STATE OF NEW HAMPSHIRE
INTER-DEPARTMENT COMMUNICATION

DATE: September 23, 2019

FROM: Andrew O'Sullivan
Wetlands Program Manager

AT (OFFICE): Department of Transportation
Bureau of Environment

SUBJECT Dredge & Fill Application
Meredith, 41890

TO Craig Rennie, Inland Wetlands Supervisor
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 District 3 for the subject major impact project. This project is classified as major per Env-Wt 303.02(p). The project is located on Meredith Neck Road in the Town of Meredith, NH. The proposed work consists of replacing an existing 4.2' x 4.8' box arch culvert with a 4' x 8' concrete box culvert embedded 1' with natural streambed simulation throughout the crossing.

This project was reviewed at the Natural Resource Agency Coordination Meeting on August 21, 2019. A copy of the minutes has been included with this application package. A copy of this application and plans can be accessed on the Departments website via the following link: http://www.nh.gov/dot/org/projectdevelopment/environment/units/program-management/wetland-applications.htm

Mitigation is not required per Env-wt 302.03(c)(2)c.

The lead people to contact for this project are William Rollins, Highway Maintenance District 3 (448-2654 or william.rollins@dot.nh.gov) or Sarah Large, Wetlands Program Analyst, Bureau of Environment (271-3226 or Sarah.Large@dot.nh.gov).

A payment voucher has been processed for this application (Voucher #581376) in the amount of $200.

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

AMO:sel
Enclosures

cc:
BOE Original
Town of Meredith (4 copies via certified mail)
David Trubey, NH Division of Historic Resources (Cultural Review Within)
Carol Henderson, NH Fish & Game (via electronic notification)
Maria Tur, US Fish & Wildlife (via electronic notification)
Mark Kern, US Environmental Protection Agency (via electronic notification)
Michael Hicks, US Army Corp of Engineers (via electronic notification)
Kevin Nyhan, BOE (via electronic notification)

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WETLANDS PERMIT APPLICATION

Water Division/ Wetlands Bureau
Land Resources Management

Check the status of your application: www.des.nh.gov/onestop

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

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

1. REVIEW TIME: Indicate your Review Time below. To determine review time, refer to Guidance Document A for instructions.

☒ Standard Review (Minimum, Minor or Major Impact) ☐ Expedited Review (Minimum Impact only)

2. MITIGATION REQUIREMENT:

If mitigation is required, a Mitigation-Pre Application meeting must occur prior to submitting this Wetlands Permit Application. To determine if mitigation is required, please refer to the Determine if Mitigation is Required Frequently Asked Questions.

Mitigation Pre-Application Meeting Date: Month: **01** Day: **26** Year: **2019**

☐ N/A - Mitigation is not required

3. PROJECT LOCATION:

Separate wetland permit applications must be submitted for each municipality within which wetland impacts occur.

ADDRESS: **Meredith Neck Road, Right-of-Way**			TOWN/CITY: **Meredith**
TAX MAP: **S05**	BLOCK:	LOT: **ROW**	UNIT:
USGS TOPO MAP WATERBODY NAME: **Page Brook** ☐ NA		STREAM WATERSHED SIZE: **1171** ☐ NA	
LOCATION COORDINATES (If known): x: 1042866.7 y: 420302.2		☐ Latitude/Longitude ☐ UTM ☒ State Plane	

4. PROJECT DESCRIPTION:

Provide a brief description of the project outlining the scope of work. Attach additional sheets as needed to provide a detailed explanation of your project. DO NOT reply "See Attached" in the space provided below.

The applicant is proposing to replace an existing 4.2' x 4.8' box arch culvert with a 4' x 8' concrete box culvert. The proposed crossing will pass the 100 year storm event and will be embedded 1' with natural stream simulation throughout crossing. New concrete headwall and wingwalls will be installed as well. The DOT will also install a diversion pipe that will remain in place as an overflow and wildlife pipe.

