recharge. According to NH GRANIT Data reviewed in ArcGIS, there is a mapped aquifer underlying Freeses Pond. Deerfield is one of many municipalities in New Hampshire with an Aquifer and Groundwater Protection Zoning District.
- Flood and Erosion Protection – Freeses Pond provides a level of flood and erosion protection by receiving precipitation, surface water, groundwater, and other sources of runoff/ discharge associated with surrounding natural and suburban areas. The pond's storage ability plays an important role in reducing erosion and flood damage to communities around the waterbody and downstream.
- Sediment & Toxicant Retention/Nutrient Removal – Freeses Pond functions like other surface waters in reducing pollution that flows downstream to the Great Bay. The impounded pond retains sediment, pollutants, and excess nutrients and plays a role in reducing carbon in the atmosphere.
- Wildlife Habitat – Freeses Pond provides habitat for a diverse assemblage of plant, fish, amphibian, bird, and mammal species. It provides feeding opportunity and refuge habitat within the pond and in the surrounded forested upland areas.

- Recreation – Freeses Pond provides opportunity for recreation including fishing and small boating (i.e., paddling).
- Endangered Species Habitat – The NHB report (NHB20-1449, dated 5/29/20) identified a single record of Blanding’s Turtle nearby, a state listed endangered species. However, upon coordination with NHF&G (refer to **Appendix G**), wildlife friendly erosion control matting will be utilized, and turtle identification fliers will be distributed to the contractors to reduce potential impacts. No impacts to this species are expected to result from the proposed activities. If spotted or Blanding’s turtles are found, the appropriate NHF&G personnel will be contacted, as detailed in **Section 7.1** below.

The proposed project will not have an impact on the functions and values of Freeses Pond as it involves the replacement of existing infrastructure within the waterbody. Proposed bed and bank impacts resulting from the installation of rip-rap and stabilization of adjacent eroded slopes will benefit the waterbody by improving stability and reducing the potential for future erosion and sedimentation at the bridge crossing. Standard best management practices, such as perimeter erosion controls and temporary water diversion methods, will be implemented throughout construction to reduce the risk of erosion and sedimentation within the waterbody and downstream. The proposed activities will not negatively impact the floodplain, as there will be no post-construction reduction to the ordinary high-water level upstream of the replacement bridge for this dam-controlled pond, but the increase in hydraulic capacity would reduce upstream flooding under 50- and 100-year flows. Finally, the project may impact wildlife and recreation due to enhanced construction-related noise and activity surrounding the bridge, however these impacts are temporary in nature and will occur over a relatively short period of time. Also, the location of the proposed work involves a frequently trafficked bridge, which reduces the likelihood that this portion of the pond within the influence of the crossing currently provides essential wildlife and/or recreation opportunity.

6. Floodplains and Floodways

The project is located within the Special Flood Hazard Area (SFHA) Zone A – 100-year floodplain, according to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map No. 33015C0090E effective May 17, 2005. Refer to the **Floodplain Map** provided in **Appendix C**. The proposed project will result in limited permanent and temporary impacts the floodplain of Freeses Pond due to the proposed replacement of the structurally deficient bridge and installation of rip-rap at the inlet and outlet. The increase in the hydraulic opening associated with the replacement of the 8.3 x 12.8-foot culvert with a 10 x 14-foot culvert will result in lowered flood elevations in the upstream portion of the pond, northeast of NH 107. HEC-RAS modeling indicates that backwater effects from the dam are the primary factor influencing water elevations at the bridge. Therefore, increasing the hydraulic opening of the replaced bridge will provide marginal hydraulic gains, with a culvert headwater elevation reduction of approximately 1.7 feet at the bridge during the 50- and 100-year flood events. Refer to the **Hydraulic Analysis Memorandum** provided in **Appendix D**.

7. Rare, Threatened, and Endangered Species

The following is a discussion of rare, threatened, and endangered species identified by the NH Natural Heritage Bureau (NHB) DataCheck tool and US Fish and Wildlife Service's (USFWS) Information for Planning and Consultation (IPaC) system.

7.1 Natural Heritage Bureau and NH Fish and Game Department

A search for the occurrence of rare plant, animal, or natural communities within the vicinity of the proposed project was completed using the NHB online DataCheck tool. A project report provided by NHB, dated May 29, 2020, identified a record of Blanding's turtle (*Emydoidea blandingii*) within the vicinity of the project area. Therefore, coordination with the NH Fish and Game (NHF&G) Department is required.

NHF&G concurred that the proposed avoidance and minimization measures are appropriate to minimize potential impacts to this species. These measures include temporary erosion controls (i.e., silt fence/sock, turbidity curtain and/or cofferdam) that will be utilized during construction to prevent sedimentation of the surrounding areas. The project will avoid the use of welded plastic or biodegradable plastic netting or thread in erosion control matting. Rather, erosion controls made of woven organic material such as coco matting will be used to decrease the risk of wildlife entanglement. A water bypass will also be established to promote continued water flow and wildlife passage throughout construction. Upon completion of the proposed bridge replacement work, the erosion control measures will be removed, and any areas of bare soil will be reseeded and stabilized.

NHF&G requested that if adult spotted or Blanding's turtles are found laying eggs or hatchlings are found in a work area, Melissa Doperalski (603-479-1129 cell) or Josh Megyesy (978-578-0802 cell) should be contacted for further instructions. Refer to **Appendix F** for the **NHB DataCheck Report** and **Appendix G** for **NHB and NHF&G Correspondence**.

7.2 US Fish and Wildlife Service

The project area was reviewed for the presence of federally listed or proposed, threatened, or endangered species, designated critical habitat, or other natural resources concerning the USFWS IPaC Project Planning Tool. Results dated August 19, 2020, indicated the potential presence of northern long-eared bat (*Myotis septentrionalis*, "NLEB") and small whorled pogonia (*Isotria medeoloides*) within the vicinity of the project corridor. Refer to the **USFWS IPaC Report** provided in **Appendix H**.

The proposed project is located within the federally protected range of the NLEB, which is a federally threatened species. Tree clearing activities are one of the largest threats to the NLEB. The proposed project will only require the removal of a four-stemmed red maple located adjacent to the upstream end of the bridge. This tree is young, has smooth bark, and the following diameters at breast height (DBHs) measured in inches: 2.2, 2.4, 3.6, and 4.0. Given the tree's age and size, this is likely not a suitable tree for the NLEB. The proposed project is not within 150 feet of known occupied maternity roost trees, nor within a ¼ mile of known hibernaculum. A consistency letter for this project was generated in the IPaC Project Planning Tool on August 19, 2020 which concluded that the project will have no effect on the threatened NLEB. Refer to the NLEB Consistency Letter provided in **Appendix H**.

The proposed project is not anticipated to negatively impact small whorled pogonia, which is a federally threatened species. Small whorled pogonia grows in birch/beech/maple/oak/hickory forest stands with an open understory, and prefers sloping habitat, particularly near small streams. This habitat type is absent from the project site. The tree species around Freeses Pond near the project bridge consist mainly of white pine and eastern hemlock, with scattered red oaks and maples. The streambanks along the bridge are dominated by herbaceous vegetation that would likely outcompete small whorled pogonia, if it were present. Furthermore, the proposed activities along the approach roadways are limited to actively disturbed areas that directly abut the paved public roadway. Therefore, the habitat within the vicinity of the proposed bridge replacement is not likely to support small whorled pogonia. Susi von Oettingen, a USFWS Endangered Species Biologist, concurred with this assessment via email dated August 26, 2020. Refer to **Appendix H** for documentation.

8. Cultural Resources

A Request for Project Review (RPR) for the proposed project was submitted on July 22, 2019 to the NH Division of Historical Resources (NHDHR). Upon review of the RPR, NHDHR found no archaeological concerns related to the proposed bridge replacement. However, NHDHR requested additional information regarding the potential impacts to warrant further study of the property at 107 North Road (Parcel 208 Lot 58), adjacent to the proposed project site. Further assessment of the proposed project determined that there will be no anticipated impacts of the project on the existing character of the property at 107 North Road. On September 18, 2020, NHDOT Cultural Resources staff approved that the project qualifies for approval under the *Section 106 Programmatic Agreement, Appendix B Certification – Activities with Minimal Potential to Cause Effects*. The proposed project would fit under the category of non-historic bridge and culvert replacement since the bridge was constructed in 1973. Refer to the **NHDHR Section 106 Consultation** provided in **Appendix I**.

9. US Army Corps of Engineers and US Coast Guard

United States Army Corps of Engineers

The proposed project would permanently impact 1,525 SF and temporarily impact 719 SF below ordinary high-water. These impacts fall under the US Army Corps of Engineers (USACE) Section 404 jurisdiction. As such, Appendix B – Corps Secondary Impacts Checklist has been completed. Refer to the **ACOE Appendix B** checklist provided in **Appendix J**.

United States Coast Guard

Since the proposed project involves modifying an existing bridge, the US Coast Guard (USCG) was consulted to determine the navigable status of Freeses Pond and potential need for further USCG coordination or authorization. Based on a letter received from James L. Rousseau on August 31, 2020, it was determined that Freeses Pond is designated as non-navigable for USCG Bridge Program jurisdiction and a permit is not required. Refer to the **USCG Correspondence** provided in **Appendix N**.

10. Conditions Applicable to All Work in Jurisdictional Areas (Env-Wt 300)

Since the project involves the placement of fill within Freeses Pond (in the form of rip-rap aprons at the bridge inlet and outlet and slope stabilization improvements), the standards outlined in New Hampshire Administrative Rule Env-Wt 307.11 must be addressed.

Env-Wt 307.11: Filling Activity Conditions

(a) *Fill shall be clean sand, gravel, rock, or other material that:*

(1) *Meets the project's specifications for its use; and*

(2) *Does not contain any material that could contaminate surface or groundwater or otherwise adversely affect the ecosystem in which it is used;*

The rip-rap aprons at the bridge inlet and outlet and the material used for the slope stabilization will be clean, meet the NHDOT Standard Specifications for its use, and will not contain any material that could contaminate the surrounding environment.

(b) *Limits of fill shall be clearly identified prior to commencement of work and controlled in accordance with Env-Wt 307.03 to ensure that fill does not spill over or erode into any area where filling is not authorized;*

The limits of fill will be clearly identified prior to the commencement of the proposed activities so that fill will only be placed where authorized. Furthermore, the project will abide by the water quality protection criteria listed in Env-Wt 307.03 through the implementation of standard erosion control BMPs including, but not limited to, steel sheet piles, clean water bypass structure, silt sock, etc. Refer to the Erosion Control Plan provided in Appendix Q. These BMPs will be regularly inspected and maintained throughout construction. Upon completion of the proposed activities, these BMPs will be removed and the temporarily disturbed areas will be restored to pre-construction condition (i.e., reseeding of bare soil areas).

(c) *Slopes shall be immediately stabilized by a method specified in Env-Wq 1506 or Env-Wq 1508, as applicable, to prevent erosion into adjacent wetlands or surface waters;*

Slopes will be stabilized immediately following the completion of the proposed bridge replacement activities to prevent erosion (Env-Wq 1506) and protect water quality (Env-Wq 1508).

(d) *No fill shall be allowed to achieve setbacks to septic systems specified in Env-Wq 1000;*

Not applicable.

(e) *Fill shall be not placed so as to direct flows onto adjacent or down-current property;*

The proposed fill will not direct flows onto adjacent or down-current properties. The proposed activities will not result in a post-construction change to the ordinary high-water.

(f) *Swamp mats and construction mats shall be deemed temporary fill for new authorizations only if they meet the requirements of (h)(1) and (h)(2), below;*

Not applicable.

(g) Authorized temporary fill other than swamp mats, construction mats, and corduroy shall be placed on geotextile fabric laid on preconstruction wetland grade;

Not applicable.

(h) Subject to (i), below, temporary fill shall be:

- (1) In place no longer than one growing season;*
- (2) Removed immediately upon work completion; and*
- (3) Disposed of at an upland location in a manner that prevents its erosion into a surface water or wetland;*

Not applicable.

(i) Corduroy shall be deemed temporary fill that may be left in place if it:

- (1) Is installed as part of a skid trail in accordance with the Forestry BMPs;*
- (2) Does not exceed 1,000 LF and 20,000 SF per crossing; and*
- (3) Does not cross or otherwise impact a perennial stream, marsh, PRA, or vernal pool;*

Not applicable.

(j) Wetlands and surface waters shall be restored to pre-impact conditions and elevation as specified in Env-Wt 307.12(i), below, unless otherwise authorized in an issued permit;

All temporarily disturbed areas will be restored to pre-impact conditions and elevation through the replacement of removed soil and revegetation to match existing conditions to the maximum extent practicable, in accordance with Env-Wt 307.12(i).

(k) Swamp mats shall be:

- (1) Properly installed, not dragged into position; and*
- (2) Removed immediately upon the completion of work; and*

Not applicable.

(l) No fill shall take place in a PRA unless:

- (1) Specifically authorized by the department in an issued permit; or*
- (2) Authorized under applicable project-specific provisions.*

The proposed fill within Freeses Pond (a floodplain wetland adjacent to a tier 3 watercourse) would not occur unless authorized by NHDES, given the project intent of stabilizing the inlet and outlet of the replaced bridge and restoring the existing eroded slope to prevent further degradation. Refer to the Natural Resources Agency Coordination Meeting Minutes provided in Appendix A.

11. Project-Specific Requirements (Env-Wt 500)

Since the project involves the replacement of a bridge that conveys a public highway within jurisdictional areas, the standards outlined in New Hampshire Administrative Rule Env-Wt 527 must be addressed.

11.1 Env-Wt 527.02: Approval Criteria for Public Highways

In accordance with RSA 482-A:3, I-a, this NHDOT project is subject to the rebuttable presumption that for applications "proposed, sponsored, or administered by the department of transportation", NHDOT "has exercised appropriate engineering judgement in the project's design."

(a) The project meets the design criteria specified in Env-Wt 527.04;

See applicable discussion below in Section 11.3.

(b) The project is consistent with RSA 482-A:1, RSA 483, RSA 483-B, RSA 485-A, and RSA 212-A;

The proposed project is consistent with all above referenced statutes. In accordance with RSA 482-A:1 "Finding of Public Purpose," the interests of the general public regarding preservation of natural resources is in line with the proposed activities. No substantial adverse impacts to the functions and values of wetlands, hydraulic capacity, groundwater recharge, recreation, etc. will result from the proposed activities. In accordance with RSA 483 "NH Rivers Management and Protection Program," the characteristics and functions of Freeses Pond will be preserved. Furthermore, the project would qualify for a Permit by Notification pursuant to RSA 483-B "Shoreland Water Quality Protection Act." Finally, coordination with NHB and USFWS was conducted to ensure all appropriate conservation measures are followed to avoid adverse impacts to identified species, thereby, complying with RSA 212-A "Endangered Species Conservation Act."

(c) The purpose of the project is to improve or maintain public safety, consistent with federal and state safety standards;

The purpose of the project is to improve public safety through the replacement of the structurally deficient and increasingly unsafe bridge.

d) The project will not cause displacement of flood storage wetlands or cause diversion of stream flow impacting abutting landowner property; and

The project will not cause displacement of flood storage wetlands or cause diversion of stream flows impacting abutting landowner property.

(e) For a project in the 100-year floodplain, the project will not increase flood stages off-site.

The project will not increase flood stages off-site. Please see Section 6 above for more information.

11.2 Env-Wt 527.03: Application Requirements for Public Highway Projects

(a) *A description of the scope of the project, the size of the impacts to aquatic resources, and the purpose of the project;*

Please refer to Sections 1 through 7 above of this supplemental narrative.

(b) *An accurate drawing with existing and proposed structure dimensions clearly annotated to:*

- (1) *Document existing site conditions;*
- (2) *Detail the precise location of the project and show the impact of the proposed activity on jurisdictional areas;*
- (3) *Show existing and proposed contours at 2-foot intervals;*
- (4) *Show existing and proposed structure invert elevations on the plans; and*
- (5) *Use a scale based on standard measures of whole units, such as an engineering rule of one to 10, provided that if plans are not printed at full scale, a secondary scale shall be noted on the plans that identifies the half scale unit of measurement;*

Please see the project plans attached to this application.

(d) *All easements and right-of-way acquisition area outlines in relation to the project;*

The existing right-of-way (ROW) is 3 rods (49.5 feet) wide along NH 107 with a slight angle at the southwestern corner of the project. Portions of the existing wingwalls extend outside the existing ROW, and the replacement wingwalls will similarly extend outside the boundary. Therefore, prior to construction, NHDOT will work with the affected landowners to acquire temporary and permanent easements for the project.

Easements will be located immediately adjacent to the roadway and culvert. The existing culvert extends beyond the right-of-way, so usage and function of the easements will not change from existing conditions. The total area of the permanent easements is approximately 4,660 SF. Refer to the Project Plans in Attachment O.

(e) *The name of the professional engineer who developed the plans, whether an employee of the applicant or at a consulting firm; and*

Ms. Julie Whitmore, VHB, NH Professional Engineer #13861, developed the project plans.

(e) *An erosion control plan that shows:*

- (1) *Existing and proposed contours at 2-foot intervals, with existing contours shown with a lighter line weight and proposed contours shown with a heavier line weight such as a bold font; and*
- (2) *The outermost limit of all work areas, including temporary phasing work, with perimeter controls.*

An erosion control plan has been included in Appendix Q.

11.3 Env-Wt 527.04: Design Requirements for Public Highway Projects

(a) Protect significant function wetlands, watercourses, and PRAs;

No significant function wetlands are located in the vicinity of the proposed activities. However, impacts to Freeses Pond will constitute PRA impacts, as this pond is a floodplain wetland adjacent to a tier 3 watercourse (i.e., Lamprey River). However, these impacts include self-mitigating rip-rap aprons at the inlet and outlet, along with slope improvement fill to stabilize restore previously eroded areas. The extent of rip-rap and slope fill within Freeses Pond has been designed to be the minimum required to achieve project objectives and minimize impacts to the Freeses Pond to the maximum extent practicable. The post-construction functions and values of Freeses Pond will match the existing.

(b) Minimize impacts to wetland and riparian function;

All project impacts have been minimized to the maximum extent practicable while still accomplishing project objectives (i.e., public safety associated with this structurally deficient bridge). There is no practicable alternative that would result in less adverse environmental impacts. Similarly, this project complies with the avoidance and minimization requirements detailed in Env-Wt 311.07(a) and Env-Wt 313.03(b).

(c) Maintain wetland and stream hydrology and function to the remaining aquatic resources;

The overall hydrology and function of Freeses Pond to the remaining aquatic resources will not be adversely impacted. Existing conditions will closely match post-construction with a culvert headwater elevation reduction of approximately 1.7 feet at the bridge during the 50- and 100-year flood events and no reduction to the ordinary high-water level at the bridge.

(d) Use on-site measures to compensate for any loss of flood storage where the project proposes:

(1) Filling or placement of structures in a 100-year floodplain; or

(2) Greater than 0.5 acre-feet of fill volume or a road crossing that affects floodplain conveyance;

The proposed activities that involve the placement of fill within Freeses Pond include the installation of rip-rap aprons at the inlet and outlet of the bridge will prevent scour and erosion, along with slope improvements to restore and stabilize previously eroded areas. No substantial loss of flood storage will result from this activity.

(e) Use on-site minimization and water quality protection measures to prevent direct discharge to surface waters and wetlands, including retention of vegetated filter strips between the construction area and the aquatic resource areas to disperse runoff with no direct discharge to natural wetlands or surface waters; and

Temporary erosion controls (i.e., steel sheet piles and silt sock) will be implemented throughout construction to prevent silt-laden discharge from the construction site from entering the surrounding habitat areas.

(f) Where temporary impacts will occur, include re-establishment of a similar ecosystem using vegetative species and spacing that are as similar as practicable to what was removed unless the applicant shows that the proposed vegetative composition will provide higher functions and values.

Upon completion of the bridge rehabilitation work, all temporary erosion control measures will be removed, and the site will be reseeded and stabilized with a seed mix that compliments the site and will perform similar functions and values to the existing vegetation. The design of the replacement structure allows for up to one foot of stream simulation materials within the proposed box culvert.

11.4 Env-Wt 527.05: Construction Requirements for Public Highway Projects

(a) The permit shall be contingent on review and approval by the department of final stream diversion and erosion control plans that detail the timing and method of stream flow diversion during construction and show temporary siltation, erosion, and turbidity control measures to be implemented; and

As previously mentioned, temporary erosion controls (i.e., steel sheet piles and silt sock) will be implemented throughout construction to protect the surrounding habitat areas. A clean water bypass structure will be implemented, as needed, to divert the flow around the steel sheet piles and permit continued passage of aquatic fauna during construction. Refer to the Erosion Control Plan provided in Appendix Q.

(b) The contractor responsible for completion of the work shall use techniques described in Env-Wq 1504.06, Env-Wq 1504.16, Env-Wq 1505.02, Env-Wq 1506, and Env-Wq 1508.

The contractor responsible for the completion of the proposed work will comply with the techniques described in Env-Wq 1504.06 "Plan Information," Env-Wq 1504.16 "Erosion Control Notes," Env-Wq 1505.02 "Required Construction Practices," Env-Wq 1506 "Methods for Erosion and Sediment Control During Terrain Alteration Activities," and Env-Wq 1508 "Permanent Methods for Protecting Water Quality," as applicable.

Appendix A – Natural Resource Agency Coordination Meeting Minutes

BUREAU OF ENVIRONMENT CONFERENCE REPORT

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting

DATE OF CONFERENCE: April 15, 2020

LOCATION OF CONFERENCE: John O. Morton Building

ATTENDED BY:

NHDOT

Sarah Large
Ron Crickard
Andrew O’Sullivan
Meli Dube
Chris Carucci
Russ St. Pierre
Samantha Fifield
Anthony Weatherbee
Rebecca Martin
Jason Tremblay
David Scott
Marc Laurin
Phile Miles
Sandra Newman
Bill Saffian
Chelsey Noyes

ACOE

Rick Kristoff

EPA

Jeannie Brochi
Beth Alafat

**Federal Highway
Administration**

Jaimie Sikora

NHDES

Lori Sommer
Karl Benedict

NH Fish & Game

Carol Henderson

Natural Heritage Bureau

Amy Lamb

The Nature Conservancy

Pete Steckler

**Consultants/Public
Participants**

Peter Walker
Julie Whitmore
Kimberly Peace
Joanne Theriault
Sean James
Marge Badois

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Statewide, #41915 (X-A004(799)).....	11

(When viewing these minutes online, click on a project to zoom to the minutes for that project.)

Pete Steckler (Nature Conservancy) indicated the Suncook River has been identified as an important wildlife corridor based on TNC's "Connect the Coast" project. Pete would like to ensure that the project accommodate terrestrial wildlife. He suggested smoother substrate to lock in at the southern abutment toe, concurring with Carol Henderson's request.

VHB will evaluate details to provide smoother riprap at the southern abutment toe of slope and evaluate water diversion structures in further detail.

This project has not been previously discussed at a Monthly Natural Resource Agency Coordination Meeting.

Deerfield, #24477

Julie Whitmore introduced the project, which is the replacement of Bridge #137/116 in Deerfield, NH. The bridge carries NH Route 107 over Freeses Pond, essentially bisecting the pond. Freeses Pond is the impoundment of the Lamprey River that enters the pond to the north and exits via a dam to the south. The bridge is a 13-foot-wide by 8-foot-tall corrugated metal culvert with mortar rubble masonry wingwalls and headwalls that was originally constructed in 1973. The downstream dam impounds flow and as indicated in both the winter and summer photos; water levels do not vary much seasonally. Therefore, the culvert functions more like an equalizer to maintain constant water surface elevations through the pond.

The culvert is in poor condition and must be replaced. Water levels coincide with the seam in the culvert, leading to corrosion at the weakest point in the structure. The most practical replacement option for this location is a 14-foot-wide by 9-foot-tall precast concrete box culvert. The box culvert will be buried with 6 inches of simulated stream infill and provides additional hydraulic capacity above ordinary high water to improve conveyance for larger storm events. Approach work is limited to the extent practicable, with no change in pavement area and slight improvements to guardrail berms and grading. Riprap will be provided at the inlet and outlet.

Pete Walker discussed wetland impact plans, indicating features such as the Top of Bank (TOB) and Ordinary High Water (OHW). Based on the current design, VHB expects less than 3,000 square feet of permanent impact in the bed and banks of the pond. Approximately 540 square feet of temporary impacts would be required to install cofferdams and riprap. The permanent impacts at the southwest approach are due to improved slope stability with new guardrail berms and 2:1 slopes.

Coordination regarding potential effects on the northern long eared bat and small whorled pogonia is ongoing. However, Pete noted that pogonia habitat is lacking, and tree clearing would be very minimal so actual impact to NLEB are not expected. Blanding's Turtle has been recorded in the project vicinity and VHB will consult with NH Fish and Game to address any concerns. The Section 106 consultation is ongoing. NHDHR has no archaeological concerns, but an historic inventory may be required on an adjacent property (Parcel 208-58).

VHB considers the riprap proposed to stabilize the proposed structure at the inlet and outlet to be self-mitigating, but is seeking concurrence. Additionally, since the culvert is located within an impounded resource, a stream geomorphic assessment is not appropriate. Based on guidance from NHDOT, the crossing will be treated as a wetland crossing rather than a stream crossing.

Sarah Large opened the forum up to questions from participants, which was conducted in a roll call manner.

Karl Benedict (NHDES) concurs with VHB's assumption that a geomorphic assessment is not required. Karl requested more information to understand Impact Area A. VHB clarified the plans were developed using the standard legend and Impact Area A is a permanent impact due to berm and slope improvements for the guardrail adjacent to the structure. VHB will provide a legend on subsequent presentations for clarity.

Due to technical difficulties, Lori Sommer (NHDES) was unable to offer comments. Pete suggested that VHB would coordinate with Lori following the NRAM. (*April 20th coordination with Lori summarized below*).

Carol Henderson (NH F&G) had no questions.

Amy Lamb (NHHHB) had no questions.

Rick Kristoff (USACE) had no questions. He indicated that EFH is not required for this project. (Note: Following the NRAM, Marc Laurin and Rebecca Martin confirmed that the Lamprey River is considered EFH and requested that VHB complete an EFH worksheet.)

Beth Alafat (EPA) had no questions.

Jean Brochi (EPA) had no questions.

Jamie Sikora (FHWA) had no questions.

Pete Steckler (Nature Conservancy) indicated this location has been identified as an important wildlife corridor by the TNC's Connect the Coast project. Pete asked about the proposed water diversion method, and suggested that if a water diversion pipe is needed, that it might be left in place to serve as a wildlife tunnel. Julie indicated the project will require cofferdams to remove the existing culvert and install the proposed culvert and that a pump around diversion via temporary pipe is anticipated. However, this diversion system will likely be installed above the roadway level and not buried, so it was not anticipated to serve as a permanent structure. Additionally, there is minimal headroom to install an adjacent permanent structure within the project limits. Pete S. suggested installing a tunnel south of the crossing based on the aerial. As Julie navigated to this approximate location, Pete W. recognized this location is outside the project limits and may not be practical to install.

Jason Tremblay and David Scott represented the Bureau of Bridge Design and had no questions.

VHB will evaluate wildlife access details and discuss with Bridge Design to determine if a structure can be included. VHB will also follow up with Lori Sommer regarding any additional NHDES concerns.

April 20, 2020 Telephone Conference with Lori Sommer, Pete Walker, and Julie Whitmore

Pete, Julie, and Lori teleconferenced Monday, April 20th to discuss mitigation. Pete indicated VHB's assumption is that the riprap aprons are self-mitigating to stabilize and protect the proposed culvert. Lori expressed concern over fill in the pond and requested additional information to clarify. Julie described the project intention – replace the existing structure with a buried invert precast box culvert that matches existing inverts. Riprap was sized according to standard practice based on hydraulic analysis. Additional impacts to Area A are due to slope improvements to stabilize the guardrail berm and embankment. Lori asked if the dam owner is known and if coordination is anticipated. Lori also asked whether a Grant of Right might be needed due to the placement of fill in the pond. Pete and Julie noted the dam is owned by

the Town of Deerfield and that although coordination is anticipated to conduct work, water surface elevations are not anticipated to be dropped for construction. While Right-of-Way impacts are anticipated, the project does not propose fill for the purpose of making land. Rather, the placement of fill is intended to restore an eroded slope, and would not affect property boundaries. Therefore, a grant of right is not anticipated. Temporary steel sheet piling is assumed to be installed for construction and temporary impacts H and G indicate the anticipated locations upstream and downstream. After discussion, Lori agreed with VHB in the assumption the riprap is self-mitigating and expressed no other concerns.

This project has not been previously discussed at the Monthly Natural Resource Agency Coordination Meeting.

Salem-Manchester, #10418F (IM-0931(205))

Marc Laurin went through a PowerPoint presentation on the status of the South Road Mitigation Site #15 in Londonderry. This 24.4 acre property was developed as a mitigation creation/preservation area as part of a mitigation compensation package for the I-93 widening wetland impacts. The required monitoring of the mitigation area has been completed and the site has been determined to have achieved success with its intended design and the functions it sought to create. The Town of Londonderry Conservation Commission has requested transfer of the property from DOT to the Town for conservation purposes. The Department is processing this as a Surplus Land request.

Phil Miles summarized the steps that the Department would undergo to dispose of the site as a surplus property. The site would be appraised and the Town of Londonderry would purchase it at its fair market value. Marge Badois stated that the Londonderry Conservation Commission was not under that impression and had assumed that this would be handled as a transfer from DOT to the Town. Phil Miles explained that in order to just transfer the property, rather than a fair market value purchase, the Conservation Commission would need to send another letter to the Bureau of ROW administrator Steve LaBonte, with their reasons asking specifically for this consideration. Jamie Sikora stated that FHWA would need to approve this request in order to protect the public interest regarding the use of public funds.

A general discussion on the current deed restrictions and who would/could hold a conservation easement ensued. Marc stated that DOT has placed a Deed Restriction on the site. As requested, subsequent to the meeting Marc provided a copy to Marge and Susan Malouin of the Conservation Commission. He also provided a copy to Carol Henderson, as well as the mitigation site's final mitigation monitoring report. The Conservation Commission also mentioned extending a trail to the property from Kendall Pond and through their other conservation land on South Street.

Lori Sommer stated that she would want to be involved in determining the most appropriate method of placing easements on the property. A stewardship management plan would need to be developed by the Town, including how the trail would be used. Lori expressed concerns that the site is designated as mitigation and appropriate buffers to the wetland resources would need to be retained. Carol also expressed concerns with maintaining the turtle habitat/protection measures of the site. Rich Kristoff will also want to check the Corps' permit language to assure that their appropriate guidelines are being followed. Pete Steckler mentioned that DNCR (formerly DRED) is a steward on Londonderry's Kendall Pond conservation land, so they may be a potential resource to get involved in the management or stewardship of the site.

DOT's Bureau of Right-of-Way and Marc will continue to coordinate on the details of the property transfer. DOT will discuss with Lori and the Conservation Commission further details of the transfer process and easement requirements.

Appendix B – Mitigation Report/Coordination/ARM Calculations

NOT APPLICABLE.

Appendix C – Floodplain Map



\\vhb\proj\Boston\11655.03\GIS\Project\FAA\FAA_USGS.mxd



Deerfield 24477 Bridge # 137/116 | Deerfield, New Hampshire

Floodplain Map

Source: VHB, NHGRANIT

Appendix D – Hydraulic Analysis Memorandum



Ref: 52501.06
February 28, 2020

Memorandum

To: Jason Tremblay, P.E.
NHDOT Senior Project Engineer
David Scott, P.E.
NHDOT Project Manager

Date: February 28, 2020

Project #: 52501.06

From: David Cloutier, P.E.
Water Resources Engineer

Re: Deerfield 24477 Bridge #137/116 - NH 107 over Freeses Pond
Freeses Pond Dam and Culvert Hydraulic Analysis

This memorandum provides a summary of hydrologic and hydraulic analysis completed by VHB to support the design of the proposed replacement for the existing culvert carrying NH Route 107 over Freeses Pond in Deerfield, NH (the Project). All elevations listed in this memorandum are referenced to the North American Vertical Datum of 1988 (NAVD88) unless noted otherwise.

Project Background

The existing NH Route 107 crossing over Freeses Pond (part of the Lamprey River) is a 12-foot wide by 8-foot tall corrugated metal pipe arch with stone masonry headwalls. The culvert, installed in 1973, is in poor structural condition and needs replacement.

Freeses Pond is formed by the impoundment of the Lamprey River at Freeses Pond Dam (NHDES Dam ID #061.02), located approximately 2,400 feet south-southeast of the Project location; the dam controls water levels at the NH Route 107 crossing location. Freeses Pond Dam is owned and operated by the Town of Deerfield for the purposes of maintaining Freeses Pond for recreation. The dam was reconstructed in 1987 with a new concrete gate structure and concrete spillway cap over existing stone masonry; the town does not have hydraulic design or as-built plans, but based on discussion with town staff this reconstruction raised the spillway elevation of the dam.

The NHDES Dam Bureau provides data on Freeses Pond Dam in the statewide dams data sheet, but this data sheet similarly does not include hydraulic design data for the dam. Freeses Pond is characterized on Flood Insurance Rate Map (FIRM) Panel 33015C0090E (Effective Date May 17, 2005) as floodplain Zone A, indicating that the Flood Insurance Study (FIS) for Rockingham County only studied it by approximate methods and that no existing hydraulic model is available.

Because the hydraulic performance of the NH Route 107 crossing is influenced by tailwater from Freeses Pond Dam, VHB performed an abbreviated hydraulic evaluation of the reach of Freeses Pond encompassing the NH Route 107 crossing and Freeses Pond Dam. This evaluation included analysis of the proposed replacement – a 14-foot wide by 9-foot tall concrete box culvert – as well as alternative designs to quantify the influence of the dam tailwater on culvert hydraulics.

Hydrologic and Hydraulic Modeling Methodology

VHB calculated the contributing watershed to Freeses Pond at the NH 107 Route crossing using USGS StreamStats 4.0 hydrologic software to be 6.9 square miles, and estimated design discharge flows at the dam from watershed data applying New Hampshire-specific hydrologic regression equations from USGS Scientific Investigations Report (SIR)

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2008-5206. As a Tier 3 highway, the design flood for NH Route 107 is the 1% AEP (100-year) event. Table 1 presents a summary of hydrology; detailed hydrologic calculations are included in Appendix A.

Table 1 NH Route 107 – Freeses Pond Culvert Hydrology

Flood Annual Exceedance Probability (AEP)	Peak Discharge (cfs)
50% AEP (2-year flood)	230
20% AEP (5-year flood)	381
10% AEP (10-year flood)	508
40% AEP (25-year flood)	681
2% AEP (50-year flood)	824
1% AEP (100-year flood)	996
0.2% AEP (500-year flood)	1,420

Source: USGS Streamstats

Using topographic survey of the NH Route 107 culvert crossing by NHDOT survey teams in August 2014 and of the Freeses Pond Dam by NHDOT survey teams in November 2019, supplemented by 1973 NHDOT record plans of the existing culvert and limited bathymetric survey by VHB in October 2019, VHB developed a simplified hydraulic model of Freeses Pond using the US Army Corps of Engineers (USACE) Hydraulic Engineering Center River Analysis System (HEC-RAS) software, Version 5.0.7. This simplified model, including only cross-sections in the immediate vicinity of the Freeses Pond Dam and the Route 107 crossing, was developed to quantify tailwater impacts of the dam on the hydraulics of the Route 107 crossing. The model is steady-state, assuming constant flows, and does not account for flood storage by Freeses Pond. Given that the estimated 192 acre-foot storage capacity of Freeses Pond (per the NHDES statewide dams data sheet) represents approximately 2 to 3 hours of flow at peak 2% and 1% flood flow rates, flood storage effects are not expected to be significant and the steady-state assumption is appropriate for this crossing. Freeses Pond Dam is modeled as an inline structure with spillway geometry from NHDOT field survey and critical flow depth for tailwater below the dam. Based on discussions with Town staff, the model assumes that stop logs would be removed to open the 4.0-ft wide by 4.25-ft high dam gate during flood events. Figure 1 (attached) shows the domain of the HEC-RAS model; detailed HEC-RAS model outputs are included in Appendix B.

Using this model geometry as a base, VHB developed three additional models:

- A proposed conditions model replacing the existing 12-by-8 foot pipe arch culvert with a 14-by-9 foot box culvert
- An alternate proposed conditions model with a 20-by-10 foot box culvert
- A hypothetical "Alt 2" model with an approximate culvert opening matching the 11.1-by-8 foot bridge that was replaced by the existing pipe arch culvert in 1973.



Memorandum

Local residents at the Public Informational Meeting in July 2019 expressed concern that the increased flooding is due to the culvert size and not the reconstructed dam. The third HEC-RAS model was incorporated to address this concern. The current normal pond level is elevation 425.3 feet, the same elevation as the 17-foot wide lower spillway crest of the dam. This normal pond elevation is 1.8 feet lower than the 83-foot wide spillway (elevation 427.1 feet), and only 2.3 feet lower than the crown of the existing Route 107 (elevation 427.6 feet).

