

STATE OF NEW HAMPSHIRE INTER-DEPARTMENT COMMUNICATION

DATE: October 18, 2023

FROM: Joshua Brown
Wetlands Program Analyst

AT (OFFICE): Department of
Transportation

SUBJECT Dredge & Fill Application
Auburn, 44167

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 Highway Design for the subject major impact project. The project will replace a 41' long 5' diameter corrugated metal pipe culvert carrying an unnamed stream under NH Route 121 (Chester Road) approximately 600' north of Bunker Hill Road in the Town of Auburn, NH. The proposed project will install a 9'X6' 4-sided Box Culvert with 2' embedment (open area approx. 9'X4') with concrete wingwalls upstream and downstream.

This project was reviewed at the Natural Resource Agency Coordination Meeting on June 21, 2023. 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: <https://www.dot.nh.gov/projects-plans-and-programs/programs/environmental-management-system/project-management-section-0>

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 was determined to not be required as the proposed work was determined to be self-mitigating.

Erosion Control Plans contained within this application should be considered final in accordance with Env-Wt 527.05(a).

The lead people to contact for this project are Kirk Mudgett, Bureau of Highway Design (271-1598 or Kirk.O.Mudgett@dot.nh.gov) or Andrew O'Sullivan, Wetlands Program Manager, Bureau of Environment (271-3226 or Andrew.O'Sullivan@dot.nh.gov).

A payment voucher has been processed for this application (Voucher #732767) in the amount of \$1,306.40.

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.

JRB;
cc:
BOE Original
Town of Auburn (4 copies via certified mail)
David Trubey, NH Division of Historic Resources (Cultural Review Within)
Mike Dionne & Kevin Newton, NH Fish & Game (via electronic notification)

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



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: NH Dept. of Transportation **TOWN NAME:** Auburn

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

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

SECTION 1 - REQUIRED PLANNING FOR ALL PROJECTS (Env-Wt 306.05; RSA 482-A:3, I(d)(2))	
Please use the Wetland Permit Planning Tool (WPPT) , the Natural Heritage Bureau (NHB) DataCheck Tool , the Aquatic Restoration Mapper , or other sources to assist in identifying key features such as: priority resource areas (PRAs) , protected species or habitats , coastal areas, designated rivers, or designated prime wetlands.	
Has the required planning been completed?	<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
<ul style="list-style-type: none"> • Protected species or habitat? <ul style="list-style-type: none"> ○ If yes, species or habitat name(s): Sandy pond shore system, coastal plain grass-leaved goldenrod (<i>Euthamia caroliniana</i>), red threeawn (<i>Aristida longespica</i> var. <i>geniculata</i>), river birch (<i>Betula nigra</i>), unpretentious yellow-seeded false pimpernel (<i>Lindernia dubia</i> var. <i>anagallidea</i>), American Eel, Swamp Darter ○ NHB Project ID #: NHB23-1098 	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
• 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

<p>Is the property within a Designated River corridor? If yes, provide the following information:</p> <ul style="list-style-type: none"> Name of Local River Management Advisory Committee (LAC): [REDACTED] A copy of the application was sent to the LAC on Month: [REDACTED] Day: [REDACTED] Year: [REDACTED] 	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<p>For dredging projects, is the subject property contaminated?</p> <ul style="list-style-type: none"> If yes, list contaminant: [REDACTED] 	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<p>Is there potential to impact impaired waters, class A waters, or outstanding resource waters?</p>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<p>For stream crossing projects, provide watershed size (see WPPT or Stream Stats): 312 acres (Lidar delineation with site assessment)</p>	
<p>SECTION 2 - PROJECT DESCRIPTION (Env-Wt 311.04(i))</p>	
<p>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>	
<p>The project will replace a 41' long 5' diameter corrugated metal pipe culvert carrying a unnamed stream under NH Route 121 (Chester Road) approximately 600' north of Bunker Hill Road in the Town of Auburn. The existing pipe is in poor condition, the inlet invert has corroded away and sinkholes were observed and subsequently repaired in December 2022 and May 2023. There is only approx. 1' of cover over the pipe. The proposed project will install a 9'X6' 4-sided Box Culvert with 2' embedment (open area approx. 9'X4') with concrete wingwalls upstream and downstream. The proposed culvert will add 4' of length on the inlet. The total length will be 45'to accommodate a pedestrian crossing during construction phasing and to provide wider shoulder for pedestrian and/or bike traffic. Incidental work includes removing and installing new guardrail, pavement restoration, and grading to match the stream channel through the culvert.</p>	
<p>Permanent impacts to riverine, scrub-shrub palustrine and lacustrine wetlands are required in the immediate vicinity of the culvert inlet and outlet to install headwalls, grade the stream channel, and add 4' of culvert length on the inlet side. Temporary impacts include bordering scrub-shrub palustrine wetlands required for installation of cofferdams, water bypass, and dewatering. Temporary impacts to riverine and lacustrine wetlands is also required for access and to facilitate installation of the proposed culvert.</p>	
<p>SECTION 3 - PROJECT LOCATION</p>	
<p>Separate wetland permit applications must be submitted for each municipality within which wetland impacts occur.</p>	
<p>ADDRESS: NH RT 121/Chester Road (600ft north of Bunker Hill Road)</p>	
<p>TOWN/CITY: Auburn</p>	
<p>TAX MAP/BLOCK/LOT/UNIT: Map: 23 (Within State ROW)</p>	
<p>US GEOLOGICAL SURVEY (USGS) TOPO MAP WATERBODY NAME: Massabesic Lake and unnamed tributary</p>	

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<input type="checkbox"/> N/A		
(Optional) LATITUDE/LONGITUDE in decimal degrees (to five decimal places):		43.9070° North 71.9753° West
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 Dept. of Transportation		
MAILING ADDRESS: PO Box 483		
TOWN/CITY: Concord	STATE: NH	ZIP CODE: 03303
EMAIL ADDRESS: kirk.o.mudgett.dot.nh.gov		
FAX: [REDACTED]	PHONE: 603-271-1598	
ELECTRONIC COMMUNICATION: By initialing here: <i>Kirk Mudgett</i> I hereby authorize NHDES to communicate all matters relative to this application electronically.		
SECTION 5 - AUTHORIZED AGENT INFORMATION (Env-Wt 311.04(c))		
<input checked="" type="checkbox"/> N/A		
LAST NAME, FIRST NAME, M.I.: [REDACTED]		
COMPANY 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.		
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.		

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):

In accordance with Env-Wt 400, the jurisdictional areas within the project limits have been delineated by the NHDOT Bureau of the Environment on 4/7/23. The jurisdictional areas are referenced on the included wetland impact plans. The project has been designed in accordance with Env-Wt 527 and Env-Wt 900 to the maximum extent practicable as described per NRAM meeting on 6-21-23. The meeting minutes are included in this application package as well as a supplemental narrative to address Env-Wt 904.10-Alternative Designs. Unavoidable impacts to wetlands have been minimized to the maximum extent practicable. Project specific information is contained within this permit application.

SECTION 8 - AVOIDANCE AND MINIMIZATION

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

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

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

SECTION 9 - MITIGATION REQUIREMENT (Env-Wt 311.02)

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

Mitigation Pre-Application Meeting Date: Month: **6** Day: **21** Year: **2023**

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	5		<input type="checkbox"/>	612		<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	516	33	<input type="checkbox"/>	1156	107	<input type="checkbox"/>
	Lake / Pond	86	24	<input type="checkbox"/>	891	114	<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			<input type="checkbox"/>			<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		607	57		2659	221	

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

MINIMUM IMPACT FEE: Flat fee of \$400.

NON-ENFORCEMENT RELATED, PUBLICLY-FUNDED AND SUPERVISED RESTORATION PROJECTS, REGARDLESS OF IMPACT CLASSIFICATION: Flat fee of \$400 (refer to RSA 482-A:3, 1(c) for restrictions).

MINOR OR MAJOR IMPACT FEE: Calculate using the table below:

Permanent and temporary (non-docking):	3266 SF	× \$0.40 =	\$ 1,306.4
Seasonal docking structure:	SF	× \$2.00 =	\$
Permanent docking structure:	SF	× \$4.00 =	\$
Projects proposing shoreline structures (including docks) add \$400 =			\$
Total =			\$ 1,306.4

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The application fee for minor or major impact is the above calculated total or \$400, whichever is greater = \$ 1,306.4


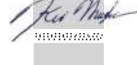
SECTION 13 - PROJECT CLASSIFICATION (Env-Wt 306.05)



Indicate the project classification.



Minimum Impact Project
 Minor Project
 Major Project



SECTION 14 - REQUIRED CERTIFICATIONS (Env-Wt 311.11)

Initial each box below to certify:




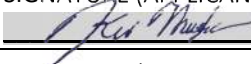



Initials:  	To the best of the signer's knowledge and belief, all required notifications have been provided.
---	--

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

SIGNATURE (OWNER): 	PRINT NAME LEGIBLY: 	DATE: 
SIGNATURE (APPLICANT, IF DIFFERENT FROM OWNER): 	PRINT NAME LEGIBLY: Kirk Mudgett	DATE: 10-5-23
SIGNATURE (AGENT, IF APPLICABLE): 	PRINT NAME LEGIBLY: 	DATE: 

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

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

TOWN/CITY CLERK SIGNATURE: 	PRINT NAME LEGIBLY: State agency exempt per RSA 482-A:3, I(a)
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TOWN/CITY: 4 copies via cert. mail	DATE: exempt per Env-WT 311.05(a)(14)
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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".

Keep this checklist for your reference; do not submit with your application.

APPLICATION CHECKLIST

Unless specified, all items below are required. Failure to provide the required items will delay a decision on your project and may result in denial of your application. Please reference statute RSA 482-A, Fill and Dredge in Wetlands, and the [Wetland Rules Env-Wt 100-900](#).

- The completed, dated, signed, and certified application (Env-Wt 311.03(b)(1)).
- Correct fee as determined in RSA 482-A:3, I(b) or (c), subject to any cap established by RSA 482-A:3, X (Env-Wt 311.03(b)(2)). Make check or money order payable to "Treasurer – State of NH".
- The Required Planning actions required by Env-Wt 311.01(a)-(c) and Env-Wt 311.03(b)(3).
- [US Army Corps of Engineers \(ACE\) "Appendix B, New Hampshire General Permits \(GPs\), Required Information and Corps Secondary Impacts Checklist"](#) and its required attachments (Env-Wt 307.02). This includes the [US Fish and Wildlife Service IPAC review](#) and [Section 106 Historic/Archaeological Resource review](#).
- Project plans described in Env-Wt 311.05 (Env-Wt 311.03(b)(4)).
- Maps, or electronic shape files and meta data, and other attachments specified in Env-Wt 311.06 (Env-Wt 311.03(b)(5)).
- Explanation of the methods, timing, and manner as to how the project will meet standard permit conditions required in Env-Wt 307 (Env-Wt 311.03(b)(7)).
- If applicable, the information regarding proposed compensatory mitigation specified in Env-Wt 311.08 and Chapter Env-Wt 800 - [Permittee Responsible Mitigation Project Worksheet](#), unless not required under Env-Wt 313.04 (Env-Wt 311.03(b)(8); Env-Wt 311.08; Env-Wt 313.04).
- Any additional information specific to the **type of resource** as specified in Env-Wt 311.09 (Env-Wt 311.03(b)(9); Env-Wt 311.04(j)).
- Project specific information required by Env-Wt 500, Env-Wt 600, and Env-Wt 900 (Env-Wt 311.03(b)(11)).
- A list containing the name, mailing address and tax map/lot number of each abutter to the subject property (Env-Wt 311.03(b)(12)).
- Copies of certified postal receipts or other proof of receipt of the notices that are required by RSA 482-A:3, I(d) (Env-Wt 311.03(b)(13)).
- Project design considerations required by Env-Wt 313 (Env-Wt 311.04(j)).
- Town tax map showing the subject property, the location of the project on the property, and the location of properties of abutters with each lot labeled with the name and mailing address of the abutter (Env-Wt 311.06(a)).
- Dated and labeled color photographs that:
 - (1) Clearly depict:
 - a. All jurisdictional areas, including but not limited to portions of wetland, shoreline, or surface water where impacts have or are proposed to occur.
 - b. All existing shoreline structures.
 - (2) Are mounted or printed no more than 2 per sheet on 8.5 x 11 inch sheets (Env-Wt 311.06(b)).
- A copy of the appropriate US Geological Survey map or updated data based on LiDAR at a scale of one inch equals 2,000 feet showing the location of the subject property and proposed project (Env-Wt 311.06(c)).
- A narrative that describes the work sequence, including pre-construction through post-construction, and the relative timing and progression of all work (Env-Wt 311.06(d)).

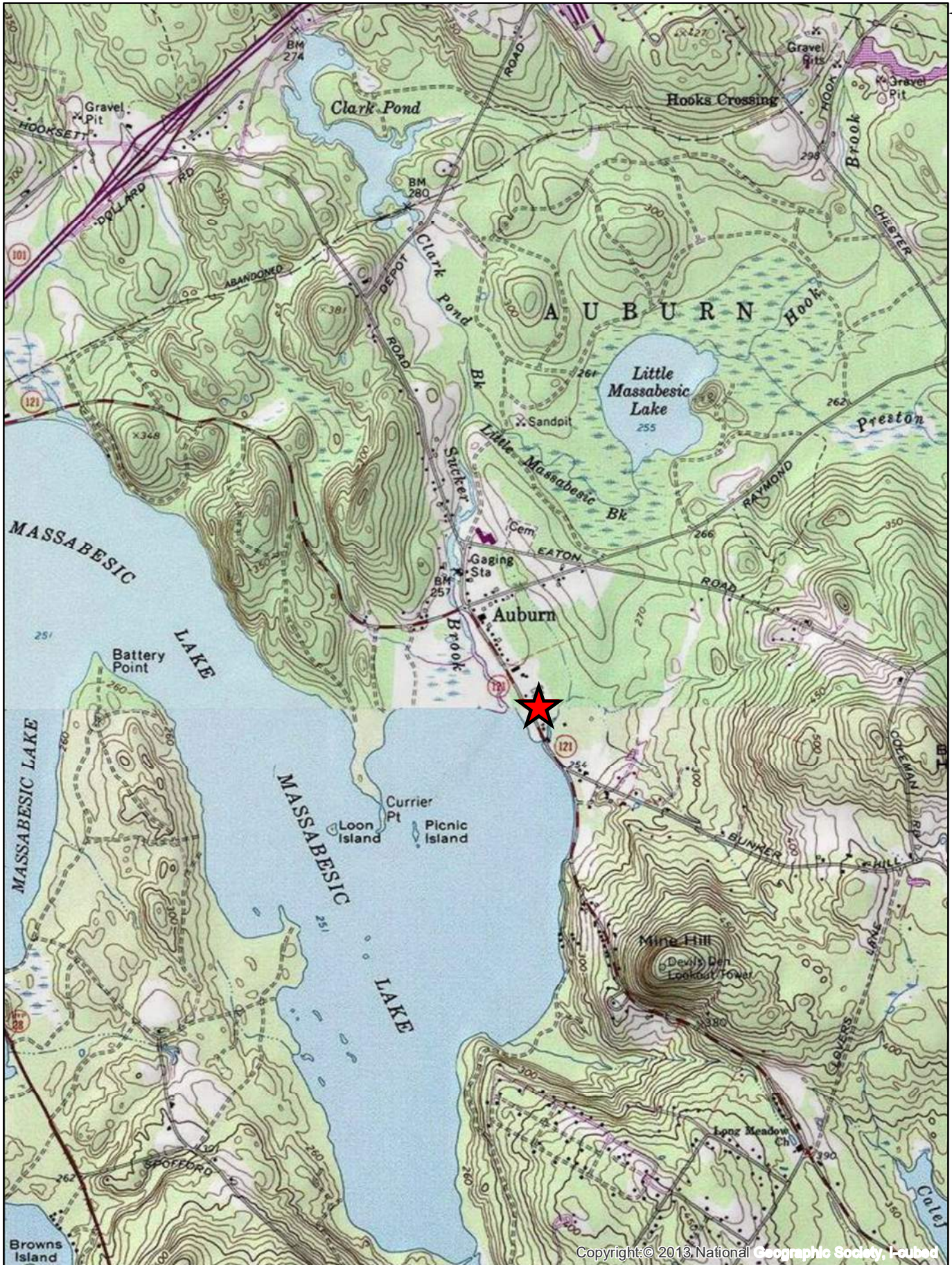
irm@des.nh.gov or (603) 271-2147

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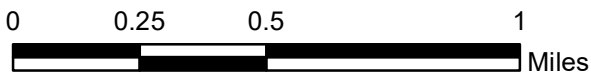
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- For all projects in the protected tidal zone, a copy of the recorded deed with book and page numbers for the property (Env-Wt 311.06(e)).
- If the applicant is not the owner in fee of the subject property, documentation of the applicant's legal interest in the subject property, provided that for utility projects in a utility corridor, such documentation may comprise a list that:
- (1) Identifies the county registry of deeds and book and page numbers of all of the easements or other recorded instruments that provide the necessary legal interest; and
 - (2) Has been certified as complete and accurate by a knowledgeable representative of the applicant (Env-Wt 311.06(f)).
- The NHB memo containing the NHB identification number and results as well as any written follow-up communications such as additional memos or email communications with either NHB or NHF&G (Env-Wt 311.06(g)). See [Wetlands Permitting: Protected Species and Habitat Fact Sheet](#).
- A statement of whether the applicant has received comments from the local conservation commission and, if so, how the applicant has addressed the comments (Env-Wt 311.06(h)).
- For projects in LAC jurisdiction, a statement of whether the applicant has received comments from the LAC and, if so, how the applicant has addressed the comments (Env-Wt 311.06(i)).
- If the applicant is also seeking to be covered by the state general permits, a statement of whether comments have been received from any federal agency and, if so, how the applicant has addressed the comments (Env-Wt 311.06(j)).
- [Avoidance and Minimization Written Narrative](#) or the [Avoidance and Minimization Checklist](#), or your own avoidance and minimization narrative (Env-Wt 311.07).
- For after-the-fact applications: information required by Env-Wt 311.12.
- [Coastal Resource Worksheet](#) for coastal projects as required under Env-Wt 600.
- Prime Wetlands information required under Env-Wt 700. See [WPPT](#) for prime wetland mapping.
- Required Attachments for Minor and Major Projects**
- [Attachment A: Minor and Major Projects](#) (Env-Wt 313.03).
- [Functional Assessment Worksheet](#) or others means of documenting the results of actions required by Env-Wt 311.10 as part of an application preparation for a standard permit (Env-Wt 311.03(b)(3); Env-Wt 311.03(b)(10)). See [Functional Assessments for Wetlands and Other Aquatic Resources Fact Sheet](#). For shoreline structures, see shoreline structures exemption in Env-Wt 311.03(b)(10)).
- Optional Materials**
- [Stream Crossing Worksheet](#) which summarizes the requirements for stream crossings under Env-Wt 900.
- Request for [concurrent processing of related shoreland / wetlands permit applications](#) (Env-Wt 313.05).

Auburn 44167



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USGS TOPO MAP: 1:24,000



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 Dept. of Transportation **TOWN NAME:** Auburn

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.

A FULLY COMPLIANT STREAM CROSSING DESIGN AT THIS LOCATION WOULD REPLACE THE EXISTING 5' DIA, CMP CULVERT WITH A 32' SPAN BRIDGE STRUCTURE WITH A WILDLIFE SHELF INSIDE. THIS WOULD LIKELY REQUIRE A PERMANENT EASEMENT OF THE NORTHERN ABUTTING PROPERTY. THE CURRENT CONSTRUCTION COST ESTIMATE FOR THIS OPTION IS \$2,169,000. SECURING FUNDING AND ADDITIONAL DESIGN TIME WOULD REQUIRE A DELAY IN THE START OF CONSTRUCTION OF 3-5 YEARS. A DELAY OF THIS MAGNITUDE WOULD INCREASE THE RISK OF FAILURE OF THE EXISTING CULVERT AND THE ROADWAY. INFLATION, ENGINEERING, AND PERMANENT EASEMENTS OR ACQUISITIONS (WHICH MAY BE REQUIRED) ARE NOT INCLUDED IN THE COST ESTIMATE. THIS ALTERNATIVE IS NOT CONSIDERED PRACTICAL UNDER THIS PROGRAM.

A HYDRAULIC DESIGN IS PROPOSED TO PASS THE 50-YEAR EVENT WITHOUT OVERTOPPING THE ROADWAY. SEVERAL SPANS WERE CONSIDERED TO BALANCE HYDRAULIC CAPACITY, A TIMELY REPLACEMENT TO REDUCE THE RISK OF FAILURE, AND ENVIRONMENTAL IMPACTS. A 9' SPAN STRUCTURE WAS SELECTED WITH A 6' RISE AND EMBEDDED WITH STREAM SIMULATION MATERIAL. PERMANENT IMPACTS ARE LIMITED TO THE PROPOSED INLET AND OUTLET TO CONSTRUCT HEADWALLS, ADD 4' OF CULVERT LENGTH AT THE INLET, AND TO GRADE THE STREAM CHANNEL.

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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.

There are no marshes delineated within 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.

The existing 5' dia. pipe culvert provides a hydrologic connection between the un-named stream and Massabesic Lake. There is no existing perch at the inlet or outlet. The proposed structure is a 9'X6' Box culvert embedded with stream simulation material. The proposed invert elevations will be set such that the simulated streambed material inside the culvert matches the existing streambed upstream and downstream. Temporary disturbance to inlet and outlet areas will be restored such that there is no change to the existing streambed grade. The hydrologic connection between the upstream and downstream channels will remain the same post-construction.

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.

The project has been designed in accordance with ENV-Wt 400, 500, and 900. Unavoidable impacts to wetlands have been minimized to the maximum extent practicable; the Department has addressed Env-Wt 311.07 Avoidance and Minimization through the checklist document included with this application. The proposed design is the minimum impact alternative that meets the project purpose and need and avoids impacts or minimizes impacts to nearby jurisdictional areas.

The resources present within the project area that will be impacted consist of the un-named stream (R2UB23), palustrine scrub-shrub wetland (PSS1F) and Massabesic Lake (L1UBH). There will be no change in the function of these wetlands due to the project. The project only proposes permanent impacts at the inlet and outlet of the proposed culvert as required to construct headwalls, add 4' of culvert at the inlet, regrade embankment adjacent to the inlet, and to grade the stream channel. The proposed temporary impacts are required to install cofferdams, water bypasses, and dewatering.

Records of rare/protected species and habitats near the project area include sandy pond shore system, coastal plain grass-leaved goldenrod, red threeawn, river birch, unpretentious yellow-seeded false pimpernel, American eel, and swamp darter. After coordination with NHB, no concerns were identified regarding impacts to the protected plant species and natural community. Regarding the wildlife records, NHFG recommendations will be followed. Recommendations include excluding baffles from culvert design, embedding the culvert with native stream material, contacting NHFG if turtles or other endangered/threatened species are encountered during construction, avoiding the use of erosion control methods containing plastic or multifilament/monofilament polypropylene netting or mesh with an opening size of greater than 1/8 inches, and ensuring NHFG access to the project area throughout the term of the

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 un-named stream is not navigable nor is it used for water recreation or is it an identified fishing location. Massabesic Lake is popular for boating and sailing (swimming is prohibited due to water supply), however depths at the culvert outlet are shallow and recreation is not expected within the project area. The Project will have no permanent effect on public commerce, navigation, or recreation. However without a timely replacement, failure of the existing culvert could result in significant transportation delays, as detours are not readily available for the traffic volume on NH 121.

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.

Downstream of the culvert a PSS1F wetland borders the lake. A 5 square foot permanent impact is proposed for the concrete wingwall and streambed material at the culvert outlet. This impact is limited to the length of wingwall required for embankment slope tie-in and is within the extent of the existing masonry wingwalls.

There are approximately 18 acres of wetlands beginning approx. 600' upstream of the project (per the National Wetlands Inventory) which likely do provide flood storage. The project will not impact these or change their flood storage function.

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.

Avoidance of all impacts is not practicable due to the poor structural condition of the existing culvert. The proposed design has the least impact to wetlands of any practicable alternative. The permanent impacts are limited at the culvert inlet and outlet. Temporary impacts to jurisdictional areas will be restored to existing conditions.

A scrub-shrub wetland is located on the edge of Massabesic Lake just to the north of the culvert. The mapped extents of the wetland overlap the existing wingwall extents. Such that, while the proposed wingwall replacement is shorter than the existing extents, there is a 5 square foot permanent impact proposed for the new wingwall.

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.

Massabesic Lake is a major drinking water supply reservoir for the City of Manchester. The project will employ best management practices during construction to prevent untreated runoff from entering the water supply. Post-project the site will have no effect on Massabesic Lake or wetlands that would be detrimental to drinking water supply and groundwater aquifer levels.

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.

Avoidance of all impacts is not practical due to the size and poor structural condition of the existing culvert. The proposed 9'X6' box culvert will cause an increase in hydraulic capacity, enhance Aquatic Organism Passage, and improve geomorphic compatability. Simulated streambed material will be added inside the culvert without causing impacts to the upstream and downstream channels. Permanent impacts to the stream channel are the minimum necessary to match the new culvert to the existing stream channel. Therefore, the proposed structure should be considered self-mitigating.

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.

N/A

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.

N/A

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.

N/A

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.

N/A

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.

N/A

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.

N/A

PART II: FUNCTIONAL ASSESSMENT	
REQUIREMENTS	Ensure that project meets the requirements of Env-Wt 311.10 regarding functional assessment (Env-Wt 311.04(j); Env-Wt 311.10).
FUNCTIONAL ASSESSMENT METHOD USED:	See attached stream crossing assessment.
NAME OF CERTIFIED WETLAND SCIENTIST (FOR NON-TIDAL PROJECTS) OR QUALIFIED COASTAL PROFESSIONAL (FOR TIDAL PROJECTS) WHO COMPLETED THE ASSESSMENT: JOSH BROWN, DEIDRA BENJAMIN	
DATE OF ASSESSMENT: 4/7/2023	
Check this box to confirm that the application includes a NARRATIVE ON FUNCTIONAL ASSESSMENT: <input checked="" type="checkbox"/>	
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: <input type="checkbox"/>	
Note: The Wetlands Functional Assessment worksheet can be used to compile the information needed to meet functional assessment requirements.	

**BUREAU OF ENVIRONMENT
CONFERENCE REPORT**

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting

DATE OF CONFERENCE: June 21, 2023

LOCATION OF CONFERENCE: Virtual meeting held via Zoom

ATTENDED BY:

NHDOT

Matt Urban
Andrew O’Sullivan
Mark Hemmerlein
Jim Commerford
Rhona Thomson
Kirk Mudgett
Arin Mills
Anthony Weatherbee
Jason Ayotte
Dillan Schmidt
David Scott

ACOE

Mike Hicks

USCG

Gary Croot

EPA

Absent

NHDES

Karl Benedict
Mary Ann Tilton
Chris Williams
Kristin Duclos

NHB

Ashley Litwinenko

NH Fish & Game

Mike Dionne
Kevin Newton

Federal Highway

Absent

US Fish & Wildlife

Absent

The Nature Conservancy

Absent

**NH Transportation &
Wildlife Workgroup**

Absent

**Consultants/ Public
Participants**

Kimberly Peace
Michael Leach
Rene LeBranche
Jenn Riordan
Tom Levins
Stephen Haas
Chris Fournier

PRESENTATIONS/ PROJECTS REVIEWED THIS MONTH: *(minutes on subsequent pages)*

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Littleton, 43809 (X-A005(203)):..... 11

- Minimizes wetland impacts to the extent practical.

At this point, the presentation was opened to questions.

Karl Benedict of NHDES stated this project should be reviewed for compliance with the stream crossing rules and section 904.09 alternative design requirements. Karl asked if the existing water velocities necessitated the proposed riprap, and if the limit of the proposed riprap could be minimized or revegetated. Rene noted the design will be reviewed relative to the riprap.

Kevin Newton of NH F&G did not have any comments since the NHB noted the project did not have any species under their jurisdiction.

Michael Hicks of USACE had no comment on the presentation.

Jean Brochi of the EPA had no comments on the presentation.

Gary Croot of the USCG had no comments on the presentation.

James Sikora of FHWA had no comments on the presentation.

NHB was not present during the meeting.

Auburn, 44167 (X-A005(339)):

Jim Commerford (hydraulics engineer, NHDOT Bureau of Highway Design) introduced the federally funded culvert replacement project in Auburn. Rhona Thomson (NHDOT Bureau of Environment) began the presentation by going over the area's natural resources.

The project is located just east of Lake Massabesic in Auburn. The project consists of replacement of a 60" corrugated metal pipe culvert that carries an unnamed stream under NH Route 121 into Lake Massabesic. Route 121 provides access to 101 and then I-93. Running south, it goes through Chester, Hampstead, and Plaistow, then runs into Massachusetts. Lake Massabesic is a water supply reservoir for the City of Manchester, and it's owned and operated by Manchester Water Works. A dam at the southwest end controls the lake level.

The 60" corrugated metal pipe culvert is 41' long and runs along a flat slope. It lies within a 312 acre watershed. The stream it carries is a tier 3 stream because of its location in a FEMA floodplain. There are no designated rivers in the area and no known previous wetland permits. The project area lies within the Massabesic Lake protected shoreland buffer, and Manchester Water Works owns the surrounding land.

There are a number of rare and/or protected species in the vicinity of the project area, mostly associated with Lake Massabesic and the sandy pond shore system. After coordination with NHB, no concerns were identified regarding impacts to plant species as a result of the project. Fish and Game recommendations will be incorporated into design and construction. The project area is located where Northern Long Eared Bats are not likely to occur.

Looking at pictures of the inlet and outlet side of the culvert, you can see Lake Massabesic is backing up through the culvert into the upstream wetland system. This backwater extends about 600 feet upstream, and at the time of the pictures, the water surface is only about two inches over the flashboards, so this is representative of the normal condition. Also shown in the pictures is the aging state of the headwalls and wingwalls – slanting, loss of material, rocks beginning to slip and fall into the river. Additional rocks have fallen in that are lower on the wall, closer to the water surface.

More pictures are shown of the culvert inlet and outlet, noting wetland delineations – the lacustrine system coming up to the culvert outlet and the scrub-shrub wetland on river right looking downstream. Looking upstream, there is a riverine system coming into the inlet and an emergent palustrine wetland on river right.

More pictures showing existing conditions include a picture showing a high rust line in the interior of the pipe, indicating normal water surface elevation; another photo of the upstream adjacent emergent palustrine wetland; and roadway pictures, noting that there is bike and pedestrian traffic on the roadway that follows the lake shoreline. The roadway profile is very flat.