5. SHORELINE FRONTAGE:

☒ N/A This does not have shoreline frontage. SHORELINE FRONTAGE:

Shoreline Frontage is calculated by determining the average of the distances of the actual natural navigable shoreline frontage and a straight line drawn between the property lines, both of which are measured at the normal high water line (Env-Wt 101.89).

6. RELATED NHDES LAND RESOURCES MANAGEMENT PERMIT APPLICATIONS ASSOCIATED WITH THIS PROJECT:

Please indicate if any of the following permit applications are required and, if required, the status of the application.

To determine if other Land Resources Management Permits are required, refer to the Land Resources Management Webpage.

Permit Type	Permit Required	File Number	Permit Application Status
Alteration of Terrain Permit Per RSA 485-A:17	☐ YES ☒ NO	_____	☐ APPROVED ☐ PENDING ☐ DENIED
Individual Sewerage Disposal per RSA 485-A:2	☐ YES ☒ NO	_____	☐ APPROVED ☐ PENDING ☐ DENIED
Subdivision Approval Per RSA 485-A	☐ YES ☒ NO	_____	☐ APPROVED ☐ PENDING ☐ DENIED
Shoreland Permit Per RSA 483-B	☐ YES ☒ NO	_____	☐ APPROVED ☐ PENDING ☐ DENIED

7. NATURAL HERITAGE BUREAU & DESIGNATED RIVERS:

See the Instructions & Required Attachments document for instructions to complete a & b below.

a. Natural Heritage Bureau File ID: NHB **18** - **2368** .

b. ☐ This project is within a Designated River corridor. The project is within ¼ mile of: _____; and date a copy of the application was sent to the Local River Management Advisory Committee: Month: __ Day: __ Year: ____

☒ N/A – This project is not within a Designated River corridor.

8. APPLICANT INFORMATION (Desired permit holder)

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

TRUST / COMPANY NAME:**NH Department of Transportation** | MAILING ADDRESS: **P.O. Box 483**

TOWN/CITY: **Concord** | STATE: **NH** | ZIP CODE: **03302**

EMAIL or FAX: **andrew.o'sullivan@dot.nh.gov** | PHONE: **603-271-3226**

ELECTRONIC COMMUNICATION: By initialing here: _____, I hereby authorize NHDES to communicate all matters relative to this application electronically.

9. PROPERTY OWNER INFORMATION (If different than applicant)

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

TRUST / COMPANY NAME:**NH Department of Transportation** | MAILING ADDRESS: **P.O. Box 483**

TOWN/CITY: **Concord** | STATE: **NH** | ZIP CODE: **03302**

EMAIL or FAX: **sarah.large@dot.nh.gov** | PHONE: **603-271-3226**

ELECTRONIC COMMUNICATION: By initialing here _____, I hereby authorize NHDES to communicate all matters relative to this application electronically.

10. AUTHORIZED AGENT INFORMATION

LAST NAME, FIRST NAME, M.I.: **Balcius, Cynthia M. CWS, CSS, CPESC** | COMPANY NAME:**Stoney Ridge Environmental**

MAILING ADDRESS: **229 Prospect Mountain Road**

TOWN/CITY: **Alton** | STATE: **NH** | ZIP CODE: **03809**

EMAIL or FAX: **cbalcius@stoneyridgeenv.com** | PHONE: **603-776-5825**

ELECTRONIC COMMUNICATION: By initialing here **cmb** , I hereby authorize NHDES to communicate all matters relative to this application electronically.