Hydraulic Analysis Results

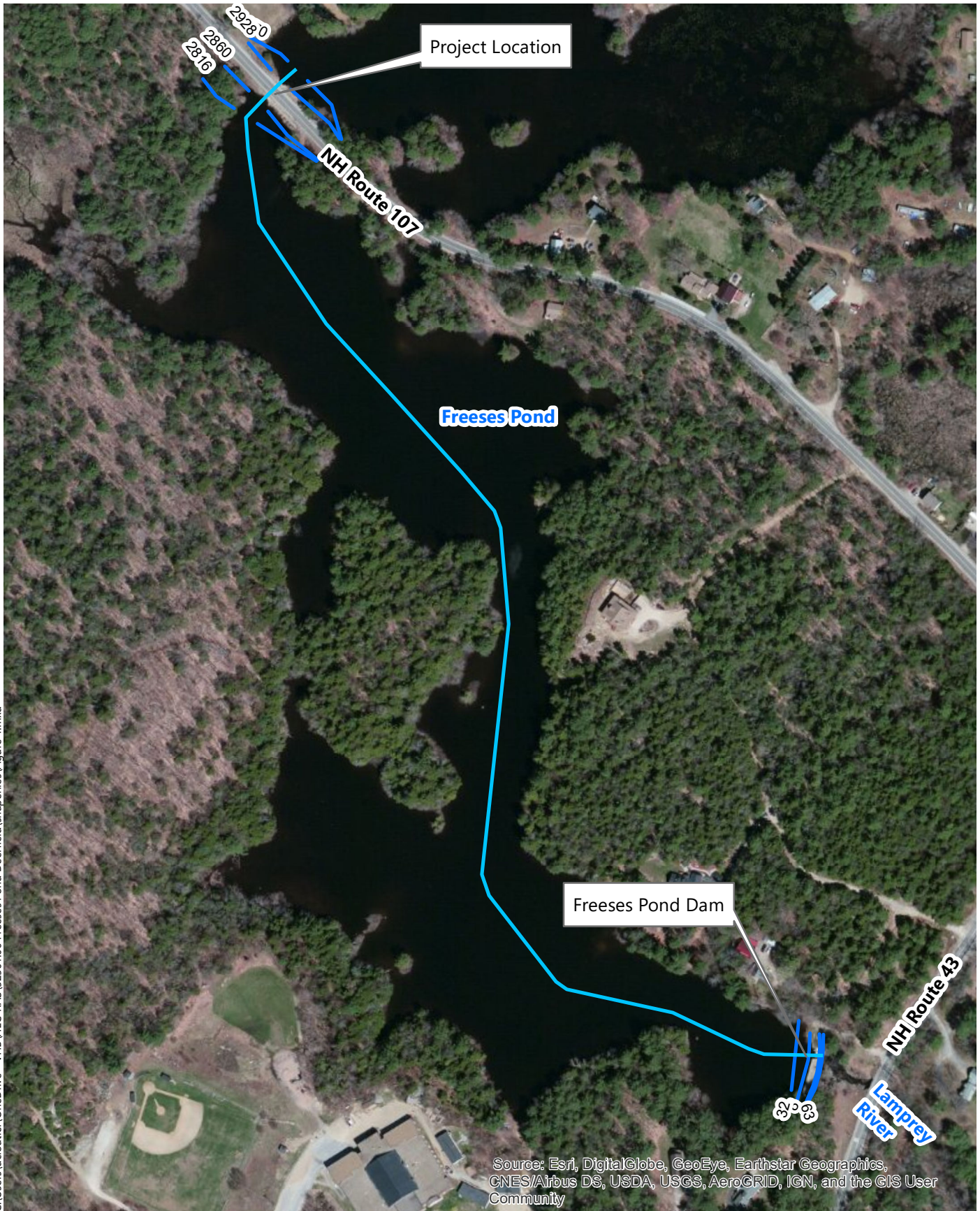
Hydraulic model results indicate that the proposed 14-foot wide by 9-foot-high precast concrete box culvert would result in lowered flood elevations in Freeses Pond upstream (North) of Route 107 compared to existing conditions. Model results also indicate that tailwater effects from Freeses Pond Dam are the primary factor influencing water elevations at the crossing, with the tailwater elevation above the crown of the existing culvert for both the 2% and 1% AEP flood events. Due to this tailwater condition, increasing the hydraulic opening of the proposed culvert (represented by a 20-foot wide by 10-foot high box culvert alternative) would provide marginal hydraulic gains. Table 2 below provides a summary of model results for the design 2% annual exceedance probability (AEP) (50-year) flood event and 1% AEP (100-year) design flood event:

Table 2 NH Route 107 – Freeses Pond Culvert Hydraulic Analysis Results

	Existing 12'x8' Pipe Arch Culvert	Proposed 14x9' Box Culvert	Alt. 1 – Proposed 10x20' Box Culvert	Alt. 2 – Pre-1973 11.1'x8' Bridge
2% AEP (50-year) Flood (Tailwater from dam = 428.5 ft)				
Culvert Headwater Elevation (ft)	431.0	429.3	428.8	431.2
Freeboard to Roadway (ft)	0.1	1.8	2.3	-0.2 (overtopped)
Culvert Discharge Velocity (fps)	9.7	6.5	4.5	10.6
1% AEP (100-year) Flood (Tailwater from dam = 428.8 ft)				
Culvert Headwater Elevation (ft)	431.7	430.0	429.3	431.7
Freeboard to Roadway (ft)	-0.5 (overtopped)	1.1	1.8	-0.5 (overtopped)
Culvert Discharge Velocity (fps)	10.3	7.9	5.3	11.1

Source: VHB HEC-RAS model. Dam spillway crest = 427.1 feet from NHDOT survey; Roadway elevation = 431.1 feet from culvert plans. Headwater measured at model station 2970 (50 ft upstream of culvert), tailwater measured at model station 2816 (55 ft downstream of culvert), velocity measured at culvert outlet

In addition, model results indicate that the existing pipe arch culvert appears to have roughly equal hydraulic capacity to the bridge it replaced in 1973, and that the 1987 reconstruction of Freeses Pond Dam (assumed to have raised the dam spillway elevation) is more likely to be the cause of any observed increase in flood elevations since the current culvert was installed.



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Deerfield 24477 Bridge #137/116 | NH 107 Over Freeses Pond

Legend

- Lamprey River Flow Path
- HEC-RAS Model Cross-Sections

**Freeses Pond Culvert Hydraulic Analysis
HEC-RAS Hydraulic Model Framework**

Source: VHB HEC-RAS model

Deerfield 24477 Bridge #137/116 - NH 107 over Freeses Pond
Freeses Pond Dam and Culvert Hydraulic Analysis

Ref: 52501.06
February 28, 2020



Memorandum

Appendix A: Hydrologic Calculations

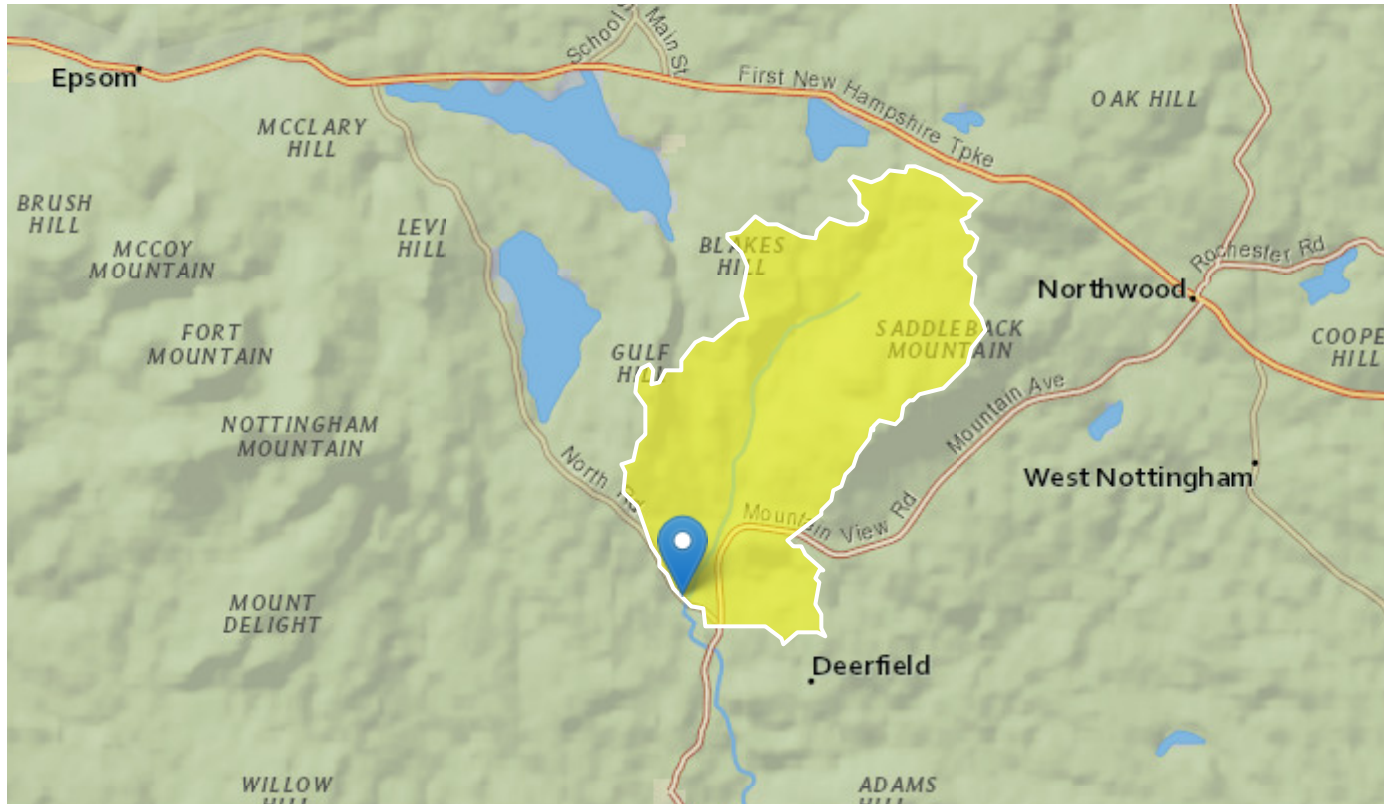
StreamStats Report

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Workspace ID: NH20190708125917489000

Clicked Point (Latitude, Longitude): 43.15673, -71.23868

Time: 2019-07-08 08:59:36 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	6.9	square miles
APRAVPRE	Mean April Precipitation	4.03	inches
WETLAND	Percentage of Wetlands	4.4259	percent
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	47.5	feet per mi

Peak-Flow Statistics Parameters^[Peak Flow Statewide SIR2008 5206]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.9	square miles	0.7	1290
APRAVPRE	Mean April Precipitation	4.03	inches	2.79	6.23
WETLAND	Percent Wetlands	4.4259	percent	0	21.8
CSL10_85	Stream Slope 10 and 85 Method	47.5	feet per mi	5.43	543

Peak-Flow Statistics Flow Report^[Peak Flow Statewide SIR2008 5206]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	PIu	SEp	Equiv. Yrs.
2 Year Peak Flood	230	ft ³ /s	142	374	30.1	3.2
5 Year Peak Flood	381	ft ³ /s	232	627	31.1	4.7
10 Year Peak Flood	508	ft ³ /s	303	852	32.3	6.2
25 Year Peak Flood	681	ft ³ /s	392	1180	34.3	8
50 Year Peak Flood	824	ft ³ /s	461	1470	36.4	9
100 Year Peak Flood	996	ft ³ /s	539	1840	38.6	9.8
500 Year Peak Flood	1420	ft ³ /s	709	2840	44.1	11

Peak-Flow Statistics Citations

Olson, S.A.,2009, Estimation of flood discharges at selected recurrence intervals for streams in New Hampshire: U.S.Geological Survey Scientific Investigations Report 2008-5206, 57 p. (<http://pubs.usgs.gov/sir/2008/5206/>)

USGS Data Disclaimer: Unless otherwise stated, all data, metadata and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. Although these data and associated metadata have been reviewed for accuracy and completeness and approved for release by the U.S. Geological Survey (USGS), no warranty expressed or implied is made regarding the display or utility of the data for other purposes, nor on all computer systems, nor shall the act of distribution constitute any such warranty.

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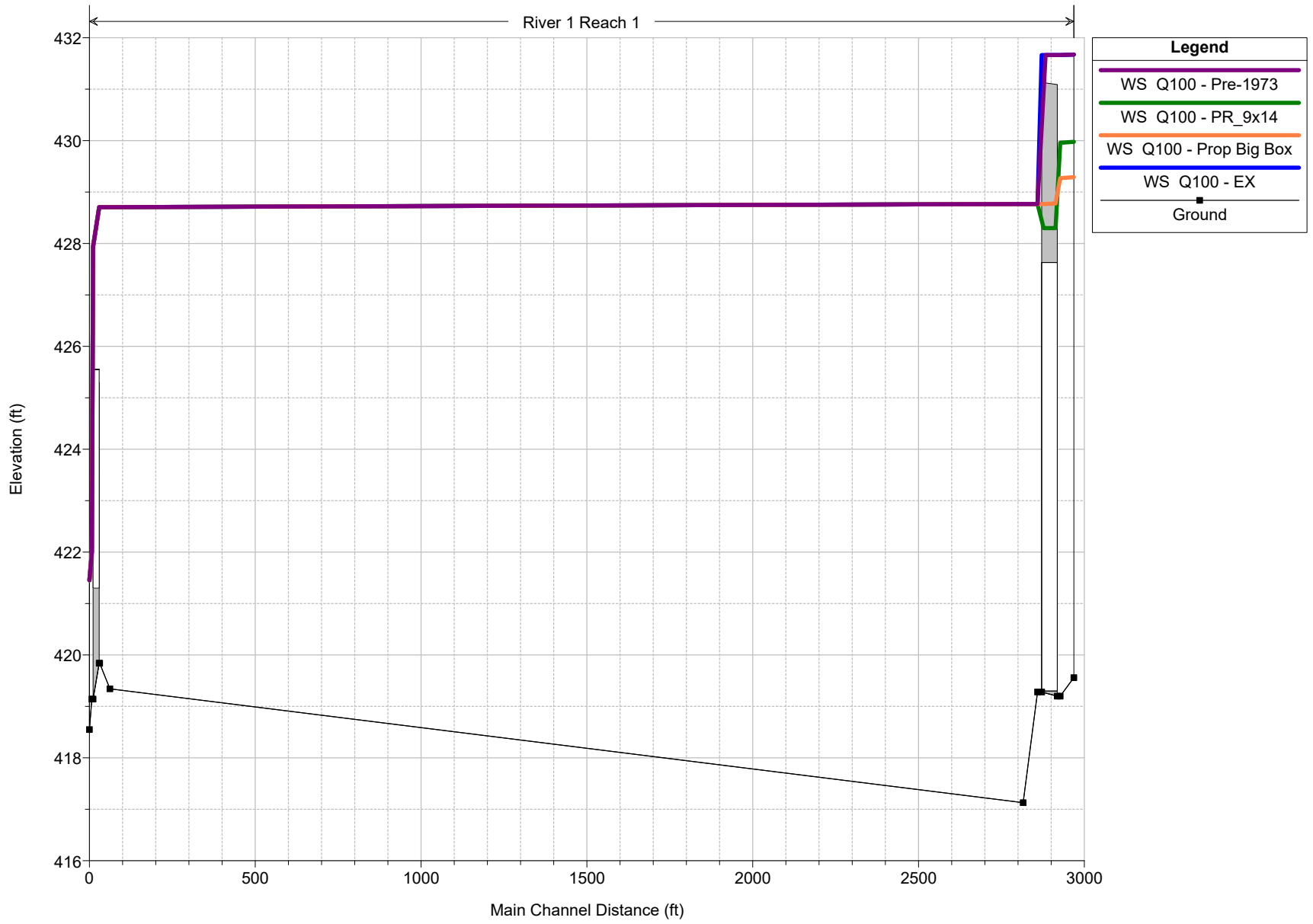


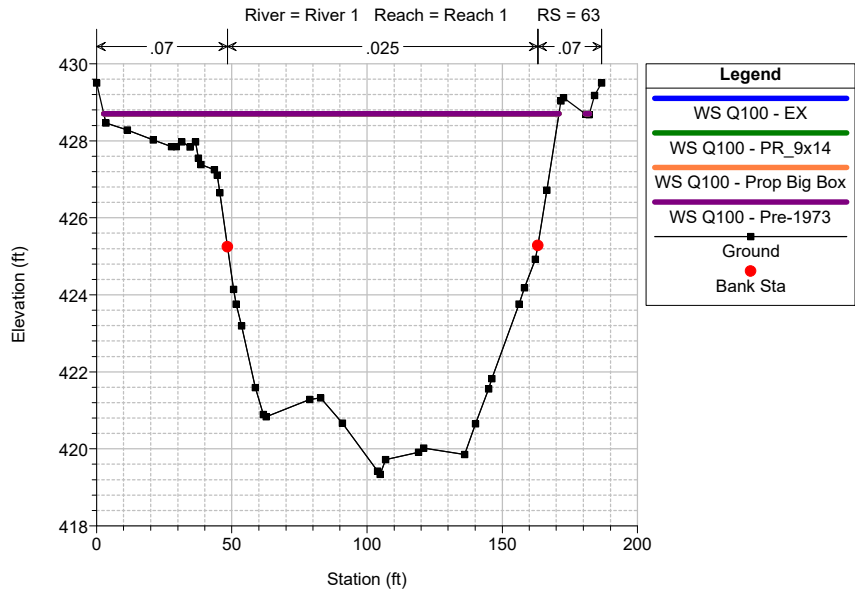
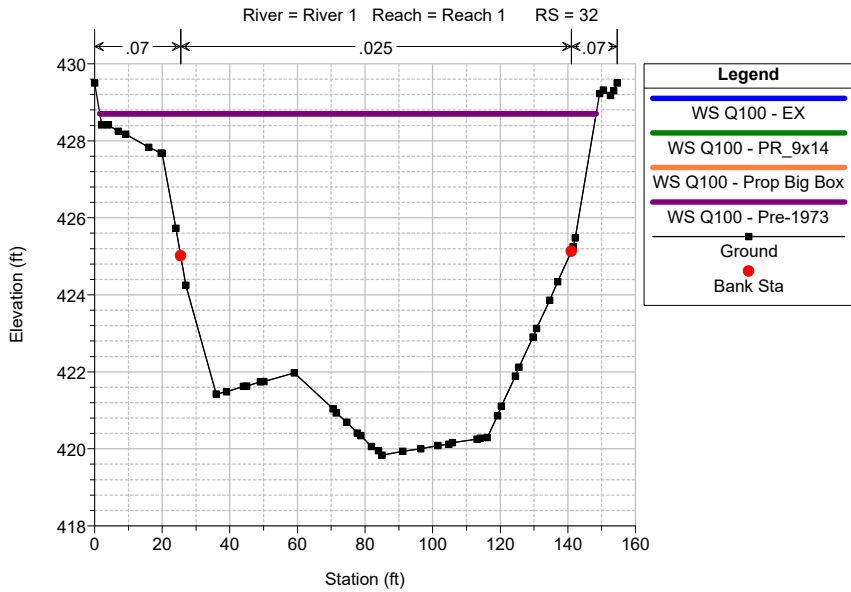
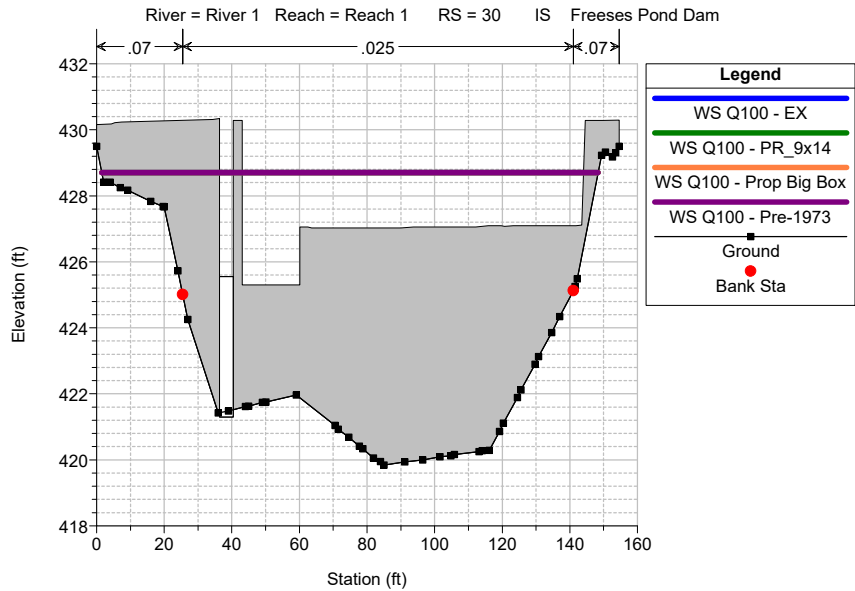
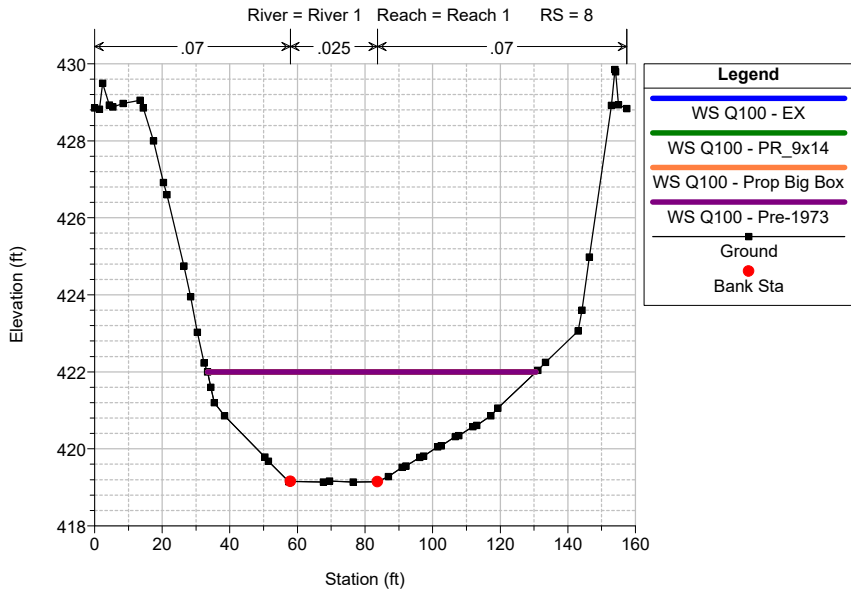
Memorandum

Appendix B: HEC-RAS Hydraulic Model Results

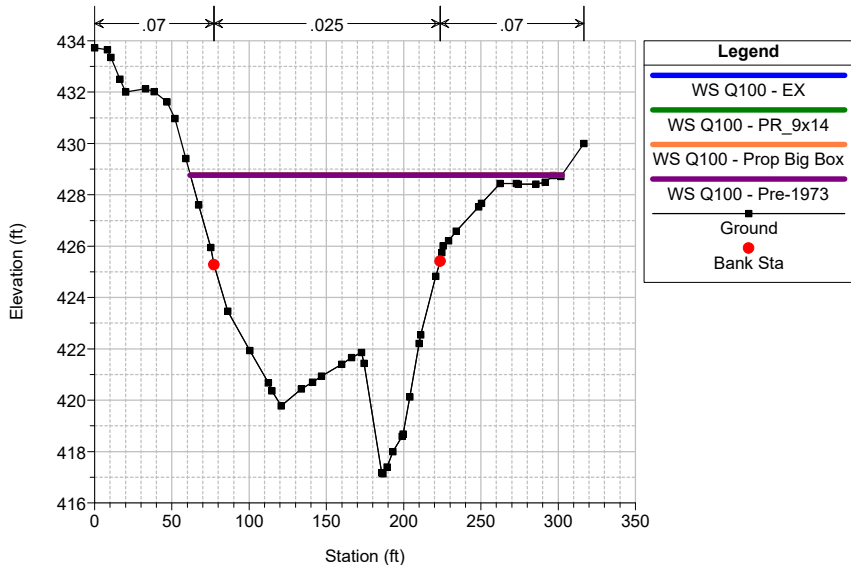
Freese's Pond Deerfield Plan: 1) EX 2/20/2020 2) PR_9x14 2/20/2020 3) Prop Big Box 2/20/2020 4) Pre-1973 2/20/2020

River 1 Reach 1

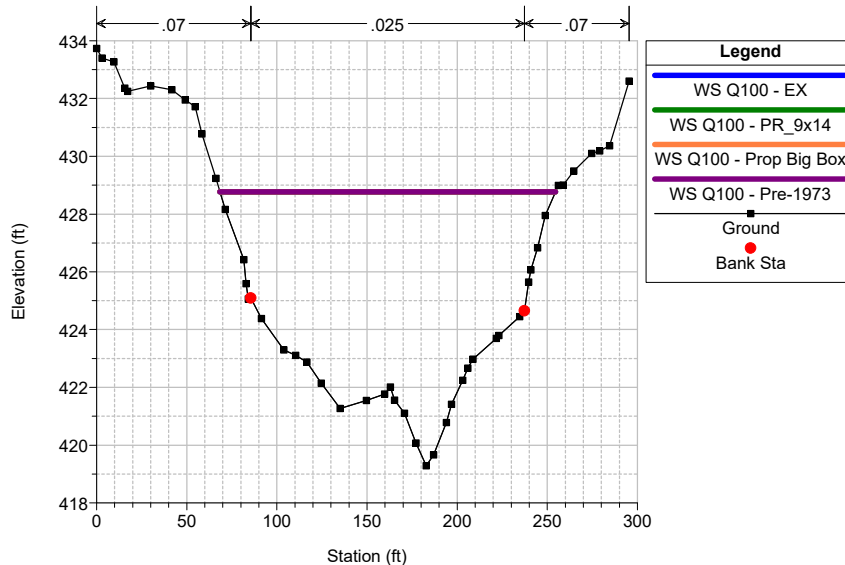




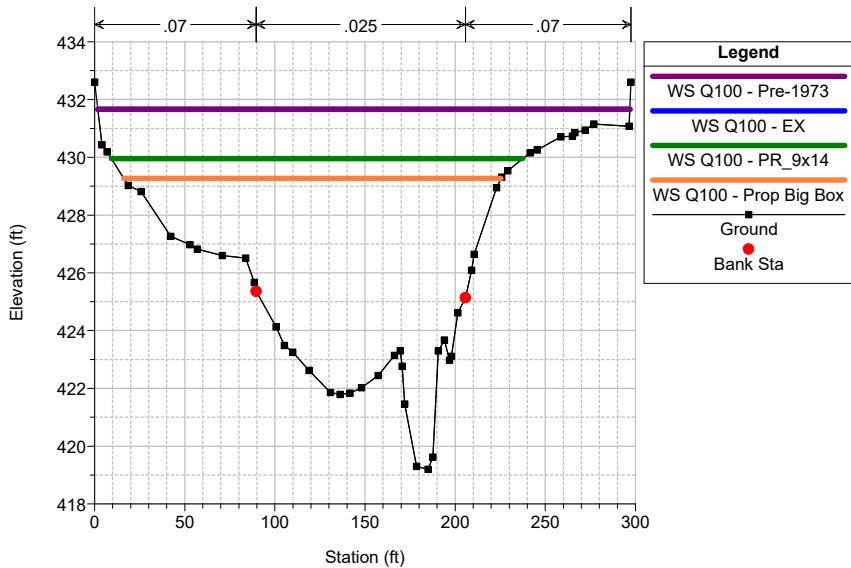
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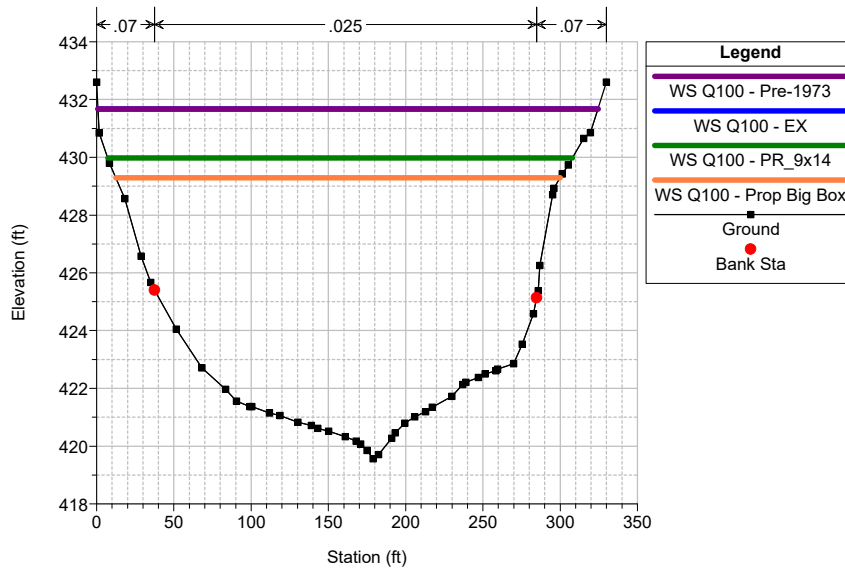
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River = River 1 Reach = Reach 1 RS = 2928

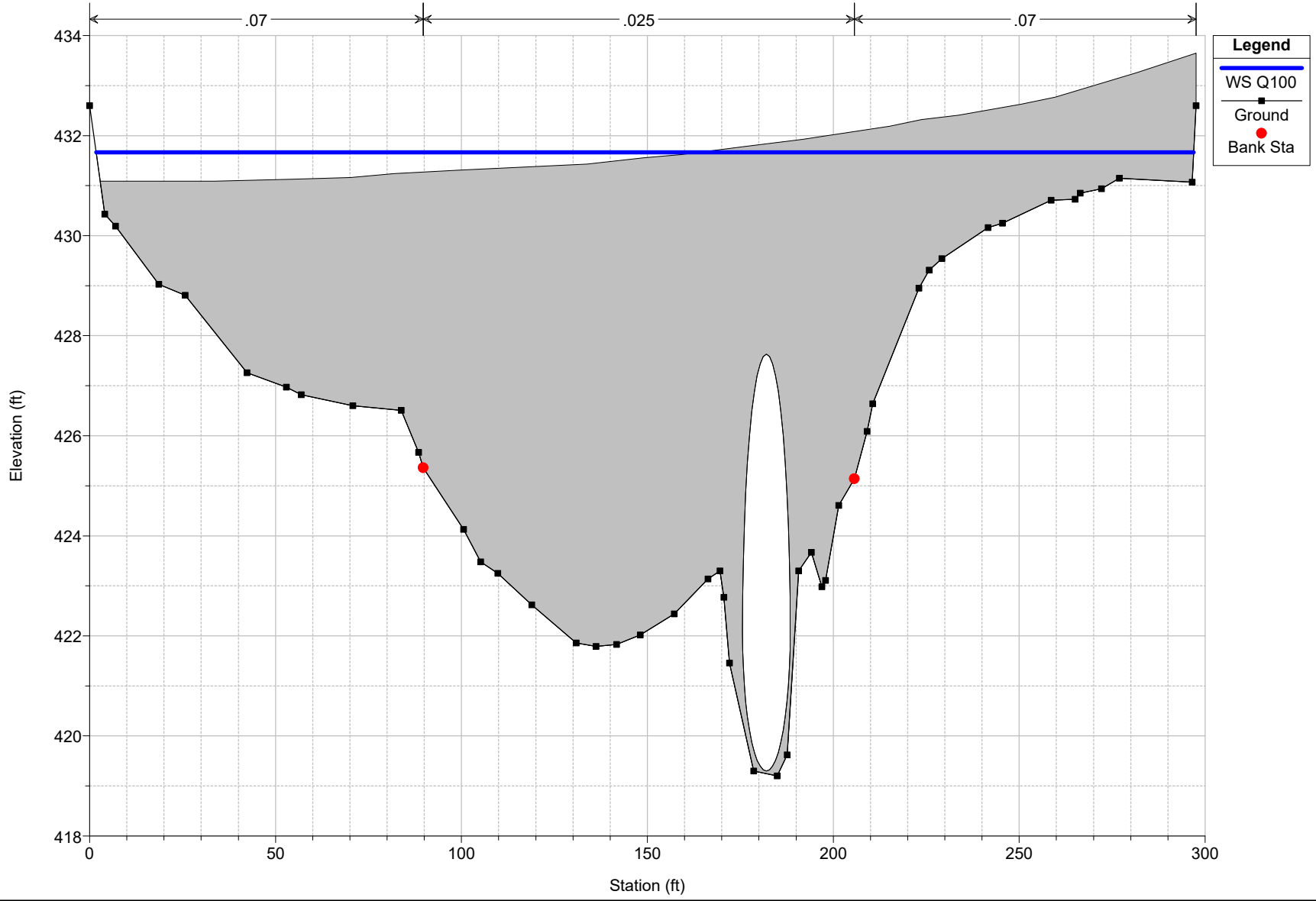


River = River 1 Reach = Reach 1 RS = 2970

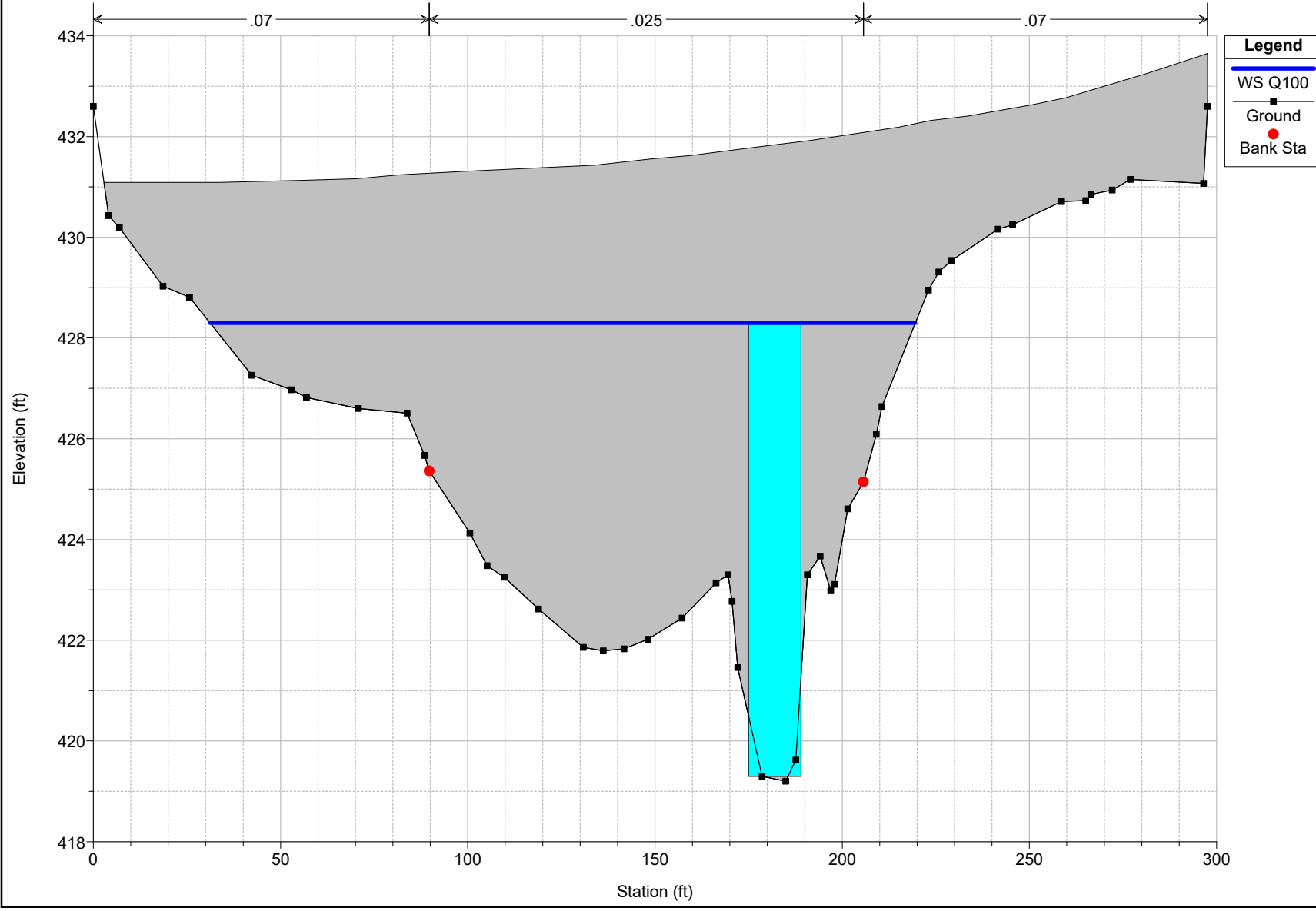


Freese's Pond Deerfield Plan: Existing 2/20/2020

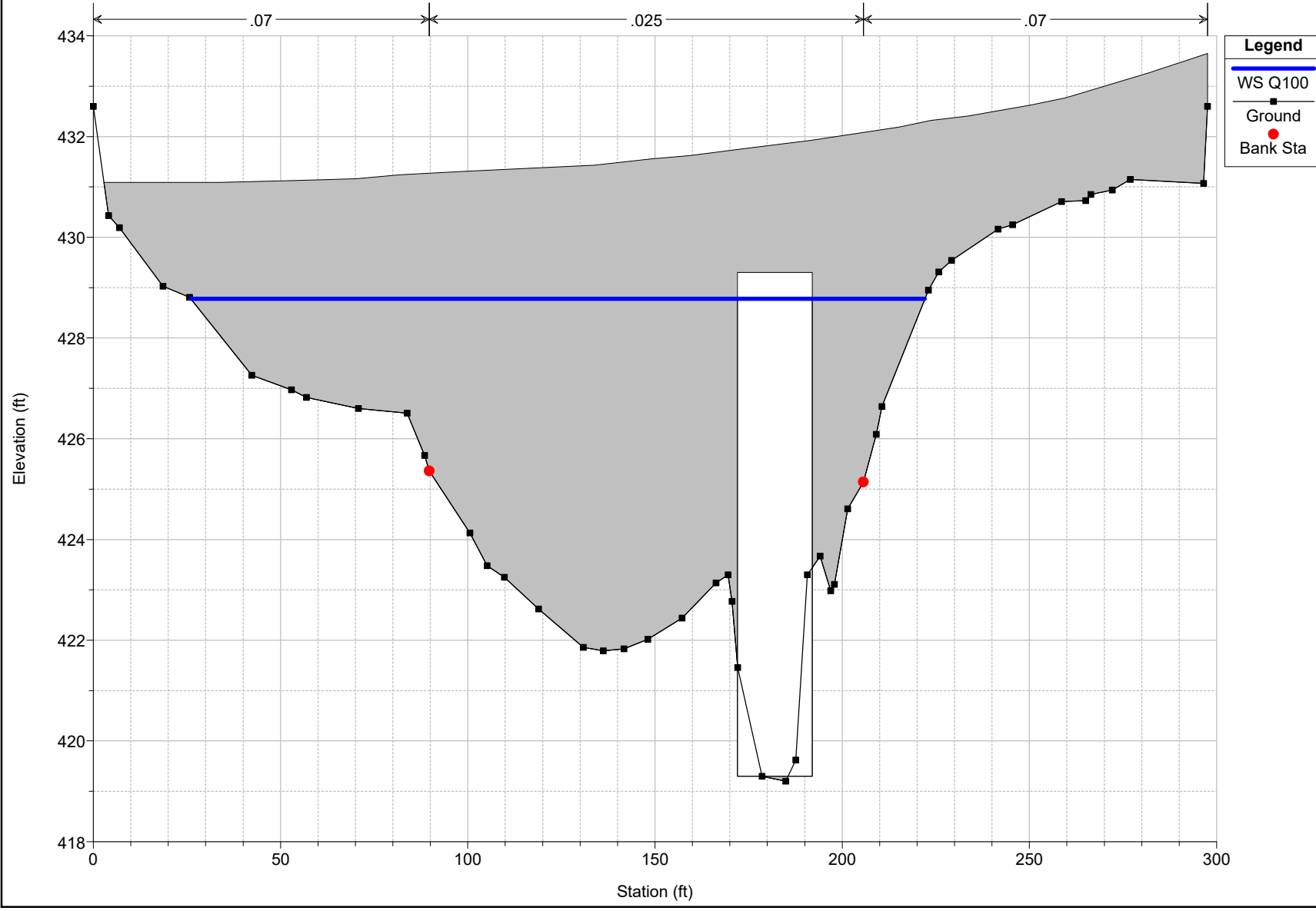
River = River 1 Reach = Reach 1 RS = 2921 Culv NH Route 107 / North Road