Three reference reaches were taken upstream of the crossing. Each of these were still within the influence of Lake Massabesic backwater, with bankfull widths of 19, 16, and 8 feet, for an average of 14.3 feet. The stream was identified as a Type E stream, and typical of Type E streams is a high entrenchment ratio due to the high floodplain widths and a flat topography outside the banks. For the purposes of the stream crossing rule compliant span calculation, using the entrenchment ratio provided of 2.2, the calculation works out to 14.3×2.2 , for a span of 31.5 feet. We will round to 32 feet for analysis. The substrate throughout the reaches was sandy-silty material and generally very fine.

Zooming out to a project overview, this is a federally funded culvert replacement through DOT's CRDR (Culvert Replacement/Rehabilitation and Drainage Repair) program. The proposed advertising date is February 20, 2024, with construction anticipated during low flow/lake level period in late summer to fall. There is one overtopping incident known, from the Mother's Day Floods in 2006. This was largely due to Massabesic Lake overtopping its banks and flooding the roadway. The culvert is in very poor condition; numerous sinkholes have appeared within the past year and been repaired by District, so this is a high priority. If the culvert were to fail, there is no suitable detour for traffic.

The existing site plan is shown, including the 100 year floodplain and private abutter whose leach field would be impacted by a wider-span alternative.

Inflows were looked at two ways, using Streamstats rural equation flows combined with the USGS National Urban Equation to better account for development within the watershed. A Basin Development Factor of 2 was used. The 50 year flow is the design flow, which worked out to be 152 cfs. A HydroCAD model with Curve Number methodology was also used, a deterministic model based on specific watershed parameters. This gave higher flows and will be what is used for design. At 50 years, we have 209 cfs. Analysis indicates the existing 60" CMP has a capacity of about 150 cfs, overtopping at about a 10 to 25 year event, which is largely due to Massabesic

Lake level coming up high. The normal Massabesic Lake water surface elevation is 250.0 at the flashboards at the dam. The estimated 50 year flood level is 251.5 (ft, NAVD88).

Numerous alternatives were considered. Alternative 1 would be a bridge with a Stream Crossing Rule compliant span of 32'. The cost estimate is over \$2,000,000 for this structure, not including right-of-way impacts, acquisitions, design engineering, etc. If selected, the project would be delayed 3-5 years or more for re-design and securing funding under a different program. The second alternative would be slip lining with a 54" smooth bore liner inside of the 60" CMP. A separate critter crossing culvert would be located in the palustrine wetland above the normal water elevation for terrestrial passage. This would be able to meet similar capacity to the existing culvert and would cost around \$315,000. Alternative 3 is an embedded box culvert, a hydraulically sized structure with a 9' span. It would be embedded with stream simulation material and would cost around \$677,000.

The preferred, proposed design is a 6' high by 9' span box culvert with approximately 2' of embedment, leaving a 4' x 9' clear opening. It will maintain the same alignment as the existing culvert, and it will match the existing stream channel elevations. The existing slope, from upstream of the culvert to downstream going into the lake, is about half a percent. It is proposed to increase the length from 41' to 45' on the inlet side to allow for a bike and/or pedestrian crossing. This wider span would reduce the potential for clogging and debris. The proposed invert elevation is 247.0 ft.

Two years of lake level data was obtained from Manchester Water Works, showing that water withdrawals lower the lake elevation in late summer and fall. 2022 was a drought year, and water elevation got down to proposed invert elevation of 247.0 in September and October. In the previous year, water was backwatered through the culvert throughout the whole year.

For temporary bypass and water control, a cofferdam will be placed upstream, directing water to a 36" diameter temporary bypass pipe which will be located on the edge of the palustrine wetland. Water will be pumped into the pipe during low flow conditions. A sump will be installed to pump to dewatering bags located on the opposite side of the abutting driveway.

Permanent wetland impacts on the inlet and outlet side are due to construction of the wingwalls and headwall and grading the stream channel to match the existing elevations. On the inlet side, there are additional impacts to widen/lengthen the culvert 4 feet, including pushing the embankment out, which may impact the emergent palustrine wetland. Temporary impacts are required for access, water control, and water diversion. Most work will be done from the roadway, with single-lane traffic.

Limits of permanent impacts extend about 9' upstream and 5' downstream of the existing culvert, with the total permanent impacts equaling 607 square feet/57 linear feet. Limits of temporary impacts are 45' upstream and 38' downstream of the existing culvert, equaling 2,659 square feet and 221 linear feet. Total proposed combined impacts are 3,266 square feet.

In summary, with permanent square foot impacts being under 5,000 square feet and permanent linear foot impacts under 200 linear feet, no mitigation is anticipated to be required. We are proposing to permit as an alternative design per the requirements of Env-904.10, since the

proposed structure does not meet the span requirement. The proposed culvert meets the remaining general design criteria under 904.01 and complies with the provisions of 904.07 to the maximum extent practicable. The proposed culvert would substantially improve hydraulic capacity and connectivity, aquatic organism passage, sediment transport, and geomorphic compatibility.

Karl Benedict stated that the chosen alternative and alternative design preparation make sense. He asked to verify whether the stream was calculated as tier 2 or tier 3, since the watershed size makes it a tier 2 but it's on the edge of a 100 year floodplain.

Jim Commerford clarified that the watershed area would make it tier 2, but proximity to the 100 year floodplain combined with the identified species would make it tier 3.

Karl agreed and thanked Jim for the verification. His next comment was to ask whether wetland impact area 2 (upstream of the culvert) is accurately classified as palustrine emergent versus riverine? The lake level is 250 and the wetland area seems to be within that. The photos also show it within lake level. He requested to please verify whether impact area 2 is palustrine emergent or riverine. If these are PEM wetlands adjacent to a tier 3 stream, it could be a priority resource area, and permanent impacts would require mitigation just for those permanent impacts. So it would be helpful to dial that in relative to what the classification is, and note potential for priority resource area based on that.

Kevin Newton stated that coordination with Fish and Game was initiated a little over a month ago and it looks like DOT has incorporated Fish and Game comments on this.

Mike Dionne had no additional comments, other than appreciating the upgrade to this culvert.

Mike Hicks (ACOE) suggested making sure that NLEB analysis was done after April. A new procedure came out through IPaC, so he commented to make sure the new D key was used.

Andrew O'Sullivan stated that Jean Brochi from EPA was not on the call. Gary Croot (USCG) was on the call and didn't have any concerns with the crossing. Jamie Sikora (FHWA) was not on the call. NHB had a conflict and could not attend the meeting, but no concerns were identified with earlier coordination.

Dover, 41824 (Non-Fed):

Jenn Riordan (GM2) introduced the state funded project and provided an overview of the environmental resources and anticipated impacts. The project involves the proposed rehabilitation of the two bridges that carry NH Route 16 (Spaulding Turnpike) over the Cocheco River in Dover. Bridge No. 106/133 carries the northbound lane and Bridge No. 105/133 carries the southbound lane. Both bridges were constructed in 1957 and were rebuilt in 1991. They are currently on the State's Red List and are in need of repair. Proposed work includes the replacement of the superstructures, bearings, and expansion joints and repair of the existing substructures. Each bridge has three piers. The abutments are located above the bank. No new, permanent structures or riprap are proposed in the river.



AVOIDANCE AND MINIMIZATION CHECKLIST

Water Division/Land Resources Management Wetlands Bureau



[Check the Status of your Application](#)

RSA/Rule: RSA 482-A/ Env-Wt 311.07(c)

This checklist can be used in lieu of the written narrative required by Env-Wt 311.07(a) to demonstrate compliance with requirements for Avoidance and Minimization (A/M), pursuant to RSA 482-A:1 and Env-Wt 311.07(c).

For the construction or modification of non-tidal shoreline structures over areas of surface waters without wetland vegetation, complete only Sections 1, 2, and 4 (or the applicable sections in [Attachment A: Minor and Major Projects \(NHDES-W-06-013\)](#)).

The following definitions and abbreviations apply to this worksheet:

- “A/M BMPs” stands for [Wetlands Best Management Practice Techniques for Avoidance and Minimization](#) dated 2019, published by the New England Interstate Water Pollution Control Commission (Env-Wt 102.18).
- “Practicable” means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes (Env-Wt 103.62).

SECTION 1 - CONTACT/LOCATION INFORMATION		
APPLICANT LAST NAME, FIRST NAME, M.I.: NH Dept. of Transportation		
PROJECT STREET ADDRESS: NH Route 121	PROJECT TOWN: Auburn	
TAX MAP/LOT NUMBER: N/A NHDOT ROW		
SECTION 2 - PRIMARY PURPOSE OF THE PROJECT		
Env-Wt 311.07(b)(1)	Indicate whether the primary purpose of the project is to construct a water-access structure or requires access through wetlands to reach a buildable lot or the buildable portion thereof.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
If you answered “no” to this question, describe the purpose of the “non-access” project type you have proposed: The purpose of this project is to replace a hydraulically undersized and structurally deficient 5' diameter and 40' long corrugated metal pipe culvert, in order to support the long term and safe use of the State's public transportation network.		

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

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SECTION 3 - A/M PROJECT DESIGN TECHNIQUES		
Check the appropriate boxes below in order to demonstrate that these items have been considered in the planning of the project. Use N/A (not applicable) for each technique that is not applicable to your project.		
Env-Wt 311.07(b)(2)	For any project that proposes new permanent impacts of more than one acre or that proposes new permanent impacts to a Priority Resource Area (PRA), or both, whether any other properties reasonably available to the applicant, whether already owned or controlled by the applicant or not, 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.	<input type="checkbox"/> Check <input checked="" type="checkbox"/> N/A
Env-Wt 311.07(b)(3)	Whether alternative designs or techniques, such as different layouts, construction sequencing, or alternative technologies could be used to avoid impacts to jurisdictional areas or their functions and values.	<input checked="" type="checkbox"/> Check <input type="checkbox"/> N/A
Env-Wt 311.07(b)(4) Env-Wt 311.10(c)(1) Env-Wt 311.10(c)(2)	The results of the functional assessment required by Env-Wt 311.03(b)(10) were used to select the location and design for the proposed project that has the least impact to wetland functions.	<input type="checkbox"/> Check <input checked="" type="checkbox"/> N/A
Env-Wt 311.07(b)(4) Env-Wt 311.10(c)(3)	Where impacts to wetland functions are unavoidable, the proposed impacts are limited to the wetlands with the least valuable functions on the site while avoiding and minimizing impacts to the wetlands with the highest and most valuable functions.	<input type="checkbox"/> Check <input checked="" type="checkbox"/> N/A
Env-Wt 313.01(c)(1) Env-Wt 313.01(c)(2) Env-Wt 313.03(b)(1)	No practicable alternative would reduce adverse impact on the area and environments under the department's jurisdiction and the project will not cause random or unnecessary destruction of wetlands.	<input checked="" type="checkbox"/> Check <input type="checkbox"/> N/A
Env-Wt 313.01(c)(3)	The project would not cause or contribute to the significant degradation of waters of the state or the loss of any PRAs.	<input checked="" type="checkbox"/> Check <input type="checkbox"/> N/A
Env-Wt 313.03(b)(3) Env-Wt 904.07(c)(8)	The project maintains hydrologic connectivity between adjacent wetlands or stream systems.	<input checked="" type="checkbox"/> Check <input type="checkbox"/> N/A
Env-Wt 311.10 A/M BMPs	Buildings and/or access are positioned away from high function wetlands or surface waters to avoid impact.	<input checked="" type="checkbox"/> Check <input type="checkbox"/> N/A
Env-Wt 311.10 A/M BMPs	The project clusters structures to avoid wetland impacts.	<input type="checkbox"/> Check <input checked="" type="checkbox"/> N/A
Env-Wt 311.10 A/M BMPs	The placement of roads and utility corridors avoids wetlands and their associated streams.	<input type="checkbox"/> Check <input checked="" type="checkbox"/> N/A
A/M BMPs	The width of access roads or driveways is reduced to avoid and minimize impacts. Pullouts are incorporated in the design as needed.	<input type="checkbox"/> Check <input checked="" type="checkbox"/> N/A
A/M BMPs	The project proposes bridges or spans instead of roads/driveways/trails with culverts.	<input type="checkbox"/> Check <input checked="" type="checkbox"/> N/A

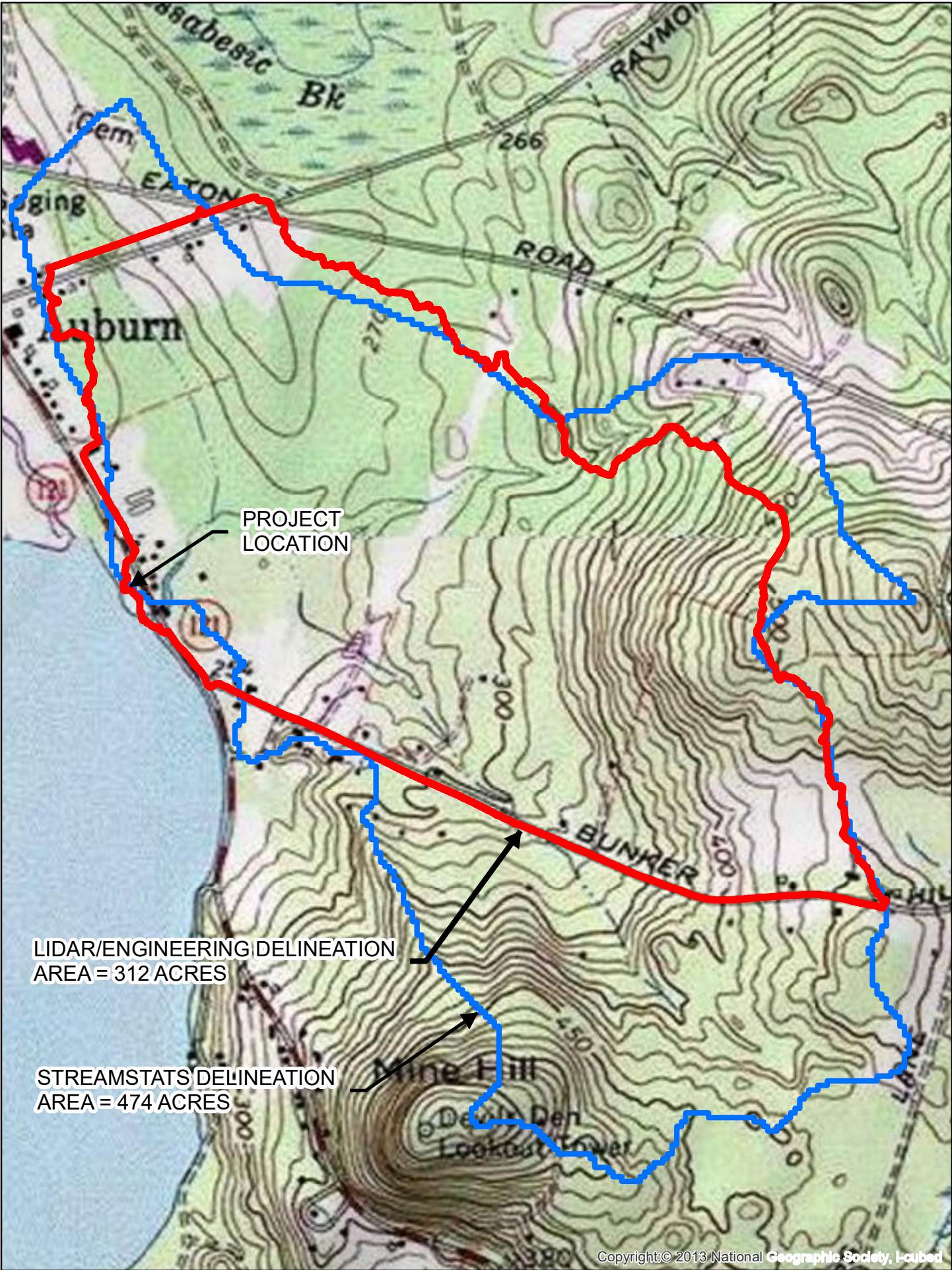
irm@des.nh.gov or (603) 271-2147

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A/M BMPs	The project is designed to minimize the number and size of crossings, and crossings cross wetlands and/or streams at the narrowest point.	<input type="checkbox"/> Check <input checked="" type="checkbox"/> N/A
Env-Wt 500 Env-Wt 600 Env-Wt 900	Wetland and stream crossings include features that accommodate aquatic organism and wildlife passage.	<input checked="" type="checkbox"/> Check <input type="checkbox"/> N/A
Env-Wt 900	Stream crossings are sized to address hydraulic capacity and geomorphic compatibility.	<input checked="" type="checkbox"/> Check <input type="checkbox"/> N/A
A/M BMPs	Disturbed areas are used for crossings wherever practicable, including existing roadways, paths, or trails upgraded with new culverts or bridges.	<input checked="" type="checkbox"/> Check <input type="checkbox"/> N/A
SECTION 4 - NON-TIDAL SHORELINE STRUCTURES		
Env-Wt 313.03(c)(1)	The non-tidal shoreline structure has been designed to use the minimum construction surface area over surfaces waters necessary to meet the stated purpose of the structure.	<input type="checkbox"/> Check <input checked="" type="checkbox"/> N/A
Env-Wt 313.03(c)(2)	The type of construction proposed for the non-tidal shoreline structure is the least intrusive upon the public trust that will ensure safe navigation and docking on the frontage.	<input type="checkbox"/> Check <input checked="" type="checkbox"/> N/A
Env-Wt 313.03(c)(3)	The non-tidal shoreline structure has been designed to avoid and minimize impacts on the ability of abutting owners to use and enjoy their properties.	<input type="checkbox"/> Check <input checked="" type="checkbox"/> N/A
Env-Wt 313.03(c)(4)	The non-tidal shoreline structure has been designed to avoid and minimize impacts to the public's right to navigation, passage, and use of the resource for commerce and recreation.	<input type="checkbox"/> Check <input checked="" type="checkbox"/> N/A
Env-Wt 313.03(c)(5)	The non-tidal shoreline structure has been designed, located, and configured to avoid impacts to water quality, aquatic vegetation, and wildlife and finfish habitat.	<input type="checkbox"/> Check <input checked="" type="checkbox"/> N/A
Env-Wt 313.03(c)(6)	The non-tidal shoreline structure has 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.	<input type="checkbox"/> Check <input checked="" type="checkbox"/> N/A

N

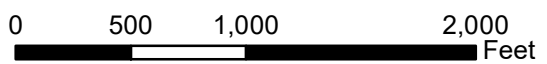


PROJECT LOCATION

LIDAR/ENGINEERING DELINEATION
AREA = 312 ACRES

STREAMSTATS DELINEATION
AREA = 474 ACRES

Watershed Map



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**New Hampshire Department of Transportation
Bureau of Environment
Stream Crossing Summary Report**

Project: Auburn, 44167

Coordinates (Lat/Long): 42.99879, -71.34386

Date of Assessment: 4/7/2023

Assessment Completed By: Josh Brown, Deidra Benjamin, & Rhona Thomson

Stream Information:

Stream Name: Cohas Brook

Stream Tier: Tier 3

Watershed Area: 312 acres

Wetland Classification: R2UB23

Average Reference Reach Values:

Average Bankfull Width: 14.3'

Average Slope: 1%

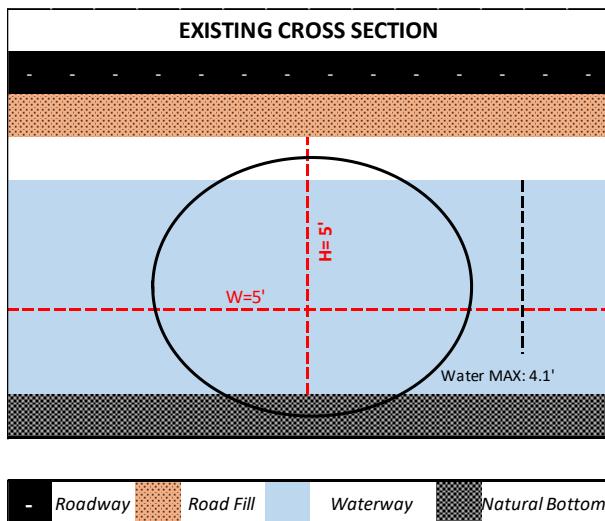
Average Floodprone Width: 200'+

Entrenchment Ratio: 16

Average Depth: 2'

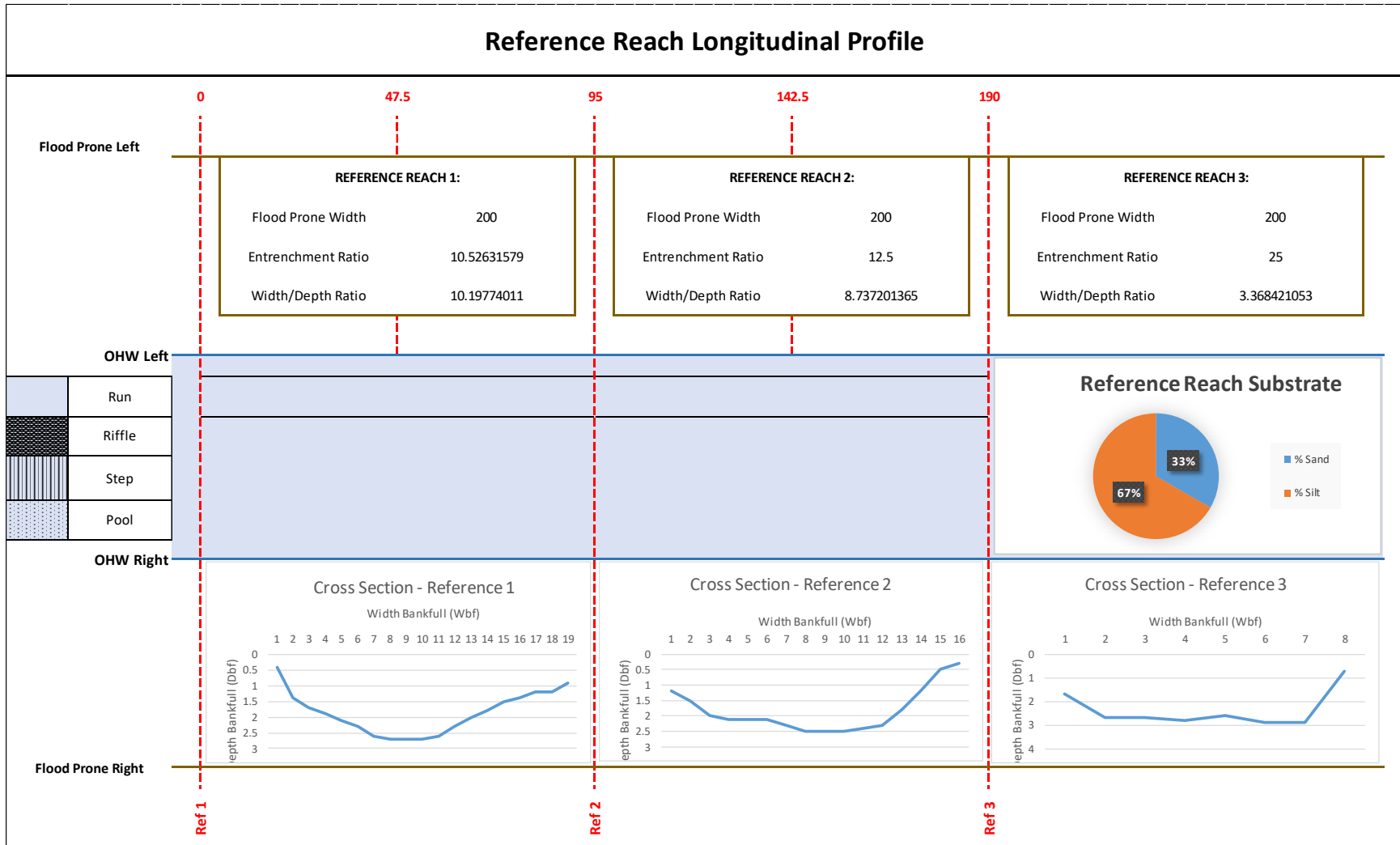
Rosgen Classification: Type E

Existing Pipe Cross Section:



EXISTING CROSSING METRICS:		
Is the crossing perched? No		
Dominant Channel Material: Mud/Silt		
Pool present? N/A		
If Yes, dimensions:		
RIPARIAN ZONE:		
Density of Vegetation: Moderate		
Dominant Species (Common Name):		
Red Oak	Red Maple	high bush blueberry
White Pine	spirea alba	Willow Sp.
Carex Sp.		

New Hampshire Department of Transportation Bureau of Environment Stream Crossing Summary Report



New Hampshire Department of Transportation
Bureau of Environment
Stream Crossing Summary Report

Photos:



Photo 1: Outlet looking west to Lake Massabesic (classified outlet area as Lacustrine).



Photo 2: Outlet looking east toward structure.

**New Hampshire Department of Transportation
Bureau of Environment
Stream Crossing Summary Report**



Photo 3: Inlet looking east upstream (Classified as Riverine).



Photo 4: Inlet looking west downstream at structure.

**New Hampshire Department of Transportation
Bureau of Environment
Stream Crossing Summary Report**



Photo 5: Small backwatered section on inlet side (R2UB23).



Photo 6: Close up photo of the small backwatered section on inlet side.

**New Hampshire Department of Transportation
Bureau of Environment
Stream Crossing Summary Report**



Photo 7: Reference Reach One – Looking downstream.



Photo 8: Reference Reach One – Looking upstream.

**New Hampshire Department of Transportation
Bureau of Environment
Stream Crossing Summary Report**



Photo 9: Reference Reach Two – Looking downstream.



Photo 10: Reference Reach Two – Looking upstream.

**New Hampshire Department of Transportation
Bureau of Environment
Stream Crossing Summary Report**



Photo 11: Reference Reach Three – Looking downstream.



Photo 12: Reference Reach Three – Looking upstream (The stream dissipates into a Scrub Shrub Wetland system).



**WETLANDS PERMIT APPLICATION
STREAM CROSSING WORKSHEET**
Water Division/Land Resources Management
Wetlands Bureau



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

This worksheet can be used to accompany Wetlands Permit Applications when proposing stream crossings.

SECTION 1 - TIER CLASSIFICATIONS

Determine the contributing watershed size at [USGS StreamStats](#).

Note: Plans for tier 2 and 3 crossings shall be designed and stamped by a professional engineer who is licensed under RSA 310-A to practice in New Hampshire.

Size of contributing watershed at the crossing location: acres

- Tier 1:** A tier 1 stream crossing is a crossing located on a watercourse where the contributing watershed size is less than or equal to 200 acres.
- Tier 2:** A tier 2 stream crossing is a crossing located on a watercourse where the contributing watershed size is greater than 200 acres and less than 640 acres.
- Tier 3:** A tier 3 stream crossing is a crossing that meets **any** of the following criteria:
- On a watercourse where the contributing watershed is more than 640 acres.
 - Within a [designated river corridor](#) unless:
 - a. The crossing would be a tier 1 stream based on contributing watershed size, or
 - b. The structure does not create a direct surface water connection to the designated river as depicted on the national hydrography dataset as found on GRANIT.
 - Within a [100-year floodplain](#) (see Section 2 below).
 - In a jurisdictional area having any protected species or habitat ([NHB DataCheck](#)).
 - In a prime wetland or within a duly-established 100-foot buffer, unless a waiver has been granted pursuant to RSA 482-A:11, IV(b) and Env-Wt 706. Review the [Wetlands Permit Planning Tool \(WPPT\)](#) for town prime wetland and prime wetland buffer maps to determine if your project is within these areas.
- Tier 4:** A tier 4 stream crossing is a crossing located on a tidal watercourse.

SECTION 2 - 100-YEAR FLOODPLAIN

Use the [FEMA Map Service Center](#) to determine if the crossing is located within a 100-year floodplain. Please answer the questions below:

- No:** The proposed stream crossing *is not* within the FEMA 100-year floodplain.
- Yes:** The proposed project *is* within the FEMA 100-year floodplain. Zone =
Elevation of the 100-year floodplain at the inlet: feet (FEMA El. or Modeled El.)

SECTION 3 - CALCULATING PEAK DISCHARGE

Existing 100-year peak discharge (Q) calculated in cubic feet per second (CFS): CFS

Calculation method:

Estimated bankfull discharge at the crossing location: CFS

Calculation method:

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

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

www.des.nh.gov

➔ **Note: If tier 1, then skip to Section 10** ➔

SECTION 4 - PREDICTED CHANNEL GEOMETRY BASED ON REGIONAL HYDRAULIC CURVES

For tier 2, tier 3 and tier 4 crossings only.

Bankfull Width: 10.8 feet Mean Bankfull Depth: 1.2 feet

Bankfull Cross Sectional Area: 12.8 square feet (SF)

SECTION 5 - CROSS SECTIONAL CHANNEL GEOMETRY: MEASUREMENTS OF THE EXISTING STREAM WITHIN A REFERENCE REACH

For tier 2, tier 3 and tier 4 crossings only.

Describe the reference reach location: Upstream, developed

Reference reach watershed size: 474 acres

Parameter	Cross Section 1 Describe bed form glide (e.g. pool, riffle, glide)	Cross Section 2 Describe bed form glide (e.g. pool, riffle, glide)	Cross Section 3 Describe bed form glide (e.g. pool, riffle, glide)	Range
Bankfull Width	19 feet	16 feet	8 feet	8 - 19 feet
Bankfull Cross Sectional Area	35.4 SF	29.3 SF	19 SF	19 - 35.4 SF
Mean Bankfull Depth	1.86 feet	1.83 feet	2.38 feet	1.83 - 2.38 feet
Width to Depth Ratio	10.2	8.7	3.4	3.4 - 10.2
Max Bankfull Depth	2.7 feet	2.5 feet	2.9 feet	2.5 - 2.9 feet
Flood Prone Width	200+ feet	200+ feet	200+ feet	200+ feet
Entrenchment Ratio	10.5	12.5	25	10.5 - 25

Use **Figure 1** below to determine the measurements of the Reference Reach Attributes

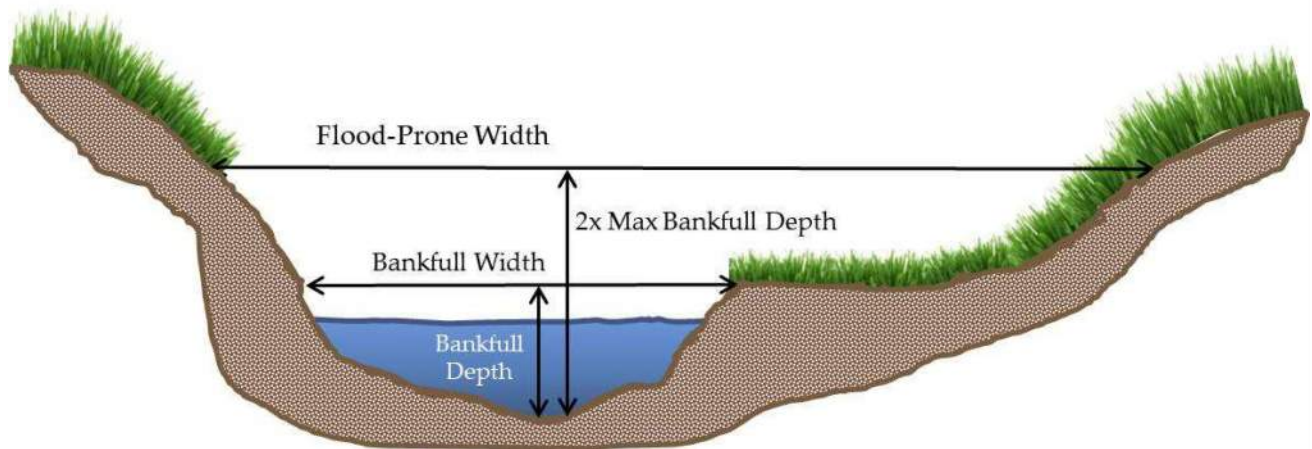


Figure 1: Determining the Reference Reach Attributes.