11. PROPERTY OWNER SIGNATURE:

See the Instructions & Required Attachments document for clarification of the below statements

By signing the application, I am certifying that:

1. I authorize the applicant and/or agent indicated on this form to act in my behalf in the processing of this application, and to furnish upon request, supplemental information in support of this permit application.
2. I have reviewed and submitted information & attachments outlined in the Instructions and Required Attachment document.
3. All abutters have been identified in accordance with RSA 482-A:3, I and Env-Wt 100-900.
4. I have read and provided the required information outlined in Env-Wt 302.04 for the applicable project type.
5. I have read and understand Env-Wt 302.03 and have chosen the least impacting alternative.
6. Any structure that I am proposing to repair/replace was either previously permitted by the Wetlands Bureau or would be considered grandfathered per Env-Wt 101.47.
7. I have submitted a Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) to the NH State Historic Preservation Officer (SHPO) at the NH Division of Historical Resources to identify the presence of historical/ archeological resources while coordinating with the lead federal agency for National Historic Preservation Act (NHPA) 106 compliance.
8. I authorize NHDES and the municipal conservation commission to inspect the site of the proposed project.
9. I have reviewed the information being submitted and that to the best of my knowledge the information is true and accurate.
10. I understand that the willful submission of falsified or misrepresented information to the NHDES is a criminal act, which may result in legal action.
11. I am aware that the work I am proposing may require additional state, local or federal permits which I am responsible for obtaining.
12. The mailing addresses I have provided are up to date and appropriate for receipt of NHDES correspondence. NHDES will not forward returned

Property Owner Signature	Print name legibly	Date
		/ /

MUNICIPAL SIGNATURES

12. CONSERVATION COMMISSION SIGNATURE

The signature below certifies that the municipal conservation commission has reviewed this application, and:

1. Waives its right to intervene per RSA 482-A:11;
2. Believes that the application and submitted plans accurately represent the proposed project; and
3. Has no objection to permitting the proposed work.

⇨	Print name legibly	Date

DIRECTIONS FOR CONSERVATION COMMISSION

1. Expedited review ONLY requires that the conservation commission's signature is obtained in the space above.

2. Expedited review requires the Conservation Commission signature be obtained **prior** to the submittal of the original application to the Town/City Clerk for signature.

3. The Conservation Commission may refuse to sign. If the Conservation Commission does not sign this statement for any reason, the application is not eligible for expedited review and the application will be reviewed in the standard review time frame.

13. TOWN / CITY CLERK SIGNATURE

As required by Chapter 482-A:3 (amended 2014), 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.

⇨	Print name legibly	Town/City	Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

1. For applications where "Expedited Review" is checked on page 1, if the Conservation Commission signature is not present, NHDES will accept the permit application, but it will NOT receive the expedited review time.
2. IMMEDIATELY sign the original application form and four copies in the signature space provided above;
3. 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.
4. 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; and
5. Retain one copy of the application form and one complete set of attachments and make them reasonably accessible for public review.

DIRECTIONS FOR APPLICANT:

1. Submit the single, 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.

14. IMPACT AREA:

For each jurisdictional area that will be/has been impacted, provide square feet and, if applicable, linear feet of impact.

Permanent: *impacts that will remain after the project is complete.*

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

Intermittent Streams: *linear footage distance of disturbance is measured along the thread of the channel.*

Perennial Streams/ Rivers: *the total linear footage distance is calculated by summing the lengths of disturbance to the channel and each bank.*

JURISDICTIONAL AREA	PERMANENT Sq. Ft. / Lin. Ft.		TEMPORARY Sq. Ft. / Lin. Ft.	
Forested wetland		☐ ATF		☐ ATF
Scrub-shrub wetland		☐ ATF		☐ ATF
Emergent wetland		☐ ATF		☐ ATF
Wet meadow		☐ ATF		☐ ATF
Intermittent stream channel	/	☐ ATF	/	☐ ATF
Perennial Stream / River channel	365 / 136	☐ ATF	/	☐ ATF
Lake / Pond	/	☐ ATF	/	☐ ATF
Bank - Intermittent stream	/	☐ ATF	/	☐ ATF
Bank - Perennial stream / River	/	☐ ATF	/	☐ ATF
Bank - Lake / Pond	/	☐ ATF	/	☐ ATF
Tidal water	/	☐ ATF	/	☐ ATF
Salt marsh		☐ ATF		☐ ATF
Sand dune		☐ ATF		☐ ATF
Prime wetland		☐ ATF		☐ ATF
Prime wetland buffer		☐ ATF		☐ ATF
Undeveloped Tidal Buffer Zone (TBZ)		☐ ATF		☐ ATF
Previously-developed upland in TBZ		☐ ATF		☐ ATF
Docking - Lake / Pond		☐ ATF		☐ ATF
Docking - River		☐ ATF		☐ ATF
Docking - Tidal Water		☐ ATF		☐ ATF
Vernal Pool		☐ ATF		☐ ATF
TOTAL	365 / 136		/	