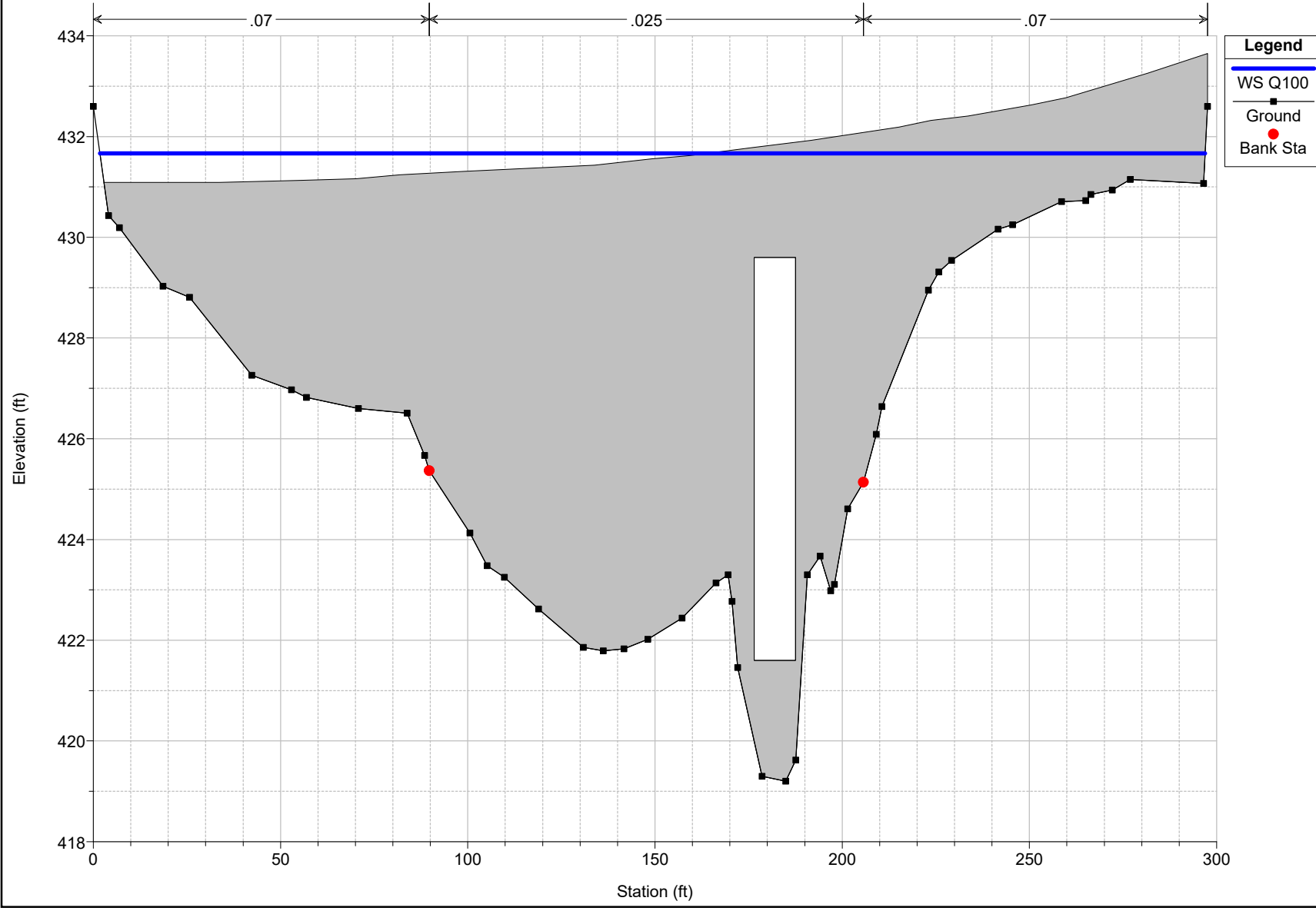
Freeses Pond Deerfield Plan: Proposed 9x14 Box 2/20/2020
River = River 1 Reach = Reach 1 RS = 2921 Culv NH Route 107 / North Road



Freese's Pond Deerfield Plan: Proposed Big Box 2/20/2020
River = River 1 Reach = Reach 1 RS = 2921 Culv NH Route 107 / North Road



Freeses Pond Deerfield Plan: Pre-1973 Structure 2/20/2020
River = River 1 Reach = Reach 1 RS = 2921 Culv NH Route 107 / North Road



HEC-RAS River: River 1 Reach: Reach 1

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach 1	2970	Q2	EX	230.00	419.56	426.79		426.79	0.000001	0.18	1258.07	261.05	0.01
Reach 1	2970	Q2	PR_9x14	230.00	419.56	426.67		426.67	0.000001	0.19	1226.71	260.02	0.01
Reach 1	2970	Q2	Prop Big Box	230.00	419.56	426.62		426.62	0.000001	0.19	1213.70	259.59	0.02
Reach 1	2970	Q2	Pre-1973	230.00	419.56	426.99		426.99	0.000001	0.18	1309.28	262.74	0.01
Reach 1	2970	Q5	EX	381.00	419.56	427.99		427.99	0.000001	0.25	1577.30	271.38	0.02
Reach 1	2970	Q5	PR_9x14	381.00	419.56	427.66		427.66	0.000002	0.26	1486.65	268.49	0.02
Reach 1	2970	Q5	Prop Big Box	381.00	419.56	427.55		427.55	0.000002	0.27	1457.32	267.55	0.02
Reach 1	2970	Q5	Pre-1973	381.00	419.56	428.26		428.26	0.000001	0.24	1651.22	273.72	0.02
Reach 1	2970	Q10	EX	508.00	419.56	428.75		428.75	0.000002	0.29	1785.67	278.48	0.02
Reach 1	2970	Q10	PR_9x14	508.00	419.56	428.13		428.13	0.000002	0.32	1615.54	272.59	0.02
Reach 1	2970	Q10	Prop Big Box	508.00	419.56	427.95		427.96	0.000003	0.33	1566.88	271.05	0.02
Reach 1	2970	Q10	Pre-1973	508.00	419.56	429.08		429.08	0.000002	0.28	1879.07	283.64	0.02
Reach 1	2970	Q25	EX	681.00	419.56	429.91		429.91	0.000002	0.34	2120.30	299.66	0.02
Reach 1	2970	Q25	PR_9x14	681.00	419.56	428.75		428.75	0.000003	0.39	1784.23	278.41	0.03
Reach 1	2970	Q25	Prop Big Box	681.00	419.56	428.45		428.45	0.000004	0.41	1702.92	275.34	0.03
Reach 1	2970	Q25	Pre-1973	681.00	419.56	430.23		430.24	0.000002	0.32	2217.94	305.22	0.02
Reach 1	2970	Q50	EX	824.00	419.56	431.00		431.01	0.000002	0.36	2458.76	318.88	0.02
Reach 1	2970	Q50	PR_9x14	824.00	419.56	429.29		429.29	0.000004	0.44	1937.37	287.50	0.03
Reach 1	2970	Q50	Prop Big Box	824.00	419.56	428.84		428.85	0.000005	0.47	1811.45	279.61	0.03
Reach 1	2970	Q50	Pre-1973	824.00	419.56	431.19		431.19	0.000002	0.35	2518.16	320.18	0.02
Reach 1	2970	Q100	EX	996.00	419.56	431.67		431.68	0.000002	0.40	2673.43	323.54	0.02
Reach 1	2970	Q100	PR_9x14	996.00	419.56	429.98		429.98	0.000004	0.49	2139.78	300.78	0.03
Reach 1	2970	Q100	Prop Big Box	996.00	419.56	429.29		429.29	0.000005	0.53	1938.06	287.55	0.03
Reach 1	2970	Q100	Pre-1973	996.00	419.56	431.67		431.68	0.000002	0.40	2673.66	323.55	0.02
Reach 1	2970	Q500	EX	1420.00	419.56	432.38		432.38	0.000003	0.53	2904.10	328.47	0.03
Reach 1	2970	Q500	PR_9x14	1420.00	419.56	431.61		431.62	0.000004	0.57	2653.29	323.11	0.03
Reach 1	2970	Q500	Prop Big Box	1420.00	419.56	430.42		430.43	0.000007	0.66	2276.24	308.49	0.04
Reach 1	2970	Q500	Pre-1973	1420.00	419.56	432.28		432.29	0.000004	0.54	2872.35	327.80	0.03
Reach 1	2928	Q2	EX	230.00	419.20	426.79	421.61	426.79	0.000009	0.46	509.36	152.61	0.04
Reach 1	2928	Q2	PR_9x14	230.00	419.20	426.67	421.61	426.67	0.000010	0.48	491.45	144.34	0.04
Reach 1	2928	Q2	Prop Big Box	230.00	419.20	426.62	421.61	426.62	0.000010	0.48	484.30	140.96	0.04
Reach 1	2928	Q2	Pre-1973	230.00	419.20	426.99	421.61	426.99	0.000008	0.44	540.07	160.14	0.04
Reach 1	2928	Q5	EX	381.00	419.20	427.99	422.49	427.99	0.000011	0.59	714.62	183.32	0.04
Reach 1	2928	Q5	PR_9x14	381.00	419.20	427.65	422.49	427.66	0.000013	0.63	653.82	177.91	0.05
Reach 1	2928	Q5	Prop Big Box	381.00	419.20	427.54	422.49	427.55	0.000014	0.65	634.40	176.15	0.05
Reach 1	2928	Q5	Pre-1973	381.00	419.20	428.26	422.49	428.26	0.000009	0.56	765.05	187.69	0.04
Reach 1	2928	Q10	EX	508.00	419.20	428.74	422.77	428.75	0.000012	0.68	858.00	195.49	0.05
Reach 1	2928	Q10	PR_9x14	508.00	419.20	428.12	422.77	428.13	0.000017	0.77	739.93	185.53	0.06
Reach 1	2928	Q10	Prop Big Box	508.00	419.20	427.94	422.77	427.95	0.000019	0.79	706.85	182.64	0.06
Reach 1	2928	Q10	Pre-1973	508.00	419.20	429.08	422.77	429.08	0.000010	0.65	924.85	205.87	0.04
Reach 1	2928	Q25	EX	681.00	419.20	429.90	423.09	429.91	0.000012	0.76	1102.32	226.58	0.05
Reach 1	2928	Q25	PR_9x14	681.00	419.20	428.73	423.09	428.75	0.000022	0.92	855.97	195.33	0.06

HEC-RAS River: River 1 Reach: Reach 1 (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach 1	2928	Q25	Prop Big Box	681.00	419.20	428.44	423.09	428.45	0.000026	0.97	799.00	190.58	0.07
Reach 1	2928	Q25	Pre-1973	681.00	419.20	430.23	423.09	430.23	0.000010	0.72	1177.29	237.92	0.05
Reach 1	2928	Q50	EX	824.00	419.20	431.00	423.32	431.01	0.000010	0.78	1372.63	270.36	0.05
Reach 1	2928	Q50	PR_9x14	824.00	419.20	429.27	423.32	429.29	0.000024	1.01	965.50	209.35	0.07
Reach 1	2928	Q50	Prop Big Box	824.00	419.20	428.83	423.32	428.84	0.000030	1.09	874.16	197.18	0.08
Reach 1	2928	Q50	Pre-1973	824.00	419.20	431.18	423.32	431.19	0.000010	0.77	1424.88	293.90	0.05
Reach 1	2928	Q100	EX	996.00	419.20	431.66	423.55	431.67	0.000012	0.87	1566.39	295.16	0.05
Reach 1	2928	Q100	PR_9x14	996.00	419.20	429.96	423.55	429.98	0.000025	1.10	1115.16	228.28	0.07
Reach 1	2928	Q100	Prop Big Box	996.00	419.20	429.27	423.55	429.29	0.000035	1.23	964.64	209.28	0.08
Reach 1	2928	Q100	Pre-1973	996.00	419.20	431.66	423.55	431.67	0.000012	0.86	1566.63	295.16	0.05
Reach 1	2928	Q500	EX	1420.00	419.20	432.37	423.97	432.38	0.000018	1.12	1774.15	296.99	0.06
Reach 1	2928	Q500	PR_9x14	1420.00	419.20	431.59	423.97	431.61	0.000024	1.25	1545.06	294.97	0.07
Reach 1	2928	Q500	Prop Big Box	1420.00	419.20	430.39	423.97	430.43	0.000041	1.47	1217.98	245.10	0.09
Reach 1	2928	Q500	Pre-1973	1420.00	419.20	432.27	423.97	432.29	0.000018	1.14	1745.32	296.73	0.06
Reach 1	2921			Culvert									
Reach 1	2860	Q2	EX	230.00	419.28	426.58		426.58	0.000005	0.35	660.65	162.65	0.03
Reach 1	2860	Q2	PR_9x14	230.00	419.28	426.58		426.58	0.000005	0.35	660.65	162.65	0.03
Reach 1	2860	Q2	Prop Big Box	230.00	419.28	426.58		426.58	0.000005	0.35	660.65	162.65	0.03
Reach 1	2860	Q2	Pre-1973	230.00	419.28	426.58		426.58	0.000005	0.35	660.65	162.65	0.03
Reach 1	2860	Q5	EX	381.00	419.28	427.44		427.45	0.000008	0.48	805.73	171.41	0.04
Reach 1	2860	Q5	PR_9x14	381.00	419.28	427.44		427.45	0.000008	0.48	805.73	171.41	0.04
Reach 1	2860	Q5	Prop Big Box	381.00	419.28	427.44		427.45	0.000008	0.48	805.73	171.41	0.04
Reach 1	2860	Q5	Pre-1973	381.00	419.28	427.44		427.45	0.000008	0.48	805.73	171.41	0.04
Reach 1	2860	Q10	EX	508.00	419.28	427.78		427.79	0.000011	0.61	864.72	174.74	0.05
Reach 1	2860	Q10	PR_9x14	508.00	419.28	427.78		427.79	0.000011	0.61	864.72	174.74	0.05
Reach 1	2860	Q10	Prop Big Box	508.00	419.28	427.78		427.79	0.000011	0.61	864.72	174.74	0.05
Reach 1	2860	Q10	Pre-1973	508.00	419.28	427.78		427.79	0.000011	0.61	864.72	174.74	0.05
Reach 1	2860	Q25	EX	681.00	419.28	428.17		428.18	0.000015	0.76	933.51	179.21	0.05
Reach 1	2860	Q25	PR_9x14	681.00	419.28	428.17		428.18	0.000015	0.76	933.51	179.21	0.05
Reach 1	2860	Q25	Prop Big Box	681.00	419.28	428.17		428.18	0.000015	0.76	933.51	179.21	0.05
Reach 1	2860	Q25	Pre-1973	681.00	419.28	428.17		428.18	0.000015	0.76	933.51	179.21	0.05
Reach 1	2860	Q50	EX	824.00	419.28	428.46		428.47	0.000019	0.87	985.51	182.57	0.06
Reach 1	2860	Q50	PR_9x14	824.00	419.28	428.46		428.47	0.000019	0.87	985.51	182.57	0.06
Reach 1	2860	Q50	Prop Big Box	824.00	419.28	428.46		428.47	0.000019	0.87	985.51	182.57	0.06
Reach 1	2860	Q50	Pre-1973	824.00	419.28	428.46		428.47	0.000019	0.87	985.51	182.57	0.06
Reach 1	2860	Q100	EX	996.00	419.28	428.77		428.78	0.000024	1.00	1041.99	186.15	0.07
Reach 1	2860	Q100	PR_9x14	996.00	419.28	428.77		428.78	0.000024	1.00	1041.99	186.15	0.07
Reach 1	2860	Q100	Prop Big Box	996.00	419.28	428.77		428.78	0.000024	1.00	1041.99	186.15	0.07
Reach 1	2860	Q100	Pre-1973	996.00	419.28	428.77		428.78	0.000024	1.00	1041.99	186.15	0.07
Reach 1	2860	Q500	EX	1420.00	419.28	429.46		429.48	0.000034	1.29	1175.37	199.28	0.08
Reach 1	2860	Q500	PR_9x14	1420.00	419.28	429.46		429.48	0.000034	1.29	1175.37	199.28	0.08

HEC-RAS River: River 1 Reach: Reach 1 (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach 1	2860	Q500	Prop Big Box	1420.00	419.28	429.46		429.48	0.000034	1.29	1175.37	199.28	0.08
Reach 1	2860	Q500	Pre-1973	1420.00	419.28	429.46		429.48	0.000034	1.29	1175.37	199.28	0.08
Reach 1	2816	Q2	EX	230.00	417.13	426.58		426.58	0.000002	0.29	805.34	161.88	0.02
Reach 1	2816	Q2	PR_9x14	230.00	417.13	426.58		426.58	0.000002	0.29	805.34	161.88	0.02
Reach 1	2816	Q2	Prop Big Box	230.00	417.13	426.58		426.58	0.000002	0.29	805.34	161.88	0.02
Reach 1	2816	Q2	Pre-1973	230.00	417.13	426.58		426.58	0.000002	0.29	805.34	161.88	0.02
Reach 1	2816	Q5	EX	381.00	417.13	427.44		427.45	0.000004	0.41	953.41	179.20	0.03
Reach 1	2816	Q5	PR_9x14	381.00	417.13	427.44		427.45	0.000004	0.41	953.41	179.20	0.03
Reach 1	2816	Q5	Prop Big Box	381.00	417.13	427.44		427.45	0.000004	0.41	953.41	179.20	0.03
Reach 1	2816	Q5	Pre-1973	381.00	417.13	427.44		427.45	0.000004	0.41	953.41	179.20	0.03
Reach 1	2816	Q10	EX	508.00	417.13	427.78		427.79	0.000006	0.52	1015.63	185.68	0.04
Reach 1	2816	Q10	PR_9x14	508.00	417.13	427.78		427.79	0.000006	0.52	1015.63	185.68	0.04
Reach 1	2816	Q10	Prop Big Box	508.00	417.13	427.78		427.79	0.000006	0.52	1015.63	185.68	0.04
Reach 1	2816	Q10	Pre-1973	508.00	417.13	427.78		427.79	0.000006	0.52	1015.63	185.68	0.04
Reach 1	2816	Q25	EX	681.00	417.13	428.17		428.18	0.000009	0.66	1089.45	193.49	0.04
Reach 1	2816	Q25	PR_9x14	681.00	417.13	428.17		428.18	0.000009	0.66	1089.45	193.49	0.04
Reach 1	2816	Q25	Prop Big Box	681.00	417.13	428.17		428.18	0.000009	0.66	1089.45	193.49	0.04
Reach 1	2816	Q25	Pre-1973	681.00	417.13	428.17		428.18	0.000009	0.66	1089.45	193.49	0.04
Reach 1	2816	Q50	EX	824.00	417.13	428.46		428.47	0.000012	0.76	1146.92	226.13	0.05
Reach 1	2816	Q50	PR_9x14	824.00	417.13	428.46		428.47	0.000012	0.76	1146.92	226.13	0.05
Reach 1	2816	Q50	Prop Big Box	824.00	417.13	428.46		428.47	0.000012	0.76	1146.92	226.13	0.05
Reach 1	2816	Q50	Pre-1973	824.00	417.13	428.46		428.47	0.000012	0.76	1146.93	226.13	0.05
Reach 1	2816	Q100	EX	996.00	417.13	428.77		428.78	0.000015	0.88	1218.09	240.52	0.06
Reach 1	2816	Q100	PR_9x14	996.00	417.13	428.77		428.78	0.000015	0.88	1218.09	240.52	0.06
Reach 1	2816	Q100	Prop Big Box	996.00	417.13	428.77		428.78	0.000015	0.88	1218.09	240.52	0.06
Reach 1	2816	Q100	Pre-1973	996.00	417.13	428.77		428.78	0.000015	0.88	1218.09	240.52	0.06
Reach 1	2816	Q500	EX	1420.00	417.13	429.46		429.48	0.000022	1.14	1388.63	251.71	0.07
Reach 1	2816	Q500	PR_9x14	1420.00	417.13	429.46		429.48	0.000022	1.14	1388.63	251.71	0.07
Reach 1	2816	Q500	Prop Big Box	1420.00	417.13	429.46		429.48	0.000022	1.14	1388.63	251.71	0.07
Reach 1	2816	Q500	Pre-1973	1420.00	417.13	429.46		429.48	0.000022	1.14	1388.63	251.71	0.07
Reach 1	63	Q2	EX	230.00	419.34	426.57		426.57	0.000004	0.37	625.83	120.38	0.03
Reach 1	63	Q2	PR_9x14	230.00	419.34	426.57		426.57	0.000004	0.37	625.83	120.38	0.03
Reach 1	63	Q2	Prop Big Box	230.00	419.34	426.57		426.57	0.000004	0.37	625.83	120.38	0.03
Reach 1	63	Q2	Pre-1973	230.00	419.34	426.57		426.57	0.000004	0.37	625.83	120.38	0.03
Reach 1	63	Q5	EX	381.00	419.34	427.43		427.43	0.000007	0.53	731.86	129.76	0.04
Reach 1	63	Q5	PR_9x14	381.00	419.34	427.43		427.43	0.000007	0.53	731.86	129.76	0.04
Reach 1	63	Q5	Prop Big Box	381.00	419.34	427.43		427.43	0.000007	0.53	731.86	129.76	0.04
Reach 1	63	Q5	Pre-1973	381.00	419.34	427.43		427.43	0.000007	0.53	731.86	129.76	0.04
Reach 1	63	Q10	EX	508.00	419.34	427.76		427.77	0.000010	0.67	775.43	131.73	0.05
Reach 1	63	Q10	PR_9x14	508.00	419.34	427.76		427.77	0.000010	0.67	775.43	131.73	0.05
Reach 1	63	Q10	Prop Big Box	508.00	419.34	427.76		427.77	0.000010	0.67	775.43	131.73	0.05

HEC-RAS River: River 1 Reach: Reach 1 (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach 1	63	Q10	Pre-1973	508.00	419.34	427.76		427.77	0.000010	0.67	775.42	131.73	0.05
Reach 1	63	Q25	EX	681.00	419.34	428.14		428.15	0.000015	0.85	829.16	153.06	0.06
Reach 1	63	Q25	PR_9x14	681.00	419.34	428.14		428.15	0.000015	0.85	829.16	153.06	0.06
Reach 1	63	Q25	Prop Big Box	681.00	419.34	428.14		428.15	0.000015	0.85	829.16	153.06	0.06
Reach 1	63	Q25	Pre-1973	681.00	419.34	428.14		428.15	0.000015	0.85	829.16	153.09	0.06
Reach 1	63	Q50	EX	824.00	419.34	428.41		428.43	0.000020	0.98	873.11	164.86	0.06
Reach 1	63	Q50	PR_9x14	824.00	419.34	428.41		428.43	0.000020	0.98	873.11	164.86	0.06
Reach 1	63	Q50	Prop Big Box	824.00	419.34	428.41		428.43	0.000020	0.98	873.11	164.86	0.06
Reach 1	63	Q50	Pre-1973	824.00	419.34	428.41		428.43	0.000020	0.98	873.12	164.86	0.06
Reach 1	63	Q100	EX	996.00	419.34	428.71		428.73	0.000025	1.14	922.21	169.91	0.07
Reach 1	63	Q100	PR_9x14	996.00	419.34	428.71		428.73	0.000025	1.14	922.21	169.91	0.07
Reach 1	63	Q100	Prop Big Box	996.00	419.34	428.71		428.73	0.000025	1.14	922.21	169.91	0.07
Reach 1	63	Q100	Pre-1973	996.00	419.34	428.71		428.73	0.000025	1.14	922.22	169.91	0.07
Reach 1	63	Q500	EX	1420.00	419.34	429.37		429.40	0.000038	1.49	1040.25	185.28	0.09
Reach 1	63	Q500	PR_9x14	1420.00	419.34	429.37		429.40	0.000038	1.49	1040.25	185.28	0.09
Reach 1	63	Q500	Prop Big Box	1420.00	419.34	429.37		429.40	0.000038	1.49	1040.25	185.28	0.09
Reach 1	63	Q500	Pre-1973	1420.00	419.34	429.37		429.40	0.000038	1.49	1040.26	185.28	0.09
Reach 1	32	Q2	EX	230.00	419.84	426.57	421.10	426.57	0.000005	0.39	599.35	122.01	0.03
Reach 1	32	Q2	PR_9x14	230.00	419.84	426.57	421.10	426.57	0.000005	0.39	599.35	122.01	0.03
Reach 1	32	Q2	Prop Big Box	230.00	419.84	426.57	421.10	426.57	0.000005	0.39	599.35	122.01	0.03
Reach 1	32	Q2	Pre-1973	230.00	419.84	426.57	421.10	426.57	0.000005	0.39	599.35	122.01	0.03
Reach 1	32	Q5	EX	381.00	419.84	427.43	421.49	427.43	0.000008	0.55	705.90	125.44	0.04
Reach 1	32	Q5	PR_9x14	381.00	419.84	427.43	421.49	427.43	0.000008	0.55	705.90	125.44	0.04
Reach 1	32	Q5	Prop Big Box	381.00	419.84	427.43	421.49	427.43	0.000008	0.55	705.90	125.44	0.04
Reach 1	32	Q5	Pre-1973	381.00	419.84	427.43	421.49	427.43	0.000008	0.55	705.89	125.44	0.04
Reach 1	32	Q10	EX	508.00	419.84	427.76	421.79	427.77	0.000012	0.69	747.92	128.83	0.05
Reach 1	32	Q10	PR_9x14	508.00	419.84	427.76	421.79	427.77	0.000012	0.69	747.92	128.83	0.05
Reach 1	32	Q10	Prop Big Box	508.00	419.84	427.76	421.79	427.77	0.000012	0.69	747.92	128.83	0.05
Reach 1	32	Q10	Pre-1973	508.00	419.84	427.76	421.79	427.77	0.000012	0.69	747.92	128.81	0.05
Reach 1	32	Q25	EX	681.00	419.84	428.14	422.06	428.15	0.000017	0.88	798.10	137.42	0.06
Reach 1	32	Q25	PR_9x14	681.00	419.84	428.14	422.06	428.15	0.000017	0.88	798.10	137.42	0.06
Reach 1	32	Q25	Prop Big Box	681.00	419.84	428.14	422.06	428.15	0.000017	0.88	798.10	137.42	0.06
Reach 1	32	Q25	Pre-1973	681.00	419.84	428.14	422.06	428.15	0.000017	0.88	798.09	137.42	0.06
Reach 1	32	Q50	EX	824.00	419.84	428.41	422.22	428.43	0.000022	1.02	837.05	145.73	0.07
Reach 1	32	Q50	PR_9x14	824.00	419.84	428.41	422.22	428.43	0.000022	1.02	837.05	145.73	0.07
Reach 1	32	Q50	Prop Big Box	824.00	419.84	428.41	422.22	428.43	0.000022	1.02	837.05	145.73	0.07
Reach 1	32	Q50	Pre-1973	824.00	419.84	428.41	422.22	428.43	0.000022	1.02	837.05	145.73	0.07
Reach 1	32	Q100	EX	996.00	419.84	428.71	422.41	428.73	0.000028	1.18	879.85	146.86	0.08
Reach 1	32	Q100	PR_9x14	996.00	419.84	428.71	422.41	428.73	0.000028	1.18	879.85	146.86	0.08
Reach 1	32	Q100	Prop Big Box	996.00	419.84	428.71	422.41	428.73	0.000028	1.18	879.85	146.86	0.08
Reach 1	32	Q100	Pre-1973	996.00	419.84	428.71	422.41	428.73	0.000028	1.18	879.85	146.86	0.08
Reach 1	32	Q500	EX	1420.00	419.84	429.36	422.84	429.40	0.000043	1.54	977.80	153.65	0.10

HEC-RAS River: River 1 Reach: Reach 1 (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach 1	32	Q500	PR_9x14	1420.00	419.84	429.36	422.84	429.40	0.000043	1.54	977.80	153.65	0.10
Reach 1	32	Q500	Prop Big Box	1420.00	419.84	429.36	422.84	429.40	0.000043	1.54	977.80	153.65	0.10
Reach 1	32	Q500	Pre-1973	1420.00	419.84	429.36	422.84	429.40	0.000043	1.54	977.79	153.65	0.10
Reach 1	30			Inl Struct									
Reach 1	8	Q2	EX	230.00	419.14	420.38	420.38	420.89	0.008118	6.16	56.11	64.64	0.98
Reach 1	8	Q2	PR_9x14	230.00	419.14	420.38	420.38	420.89	0.008118	6.16	56.11	64.64	0.98
Reach 1	8	Q2	Prop Big Box	230.00	419.14	420.38	420.38	420.89	0.008118	6.16	56.11	64.64	0.98
Reach 1	8	Q2	Pre-1973	230.00	419.14	420.38	420.38	420.89	0.008118	6.16	56.11	64.64	0.98
Reach 1	8	Q5	EX	381.00	419.14	420.82	420.82	421.47	0.007281	7.15	87.50	77.72	0.97
Reach 1	8	Q5	PR_9x14	381.00	419.14	420.82	420.82	421.47	0.007281	7.15	87.50	77.72	0.97
Reach 1	8	Q5	Prop Big Box	381.00	419.14	420.82	420.82	421.47	0.007281	7.15	87.50	77.72	0.97
Reach 1	8	Q5	Pre-1973	381.00	419.14	420.82	420.82	421.47	0.007281	7.15	87.50	77.72	0.97
Reach 1	8	Q10	EX	508.00	419.14	421.11	421.11	421.87	0.007059	7.84	111.09	83.77	0.99
Reach 1	8	Q10	PR_9x14	508.00	419.14	421.11	421.11	421.87	0.007059	7.84	111.09	83.77	0.99
Reach 1	8	Q10	Prop Big Box	508.00	419.14	421.11	421.11	421.87	0.007059	7.84	111.09	83.77	0.99
Reach 1	8	Q10	Pre-1973	508.00	419.14	421.11	421.11	421.87	0.007059	7.84	111.09	83.77	0.99
Reach 1	8	Q25	EX	681.00	419.14	421.47	421.47	422.34	0.006707	8.54	142.16	89.52	0.99
Reach 1	8	Q25	PR_9x14	681.00	419.14	421.47	421.47	422.34	0.006707	8.54	142.16	89.52	0.99
Reach 1	8	Q25	Prop Big Box	681.00	419.14	421.47	421.47	422.34	0.006707	8.54	142.16	89.52	0.99
Reach 1	8	Q25	Pre-1973	681.00	419.14	421.47	421.47	422.34	0.006707	8.54	142.16	89.52	0.99
Reach 1	8	Q50	EX	824.00	419.14	421.72	421.72	422.69	0.006703	9.13	164.50	93.08	1.00
Reach 1	8	Q50	PR_9x14	824.00	419.14	421.72	421.72	422.69	0.006703	9.13	164.50	93.08	1.00
Reach 1	8	Q50	Prop Big Box	824.00	419.14	421.72	421.72	422.69	0.006703	9.13	164.50	93.08	1.00
Reach 1	8	Q50	Pre-1973	824.00	419.14	421.72	421.72	422.69	0.006703	9.13	164.50	93.08	1.00
Reach 1	8	Q100	EX	996.00	419.14	422.00	422.00	423.07	0.006597	9.70	191.23	97.17	1.01
Reach 1	8	Q100	PR_9x14	996.00	419.14	422.00	422.00	423.07	0.006597	9.70	191.23	97.17	1.01
Reach 1	8	Q100	Prop Big Box	996.00	419.14	422.00	422.00	423.07	0.006597	9.70	191.23	97.17	1.01
Reach 1	8	Q100	Pre-1973	996.00	419.14	422.00	422.00	423.07	0.006597	9.70	191.23	97.17	1.01
Reach 1	8	Q500	EX	1420.00	419.14	422.61	422.61	423.91	0.006379	10.87	253.91	106.29	1.03
Reach 1	8	Q500	PR_9x14	1420.00	419.14	422.61	422.61	423.91	0.006379	10.87	253.91	106.29	1.03
Reach 1	8	Q500	Prop Big Box	1420.00	419.14	422.61	422.61	423.91	0.006379	10.87	253.91	106.29	1.03
Reach 1	8	Q500	Pre-1973	1420.00	419.14	422.61	422.61	423.91	0.006379	10.87	253.91	106.29	1.03
Reach 1	1	Q2	EX	230.00	418.55	419.83	419.83	420.34	0.008322	6.31	58.50	65.87	0.99
Reach 1	1	Q2	PR_9x14	230.00	418.55	419.83	419.83	420.34	0.008322	6.31	58.50	65.87	0.99
Reach 1	1	Q2	Prop Big Box	230.00	418.55	419.83	419.83	420.34	0.008322	6.31	58.50	65.87	0.99
Reach 1	1	Q2	Pre-1973	230.00	418.55	419.83	419.83	420.34	0.008322	6.31	58.50	65.87	0.99
Reach 1	1	Q5	EX	381.00	418.55	420.27	420.27	420.93	0.007511	7.34	90.76	79.41	0.99
Reach 1	1	Q5	PR_9x14	381.00	418.55	420.27	420.27	420.93	0.007511	7.34	90.76	79.41	0.99
Reach 1	1	Q5	Prop Big Box	381.00	418.55	420.27	420.27	420.93	0.007511	7.34	90.76	79.41	0.99
Reach 1	1	Q5	Pre-1973	381.00	418.55	420.27	420.27	420.93	0.007511	7.34	90.76	79.41	0.99

HEC-RAS River: River 1 Reach: Reach 1 (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach 1	1	Q10	EX	508.00	418.55	420.58	420.58	421.33	0.007083	7.97	116.53	86.72	0.99
Reach 1	1	Q10	PR_9x14	508.00	418.55	420.58	420.58	421.33	0.007083	7.97	116.53	86.72	0.99
Reach 1	1	Q10	Prop Big Box	508.00	418.55	420.58	420.58	421.33	0.007083	7.97	116.53	86.72	0.99
Reach 1	1	Q10	Pre-1973	508.00	418.55	420.58	420.58	421.33	0.007083	7.97	116.53	86.72	0.99
Reach 1	1	Q25	EX	681.00	418.55	420.93	420.93	421.79	0.006901	8.74	147.61	92.65	1.00
Reach 1	1	Q25	PR_9x14	681.00	418.55	420.93	420.93	421.79	0.006901	8.74	147.61	92.65	1.00
Reach 1	1	Q25	Prop Big Box	681.00	418.55	420.93	420.93	421.79	0.006901	8.74	147.61	92.65	1.00
Reach 1	1	Q25	Pre-1973	681.00	418.55	420.93	420.93	421.79	0.006901	8.74	147.61	92.65	1.00
Reach 1	1	Q50	EX	824.00	418.55	421.17	421.17	422.14	0.006909	9.34	170.68	96.48	1.02
Reach 1	1	Q50	PR_9x14	824.00	418.55	421.17	421.17	422.14	0.006909	9.34	170.68	96.48	1.02
Reach 1	1	Q50	Prop Big Box	824.00	418.55	421.17	421.17	422.14	0.006909	9.34	170.68	96.48	1.02
Reach 1	1	Q50	Pre-1973	824.00	418.55	421.17	421.17	422.14	0.006909	9.34	170.68	96.48	1.02
Reach 1	1	Q100	EX	996.00	418.55	421.45	421.45	422.52	0.006808	9.93	198.46	101.11	1.03
Reach 1	1	Q100	PR_9x14	996.00	418.55	421.45	421.45	422.52	0.006808	9.93	198.46	101.11	1.03
Reach 1	1	Q100	Prop Big Box	996.00	418.55	421.45	421.45	422.52	0.006808	9.93	198.46	101.11	1.03
Reach 1	1	Q100	Pre-1973	996.00	418.55	421.45	421.45	422.52	0.006785	9.92	198.72	101.15	1.03
Reach 1	1	Q500	EX	1420.00	418.55	422.06	422.06	423.34	0.006604	11.12	263.00	110.36	1.05
Reach 1	1	Q500	PR_9x14	1420.00	418.55	422.06	422.06	423.34	0.006607	11.12	262.95	110.35	1.05
Reach 1	1	Q500	Prop Big Box	1420.00	418.55	422.06	422.06	423.34	0.006607	11.12	262.95	110.35	1.05
Reach 1	1	Q500	Pre-1973	1420.00	418.55	422.06	422.06	423.34	0.006604	11.12	263.00	110.36	1.05

Appendix E – Env-Wt 514 Bank/Shoreline Stabilization Worksheet



**BANK/SHORELINE STABILIZATION
PROJECT-SPECIFIC WORKSHEET
FOR STANDARD APPLICATION**
Water Division/Land Resources Management
Wetlands Bureau
[Check the Status of your Application](#)



RSA/Rule: RSA 482/ Env-Wt 514

APPLICANT LAST NAME, FIRST NAME, M.I.: **NH Department of Transportation**

This worksheet summarizes the criteria and requirements for a Standard Permit for all types of “bank/shoreline stabilization” projects, as outlined in Chapter Env-Wt 500. In addition to the project-specific criteria and requirements on this worksheet, all Standard Applications must meet the criteria and requirements listed in the [Standard Dredge and Fill Wetlands Permit Application form \(NHDES-W-06-012\)](#).