SECTION 6 - LONGITUDINAL PARAMETERS OF THE REFERENCE REACH AND CROSSING LOCATION

For tier 2, tier 3 and tier 4 crossings only.

Average Channel Slope of the Reference Reach: 1%

Average Channel Slope at the Crossing Location: 1%

SECTION 7 - PLAN VIEW GEOMETRY

Note: Sinuosity is measured a distance of at least 20 times bankfull width, or 2 meander belt widths.

For tier 2, tier 3 and tier 4 crossings only.

Sinuosity of the Reference Reach: 1.06	
Sinuosity of the Crossing Location: 1.59	
SECTION 8 - SUBSTRATE CLASSIFICATION BASED ON FIELD OBSERVATIONS	
<i>For tier 2, tier 3 and tier 4 crossings only.</i>	
% of reach that is bedrock:	0 %
% of reach that is boulder:	0 %
% of reach that is cobble:	0 %
% of reach that is gravel:	0 %
% of reach that is sand:	33 %
% of reach that is silt:	67 %
SECTION 9 - STREAM TYPE OF REFERENCE REACH	
<i>For tier 2, tier 3 and tier 4 crossings only.</i>	
Stream Type of Reference Reach:	Type E

Refer to Rosgen Classification Chart (**Figure 2**) below:

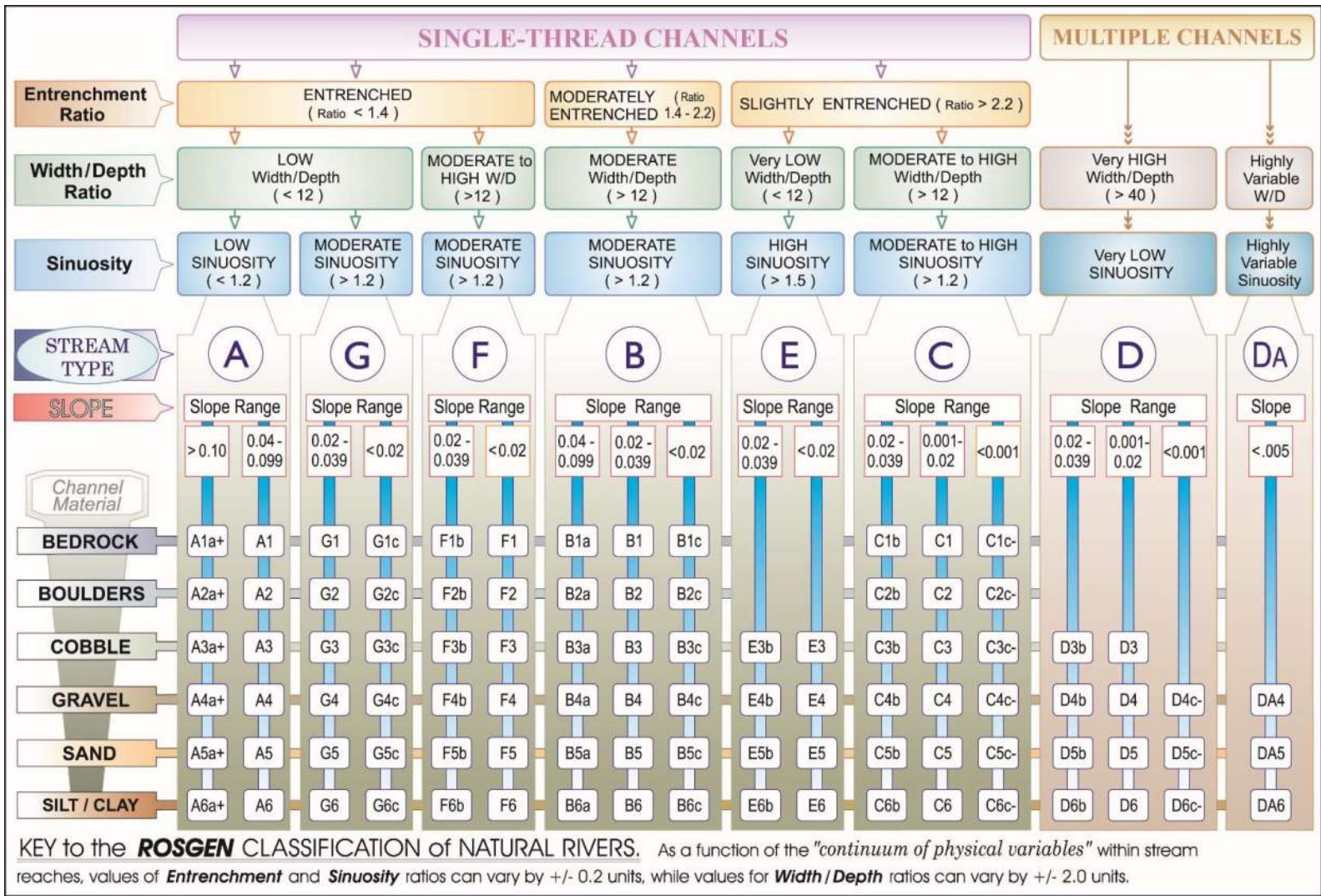


Figure 2: Reference from Applied River Morphology, Rosgen, 1996.

SECTION 10 - CROSSING STRUCTURE METRICS						
Existing Conditions	Existing Structure Type:	<input type="checkbox"/> Bridge span <input type="checkbox"/> Pipe arch <input type="checkbox"/> Open-bottom culvert <input checked="" type="checkbox"/> Closed-bottom culvert <input type="checkbox"/> Closed-bottom culvert with stream simulation <input type="checkbox"/> Other: <input type="text"/>				
	Existing Crossing Span: (perpendicular to flow)	<input type="text"/> feet	Culvert Diameter:	5 feet		
	Existing Crossing Length: (parallel to flow)	~41 feet	Inlet Elevation: El.	<input type="text"/> feet		
Proposed Conditions	Existing Crossing Length: (parallel to flow)	~41 feet	Outlet Elevation: El.	<input type="text"/> feet		
	Proposed Structure Type:		Tier 1	Tier 2	Tier 3	Alternative Design
	Bridge Span		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Pipe Arch		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
	Closed-bottom Culvert		<input type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/>
Open-bottom Culvert		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Closed-bottom Culvert with stream simulation		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Proposed Structure Span:	9 feet	Culvert Diameter:	N/A feet			

(perpendicular to flow)	Inlet Elevation: El. 247.9 feet
Proposed Structure Length: 45 feet (parallel to flow)	Outlet Elevation: El. 247.5 feet Culvert Slope: 1%
Proposed Entrenchment Ratio: * 9'/200'=0.045 For Tier 2, Tier 3 and Tier 4 Crossings Only. To accommodate the entrenchment ratio, floodplain drainage structures may be utilized.	

* Note: Proposed Entrenchment Ratio must meet the minimum ratio for each stream type listed in **Figure 3**, otherwise the applicant must address the Alternative Design criteria listed in Env-Wt 904.10.

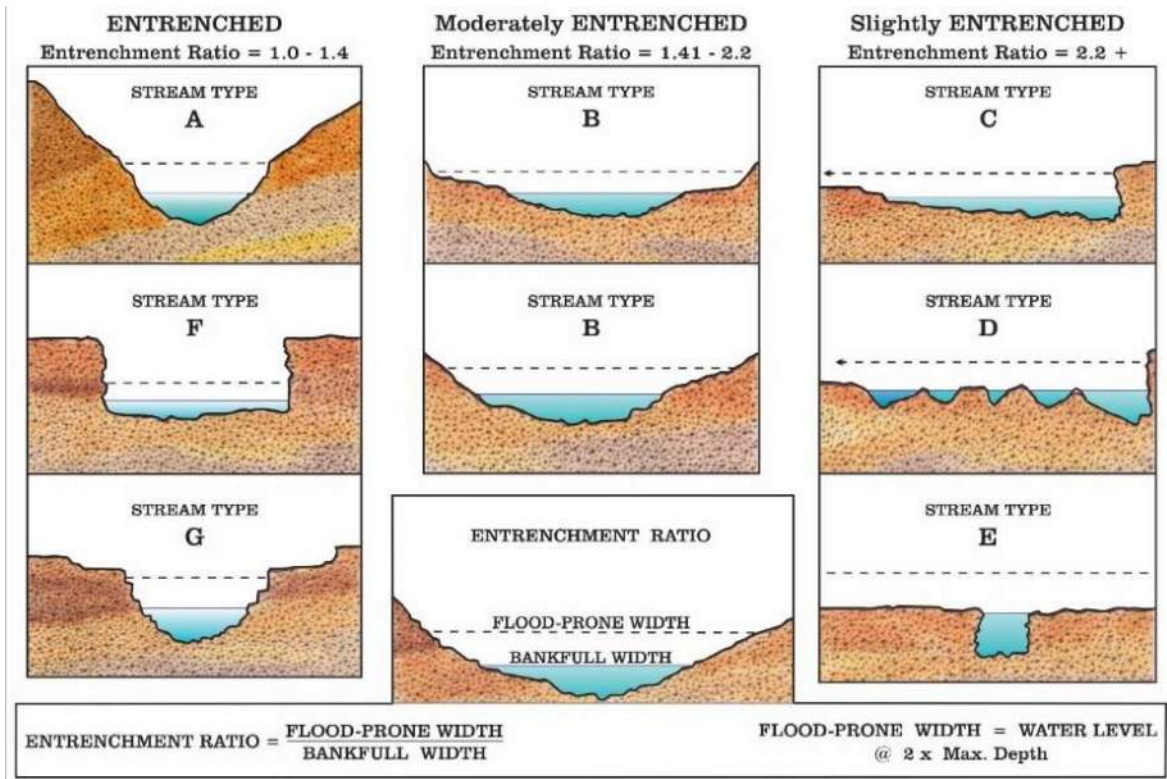


Figure 3: Reference from Applied River Morphology, Rosgen, 1996.

SECTION 11 - CROSSING STRUCTURE HYDRAULICS		
	Existing	Proposed
100 year flood stage elevation at inlet:	253.46	253.08
Flow velocity at outlet in feet per second (FPS):	7.29	5.68
Calculated 100 year peak discharge (Q) for the <i>proposed</i> structure in CFS:		269
Calculated 50 year peak discharge (Q) for the <i>proposed</i> structure in CFS:		209
SECTION 12 - CROSSING STRUCTURE OPENNESS RATIO		
For tier 2, tier 3 and tier 4 crossings only.		
Crossing Structure Openness Ratio* = 0.48 (Existing)		
* Openness box culvert = (height x width)/length Openness round culvert = (3.14 x radius ²)/length		

SECTION 13 - GENERAL DESIGN CONSIDERATIONS

Env-Wt 904.01 requires all stream crossings to be designed and constructed according to the following requirements. Check each box if the project meets these general design considerations.

All stream crossings shall be designed and constructed so as to:

- Not be a barrier to sediment transport.
- Prevent the restriction of high flows and maintain existing low flows.
- Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction.
- Not cause an increase in the frequency of flooding or overtopping of banks.
- Maintain or enhance geomorphic compatibility by:
 - a. Minimizing the potential for inlet obstruction by sediment, wood, or debris, and
 - b. Preserving the natural alignment of the stream channel.
- Preserve watercourse connectivity where it currently exists.
- Restore watercourse connectivity where:
 - a. Connectivity previously was disrupted as a result of human activity(ies), and
 - b. Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both.
- Not cause erosion, aggradation, or scouring upstream or downstream of the crossing.
- Not cause water quality degradation.

SECTION 14 - TIER-SPECIFIC DESIGN CRITERIA

Stream crossings must be designed in accordance with the tier specific design criteria listed in Part Env-Wt 904.

- The proposed project meets the tier specific design criteria listed in Part Env-Wt 904 and each requirement has been addressed in the plans and as part of the wetland application.

SECTION 15 - ALTERNATIVE DESIGN

NOTE: If the proposed crossing does not meet all of the general design considerations, the tier specific design criteria, or the minimum entrenchment ratio for each given stream type listed in **Figure 3**, then an alternative design plan and associated requirements must be addressed pursuant to Env-Wt 904.10.

- I have submitted an alternative design and addressed each requirement listed in Env-Wt 904.10.

Memo

NH Natural Heritage Bureau NHB DataCheck Results Letter

Please note: portions of this document are confidential.
Maps and NHB record pages are confidential and should be redacted from public documents.

To: Rhona Thomson, Department of Transportation
7 Hazen Drive
Concord, NH 03302

From: NHB Review, NH Natural Heritage Bureau
Date: 4/13/2023 (valid until 04/13/2024)

Re: Review by NH Natural Heritage Bureau

Permits: NHDES - Shoreland Standard Permit, NHDES - Wetland Standard Dredge & Fill - Major

NHB ID: NHB23-1098

Town: Auburn

Location: NH Route 121

Description: The proposed project involves the replacement of a failing 60-inch diameter corrugated metal pipe on NH Route 121 by Lake Massabesic in Auburn. Headwalls and guardrail will be reset within the same footprint.

cc: NHFG Review

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

Comments NHB: There are several rare plants nearby the proposed project area associated with the sandy pond shore system. Please send NHB proposed plans and representative photos during the growing season.
F&G: Please refer to NHFG consultation requirements below.

Natural Community	State ¹	Federal	Notes
Sandy pond shore system	--	--	These natural communities are extremely vulnerable to trampling, and tend to disappear from areas that experience even moderate recreational use. They are vulnerable to changes to the hydrology of the pond or lake.

Plant species	State ¹	Federal	Notes
coastal plain grass-leaved-goldenrod (<i>Euthamia caroliniana</i>)	T	--	Threats include water level manipulations of ponds, pond shore development, heavy recreational use, and herbiciding. Increased nutrient levels, e.g., from septic runoff, is also a threat.
red threeawn (<i>Aristida longespica</i> var. <i>geniculata</i>)	T	--	The pond or lake shore natural communities where this species occurs are extremely

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

Memo

NH Natural Heritage Bureau NHB DataCheck Results Letter

Please note: portions of this document are confidential.
Maps and NHB record pages are confidential and should be redacted from public documents.

river birch (<i>Betula nigra</i>)	T	--	vulnerable to trampling, and tend to disappear from areas that experience even moderate recreational use. They are also vulnerable to changes to the lake's hydrology. Additional habitats include sandplains and disturbed openings.
unpretentious yellow-seeded false pimpernel (<i>Lindernia dubia</i> var. <i>anagallidea</i>)*	E	--	The population could be deleteriously affected by any project activities that alter the hydrology of its habitat, by increased sedimentation, and by increased nutrients/pollutants in stormwater runoff. The pond shore habitat that supports this species can only withstand a limited amount of human disturbance. Trampling, removal, and burying of vegetation are all destructive and can also result in the introduction of non-native invasive species. Dams that reduce natural fluctuations in water level threaten the long-term survival of this habitat, e.g., by allowing woody shrubs and other more competitive vegetation to become established. Another threat is the contamination of water quality by road and agricultural runoff.

Vertebrate species

	State ¹	Federal	Notes
American Eel (<i>Anguilla rostrata</i>)*	SC	--	Contact the NH Fish & Game Dept (see below).
Swamp Darter (<i>Etheostoma fusiforme</i>)*	SC	--	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.

For all animal reviews, refer to 'IMPORTANT: NHFG Consultation' section below.

Disclaimer: 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.

IMPORTANT: NHFG Consultation

If this NHB Datacheck letter DOES NOT include ANY wildlife species records, then, based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

If this NHB Datacheck letter includes a record for a threatened (T) or endangered (E) wildlife species, consultation with the New Hampshire Fish and Game Department under Fis 1004 may be required. To review the Fis 1000 rules (effective February 3, 2022), please go to <https://wildlife.state.nh.us/wildlife/environmental-review.html>. All requests for consultation and submittals should be sent via email to

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

Memo

NH Natural Heritage Bureau NHB DataCheck Results Letter

Please note: portions of this document are confidential.
Maps and NHB record pages are confidential and should be redacted from public documents.

NHFGreview@wildlife.nh.gov or can be sent by mail, and **must include the NHB DataCheck results letter number and “Fis 1004 consultation request” in the subject line.**

If the NHB DataCheck response letter does not include a threatened or endangered wildlife species but includes other wildlife species (e.g., Species of Special Concern), consultation under Fis 1004 is not required; however, some species are protected under other state laws or rules, so coordination with NH Fish & Game is highly recommended or may be required for certain permits. While some permitting processes are exempt from required consultation under Fis 1004 (e.g., *statutory permit by notification*, *permit by rule*, *permit by notification*, *routine roadway registration*, *docking structure registration*, or *conditional authorization by rule*), coordination with NH Fish & Game may still be required under the rules governing those specific permitting processes, and it is recommended you contact the applicable permitting agency. For projects not requiring consultation under Fis 1004, but where additional coordination with NH Fish and Game is requested, please email NHFGreview@wildlife.nh.gov, and include the NHB DataCheck results letter number and “review request” in the email subject line.

Contact NH Fish & Game at (603) 271-0467 with questions.

Department of Natural and Cultural Resources
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(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301



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

In Reply Refer To:
Project code: 2023-0040593
Project Name: Auburn 44167

June 01, 2023

Federal Action Agency (if applicable): New Hampshire Department of Transportation

Subject: Record of project representative's no effect determination for 'Auburn 44167'

Dear Rhona Thomson:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on June 01, 2023, for 'Auburn 44167' (here forward, Project). This project has been assigned Project Code 2023-0040593 and all future correspondence should clearly reference this number. **Please carefully review this letter.**

Ensuring Accurate Determinations When Using IPaC

The Service developed the IPaC system and associated species' determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into the IPaC must accurately represent the full scope and details of the Project. Failure to accurately represent or implement the Project as detailed in IPaC or the Northern Long-eared Bat Rangewide Determination Key (Dkey), invalidates this letter.

Determination for the Northern Long-Eared Bat

Based upon your IPaC submission and a standing analysis, your project has reached the determination of "No Effect" on the northern long-eared bat. To make a no effect determination, the full scope of the proposed project implementation (action) should not have any effects (either positive or negative), to a federally listed species or designated critical habitat. Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may

include consequences occurring outside the immediate area involved in the action. (See § 402.17).

Under Section 7 of the ESA, if a federal action agency makes a no effect determination, no consultation with the Service is required (ESA §7). If a proposed Federal action may affect a listed species or designated critical habitat, formal consultation is required except when the Service concurs, in writing, that a proposed action "is not likely to adversely affect" listed species or designated critical habitat [50 CFR §402.02, 50 CFR§402.13].

Other Species and Critical Habitat that May be Present in the Action Area

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

- Monarch Butterfly *Danaus plexippus* Candidate

You may coordinate with our Office to determine whether the Action may affect the animal species listed above and, if so, how they may be affected.

Next Steps

Based upon your IPaC submission, your project has reached the determination of “No Effect” on the northern long-eared bat. If there are no updates on listed species, no further consultation/coordination for this project is required with respect to the northern long-eared bat. However, the Service recommends that project proponents re-evaluate the Project in IPaC if: 1) the scope, timing, duration, or location of the Project changes (includes any project changes or amendments); 2) new information reveals the Project may impact (positively or negatively) federally listed species or designated critical habitat; or 3) a new species is listed, or critical habitat designated. If any of the above conditions occurs, additional coordination with the Service should take place to ensure compliance with the Act.

If you have any questions regarding this letter or need further assistance, please contact the New England Ecological Services Field Office and reference Project Code 2023-0040593 associated with this Project.

Action Description

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

1. Name

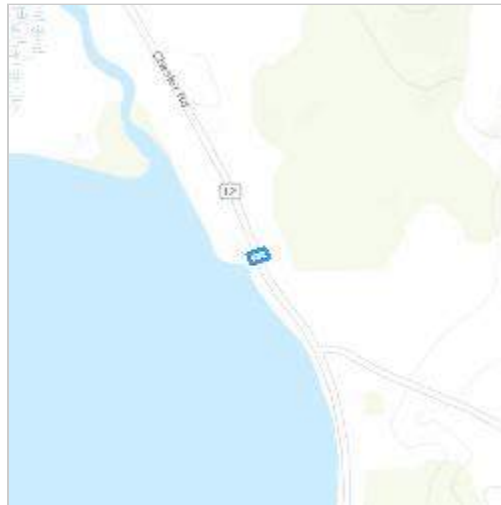
Auburn 44167

2. Description

The following description was provided for the project 'Auburn 44167':

This project proposes to replace a failing 60-inch diameter corrugated metal pipe carrying an unnamed brook under NH Route 121 into Massabesic Lake in Auburn. The deteriorated invert of the pipe is causing sinkholes in the gravel shoulder and settlement of the stone header. The proposed replacement is a 9' x 6' concrete box culvert with 2' of embedment. Headwalls and guardrail would be replaced.

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@42.9987238,-71.3439879462783,14z>



DETERMINATION KEY RESULT

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

QUALIFICATION INTERVIEW

1. Does the proposed project include, or is it reasonably certain to cause, intentional take of the northern long-eared bat or any other listed species?

Note: Intentional take is defined as take that is the intended result of a project. Intentional take could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered or proposed species?

No

2. The proposed action does not intersect an area where the northern long-eared bat is likely to occur, based on the information available to U.S. Fish and Wildlife Service as of the most recent update of this key. If you have data that indicates that northern long-eared bats are likely to be present in the action area, answer "NO" and continue through the key.

Do you want to make a no effect determination?

Yes

PROJECT QUESTIONNAIRE

IPAC USER CONTACT INFORMATION

Agency: New Hampshire Department of Transportation

Name: Rhona Thomson

Address: 7 Hazen Drive

City: Concord

State: NH

Zip: 03301

Email: rhona.c.thomson@dot.nh.gov

Phone: 5024208963



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

In Reply Refer To:
Project Code: 2023-0040593
Project Name: Auburn 44167

June 01, 2023

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

To Whom It May Concern:

Updated 4/12/2023 - Please review this letter each time you request an Official Species List, we will continue to update it with additional information and links to websites may change.

About Official Species Lists

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. Federal and non-Federal project proponents have responsibilities under the Act to consider effects on listed species.

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 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. 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 by returning to an existing project's page in IPaC.

Endangered Species Act Project Review

Please visit the “**New England Field Office Endangered Species Project Review and Consultation**” website for step-by-step instructions on how to consider effects on listed

species and prepare and submit a project review package if necessary:

<https://www.fws.gov/office/new-england-ecological-services/endangered-species-project-review>

NOTE Please do not use the **Consultation Package Builder** tool in IPaC except in specific situations following coordination with our office. Please follow the project review guidance on our website instead and reference your **Project Code** in all correspondence.

Northern Long-eared Bat - (Updated 4/12/2023) The Service published a final rule to reclassify the northern long-eared bat (NLEB) as endangered on November 30, 2022. The final rule went into effect on March 31, 2023. You may utilize the **Northern Long-eared Bat Rangewide Determination Key** available in IPaC. More information about this Determination Key and the Interim Consultation Framework are available on the northern long-eared bat species page:

<https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis>

For projects that previously utilized the 4(d) Determination Key, the change in the species' status may trigger the need to re-initiate consultation for any actions that are not completed and for which the Federal action agency retains discretion once the new listing determination becomes effective. If your project was not completed by March 31, 2023, and may result in incidental take of NLEB, please reach out to our office at newengland@fws.gov to see if reinitiation is necessary.

Additional Info About Section 7 of the Act

Under section 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether projects may affect threatened and endangered species and/or designated critical habitat. If a Federal agency, or its non-Federal representative, determines 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 Federal agency also may need to consider proposed species and proposed critical habitat in the consultation. 50 CFR 402.14(c)(1) specifies the information required for consultation under the Act regardless of the format of the evaluation. 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:

<https://www.fws.gov/service/section-7-consultations>

In addition to consultation requirements under Section 7(a)(2) of the ESA, please note that under sections 7(a)(1) 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. Please contact NEFO if you would like more information.

Candidate species that appear on the enclosed species list have no current protections under the ESA. The species' occurrence on an official species list does not convey a requirement to

consider impacts to this species as you would a proposed, threatened, or endangered species. The ESA does not provide for interagency consultations on candidate species under section 7, however, the Service recommends that all project proponents incorporate measures into projects to benefit candidate species and their habitats wherever possible.

Migratory Birds

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

<https://www.fws.gov/program/migratory-bird-permit>

<https://www.fws.gov/library/collections/bald-and-golden-eagle-management>

Please feel free to contact us at **newengland@fws.gov** with your **Project Code** in the subject line if you need more information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat.

Attachment(s): Official Species List

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

Project Code: 2023-0040593

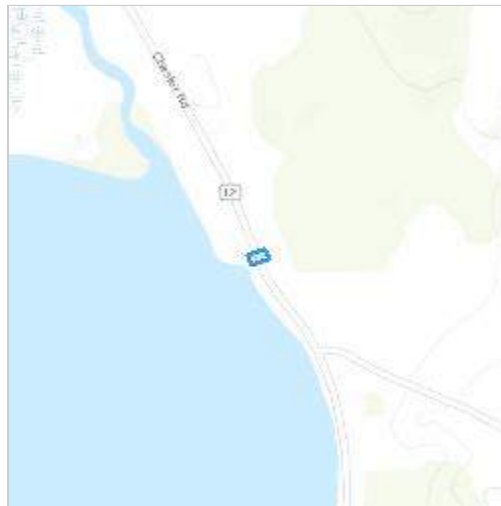
Project Name: Auburn 44167

Project Type: Culvert Repair/Replacement/Maintenance

Project Description: This project proposed to replace a failing 60-inch diameter corrugated metal pipe and reset headwalls within the same footprint. Guardrail will also be reset in the same footprint, and existing established staging areas will be used and protected.

Project Location:

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@42.9987238,-71.3439879462783,14z>



Counties: Rockingham County, New Hampshire

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	Endangered

INSECTS

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

CRITICAL HABITATS

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

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

IPAC USER CONTACT INFORMATION

Agency: New Hampshire Department of Transportation

Name: Rhona Thomson

Address: 7 Hazen Drive

City: Concord

State: NH

Zip: 03301

Email: rhona.c.thomson@dot.nh.gov

Phone: 5024208963

Thomson, Rhona

From: DNCR: NHB Review
Sent: Monday, June 5, 2023 11:40 AM
To: Thomson, Rhona
Subject: RE: NHB Review: NHB23-1098

Hi Rhona,

Thank you for sending additional materials for this proposed project. Upon reviewing the wetland impact plan, and photographs, NHB has no further concerns regarding this proposed work. Please ensure that proper erosion and sediment controls are utilized to avoid potential secondary impacts.

Please contact NHB if there are any changes to proposed work.

Thank you,

Ashley Litwinenko
Environmental Reviewer
Natural Heritage Bureau (NHB)
Division of Forests & Lands - DNCR
172 Pembroke Rd., Concord, NH 03301
Phone: 603-271-2834
[Datacheck Tool](#)
[NHB Botany information](#)

Advance Vacation Notice – OFF 7/24 – 7/28

Follow-up on Environmental Review related emails will be delayed that week, please email NHBReview@dncr.nh.gov prior to that time if a follow-up review is time sensitive. NHB DataCheck Letters will still be distributed, and NHB DataCheck Tool assistance will be available during this time. Thank you for your understanding.

From: Thomson, Rhona <Rhona.C.Thomson@dot.nh.gov>
Sent: Monday, June 5, 2023 10:38 AM
To: DNCR: NHB Review <nhbreview@dncr.nh.gov>
Subject: RE: NHB Review: NHB23-1098

Hi Ashley,

Thanks for the clarification and sorry for the late response! The design team recently developed preliminary wetland impact plans for Auburn 44167 (NHB23-1098), which are attached to this email. Also attached are photos of the site and proposed impact areas, along with survey plans of existing conditions. Please let me know if you have any questions, comments, or concerns.

Thank you!

Rhona Thomson
Environmental Analyst
NH Department of Transportation
Bureau of Environment
7 Hazen Drive, Concord, NH 03302
Ph: 603-271-7966

From: DNCR: NHB Review <nhbreview@dncr.nh.gov>
Sent: Monday, April 24, 2023 11:53 AM
To: Thomson, Rhona <Rhona.C.Thomson@dot.nh.gov>
Subject: RE: NHB Review: NHB23-1098

Hi Rhona,

Thank you for following-up regarding NHB23-1098. Photos of all proposed impact areas, guardrails/ headwalls to be reset, and including any temporary equipment staging locations would be helpful for NHB's review.

This project area directly overlaps with the Sandy pond shore system, and several rare plant species are associated with this system. When you do have project plans for existing and proposed conditions, even if they are just preliminary it will help NHB assess potential impacts. The project plans combined with the photographs of all impact areas will help us to provide recommendations.

If you have any other questions, please feel free to reach out.

Thank you,

Ashley Litwinenko
Environmental Reviewer
Natural Heritage Bureau (NHB)
Division of Forests & Lands - DNCR
172 Pembroke Rd., Concord, NH 03301
Phone: 603-271-2834
[Datacheck Tool](#)
[NHB Botany information](#)

From: Thomson, Rhona <Rhona.C.Thomson@dot.nh.gov>
Sent: Monday, April 24, 2023 9:56 AM
To: DNCR: NHB Review <nhbreview@dncr.nh.gov>
Cc: Litwinenko, Ashley <Ashley.M.Litwinenko@dncr.nh.gov>
Subject: RE: NHB Review: NHB23-1098

Hi Ashley,

Thank you for your review! Please let me know if there is someone else I should ask, but I wanted to check in about the requested representative photos during the growing season. What type of photos would be most helpful (photos of the project area in general, or photos of the specific protected plant species nearby)?