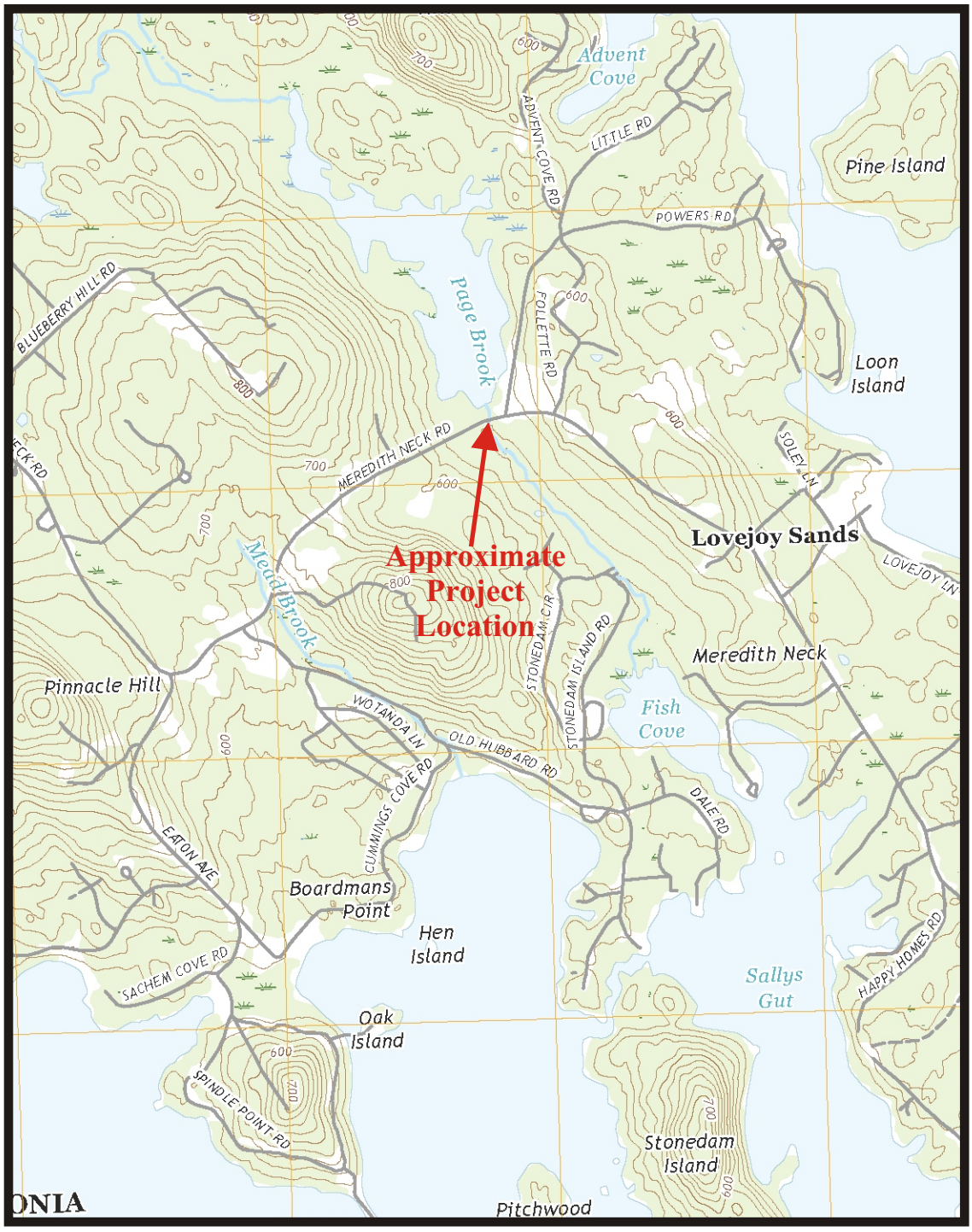
15. APPLICATION FEE: See the Instructions & Required Attachments document for further instruction