Do **not** use this worksheet if the project is located in a coastal (tidal) area (Env-Wt 509.02(b)).

SECTION 1 - APPROVAL CRITERIA (Env-Wt 514.02)

An application for bank/shoreline stabilization must meet the following approval criteria:

- The project must meet the applicable conditions established in Env-Wt 300.
- For a hard-scape stabilization proposal, such as rip-rap or a retaining wall, the applicant must demonstrate that the bank or shoreline in that location cannot be stabilized by preserving natural vegetation, landscaping, or bioengineering.
- Bank/shoreline stabilization must be designed to be the least intrusive practicable method in accordance with Chapter 8 of the [Wetlands Best Management Practice Techniques for Avoidance and Minimization \(A/M BMPs\)](#).
- Bank/shoreline stabilization must conform to the natural alignment of the bank/shoreline.
- Bank/shoreline stabilization must not adversely affect the stream course such that water flow will be transported by the stream channel in a manner that the stream maintains its dimensions, general pattern, and slope with no unnatural raising or lowering of the channel bed elevation along the stream bed profile.
- Bank/shoreline stabilization must not adversely affect the physical stream forms or alter the local channel hydraulics, natural stream bank stability, or floodplain connectivity.
- Bank/shoreline stabilization must avoid and minimize impacts to shoreline resource functions as described in Env-Wt 514.01 and Chapter 8 of the [A/M BMPs](#).
- If the project is a wall on a great pond or other surface water where the state holds fee simple ownership of the bed, bank/shoreline stabilization must locate the wall on the shoreward side of the normal high water line.
- If the project is to install rip-rap, bank/shoreline stabilization must locate the rip-rap shoreward of the normal high water line, where practicable, and extend it not more than two feet lakeward of that line at any point.
- The hierarchy of bank stabilization practices must be as follows:
 - (1) Soft vegetative bank stabilization, including regrading and replanting of slopes, in which all work occurs above ordinary high water or normal high water,
 - (2) Bioengineered bank stabilization or naturalized design techniques that uses a combination of live vegetation, woody material, or geotextile matting and may include regrading and replanting of slopes,

irm@des.nh.gov or (603) 271-2147

NHDES Wetlands Bureau, 29 Hazen Drive, PO BOX 95, Concord, NH 03302-0095

www.des.nh.gov

- (3) Semi-natural form design shall be allowed only where the applicant demonstrates that anticipated turbulence, flows, restricted space, or similar factors, render vegetative or soft stabilization methods, bioengineering, and natural process design stabilization methods physically impractical,
- (4) Hard-scape or rip-rap design shall be allowed only where anticipated turbulence, flows, restricted space, or similar factors render vegetative, bio-engineering, semi-natural form design and diversion methods physically impractical and where necessary to protect existing infrastructure, and
- (5) Wall construction shall be allowed as the last available option, only where lack of space or other limitations of the site make alternative stabilization methods of bioengineering, seminatural, and rip-rap impractical. Wherever sufficient room exists, slopes shall be cut back to eliminate the requirement for a wall.

Stream bank-stabilization project plans must be developed in accordance with the following techniques, as applicable:

- Naturalized and semi-natural design techniques where practicable in accordance with the [Guidelines for Naturalized River Channel Design and Bank Stabilization](#) dated February 2007; R. Schiff, J.G. MacBroom, and J. Armstrong Bonin.
- For bioengineering projects, [National Engineering Handbook Part 654 \(NEH 654\), Technical Supplement 141, Streambank Soil Bioengineering](#), dated August 2007, USDA NRCS.
- For stream restoration projects, [NEH 654, Stream Restoration Design](#), dated August 2007, USDA NRCS.

SECTION 2 - APPLICATION REQUIREMENTS FOR ALL BANK/SHORELINE STABILIZATION PROJECTS (Env-Wt 514.03)

An application for any bank/shoreline stabilization project must include:

A narrative and photos that:

- Describe and illustrate existing conditions and locations where shoreline vegetation currently exists.

The Freeses Pond bank within the project area is dominated by herbaceous vegetation downslope near the water and sand and gravel upslope between the culvert headwalls and NH 107. Refer to the Supplemental Narrative and Representative Site Photos provided in Appendix L for additional information.

Note that this proposed riprap stabilization was presented at the April 15, 2020 Natural Resource Agency Coordination Meeting at which time, no concerns or objections were raised.

- Identify all known causes of erosion to the bank/shoreline in that location.

Normal water level fluctuations at the bridge on this dam-controlled pond is the main known cause of erosion within the project area.

- Identify information and, for minor and major projects, engineering standards used to determine the appropriateness of the proposed bank stabilization treatment or practice.

Appropriateness of the proposed bank stabilization practice was determined in accordance with NHDOT's Standard Specification requirements.

- Explain the design elements that have been incorporated to address erosion, by eliminating or minimizing the causes therefor.

To address erosion and stabilize the replaced bridge structure, rip-rap is proposed at the inlet and outlet of the bridge, and on roadway sideslopes directly adjacent to the bridge wingwalls. Furthermore, the slight increase in the bridge opening may yield a slight benefit to the cause of erosion within the project area by decreasing water velocities under high flows.

- For minor and major bank/shoreline stabilization projects or minimum impact bioengineering stream bank projects, identify the flood risk tolerance of the proposed treatment or practice using the appropriate technical guidance or national engineering handbook.

Because this is a state highway route, where failure of the bank stabilization under flood conditions would present a safety issue to the public.

A cross-section plan that shows:

- The difference in elevation between the lowest point of the bank/shoreline slope to be impacted by the construction and the highest point of the bank/shoreline slope to be impacted.
- The linear distance across the proposed project area as measured along a straight line between the highest and lowest point of the bank/shoreline slope to be impacted.
- The existing and proposed slope of the bank/shoreline.
- The normal high water line or ordinary high water mark, as applicable.

Hard-scape, rip-rap, or unnatural design plans that must include:

- Designation of minimum and maximum stone size.
- Gradation.
- Minimum rip-rap thickness.
- Type of bedding for stone.
- Cross-section and plan views of the proposed installation.
- A description of anticipated turbulence, flows, restricted space, or similar factors that would render vegetation and bioengineering stabilization methods physically impracticable.
- Engineering plans for rip-rap in excess of 100 linear feet along the bank or bed of a stream or river, including in-stream revetments, stamped by a professional engineer.
- If the project proposes rip-rap adjacent to great ponds or other surface waters where the state holds fee simple ownership to the bed, a stamped surveyed plan showing the location of the normal high water line and the footprint of the proposed project.

Design plans for a wall in non-tidal waters must include:

- Cross-section and plan views of the proposed installation and sufficient plans to clearly indicate the relationship of the project to fixed points of reference, abutting properties, and features of the natural shoreline.
- If the application is for a wall adjacent to a great pond or other surface water where the state holds fee simple ownership to the bed, a surveyed plan, stamped by a licensed land surveyor, showing the location of the normal high water line and the footprint of the proposed project.

SECTION 3 - DESIGN REQUIREMENTS FOR ALL BANK/ShORELINE STABILIZATION PROJECTS (Env-Wt 514.04)

In addition to meeting all applicable requirements in Env-Wt 300, bank/shoreline stabilization must be designed to:

- Incorporate stormwater diversion and retention to minimize erosion.
- Retain natural vegetation to the maximum extent possible.
- If space and soil conditions allow, cut back unstable banks to a flatter slope and then plant with native, non-invasive trees, shrubs, and groundcover.
- Avoid and minimize impacts to adjacent properties and infrastructure.
- Avoid and minimize impacts to water quality.
- Avoid and minimize impacts to priority resource areas, avian nesting areas, fish spawning locations, and other wildlife habitat to meet the requirements of Env-Wt 514.02.
- Incorporate naturalized and semi-natural design techniques where practicable in accordance with [Guidelines for Naturalized River Channel Design and Bank Stabilization](#) dated February 2007, R. Schiff, J.G. MacBroom, and J. Armstrong Bonin.
- For bioengineering projects, be in accordance with [NEH 654, Technical Supplement 141, Streambank Soil Bioengineering](#), dated August 2007, USDA NRCS.
- For stream restoration projects, be in accordance with [NEH 654, Stream Restoration Design](#), dated August, 2007, USDA NRCS.

SECTION 4 - CONSTRUCTION REQUIREMENTS FOR ALL BANK/ShORELINE STABILIZATION PROJECTS (Env-Wt 514.05)

In addition to all applicable construction standards specified in Env-Wt 300, the following apply to all bank/ shoreline stabilization projects:

- Materials used to emulate a natural channel bottom must:
 - Be consistent with materials identified in the reference reach, and
 - Not include any angular rip-rap or gravel unless specifically identified on the approved plan.
- Bank restoration must be constructed, landscaped, and monitored in a manner that will create a healthy riparian or lacustrine shoreline system.
- Bank/shoreline stabilization areas must:
 - (1) Have at least 75% successful establishment of vegetation after two growing seasons, or
 - (2) Be replanted and re-established until a functional lacustrine, wetland, or riparian system has been reestablished in accordance with the approved plans.
- Unless otherwise approved, construction must be performed during low flow or dry conditions.
- Where there is documented occurrence of a cold water fishery or protected species or habitat, unless a waiver of this condition is issued in writing by the department in consultation with the New Hampshire Fish and Game Department, work must occur:
 - During low-flow or dry conditions during the growing season, and
 - Prior to October 1.

- Work authorized must be carried out in accordance with Env-Wt 307 such that there are no discharges in or to spawning or nursery areas during spawning seasons.
- Work authorized must be carried out in accordance with Env-Wt 307 such that controls are in place to protect water quality and appropriate turbidity controls such that no turbidity escape the immediate dredge area and must remain until suspended particles have settled and water at the work site has returned to normal clarity.
- Within 60 days of completion of construction, the applicant must submit a post-construction report that:
 - Has been prepared by a professional engineer, certified wetland scientist, or qualified professional, as applicable, and
 - Contains a narrative, exhibits, and photographs, as necessary to report the status of the project area and restored jurisdictional area.

SECTION 5 - ON-GOING REQUIREMENTS FOR ALL BANK/SHORELINE STABILIZATION PROJECTS (Env-Wt 514.06)

The owner must monitor the project and take corrective measures if the area is inadequately stabilized or restored by:

- (a) Replacing fallen or displaced materials without a permit, where no machinery in the channel is required,
- (b) Identifying corrective actions and follow-up plans in accordance with Env-Wt 307, and
- (c) Filing appropriate application and plans where work exceeds (a), above.

SECTION 6 - BANK STABILIZATION CONSTRUCTION PROJECT CLASSIFICATION (Env-Wt 514.07)

Refer to Env-Wt 514.07 for project classification.

Appendix F – NHB DataCheck Report

CONFIDENTIAL – NH Dept. of Environmental Services review

Memo



NH NATURAL HERITAGE BUREAU
NHB DATACHECK RESULTS LETTER

To: Nicole Martin, VHB, Inc.
2 Bedford Farms Drive
Suite 200
Bedford, NH 03110

From: Amy Lamb, NH Natural Heritage Bureau
Date: 5/29/2020 (valid for one year from this date)

Re: Review by NH Natural Heritage Bureau
NHB File ID: NHB20-1449 Town: Deerfield Location: Tax Maps: NH 107 Right-of-Way
Description: The New Hampshire Department of Transportation (NHDOT) proposes to replace Bridge No. 137/116 that carries NH 107 over Freeses Pond in Deerfield, NH. This bridge has been on NHDOT's Red List since 2010 and is in "serious" condition.

cc: Kim Tuttle

As requested, I have searched our database for records of rare species and exemplary natural communities, with the following results.

Comments: Please contact the NH Fish & Game Department.

Vertebrate species	State ¹	Federal	Notes
Blanding's Turtle (<i>Emydoidea blandingii</i>)	E	--	Contact the NH Fish & Game Dept (see below).

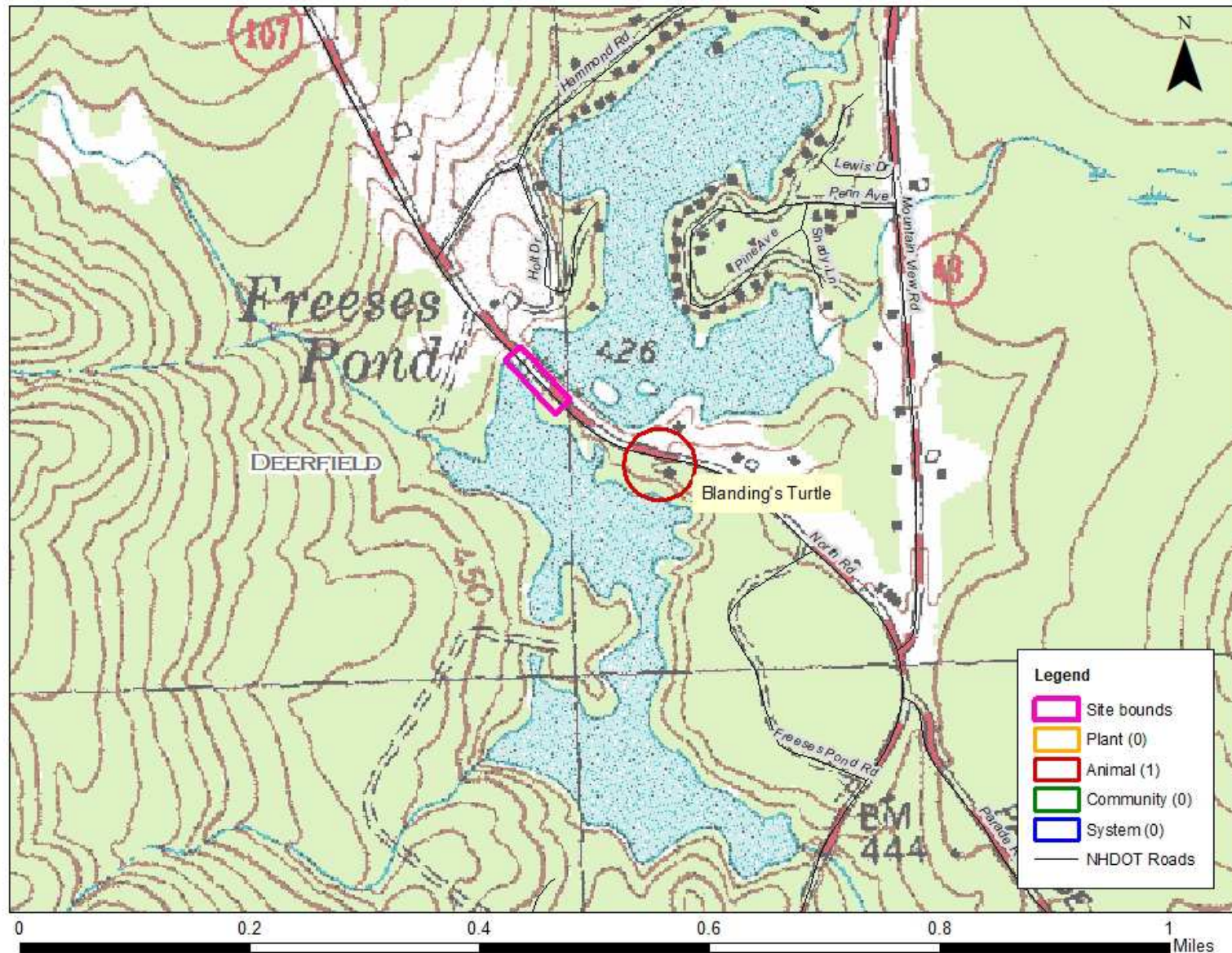
¹Codes: "E" = Endangered, "T" = Threatened, "SC" = Special Concern, "--" = an exemplary natural community, or a rare species tracked by NH Natural Heritage that has not yet been added to the official state list. An asterisk (*) indicates that the most recent report for that occurrence was more than 20 years ago.

Contact for all animal reviews: Kim Tuttle, NH F&G, (603) 271-6544.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

CONFIDENTIAL – NH Dept. of Environmental Services review

NHB20-1449



Appendix G – NHB and NHF&G Correspondence

From: Tuttle, Kim
To: [Walker, Peter](#)
Subject: RE: [External] RE: Deerfield 24477, NHB020-1449 Project Review
Date: Friday, August 28, 2020 2:55:25 PM

Hi Pete,

The NHFG Nongame Program is satisfied that if the commitments described below in my earlier 8/28/2020 email are taken, potential impacts to the state endangered Blanding's turtle will be minimized for the replacement of the corrugated metal culvert that carries NH 107 over Freeses Pond in Deerfield with a 10-foot rise by 14-foot span precast concrete box culvert.

Thanks,

Kim Tuttle
Wildlife Biologist
NH Fish and Game
11 Hazen Drive
Concord, NH 03301
603-271-6544

From: Walker, Peter <PWalker@VHB.com>
Sent: Friday, August 28, 2020 2:46 PM
To: Tuttle, Kim <Kim.Tuttle@wildlife.nh.gov>
Cc: Laurin, Marc <Marc.Laurin@dot.nh.gov>
Subject: RE: [External] RE: Deerfield 24477, NHB020-1449 Project Review

EXTERNAL: Do not open attachments or click on links unless you recognize and trust the sender.

Hi Kim –

The replacement structure is a four-sided box culvert. We'll bury the bottom by about 18 inches and place salvaged streambed material in its bottom to simulate a natural bed substrate. You are right, material would eventually deposit naturally, but our intent is to backfill with native material.

OHW is around 426.5 and invert is 420, so about 6.5 ft is typical water depth. Due to the dam, it does not fluctuate significantly and would consider this the year round water depth.

Let us know if you have any other questions, or if you have any other recommendations?

Peter J. Walker
Principal, Environmental Services

P 603.391.3942
www.vhb.com

From: Tuttle, Kim <Kim.Tuttle@wildlife.nh.gov>
Sent: Friday, August 28, 2020 9:56 AM
To: Walker, Peter <PWalker@VHB.com>
Subject: [External] RE: Deerfield 24477, NHB020-1449 Project Review

Hello Pete,

What do you mean by a "... buried invert to simulate a natural bottom to mimic the existing benthic habitat and address environmental concerns."? We assume that it will naturally backfill with sediment as it appears that it is backwatered at all times by the Freeses Pond Dam. Do you have an idea of the usual summertime depth of water in the culvert?

Thank you for committing to using wildlife friendly erosion control matting and distributing the turtle poster to construction personnel. Please inform them of the potential to encounter protected turtles from April through November at this site. Female Blanding's and spotted turtles will lay eggs in mineral soils with good sun exposure during turtle nesting season from the end of May until the beginning of July and may lay eggs on the road shoulders and in staging areas. Most newly hatched turtles will emerge from their nests from August through October. If any are found, please attempt to take photographs and send to us for documentation. The following note should be prominently added to the plans along with a photo of Blanding's and spotted turtle that you may copy from the flyer:

IF ADULT SPOTTED OR BLANDING'S TURTLES ARE FOUND LAYING EGGS OR HATCHLNGS ARE FOUND IN A WORK AREA, PLEASE CONTACT MELISSA DOPERALSKI (603-479-1129 cell) or JOSH MEGYESY (cell 978-578-0802) FOR FURTHER INSTRUCTIONS.

Thanks,

Kim Tuttle
Wildlife Biologist
NH Fish and Game
11 Hazen Drive
Concord, NH 03301
603-271-6544

From: Walker, Peter <PWalker@VHB.com>
Sent: Thursday, August 20, 2020 4:05 PM
To: Tuttle, Kim <Kim.Tuttle@wildlife.nh.gov>
Cc: Henderson, Carol <Carol.Henderson@wildlife.nh.gov>; Scott, David <David.Scott@dot.nh.gov>; Laurin, Marc <Marc.Laurin@dot.nh.gov>; Whitmore, Julie <JWhitmore@vhb.com>; Martin, Nicole <nmartin@vhb.com>
Subject: Deerfield 24477, NHB020-1449 Project Review

EXTERNAL: Do not open attachments or click on links unless you recognize and trust the

sender.

Hi Kim –

Please see the attached letter regarding the proposed replacement of the corrugated metal culvert that carries NH 107 over Freeses Pond in Deerfield. Blanding's turtle has been observed in the area, so we are seeking your review of the project. Please let us know if you have any concerns or recommendations.

Pete

Peter J. Walker

Principal, Environmental Services



2 Bedford Farms Drive
Suite 200
Bedford, NH 03110-6532
P 603.391.3942 | M 603.303.1038 | F 603.518.7495
pwalker@vhb.com

Engineers | Scientists | Planners | Designers
www.vhb.com

[VHB Viewpoints](#)

Explore trends and critical issues with our thought leaders.

This communication and any attachments to this are confidential and intended only for the recipient(s). Any other use, dissemination, copying, or disclosure of this communication is strictly prohibited. If you have received this communication in error, please notify us and destroy it immediately. Vanasse Hangen Brustlin, Inc. is not responsible for any undetectable alteration, virus, transmission error, conversion, media degradation, software error, or interference with this transmission or attachments to this transmission.
Vanasse Hangen Brustlin, Inc. | info@vhb.com



SEEKING REPORTS OF RARE TURTLES

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



Blanding's turtle (state endangered)

- Large, dark/black domed shell with lighter speckles
- Distinct yellow throat/chin
- Aquatic but often moves on land



Wood turtle (special concern)

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



Eastern box turtle (state endangered)

- Small terrestrial turtle with highly domed shell
- Irregular yellow or orange markings over brown/black base



Spotted turtle (state threatened)

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

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

Appendix H – USF&WS IPaC Report & Correspondence



United States Department of the Interior



FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
<http://www.fws.gov/newengland>

In Reply Refer To:

August 19, 2020

Consultation Code: 05E1NE00-2019-SLI-0881

Event Code: 05E1NE00-2020-E-11372

Project Name: Deerfield, 24477 - NH Route 107 Culvert (NH DOT Bridge # 137/116) Spanning Freeses Pond

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

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

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

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

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

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

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

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

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

Attachment(s):

- Official Species List
-

Official Species List

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

This species list is provided by:

New England Ecological Services Field Office

70 Commercial Street, Suite 300

Concord, NH 03301-5094

(603) 223-2541

Project Summary

Consultation Code: 05E1NE00-2019-SLI-0881

Event Code: 05E1NE00-2020-E-11372

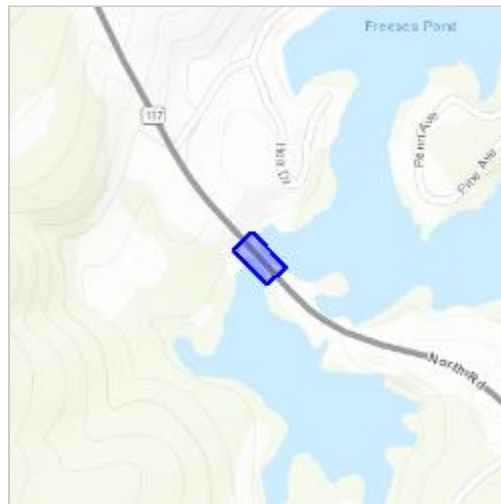
Project Name: Deerfield, 24477 - NH Route 107 Culvert (NHDOT Bridge # 137/116)
Spanning Freeses Pond

Project Type: TRANSPORTATION

Project Description: This project involves replacing the existing 14-foot span corrugated metal culvert (NHDOT Bridge #137/116), which carries NH Route 107 (North Road) over Freeses Pond in Deerfield, NH, with a precast concrete box culvert of similar span. Approximately 350 linear feet of associated roadway work will occur.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/43.15672338464917N71.23873831585368W>



Counties: Rockingham, NH

Endangered Species Act Species

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

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

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

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

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

Mammals

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

Flowering Plants

NAME	STATUS
Small Whorled Pogonia <i>Isotria medeoloides</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1890	Threatened

Critical habitats

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



United States Department of the Interior



FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
<http://www.fws.gov/newengland>

IPaC Record Locator: 358-22657662

August 19, 2020

Subject: Consistency letter for the 'Deerfield, 24477 - NH Route 107 Culvert (NHDOT Bridge # 137/116) Spanning Freeses Pond' project (TAILS 05E1NE00-2019-R-0881) under the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat.

To whom it may concern:

The U.S. Fish and Wildlife Service (Service) has received your request to verify that the **Deerfield, 24477 - NH Route 107 Culvert (NHDOT Bridge # 137/116) Spanning Freeses Pond** (Proposed Action) may rely on the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 *et seq.*).

Based on the information you provided (Project Description shown below), you have determined that the Proposed Action will have no effect on the endangered Indiana bat (*Myotis sodalis*) or the threatened Northern long-eared bat (*Myotis septentrionalis*). If the Proposed Action is not modified, **no consultation is required for these two species.**

For Proposed Actions that include bridge/structure removal, replacement, and/or maintenance activities: If your initial bridge/structure assessments failed to detect Indiana bats, but you later detect bats during construction, please submit the Post Assessment Discovery of Bats at Bridge/Structure Form (User Guide Appendix E) to this Service Office. In these instances, potential incidental take of Indiana bats may be exempted provided that the take is reported to the Service.

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

may also be required. In either of these circumstances, please advise the lead Federal action agency accordingly.

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

- Small Whorled Pogonia, *Isoetia medeoloides* (Threatened)
-

Project Description

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

Name

Deerfield, 24477 - NH Route 107 Culvert (NHDOT Bridge # 137/116) Spanning Freeses Pond

Description

This project involves replacing the existing 14-foot span corrugated metal culvert (NHDOT Bridge #137/116), which carries NH Route 107 (North Road) over Freeses Pond in Deerfield, NH, with a precast concrete box culvert of similar span. Approximately 350 linear feet of associated roadway work will occur.

Determination Key Result

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

Qualification Interview

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

[1] See [Indiana bat species profile](#)

Automatically answered

No

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

[1] See [Northern long-eared bat species profile](#)

Automatically answered

Yes

3. Which Federal Agency is the lead for the action?

A) Federal Highway Administration (FHWA)

4. Are *all* project activities limited to non-construction^[1] activities only? (examples of non-construction activities include: bridge/abandoned structure assessments, surveys, planning and technical studies, property inspections, and property sales)

[1] Construction refers to activities involving ground disturbance, percussive noise, and/or lighting.

No

5. Does the project include *any* activities that are **greater than** 300 feet from existing road/rail surfaces^[1]?

[1] Road surface is defined as the actively used [e.g. motorized vehicles] driving surface and shoulders [may be pavement, gravel, etc.] and rail surface is defined as the edge of the actively used rail ballast.

No

6. Does the project include *any* activities **within** 0.5 miles of a known Indiana bat and/or NLEB hibernaculum^[1]?

[1] For the purpose of this consultation, a hibernaculum is a site, most often a cave or mine, where bats hibernate during the winter (see suitable habitat), but could also include bridges and structures if bats are found to be hibernating there during the winter.

No

7. Is the project located **within** a karst area?

No

8. Is there *any* suitable^[1] summer habitat for Indiana Bat or NLEB **within** the project action area^[2]? (includes any trees suitable for maternity, roosting, foraging, or travelling habitat)

[1] See the Service's [summer survey guidance](#) for our current definitions of suitable habitat.

[2] The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR Section 402.02). Further clarification is provided by the [national consultation FAQs](#).

Yes

9. Will the project remove *any* suitable summer habitat^[1] and/or remove/trim any existing trees **within** suitable summer habitat?

[1] See the Service's [summer survey guidance](#) for our current definitions of suitable habitat.

No

10. Does the project include activities **within documented NLEB habitat**^{[1][2]}?

[1] Documented roosting or foraging habitat – for the purposes of this consultation, we are considering documented habitat as that where Indiana bats and/or NLEB have actually been captured and tracked using (1) radio telemetry to roosts; (2) radio telemetry triangulation/triangulation to estimate foraging areas; or (3) foraging areas with repeated use documented using acoustics. Documented roosting habitat is also considered as suitable summer habitat within 0.25 miles of documented roosts.)

[2] For the purposes of this key, we are considering documented corridors as that where Indiana bats and/or NLEB have actually been captured and tracked to using (1) radio telemetry; or (2) treed corridors located directly between documented roosting and foraging habitat.

No

11. Does the project include wetland or stream protection activities associated with compensatory wetland mitigation?
No
 12. Does the project include slash pile burning?
No
 13. Does the project include *any* bridge removal, replacement, and/or maintenance activities (e.g., any bridge repair, retrofit, maintenance, and/or rehabilitation work)?
No
 14. Does the project include the removal, replacement, and/or maintenance of *any* structure other than a bridge? (e.g., rest areas, offices, sheds, outbuildings, barns, parking garages, etc.)
No
 15. Will the project involve the use of **temporary** lighting *during* the active season?
No
 16. Will the project install new or replace existing **permanent** lighting?
No
 17. Does the project include percussives or other activities (**not including tree removal/trimming or bridge/structure work**) that will increase noise levels above existing traffic/background levels?
No
 18. Are *all* project activities limited to actions that DO NOT cause any stressors to the bat species, including as described in the BA/BO (i.e., habitat removal, tree removal/trimming, bridge and/or structure activities, temporary or permanent lighting, or use of percussives)?

Examples: lining roadways, unlighted signage , rail road crossing signals, signal lighting, and minor road repair such as asphalt fill of potholes, etc.
Yes
 19. Will the project raise the road profile **above the tree canopy**?
No
-

20. Are *all* project activities consistent with a No Effect determination in this key?

Automatically answered

Yes, all project activities are limited to actions that DO NOT cause any stressors to the bat species as described in the BA/BO

Determination Key Description: FHWA, FRA, FTA Programmatic Consultation For Transportation Projects Affecting NLEB Or Indiana Bat

This key was last updated in IPaC on December 02, 2019. Keys are subject to periodic revision.

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

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



THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION



Victoria F. Sheehan
Commissioner

William Cass, P.E.
Assistant Commissioner

August 25, 2020

Susi von Oettingen
US Fish and Wildlife Service
70 Commercial Street, Suite 300
Concord, NH 03301

Re: Deerfield 24477 –NH Route 107 over Freeses Pond, NHDOT Bridge #137/116

Dear Ms. Von Oettingen:

The NH Department of Transportation (NHDOT) is planning to replace the corrugated metal culvert that carries NH Route 107 over Freeses Pond in Deerfield, New Hampshire (NHDOT Bridge #137/116). See **Figure 1** and the attached project plans.

An IPaC Species List generated for the project on August 19, 2020 (Consultation Code 05E1NE00-2019-SLI-0881), identified northern long-eared bat (*Myotis septentrionalis*) and small whorled pogonia (*Isotria medeoloides*) as potentially occurring within or near the project area. A no effect consistency letter was generated for the northern long-eared bat on August 19, 2020. This letter provides additional information related to potential impacts to small whorled pogonia, and seeks your concurrence that the project would have no effect on this species.

NHDOT Bridge #137/116 is in “serious” condition and has been on the NHDOT Red List since 2010. An inspection of the bridge in July identified that immediate repair was needed. NH Route 107 was temporarily closed, and the Department performed repairs within the roadbed by spanning the culvert with steel beams and steel plates, which were buried and paved over so that the road can remain open to traffic until the permanent replacement can be constructed.

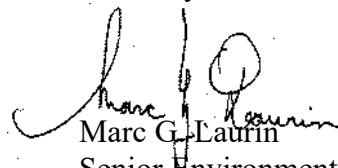
The proposed permanent bridge project involves replacing the existing 8-foot tall by 12-foot wide corrugated metal pipe arch culvert with a 10-foot rise by 14-foot span precast concrete box culvert. The existing culvert has stone masonry headwalls which will be replaced with precast wingwalls and headwall-mounted bridge rail. Existing overhead utilities will be relocated prior to construction to allow for construction equipment to replace the culvert. The roadway will be closed for the duration of the project, no temporary access points are required as the project is accessible from the roadway. This project is expected to be advertised in early 2022, with construction beginning in mid-spring, road closure in July and August, and construction completion in September 2022.

Regarding potential impacts to small whorled pogonia, this species was not observed during natural resource field work performed by VHB, Inc., our environmental consultant. Additionally, the habitat type impacted by the project differs substantially from the mature forest habitat that typically supports small whorled pogonia (see attached photographs).

The impacted area consists of highly disturbed roadside slope of placed fill material, including steep and erodible slopes with a mix of bare sand/gravelly soil and herbaceous vegetation, including white meadowsweet (*Spiraea alba*), species of aster (*Symphyotrichum* spp.), shrub/sapling red maple (*Acer rubrum*), species of goldenrod (*Solidago* spp.), and steeplebush (*Spiraea tomentosa*). The adjacent wetlands include emergent habitats including reed canary grass (*Phalaris arundinacea*), cinnamon fern (*Osmundastrum cinnamomeum*), soft rush (*Juncus effusus*), leatherleaf (*Chamaedaphne calyculata*), maleberry (*Lyonia ligustrina*), and silky dogwood (*Cornus amomum*).

Please let us know if you concur that there is no suitable habitat for small whorled pogonia at our project site, and therefore no effect to this species, or if you have any concerns or conservation recommendations. As always, don't hesitate to call or email if you have any questions or require any further information.