Specific project plans aren't available yet, but the proposed plans are to replace the 60" corrugated metal pipe culvert, most likely with a concrete box within the same footprint. Guardrail and headwalls will also be reset.

I will keep you updated as more information becomes available, but please let me know if there is additional information I can provide or if you have questions or concerns.

Thank you!
Rhona

Rhona Thomson
Environmental Analyst
NH Department of Transportation
Bureau of Environment
7 Hazen Drive, Concord, NH 03302
Ph: 603-271-7966
Rhona.c.thomson@dot.nh.gov

From: DNCR: NHB Review <nhbreview@dncr.nh.gov>
Sent: Thursday, April 13, 2023 12:07 PM
To: Thomson, Rhona <Rhona.C.Thomson@dot.nh.gov>
Cc: FGC: NHFG review <NHFGreview@wildlife.nh.gov>
Subject: NHB Review: NHB23-1098

Attached, please find the review of the NH Natural Heritage Bureau's (NHB) database to determine whether the proposed project could impact rare species and exemplary natural communities.

If you received a comment on the DataCheck Letter from NHB, please reply to this email with any documents, photos, or information requested.

If you received a comment on the DataCheck Letter from NHFG, please follow the consultation requirements listed on the DataCheck Letter and coordinate with NHFGreview@wildlife.nh.gov

Best,
Maddie

Maddie Severance
Assistant Ecological Information Specialist

NH Natural Heritage Bureau
DNCR - Forests & Lands
172 Pembroke Rd
Concord, NH 03301
603-271-0687

If there are problems with your DataCheck letter or you need help using the DataCheck Tool, contact Maddie Severance: (603) 271-0687

If there is a rare plant or exemplary natural community and an NHB Comment on your DataCheck letter, contact Ashley Litwinenko for any environmental review questions: (603) 271-2834

If there is a rare wildlife species and an NHFG comment on your DataCheck Letter, contact Kim Snyder for any environmental review questions: (603) 271- 0467

Thomson, Rhona

From: Newton, Kevin
Sent: Tuesday, May 2, 2023 2:31 PM
To: Thomson, Rhona
Cc: FGC: NHFG review; Winters, Melissa; Detzel, Seta
Subject: NHB23-1098, Culvert Replacement Under NH Route 121, Auburn, NHDES Wetland Standard Dredge & Fill - Major, NHDED Shoreland Standard Permit

Good afternoon Rhona,

New Hampshire Fish and Game has completed review of the consultation request for NHB23-1098 prepared by the New Hampshire Department of Transportation. The proposed project is for the replacement of an existing 60" CMP with a 8'x6' embedded box culvert located under NH Route 121, Auburn, NH.

If plan details change, please consult the New Hampshire Fish and Game Nongame and Endangered Wildlife Program to determine if updated recommendations are required.

Applications associated with this review:

- NHDES – Wetland Standard Dredge & Fill - Major (pending)
- NHDES – Shoreland Standard Permit (pending)

Incorporation of NHFG recommendations is not required for Species of Special Concern; however, incorporation of recommendations is highly recommended or may be required for certain permits. Applicants would still be responsible for any actions that may result in the take of these species. The recommendations below should be incorporated into site plans in order to help minimize potential take.

NHFG Recommendations:

1. American Eel (State species of special concern) and Swamp Darter (State species of special concern) occur within the vicinity of the project area. All operators and personnel working on or entering the site should be made aware of the potential presence of these species.
2. Baffles should not be included within the culvert design.
3. If the proposed culvert is to be embedded, it should be embedded with native stream material to mimic upstream and downstream conditions.
4. Turtles may be attracted to disturbed ground during nesting season (May 15th – June 30th). All turtle species nests are protected by NH laws. If a nest is observed or suspected, operators shall contact Melissa Winters (603-479-1129) or Josh Megyesy (978-578-0802) at NHFG immediately for further consultation.
5. All manufactured erosion and sediment control products, with the exception of turf reinforcement mats, utilized for, but not limited to, slope protection, runoff diversion, slope interruption, perimeter control, inlet protection, check dams, and sediment traps shall not contain plastic, or multifilament or monofilament polypropylene netting or mesh with an opening size of greater than 1/8 inches.
6. All observations of threatened or endangered species on the project site shall be reported immediately to the NHFG nongame and endangered wildlife environmental review program by phone at 603-271-2461 and by email at NHFGreview@wildlife.nh.gov, with the email subject line containing the NHB DataCheck tool results letter assigned number, the project name, and the term Wildlife Species Observation.
7. Photographs of the observed species and nearby elements of habitat or areas of land disturbance shall be provided to NHFG in digital format at the above email address for verification, as feasible.

8. In the event a threatened or endangered species is observed on the project site during the term of the permit, the species shall not be disturbed, handled, or harmed in any way prior to consultation with NHFG and implementation of corrective actions recommended by NHFG.
9. NHFG, including its employees and authorized agents, shall have access to the property during the term of the permit.

NHFG has completed our review of materials submitted for consultation under FIS 1004 in compliance with the Memorandum of Agreement between the Fish and Game Department and the Department of Transportation regarding Environmental Review of NHDOT Projects(RSA 21-A:, III), signed by NHFG dated 2/4/2022. Questions or concerns on NHFG recommendations must follow FIS 1004.12. Note that NHFG recommendations may be withdrawn pursuant to FIS 1004.

Sincerely,

Kevin Newton
Wildlife Biologist
NH Fish and Game Department
Wildlife Division
11 Hazen Drive, Concord NH 03301
Phone: 603-271- 5860

New Hampshire Fish and Game requirements for environmental review consultation can be found at: https://gencourt.state.nh.us/rules/state_agencies/fis1000.html. ALL requests for consultation and submittals should be sent via email to NHFGreview@wildlife.nh.gov or can be sent hardcopy by mail. **The NHB datacheck results letter number needs to be included in the email subject line to read as "NHBxx-xxxx_Project Name_FIS 1004 Consultation Submittal"**.

The requirements for consultation (Fis 1004) shall not apply to the following: statutory permit by notification, permit by rule, permit by notification, routine roadway registration, docking structure registration, or conditional authorization by rule. Review requests for these projects or other project types should be submitted to NHFGreview@wildlife.nh.gov or can be sent hardcopy by mail – email or mail subject line for these review requests should read **"NHBxx-xxxx_Project Name_ Env. Review Request"**.

Please provide shapefiles/KMZ/KMLs of the project site (and relevant features if applicable) with your submittal. Review statements provided in the NHB Datacheck Results letter for additional guidance

Appendix B Certification – Activities with Minimal Potential to Cause Effects

Date Reviewed: 7/20/2023
(Desktop or Field Review Date)

Project Name: Auburn

State Number: 44167

FHWA Number: X-A005(339)

Environmental Contact: Rhona Thomson

DOT

Email Address: Rhona.c.thomson@dot.nh.gov

Project Manager: Jim Commerford

Project Description: This project proposes to replace a failing 60" corrugated metal pipe culvert with a 6' high by 9' span box culvert with approximately 2' of embedment in the same alignment as the existing culvert. The culvert length is proposed to increase from 41' to 45' on the inlet side to allow for a bike and/or pedestrian crossing. Headwalls and guardrails would also be replaced. Existing established staging areas would be used and protected. The proposed culvert would be safer and would substantially improve hydraulic capacity and connectivity.

Please select the applicable activity/activities:

Highway and Roadway Improvements	
<input type="checkbox"/>	1. Modernization and general highway maintenance that may require additional highway right-of-way or easement , 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 checked="" 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 type="checkbox"/>	7. Non-historic bridge and culvert maintenance, renovation, or total replacement, that may require minor additional right-of-way or easement , including: Choose an item. 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

Section 106 Programmatic Agreement – Cultural Resources Review Effect Finding

Appendix B Certification – Activities with Minimal Potential to Cause Effects

Railroad Improvements	
<input type="checkbox"/>	15. Modernization, maintenance, and safety improvements of railroad facilities within the existing railroad or highway right-of-way, provided no historic railroad features are impacted , including, but not limited to: 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.

This project is applicable under Appendix B of the Programmatic Agreement due to its scope, which involves replacement of a 60” corrugated metal pipe culvert. The culvert is estimated to be about 20 years old, when a stone box culvert lintels were removed and the CMP dropped into the existing culvert area. Excavation shall be limited to previously disturbed areas. The project was reviewed by the Cultural Resource Program Manager and the Cultural Resource Program Specialist using EMMIT, and no individually inventoried properties or historic properties were identified in or adjacent to the project area. There is a pre-contact archaeological site 547 ft northwest of the project area associated with the nearby Clair’s Boat Launch area, on the east shore of Massabesic Lake’s Picnic Parking area on a level terrace along the sandy beach lake shore. All project activities, including staging, would be limited to previously disturbed areas. Staging on the grassy parking area near the boat launch would be minimized to the extent practical, for temporarily placing dewatering/sediment filter bags. Should any excavation need to occur in this area, please contact the Bureau of Environment, as there is a potential for archaeological sensitivity.

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?	Not Applicable	NHDHR R&C # assigned?	<u>N/A</u>
Please identify public outreach effort contacts; method of outreach and date:	<u>Initial contact letters were sent to local officials on 2/6/23. A site meeting was held with NHDOT personnel, Manchester Water Works and an Auburn selectboard member on May 3, 2023.</u>		

Section 106 Programmatic Agreement – Cultural Resources Review Effect Finding

Appendix B Certification – Activities with Minimal Potential to Cause Effects

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

<input type="checkbox"/>	No Potential to Cause Effects	<input checked="" 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 <i>not</i> 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:			
_____		_____	
NHDOT Cultural Resources Staff		Date	

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.

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.



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

**Appendix B
New Hampshire General Permits
Required Information and USACE Section 404 Checklist**

USACE Section 404 Checklist

1. Attach any explanations to this checklist. Lack of information could delay a USACE 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 3 for information on single and complete projects.
4. Contact USACE at (978) 318-8832 with any questions.
5. The information requested below is generally required in the NHDES Wetland Application. See page 61 for NHDES references and Admin Rules as they relate to the information below.

1. Impaired Waters	Yes	No
1.1 Will any work occur within 1 mile upstream in the watershed of an impaired water? See the following to determine if there is an impaired water in the vicinity of your work area. * https://nhdes-surface-water-quality-assessment-site-nhdes.hub.arcgis.com/ https://www.des.nh.gov/water/rivers-and-lakes/water-quality-assessment https://www4.des.state.nh.us/onestopdatamapper/onestopmapper.aspx		X
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 tidal SAS, prime wetlands, or priority resource areas? 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://www4.des.state.nh.us/NHB-DataCheck/ .	X	
2.3 If wetland crossings are proposed, are they adequately designed to maintain hydrology, sediment transport & wildlife passage?	N/A	
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
2.5 The overall project site is more than 40 acres?		X
2.6 What is the area of the previously filled wetlands?	unknown	
2.7 What is the area of the proposed fill in wetlands?	57 sq. ft	
2.8 What % of the overall project sire will be previously and proposed filled wetlands?	unknown	
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://www4.des.state.nh.us/NHB-DataCheck/ . USFWS IPAC website: https://ipac.ecosphere.fws.gov/	X	

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: https://wildlife.state.nh.us/wildlife/wap-high-rank.html. • 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 31?	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	
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 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 37 GC 14(d) of the GP document**	N/A	
6. Minimal Impact Determination (for projects that exceed 1 acre of permanent impact)	Yes	No
Projects with greater than 1 acre of permanent impact must include the following: <ul style="list-style-type: none"> • Functional assessment for aquatic resources in the project area. • On and off-site alternative analysis. • Provide additional information and description for how the below criteria are met. 		
6.1 Will there be complete loss of aquatic resources on site?		
6.2 Have the impacts to the aquatic resources been avoided and minimized to the greatest extent practicable?		
6.3 Will all aquatic resource function be lost?		
6.4 Does the aquatic resource (s) have regional significance (watershed or ecoregion)?		
6.5 Is there an on-site alternative with less impact?		
6.6 Is there an off-site alternative with less impact?		
6.7 Will there be a loss to a resource dependent species?		
6.8 Are indirect impacts greater than 1 acre within and adjacent to the project area?		
6.9 Does the proposed mitigation replace aquatic resource function for direct, indirect, and cumulative impacts?		

*Although this checklist utilizes state information, its submittal to USACE is a federal requirement.

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

**CULVERT REPLACEMENT
NH ROUTE 121 OVER UN-NAMED BROOK
AUBURN, NH
NHDOT PROJECT NO. 44167
SUPPLEMENTAL NARRATIVE**

Project Description

The project will replace an existing 60" diameter corrugated metal pipe which conveys a small stream into Massabesic lake. The proposed alternative is a precast 9' wide by 5' high 4-sided box culvert embedded with stream simulation material, with concrete headwall and wingwalls upstream and downstream, a 12" layer of simulated streambed material to initiate natural sedimentation processes, and reconstruction of the roadway over the culvert. This is a federally funded culvert rehabilitation project. The proposed advertising date is February 20, 2024, with construction anticipated in the summer-fall of 2024.

This project was initiated and is funded under NHDOT's Federal CRDR Program (Culvert Replacement/Rehabilitation & Drainage Repair). The Program purpose is to address major culvert and drainage needs statewide that are not being addressed through current or future Capital Improvement or other programmatic projects. The Program receives \$2,000,000 in total funding annually, which includes construction, engineering, and ROW costs. The Program funding is fully committed for at least the next three years. Due to the discovery of severe sinkholes and piping in December of 2022 which required rapid repairs, the replacement or rehabilitation of this culvert has been prioritized. The pipe is at the end of its design life and failure to address these deficiencies without a timely replacement could lead to failure or collapse of the culvert and would cause serious impacts to public/private infrastructure and the travelling public.

Existing Conditions

The existing crossing is a 41' long 60" diameter corrugated metal pipe culvert with a granite headwall and granite masonry wingwalls. No record of original construction is known, however initial construction was likely a stone box installed circa 1920s. Anecdotal evidence from District 5 suggests the current structure was installed around 20 years ago. The culvert slope is nearly flat with a downstream outlet elevation of 247.55 with about 1' of embedment. At the inlet the bottom of the pipe was fully eroded and an approx. 1' deep hole was observed, likely from recent installation of a (since removed) grate to prevent beaver activity. Mortar has eroded from the headwalls and the wingwalls are beginning to fall into the stream. The fill height over the pipe is about 1'.

In late December of 2022, severe sinkholes and soil piping were discovered and required emergency repair by NHDOT District 5. Water was flowing around the pipe and eroding the embankment up to the shoulder and pavement. This raised significant concern for the stability of the culvert and roadway and prioritized repair and replacement. Sinkholes have subsequently been discovered in May and again in September. Pictures of the sinkholes are available in the Photo Log.

The crossing is a Tier 3 due to FEMA Zone A Floodplain surrounding Massabesic Lake and the priority species identified by NHB. The watershed is approximately 312 acres (0.487 square miles) based on Lidar. The Streamstats watershed was larger, 474 acres (0.74 square miles), however it did not account for roadway elevations and drainage structures along Bunker Hill Road. Which based on field review would prevent runoff from crossing the roadway and instead flow to Massabesic Lake through a 12" and 30" culvert under NH 121 south of Bunker Hill Road.

Review of the NHDES Aquatic Restoration Mapper on 3/28/23 notes the culvert is backwatered, it can pass the 2-year flood, and a drainage area of 470 acres. AOP scored reduced passage and Geomorphic score was Mostly Incompatible.

NH121 is a Tier 3 road (Major Collector) with average daily traffic (ADT) volume in 2022 of 5,102 vehicles per day with 6% being business/commercial vehicles. The peak recorded ADT was 6,298 vehicles per day in 2019 with 8% being business/commercial vehicles. The paved width is about 24' wide with markings for 11' travel lanes with 1' shoulders. The ROW width is 66'. The posted speed limit is 35 mph.

A stream assessment was performed by the NHDOT Bureau of the Environment on 4/7/23. The average slope is 1% for approximately 200 feet upstream before the stream dissipates into a scrub-shrub wetland system. Bankfull measurements ranged from 8 to 19 feet at the three reference reach cross sections. The stream is a Rosgen Type E stream with a very large entrenchment ratio (typical of Type E streams), ranging from 10.5 to 25 at the reference reaches. The flood prone width at each cross section was 200+ feet indicative of the flat topography to the in the lower reaches of the watershed.

A challenge of construction at this location is the lack of an available detours. The proposed design will limit NH121 to one way traffic for the duration of construction. Access to remove the existing pipe and install the replacement structure will primarily be done from within the existing roadway.

Natural and Cultural resources

Threatened and Endangered Species:

An Official Species List was requested and obtained from the US Fish and Wildlife Service using the Information for Planning and Conservation (IPaC) tool. The Official Species List indicated one mammal species, the Northern Long-Eared Bat (NLEB), and one insect species, Monarch Butterfly, within the project area.

Using the FHWA, FRA, FTA Programmatic Consultation for Transportation Projects affecting NLEB or Indiana Bat on IPaC, it was found that the project may rely on the amended February 5, 2018 FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-Eared Bat. The proposed action intersects an area where northern long-eared bats are not likely to occur; therefore, it is anticipated that the project would have no effect on northern long-eared bat. The project is not expected to impact any federally protected species and no further consultation with the USFWS is required.

The monarch butterfly has become a candidate for listing under the Endangered Species Act (ESA). The USFWS will review the monarch's status each year until resources are available to begin developing a

proposal to list the monarch as threatened or endangered under the ESA. The candidate status of the monarch does not provide protection under the Endangered Species Act, and no further coordination with the USFWS is required at this time. Monarch habitat includes non-forested, non-shrubby areas where there is potential for nectar species (flowering plants) and/or milkweed plants, including, but not limited to, regularly or semi-regularly mowed areas within the ROW and where a clear zone is maintained.

The Natural Heritage Bureau data check:

The Natural Heritage Bureau data check identified one exemplary natural community (sandy pond shore system), three state threatened plant species (coastal plain grass-leaved goldenrod, red threeawn, and river birch), and one state endangered plant species (unpretentious yellow-seeded false pimpernel). After coordination with NHB involving photos taken of the project area, no further concerns were identified in regards to the rare plant species and natural community, and no impacts are anticipated.

NH Fish & Game Coordination:

The NHB DataCheck letter identified two vertebrate species of special concern in the vicinity of the project area, American Eel and Swamp Darter. NHFG provided the following recommendations:

- American Eel (State species of special concern) and Swamp Darter (State species of special concern) occur within the vicinity of the project area. All operators and personnel working on or entering the site should be made aware of the potential presence of these species.
- Baffles should not be included within the culvert design.
- If the proposed culvert is to be embedded, it should be embedded with native stream material to mimic upstream and downstream conditions.
- Turtles may be attracted to disturbed ground during nesting season (May 15th – June 30th). All turtle species nests are protected by NH laws. If a nest is observed or suspected, operators shall contact Melissa Winters (603-479-1129) or Josh Megyesy (978-578-0802) at NHFG immediately for further consultation.
- All manufactured erosion and sediment control products, with the exception of turf reinforcement mats, utilized for, but not limited to, slope protection, runoff diversion, slope interruption, perimeter control, inlet protection, check dams, and sediment traps shall not contain plastic, or multifilament or monofilament polypropylene netting or mesh with an opening size of greater than 1/8 inches.
All observations of threatened or endangered species on the project site shall be reported immediately to the NHFG nongame and endangered wildlife environmental review program by phone at 603-271-2461 and by email at NHFGreview@wildlife.nh.gov, with the email subject line containing the NHB DataCheck tool results letter assigned number, the project name, and the term Wildlife Species Observation.
- Photographs of the observed species and nearby elements of habitat or areas of land disturbance shall be provided to NHFG in digital format at the above email address for verification, as feasible.

In the event a threatened or endangered species is observed on the project site during the term of the permit, the species shall not be disturbed, handled, or harmed in any way prior to consultation with NHFG and implementation of corrective actions recommended by NHFG.

NHFG, including its employees and authorized agents, shall have access to the property during the term of the permit.

These recommendations will all be incorporated into design and construction.

Cultural Resources:

The proposed project was reviewed by the Department's Cultural Resource Program Manager and Cultural Resource Program Specialist, and it was determined that the project would be consistent with the conditions of Appendix B of the Programmatic Agreement between the Department, the NH Division of the Federal Highway Administration, and the NH Division of Historical Resources and a Section 106 finding of "No Historic Properties Affected" was made. The culvert is estimated to be about 20 years old, when lintels of a stone box culvert were removed and the CMP was dropped into the existing culvert area, so it is not considered historic. A pre-contact archaeological site is within the vicinity of the boat launch area. Project activities, including staging, will be limited to previously disturbed areas, and no excavation will occur near the boat launch area.

Wetlands:

Impacts to wetlands are predominantly temporary. Proposed permanent impacts are limited to the inlet and outlet of the proposed culvert as required to construct headwalls, add 4' of culvert at the inlet, regrade embankment adjacent to the inlet, and to grade the stream channel.

Water Quality:

The project was reviewed by the Department's Water Quality Program Manager and no concerns were identified. The project would not require earth disturbances equal to or greater than one acre and thus, coverage under the EPA's National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) is not required. Although the project area is located within a regulated Municipal Separate Storm System (MS4) community, the project would not be subject to MS4 Permit requirements as it would not result in one acre or more of land disturbance. Best Management Practices will be utilized throughout construction to prevent erosion and sedimentation.

Impaired Waters:

The unnamed brook is not in the list of impaired waters in Auburn (2018-303d list).

Contamination:

No point-source or PFAS concerns were identified. Limited Reuse Soils (LRS) within the operational State right-of-way shall be addressed in accordance with applicable NHDES rules, waivers, and/or Soils Management Plans.

Invasive Species:

The Contractor will be required to perform all work activities in accordance with the Department publication “Best Management Practices for the Control of Invasive and Noxious Plant Species” to prevent the spread of invasive species during construction.

Prime Wetlands, Designated Rivers, and Shoreland Water Quality Protection Act:

There are no prime wetlands or designated rivers within the project area. The project area is within the protected shoreland buffer of Lake Massabesic, and the appropriate shoreland permit will be obtained.

Floodplains:

FEMA Zone A floodplain is mapped around the lake perimeter and loosely follows NH121 in the vicinity of the culvert. There are no base flood elevations or a study available for Zone A. There is also a Zone A boundary which begins approximately 300 feet upstream of the culvert and follows the perimeter of a wetland complex.

Conservation Lands:

The project area is bordered by Manchester Water Works land. Coordination with Manchester Water Works has been initiated and is ongoing. There are no Conservation Land Stewardship or Land and Community Heritage Investment Program-supported resources in or near the project area.

Conservation Commission:

A letter was sent to the Auburn Conservation Commission on 2/6/23 and as of 7/26/23, no response has been received.

Massabesic Lake

Massabesic Lake is a water supply reservoir for the City of Manchester. The lake level is maintained via a dam spillway with 18” flashboards located on the southwestern side of the lake. The flashboard crest is at elevation 250.0 (ft, NAVD88), which maintains the normal pond elevation. As the existing culvert invert elevation is 247.55, the normal lake level will backwater through the culvert with a depth of approximately 2.5 feet. Water withdrawals throughout the summer tend to draw down the reservoir in the late summer and fall.

Two full years of daily lake level data was provided by Manchester Water Works and is shown below in Figure 1. Additional tables of monthly lake level data were provided by the Massabesic Yacht Club. From these sources the estimated 50-year WSEL is 251.5’. Direct WSEL data is not available on the 100-year flood conditions, but based on NHDOT District 5 experience, the NH121 along Massabesic Lake overtopped during the 2006 Mother’s Day floods. This is the only known overtopping event. The FEMA Zone A delineation and language in the Auburn 2018 Hazard Mitigation Plan generally agree with this assumption. Thus, it is assumed that the 100-year event will overtop NH121 for approximately 600 feet of roadway as it runs along Massabesic lake. The roadway centerline in the vicinity of the culvert ranges

from El. 253.2 to El. 254.2. Generally, any increase in WSEL due to the culvert overtopping during this event will be negligible.

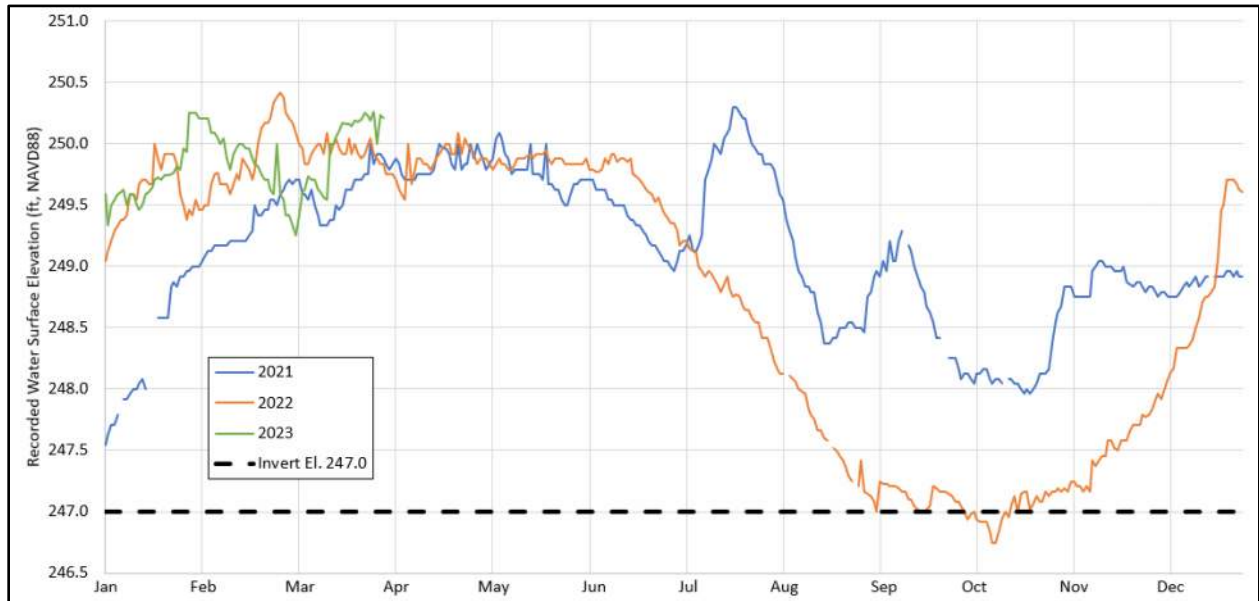


Figure 1: Available Massabesic Water Surface Level Data

Hydrology/Hydraulics

The watershed is primarily forested, with lots along Bunker Hill, Nolls Farm, Coleman roads, and off of NH 121. Approximately 19 acres of wetlands are present in the lower reaches of the watershed. A private airstrip (Cleary Airport) with a grass runway bisects the watershed and directs runoff towards a fire pond at its southern end. Delineated by Lidar with field review, the watershed is 312 acres.

Hydrology was analyzed using two methods, Streamstats (ie. the USGS NH Rural Equation) combined with the USGS National Urban Equation and an SCS/HydroCAD Model using the Curve Number Methodology. The rural Streamstats flows were reviewed and increased with the USGS National Urban Equation using a Basin Development factor (BDF) of 2. This helps to better account for development in the upland reaches of the watershed, notable two subdivisions. The 50-year event runoff is 152 cfs using this method. This method assumes the larger Streamstats drainage area of 474 acres.

NOAA Atlas 14 rainfall predictions were used to develop a HydroCAD model using the SCS Curve Number methodology. Hydrologic soils groups present are a mix of A, B, and C. Analysis divided the watershed into subbasins. The composite curve number for the entire watershed is 65. A summary of results is shown below in Table 1. The SCS/HydroCAD flows were used for design of the culvert.

Table 1: Summary of 24-hour Rainfall and Peak Runoff Flows

Recurrence	24-hr Rainfall (inches)		
	NOAA Atlas 14	Peak Flow Summary (cfs)	
		USGS National Urban Equation	SCS/HydroCAD
2	2.91	47	32
5	3.83	76	70
10	4.6	98	108
25	5.65	126	165
50	6.43	152	209
100	7.28	180	269

Bold Value was used for design.

A HEC-RAS model was developed to evaluate the existing conditions, conduct alternative analyses, and to determine the final design of the proposed culvert. Table 2 below, shows the performance of the existing culvert by headwater elevation. Survey indicates the NH121 centerline over the culvert is at El. 253.2. This analysis shows the culvert is likely undersized as it overtops at the current 25-year estimate. It also likely indicates the flow is conservative for design purposes, as NHDOT district 5 has not reported overtopping events of this frequency.

Table 2: Existing 5’ Diameter Pipe Calculated Headwater Elevations

Recurrence Year	Headwater Elevation (ft, NAVD88)
2	251.14
5	252.1
10	252.93
25	253.21
50	253.34
100	Lake Overtops NH121

Indicates Overtopping

Applicable Design Standard

The Department design standard guidance is to pass the 50-year event while keeping the peak water surface elevation less than the top of the culvert rise (ie. low chord). Due to the high Massabesic lake levels, this headwater criteria is not achievable at this location as the backwater condition (Water Surface El. 251.5), would leave only 6” of freeboard. In this case, the design standard will be to prevent the 50-year event from overtopping the roadway. As previously noted, the roadway will overtop due to Massabesic Lake at the 100 year event, regardless the culverts hydraulic capacity.

Alternative Analysis

USACE’s HEC-RAS program was used for alternative analyses. Three alternatives were considered and are described below with a comparison of the hydraulic performance shown in Table 2 for the 2 to 100-year flows. Cost estimates for each alternative are provided at the end of this supplemental narrative.

Alternative 1: Stream Crossing Rules Compliant 32' Bridge

The existing structure would be completely removed, a significant portion of roadway closed and excavated, a new bridge structure installed, and the roadway subsequently reconstructed. The average bankfull width based on the three reference reaches surveyed was 14.3', with a flood-prone width of over 200 feet, and an entrenchment ratio range of 10.5 to 25. Using the minimum reference reach for a Rosgen Type E stream (per Figure 3 of the Stream Crossing Worksheet) of 2.2, the stream crossing rule compliant span is 31.5'. Rounded to 32' for alternative analysis.

This alternative proposes a 32' span by 35' wide, 3-sided cast-in-place concrete bridge structure with bridge rail, headers, and wingwalls. Construction would be phased to maintain single lane traffic, however the project would cause significant traffic interruptions.