☐ Minimum Impact Fee: Flat fee of $ 200

☐ Minor or Major Impact Fee: Calculate using the below table below

Permanent and Temporary (non-docking)	**365** sq. ft.	X $0.20 =	$ **73**
Temporary (seasonal) docking structure:	sq. ft.	X $1.00 =	$
Permanent docking structure:	sq. ft.	X $2.00 =	$
Projects proposing shoreline structures (including docks) add $200 =			$
Total =			$
The Application Fee is the above calculated Total or $200, whichever is greater =			$ **200**

Site Locus
NH Department of Transportation
NHDOT Project No. 41890
Tax Map S05 - Right-of-Way
Meredith, New Hampshire



Scale 1:24,000

Wetland Function-Value Evaluation Form

Total area of wetland_____ Human made?_____ Is wetland part of a wildlife corridor?_____ or a "habitat island"?_____

Adjacent land use_____ Distance to nearest roadway or other development_____

Dominant wetland systems present_____ Contiguous undeveloped buffer zone present_____

Is the wetland a separate hydraulic system?_____ If not, where does the wetland lie in the drainage basin?_____

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

Wetland I.D._____

Latitude_____ Longitude_____

Prepared by:_____ Date_____

Wetland Impact:
Type_____Area_____

Evaluation based on:
Office_____ Field_____

Corps manual wetland delineation completed? Y_____ N_____

Function/Value	Suitability Y / N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge				
Floodflow Alteration				
Fish and Shellfish Habitat				
Sediment/Toxicant Retention				
Nutrient Removal				
Production Export				
Sediment/Shoreline Stabilization				
Wildlife Habitat				
Recreation				
Educational/Scientific Value				
Uniqueness/Heritage				
Visual Quality/Aesthetics				
ES Endangered Species Habitat				
Other				

Notes:

* Refer to backup list of numbered considerations.

WETLANDS PERMIT APPLICATION – ATTACHMENT A
MINOR AND MAJOR - 20 QUESTIONS

Land Resources Management
Wetlands Bureau

Check the Status of your application: www.des.nh.gov/onestop

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

Env-Wt 302.04 Requirements for Application Evaluation - For any major or minor project, the applicant shall demonstrate by plan and example that the following factors have been considered in the project's design in assessing the impact of the proposed project to areas and environments under the department's jurisdiction. Respond with statements demonstrating:

1. The need for the proposed impact.

The existing crossing consists of an undersized 4.2' x 4.8' concrete arch culvert that is severely degraded. The NHDOT needs to replace this crossing as a matter of public safety. As part of the replacement the DOT is proposing to increase the size of the crossing from the 4.2' x 4.8' concrete box to a 4' x 8' embedded box culvert with stream simulation throughout the bottom of the culvert. The proposed crossing will pass the 100-year storm event, reducing the likelihood of flooding at this crossing.

2. That the alternative proposed by the applicant is the one with the least impact to wetlands or surface waters on site.

The proposed alternative involves the replacement of an existing stream crossing. Direct impacts associated with the proposed stream crossing alternative will occur in the same general footprint of the existing crossing. This proposed culvert will be wider than the existing culvert and is more consistent with Env-Wt 904.01 General Design Conditions. It will pass the 100-year storm event and will allow for increased wildlife passage and hydrologic connectivity. As part of this project the NHDOT is proposing to install a diversion pipe during construction. This proposed diversion pipe will run parallel to the construction area and provide hydrologic continuity during construction. Once construction is complete the bypass pipe will remain in place just above the elevation of the box culvert in order to provide flood protection and wildlife passage.