Sincerely,



Marc G. Laurin
Senior Environmental Manager
Room 109 – Tel (603) 271-4044
E-mail – marc.laurin@dot.nh.gov

Attachments:

- Figure 1 - USGS Locus Map
- Project Plans
- Representative Site Photographs

cc: Jamie Sikora, FHWA
David Scott, NHDOT
Peter Walker, VHB

s:\environment\projects\deerfield\24477\fish and wildlife service\20200825lt - vonoettingen.docx

From: "vonOettingen, Susi" <susi_vonoettingen@fws.gov>
Date: August 26, 2020 at 7:48:03 AM EDT
To: "Laurin, Marc" <Marc.Laurin@dot.nh.gov>
Cc: Jamie Sikora <jamie.sikora@dot.gov>, "Scott, David" <David.Scott@dot.nh.gov>, "Walker, Peter" <PWalker@VHB.com>, "Tremblay, Jason" <Jason.Tremblay@dot.nh.gov>
Subject: Re: [EXTERNAL] Deerfield, 24477 - Small Whorled Pogonia

Hi Marc,

I agree, no habitat, no effect.

Susi

Susi von Oettingen
Endangered Species Biologist
New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301
(603) 227-6418 (direct line)

** Temporary Detail as Listing Coordinator for the North Atlantic- Appalachian Region until August 21st. If this relates to Section 7 consultation, please forward your email to: newengland@fws.gov or David Simmons: David_Simmons@fws.gov**

From: Laurin, Marc <Marc.Laurin@dot.nh.gov>
Sent: Tuesday, August 25, 2020 8:55 AM
To: vonOettingen, Susi <susi_vonoettingen@fws.gov>
Cc: Jamie Sikora <jamie.sikora@dot.gov>; Scott, David <David.Scott@dot.nh.gov>; Peter Walker <pwalker@vhb.com>; Tremblay, Jason <Jason.Tremblay@dot.nh.gov>
Subject: [EXTERNAL] Deerfield, 24477 - Small Whorled Pogonia

Susi,

The IPaC Species List identified that Small Whorled Pogonia may be present in the vicinity of the project area. VHB, our environmental consultant, did not identified any pogonia within the project area and determined that suitable habitat for the species is not present. Attached is a description and photographs of the area.

Your concurrence that USFWS has no concerns with the project in regards to the species is requested.

Thanks,

Marc

Appendix I – NHDHR Section 106 Consultation

Please mail 2 copies of the completed form and required material to:

Cultural Resources Staff
Bureau of Environment
NH Department of Transportation
7 Hazen Drive
Concord, NH 03302

RECEIVED
DEC 13 2019

DHR Use Only	
R&C #	11358
Log In Date	12/13/19
Response Date	___/___/___
Sent Date	___/___/___

**Request for Project Review by the
New Hampshire Division of Historical Resources
for **Transportation** Projects**

RECEIVED
DEC 23 2019
VHB

- This is a new submittal.
- This is additional information relating to DHR Review and Compliance (R&C)#:

GENERAL PROJECT INFORMATION

DOT Project Name & Number **Deerfield 24477 [X-A002(898)]**

Brief Descriptive Project Title **Bridge #137/116, NH 107 Over Freeses Pond**

Project Location **NH 107 over Freeses Pond**

City/Town **Deerfield**

Lead Federal Agency and Contact (if applicable) **Federal Highway Administration, Jamie Sikora**
(Agency providing funds, licenses, or permits)

Permit Type and Permit or Job Reference # **Wetland Permit (not yet submitted)**

DOT Environmental Manager (if applicable) **Marc Laurin**

PROJECT SPONSOR INFORMATION

Project Sponsor Name **Marc Laurin, NH Department of Transportation**

Mailing Address **PO Box 483** Phone Number **603-271-4044**

City **Concord** State **NH** Zip **03302-0483** Email **marc.laurin@dot.nh.gov**

CONTACT PERSON TO RECEIVE RESPONSE

Name/Company **Julie Whitmore, VHB**

Mailing Address **2 Bedford Farms Drive, Suite 200** Phone Number **603-391-3900**

City **Bedford** State **NH** Zip **03110-6532** Email **jwhitmore@vhb.com**

This form is updated periodically. Please download the current form at <http://www.nh.gov/nhdhr/review>. Please refer to the Request for Project Review for Transportation Projects Instructions for direction on completing this form. Submit 2 copies of this project review form for each project for which review is requested. Include 1 self-addressed stamped envelope to expedite review response. Project submissions will not be accepted via facsimile or e-mail. This form is required. Review request form must be complete for review to begin. Incomplete forms will be sent back to the applicant without comment. Please be aware that this form may only initiate consultation. For some projects, additional information will be needed to complete the Section 106 review. All items and supporting documentation submitted with a review request, including photographs and publications, will be retained by the DOT and the DHR as part of its review records. Items to be kept confidential should be clearly identified. For questions regarding the DHR review process and the DHR's role in it, please visit our website at: <http://www.nh.gov/nhdhr/review> or contact the R&C Specialist at Marika.Labash@dncr.nh.gov or 603.271.3558.

Project Boundaries and Description

- Attach the Project Mapping **indicating the proposed area of potential effects (APE)**. (See RPR for Transportation Projects Instructions and R&C FAQs for guidance. Note that the APE is subject to approval by lead federal agency and SHPO.)
- Attach a detailed narrative description of the proposed project.
- Attach current engineering plans with tax parcel, landscape, and building references, and areas of proposed excavation, if available.
- Attach photos of the project area/APE with mapped photo key (overview of project location and area adjacent to project location, and specific areas of proposed impacts and disturbances.) (Blank photo logs are available on the DHR website. Informative photo captions can be used in place of a photo log.)
- A DHR records search must be conducted to identify properties within or adjacent to the APE. Provide records search results via EMMIT or in **Table 1**. (Blank table forms are available on the DHR website.) EMMIT or in-house records search conducted on **02/07/2019**.*

*The DHR recommends that all survey/National Register nomination forms and their Determination of Eligibility (green) sheets are downloaded or copied for your use in project development.

Architecture

Are there any buildings, structures (bridges, walls, culverts, etc.) objects, districts or landscapes within the APE? Yes No

If no, skip to Archaeology section. If yes, submit all of the following information:

- Attach completed **Table 2**.
- Photographs of **each** resource or streetscape located within the APE. Add to the mapped photo key and photo log noted above. (Digital photographs are accepted. All photographs must be clear, crisp and focused.)
- Copies of National Register boundary (listed or eligible) mapping, and add National Register boundaries for listed and eligible properties to project mapping/engineering plans (if applicable).

Archaeology

Does the proposed undertaking involve ground-disturbing activity? Yes No
If yes, submit all of the following information:

- Description of current and previous land use and disturbances.
- Available information concerning known or suspected archaeological resources within the project area (such as cellar holes, wells, foundations, dams, etc.)

Please note that for many projects an architectural and/or archaeological survey or other additional information may be needed to complete the Section 106 process.

AGENCY COMMENT

This Space for DOT and Division of Historical Resources Use Only

Sent to DHR; Authorized DOT Signature: Sheela Charles Date: 12/11/19

- Insufficient information to initiate review.**
- Additional information is needed in order to complete review.

Comments: NO ARCHAEOLOGICAL CONCERNS.

Above-ground inventory of Parcel 208-58 may be warranted depending on impacts.

If plans change or resources are discovered in the course of this project, you must contact the Division of Historical Resources as required by federal law and regulation.

Authorized DHR Signature: Aanna Black Date: Dec 19, 2019

Section 106 Programmatic Agreement – Cultural Resources Review Effect Finding

Appendix B Certification – Activities with Minimal Potential to Cause Effects

Date Reviewed: 9/2/2020
(Desktop or Field Review Date)

This Project uses only State funding; however project activities listed below comply with the PA.

Project Name: Deerfield –Bridge #137/116,
NH 107 over Freeses Pond

State Number: 24477

FHWA Number: X-A002(898)

Environmental Contact: Marc Laurin
Email Address: Marc.Laurin@dot.nh.gov

DOT Project Manager: David Scott, NHDOT

Project Description: The project involves the replacement of bridge #137/116 (constructed in 1973) which carries NH Route 107 over Freeses Pond in Deerfield, NH, as well as approximately 350 linear feet of associated roadway work.

Please select the applicable activity/activities:

Highway and Roadway Improvements	
<input type="checkbox"/>	1. Modernization and general highway maintenance <u>that may require additional highway right-of-way or easement</u> , including: Choose an item. Choose an item.
<input type="checkbox"/>	2. Installation of rumble strips or rumble stripes
<input type="checkbox"/>	3. Installation or replacement of pole-mounted signs
<input type="checkbox"/>	4. Guardrail replacement, provided any extension does not connect to a bridge older than 50 years old (unless it does already), and there is no change in access associated with the extension
Bridge and Culvert Improvements	
<input type="checkbox"/>	5. Culvert replacement (excluding stone box culverts), when the culvert is less than 60" in diameter and excavation for replacement is limited to previously disturbed areas
<input type="checkbox"/>	6. Bridge deck preservation and replacement, as long as no character defining features are impacted
<input checked="" type="checkbox"/>	7. Non-historic bridge and culvert maintenance, renovation, or total replacement, <u>that may require minor additional right-of-way or easement</u> , including: a. replacement or maintenance of non-historic bridges Choose an item.
<input type="checkbox"/>	8. Historic bridge maintenance activities within the limits of existing right-of-way, including: Choose an item. Choose an item.
<input type="checkbox"/>	9. Stream and/or slope stabilization and restoration activities (including removal of debris or sediment obstructing the natural waterway, or any non-invasive action to restore natural conditions)
Bicycle and Pedestrian Improvements	
<input type="checkbox"/>	10. Construction of pedestrian walkways, sidewalks, sidewalk tip-downs, small passenger shelters, and alterations to facilities or vehicles in order to make them accessible for elderly and handicapped persons
<input type="checkbox"/>	11. Installation of bicycle racks
<input type="checkbox"/>	12. Recreational trail construction
<input type="checkbox"/>	13. Recreational trail maintenance when done on existing alignment
<input type="checkbox"/>	14. Construction of bicycle lanes and shared use paths and facilities within the existing right-of-way
Railroad Improvements	
<input type="checkbox"/>	15. Modernization, maintenance, and safety improvements of railroad facilities within the existing railroad or highway right-of-way, <u>provided no historic railroad features are impacted</u> , including, but not limited to:

Section 106 Programmatic Agreement – Cultural Resources Review Effect Finding

Appendix B Certification – Activities with Minimal Potential to Cause Effects

	Choose an item. Choose an item.
<input type="checkbox"/>	16. In-kind replacement of modern railroad features (i.e. those features that are less than 50 years old)
<input type="checkbox"/>	17. Modernization/modification of railroad/roadway crossings provided that all work is undertaken within the limits of the roadway structure (edge of roadway fill to edge of roadway fill) and no associated character defining features are impacted
Other Improvements	
<input type="checkbox"/>	18. Installation of Intelligent Transportation Systems
<input type="checkbox"/>	19. Acquisition or renewal of scenic, conservation, habitat, or other land preservation easements where no construction will occur
<input type="checkbox"/>	20. Rehabilitation or replacement of existing storm drains.
<input type="checkbox"/>	21. Maintenance of stormwater treatment features and related infrastructure

Please describe how this project is applicable under Appendix B of the Programmatic Agreement.

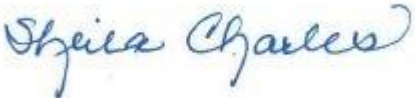
The propose project applies under the category of non-historic bridge and culvert replacement since the bridge was constructed in 1973. The existing bridge is in serious condition with a rating of 3 and was added to the NHDOT Red List on May 7, 2010. The project proposes to replace the existing structure with a precast concrete box culvert with precast wingwalls and headwall-mounted guardrail. The bridge will also have a 24-foot rail-to-rail width and a 2% crown. It is anticipated that approximately 4,660 square feet of permanent right-of-way impacts will be needed for the installation.

Please submit this Certification Form along with the Transportation RPR, including photographs, USGS maps, design plans and as-built plans, if available, for review. Note: The RPR can be waived for in-house projects, please consult Cultural Resources Program Staff.

Coordination Efforts:

Has an RPR been submitted to NHDOT for this project?	Yes	NHDHR R&C # assigned?	<u>11358</u>
Please identify public outreach effort contacts; method of outreach and date:	<u>Public Information Meeting, Selectmen’s Meeting June 17, 2019</u>		

Finding: (To be filled out by NHDOT Cultural Resources Staff)

<input checked="" type="checkbox"/>	No Potential to Cause Effects	<input type="checkbox"/>	No Historic Properties Affected
This finding serves as the Section 106 Memorandum of Effect. No further coordination is necessary.			
<input type="checkbox"/>	This project does not comply with Appendix B. Review will continue under Stipulation VII of the Programmatic Agreement. Please contact NHDOT Cultural Resources Staff to determine next steps.		
NHDOT comments:		9/18/2020	
			
_____ NHDOT Cultural Resources Staff		_____ Date	

Section 106 Programmatic Agreement – Cultural Resources Review Effect Finding

Appendix B Certification – Activities with Minimal Potential to Cause Effects

Coordination of the Section 106 process should begin as early as possible in the planning phase of the project (undertaking) so as not to cause a delay.

Project sponsors should not predetermine a Section 106 finding under the assumption a project is limited to the activities listed in Appendix B until this form is signed by the NHDOT Bureau of Environment Cultural Resources Program staff.

Every project shall be coordinated with, and reviewed by the NHDOT-BOE Cultural Resources Program in accordance with the *Programmatic Agreement Among the Federal Highway Administration, the New Hampshire State Historic Preservation Office, the Army Corps of Engineers, New England District, the Advisory Council on Historic Preservation, and the New Hampshire Department of Transportation Regarding the Federal Aid Highway Program in New Hampshire*. In accordance with the Advisory Council's regulations, we will continue to consult, as appropriate, as this project proceeds.

NHDOT and the State Historic Preservation Office may use provisions of the Programmatic Agreement to address the applicable requirements of NH RSA 227-C:9 in the location, identification, evaluation and management of historic resources, for projects funded by State funds.

If any portion of the project is not entirely limited to any one or a combination of the activities specified in Appendix B (with, or without the inclusion of any activities listed in Appendix A), please continue discussions with NHDOT Cultural Resources staff.

This No Potential to Cause Effect or No Historic Properties Affected project determination is your Section 106 finding, as defined in the Programmatic Agreement.

Should project plans change, please inform the NHDOT Cultural Resources staff in accordance with Stipulation VII of the Programmatic Agreement.

Appendix J – ACOE Appendix B



**US Army Corps
of Engineers**®
New England District

**New Hampshire General Permits (GPs)
Appendix B - Corps Secondary Impacts Checklist
(for inland wetland/waterway fill projects in New Hampshire)**

1. Attach any explanations to this checklist. Lack of information could delay a Corps permit determination.
2. All references to “work” include all work associated with the project construction and operation. Work includes filling, clearing, flooding, draining, excavation, dozing, stumping, etc.
3. See GC 5, regarding single and complete projects.
4. Contact the Corps at (978) 318-8832 with any questions.

1. Impaired Waters	Yes	No
1.1 Will any work occur within 1 mile upstream in the watershed of an impaired water? See http://des.nh.gov/organization/divisions/water/wmb/section401/impaired_waters.htm to determine if there is an impaired water in the vicinity of your work area.*		X ¹
2. Wetlands	Yes	No
2.1 Are there are streams, brooks, rivers, ponds, or lakes within 200 feet of any proposed work?	X	
2.2 Are there proposed impacts to SAS, special wetlands. Applicants may obtain information from the NH Department of Resources and Economic Development Natural Heritage Bureau (NHB) DataCheck Tool for information about resources located on the property at https://www2.des.state.nh.us/nhb_datacheck/ . The book Natural Community Systems of New Hampshire also contains specific information about the natural communities found in NH.		X
2.3 If wetland crossings are proposed, are they adequately designed to maintain hydrology, sediment transport & wildlife passage?	X ²	
2.4 Would the project remove part or all of a riparian buffer? (Riparian buffers are lands adjacent to streams where vegetation is strongly influenced by the presence of water. They are often thin lines of vegetation containing native grasses, flowers, shrubs and/or trees that line the stream banks. They are also called vegetated buffer zones.)	X ³	
2.5 The overall project site is more than 40 acres?		X
2.6 What is the area of the previously filled wetlands?	N/A	
2.7 What is the area of the proposed fill in wetlands?	2,311 SF	
2.8 What is the % of previously and proposed fill in wetlands to the overall project site?	N/A	
3. Wildlife	Yes	No
3.1 Has the NHB & USFWS determined that there are known occurrences of rare species, exemplary natural communities, Federal and State threatened and endangered species and habitat, in the vicinity of the proposed project? (All projects require an NHB ID number & a USFWS IPAC determination.) NHB DataCheck Tool: https://www2.des.state.nh.us/nhb_datacheck/ USFWS IPAC website: https://ecos.fws.gov/ipac/location/index	X ⁴	

3.2 Would work occur in any area identified as either “Highest Ranked Habitat in N.H.” or “Highest Ranked Habitat in Ecological Region”? (These areas are colored magenta and green, respectively, on NH Fish and Game’s map, “2010 Highest Ranked Wildlife Habitat by Ecological Condition.”) Map information can be found at: <ul style="list-style-type: none"> • PDF: www.wildlife.state.nh.us/Wildlife/Wildlife_Plan/highest_ranking_habitat.htm. • Data Mapper: www.granit.unh.edu. • GIS: www.granit.unh.edu/data/downloadfreedata/category/databycategory.html. 		X
3.3 Would the project impact more than 20 acres of an undeveloped land block (upland, wetland/waterway) on the entire project site and/or on an adjoining property(s)?		X
3.4 Does the project propose more than a 10-lot residential subdivision, or a commercial or industrial development?		X
3.5 Are stream crossings designed in accordance with the GC 21?	N/A	
4. Flooding/Floodplain Values	Yes	No
4.1 Is the proposed project within the 100-year floodplain of an adjacent river or stream?	X ⁵	
4.2 If 4.1 is yes, will compensatory flood storage be provided if the project results in a loss of flood storage?	N/A	
5. Historic/Archaeological Resources		
For a minimum, minor or major impact project - a copy of the Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) with your DES file number shall be sent to the NH Division of Historical Resources as required on Page 11 GC 8(d) of the GP document**	X ⁶	

*Although this checklist utilizes state information, its submittal to the Corps is a Federal requirement.

** If your project is not within Federal jurisdiction, coordination with NH DHR is not required under Federal law.

Supporting Notes:

1. According to the resource provided, the project site is not located within a one-mile buffer of an impaired waterway. However, the NHDES Wetlands Permit Planning Tool (WPPT) shows that the project site is located in proximity to the ¼-mile buffer of the dissolved oxygen saturation-impaired Lamprey River (located upstream and downstream of Freeses Pond, outside the project area). However, given the limited nature of the proposed activities and the implementation of soil erosion and sediment control measures throughout construction, no negative water quality impacts are anticipated.
2. The project bridge (No. #137/116) that carries NH Route 107 over Freeses Pond is a wetland crossing that has been designed to adequately maintain (and improve) hydrology, sediment transport, and wildlife passage. The exist culvert has an 8.3-foot rise and 12.8-foot span, while the replaced culvert will have a 10-foot rise and a 14-foot span. This increased opening will not negatively impact the floodplain, as there will be no reduction to the ordinary high-water level at the bridge, rather it will result in lowered flood elevations in the upstream portion of the pond, northeast of NH 107. However, an abbreviated HEC-RAS modeling indicates that tailwater effects from the dam are the primary factor influencing water elevations at the bridge. Therefore, increasing the hydraulic opening of the replaced bridge will provide hydraulic gains, with a culvert headwater elevation reduction of approximately 1.7 feet at the bridge during the 50- and 100-year flood events. The use of erosion controls throughout construction and the presence of rip-rap at the culvert inlet and outlet will maintain the sediment transport without increasing it. The rip-rap will present scour and excessive siltation of the project area and downstream waters. Finally, the bottom of the replaced culvert will be covered in sediment to mimic a natural stream bed and not inhibit the passage of aquatic wildlife.
3. The proposed project will only require the removal of a four-stemmed red maple located adjacent to the upstream end of the bridge. The stems of this tree have the following diameters at breast height (DBHs): 2.2, 2.4, 3.6, and 4.0. No additional tree clearing is proposed.
4. The project was reviewed for the presence of rare plant, animal, or natural communities within the vicinity of the proposed project using the Natural Heritage Bureau (NHB) online DataCheck tool. The report provided by NHB dated May 29, 2020 identified the following record in the vicinity of the project area: Blanding's turtle (*Emydoidea blandingii*). Coordination with the NH Fish & Game Department determined that no impacts to this species are anticipated to result from the proposed project. The project was also reviewed for the presence of federally listed or proposed threatened, or endangered species, designated critical habitat, or other natural communities using the US Fish and Wildlife Services' (USFWS) Information for Planning and Consultation (IPaC) system. Results dated August 19, 2020 indicated the presence of the northern long-eared bat (NLEB, *Myotis septentrionalis*) and small whorled pogonia (*Isotria medeoloides*) within the vicinity of the project area. A consistency letter regarding the NLEB was generated in IPaC for the project, which found that the proposed project will likely have no effect on the endangered Indiana bat (*Myotis sodalis*) or the NLEB. Additionally, based on coordination with the NHB and USFWS, the habitat within the vicinity of the culvert is unlikely to support small whorled pogonia, and, therefore, the project is not anticipated to negatively affect this species.
5. The project culvert (Bridge #137/116) is located within the FEMA-mapped 100-year floodplain of Freeses Pond. However, the proposed project activities will not influence the hydraulic capacity of the pond (aside from the slight increase in the culvert size which will not result in a reduction to the ordinary high-water level at the bridge, as discussed in #2 above).
6. A Request for Project Review (RPR) for the proposed project was submitted on December 13, 2019, to the Division of Historical Resources (NHDHR) by VHB on behalf of the New Hampshire Department of Transportation (NHDOT). The FHWA is serving as the Lead Federal Agency for this consultation. Upon review of the RPR, NHDHR found no archaeological concerns related to the bridge replacement. NHDOT subsequently determined that the project is consistent with Appendix B of the NHDOT/NHDHR/FHWA Section 106 Programmatic Agreement, and approved the project with a finding of "No Historic Properties Affected."

Appendix K – Wetland Function-Value Evaluation Form

Wetland Function-Value Evaluation Form

Total area of wetland N/A Human made? Impounded Is wetland part of a wildlife corridor? Yes or a "habitat island"? No

Adjacent land use Roadway, Rural Residential Distance to nearest roadway or other development N/A - Bridge Crossing

Dominant wetland systems present PUB3Hh (Freeses Pond) Contiguous undeveloped buffer zone present No

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Northwest portion

How many tributaries contribute to the wetland? Many Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Freeses Pond













Latitude 43.156745 Longitude -71.238761

Prepared by: KPW Date 07/28/2020

Wetland Impact:
Type Bed and Bank Area 2,852 SF

Evaluation based on:
Office Field

Corps manual wetland delineation completed? Y N

Function/Value	Suitability Y / N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge	Y	1, 3, 4, 7, 9, 11, 15	X	The impounded pond provides opportunity for recharge. A mapped aquifer underlies Freeses Pond.
 Floodflow Alteration	Y	1, 2, 5, 6, 7, 9, 10, 11, 13, 15, 16, 17	X	The pond water level is dam controlled and associated with the Lamprey River.
 Fish and Shellfish Habitat	Y	1, 3, 4, 5, 6, 7, 8, 14, 16, 17	X	The dam may serve as a barrier to fish and lessen this function but the spillway may support fish passage.
 Sediment/Toxicant Retention	Y	1, 2, 3, 4, 5, 6, 8, 10, 11, 12	X	Slow moving/ponded water allows for settling of suspended sediment/pollutants.
 Nutrient Removal	Y	2, 3, 4, 5, 6, 7, 10, 13, 14	X	Long water retention time and slow speed in the pond are controlled by the dam.
 Production Export	Y	1, 2, 4, 6, 10		Some suitability for wildlife food sources.
 Sediment/Shoreline Stabilization	N	N/A		Specific to wetlands located along the banks of waterbodies.
 Wildlife Habitat	Y	1, 3, 5, 6, 7, 8, 12, 17, 19, 20, 21	X	Pond provides food, surrounding shelter, etc. for wildlife.
 Recreation	Y	2, 5, 6, 7, 9, 12	X	The pond is used for fishing and paddling.
 Educational/Scientific Value	N	N/A		
 Uniqueness/Heritage	Y	3, 14, 16, 17, 19, 21, 23		Some suitability due to the Freeses Pond Dam.
 Visual Quality/Aesthetics	N	N/A		
ES Endangered Species Habitat	Y	1, 2		The NHHB report (NHB20-1449, dated 5/29/20) identified a single record of Blanding's Turtle nearby, a state listed endangered species.
Other				

Notes: * Refer to backup list of numbered considerations.

Appendix L – Representative Site Photos

Representative Site Photographs
Bridge No. 137/116 Replacement, Deerfield, NH



Photo 1: View southwest of NH 107 within the proposed project area, taken from the upstream side (6/27/19).



Photo 2: View northeast of NH 107 within the proposed project area, taken from the upstream side (6/27/19).

Representative Site Photographs
Bridge No. 137/116 Replacement, Deerfield, NH



Photo 3: View northwest of the upstream side of the corrugated steel pipe arch bridge (6/27/19).



Photo 4: View east of upstream Freeses Pond, taken from the bridge (6/27/19).

Representative Site Photographs
Bridge No. 137/116 Replacement, Deerfield, NH



Photo 5: View southeast of the upstream Freeses Pond bank (1/18/19).



Photo 6: View southeast along the upstream Freeses Pond bank further southeast of the bridge (1/18/19).

Representative Site Photographs
Bridge No. 137/116 Replacement, Deerfield, NH



Photo 7: View southwest along the upstream Freeses Pond Bank, with the bridge located in the background out of frame to the right (1/18/19).



Photo 8: View southwest of the delineated floodplain wetland adjacent to the upstream portion of Freeses Pond (1/18/19).

Representative Site Photographs
Bridge No. 137/116 Replacement, Deerfield, NH



Photo 9: View northwest of the downstream Freeses Pond bank (1/18/19).



Photo 10: View east of the downstream side of the corrugated steel pipe arch bridge (1/18/19).

Representative Site Photographs
Bridge No. 137/116 Replacement, Deerfield, NH



Photo 11: View northeast of the downstream side of the corrugated steel pipe arch bridge (6/27/19).



Photo 12: View south of downstream Freeses Pond, taken from the bridge (6/27/19).

Representative Site Photographs
Bridge No. 137/116 Replacement, Deerfield, NH



Photo 13: View south of the Freeses Pond Dam that impounds the Lamprey River (6/27/19).



Photo 14: View north of the Freeses Pond Dam spillway (6/27/19).

Appendix M – Construction Sequence Narrative

Construction Sequence

1. Install detour signs and traffic control items.
2. Close roadway and install cofferdams and erosion control measures, including a clean water bypass required for storm conveyance and aquatic organism passage.
3. Dewater inside cofferdams and remove existing structure.
4. Install proposed culvert and bedding material. Install infill and finalize culvert installation.
5. Install rip-rap aprons.
6. Remove cofferdams and bypass.
7. Finalize roadway construction, including subbase material, pavement, and guardrail.
8. Remove detour signs and traffic control items.
9. Final striping to be completed under localized closures.
10. Remove erosion control measures and open to traffic.
11. All work shall be constructed in accordance with the NHDOT publication *Best Management Practices for Roadside Invasive Plants* (2008) and *Best Management Practices for the Control of Invasive and Noxious Plant Species* (2018) to avoid the potential introduction of invasive species into the project area.

Appendix N – USCG Correspondence

U.S. Department of
Homeland Security

United States
Coast Guard



Commander
First Coast Guard District

One South Street
Battery Park Building
New York, NY 10004-1466
Staff Symbol: dpb
Phone: (212) 514-4338
Email: Dale.K.Lewis2@uscg.mil

16211
August 31, 2020

NH Department of Transportation
Attn: Mr. Marc Laurin
Senior Environmental Manager
7 Hazen Drive
Concord, NH 03302-0483
Marc.Laurin@dot.nh.gov

via e-mail

Re: NV-1070: NH Route 107 Bridge over Freeses Pond

Dear Mr. Laurin,

This is in response to your letter dated August 28, 2020 and corresponding information requesting whether the Coast Guard will require a permit for the referenced bridge project. We have examined the proposed project area with regard to its status as a navigable water of the United States for purposes of Coast Guard bridge jurisdiction.

We concur with your determination. Our examination indicates that there is no sufficient factual support for concluding that Freeses Pond, Deerfield, NH, at the project location, has current or historic navigation occurring on this water of the United States. Since this is the case, a Coast Guard bridge permit or exemption will not be required for the referenced bridge project.

If you have any questions feel free to contact this office at the number above.

Sincerely,

J. L. Rousseau
Supervisory Bridge Management Specialist Acting
U.S. Coast Guard
By direction

E-Copy: 1) USCG Sector Northern New England, Waterways
2) USACE, New England Division, Navigation Section

Appendix O – Turbidity Sampling and Control Plan for In-Water Work

Turbidity in Freeses Pond during all in-water work shall be monitored and controlled as follows:

1. General Condition:

- a. All proposed monitoring for turbidity for all in-water work. Work shall be completed by a qualified Contractor approved by NHDOT and shall be conducted in accordance with the specifications below.
- b. Turbidity monitoring measurements at all specified stations. In addition, visual monitoring (with photo documentation) for visible turbidity at all stations shall be conducted as described in sections below.
- c. With NHDOT approval, turbidity measurements using turbidity meters or probes do not need to be made if the Contractor believes that it would be unsafe for personnel to collect in stream measurements due to conditions such as high water velocity and/or ice conditions.

2. Monitoring Stations and Monitoring Frequency: Markers (buoys or similar devices) shall be set up in the pond at the locations as described below:

- a. **Background (B):** A markers designating the background station will be located well outside of the mixing zone in an area not disturbed by the construction activity. The purpose of this stations is to provide baseline turbidity information. During in-water work that could potentially result in increased turbidity.
 - i. Turbidity measurements shall be taken;
 - 1) Prior to the commitment of in-water work
 - 2) Midday while in-water is being performed, and at the
 - 3) Conclusion of in-water work
 - ii. Turbidity measurements shall be taken hourly if there is visible turbidity at the sentry or mixing zone edge stations.
- b. **Sentry (S-Nx & S-Sx):** Markers designating the sentry station shall be placed approximately 100 feet north and south of the bridge. This visual inspection is intended to detect restrictions for aquatic passage / refuge within the mixing zone and possible exceedance or the turbidity standard at the mixing zone edge. During in-water work that could potentially result in increased in-water turbidity, monitoring for turbidity shall be conducted as follows:
 - i. Visual Monitoring shall be take place every hour
 - ii. Measurements shall be taken hourly if there is visible turbidity.
- c. **Mixing Zone Edge (MZ-Nx & MZ-Sx):** Markers shall be placed 50 feet from each shore and approximately 50 apart on a line 200 feet, north and south of the bridge. The purpose of these stations are to determine compliance with turbidity-related surface water quality standards and to identify the edge of the mixing zones. During in-water work that could potentially result in increased in-water turbidity, monitoring for turbidity shall be conducted as follows:
 - i. Visual Monitoring shall be take place every hour
 - ii. Measurements shall be taken hourly if there is visible turbidity.

3. Required Actions to Control Discharges:

- a. **Sentry (S-Nx & S-Sx):** If visible turbidity measures more than 30 NTUs across more than one third of the width of the mixing zone work shall stop until the

visible turbidity measures no more than 30 NTUs for less than one third of the width of the mixing zone

- b. **Mixing Zone Edge (MZ-Nx & MZ-Sx):** If visible turbidity measures more than 10 NTUs above background at the edge of the mixing zone, work shall immediately stop and shall not resume until turbidity drops below 10 NTUs above background at the edge of the mixing zone.
4. **Meter Monitoring Protocols:** Field measurements of turbidity using turbidity meters shall comply with the following:
- a. Monitoring frequency at each location shall comply with item 2 above.
 - b. Results for in stream measurements, calibration and QA/QC shall be recorded on field data sheets, as well as the date, time, location and the names of those conducting the monitoring.
 - c. Sampling Procedures for Hand-held Meters
 - 1) Rinse the sampling container three times with water from the waterbody.
 - 2) Submerge the sampling container a minimum of an arm's length upstream and allow the container to fill. Collect samples approximately one foot below the surface or at mid-depth (whichever is less) by placing a finger or thumb over the container opening, submersing the container to the appropriate depth, and then removing your finger or thumb from the container opening and allowing the container to fill.
 - 3) Do not collect any water immediately adjacent to legs or boots.
 - 4) Ensure that any introduced air bubbles are removed prior to analysis.
 - 5) Immediately cap the sample container, measure in the field using a turbidity meter and record results on the field data sheet.
 - d. Sampling Procedures Using Dataloggers (Optional):
 - i. Dataloggers can be used instead of hand-held meters to automatically collect the majority of near-continuous (i.e., every 15 minutes) turbidity measurements.
 - ii. Dataloggers shall be calibrated according to manufacturer's instructions, with results recorded on the field data sheet.
 - iii. On the same day that dataloggers are deployed as well as prior to and on the same day that dataloggers are retrieved, hand-held turbidity measurements shall be made instream next to the datalogger for comparison to datalogger results.
 - iv. Dataloggers shall be retrieved, data downloaded, recalibrated and redeployed at least once every 2 weeks.
 - v. If dataloggers are used, hand-held turbidity meter measurements shall also be taken at least twice per day as a back-up in case the datalogger malfunctions and/or the data (which is downloaded at least once every 2 weeks) is later found to be invalid.
 - e. Quality Control and Quality Assurance
 - 1) Turbidity meters shall have an accuracy of + 2% for readings below 100 NTUs and + 3% for readings above 100 NTUs, and a resolution of ± 0.1

NTU. Prior to monitoring, meter specifications shall be provided to NHDOT for approval.

- 2) Hand-held Meters shall be recalibrated daily with results recorded on the field data sheet.
- 3) Duplicate samples shall be taken for every 10th sample with results and identification of the duplicate sample clearly identified and recorded on the field data sheet. If the relative difference¹ between the duplicate measurement and the original measurement exceeds 10%, recalibrate the turbidity meter and re-measure turbidity.
- 4) Blank samples shall be taken every 10th sample and recorded on the field data sheet. Blank samples shall be taken by filling a sample container with deionized water and measuring the turbidity immediately following measurement of the 10th sample.

5. **Meter Monitoring Protocols:** Field measurements of turbidity using turbidity meters shall comply with the following:

- a. Monitoring frequency at each location shall comply with item 2 above.
- b. Results for in stream measurements, calibration and QA/QC shall be recorded on field data sheets, as well as the date, time, location and the names of those conducting the monitoring.
- c. Sampling Procedures for Hand-held Meters
 - 1) Rinse the sampling container three times with water from the waterbody.
 - 2) Submerge the sampling container a minimum of an arm's length upstream and allow the container to fill. Collect samples approximately one foot below the surface or at mid-depth (whichever is less) by placing a finger or thumb over the container opening, submersing the container to the appropriate depth, and then removing your finger or thumb from the container opening and allowing the container to fill.
 - 3) Do not collect any water immediately adjacent to legs or boots.
 - 4) Ensure that any introduced air bubbles are removed prior to analysis.
 - 5) Immediately cap the sample container, measure in the field using a turbidity meter and record results on the field data sheet.
- d. Sampling Procedures Using Dataloggers (Optional):
 - i. Dataloggers can be used instead of hand-held meters to automatically collect the majority of near-continuous (i.e., every 15 minutes) turbidity measurements.
 - ii. Dataloggers shall be calibrated according to manufacturer's instructions, with results recorded on the field data sheet.

¹ The relative percent difference (RPD) is equal to the following:

$$RPD = \frac{|x_1 - x_2|}{\frac{x_1 + x_2}{2}} \times 100\%$$

where x_1 is the original sample concentration and
 x_2 is the replicate sample concentration

- iii. On the same day that dataloggers are deployed as well as prior to and on the same day that dataloggers are retrieved, hand-held turbidity measurements shall be made instream next to the datalogger for comparison to datalogger results.
 - iv. Dataloggers shall be retrieved, data downloaded, recalibrated and redeployed at least once every 2 weeks.
 - v. If dataloggers are used, hand-held turbidity meter measurements shall also be taken at least twice per day as a back-up in case the datalogger malfunctions and/or the data (which is downloaded at least once every 2 weeks) is later found to be invalid.
- e. Quality Control and Quality Assurance
- 1) Turbidity meters shall have an accuracy of + 2% for readings below 100 NTUs and + 3% for readings above 100 NTUs, and a resolution of ± 0.1 NTU. Prior to monitoring, meter specifications shall be provided to NHDOT for approval.
 - 2) Hand-held Meters shall be recalibrated daily with results recorded on the field data sheet.
 - 3) Duplicate samples shall be taken for every 10th sample with results and identification of the duplicate sample clearly identified and recorded on the field data sheet. If the relative difference² between the duplicate measurement and the original measurement exceeds 10%, recalibrate the turbidity meter and re-measure turbidity.
 - 4) Blank samples shall be taken every 10th sample and recorded on the field data sheet. Blank samples shall be taken by filling a sample container with deionized water and measuring the turbidity immediately following measurement of the 10th sample.