Cost for this alternative is estimated at \$2,175,000. See the attached detailed cost estimate located at the end of this supplemental narrative. Note that the estimates provided are only for construction cost. Design engineering, permit fees, mitigation cost (if any), ROW impacts, and reimbursable utility impacts are not included. It also does not account for raising the roadway, which may be required to meet NHDOT standards. We anticipate this alternative would require acquisition of the northern abutting property or rights. Securing funding and additional design time would require a delay in the start of construction of 3 – 5 years, or more. The existing pipe will not last another 3 – 5 years, therefore this alternative does not meet the goal of timely repair and is not considered practical under this Program.

Alternative 2: 54" Slip-line with a new 4'X2' Critter Crossing Concrete Box

The pipe would be slip-lined with a 54" smooth bore liner, the voids filled with pumpable cellular concrete, the headwalls repaired and/or reconstructed, and a new 4'X2' concrete box constructed in addition to the culvert. The concrete box provides a dry critter crossing under NH121 during low lake levels and additional hydraulic capacity during high flow events. It would be situated to use the existing PEM1E wetland bordering NH121 upstream and small inlet downstream about 25' south of the culvert.

The 4'X2' concrete box pipe would be installed first and used to control and convey flows while the pipe culvert is dewatering and the 54" slip-line installed. Compared to other alternatives this would minimize traffic disturbances, provide a dry wildlife crossing, and reduce construction time and costs. Hydraulic analyses shown in Table 2 below indicate this alternative provides similar hydraulic performance to the existing condition.

Cost for this alternative is estimated at \$320,000. See the attached detailed cost estimate located at the end of this supplemental narrative. Note that the estimates provided are only for construction cost. Design engineering, permit fees, mitigation cost (if any), ROW impacts, and reimbursable utility impacts are not included.

Alternative 3: 9’X5’ 4-Sided Concrete Box Culvert

The existing pipe, headwalls, and wingwalls would be completely removed and a new 9’ wide by 5’ high 4-sided box culvert would be installed with concrete headwalls and wingwalls. The culvert would be embedded streambed simulation material. Once established, natural sedimentation processes will resume due to the lower velocities created by the lake backwatering through the culvert and into the wetland. Compared with other alternatives, this would increase AOP, hydraulic connectivity, and substantially increase the hydraulic capacity. This alternative can pass the 50-year flood with approximately half a foot of freeboard.

Cost for this alternative is estimated at \$682,000. See the attached detailed cost estimate located at the end of this supplemental narrative. Note that the estimates provided are only for construction cost. Design engineering, permit fees, mitigation cost (if any), ROW impacts, and reimbursable utility impacts are not included.

Table 3: Existing and Alternative Headwater Elevations

Recurrence Year	Flow (cfs)	Headwater Elevation (ft, NAVD88)			
		Existing: 5' Dia. Pipe	Alt 1: 32' Span Bridge	Alt 2: Slip-line with Surge/Critter Pipe	Alt 3: 9'X6' Box (9'X4' open area)
2	32	251.14	251	251.19	251.02
5	70	252.1	251.5	252.24	251.61
10	108	252.93	251.51	253.01	251.76
25	165	253.21	251.52	253.26	252.12
50	209	253.34	251.53	253.35	252.5
100	269	Massabesic Lake Floods Roadway			

Proposed Design

The proposed design is the 9’X5’ four sided box culvert embedded with streambed simulation material. The alignment will match that of the existing culvert, which is perpendicular to the roadway. The streambed invert elevations will match the existing stream channel upstream and downstream and maintain the reach slope of 0.5% through the culvert. Refer to the Culvert Profile on sheet 5 of the Wetland Plans for invert elevations and anticipated tie-ins. The Culvert is proposed to increase from 41’ to 45’ long to accommodate a widened shoulder on the inlet side for a bike/pedestrians both during construction sequencing and post-construction. The guardrail will also be re-aligned to maintain the same offset from the headwall, and the edge of the roadway embankment will be re-established. The embankment will be graded with a 3H:1V slope (instead of the typical 4H:1V) to minimize the impact to the adjacent riverine wetland. Refer to plan and cross section on sheet 7 of the Wetland Plans for extents of this impact.

Water diversion will be through a 3’ dia. temporary pipe installed outside the culvert excavation limits to the south of the culvert. The pipe will be located at the border of the riverine wetland upstream and the small lacustrine inlet at the downstream. Project impact areas allow for this type of diversion. Final water diversion plan will be per the Contractor’s approved SWPPP.

Pavement reconstruction is anticipated for approximately 50 feet in either direction of the culvert (approx. 100 linear feet in total). Guardrail will be removed and re-installed to match the existing extents. A single utility pole, located on the outlet/lake side of NH121 will be relocated to accommodate the guardrail re-installation in coordination with the utility companies.

Benefits of this alternative include; increasing hydraulic capacity and connectivity, increasing AOP, maintaining and improving sediment transport, and reduce the potential for flooding. Since Massabesic Lake backwaters the culvert most of the time, there is limited concern for low flow AOP as well as scour.

Permanent stream impacts will be required for grading around the new wingwalls, extending the inlet 4' upstream, and to permanently widen the shoulder on the inlet side. Permanent impacts extend 9' upstream and 5' downstream of the existing inlet and outlet. Temporary stream impacts will be required for access, water diversion, and erosion controls. These extend 45' upstream and 38' downstream from the existing inlet and outlet. A detailed breakdown of the impacts is shown in Table 4 below and in the Wetland Plans. Total disturbed area (temporary and permanent) is estimated at 3,266 SF (0.075 acres).

No tree clearing is required at the inlet or outlet. Temporary impact areas will be restored with approved seed, mulch, and wildlife friendly erosion control matting (where steeper than 4:1).

Construction and Access Considerations

Construction will be phased to maintain single lane travel along NH121 for the duration of the anticipated two-month construction period. Access to the culvert will primarily be from the closed travel lanes and shoulders of NH 121 due to the low fill height. Additional access on the upstream side, requiring a temporary easement, is anticipated on the north bank to install the cofferdam. Access to the lake side of water control and diversion will use the embankment on both sides of the culvert to install water diversion structures, sumps, and to construct the wingwalls and headwall.

It is anticipated the first phase of traffic control will close the northbound lane and install the proposed box culvert on the inlet side. During this phase temporary lane widening will shift the southbound lane towards the existing headwall to allow for approximately half the culvert length to be installed. The anticipated second phase of traffic will switch the lanes, closing the southbound lane while installing the second half of the culvert on the outlet side. Single lane traffic will be maintained with temporary signals.

Prior to excavating the existing culvert and the above phasing, the 3' diameter plastic bypass pipe for stream diversion will be installed. Traffic control for this installation will be handled by flaggers.

Preliminary discussion with Manchester Water Works has indicated a temporary easement will be agreed upon to use Water Works property beyond the State ROW on the eastern side of NH121 south of the culvert between gravel driveway (Water Works property, homeowner has a driveway/access easement) and Bunker Hill Road.

Summary

The proposed culvert replacement is presented as an Alternative Design under Env-Wt 904.10 because the proposed culvert would not meet the compliant span requirement and would not provide a vegetated bank or wildlife shelf within the structure.

The proposed culvert will meet all the general design criteria under 904.01 and comply with the remaining provisions of 904.07 to the maximum extent practicable.

Auburn 44167		Preliminary Design						
Culvert Replacement Option - Fully Compliant Design								
3-Sided Concrete Frame, 32' span x 35' wide			By	JSC	4/2023			
Phased Construction to maintain single lane traffic			Updated	JSC	5/2023			
			Checked	TSM	5/2023			
Item	Description	Unit	Quantity	Price (\$)	Total			
Earthwork Items								
202.42	Removal of Existing Pipe Culvert	LS	40	75	\$3,000			
203.1	Common Excavation (remove existing pavement & base)	CY	100	45	\$4,500			
203.11	Common Excavation - LRS - within ROW	CY	100	40	\$4,000			
203.601	Embankment in Place (small amount for misc grading)	CY	25	25	\$625			
206.1	Common Structure Ex (Cost is included in bridge estimate)	CY	N/A	50	\$0			
206.19	Common Structure Ex - Exploratory	CY	10	100	\$1,000			
209.1	Granular Backfill	CY	50	\$60	\$3,000			
214	Fine Grading (for stream channel through bridge)	U	1	3,000	\$3,000			
Sub-Total					\$19,125			
Structure Items								
503.101	Water Diversion	U	2	40,000	\$80,000			
503.201	Cofferdams	U	2	50,000	\$100,000			
508	Structural Fill, (subsidiary to item No. 529.001)	CY	100	60	\$6,000			
529.001	Concrete Rigid Frame (3-sided) - 32' rail to rail, 32' span x 6' rise, no skew Includes standard headers, wings, bridge curb & rail, excav, backfill, incidentals	U	1	1,109,000	\$1,109,000			
583.002	Reset Stone Headwalls	SY	60	\$28	\$1,680			
585.21XXX	Simulated Streambed Material (Bed and Banks = 32 ft wide, 60 ft long, 2 ft deep) Including Stone Armor Layer and Geotextile	CY	150	100	\$15,000			
Sub-Total					\$1,311,680			
Roadway Items								
304.3	Crushed Gravel (12" Base and shoulder)	CY	200	\$51	\$10,200.00			
403.x	Hot Bituminous Pavement (100' length x 24' width x 4.5" depth)	TON	11	\$275	\$3,025.00			
606.417	Portable Concrete Barrier for Traffic Control	LF	100	60	\$6,000			
606.1801	TL2 Guardrail (maintain same extents as existing)	LF	270	\$40	\$10,800.00			
606.1255	TL2 Terminal Unit	U	4	\$4,400	\$17,600.00			
616.161	Temp. Traffic Signal (2-phase) Officers w/ Vehicle (4 hrs/day x 2 day/week x 12 weeks plus 3 full weeks (beginning, middle, end) x \$84/hr)	U	1	25,000	\$25,000			
618.61		\$	18,144	1	\$18,144			
618.7	Flaggers (2 flaggers x 6 weeks x 5 days/week x 8 hrs/day)	HR	480	40	\$19,200			
619.25	Portable Changeable Message Sign	U	2	3,000	\$6,000			
Sub-Total					\$102,744.00			
Project Wide Items								
645.7	Storm Water Pollution Prevention Plan	U	1	3,500	\$3,500			
646.x	Humus, Seed, Mulch	SY	750	15	\$11,250			
697.11	Invasive Species Management Plan	U	1	3,000	\$3,000			
697.31	Project Operations Plan (for LRS / Contaminated Soil & Water Mgm't)	U	1	4,000	\$4,000			
698.13	Field Office, Type C - 1 Season	MON	4	2,500	\$10,000			
Sub-Total					\$31,750			
Construction Sub-Total					\$1,465,299			
Project Wide Items (% of Total Costs)								
	Erosion Control		5.0%	of Item Sub-Total	U	1	73,300	\$73,300
619.1	Traffic Control		10.0%	of Item Sub-Total	U	1	146,600	\$146,600
	Misc Items and Contingency		10.0%	of Item Sub-Total	U	1	146,600	\$146,600
692	Mobilization		12.0%	of Contract Sub-Total		1	175,900	\$175,900
1010.x	Fuel and Asphalt Adjustments (fixed amount per guideline memo)				\$	1	20,000	\$20,000
1030	Construction Admin & Inspection		10.0%	of Contract Sub-Total		1	146,600	\$146,600
Sub-Total					\$709,000			
Cost Estimate Total					\$2,175,000			

Notes:

- Quantities noted N/A have been separately accounted for in Item 529.001
- Cost Estimate Total rounded to nearest \$1,000.
- Does not account for permanent easements or acquisitions, which may be required for this alternative.

Auburn 44167		Preliminary Design			
Culvert Rehabilitation Option					
54" Slip-Line and 4'X2' Critter Crossing			By	JSC	4/2023
Phased Construction to maintain single lane traffic (alternating one way)			Updated	JSC	5/2023
			Checked	TSM	5/2023
Item	Description	Unit	Quantity	Price (\$)	Total
Earthwork Items					
202.42	Removal of Existing Pipe Culvert	LF	N/A	75	\$0
203.1	Common Excavation (remove existing pavement & base)	CY	10	25	\$250
203.11	Common Excavation - LRS - within ROW	CY	12	40	\$480
203.601	Embankment in Place (small amount for misc grading)	CY	25	25	\$625
206.1	Common Structure Ex	CY	35	50	\$1,750
206.19	Common Structure Ex - Exploratory	CY	10	100	\$1,000
209.1	Granular Backfill	CY	25	\$60	\$1,500
Earthwork Sub-Total					\$4,105.00
Structure Items					
503.101	Water Diversion	U	2	15,000.00	\$30,000
503.201	Cofferdams	U	2	25,000.00	\$50,000
529.001	Precast Box Culvert (includes headwalls, excav, backfill, incidentals) 40' long x 4 x 2 precast box, 8" walls assumed				
	8.44 SF / LF x 40 LF = 10 CY (rounder \$ 4,500 /CY	U	1	36,000.00	\$36,000
	54" Smooth Bore Liner (40' long)	U	1	40,000	\$40,000
Structure Sub-Total					\$156,000.00
Roadway Items					
304.3	Crushed Gravel (12" Base and shoulder)	CY	15	\$51	\$765
403.x	Hot Bituminous Pavement (100' length x 24' width x 4.5" depth)	TON	1	\$275	\$275
606.417	Portable Concrete Barrier for Traffic Control	LF	10	60	\$600
606.1801	TL2 Guardrail (maintain same extents as existing)	LF	30	\$40	\$1,200
606.1255	TL2 Terminal Unit	U	0	\$4,400	\$0
618.61	Officers w/ Vehicle (4 hrs/day x 2 day/week x 2 weeks plus 2 weeks (beginning, middle) x \$84/hr)	\$	8,064	1	\$8,064
618.7	Flaggers (2 flaggers x 4 weeks x 5 days/week x 8 hrs/day)	HR	320	40	\$12,800
619.25	Portable Changeable Message Sign	U	2	3,000	\$6,000
Roadway Sub-Total					\$28,664.00
Project Wide Items					
645.7	Storm Water Pollution Prevention Plan	U	1	3,500	\$3,500
646.x	Humus, Seed, Mulch	SY	500	15.00	\$7,500
697.11	Invasive Species Management Plan	U	1	3,000.00	\$3,000
697.31	Project Operations Plan (for LRS / Contaminated Soil & Water Mgm't)	U	1	4,000.00	\$4,000
698.13	Field Office, Type C - 1 Season	MON	N/A	\$2,500	\$0
Item Sub-Total					\$18,000
Construction Sub-Total					\$206,769
Project Wide Items (% of Total Costs)					
619.1	Erosion Control	U	1	10,400	\$10,400
	Traffic Control	U	1	20,700	\$20,700
	Misc Items and Contingency	U	1	20,700	\$20,700
692	Mobilization		1	20,700	\$20,700
1010.x	Fuel and Asphalt Adjustments (fixed amount per guideline memo)	\$	1	20,000	\$20,000
1030	Construction Admin & Inspection		1	20,700	\$20,700
Cost Estimate Total					\$320,000

Notes:

1. N/A items are not not applicable to this alternative.
2. Cost Estimate Total rounded to nearest \$1,000.

Auburn 44167 Preliminary Design					
Culvert Replacement Option - Hydraulic Design					
9' span 4-Sided Concrete Box Culvert			By	JSC	4/2023
Phased Construction to maintain single lane traffic			Updated	JSC	5/2023
			Checked	TSM	5/2023
Item No.	Description	Unit	Quantity	Price (\$)	Total
Earthwork Items					
202.42	Removal of Existing Pipe Culvert	LF	40	\$75	\$3,000
203.1	Common Excavation (remove existing pavement & base)	CY	52	\$45	\$2,340
203.11	Common Excavation - LRS within ROW	CY	62	\$40	\$2,480
203.601	Embankment in Place (small amount for misc grading)	CY	25	\$25	\$625
206.1	Common Structure Excavation	CY	447	\$50	\$22,350
206.19	Common Structure Ex - Exploratory	CY	10	\$100	\$1,000
209.1	Granular Backfill	CY	50	\$60	\$3,000
214	Fine Grading (for stream channel through culvert)	U	1	\$3,000	\$3,000
Sub-Total					\$37,795
Structure Items					
503.101	Water Diversion	U	2	\$20,000	\$40,000
503.201	Cofferdams	U	2	\$35,000	\$70,000
508	Structural Fill, (subsidiary to item No. 529.001)	CY	30	\$60	\$1,800
529.001	Precast Box Culvert (includes headwalls, excav, backfill, incidentals)				
	44' long x 9' x 6' precast box, 8" walls assumed				
	21.78 SF / LF x 45 LF = 37 CY (rounded) \$ 4,500 /CY	U	1	\$166,500	\$166,500
520.1	Concrete Wingwalls (Class A Concrete) w/ footing	CY	11	\$1,300	\$14,300
544.1	Reinforcing Steel	LB	1,200	\$3.25	\$3,900
583.002	Reset Stone Headwalls	SY	60	\$28	\$1,680
585.21XXX	Simulated Streambed Material (Bed and Banks = 9 ft wide, 60 ft long, 2 ft deep)	CY	40	\$100	\$4,000
	Including Stone Armor Layer and Geotextile				
Sub-Total					\$302,180
Roadway Items					
304.3	Crushed Gravel (12" Base and shoulder)	CY	120	\$51	\$6,120
403.x	Hot Bituminous Pavement (100' length x 24' width x 4.5" depth)	TON	7	\$275	\$1,925
606.417	Portable Concrete Barrier for Traffic Control	LF	30	\$60	\$1,800
606.1801	TL2 Guardrail (maintain same extents as existing)	LF	270	\$40	\$10,800
606.1255	TL2 Terminal Unit	U	4	\$4,400	\$17,600
616.161	Temp. Traffic Signal (2-phase)	U	1	\$25,000	\$25,000
618.61	Officers w/ Vehicle (4 hrs/day x 2 day/week x 5 weeks plus 3 full weeks (beginning, middle, end) x \$84/hr)	\$	13,440	\$1	\$13,440
618.7	Flaggers (2 flaggers x 3 weeks x 5 days/week x 10 hrs/day)	HR	300	\$40	\$12,000
619.25	Portable Changeable Message Sign	U	2	\$3,000	\$6,000
Sub-Total					\$86,640
Project Wide Items					
645.7	Storm Water Pollution Prevention Plan	U	1	3,500	\$3,500
646.x	Humus Seed, Mulch	SY	500	\$15	\$7,500
697.11	Invasive Species Management Plan	U	1	\$3,000	\$3,000
697.31	Project Operations Plan (for LRS / Contaminated Soil& Water Mgm't)	U	1	\$4,000	\$4,000
698.13	Field Office, Type C - 1 Season	MON	2	\$2,500	\$5,000
Item Sub-Total					\$23,000
Construction Sub-Total					\$449,615

Auburn 44167		Preliminary Design	
Culvert Replacement Option - Hydraulic Design			
9' span 4-Sided Concrete Box Culvert		By	JSC 4/2023
Phased Construction to maintain single lane traffic		Updated	JSC 5/2023
		Checked	TSM 5/2023

Item No.	Description	Unit	Quantity	Price (\$)	Total
Project Wide Items (% of Total Costs)					
	Erosion Control		5.0%	of Construction Sub-Total	
		U	1.00	\$22,500	\$22,500
619.1	Traffic Control		10.0%	of Construction Sub-Total	
		U	1.00	\$45,000	\$45,000
	Misc Items and Contingency		10.0%	of Construction Sub-Total	
		U	1.00	\$45,000	\$45,000
692	Mobilization		12.0%	of Construction Sub-Total	
			1.00	\$54,000	\$54,000
1010.x	Fuel and Asphalt Adjustments (fixed amount per guideline memo)				
		\$	1.00	\$20,000	\$20,000
1030	Construction Admin & Inspection		10.0%	of Construction Sub-Total	
			1.00	\$45,000	\$45,000
				Sub-Total	\$231,500
				Cost Estimate Total	\$682,000

1. Cost Estimate Total rounded to nearest \$1,000.

Auburn, 44167



Photo 1: *Culvert Outlet (3/24/23) J. Commerford*



Photo 2: *Culvert Outlet from Massabesic Lake (4/7/23) R. Thomson*

Auburn, 44167



Photo 3: *Looking towards Massabesic Lake from Culvert (4/7/23) R. Thomson*



Photo 4: *Looking towards Massabesic Lake from shore (3/24/23) J. Commerford*

Auburn, 44167



Photo 5: *Culvert Inlet (3/24/23) J. Commerford*



Photo 6: *Looking at the Culvert Inlet from Upstream (4/7/23) R. Thomson*

Auburn, 44167



Photo 7: From Culvert inlet looking upstream towards right bank (4/7/23) R. Thomson



Photo 8: Upstream channel from Culvert (4/7/23) R. Thomson

Auburn, 44167



Photo 9: *Looking Downstream towards the Culvert (4/7/23) R. Thomson*

Auburn 44167

CONSTRUCTION SEQUENCE

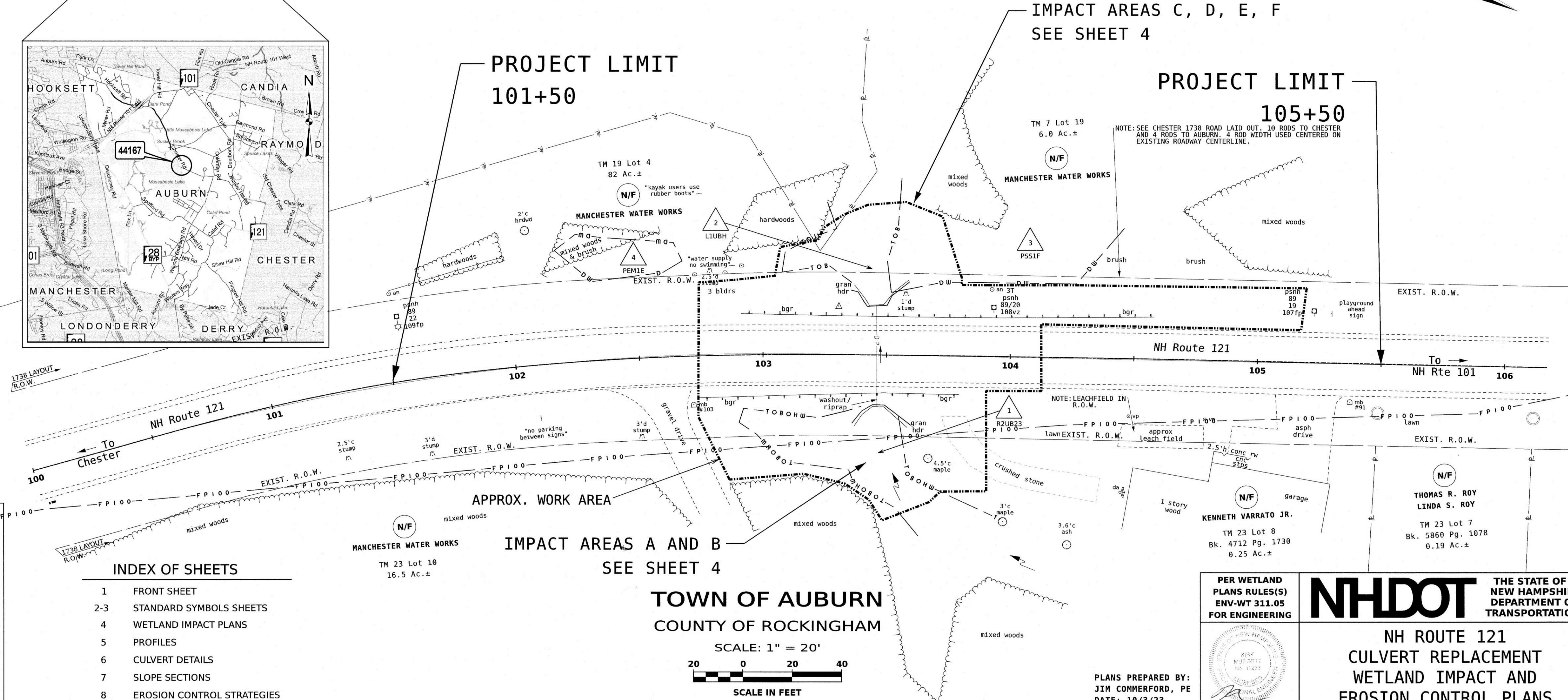
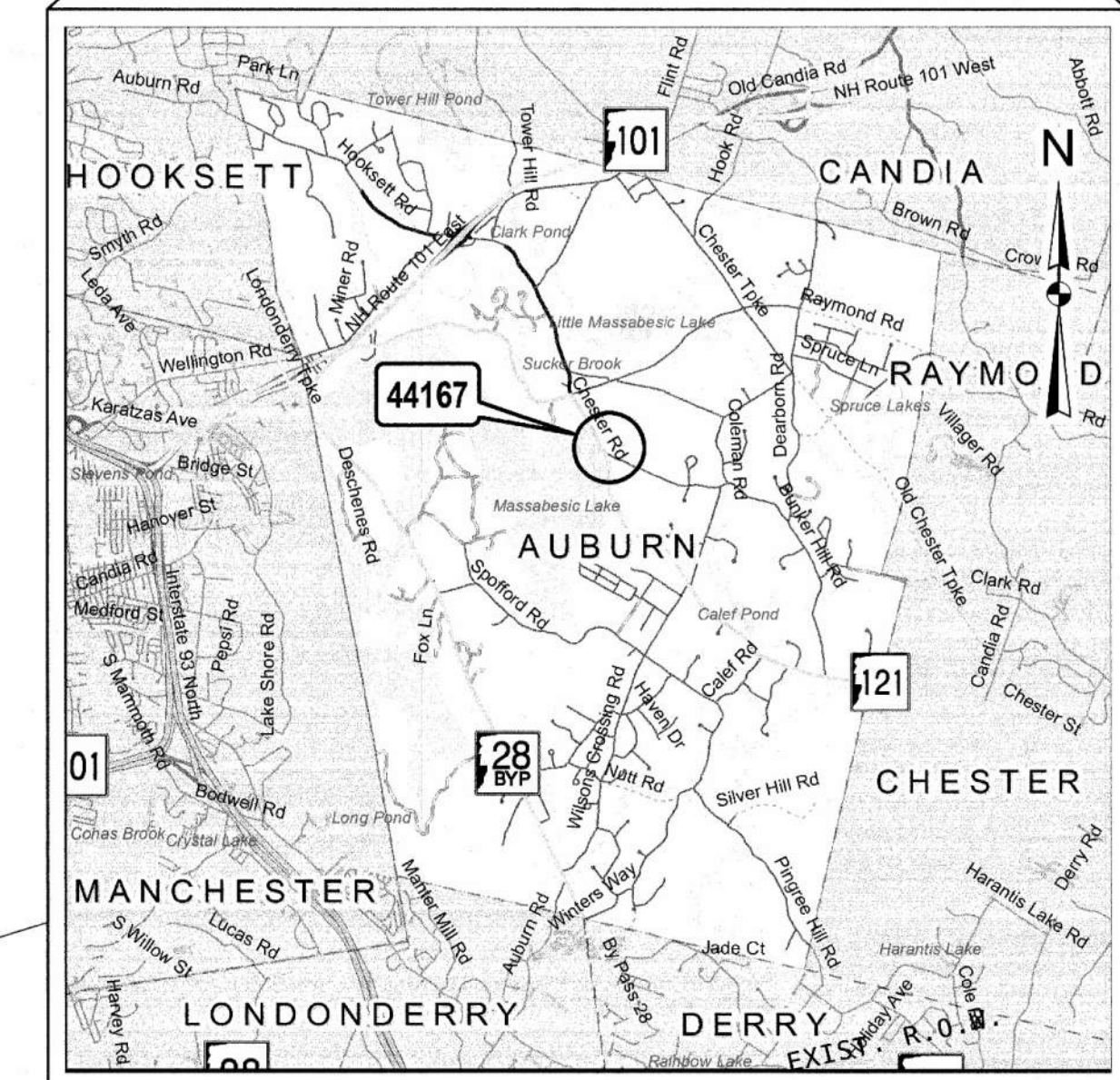
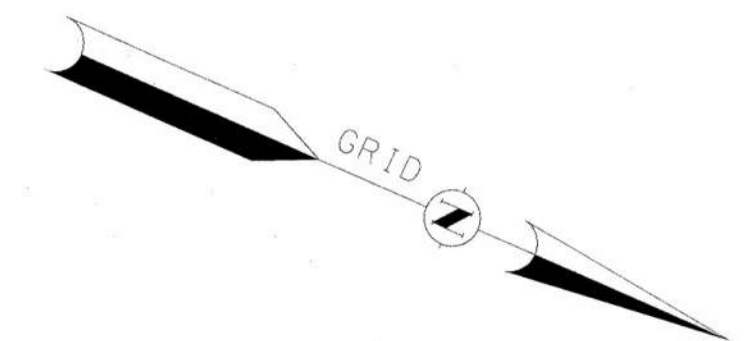
1. Perform necessary clearing operations for access and staging.
2. Install perimeter sediment controls and install necessary temporary erosion controls as specified on the strategies sheet. Include all staging areas. Set up dewatering basins.
3. Install Water Diversion (stream diversion). An acceptable water diversion would be a temporary pipe installed just outside the box culvert excavation limits to the south of the culvert as depicted on the Wetland Plans. The Contract will require the Contractor's water diversion plan be designed to accommodate a 2-year storm event.
4. Construct temporary widening on outlet side of the culvert for Phase 1 traffic control. Widening is expected to extend nearly to the existing headwall. The actual width of widening will be as approved by the NHDOT Engineer, based on the Contractor's installation plan for the culvert.
5. Set up Phase 1 traffic control barrier (maintain 1 lane of traffic through work area using, shifted toward the outlet side of culvert).
6. Install Cofferdam to support the portion of NH 121 open to traffic.
7. Remove approximately half of the existing CMP culvert (starting at the inlet side), install new box culvert sections, embedment material, outlet side headwall and grading to match existing channel and banks.
8. Stabilize outlet channel banks and over bank areas.
9. Modify cofferdam supporting NH 121 as needed for Phase 2 of culvert installation.
10. Set up Phase 2 traffic control (shift traffic toward inlet side of culvert). Construct temporary widening at the inlet side of the culvert.
11. Remove temporary widening constructed during Phase 1. Restore disturbed areas to original or proposed grade. Stabilize disturbed areas.
12. Remove remaining portion of the box culvert, install new box culvert sections, embedment material, inlet side headwall, and grading to match inlet channel and banks.
13. Stabilize inlet channel banks and over bank areas.
14. Remove cofferdam and traffic control barrier (maintain 1 lane of traffic using concrete barriers, shift traffic as needed to accomplish remaining operations).
15. Remove diversion pipe, repair and stabilize areas disturbed by removal. Remove water diversion and re-establish flow through the new culvert.
16. Install final paving and pavement markings. Final pavement width and elevation will match the original NH 121 conditions.
17. Stabilize remaining disturbed areas.
18. Remove all perimeter controls.

**STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION**

**WETLANDS PLANS
FEDERAL AID PROJECT**

**FEDERAL PROJECT NO. X-A00(339)
N.H. PROJECT NO. 44167
NH ROUTE 121**

DESIGN DATA		
AVERAGE DAILY TRAFFIC 20	22	5,100
AVERAGE DAILY TRAFFIC 85	TBD	TBD
PERCENT OF TRUCKS		UNKNOWN
DESIGN SPEED		40 MPH
LENGTH OF PROJECT		45 LF (CULVERT)



DRAWN BY: GRR
 CHECKED BY: JSC
 DATE: 6/23
 DATE: 10/23

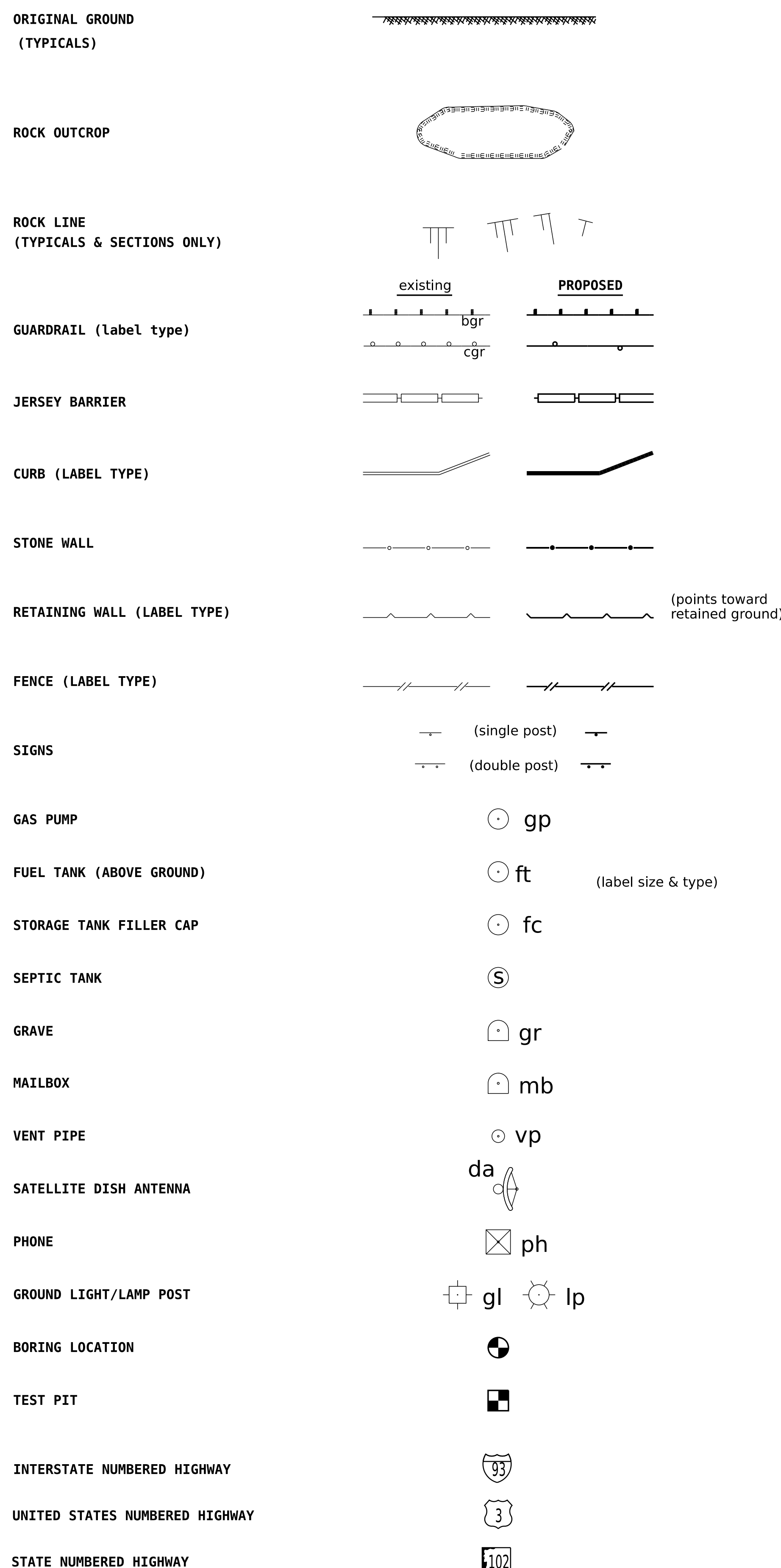
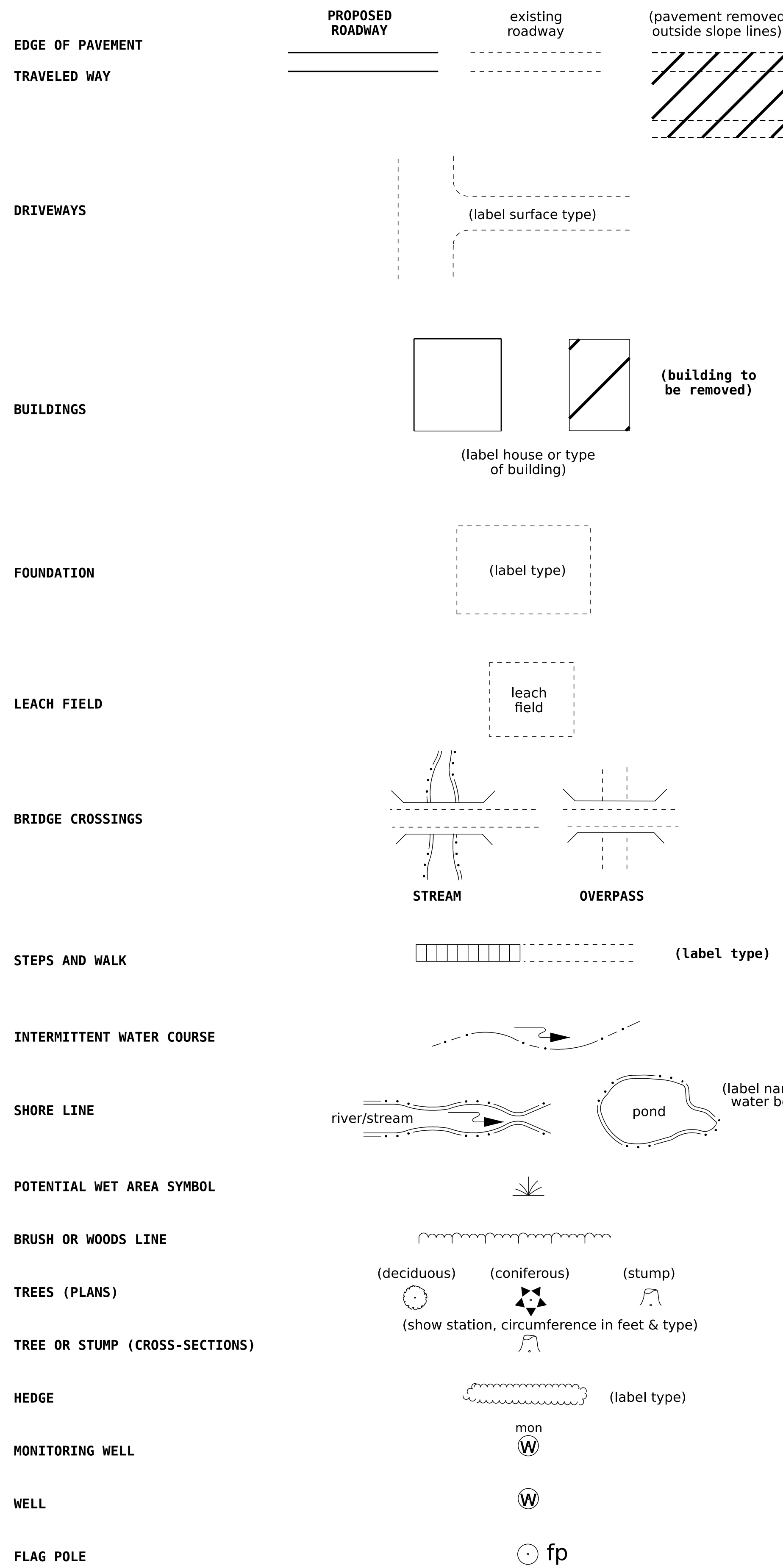
INDEX OF SHEETS	
1	FRONT SHEET
2-3	STANDARD SYMBOLS SHEETS
4	WETLAND IMPACT PLANS
5	PROFILES
6	CULVERT DETAILS
7	SLOPE SECTIONS
8	EROSION CONTROL STRATEGIES
9	EROSION CONTROL PLAN

WETLAND DELINEATION PER ENV-WT 406 BY:
 NHDOT (JOSHUA BROWN AND DEIDRA BENJAMIN) ON 4/7/23.

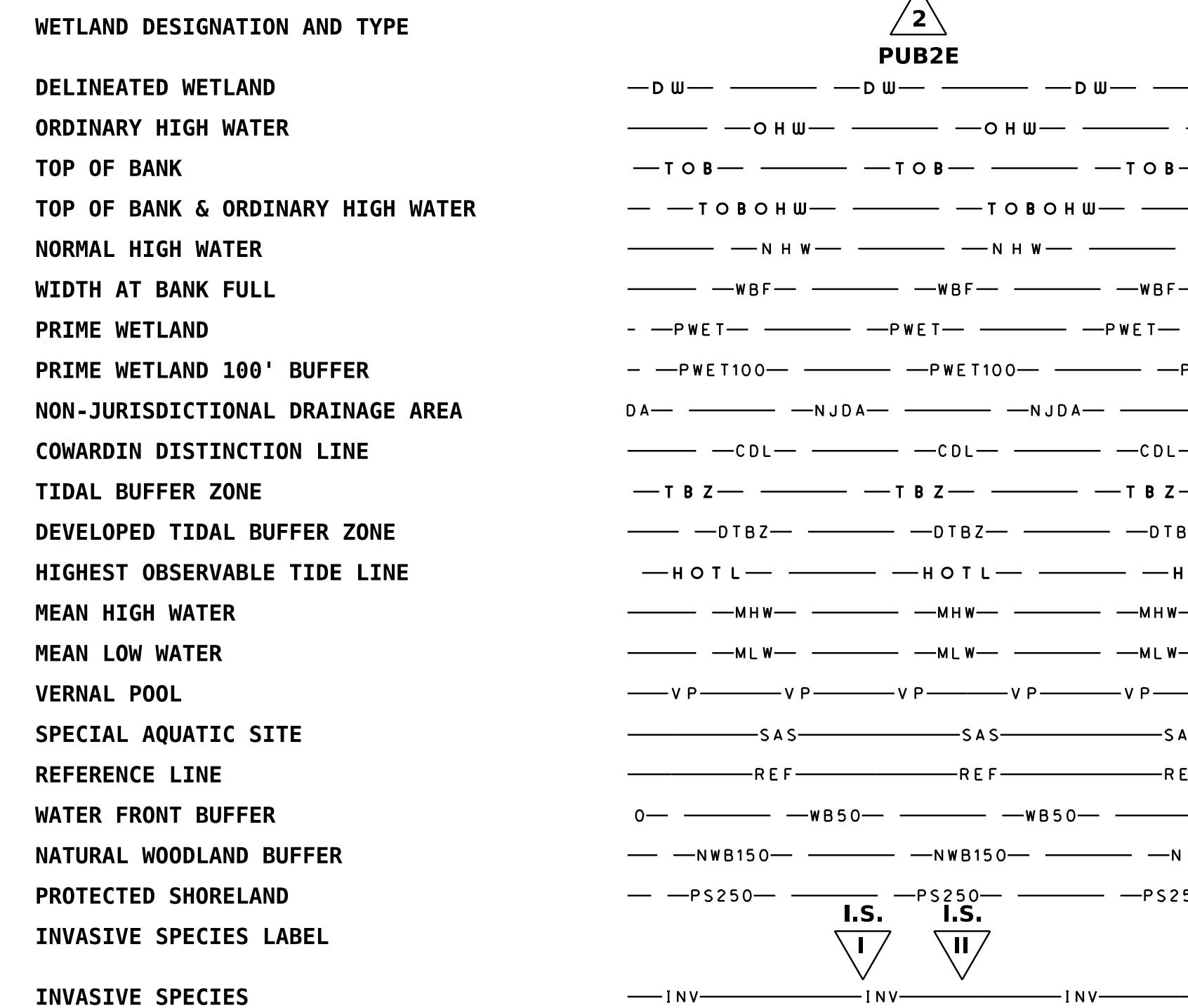
FOR CONSTRUCTION AND ALIGNMENT DETAILS - SEE CONSTRUCTION PLANS

PER WETLAND PLANS RULES(S) ENV-WT 311.05 FOR ENGINEERING	<p style="text-align: center;">NH DOT</p> <p style="text-align: center;">THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION</p>	<p style="text-align: center;">NH ROUTE 121 CULVERT REPLACEMENT WETLAND IMPACT AND EROSION CONTROL PLANS</p>											
	<p style="text-align: center;">PLANS PREPARED BY: JIM COMMERFORD, PE DATE: 10/3/23</p>												
<table border="1" style="width: 100%;"> <thead> <tr> <th>DRAWING NAME</th> <th>FEDERAL PROJECT NO.</th> <th>STATE PROJECT NO.</th> <th>SHEET NO.</th> <th>TOTAL SHEETS</th> </tr> </thead> <tbody> <tr> <td>1 44167-FSC 10.3.23</td> <td>X-A005(339)</td> <td>44167</td> <td>1</td> <td>9</td> </tr> </tbody> </table>	DRAWING NAME	FEDERAL PROJECT NO.	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS	1 44167-FSC 10.3.23	X-A005(339)	44167	1	9			
DRAWING NAME	FEDERAL PROJECT NO.	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS									
1 44167-FSC 10.3.23	X-A005(339)	44167	1	9									

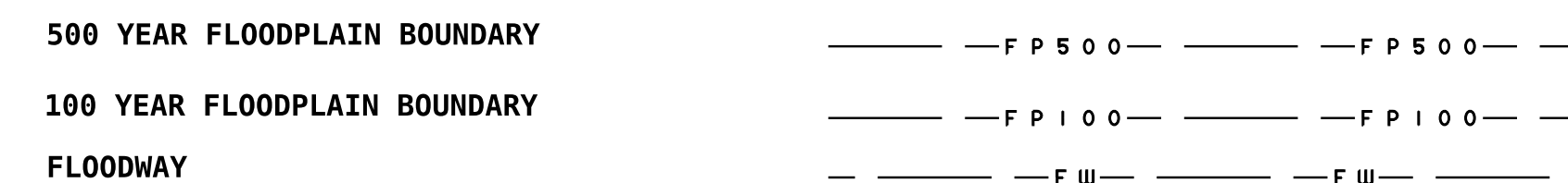
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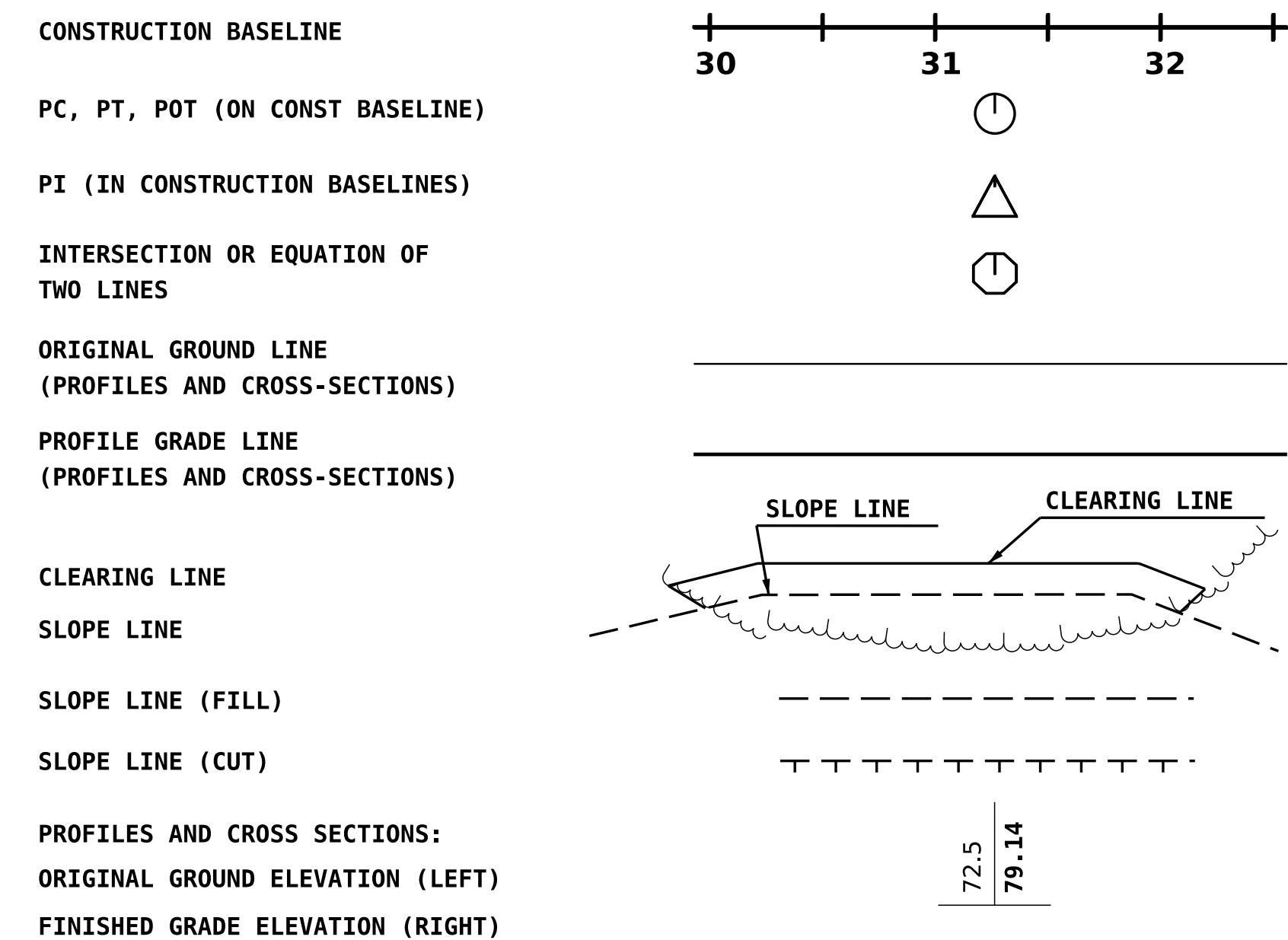
SHORELAND - WETLAND



FLOODPLAIN / FLOODWAY



ENGINEERING

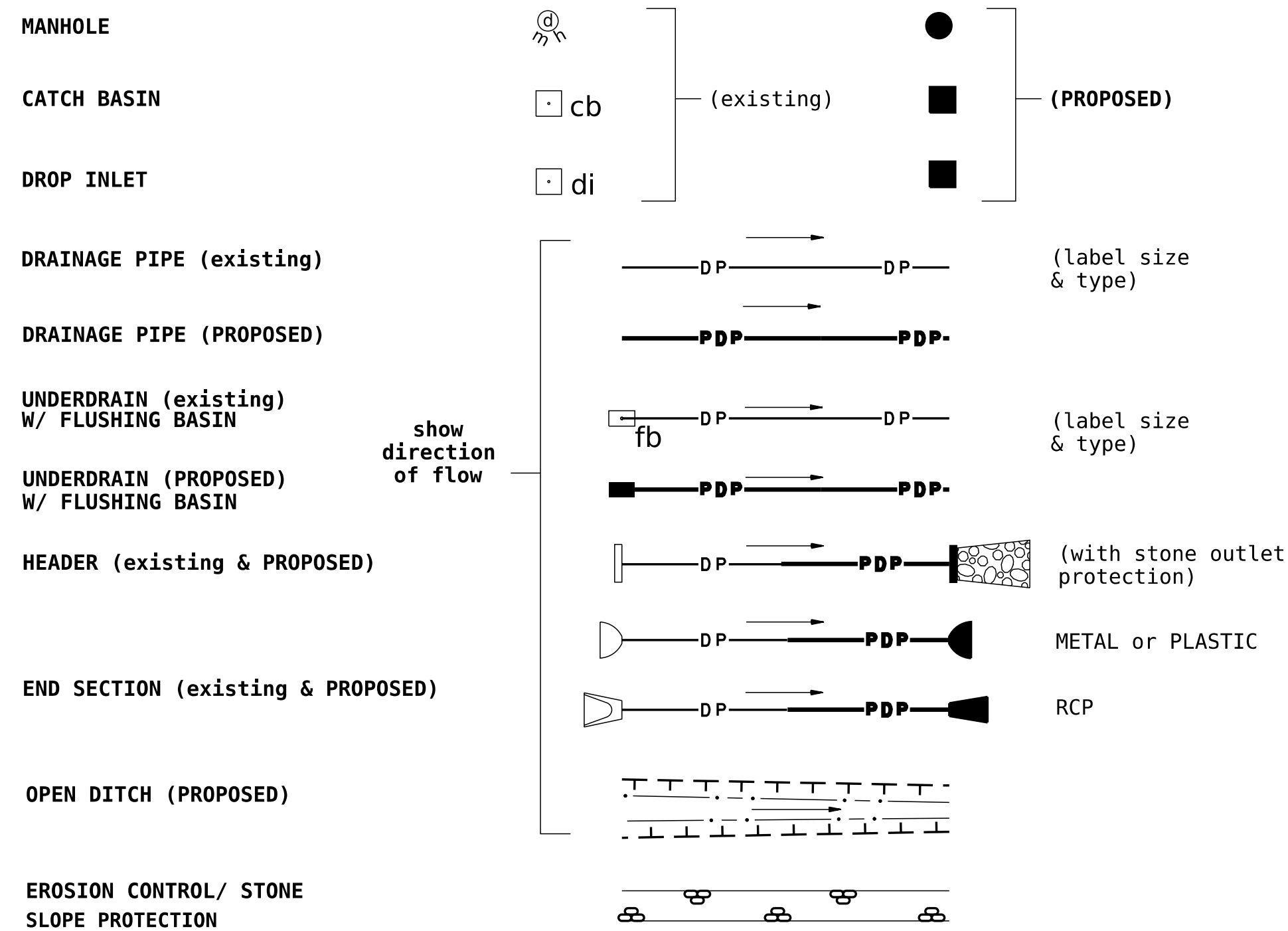


STATE OF NEW HAMPSHIRE
 AUBURN
 DEPARTMENT OF TRANSPORTATION o BUREAU OF HIGHWAY DESIGN

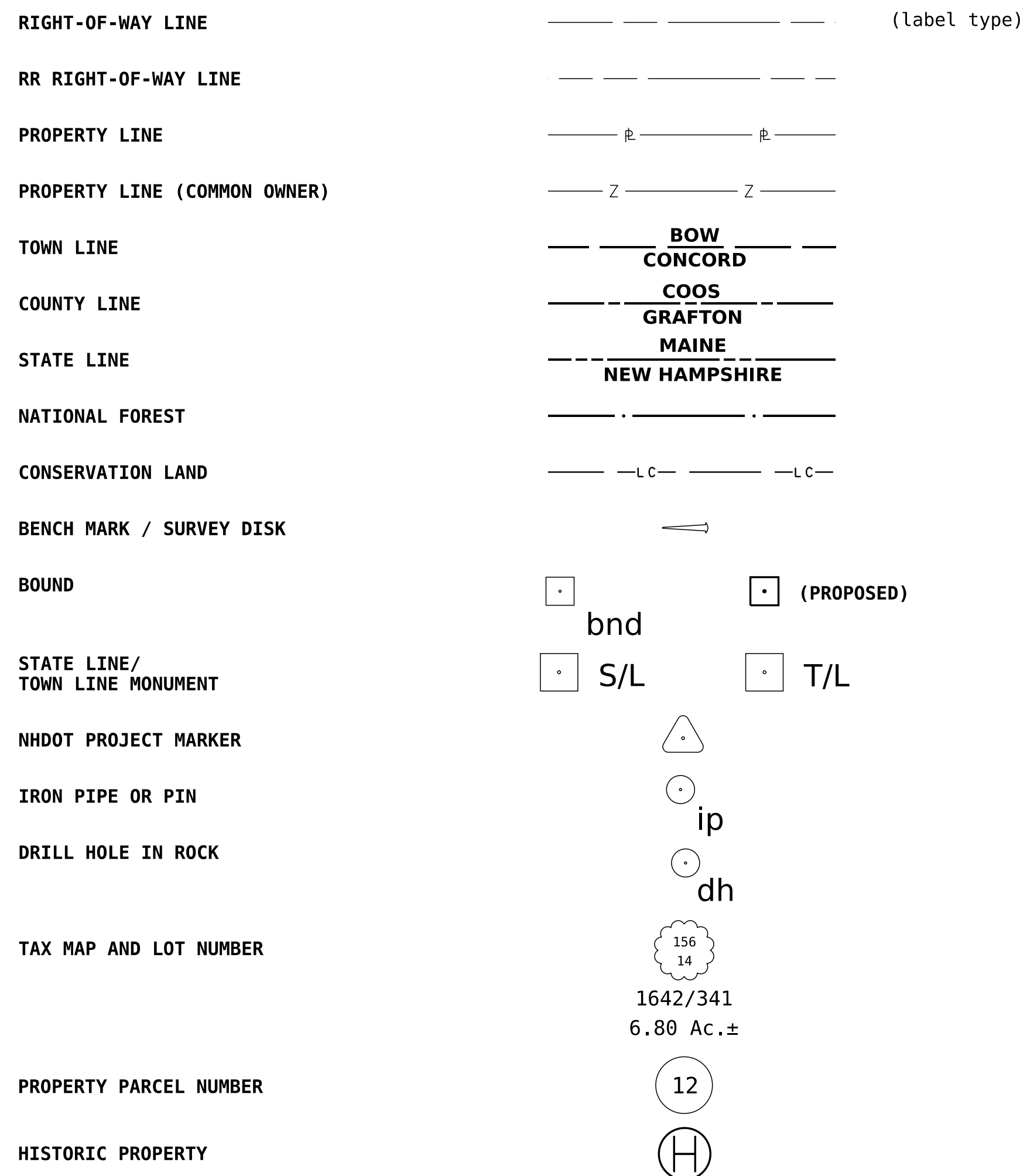
STANDARD SYMBOLS

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
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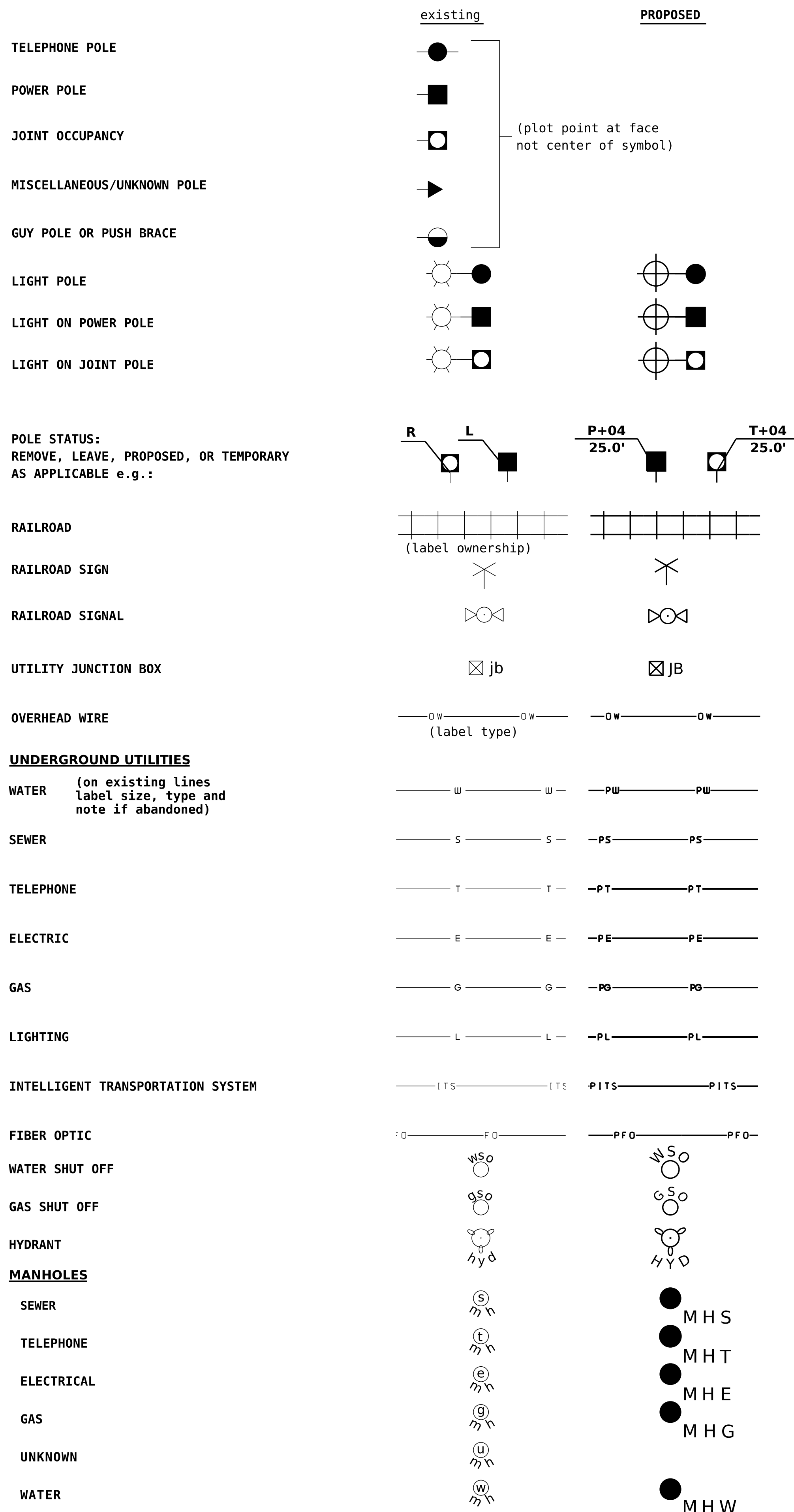
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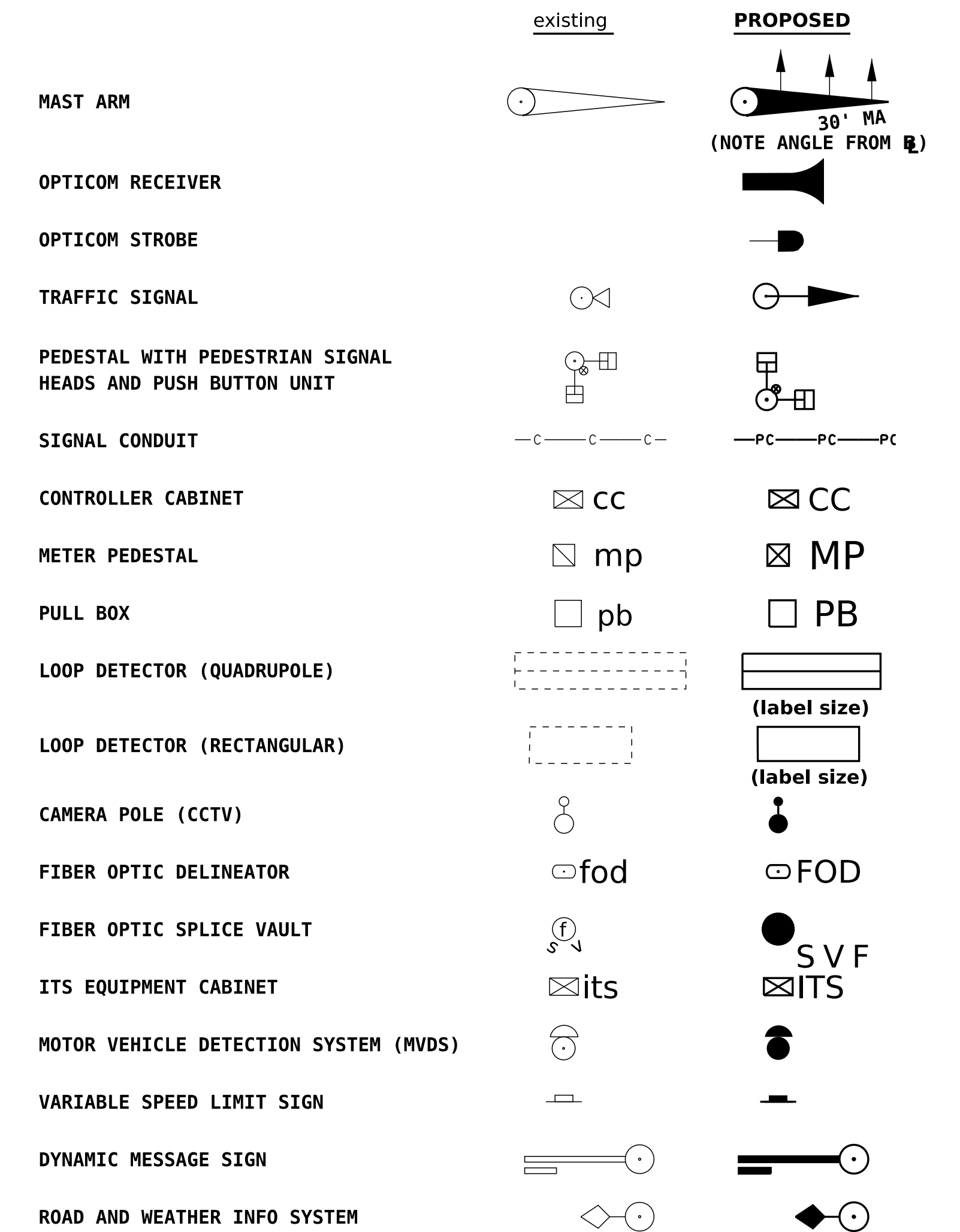
BOUNDARIES / RIGHT-OF-WAY