The other alternatives, such as not repairing the crossing or replacing the crossing so it will be fully complaint with the stream crossing rule * Due to the degradation of the existing culvert, not replacing the crossing would put public safety at risk. Completely conforming with the stream crossing rules is not feasible due to the limitations of the existing site conditions. These limitations include proximity of existing residential structures.

***were considered.**

3. The type and classification of the wetlands involved.

In the proposed project area Page Brook is a perennial stream that is classified as a riverine, lower perennial system with an unconsolidated bottom comprised of cobble-gravel (R2UB1).

4. The relationship of the proposed wetlands to be impacted relative to nearby wetlands and surface waters.

North of the existing crossing is the wetland system that has been designated as a prime wetland by the Town of Meredith as the Page Pond Prime Wetland system. This northern wetland has an emergent center that is classified as palustrine, emergent, persistent system that is seasonally flooded/saturated, with areas bordering forested wetland that are classified as palustrine, forested, broad-leaved deciduous systems which are seasonally flooded/saturated (PEM1E/PFOIE). At the southern terminus of the emergent system is a large beaver dam which has created an impoundment the size of Page Pond. South of the beaver dam Page Brook becomes channelized for approximately 120 feet before reaching the crossing. South of the crossing Page Brook remains channelized for approximately another 115 feet prior to flowing into an emergent wetland system where a central channel remains present. This emergent wetland on the south side of the project area is classified as palustrine, emergent, persistent system that is seasonally flooded/saturated (PEM1E). It should be noted that the actual impact area is well outside of the prime wetland.

5. The rarity of the wetland, surface water, sand dunes, or tidal buffer zone area.

These types of wetlands and surface waters located within the project area are not rare.

6. The surface area of the wetlands that will be impacted.

The proposed culvert replacement is 8 ft wide, 4 ft high and 30 ft long. This proposed project would permanently impact 365 square feet of jurisdictional area.

7. The impact on plants, fish and wildlife including, but not limited to:
   a. Rare, special concern species;
   b. State and federally listed threatened and endangered species;
   c. Species at the extremities of their ranges;
   d. Migratory fish and wildlife;
   e. Exemplary natural communities identified by the DRED-NHB; and
   f. Vernal pools.

a. No rare or special concern species are known to occur in the project vicinity.

b. New Hampshire Natural Heritage Bureau has no record of threatened or endangered species in the project vicinity. The United States Fish and Wildlife Service has identified that small whorled pogonia (threatened) and Northern long-eared bat (threatened) may occur within the project vicinity. Disturbance associated with the proposed project occurs only within and immediatly adjacent to the existing crossing which are not suitable habitat for small whorled pogonia. The proposed project is not located within 1/4 mile of any known potential Northern long-eared bat hibernacula (cave or sub-surface mine). Disturbance associated with the proposed project will not likely involve cutting or trimming trees. However, no maternity roosting trees have been identifed within 150 feet of the proposed project.

c. No species at the extremities of their range have been identified within the project vicinity.

d. No migratory fish or wildlife species are known to exclusively use or concentrante in any number within the project area.

e. DRED-NHB has not identifed any exemplary natural communities within the project area.

f. No vernal pools have been identified within the project area.

8. The impact of the proposed project on public commerce, navigation and recreation.

Page Brook is not used for navigation and is too small to be used for recreation. The proposed crossing will allow for slightly wider road shoulders which will provide safer public access to the road.

9. The extent to which a project interferes with the aesthetic interests of the general public. For example, where an applicant proposes the construction of a retaining wall on the bank of a lake, the applicant shall be required to indicate the type of material to be used and the effect of the construction of the wall on the view of other users of the lake.

The proposed project is a replacement stream crossing and will look very similar to the existing concrete culvert.

10. The extent to which a project interferes with or obstructs public rights of passage or access. For example, where the applicant proposes to construct a dock in a narrow channel, the applicant shall be required to document the extent to which the dock would block or interfere with the passage through this area.