6. **Visual Monitoring with Photo Documentation Protocols:** Visual Monitoring for turbidity and photo documentation shall comply with the following:
- a. Visual Monitoring results shall be recorded on field data sheets. Field Data sheets for Visual Monitoring shall include the names of those conducting the observations, the date, time, location and result (i.e., visual turbidity or no visual turbidity) of each observation, and the date/time when work was ordered to be stopped and the date/time when work was allowed to resume.
 - b. Photos of each station shall be taken during each observation in which there is visible turbidity. Each photo shall include the date, time and location.

$$RPD = \frac{|x_1 - x_2|}{\frac{x_1 + x_2}{2}} \times 100\%$$

²

2

The relative percent difference (RPD) is equal to the following:

where x_1 is the original sample concentration and
 x_2 is the replicate sample concentration

- c. Photos must be taken from a location and angle that will clearly show visible turbidity should it occur. Use of drones for this purpose is recommended. Prior to construction, the Contractor shall provide photos of each monitoring location to NHDOT for approval proving that the proposed method to photograph conditions in-stream will clearly show visible turbidity should it occur.

7. Documentation, Notification and Reporting:

- a. The Contractor shall maintain electronic copies of all field data sheets, datalogger data in MS Excel format (if dataloggers are used) and photos (with date, time and location) and submit them to NHDOT and/or NHDES within 48 hours of receiving a request.
 - b. Reports that include the results from the previous week, and shall be transmitted to NHDOT by Tuesday of the following week. The weekly reports shall include the following:
 - i. If turbidity data was not collected, an explanation as to why and when it wasn't collected with supporting information (i.e., gage information showing high flows, photos showing ice build-up, etc.)
 - ii. A summary of any data that was collected that did not meet the QA/QC requirements.
 - iii. Turbidity meter results including the date, time and location.
 - iv. The dates, times, locations and associated photos
 - v. The dates and times when work was stopped due to exceedances of any of the criteria above.
 - vi. The dates, times, associated photos at each location and turbidity meter results, when work was allowed to resume.
 - vii. If dataloggers are used and retrieved the previous week (see item 4.d), an MS Excel plot showing all datalogger results with NTUs on the y-axis and time/date on the x-axis.
8. **Notification:** NHDOT shall be notified immediately when turbidity results indicate that a exceedances have occurred and NHDES shall be notified **within 24 hours** when turbidity results indicate that exceedances outside the mixing zone have occurred.

Appendix P – Wetland Impact Plans

STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION

WETLAND IMPACT PLANS FEDERAL AID PROJECT

**FEDERAL AID PROJECT
X-A002(898)**

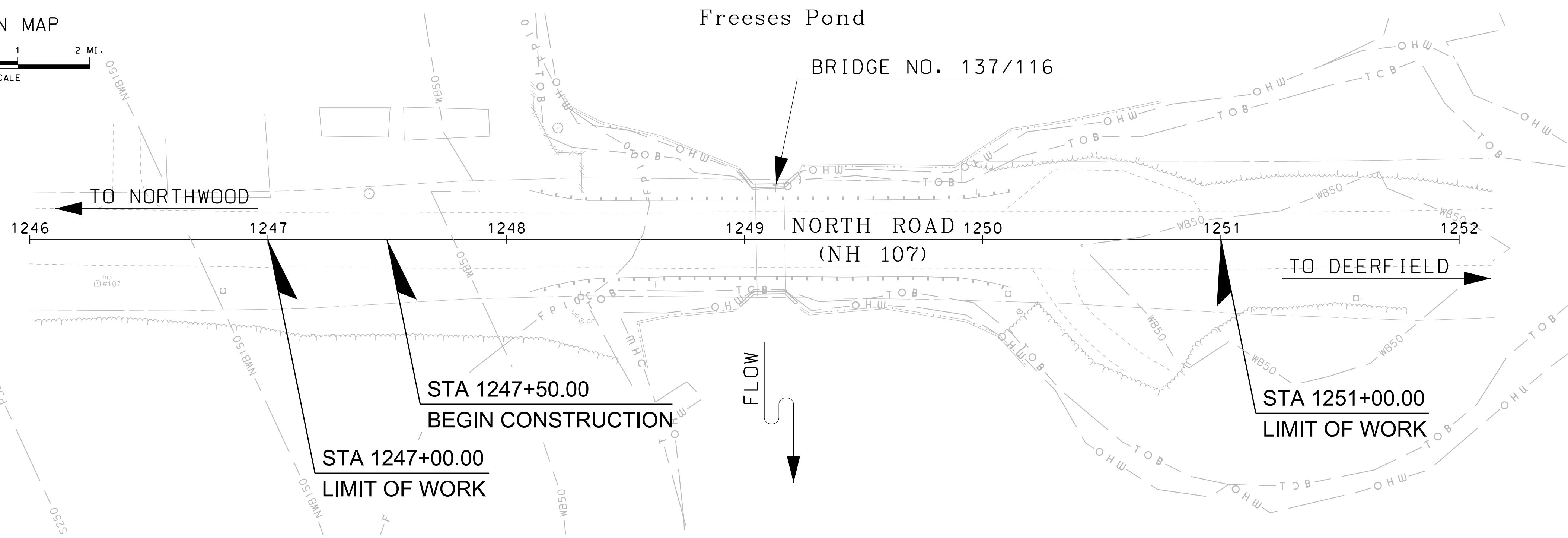
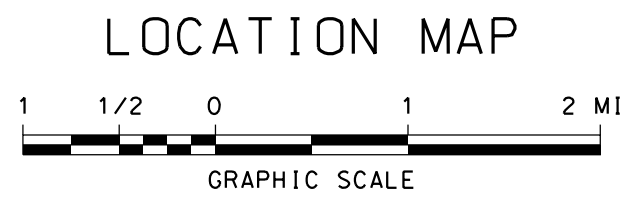
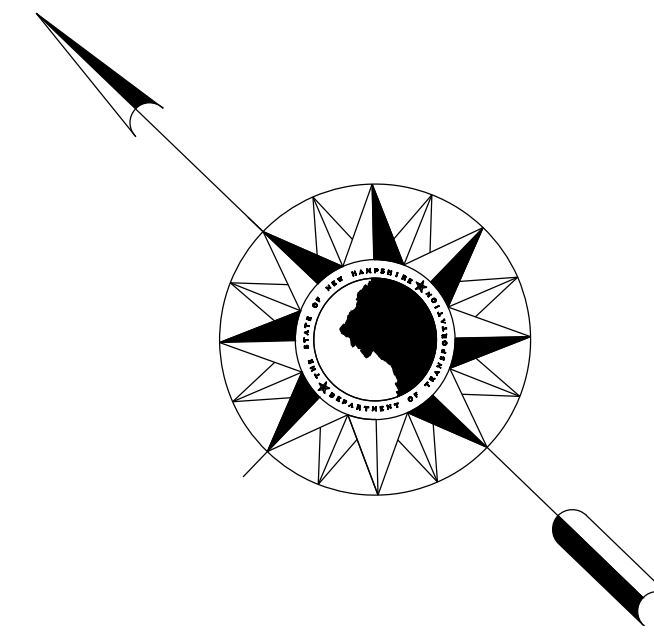
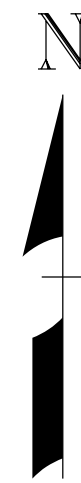
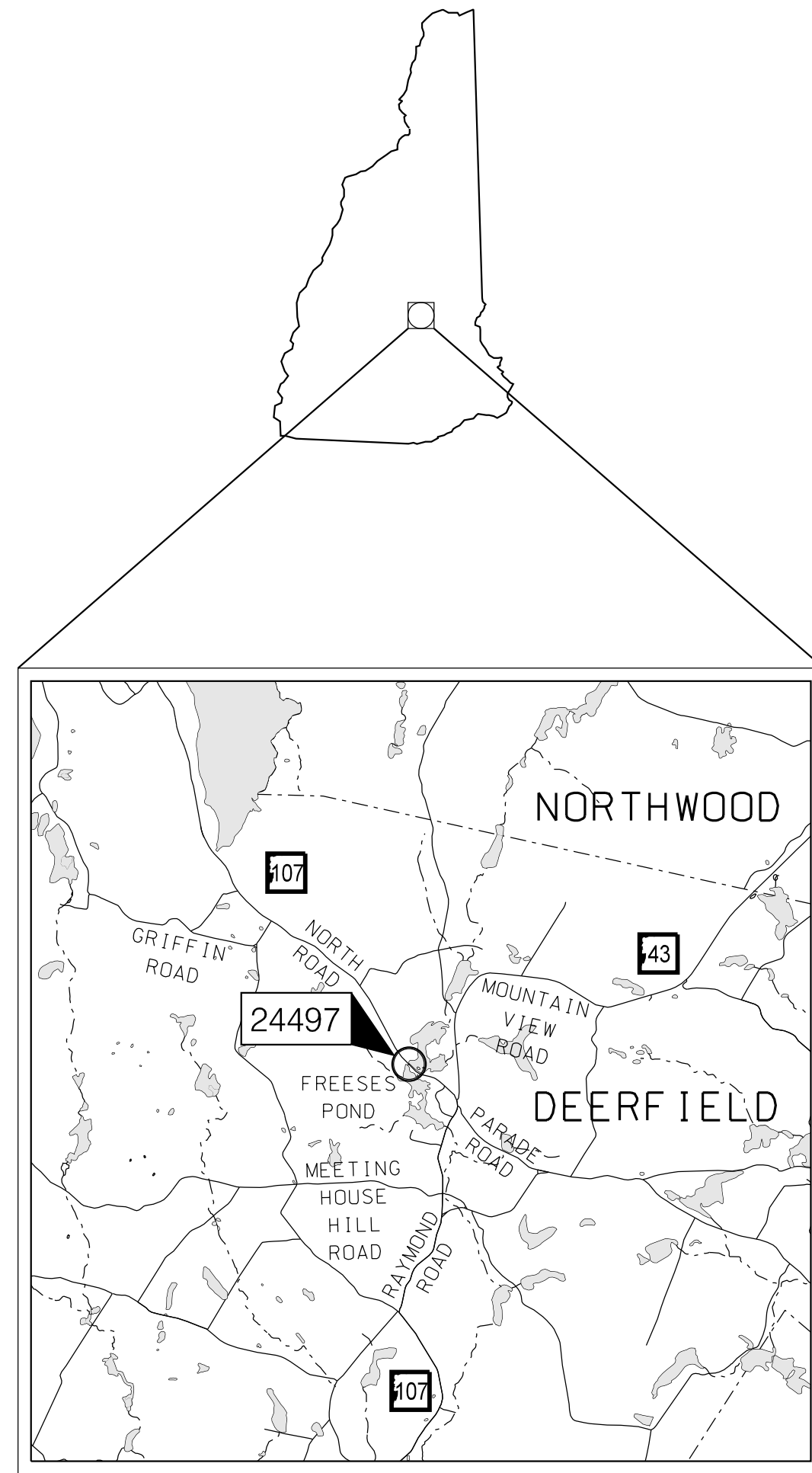
**N.H. PROJECT NO. 24477
NH107**

DESIGN DATA

NH 18	
AVERAGE DAILY TRAFFIC 20 ¹⁹	2700
AVERAGE DAILY TRAFFIC 20 ³⁹	XXXX
PERCENT OF TRUCKS	X.X
DESIGN SPEED	35 mph
LENGTH OF PROJECT (NH 18)	535 ft

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2-3	STANDARD SYMBOLS (2 SHEETS)
4	EROSION CONTROL LEGEND AND STRATEGY
5	EXISTING CONDITIONS PLAN
6	WETLAND IMPACT PLAN
7	EROSION CONTROL PLAN
8	BRIDGE PLAN AND ELEVATION
9	CULVERT DETAILS



PRELIMINARY PLANS
3/31/2021
ISSUED FOR PERMITTING

NHDOT THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION

RECOMMENDED FOR APPROVAL:

DIRECTOR OF PROJECT DEVELOPMENT DATE

APPROVED:

ASSISTANT COMMISSIONER AND CHIEF ENGINEER DATE

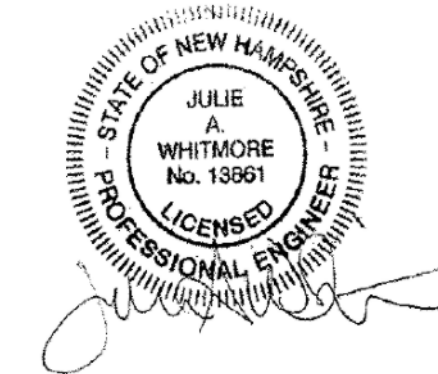
U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED:

DIVISION ADMINISTRATOR DATE

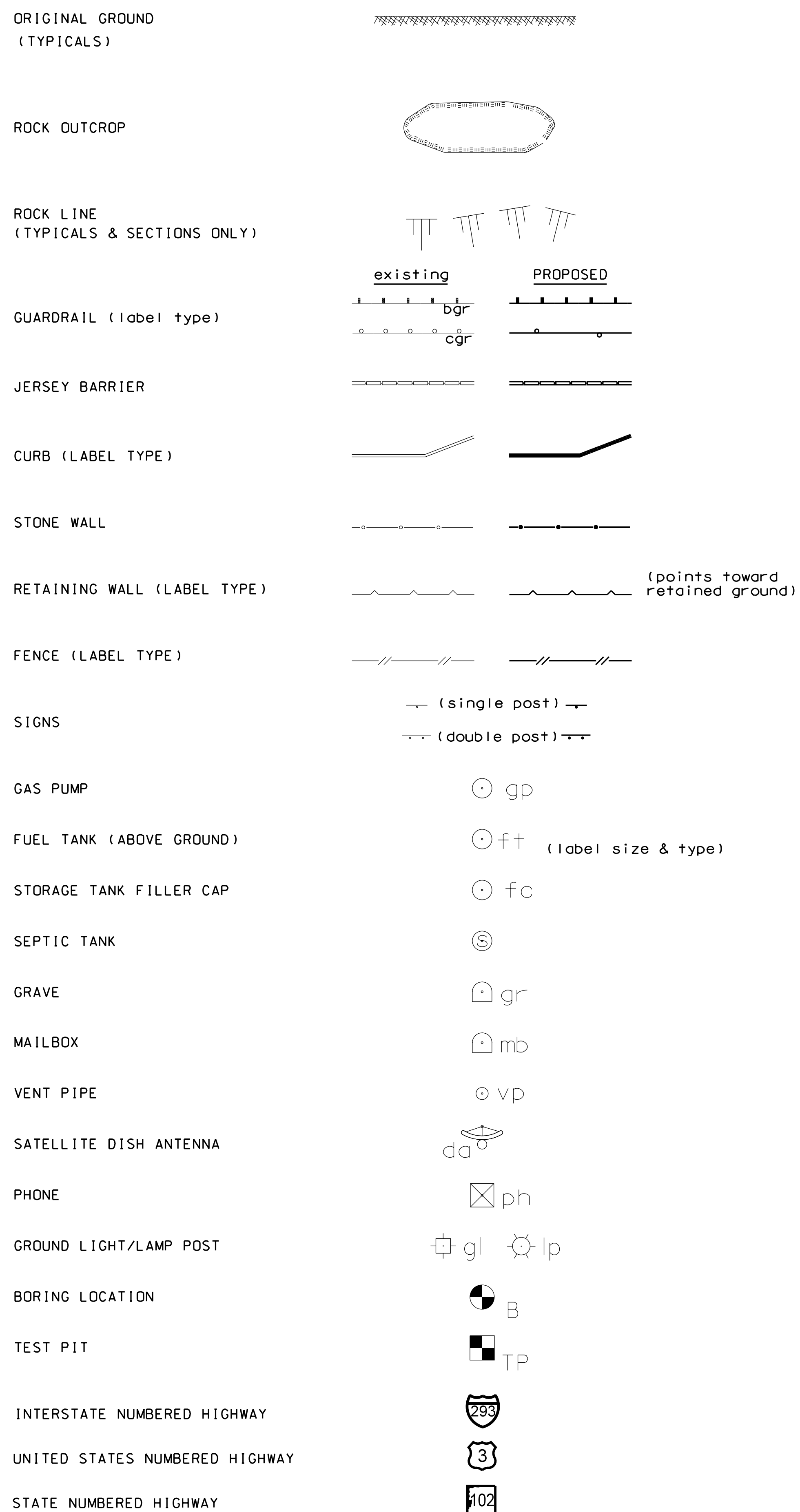
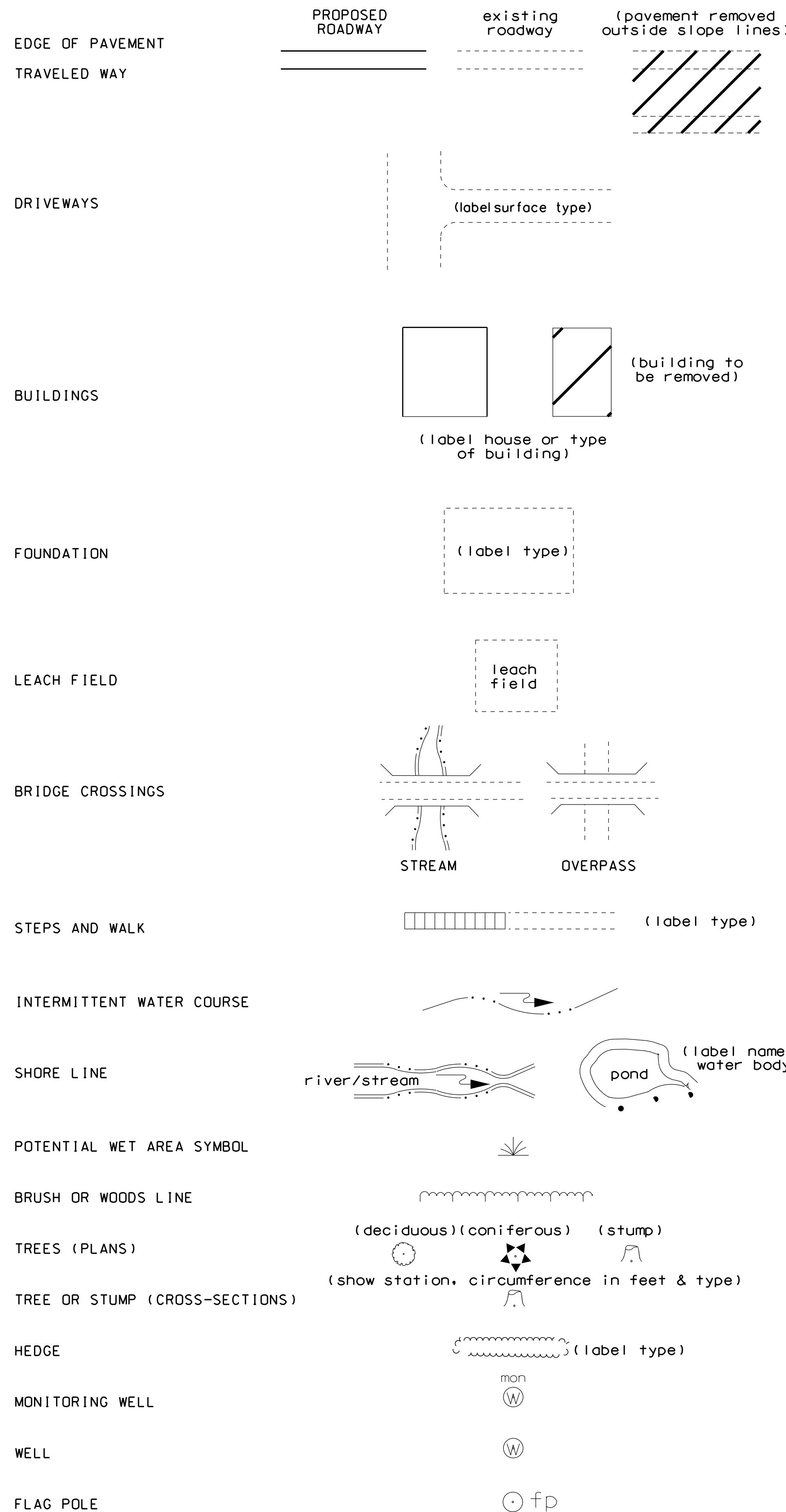
FEDERAL PROJECT NO.	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
X-A002(898)	24477	1	9

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COUNTY OF ROCKINGHAM
SCALE: 1" = 60'

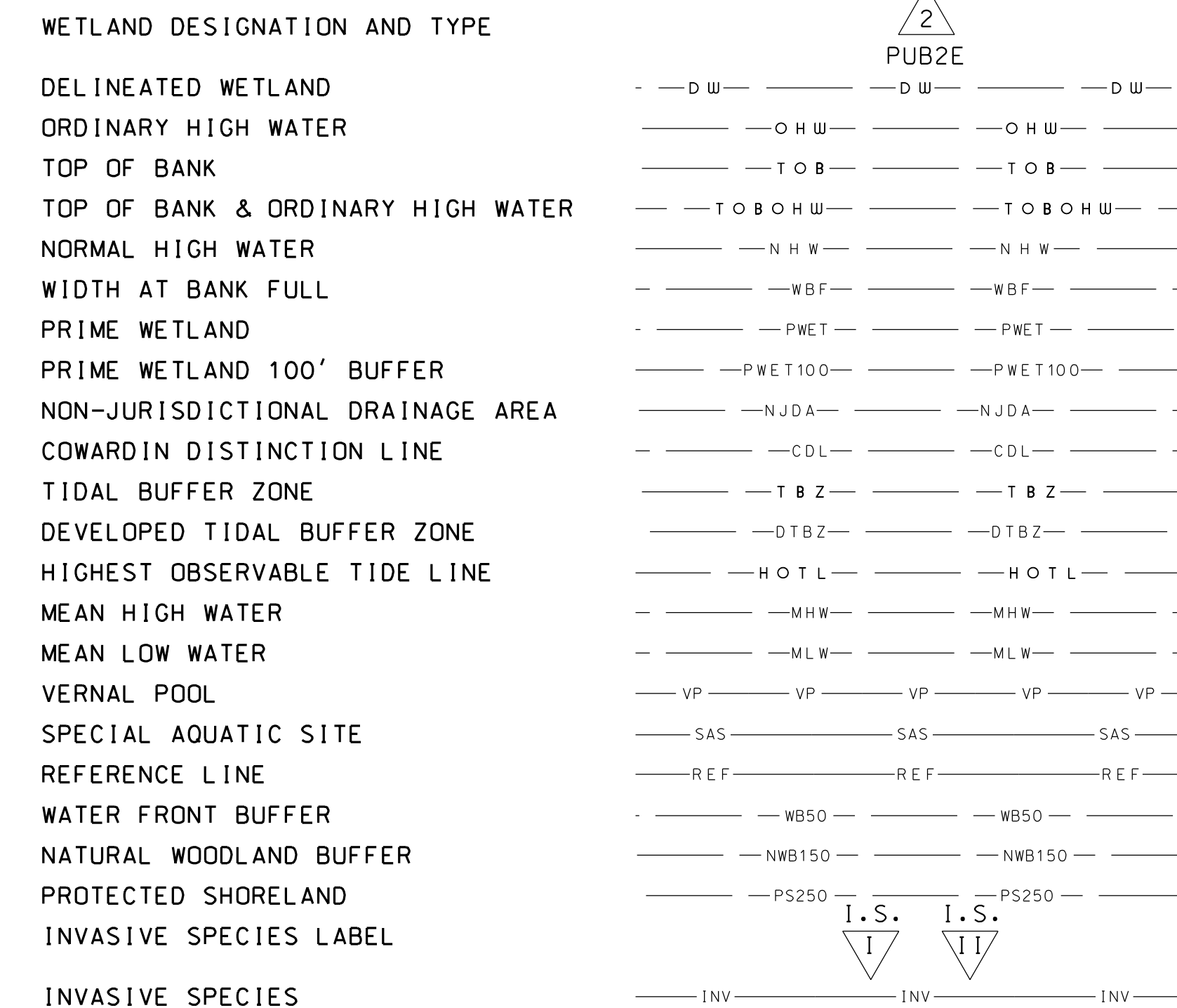


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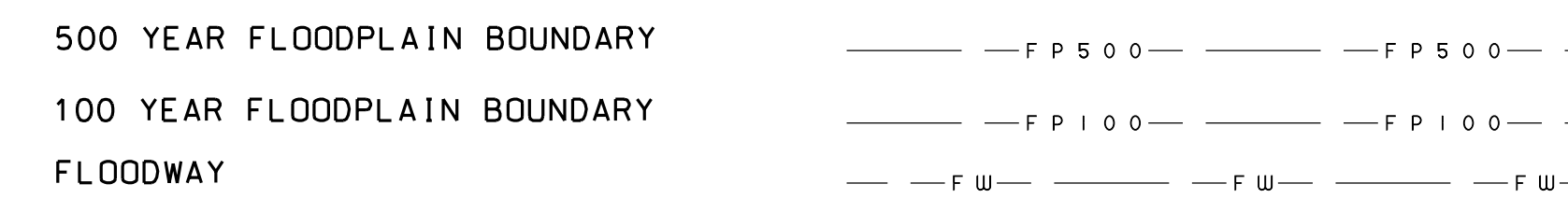
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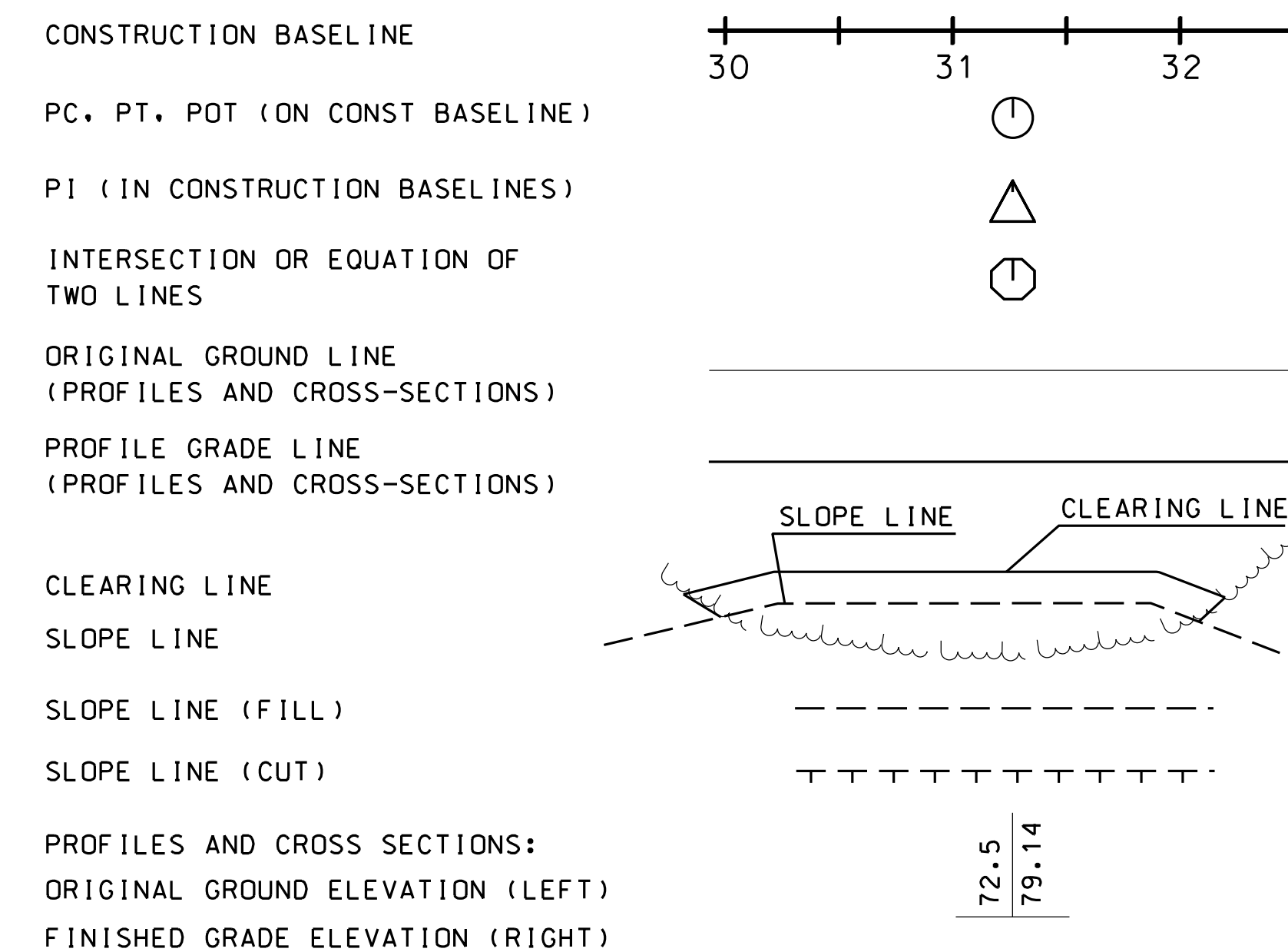
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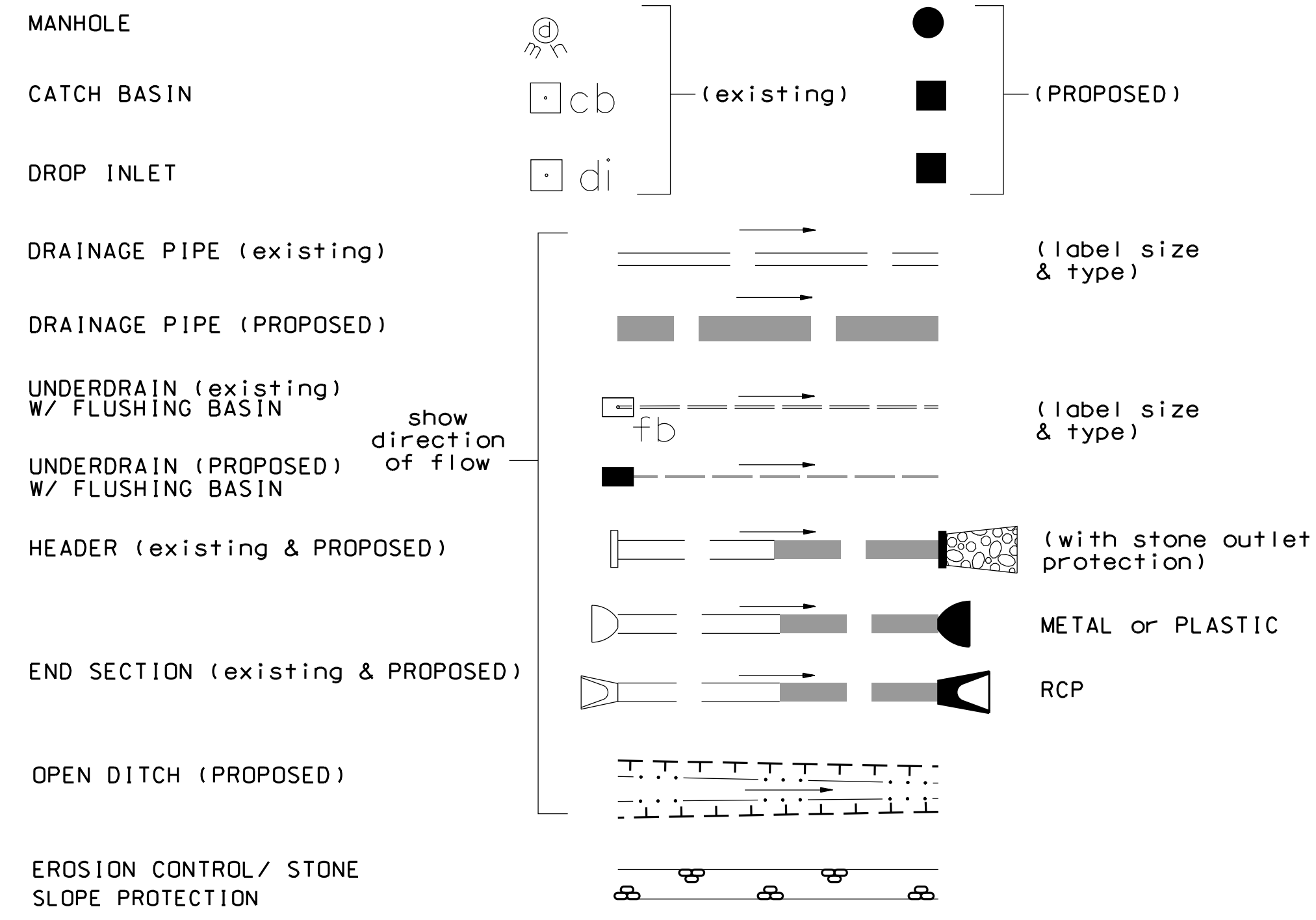
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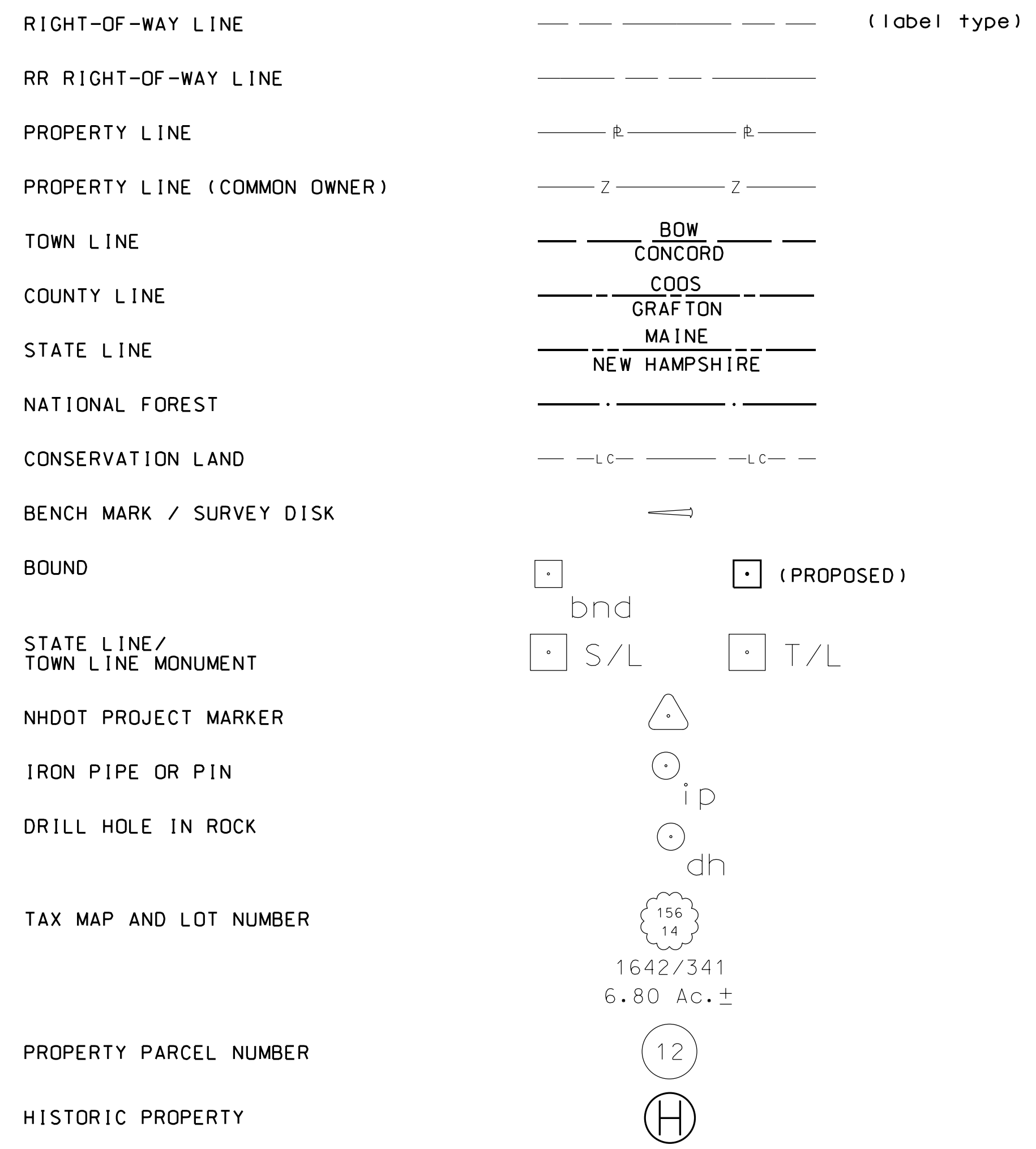
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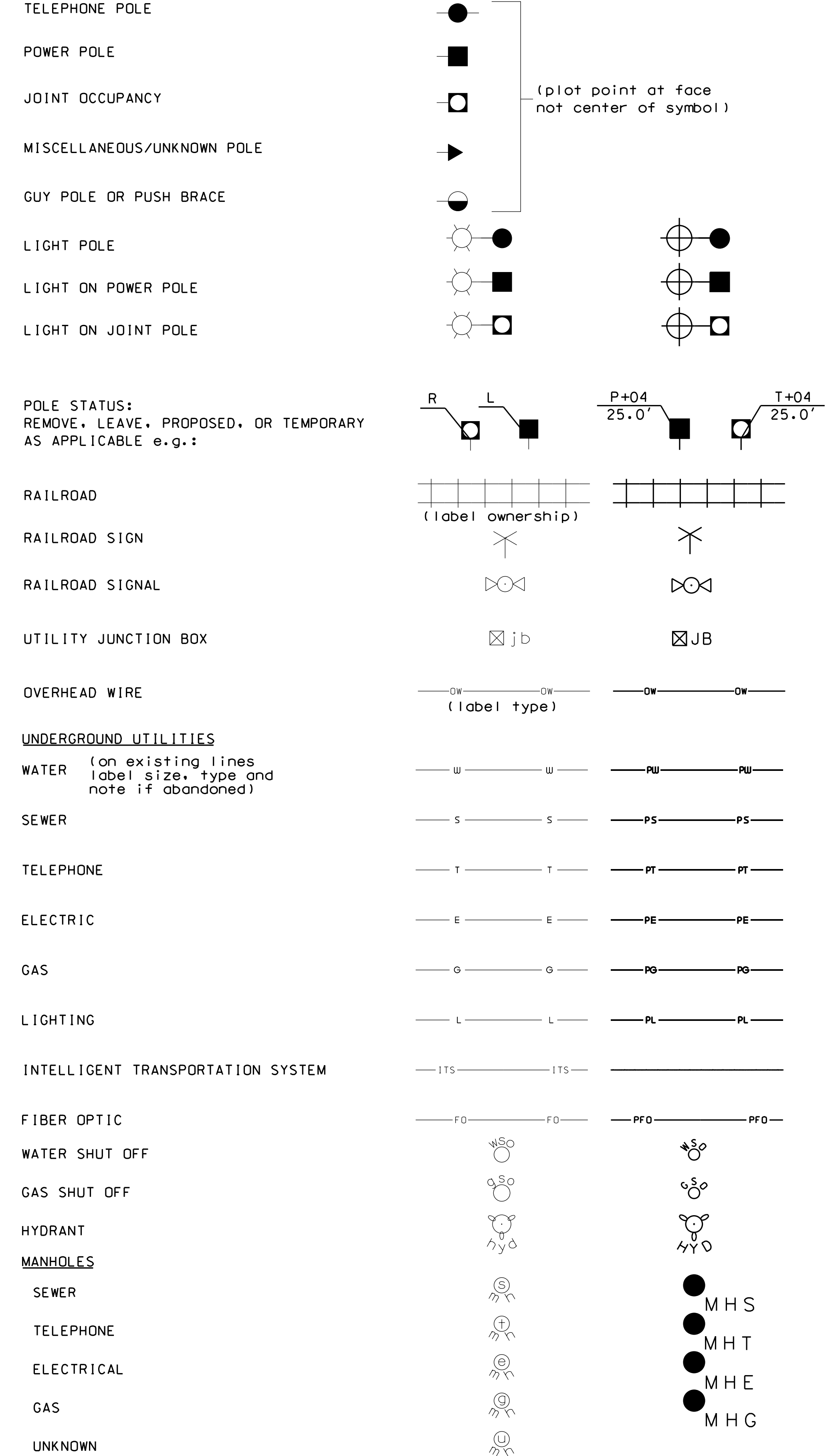
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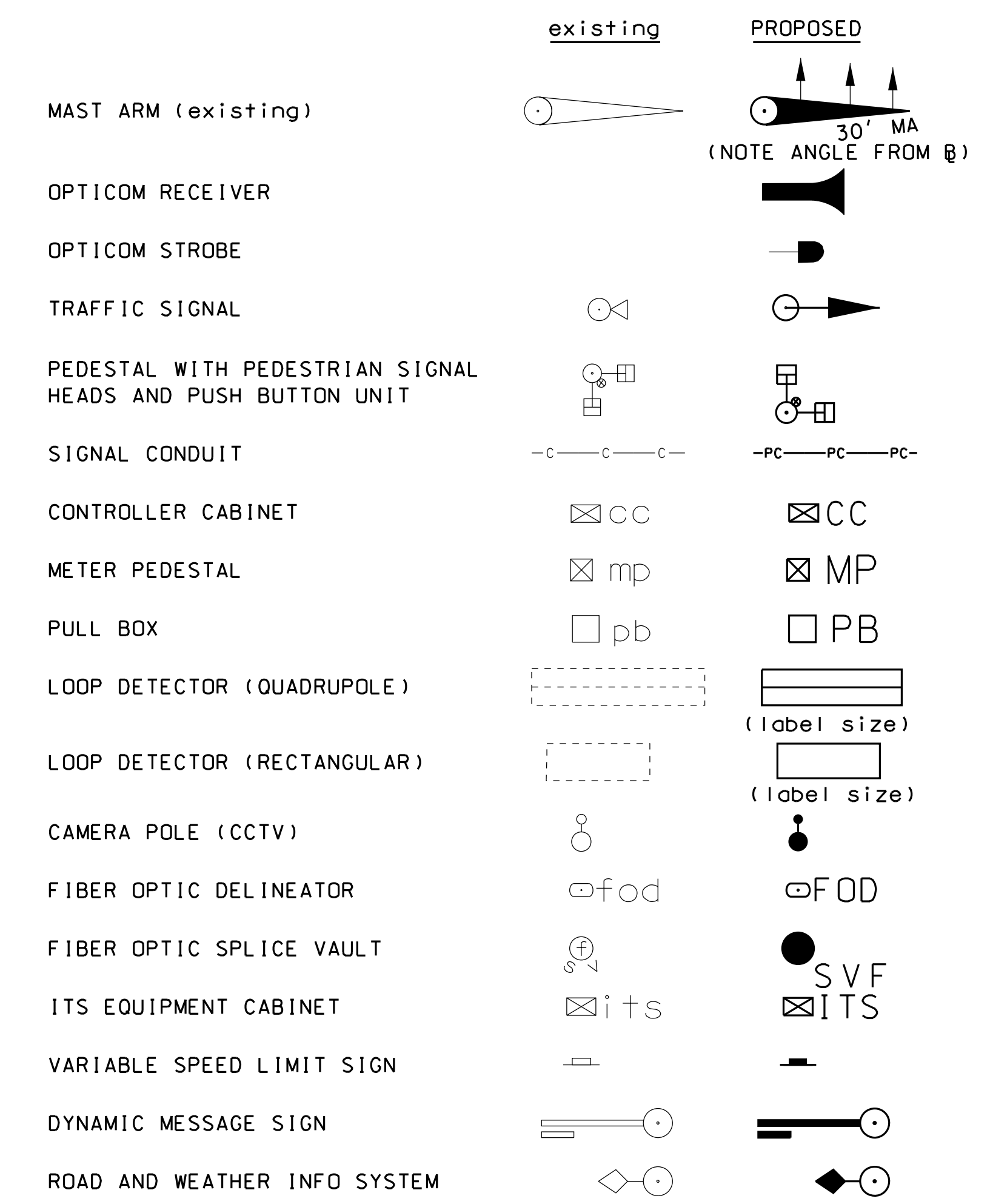
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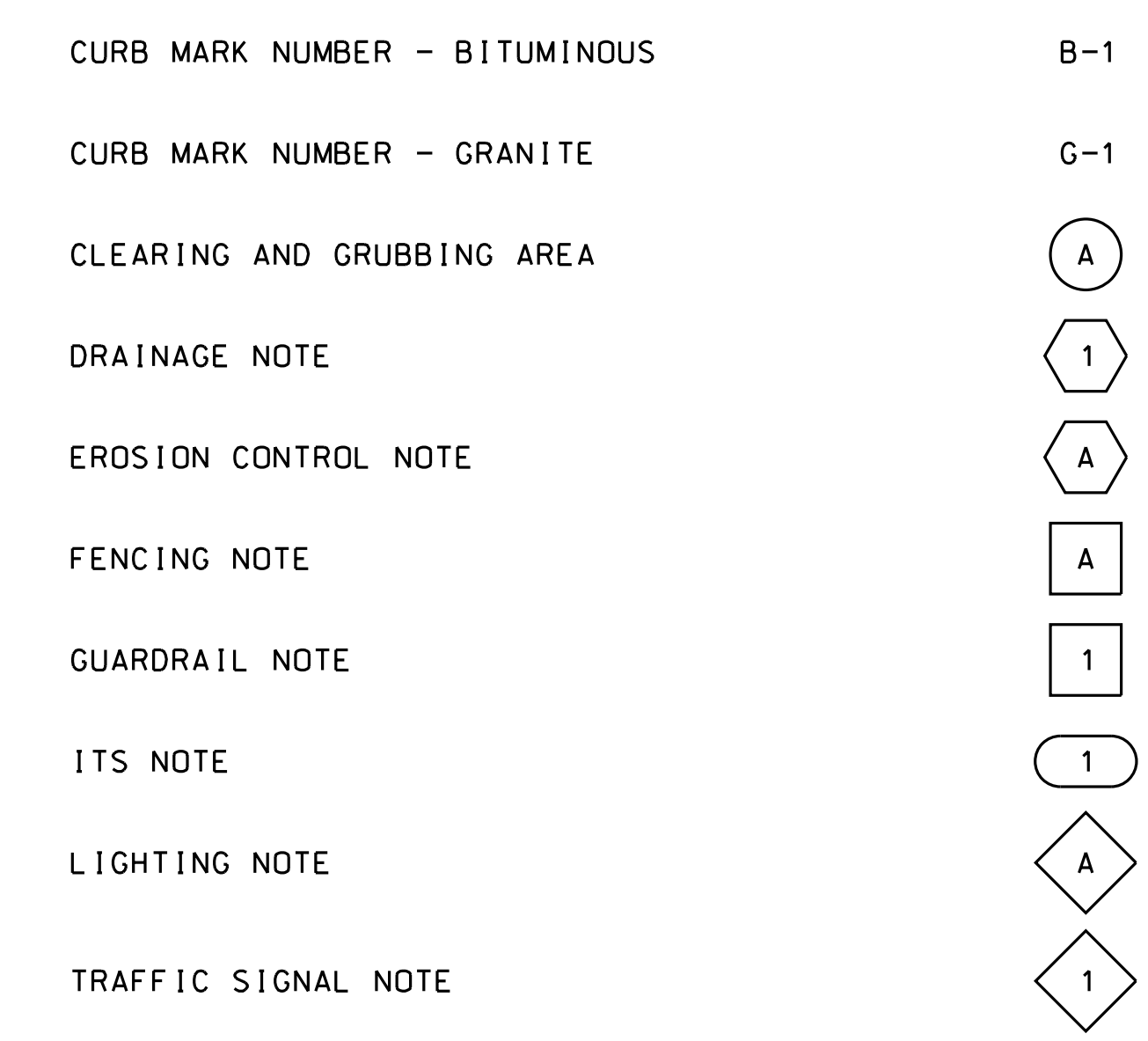
UTILITIES