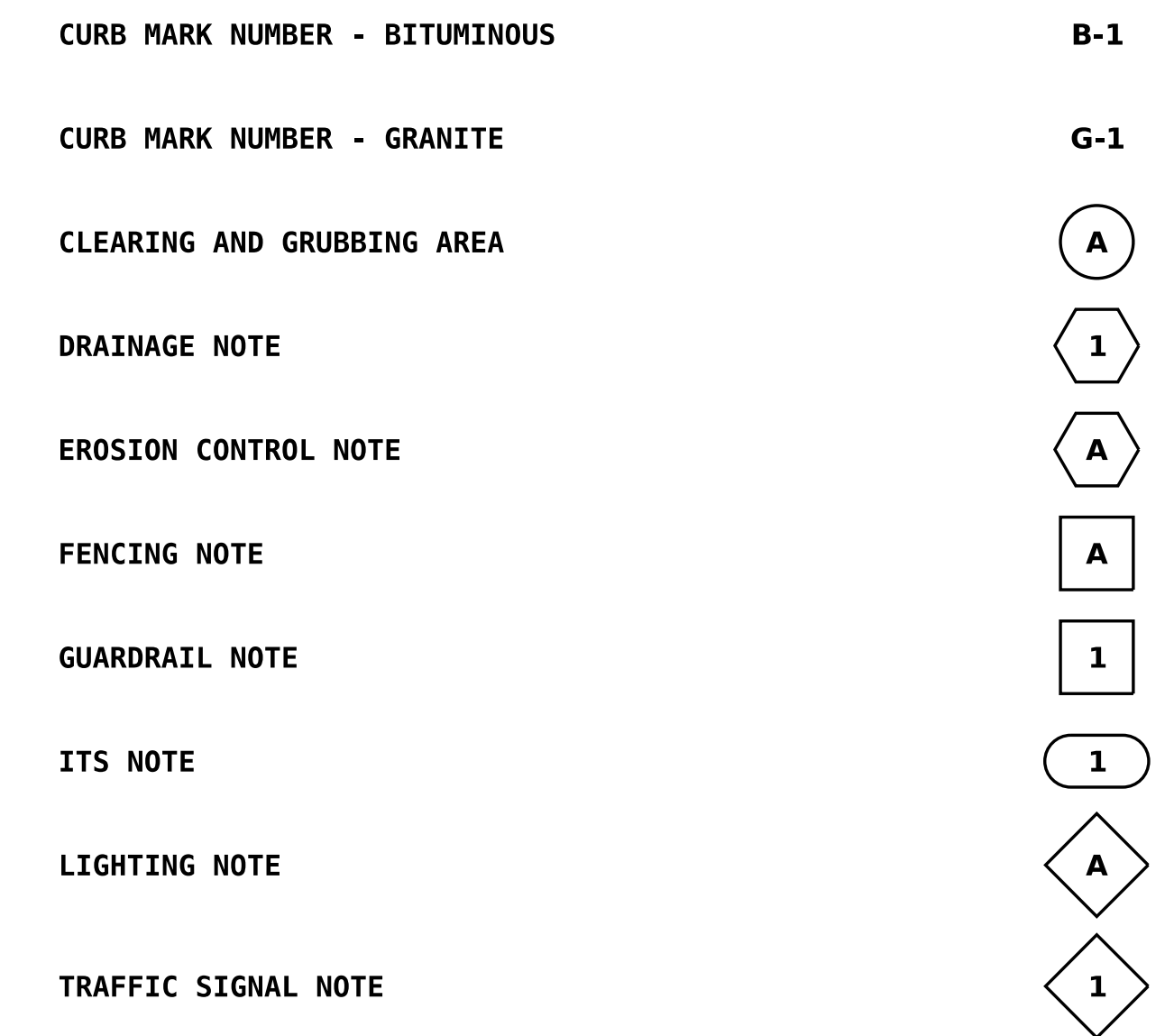
UTILITIES



TRAFFIC SIGNALS / ITS



CONSTRUCTION NOTES

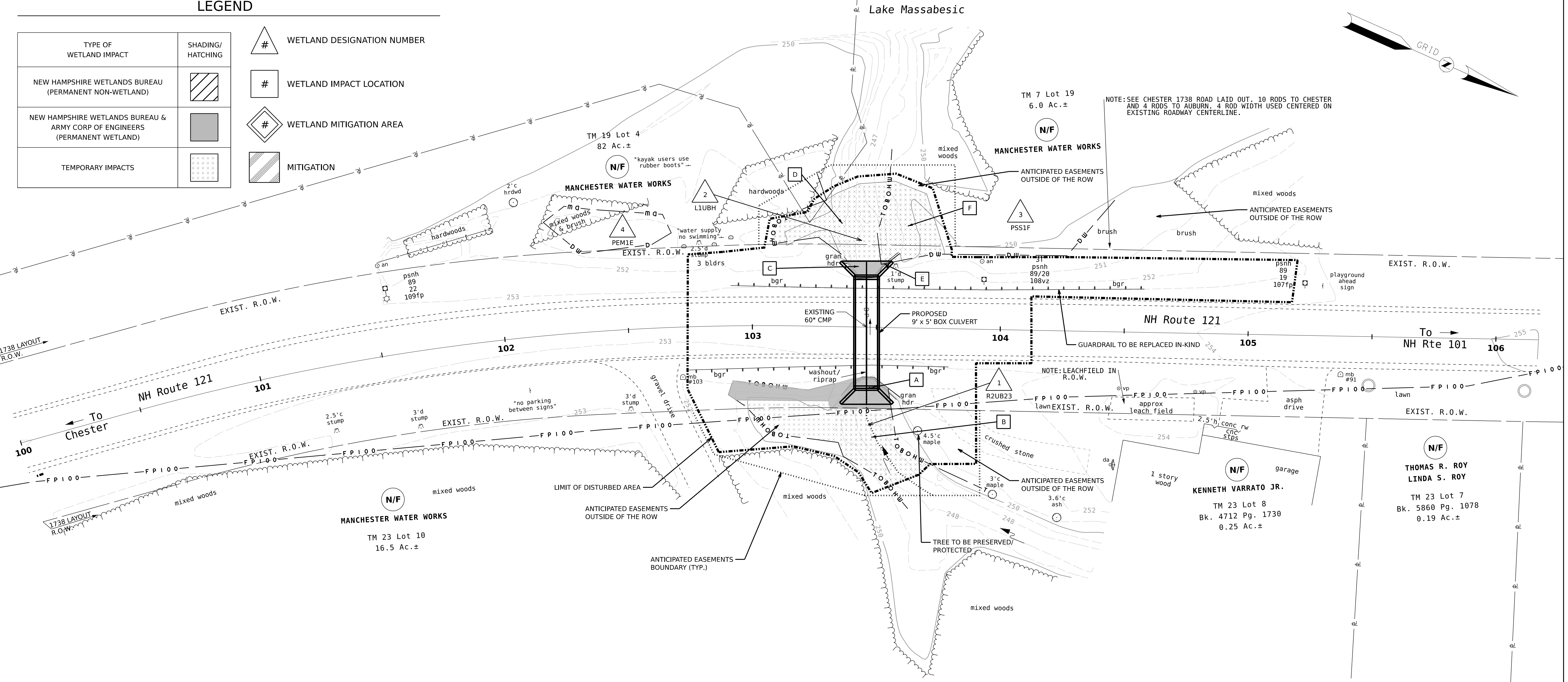


STATE OF NEW HAMPSHIRE				
AUBURN				
DEPARTMENT OF TRANSPORTATION		BUREAU OF HIGHWAY DESIGN		
STANDARD SYMBOLS				
REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
02-25-2022	2, 3 44167stdsyml-2-ce	44167	3	9

LEGEND

TYPE OF WETLAND IMPACT	SHADING/HATCHING	#	WETLAND DESIGNATION NUMBER
NEW HAMPSHIRE WETLANDS BUREAU (PERMANENT NON-WETLAND)		#	WETLAND IMPACT LOCATION
NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		#	WETLAND MITIGATION AREA
TEMPORARY IMPACTS			MITIGATION

SDR PROCESSED	DATE	05/23/23
	DATE	06/08/23
	DATE	07/23
	DATE	
NEW DESIGN	GRR	
	JSC	
SHEET CHECKED		
AS BUILT DETAILS		
REVISIONS AFTER PROPOSAL	DESCRIPTION	
STATION		
STATION		
DATE		
NUMBER		



WETLAND NUMBER	WETLAND CLASSIFICATION	LOCATION	AREA IMPACTS						LINEAR STREAM IMPACTS FOR MITIGATION		
			PERMANENT			TEMPORARY			PERMANENT		
			N.H.W.B. (NON-WETLAND)	N.H.W.B. & A.C.O.E. (WETLAND)	TEMPORARY	BANK LEFT	BANK RIGHT	CHANNEL			
			SF	LF	SF	LF	SF	LF	LF	LF	LF
1	R2UB23	A		516	33						
1	R2UB23	B				1156	107				
2	L1UBH	C		86	24						
2	L1UBH	D				891	114				
3	PSS1F	E		5							
3	PSS1F	F				612					
4	PEM1E	*									
TOTAL				607	57	2659	221				

*NO IMPACTS PROPOSED.

PERMANENT IMPACTS: 607 SF
 TEMPORARY IMPACTS: 2659 SF

TOTAL IMPACTS: 3266 SF

CODE	DESCRIPTION
R2UB23	RIVERINE, LOWER PERENNIAL, UNCONSOLIDATED BOTTOM, SAND, MUD
PEM1E	PALUSTRINE, EMERGENT, PERSISTENT, SEASONALLY FLOODED / SATURATED
L1UBH	LACUSTRINE, LIMNETIC, UNCONSOLIDATED BOTTOM, PERMANENTLY FLOODED
PSS1F	PALUSTRINE, SCRUB-SHRUB, BROAD-LEAVED DECIDUOUS, SEMIPERMANENTLY FLOODED

- NOTES:
- WETLANDS WERE DELINEATED ACCORDING TO ENV-WT 406 ON 4/6/2023 BY JOSHUA BROWN AND DEIDRA BENJAMIN.
 - VERTICAL DATUM IS NAVD88.

SCOPE OF WORK

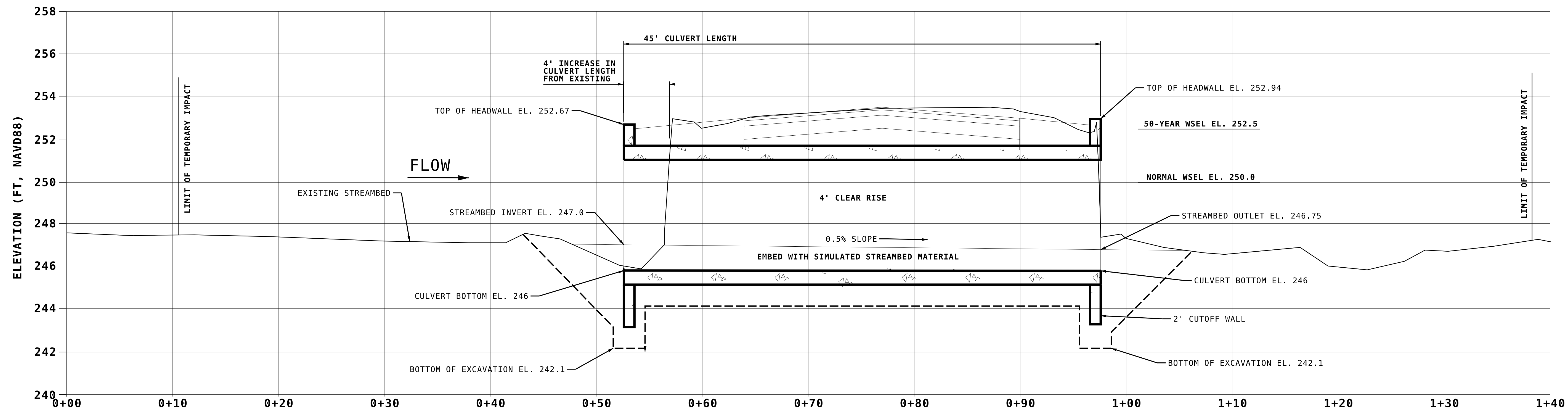
STA 103+46:
 REPLACE EXISTING 60" DIA. 41' LONG CMP CULVERT WITH 9' SPAN X 5' RISE (4' CLEAR HEIGHT) X 45' LONG PRECAST CONCRETE BOX CULVERT EMBEDDED 1' BELOW STREAMBED. CONSTRUCT CONCRETE HEADWALLS AT BOTH ENDS ANGLED AT 45 DEGREES TOWARDS THE BANK.

SEE DETAILS FOR MATCHING NEW CULVERT TO EXISTING STREAM.
 USE APPROVED WETLAND SEED MIX TO RESTORE JURISDICTIONAL WETLAND AREAS.

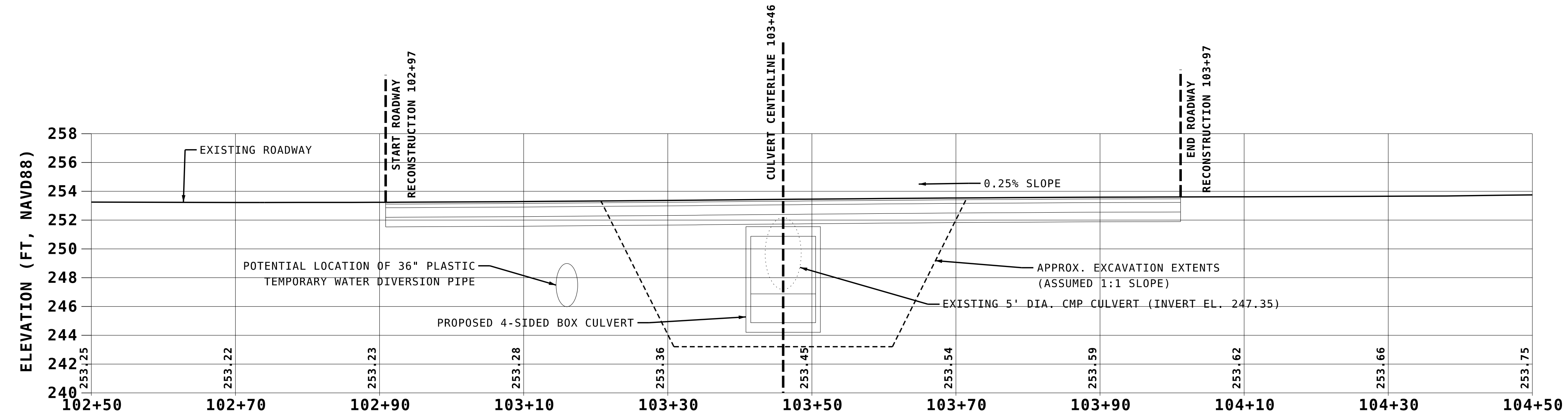


STATE OF NEW HAMPSHIRE AUBURN			
DEPARTMENT OF TRANSPORTATION		BUREAU OF HIGHWAY DESIGN	
WETLAND IMPACT PLAN			
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4 44167-wetplan	44167	4	9

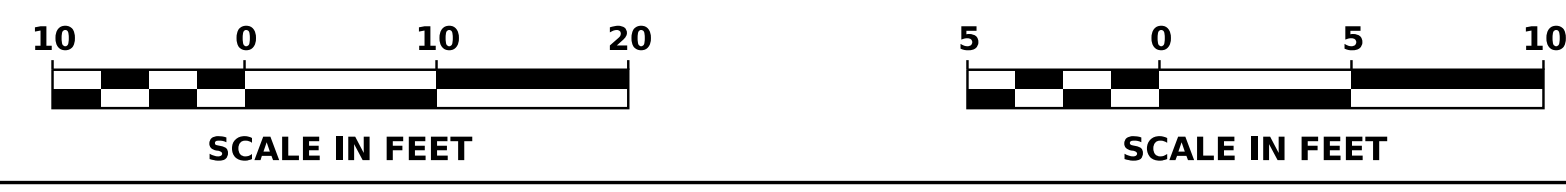
REVISIONS AFTER PROPOSAL		DESCRIPTION	
STATION			
DATE			
NUMBER			
SDR PROCESSED	SEL	DATE	05/23/23
NEW DESIGN	JSC	DATE	07/23
SHEET CHECKED	JSC	DATE	09/23
AS BUILT DETAILS		DATE	



CULVERT PROFILE
 HORIZONTAL SCALE: 1" = 5' VERTICAL SCALE: 1" = 2.5'



ROADWAY PROFILE
 HORIZONTAL SCALE: 1" = 10' VERTICAL SCALE: 1" = 5'

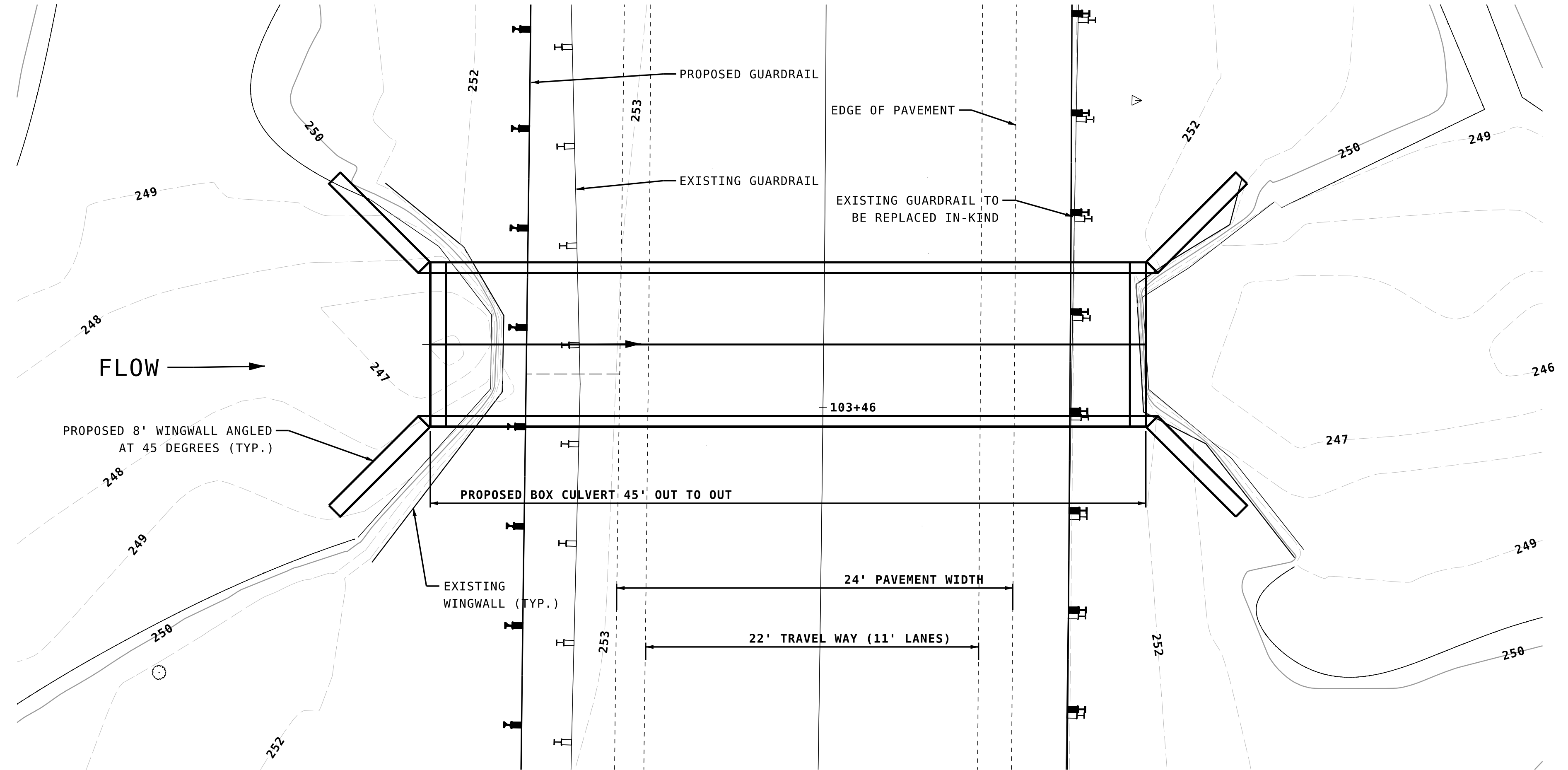


NOTE: VERTICAL DATUM IS NAVD88.

STATE OF NEW HAMPSHIRE			
AUBURN			
DEPARTMENT OF TRANSPORTATION		BUREAU OF HIGHWAY DESIGN	
PROFILES			
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
5 44167-Profiles 9.21.23	44167	5	9

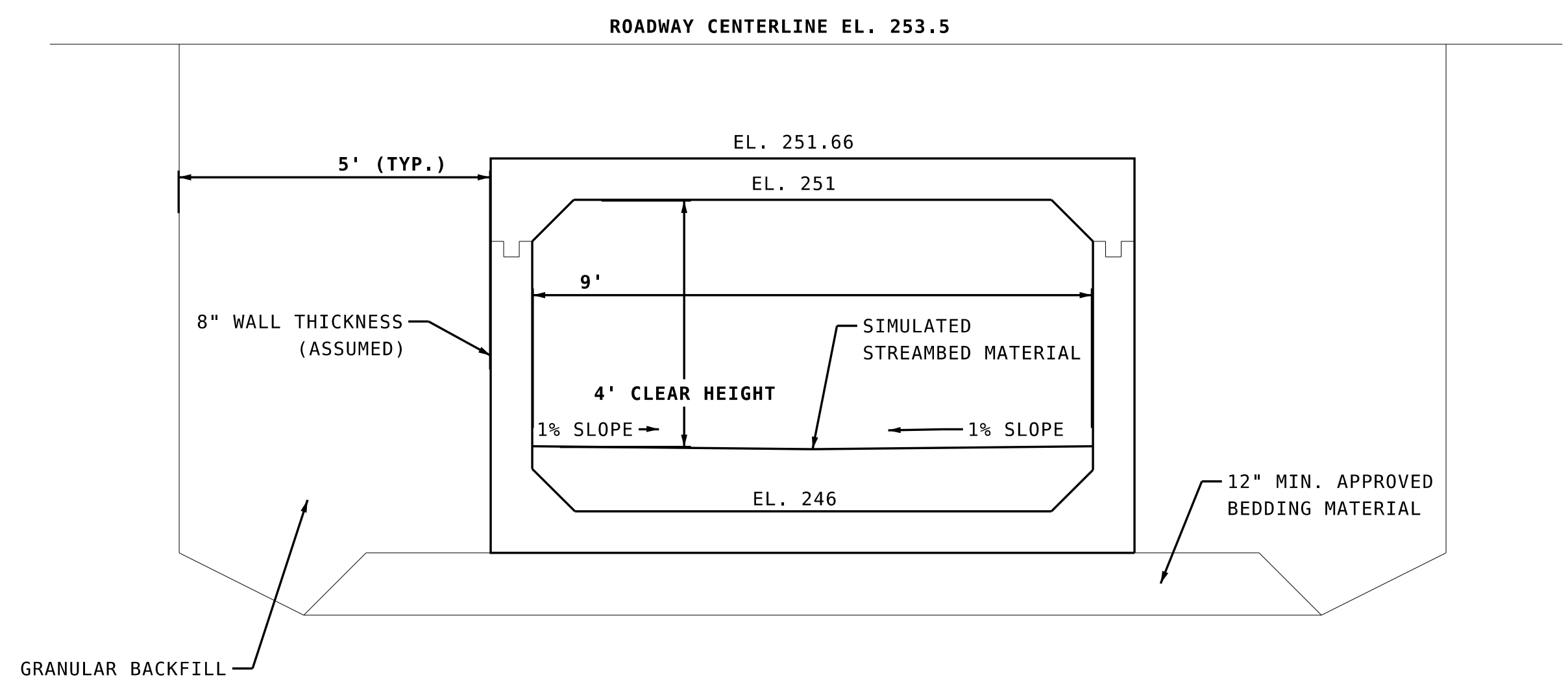
Profile-1 [Sheet]

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NEW DESIGN		GRR	06/23	DATE2	STATION		
SHEET CHECKED		JSC		DATE	STATION		
AS BUILT DETAILS				DATE			



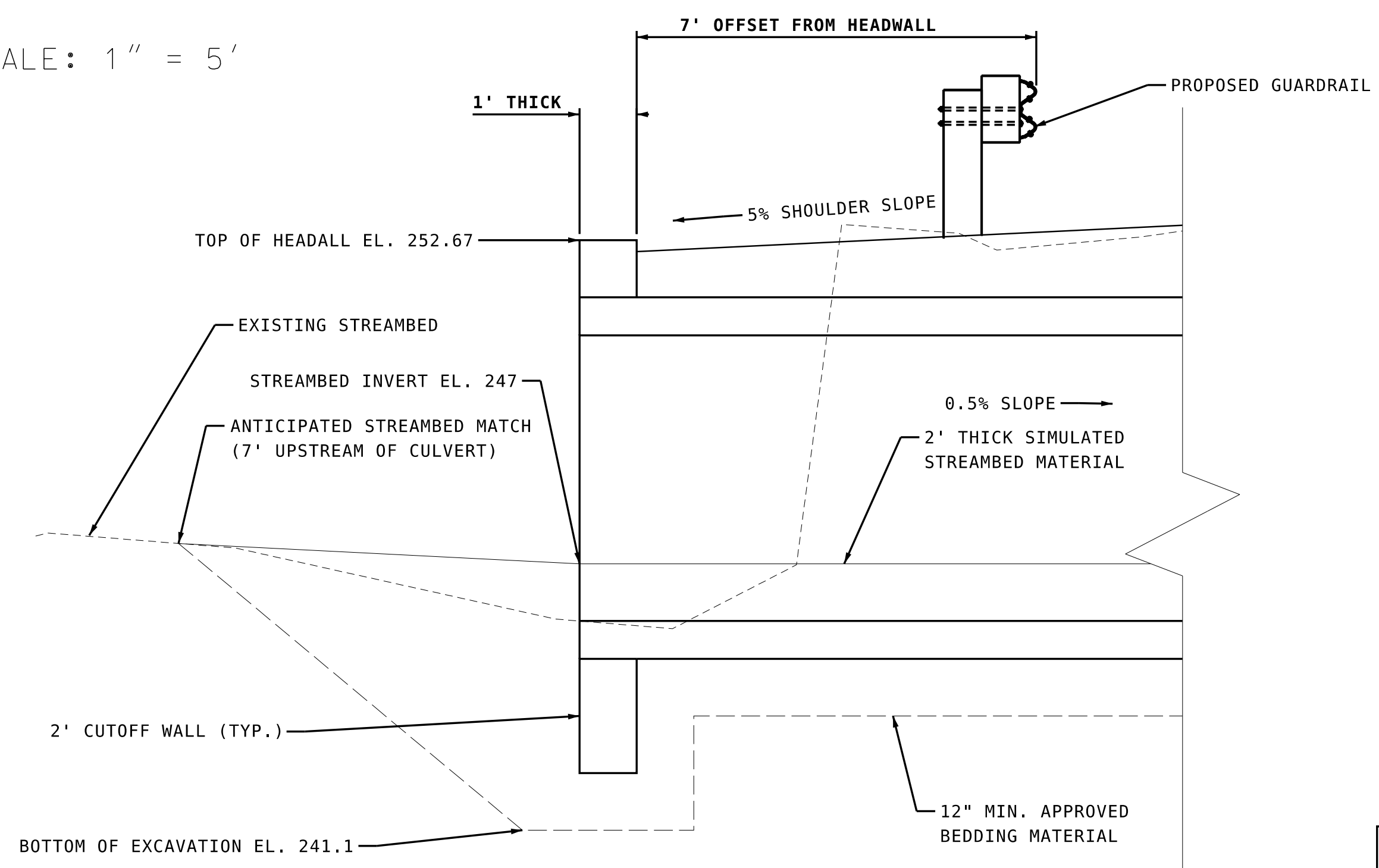
CULVERT PLAN

SCALE: 1" = 5'



CULVERT CROSS SECTION

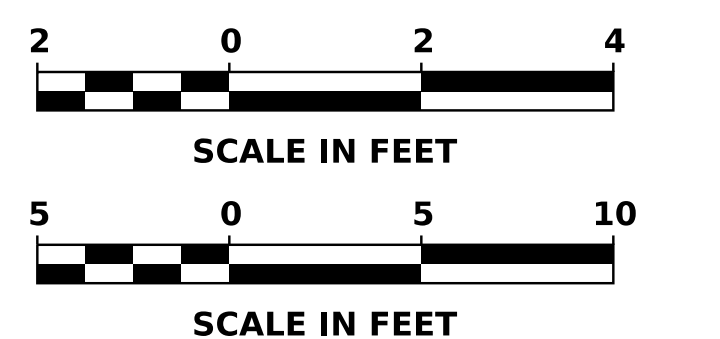
SCALE: 1" = 2'



SECTION A-A

SCALE: 1" = 2'

NOTE: VERTICAL DATUM IS NAVD88.