The proposed project will not interfere with or obstruct any public rights of passage. The NHDOT is planning to close one lane of the two lane road at a time to allow for continued useage of the road, through oneway alternating traffic, during construction.

11. The impact upon abutting owners pursuant to RSA 482-A:11, II. For example, if an applicant is proposing to rip-rap a stream, the applicant shall be required to document the effect of such work on upstream and downstream abutting properties.

The proposed project will occur within and immediatly adjacent to the footprint of an existing crossing. The proposed crossing is slightly wider which will allow for improved hydrologic connectivity. The increased culvert size will lhave no impact on abutting properties. There are existing riprap pads that will be replaced in the same area and configuration as part of this project. The replaced riprap pads will not cause impacts up or downstream.

12. The benefit of a project to the health, safety, and well being of the general public.

The proposed project involves the replacement of an existing crossing which has begun to show signs of degradation. The proposed crossing will allow for slightly wider shoulders along the sides of the road. Overall the replacement of this existing crossing will provide safer access to the general public.

13. The impact of a proposed project on quantity or quality of surface and ground water. For example, where an applicant proposes to fill wetlands the applicant shall be required to document the impact of the proposed fill on the amount of drainage entering the site versus the amount of drainage exiting the site and the difference in the quality of water entering and exiting the site.

The proposed impacts will occur within and immediatly adjacent to the existing crossing. The minimal impact to the wetland system will have a positive impact on the amount and quality of drainage entering or exiting the site. During construction a diversion pipe will be installed to maintain hydrologic connectivity. Improvements to the stream crossing will maintain low flows and help to pass larger flood flows. Stormwater will continue to drain/run off the roadway and road shoulders and into the stream in the same manner as it does now.

14. The potential of a proposed project to cause or increase flooding, erosion, or sedimentation.

By significantly increasing the size of the culvert at the crossing, the proposed stream crossing is projected to decrease the overall potential for flooding and subsequent erosion and sedimentation. The new pipe will now pass the 100-year storm event.

15. The extent to which a project that is located in surface waters reflects or redirects current or wave energy which might cause damage or hazards.

The proposed project will not redirect current or wave energy. The proposed project will increase the size of an existing concrete pipe to better accomodate storm events, while mainitain base flows.

16. The cumulative impact that would result if all parties owning or abutting a portion of the affected wetland or wetland complex were also permitted alterations to the wetland proportional to the extent of their property rights. For example, an applicant who owns only a portion of a wetland shall document the applicant's percentage of ownership of that wetland and the percentage of that ownership that would be impacted.

The proposed actions are within a public highway Right-Of-Way related to road maintenance. Abutting owners would be served by the proposed project and would not have the need for proportional impacts.

17. The impact of the proposed project on the values and functions of the total wetland or wetland complex.

During the assessment SRE identified three suitable functions and two principal functions. The principal functions for the portions of the wetland systems within the project area are floodflow alteration and sediment/shoreline stabilization. This wetland is constricted at the outlet by a culvert. Given the generally flat topography with some adjacent flood storage potential it is likely that this portion of the wetland is suitable for retaining water following precipitation events. The remaining suitable function is fish and shellfish habitat. This function is only considered to be suitable due to the presence of a beaver dam upstream of the project area. SRE utilized NH Department of Resource and Economic Development, Natural Heritage Bureau (NHDRED NHB) Data Check Tool to run a scan for threatened and endangered species and exemplary communities. The NHB scan did not find any threatened or endangered species or any exemplary communities within the project limits. An IPaC (Information for Planning and Consultation) Report was filed with the U.S. Fish and Wildlife Service regarding this proposed project. The report came back identifying the Northern Long-eared Bat as a species that may occur within the project boundaries. Given the lack of trees within the project area and the adjacent road endangered species habitat is not considered a suitable or principal value of this wetland. The limited vegetation, existing outlet and close proximity to the road and other structures prevent the additional functions/values from being considered suitable. It should be noted that immediately upstream and downstream of the project location are wetlands that likely have much higher quality functions and values.