TRAFFIC SIGNALS / ITS



CONSTRUCTION NOTES



EROSION CONTROL STRATEGIES

1. ENVIRONMENTAL COMMITMENTS:

- 1.1. THESE GUIDELINES DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH ANY CONTRACT PROVISIONS, OR APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.
 - 1.2. THIS PROJECT WILL BE SUBJECT TO THE US EPA'S NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORM WATER CONSTRUCTION GENERAL PERMIT AS ADMINISTERED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA). THIS PROJECT IS SUBJECT TO REQUIREMENTS IN THE MOST RECENT CONSTRUCTION GENERAL PERMIT (CGP).
 - 1.3. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE NHDES WETLAND PERMIT, THE US ARMY CORPS OF ENGINEERS PERMIT, WATER QUALITY CERTIFICATION AND THE SPECIAL ATTENTION ITEMS INCLUDED IN THE CONTRACT DOCUMENTS.
 - 1.4. ALL STORM WATER, EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE NEW HAMPSHIRE STORMWATER MANUAL, VOLUME 3, EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION (DECEMBER 2008) (BMP MANUAL) AVAILABLE FROM THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES (NHDES).
 - 1.5. THE CONTRACTOR SHALL COMPLY WITH RSA 485-A:17, AND ALL, PUBLISHED NHDES ALTERATION OF TERRAIN ENV-WO 1500 REQUIREMENTS ([HTTP://DES.NH.GOV/ORGANIZATION/COMMISSIONER/LEGAL/RULES/INDEX.HTM](http://des.nh.gov/organization/commissioner/legal/rules/index.htm))
 - 1.6. THE CONTRACTOR IS DIRECTED TO REVIEW AND COMPLY WITH SECTION 107.1 OF THE CONTRACT AS IT REFERS TO SPILLAGE, AND ALSO WITH REGARDS TO EROSION, POLLUTION, AND TURBIDITY PRECAUTIONS.
- 2. STANDARD EROSION CONTROL SEQUENCING APPLICABLE TO ALL CONSTRUCTION PROJECTS:**
- 2.1. PERIMETER CONTROLS SHALL BE INSTALLED PRIOR TO EARTH DISTURBING ACTIVITIES. PERIMETER CONTROLS AND STABILIZED CONSTRUCTION EXITS SHALL BE INSTALLED AS SHOWN IN THE BMP MANUAL AND AS DIRECTED BY THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) PREPARER.
 - 2.2. EROSION, SEDIMENTATION CONTROL MEASURES AND INFILTRATION BASINS SHALL BE CLEANED, REPLACED AND AUGMENTED AS NECESSARY TO PREVENT SEDIMENTATION BEYOND PROJECT LIMITS THROUGHOUT THE PROJECT DURATION.
 - 2.3. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED IN ACCORDANCE WITH THE CONSTRUCTION GENERAL PERMIT AND SECTION 645 OF THE NHDOT SPECIFICATIONS FOR ROAD AND BRIDGES CONSTRUCTION.
 - 2.4. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
 - (A) BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
 - (B) A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
 - (C) A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP-RAP HAS BEEN INSTALLED;
 - (D) TEMPORARY SLOPE STABILIZATION CONFORMING TO TABLE 1 HAS BEEN PROPERLY INSTALLED
 - 2.5. ALL STOCKPILES SHALL BE CONTAINED WITH A PERIMETER CONTROL. IF THE STOCKPILE IS TO REMAIN UNDISTURBED FOR MORE THAN 14 DAYS, MULCHING WILL BE REQUIRED.
 - 2.6. A WATER TRUCK SHALL BE AVAILABLE TO CONTROL EXCESSIVE DUST AT THE DIRECTION OF THE CONTRACT ADMINISTRATOR.
 - 2.7. TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES SHALL REMAIN UNTIL THE AREA HAS BEEN PERMANENTLY STABILIZED.
 - 2.8. CONSTRUCTION PERFORMED ANY TIME BETWEEN NOVEMBER 30th AND MAY 1st OF ANY YEAR SHALL BE CONSIDERED WINTER CONSTRUCTION AND SHALL CONFORM TO THE FOLLOWING REQUIREMENTS.
 - (A) ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15th, OR WHICH ARE DISTURBED AFTER OCTOBER 15th, SHALL BE STABILIZED IN ACCORDANCE WITH TABLE 1.
 - (B) ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15th, OR WHICH ARE DISTURBED AFTER OCTOBER 15th, SHALL BE STABILIZED TEMPORARILY WITH STONE OR IN ACCORDANCE WITH TABLE 1.
 - (C) AFTER NOVEMBER 30th INCOMPLETE ROAD SURFACES, WHERE WORK HAS STOPPED FOR THE SEASON, SHALL BE PROTECTED IN ACCORDANCE WITH TABLE 1.
 - (D) WINTER EXCAVATION AND EARTHWORK SHALL BE DONE SUCH THAT NO MORE THAN 1 ACRE OF THE PROJECT IS WITHOUT STABILIZATION AT ONE TIME, UNLESS A WINTER CONSTRUCTION PLAN HAS BEEN APPROVED BY NHDOT THAT MEETS THE REQUIREMENTS OF ENV-WO 1505.02 AND ENV-WO 1505.05.
 - (E) A SWPPP AMENDMENT SHALL BE SUBMITTED TO THE DEPARTMENT, FOR APPROVAL, ADDRESSING COLD WEATHER STABILIZATION (ENV-WO 1505.05) AND INCLUDING THE REQUIREMENTS OF NO LESS THAN 30 DAYS PRIOR TO THE COMMENCEMENT OF WORK SCHEDULED AFTER NOVEMBER 30th.

GENERAL CONSTRUCTION PLANNING AND SELECTION OF STRATEGIES TO CONTROL EROSION AND SEDIMENT ON HIGHWAY CONSTRUCTION PROJECTS

3. PLAN ACTIVITIES TO ACCOUNT FOR SENSITIVE SITE CONDITIONS:
 - 3.1. CLEARLY FLAG AREAS TO BE PROTECTED IN THE FIELD AND PROVIDE CONSTRUCTION BARRIERS TO PREVENT TRAFFICKING OUTSIDE OF WORK AREAS.
 - 3.2. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS.
 - 3.3. PROTECT AND MAXIMIZE EXISTING NATIVE VEGETATION AND NATURAL FOREST BUFFERS BETWEEN CONSTRUCTION ACTIVITY AND SENSITIVE AREAS.
 - 3.4. WHEN WORK IS PERFORMED IN AND NEAR WATER COURSES, STREAM FLOW DIVERSION METHODS SHALL BE IMPLEMENTED PRIOR TO ANY EXCAVATION OR FILLING.
 - 3.5. WHEN WORK IS PERFORMED WITHIN 50 FEET OF SURFACE WATERS (WETLAND, OPEN WATER OR FLOWING WATER), PERIMETER CONTROL SHALL BE ENHANCED CONSISTENT WITH SECTION 2.1.2.1. OF THE 2012 NPDES CONSTRUCTION GENERAL PERMIT.
4. MINIMIZE THE AMOUNT OF EXPOSED SOIL:
 - 4.1. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS. MINIMIZE THE AREA OF EXPOSED SOIL AT ANY ONE TIME. PHASING SHALL BE USED TO REDUCE THE AMOUNT AND DURATION OF SOIL EXPOSED TO THE ELEMENTS AND VEHICLE TRACKING.
 - 4.2. UTILIZE TEMPORARY MULCHING OR PROVIDE ALTERNATE TEMPORARY STABILIZATION ON EXPOSED SOILS IN ACCORDANCE WITH TABLE 1.
 - 4.3. THE MAXIMUM AMOUNT OF DISTURBED EARTH SHALL NOT EXCEED A TOTAL OF 5 ACRES FROM MAY 1st THROUGH NOVEMBER 30th, OR EXCEED ONE ACRE DURING WINTER MONTHS, UNLESS THE CONTRACTOR DEMONSTRATES TO THE DEPARTMENT THAT THE ADDITIONAL AREA OF DISTURBANCE IS NECESSARY TO MEET THE CONTRACTORS CRITICAL PATH METHOD SCHEDULE (CPM), AND THE CONTRACTOR HAS ADEQUATE RESOURCES AVAILABLE TO ENSURE THAT ENVIRONMENTAL COMMITMENTS WILL BE MET.
5. CONTROL STORMWATER FLOWING ONTO AND THROUGH THE PROJECT:
 - 5.1. DIVERT OFF-SITE RUNOFF OR CLEAN WATER AWAY FROM THE CONSTRUCTION ACTIVITY TO REDUCE THE VOLUME THAT NEEDS TO BE TREATED ON-SITE.
 - 5.2. DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM DISTURBED AREAS, SLOPES, AND AROUND ACTIVE WORK AREAS AND TO A STABILIZED OUTLET LOCATION.
 - 5.3. CONSTRUCT IMPERMEABLE BARRIERS AS NECESSARY TO COLLECT OR DIVERT CONCENTRATED FLOWS FROM WORK OR DISTURBED AREAS.
 - 5.4. STABILIZE, TO APPROPRIATE ANTICIPATED VELOCITIES, CONVEYANCE CHANNELS OR PUMPING SYSTEMS NEEDED TO CONVEY CONSTRUCTION STORMWATER TO BASINS AND DISCHARGE LOCATIONS PRIOR TO USE.
 - 5.5. DIVERT OFF-SITE WATER THROUGH THE PROJECT IN AN APPROPRIATE MANNER SO NOT TO DISTURB THE UPSTREAM OR DOWNSTREAM SOILS, VEGETATION OR HYDROLOGY BEYOND THE PERMITTED AREA.
6. PROTECT SLOPES:
 - 6.1. INTERCEPT AND DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM UNPROTECTED AND NEWLY ESTABLISHED AREAS AND SLOPES TO A STABILIZED OUTLET OR CONVEYANCE.
 - 6.2. CONSIDER HOW GROUNDWATER SEEPAGE ON CUT SLOPES MAY IMPACT SLOPE STABILITY AND INCORPORATE APPROPRIATE MEASURES TO MINIMIZE EROSION.
 - 6.3. CONVEY STORMWATER DOWN THE SLOPE IN A STABILIZED CHANNEL OR SLOPE DRAIN.
 - 6.4. THE OUTER FACE OF THE FILL SLOPE SHOULD BE IN A LOOSE RUFFLED CONDITION PRIOR TO TURF ESTABLISHMENT. TOPSOIL OR HUMUS LAYERS SHALL BE TRACKED UP AND DOWN THE SLOPE, DISKED, HARROWED, DRAGGED WITH A CHAIN OR MAT, MACHINE-RAKED, OR HAND-WORKED TO PRODUCE A RUFFLED SURFACE.
7. ESTABLISH STABILIZED CONSTRUCTION EXITS:
 - 7.1. INSTALL AND MAINTAIN CONSTRUCTION EXITS, ANYWHERE TRAFFIC LEAVES A CONSTRUCTION SITE ONTO A PUBLIC RIGHT-OF-WAY.
 - 7.2. SWEEP ALL CONSTRUCTION RELATED DEBRIS AND SOIL FROM THE ADJACENT PAVED ROADWAYS AS NECESSARY.
8. PROTECT STORM DRAIN INLETS:
 - 8.1. DIVERT SEDIMENT LADEN WATER AWAY FROM INLET STRUCTURES TO THE EXTENT POSSIBLE.
 - 8.2. INSTALL SEDIMENT BARRIERS AND SEDIMENT TRAPS AT INLETS TO PREVENT SEDIMENT FROM ENTERING THE DRAINAGE SYSTEM.
 - 8.3. CLEAN CATCH BASINS, DRAINAGE PIPES, AND CULVERTS IF SIGNIFICANT SEDIMENT IS DEPOSITED.
 - 8.4. DROP INLET SEDIMENT BARRIERS SHOULD NEVER BE USED AS THE PRIMARY MEANS OF SEDIMENT CONTROL AND SHOULD ONLY BE USED TO PROVIDE AN ADDITIONAL LEVEL OF PROTECTION TO STRUCTURES AND DOWN-GRADIENT SENSITIVE RECEPTORS.
9. SOIL STABILIZATION:
 - 9.1. WITHIN THREE DAYS OF THE LAST ACTIVITY IN AN AREA, ALL EXPOSED SOIL AREAS, WHERE CONSTRUCTION ACTIVITIES ARE COMPLETE, SHALL BE STABILIZED.
 - 9.2. IN ALL AREAS, TEMPORARY SOIL STABILIZATION MEASURES SHALL BE APPLIED IN ACCORDANCE WITH THE STABILIZATION REQUIREMENTS (SECTION 2.2) OF THE 2012 CGP. (SEE TABLE 1 FOR GUIDANCE ON THE SELECTION OF TEMPORARY SOIL STABILIZATION MEASURES.)
 - 9.3. EROSION CONTROL SEED MIX SHALL BE SOWN IN ALL INACTIVE CONSTRUCTION AREAS THAT WILL NOT BE PERMANENTLY SEEDED WITHIN TWO WEEKS OF DISTURBANCE AND PRIOR TO SEPTEMBER 15, OF ANY GIVEN YEAR. IN ORDER TO ACHIEVE VEGETATIVE STABILIZATION PRIOR TO THE END OF THE GROWING SEASON.
 - 9.4. SOIL TACKIFIERS MAY BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND REAPPLIED AS NECESSARY TO MINIMIZE SOIL AND MULCH LOSS UNTIL PERMANENT VEGETATION IS ESTABLISHED.
10. RETAIN SEDIMENT ON-SITE AND CONTROL DEWATERING PRACTICES:
 - 10.1. TEMPORARY SEDIMENT BASINS (CGP-SECTION 2.1.3.2) OR SEDIMENT TRAPS (ENV-WO 1506.10) SHALL BE SIZED TO RETAIN, ON-SITE, THE VOLUME OF A 2-YEAR 24-HOUR STORM EVENT FOR ANY AREA OF DISTURBANCE OR 3,600 CUBIC FEET OF STORMWATER RUNOFF PER ACRE OF DISTURBANCE, WHICHEVER IS GREATER. TEMPORARY SEDIMENT BASINS USED TO TREAT STORMWATER RUNOFF FROM AREAS GREATER THAN 5-ACRES OF DISTURBANCE SHALL BE SIZED TO ALSO CONTROL STORMWATER RUNOFF FROM A 10-YEAR 24 HOUR STORM EVENT. ON-SITE RETENTION OF THE 10-YEAR 24-HOUR EVENT IS NOT REQUIRED.
 - 10.2. CONSTRUCT AND STABILIZE DEWATERING INFILTRATION BASINS PRIOR TO ANY EXCAVATION THAT MAY REQUIRE DEWATERING.
 - 10.3. TEMPORARY SEDIMENT BASINS OR TRAPS SHALL BE PLACED AND STABILIZED AT LOCATIONS WHERE CONCENTRATED FLOW (CHANNELS AND PIPES) DISCHARGE TO THE SURROUNDING ENVIRONMENT FROM AREAS OF UNSTABILIZED EARTH DISTURBING ACTIVITIES.

11. ADDITIONAL EROSION AND SEDIMENT CONTROL GENERAL PRACTICES:

- 11.1. USE TEMPORARY MULCHING, PERMANENT MULCHING, TEMPORARY VEGETATIVE COVER, AND PERMANENT VEGETATIVE COVER TO REDUCE THE NEED FOR DUST CONTROL. USE MECHANICAL SWEEPERS ON PAVED SURFACES WHERE NECESSARY TO PREVENT DUST BUILDUP. APPLY WATER, OR OTHER DUST INHIBITING AGENTS OR TACKIFIERS, AS APPROVED BY THE NHDES.
- 11.2. ALL STOCKPILES SHALL BE CONTAINED WITH TEMPORARY PERIMETER CONTROLS. INACTIVE SOIL STOCKPILES SHOULD BE PROTECTED WITH SOIL STABILIZATION MEASURES (TEMPORARY EROSION CONTROL SEED MIX AND MULCH, SOIL BINDER) OR COVERED WITH ANCHORED TARPS.
- 11.3. EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSPECTED IN ACCORDANCE WITH SECTION 645 OF NHDOT SPECIFICATIONS, WEEKLY AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.25 IN. OF RAIN PER 24-HOUR PERIOD. EROSION AND SEDIMENT CONTROL MEASURES WILL ALSO BE INSPECTED IN ACCORDANCE WITH THE GUIDANCE MEMO FROM THE NHDES CONTAINED WITHIN THE CONTRACT PROPOSAL AND THE EPA CONSTRUCTION GENERAL PERMIT.
- 11.4. THE CONTRACTOR SHOULD UTILIZE STORM DRAIN INLET PROTECTION TO PREVENT SEDIMENT FROM ENTERING A STORM DRAINAGE SYSTEM PRIOR TO THE PERMANENT STABILIZATION OF THE CONTRIBUTING DISTURBED AREA.
- 11.5. PERMANENT STABILIZATION MEASURES WILL BE CONSTRUCTED AND MAINTAINED IN LOCATIONS AS SHOWN ON THE CONSTRUCTION PLANS TO STABILIZE AREAS. VEGETATIVE STABILIZATION SHALL NOT BE CONSIDERED PERMANENTLY STABILIZED UNTIL VEGETATIVE GROWTH COVERS AT LEAST 85% OF THE DISTURBED AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR EROSION AND SEDIMENT CONTROL FOR ONE YEAR AFTER PROJECT COMPLETION.
- 11.6. CATCH BASINS: CARE SHALL BE TAKEN TO ENSURE THAT SEDIMENTS DO NOT ENTER ANY EXISTING CATCH BASINS DURING CONSTRUCTION. THE CONTRACTOR SHALL PLACE TEMPORARY STONE INLET PROTECTION OVER INLETS IN AREAS OF SOIL DISTURBANCE THAT ARE SUBJECT TO SEDIMENT CONTAMINATION.
- 11.7. TEMPORARY AND PERMANENT DITCHES SHALL BE CONSTRUCTED, STABILIZED AND MAINTAINED IN A MANNER THAT WILL MINIMIZE SCOUR. TEMPORARY AND PERMANENT DITCHES SHALL BE DIRECTED TO DRAIN TO SEDIMENT BASINS OR STORM WATER COLLECTION AREAS.
- 11.8. WINTER EXCAVATION AND EARTHWORK ACTIVITIES NEED TO BE LIMITED IN EXTENT AND DURATION, TO MINIMIZE POTENTIAL EROSION AND SEDIMENTATION IMPACTS. THE AREA OF EXPOSED SOIL SHALL BE LIMITED TO ONE ACRE, OR THAT WHICH CAN BE STABILIZED AT THE END OF EACH DAY UNLESS A WINTER CONSTRUCTION PLAN, DEVELOPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST, IS REVIEWED AND APPROVED BY THE DEPARTMENT.
- 11.9. CHANNEL PROTECTION MEASURES SHALL BE SUPPLEMENTED WITH PERIMETER CONTROL MEASURES WHEN THE DITCH LINES OCCUR AT THE BOTTOM OF LONG FILL SLOPES. THE PERIMETER CONTROLS SHALL BE INSTALLED ON THE FILL SLOPE TO MINIMIZE THE POTENTIAL FOR FILL SLOPE SEDIMENT DEPOSITS IN THE DITCH LINE.

BEST MANAGEMENT PRACTICES (BMP) BASED ON AMOUNT OF OPEN CONSTRUCTION AREA

12. STRATEGIES SPECIFIC TO OPEN AREAS LESS THAN 5 ACRES:
 - 12.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WO 1500; ALTERATION OF TERRAIN FOR CONSTRUCTION AND USE ALL CONVENTIONAL BMP STRATEGIES.
 - 12.2. SLOPES STEEPER THAN 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING.
 - 12.3. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT ALONE.
 - 12.4. AREAS WHERE HAUL ROADS ARE CONSTRUCTED AND STORMWATER CANNOT BE TREATED THE DEPARTMENT WILL CONSIDER INFILTRATION.
 - 12.5. FOR HAUL ROADS ADJACENT TO SENSITIVE ENVIRONMENTAL AREAS OR STEEPER THAN 5%, THE DEPARTMENT WILL CONSIDER USING EROSION STONE, CRUSHED GRAVEL, OR CRUSHED STONE BASE TO HELP MINIMIZE EROSION ISSUES.
 - 12.6. ALL AREAS THAT CAN BE STABILIZED SHALL BE STABILIZED PRIOR TO OPENING UP NEW TERRITORY.
 - 12.7. DETENTION BASINS SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE A 2 YEAR STORM EVENT.
13. STRATEGIES SPECIFIC TO OPEN AREAS BETWEEN 5 AND 10 ACRES:
 - 13.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WO 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES WILL BE UTILIZED.
 - 13.2. DETENTION BASINS WILL BE CONSTRUCTED TO ACCOMMODATE THE 2-YEAR 24-HOUR STORM EVENT AND CONTROL A 10-YEAR 24-HOUR STORM EVENT.
 - 13.3. SLOPES STEEPER THAN A 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS. OTHER ALTERNATIVE MEASURES, SUCH AS BONDED FIBER MATRIXES (BFMS) OR FLEXIBLE GROWTH MEDIUMS (FGMS) MAY BE UTILIZED, IF MEETING THE NHDES APPROVALS AND REGULATIONS.
 - 13.4. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS.
14. STRATEGIES SPECIFIC TO OPEN AREAS OVER 10 ACRES:
 - 14.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WO 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES AND BETWEEN 5 AND 10 ACRES WILL BE UTILIZED.
 - 14.2. THE DEPARTMENT ANTICIPATES THAT SOIL BINDERS WILL BE NEEDED ON ALL SLOPES STEEPER THAN 3:1, IN ORDER TO MINIMIZE EROSION AND REDUCE THE AMOUNT OF SEDIMENT IN THE STORMWATER TREATMENT BASINS.
 - 14.3. THE CONTRACTOR WILL BE REQUIRED TO HAVE AN APPROVED DESIGN IN ACCORDANCE WITH ENV-WO 1506.12 FOR AN ACTIVE FLOCCULANT TREATMENT SYSTEM TO TREAT AND RELEASE WATER CAPTURED IN STORM WATER BASINS. THE CONTRACTOR SHALL ALSO RETAIN THE SERVICES OF AN ENVIRONMENTAL CONSULTANT WHO HAS DEMONSTRATED EXPERIENCE IN THE DESIGN OF FLOCCULANT TREATMENT SYSTEMS. THE CONSULTANT WILL ALSO BE RESPONSIBLE FOR THE IMPLEMENTATION AND MONITORING OF THE SYSTEM.

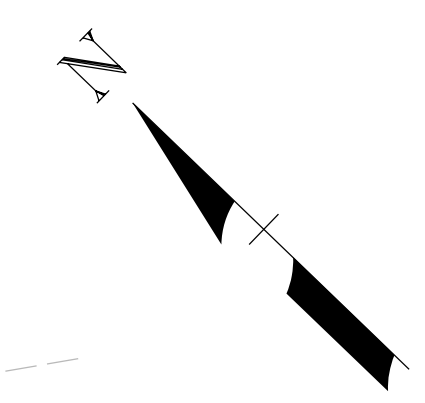
**TABLE 1
GUIDANCE ON SELECTING TEMPORARY SOIL STABILIZATION MEASURES**

APPLICATION AREAS	DRY MULCH METHODS				HYDRAULICALLY APPLIED MULCHES ²				ROLLED EROSION CONTROL BLANKETS ³			
	HMT	WC	SG	CB	HM	SMM	BFM	FRM	SNSB	DNSB	DNCSB	DNCB
SLOPES ¹												
STEEPER THAN 2:1	NO	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO	YES
2:1 SLOPE	YES	YES	YES	YES	NO	NO	YES	YES	NO	YES	YES	YES
3:1 SLOPE	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	NO
4:1 SLOPE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO	NO
WINTER STABILIZATION	4T/AC	YES	YES	YES	NO	NO	YES	YES	YES	YES	YES	YES
CHANNELS												
LOW FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES
HIGH FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES

ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE
HMT	HAY MULCH & TACK	HM	HYDRAULIC MULCH	SNSB	SINGLE NET STRAW BLANKET
WC	WOOD CHIPS	SMM	STABILIZED MULCH MATRIX	DNSB	DOUBLE NET STRAW BLANKET
SG	STUMP GRINDINGS	BFM	BONDED FIBER MATRIX	DNCSB	2 NET STRAW-COCONUT BLANKET
CB	COMPOST BLANKET	FRM	FIBER REINFORCED MEDIUM	DNCB	2 NET COCONUT BLANKET

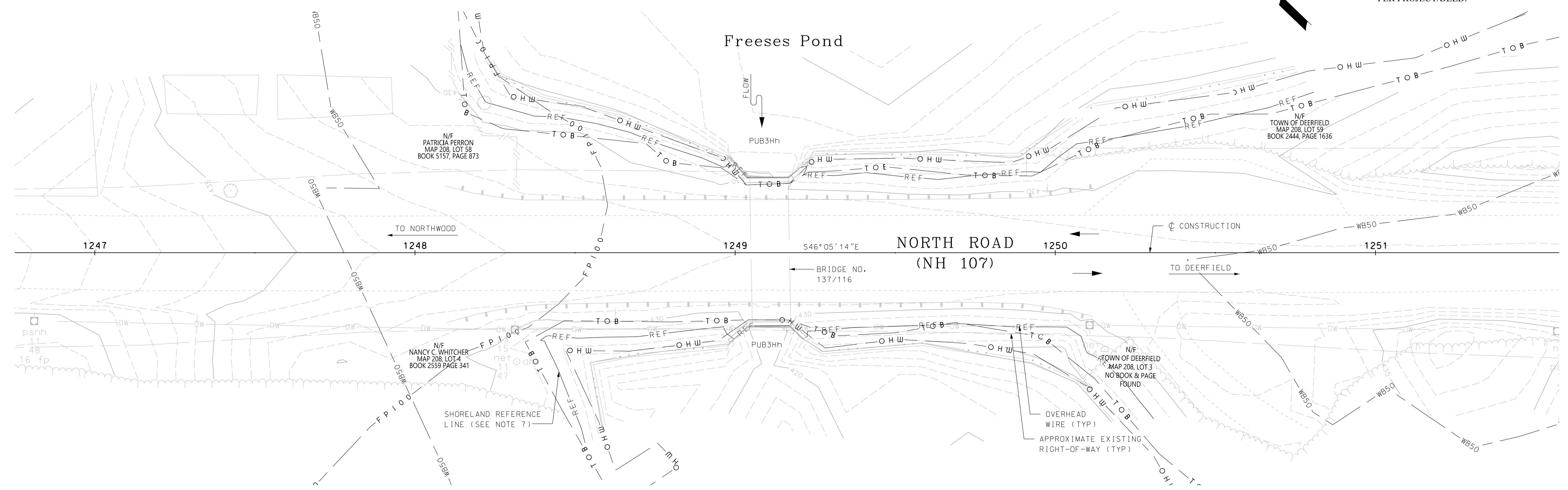
- NOTES:**
1. ALL SLOPE STABILIZATION OPTIONS ASSUME A SLOPE LENGTH ≤ 10 TIMES THE HORIZONTAL DISTANCE COMPONENT OF THE SLOPE, IN FEET.
 2. PRODUCTS CONTAINING POLYACRYLAMIDE (PAM) SHALL NOT BE APPLIED DIRECTLY TO OR WITHIN 100 FEET OF ANY SURFACE WATER WITHOUT PRIOR WRITTEN APPROVAL FROM THE NH DEPARTMENT OF ENVIRONMENTAL SERVICES.
 3. ALL EROSION CONTROL BLANKETS SHALL BE MADE WITH WILDLIFE FRIENDLY BIODEGRADABLE NETTING.