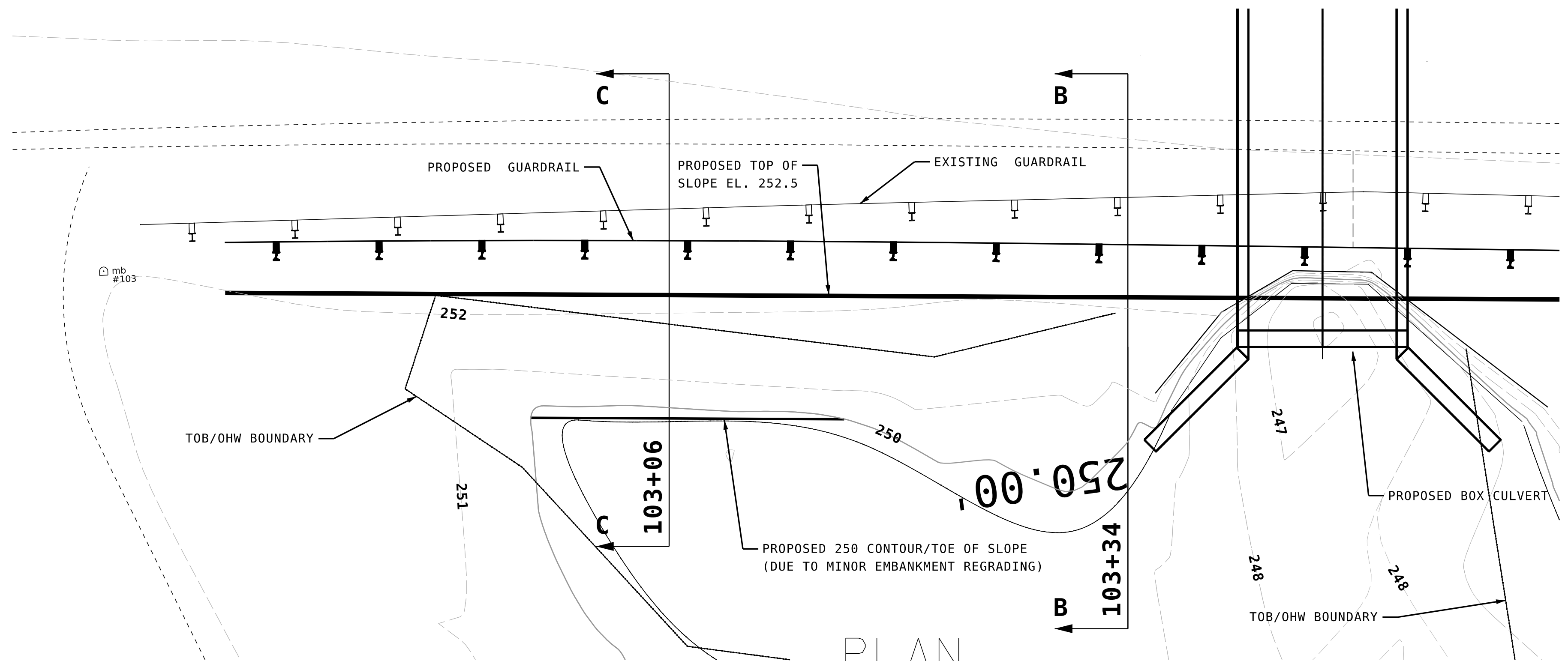


STATE OF NEW HAMPSHIRE			
AUBURN			
DEPARTMENT OF TRANSPORTATION		BUREAU OF HIGHWAY DESIGN	
CULVERT DETAILS			
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
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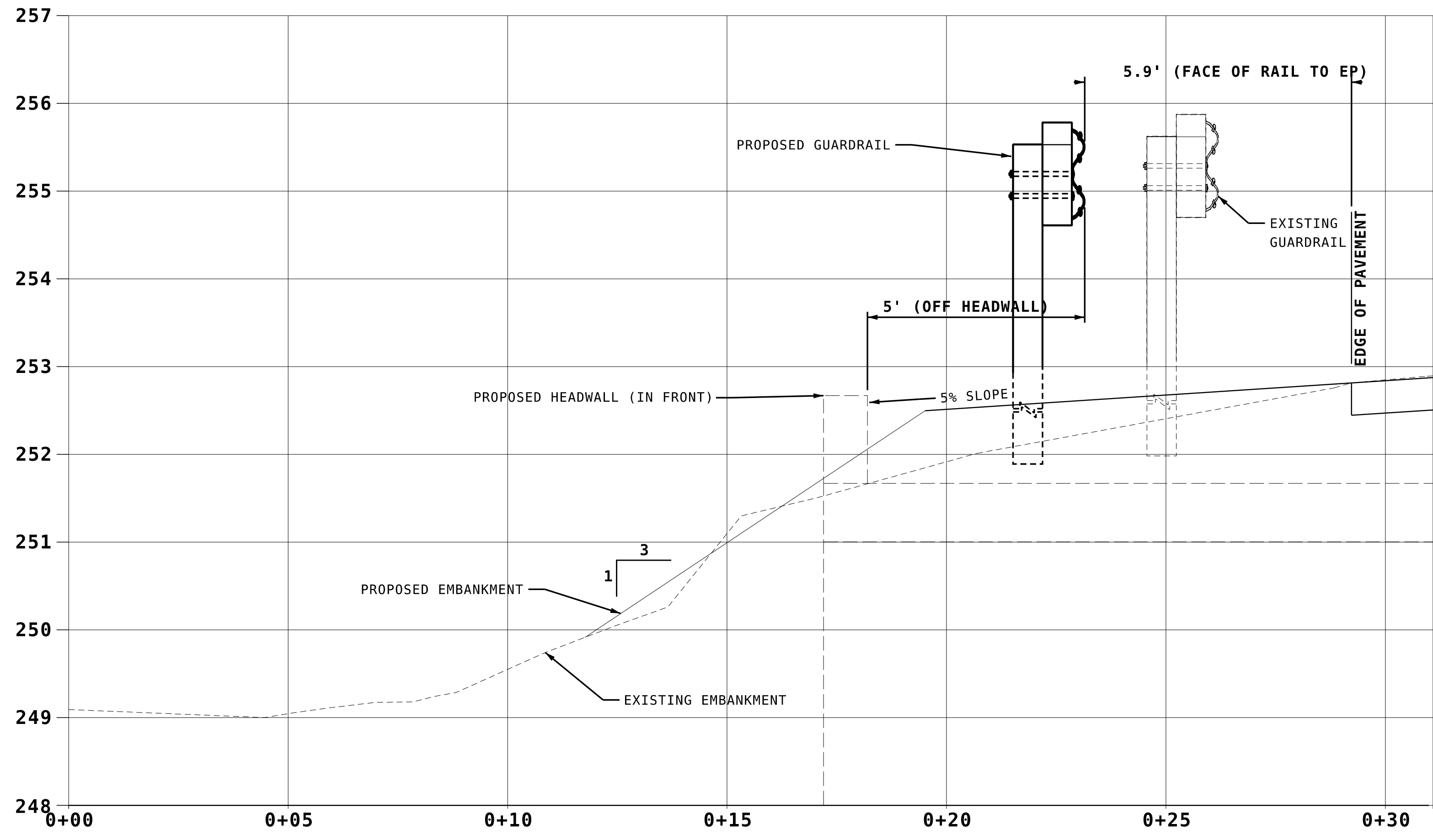
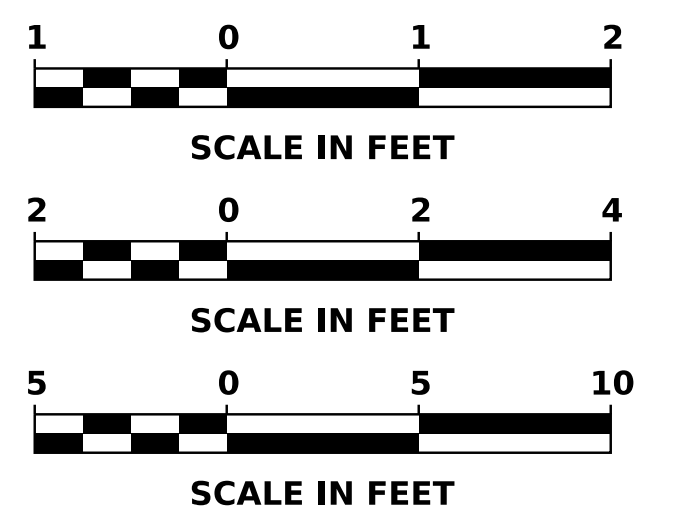
MODEL: Culvert Plan

SDR PROCESSED		SEL	DATE	05/23/23
NEW DESIGN		JSC	DATE	07/23
SHEET CHECKED		JSC	DATE	09/23
AS BUILT DETAILS			DATE	

REVISIONS AFTER PROPOSAL	DESCRIPTION
STATION	
NUMBER	
DATE	

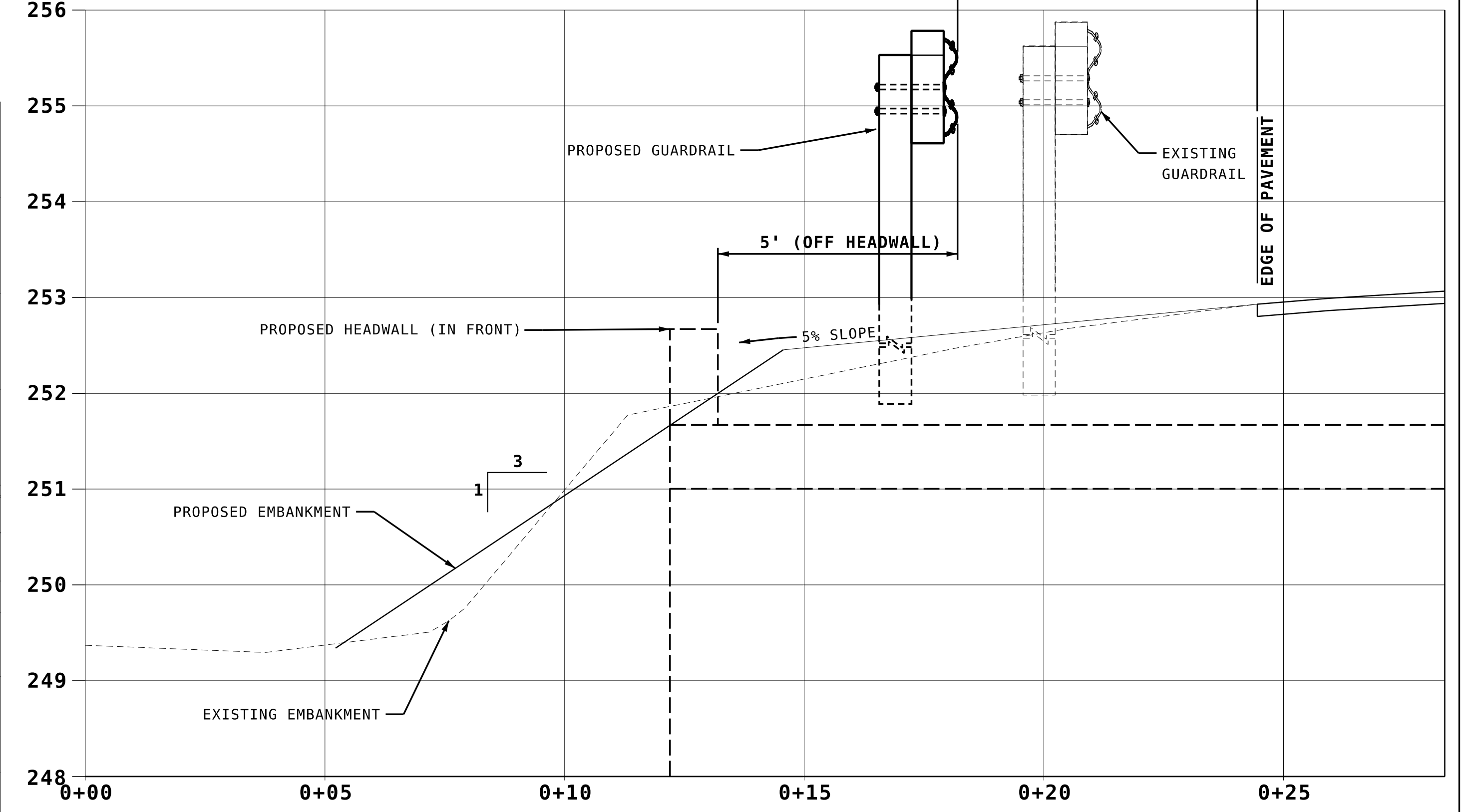


PLAN
SCALE: 1" = 5'



SLOPE CROSS SECTION B-B (103+34)

HORIZONTAL SCALE: 1" = 2' VERTICAL SCALE: 1" = 1'



SLOPE CROSS SECTION C-C (103+06)

HORIZONTAL SCALE: 1" = 2' VERTICAL SCALE: 1" = 1'

NOTE: VERTICAL DATUM IS NAVD88.

STATE OF NEW HAMPSHIRE			
AUBURN			
DEPARTMENT OF TRANSPORTATION		BUREAU OF HIGHWAY DESIGN	
SLOPE SECTIONS			
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
7 44167-Slope_XS	44167	7	9

MODEL: Culvert Plan

EROSION CONTROL NOTES AND STRATEGIES

1. Erosion Control/Stormwater Control Selection, Sequencing and Maintenance
 - 1.1. Comply with RSA 485-A:17 Terrain Alteration.
 - 1.2. Install and maintain all erosion control/stormwater controls in accordance with the New Hampshire Stormwater Management Manual, Volume 3, Erosion and Sediment Controls During Construction, December 2008 (BMP Manual), available from the NH Department of Environmental Services (NHDES).
 - 1.3. Install erosion control/stormwater control measures prior to the start of work and in accordance with the manufacturer's recommendations.
 - 1.4. Select erosion control/stormwater control measures based on the size and nature of the project and physical characteristics of the site, including slope, soil type, vegetative cover, and proximity to jurisdictional areas.
 - 1.5. Install perimeter controls prior to earth disturbing activities.
 - 1.6. Install stormwater treatment ponds and drainage swales before rough grading the site.
 - 1.7. Clean, replace, and augment stormwater control measures and infiltration basins as necessary to prevent sedimentation beyond project limits throughout the project duration.
 - 1.8. Inspect erosion and sediment control measures in accordance with Section 645 of the specifications, weekly, and within 24 hours (during normal work hours), of any storm event greater than 0.25 inches of rain in a 24-hour period.
 - 1.9. Contain stockpiles with temporary perimeter controls. Protect inactive soil stockpiles with soil stabilization measures (temporary erosion control seed mix and mulch, soil binder) or cover them with anchored tarps. If the stockpile is to remain undisturbed for more than 14 days, mulch the stockpile.
 - 1.10. Maintain temporary erosion and stormwater control measures in place until the area has been permanently stabilized.
 - 1.11. An area is considered stable if one of the following has occurred:
 - Base course gravels have been installed in areas to be paved;
 - A minimum of 85% vegetative growth has been established;
 - A minimum of 3" of non-erosive material such as stone or rip-rap has been installed;
 - Temporary slope stabilization has been properly installed (see Table 1).
 - 1.12. Direct runoff to temporary practices until permanent stormwater infrastructure is constructed and stabilized.
 - 1.13. 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.
 - 1.14. Plan activities to account for sensitive site conditions
 - Sequence construction to limit the duration and area of exposed soils.
 - Clearly flag areas to be protected in the field and provide construction barrier to prevent trafficking outside of work areas.
 - Protect and maximize existing native vegetation and natural forest buffers between construction activities and sensitive areas.
 - When work is undertaken in a flowing watercourse, implement stream flow diversion methods prior to any excavation or filling activity.
 - 1.15. Utilize storm drain inlet protection to prevent sediment from entering a storm drainage system prior to the permanent stabilization of the contributing disturbed area.
 - 1.16. Use care to ensure that sediments do not enter any existing catch basins during construction. Place temporary inlet protection at inlets in areas of soil disturbance that are subject to sedimentation.
 - 1.17. Construct, stabilize, and maintain temporary and permanent ditches in a manner that will minimize scour. Direct temporary and permanent ditches to drain to sediment basins or stormwater collection areas.
 - 1.18. Supplement channel protection measures with perimeter control measures when ditch lines occur at the bottom of long fill slopes. Install the perimeter controls on the fill slope to minimize the potential for fill slope sediment deposits in the ditch line.
 - 1.19. Divert sediment laden water away from drainage inlet structures to the extent possible.
 - 1.20. Install sediment barriers and sediment traps at drainage inlets to prevent sediment from entering the drainage system.
 - 1.21. Clean catch basins, drainage pipes, and culverts if significant sediment is deposited.
 - 1.22. Construct and stabilize dewatering infiltration basins prior to any excavation that may require dewatering.
 - 1.23. Place and stabilize temporary sediment basins or traps at locations where concentrated flow (channels and pipes) discharge to the surrounding environment from areas of unstabilized earth disturbing activities.
 - 1.24. Stabilize, to appropriate anticipated velocities, conveyance channels or pumping systems needed to convey construction stormwater to basins and discharge locations prior to use.
 - 1.25. Size temporary sediment basins to contain the 2-year, 24 hour storm event.
 - 1.26. Size temporary sediment traps to contain 3,600 cubic feet of storage for each acre of drainage area.
 - 1.27. Construct detention basins to accommodate the 2-year, 24-hour storm event.
2. Construction Planning
 - 2.1. Divert off site runoff or clean water away from the construction activities to reduce the volume that needs to be treated on site.
 - 2.2. Divert storm runoff from upslope drainage areas away from disturbed areas, slopes and around active work areas to a stabilized outlet location.
 - 2.3. Construct impermeable barriers, as necessary, to collect or divert concentrated flows from work or disturbed areas.
 - 2.4. Locate staging areas and stockpiles outside of wetlands jurisdiction.
 - 2.5. Do not store, maintain, or repair mobile heavy equipment in wetlands, unless equipment cannot be practicably removed and secondary containment is provided.
 - 2.6. Provide a water truck to control excessive dust, at the discretion of the Contract Administrator.
3. Site Stabilization
 - 3.1. Stabilize all areas of unstabilized soil as soon as practicable, but no later than 45 days after initial disturbance.
 - 3.2. Limit unstabilized soil to a maximum of 5 acres unless documentation is provided that demonstrates that cuts and fills are such that 5 acres is unreasonable.
 - 3.3. Use erosion control seed mix in all inactive construction areas that will not be permanently seeded within two weeks of disturbance and prior to September 15th of any given year in order to achieve vegetative stabilization prior to the end of the growing season.
 - 3.4. Apply, and reapply as necessary, soil tackifiers in accordance with the manufacturer's specifications to minimize soil and mulch loss until permanent vegetation is established.
 - 3.5. Stabilize basins, ditches and swales prior to directing runoff to them.
 - 3.6. Stabilize roadway and parking areas within 72 hours of achieving finished grade.
 - 3.7. Stabilize cut and fill slopes within 72 hours of achieving finished grade.
 - 3.8. When temporarily stabilizing soils and slopes, utilize the techniques outlined in Table 1.
 - 3.9. Stabilize all areas that can be stabilized prior to opening up new areas to construction activities.
 - 3.10. Utilize Table 1 when selecting temporary soil stabilization measures.
 - 3.11. Divert off-site water through the project in an appropriate manner so as not to disturb the upstream or downstream soils, vegetation or hydrology beyond the permitted area.
 - 3.12. Install and maintain construction exits anywhere traffic leaves a construction site onto a public right-of-way.
 - 3.13. Sweep all construction related debris and soil from the adjacent paved roadways, as necessary.

4. Slope Protection
 - 4.1. Intercept and divert storm runoff from upslope drainage areas away from unprotected and newly established areas and slopes to a stabilized outlet or conveyance.
 - 4.2. Consider how groundwater seepage on cut slopes may impact slope stability and incorporate appropriate measures to minimize erosion.
 - 4.3. Convey storm water down the slope in a stabilized channel or slope drain.
 - 4.4. The outer face of the fill slope should be in a loose, ruffled condition prior to turf establishment.
5. Winter Construction
 - 5.1. To minimize erosion and sedimentation impacts, limit the extent and duration of winter excavation and earthwork activities. 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 contractor's Critical Path Method (CPM) schedule, and the contractor has adequate resources available to ensure that environmental requirements will be met.
 - 5.2. Construction performed any time between November 30th and May 1st of any year is considered winter construction. During winter construction:
 - Stabilize all proposed vegetation areas which do not exhibit a minimum of 85% vegetative growth by October 15th, or which are disturbed after October 15th, in accordance with Table 1.
 - Stabilize all ditches or swales which do not exhibit a minimum of 85% vegetative growth by October 15th, or which are disturbed after October 15th, in accordance with Table 1.
 - Protect incomplete road surfaces, where base course gravels have not been installed, and where work has stopped for the season after November 30th, in accordance with Table 1.
 - Unless a winter construction plan has been approved by NHDOT, conduct winter excavation and earthwork such that no more than 1 acre of the project is without stabilization any one time.
6. Wildlife Protection Measures
 - 6.1. Report all observations of threatened and endangered species on the project site to the Department's Bureau of Environment by phone at 603-271-3226 or by email at Bureau16@dot.nh.gov, indicating in the subject line the project name, number, and that a threatened/endangered species was found.
 - 6.2. Photograph the observed species and nearby elements of habitat or areas of land disturbance and provide them to the Department's Bureau of Environment at the above email address.
 - 6.3. In the event that a threatened or endangered species is observed on the project during work, the species shall not be disturbed, handled, or harmed prior to receiving direction from the Bureau of Environment.
 - 6.4. Utilize wildlife friendly erosion control methods when:
 - Erosion control blankets are used,
 - A protected species or habitat is documented,
 - The proposed work is in or adjacent to a priority resource area, and/or when specifically requested by NHB or NHF&G

GUIDANCE ON SELECTING TEMPORARY SOIL STABILIZATION MEASURES
TABLE 1

APPLICATION AREAS	DRY MULCH METHODS				HYDRAULICALLY APPLIED MULCHES ²				ROLLED EROSION CONTROL BLANKETS ³			
	HMT	WC	SG	CB	HM	SMM	BFM	FRM	SNSB	DNSB	DNSCB	DNCB
SLOPES ¹												
STEEPER THAN 2:1	NO	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO	YES
2:1 SLOPE	YES ¹	YES ¹	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	DNSCB	2 NET STRAW-COCONUT BLANKET
CB	COMPOST BLANKET	FRM	FIBER REINFORCED MEDIUM	DNCB	2 NET COCONUT BLANKET

NOTES:

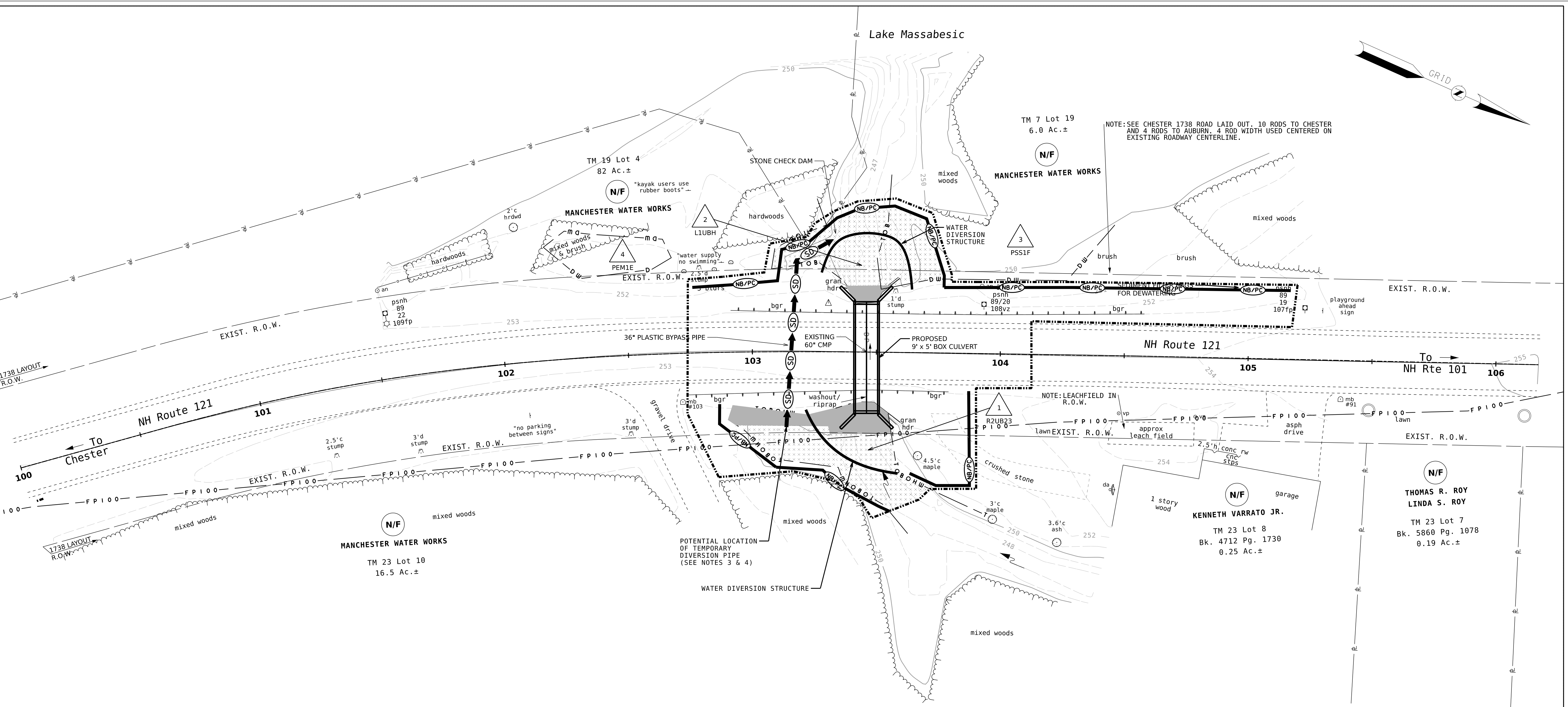
1. All slope stabilization options assume a slope length ≤ 10 times the horizontal distance component of the slope, in feet.
2. Do not apply products containing polyacrylamide (PAM) directly to, or within 100 feet of any surface water without NHDES approval.
3. Install all methods in Table 1 per the manufacturer's recommendation for time of year and steepness of slope.

STATE OF NEW HAMPSHIRE
AUBURN
DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
erosstrat-ce 07-31-2023	_8 44167-erostrat-ce	44167	8	9

SDR PROCESSED	SEL	DATE	05/23/23
NEW DESIGN	GRR	DATE	06/08/23
SHEET CHECKED	JSC	DATE	09/23
AS BUILT DETAILS		DATE	



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

GENERAL NOTES

- LIMITS OF TEMPORARY DISTURBANCE ARE BASED ON CONSTRUCTION OF THE CULVERT HALF AT A TIME WHILE MAINTAINING ONE LANE OF TRAFFIC THROUGH THE WORK AREA. ALL AREAS OF TEMPORARY DISTURBANCE SHALL BE RESTORED TO EXISTING GRADE.
- A COFFERDAM ITEM WILL BE INCLUDED IN THE CONTRACT FOR SUPPORT OF THE ROAD AND IF NECESSARY FOR SUPPORT OF THE EXCAVATION AND CONTROL OF GROUNDWATER. SEDIMENT BAGS FOR DEWATERING MAY BE PLACED BETWEEN THE EDGE OF PAVEMENT AND THE ROW, WITH APPROPRIATE SEPARATION FROM WETLANDS.
- A WATER DIVERSION ITEM WILL BE INCLUDED IN THE CONTRACT FOR MANAGING SURFACE WATER. STREAM FLOW SHALL BE PASSED THROUGH THE WORK AREA BY AN APPROVED METHOD. AT A MINIMUM, THE WATER DIVERSION SHALL BE DESIGNED TO ACCOMMODATE A 2 YEAR STORM.
- COFFERDAM, DEWATERING, AND WATER DIVERSION DETAILS SHALL BE DESIGNED BY THE CONTRACTOR AND SUBMITTED TO NHDOT FOR APPROVAL.

SCOPE OF WORK

STA 103+46:
 REPLACE EXISTING 60" DIA. 41' LONG CMP CULVERT WITH 9' SPAN X 5' RISE (4' CLEAR HEIGHT) X 45' LONG PRECAST CONCRETE BOX CULVERT EMBEDDED 1' BELOW STREAMBED.
 CONSTRUCT CONCRETE HEADWALLS AT BOTH ENDS ANGLED AT 45 DEGREES TOWARDS THE BANK.



STATE OF NEW HAMPSHIRE			
AUBURN			
DEPARTMENT OF TRANSPORTATION		BUREAU OF HIGHWAY DESIGN	
EROSION CONTROL PLAN			
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
9 44167-ercplan	44167	9	9