STATE OF NEW HAMPSHIRE				
ALLENSTOWN				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
<i>EROSION CONTROL LEGEND AND STRATEGY</i>				
REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
12-21-2015	weterosstrat	24477	4	9



NOTE: MORE RESEARCH NEEDED ON ARTHUR HAMMOND PARCEL.

NOTE: 33' ROW FROM CENTERLINE HERE FROM PROJECT NRS-259-B. STARTING AT STA. 249+90 AND RUNNING TO STA. 256+06.96 PER PROJECT/DEED.



WETLAND CLASSIFICATION CODES

PUB3Hh - PALUSTRINE, UNCONSOLIDATED BOTTOM, MUD, PERMANENTLY FLOODED, DIKE/IMPOUNDED

EXISTING CONDITIONS PLAN

SCALE: 1/16" = 1'-0"

NOTES

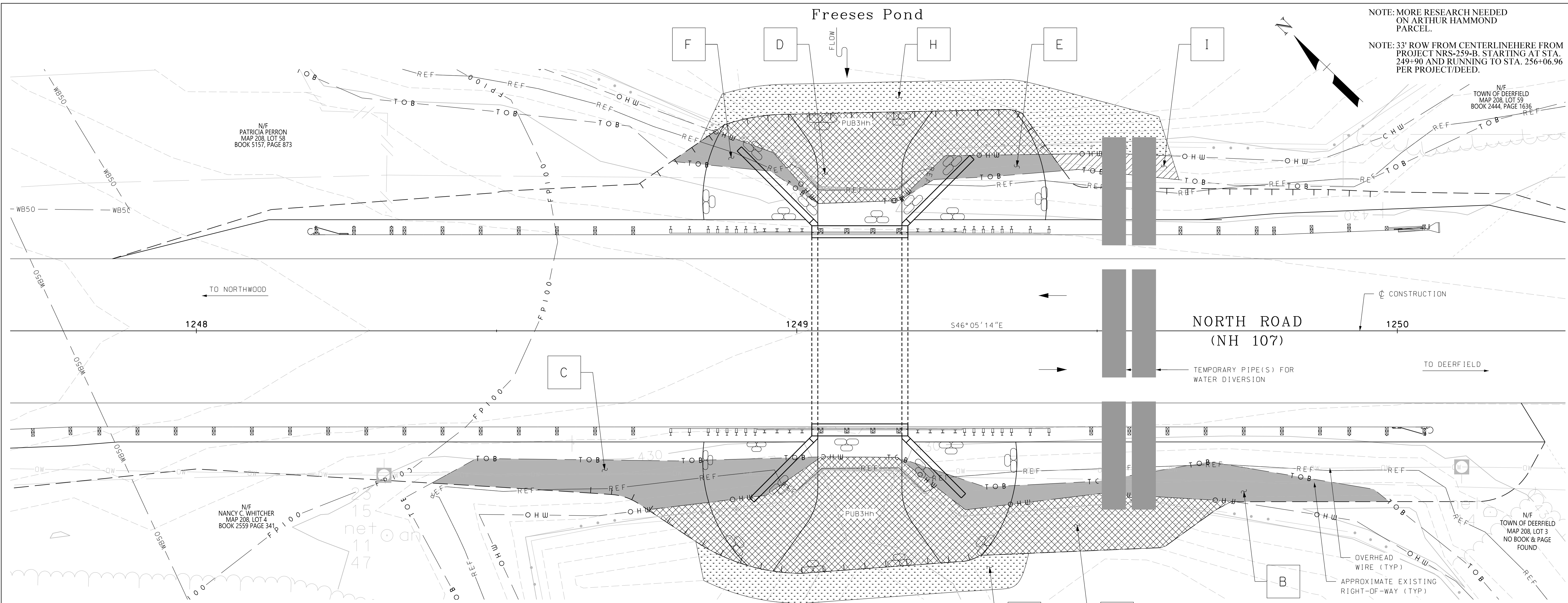
1. VHB SENIOR ENVIRONMENTAL SCIENTIST, KRISTOPHER WILKES (NH CWS #288), DELINEATED JURISDICTIONAL WETLANDS AND SURFACE WATERS ADJACENT TO THE EXISTING BRIDGE CROSSING ON JANUARY 18, 2019.
2. WETLAND DELINEATION WAS PERFORMED IN ACCORDANCE WITH THE PROCEDURES AND STANDARDS OUTLINED IN THE REGIONAL SUPPLEMENT TO THE U.S. ARMY CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION, VERSION 2.0 (JANUARY 2012).
3. WETLAND DELINEATION ALSO RELIED UPON THE FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN THE UNITED STATES, VERSION 8.2, PUBLISHED BY THE NATURAL RESOURCE CONSERVATION SERVICE AND THE FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, VERSION 4.0, PUBLISHED BY THE NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION.
4. DOMINANT WETLAND VEGETATION WAS ASSESSED USING THE NORTHCENTRAL AND NORTHEAST REGIONAL WETLAND PLANT LIST PUBLISHED BY THE U.S. ARMY CORPS OF ENGINEERS.
5. WETLANDS AND SURFACE WATERS WERE CLASSIFIED USING THE USFWS METHODOLOGY CLASSIFICATION OF WETLANDS AND DEEPWATER HABITATS OF THE UNITED STATES (COWARDIN ET AL. 1979, REVISED 1985).
6. STREAM TOP-OF-BANK AND ORDINARY HIGH WATER DELINEATION WAS PERFORMED IN ACCORDANCE WITH ENV-WT 101.07 & RSA 483-B:4 (XI-E)."
7. THE REFERENCE LINE FOR FREESSES POND IS ELEV. 428, PER THE NHDES CONSOLIDATED LIST OF WATER BODIES SUBJECT TO RSA 483-B, THE SHORELAND WATER QUALITY PROTECTION ACT (SWQPA). THE REFERENCE LINE IS DEPICTED ON THIS EXISTING CONDITIONS PLAN, AS WELL AS THE FIELD DELINEATED ORDINARY HIGH WATER LINE.



STATE OF NEW HAMPSHIRE					
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN					
TOWN DEERFIELD		BRIDGE NO. 137/116		STATE PROJECT 24477	
LOCATION NH ROUTE 107 OVER FREESSES POND					
EXISTING CONDITIONS PLAN					BRIDGE SHEET
ISSUED FOR PERMITTING					5 OF 9
DESIGNED TSP 3/21		CHECKED JAW 3/21		FILE NUMBER	
DRAWN KDW 3/21		CHECKED GSG 3/21		---	
QUANTITIES		CHECKED		---	
ISSUE DATE		FEDERAL PROJECT NO.		SHEET NO.	TOTAL SHEETS
REV. DATE					---

PLOT DATE	DRAWING NAME	SHEET SCALE
3/31/2021	24477wetexplan.dgn	AS NOTED

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WETLAND IMPACT SUMMARY									
WETLAND IDENTIFICATION	WETLAND CLASSIFICATION	AREA IMPACTS							
		PERMANENT				TEMPORARY			
		N.H.W.B. (NON-WETLAND) BANK		N.H.W.B. & A.C.O.E. (WETLAND) BED		(NON-WETLAND)		(WETLAND)	
		SF	LF	SF	LF	SF	LF	SF	LF
A	PUB3Hh			1010	20				
B	PUB3Hh	292	7						
C	PUB3Hh	341	9						
D	PUB3Hh			515	16				
E	PUB3Hh	76	4						
F	PUB3Hh	77	6						
G	PUB3Hh							257	5
H	PUB3Hh							462	5
I	PUB3Hh					64	4		
TOTAL		786	26	1525	36	64	4	719	10

PERMANENT IMPACTS: 2311 SF
 TEMPORARY IMPACTS: 783 SF
 TOTAL IMPACTS: 3094 SF

LEGEND

TYPE OF WETLAND IMPACT	SHADING/HATCHING
NEW HAMPSHIRE WETLANDS BUREAU (PERMANENT NON-WETLAND)	■
NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)	▨
TEMPORARY IMPACTS (WETLAND)	▩
TEMPORARY IMPACTS (NON-WETLAND)	▧

WETLAND CLASSIFICATION CODES	
PUB3Hh	PALUSTRINE, UNCONSOLIDATED BOTTOM, MUD, PERMANENTLY FLOODED, DIKE/IMPOUNDED

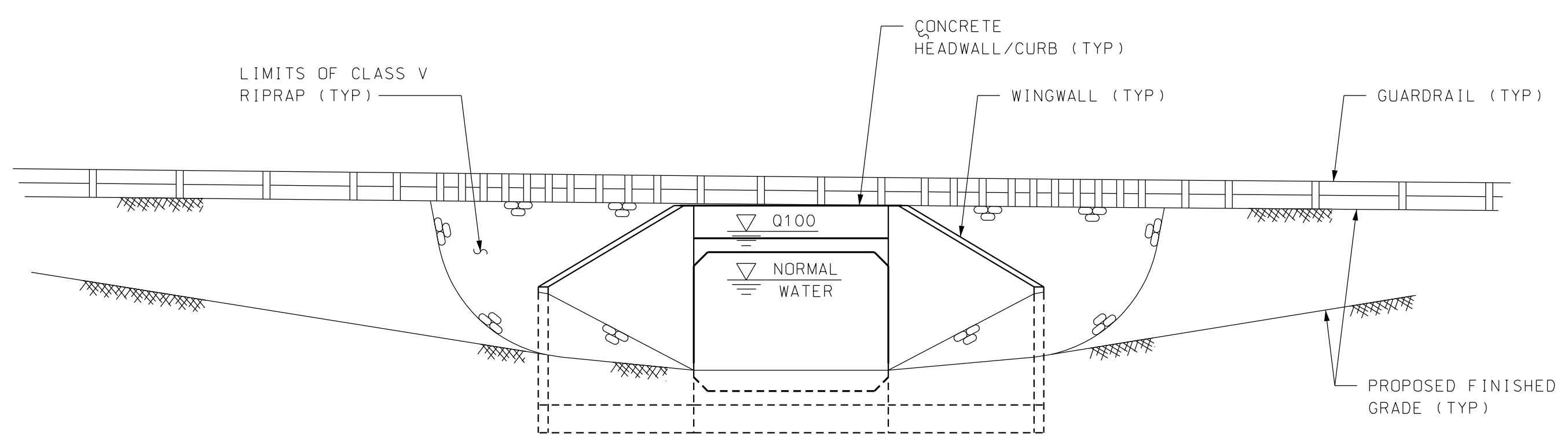
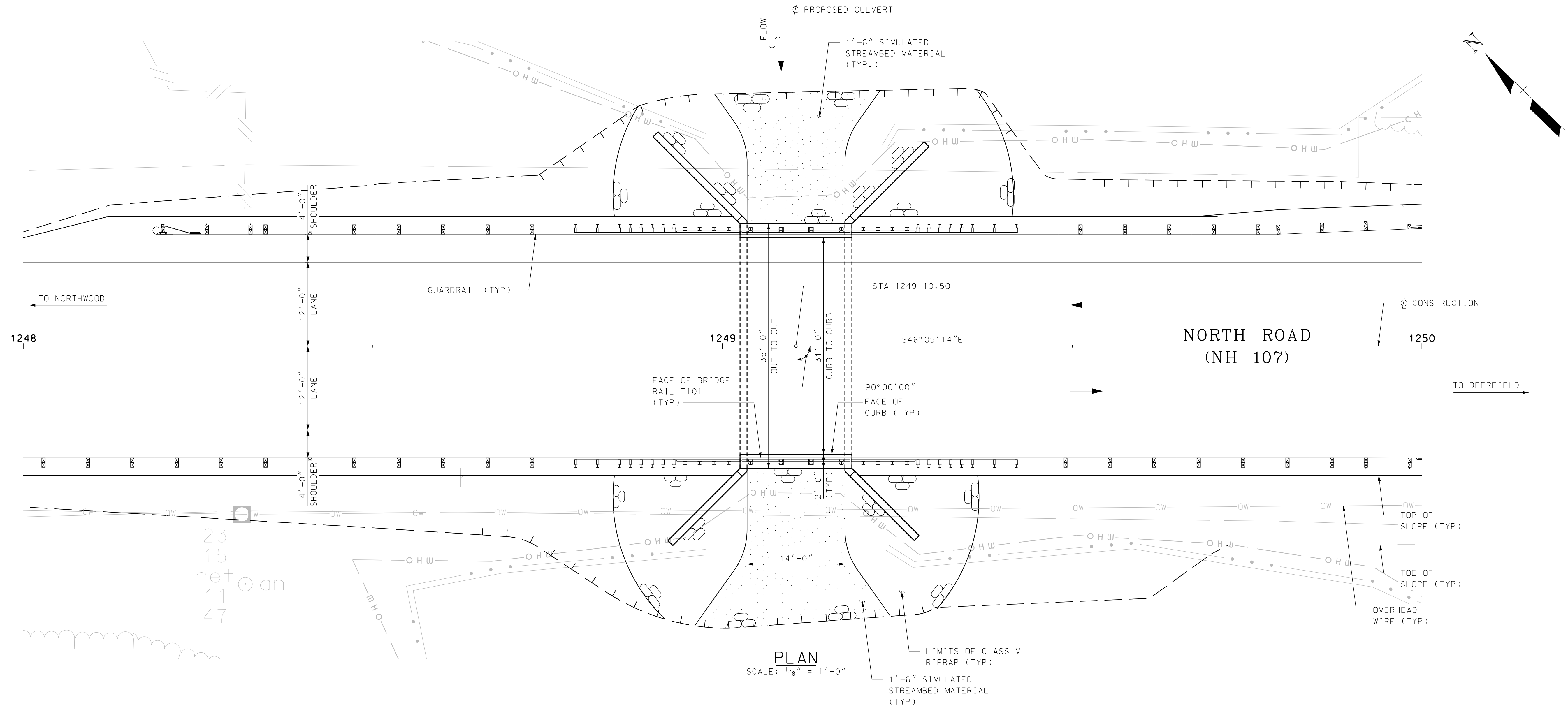
STATE OF NEW HAMPSHIRE					
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN					
TOWN DEERFIELD		BRIDGE NO. 137/116		STATE PROJECT 24477	
LOCATION NH ROUTE 107 OVER FREESSES POND					
WETLAND IMPACT PLAN					BRIDGE SHEET
ISSUED FOR PERMITTING					6 OF 9
3/31/2021		DESIGNED TSP 3/21	CHECKED JAW 3/21	BY GSG 3/21	DATE 3/21
ISSUE DATE	REV. DATE	FEDERAL PROJECT NO.		SHEET NO.	TOTAL SHEETS



PLOT DATE	DRAWING NAME	SHEET SCALE
3/31/2021	24477wetplan.dgn	AS NOTED

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Freezes Pond



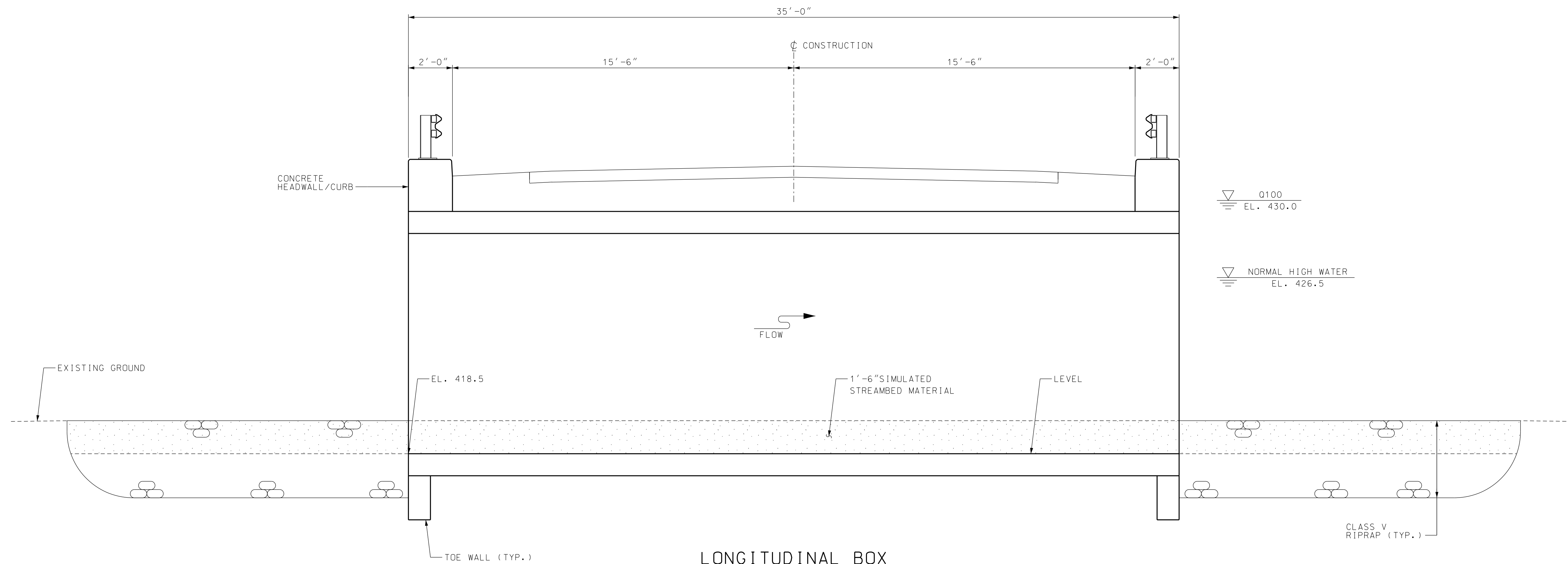
HYDRAULIC DATA	
DRAINAGE AREA	6.9 SQ. MILES
DESIGN FLOOD DISCHARGE (100 YR)	996 CFS
DESIGN FLOOD ELEVATION (100 YR)	430.0 FEET
DESIGN FLOOD VELOCITY (100 YR)	7.9 FPS
SCOUR CHECK DISCHARGE (500 YR)	1420 CFS
ANTICIPATED DEPTH OF SCOUR (100 YR)	15 FT
BRIDGE FULL WATERWAY OPENING TO \perp RIVER	117.5 SQ. FEET

STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN							
TOWN DEERFIELD		BRIDGE NO. 137/116		STATE PROJECT 24477			
LOCATION NH ROUTE 107 OVER FREESES POND							
BRIDGE PLAN AND ELEVATION AND BRIDGE QUANTITIES							
ISSUED FOR PERMITTING 3/31/2021	DESIGNED	TSP	3/21	CHECKED	JAW	3/21	BRIDGE SHEET 8 OF 9
	DRAWN	KDW	3/21	CHECKED	GSG	3/21	
	QUANTITIES			CHECKED			FILE NUMBER ---
ISSUE DATE	FEDERAL PROJECT NO.			SHEET NO.	TOTAL SHEETS		
REV. DATE					---		

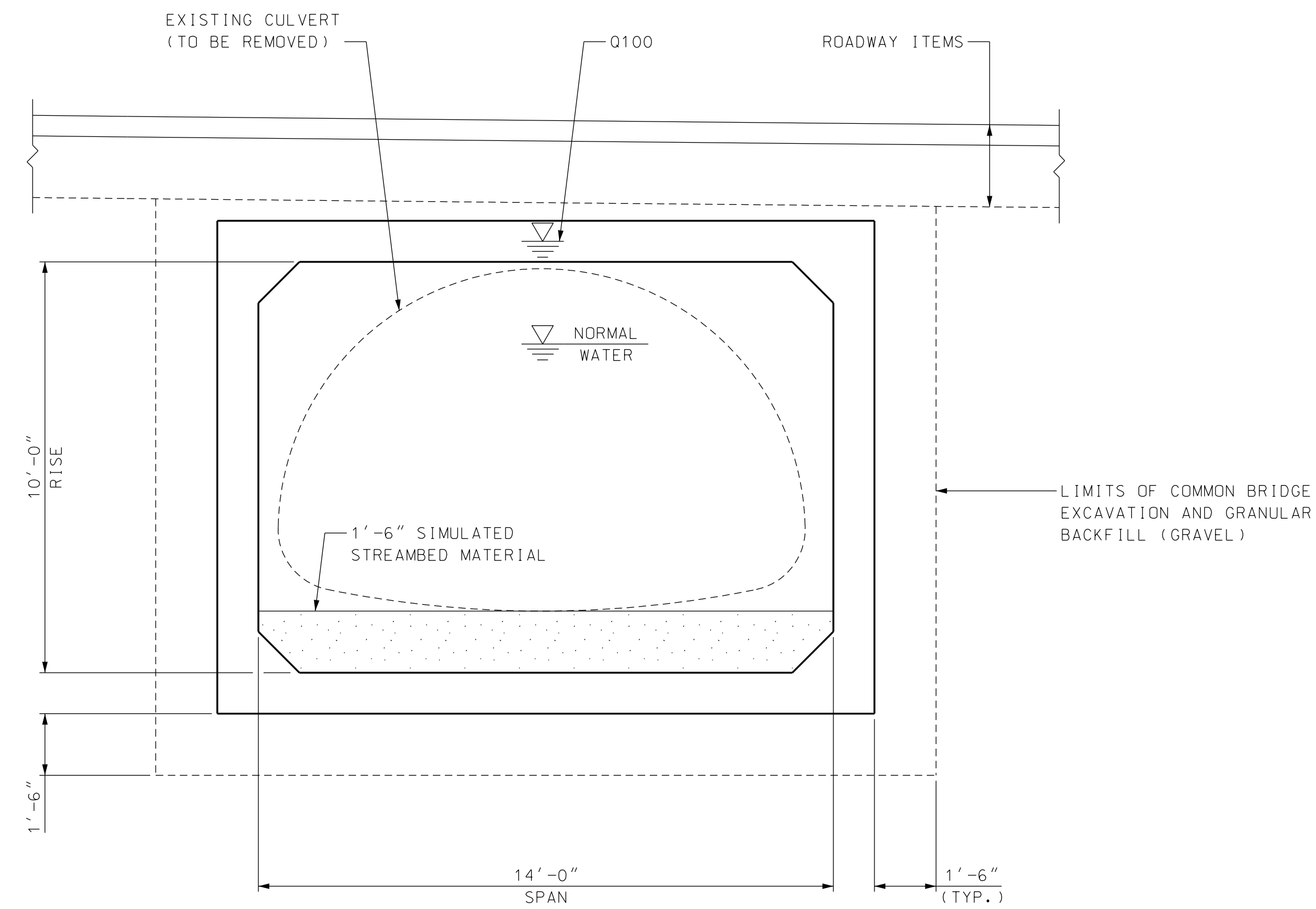


PLOT DATE	DRAWING NAME	SHEET SCALE
3/31/2021	24477plan&elev.dgn	AS NOTED

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LONGITUDINAL BOX CULVERT SECTION
SCALE: 3/8" = 1'-0"



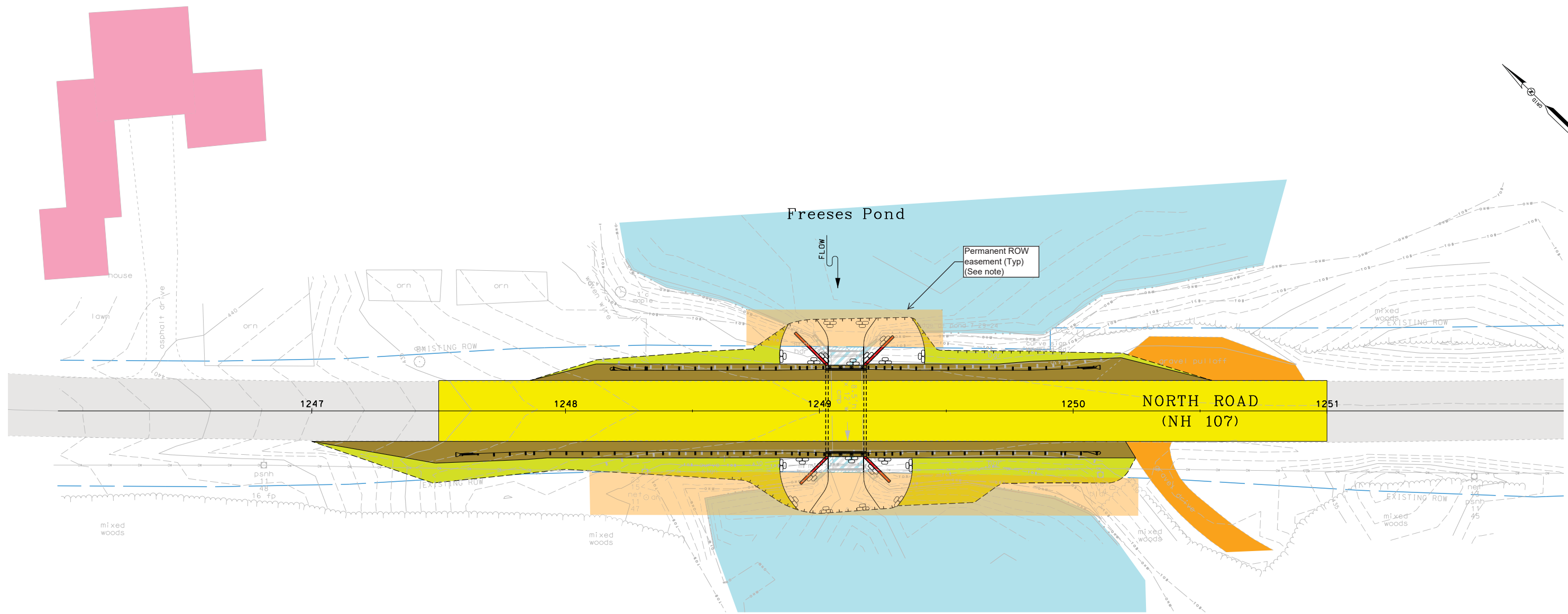
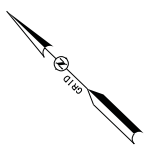
TRANSVERSE BOX CULVERT SECTION
SCALE: 3/8" = 1'-0"



STATE OF NEW HAMPSHIRE																
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN																
TOWN DEERFIELD			BRIDGE NO. 137/116			STATE PROJECT 24477										
LOCATION NH ROUTE 107 OVER FREESES POND																
BOX CULVERT DETAILS (1 OF 2)								BRIDGE SHEET								
ISSUED FOR PERMITTING 3/31/2021								DESIGNED	TSP	3/21	CHECKED	JAW	3/21	BRIDGE SHEET		
								DRAWN	KDW	3/21	CHECKED	GSG	3/21	FILE NUMBER		
								QUANTITIES						CHECKED		---
								ISSUE DATE			FEDERAL PROJECT NO.		SHEET NO.	TOTAL SHEETS		
REV. DATE						---										

PLOT DATE	DRAWING NAME	SHEET SCALE
3/31/2021	24477culvertdetails1.dgn	AS NOTED

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Note:
The Permanent ROW Easement areas are shown for information only and shall be subject to verification.

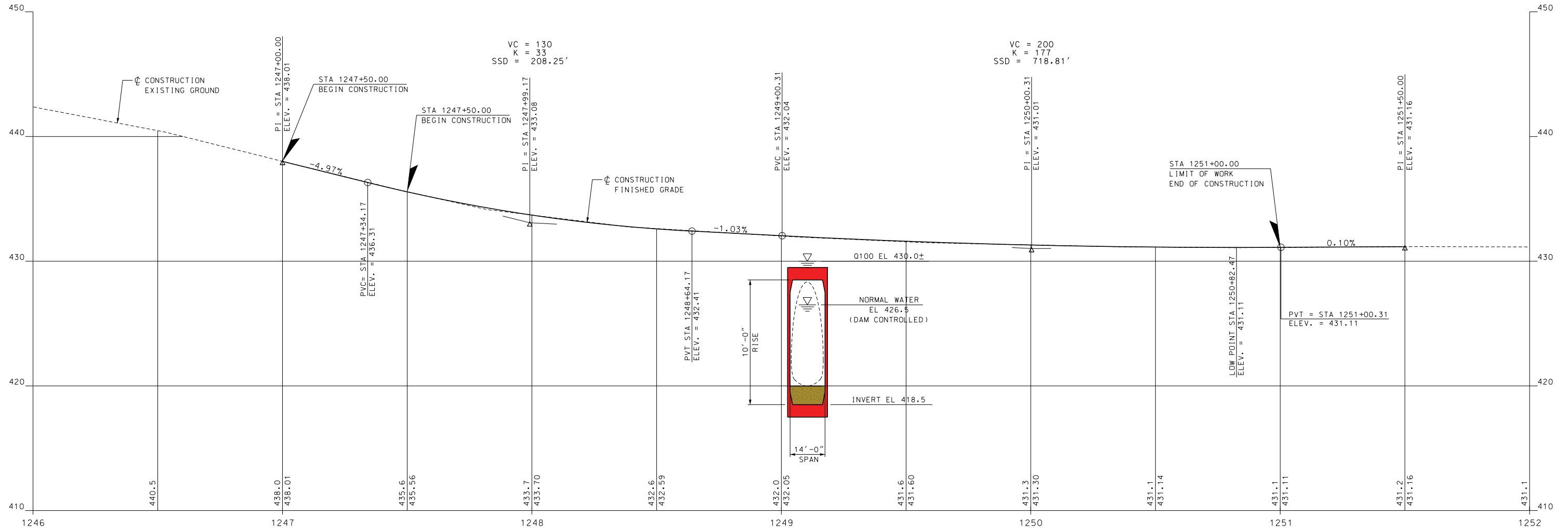
GENERAL PLAN
SCALE: 1" = 20'



PLOT DATE	DRAWING NAME	SHEET SCALE
7/7/2020	24477_color_genplan1.dgn	AS NOTED

STATE OF NEW HAMPSHIRE						
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN						
TOWN DEERFIELD		BRIDGE NO. 137/116		STATE PROJECT 24477		
LOCATION NH ROUTE 107 OVER FREESSES POND						
GENERAL PLAN						
PRELIMINARY PLANS 7/7/2020 SUBJECT TO CHANGE	DESIGNED	TSP	7/20	CHECKED	JAW	7/20
	DRAWN	KDW	7/20	CHECKED	GSG	7/20
	QUANTITIES			CHECKED		
	ISSUE DATE		FEDERAL PROJECT NO.	SHEET NO.	TOTAL SHEETS	
REV. DATE				---		

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PROFILE

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 5'



STATE OF NEW HAMPSHIRE					
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN					
TOWN DEERFIELD		BRIDGE NO. 137/116		STATE PROJECT 24477	
LOCATION NH ROUTE 107 OVER FREESSES POND					
PROFILE					BRIDGE SHEET
PRELIMINARY PLANS					2 OF 2
DESIGNED TSP 7/20			CHECKED JAW 7/20		FILE NUMBER
DRAWN KDW 7/20			CHECKED GSG 7/20		---
QUANTITIES			CHECKED		---
ISSUE DATE		FEDERAL PROJECT NO.		SHEET NO.	
REV. DATE				TOTAL SHEETS	

PLOT DATE	DRAWING NAME	SHEET SCALE
7/7/2020	24477_color_profile1.dgn	AS NOTED

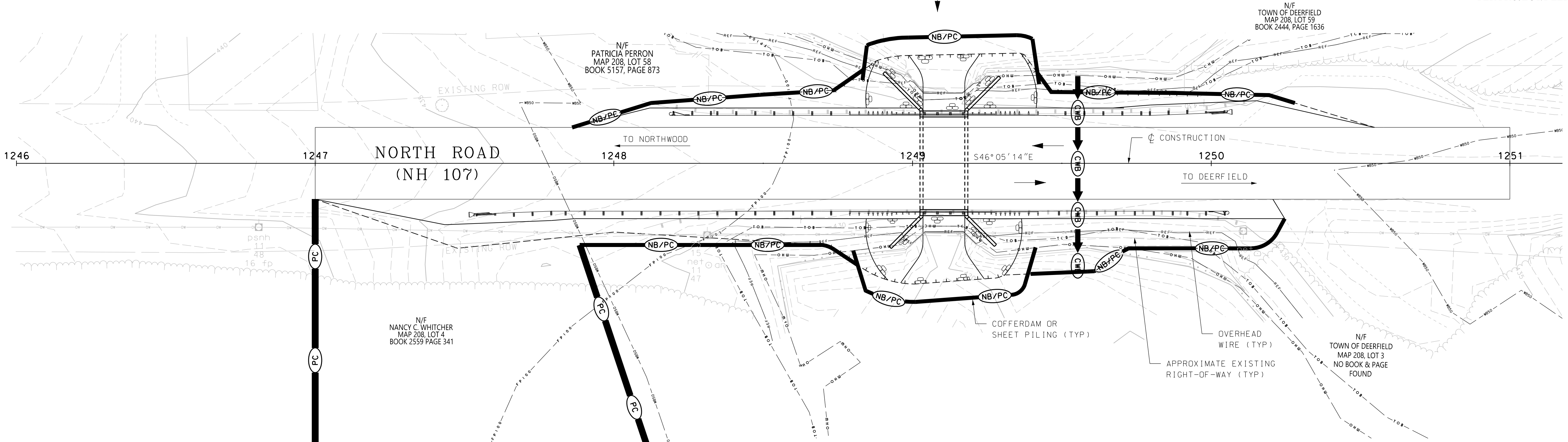
7/7/2020
SUBJECT TO CHANGE

Appendix Q – Erosion Control Plan

Freeses Pond

NOTE: MORE RESEARCH NEEDED ON ARTHUR HAMMOND PARCEL.

NOTE: 33' ROW FROM CENTERLINE HERE FROM PROJECT NRS-259-B. STARTING AT STA. 249+90 AND RUNNING TO STA. 256+06.96 PER PROJECT/DEED.



EROSION CONTROL PLAN

SCALE: 1" = 20'



Spotted turtle



Blanding's turtle

NOTE

1. IF ADULT SPOTTED OR BLANDINGS TURTLES ARE FOUND LAYING EGGS OR HATCHLINGS ARE FOUND IN A WORK AREA, PLEASE CONTACT MELISSA DOPERALSKI (CELL 603-479-1129) OR JOSH MEGYESY (CELL 978-578-0802) FOR FURTHER INSTRUCTIONS.

EROSION CONTROL PLAN LEGEND	
	PERIMETER CONTROL SILT FENCE EROSION CONTROL MIX BERM EROSION CONTROL MIX SOX TURBIDITY CURTAIN SHEET PILE COFFER DAM
	NATURAL BUFFER/PERIMETER CONTROL SILT FENCE EROSION CONTROL MIX BERM EROSION CONTROL MIX SOX TURBIDITY CURTAIN SHEET PILE COFFER DAM
	CHANNEL PROTECTION STONE CHECK DAMS STRAW WATTLES CHANNEL MATTING CLASS D EROSION STONE CLASS C STONE
	CLEAN WATER BYPASS PUMP THROUGH PIPE DRAIN THROUGH PIPE OR CHANNEL

STATE OF NEW HAMPSHIRE					
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN					
TOWN DEERFIELD	BRIDGE NO. 137/116	STATE PROJECT 24477			
LOCATION NH ROUTE 107 OVER FREESSES POND					
EROSION CONTROL PLAN					BRIDGE SHEET
ISSUED FOR PERMITTING					7 OF 9
					FILE NUMBER
3/31/2021	DESIGNED TSP 3/21	CHECKED JAW 3/21	BY DATE	BY DATE	---
	DRAWN KDW 3/21	CHECKED GSG 3/21			---
	QUANTITIES CHECKED				---
REV. DATE	FEDERAL PROJECT NO.		SHEET NO.	TOTAL SHEETS	



PLOT DATE	DRAWING NAME	SHEET SCALE
3/31/2021	24477weterplan.dgn	AS NOTED