18. The impact upon the value of the sites included in the latest published edition of the National Register of Natural Landmarks, or sites eligible for such publication.

The construction area is not located near any sites of value listed in the National Registry of Natural Landmarks.

19. The impact upon the value of areas named in acts of congress or presidential proclamations as national rivers, national wilderness areas, national lakeshores, and such areas as may be established under federal, state, or municipal laws for similar and related purposes such as estuarine and marine sanctuaries.

There are no areas of value named in acts of congress or presidential proclamations anywhere near the construction site

20. The degree to which a project redirects water from one watershed to another.

This proposed stream crossing replaces an existing culvert in the same location. Water will not be redirected from one watershed to another.

Additional comments

Supplemental Narrative

The proposed project consists of the replacement of an existing concrete arch culvert with a pre-cast concrete box culvert at an existing Tier 3 stream crossing. The existing culvert is located on Page Brook, running beneath Meredith Neck Road in Meredith.

The overall geographic location of the existing culvert is found approximately 237 feet west of the intersection of Powers Road and Meredith Neck Road. Approximately 170 feet upstream of the wetland crossing is the Town of Meredith Designated Page Brook Prime Wetland System. The Page Pond Wetland consists of a large area of open water surrounded by emergent vegetation and pockets of forested wetland. The hydrology of this wetland system is partially driven by a beaver dam that has been created at the outlet of the wetland, causing an impoundment. The outlet of the Page Pond Wetland drains south into Page Brook which becomes channelized before flowing further south into the existing crossing. After the crossing the system remains channelized and opens into a long narrow emergent wetland system with a wetted channel running through the center. The Prime Wetland ends 170 feet upstream of the existing crossing.

Existing Site Conditions

The existing culvert has begun to show signs of degradation and as a result the NHDOT is looking to upgrade the crossing. This existing concrete arch culvert is 4.8 feet wide by 4.2 feet high and is approximately 27 feet long with concrete headwalls and wings, as well as two small areas of rip-rap slope stabilization on either side of the culvert and river rock aprons in the stream bed. The NHDOT is proposing to replace the existing culvert with a box culvert measuring 8 feet wide, 4 feet high and 30 feet long. The proposed box culvert will be installed to match the existing inlet and outlet inverts. In order to allow for continued hydrologic connection the NHDOT is proposing to install a diversion pipe during construction. This proposed diversion pipe will be 36 inches in diameter and 56 ft long running parallel to the construction area, approximately 3' off of the proposed culvert. Once construction is complete the bypass pipe will remain in place in order to provide overflow and flood protection and wildlife passage. The installation of this box culvert and diversion pipe will require 365 sq.ft. of jurisdictional permanent impact. The existing headwalls are built into the existing concrete culvert structure. The proposed headwalls and wings will be separate pre-cast structures placed in the same general location as the existing structures but with slight adjustments to better align with the stream channel. The existing headwalls are 24 feet long and 0.5 foot wide. The proposed curbwalls will be 10 feet long and 1 foot wide and will not be installed within jurisdictional areas. The proposed wings will be 4.8 feet long and 1 foot wide, resulting in 9.6 sq.ft. of jurisdictional impact for installation. The total impact for this wetland crossing will be 365 sq.ft and 135 LF (bank, channel, bank) of permanent impacts.

In the proposed project area, Page Brook is a perennial stream that is classified as a riverine, lower perennial system with an unconsolidated bottom comprised of cobble-gravel (R2UB1). North of the existing crossing is the wetland system that has been designated as a prime wetland by the Town of Meredith as the Page Pond Prime Wetland system. This northern wetland has an emergent center that is classified as palustrine, emergent, persistent system that is seasonally

flooded/saturated, with areas bordering forested wetland that are classified as palustrine, forested, broad-leaved deciduous systems which are seasonally flooded/saturated (PEM1E/PFOIE). At the southern terminus of the emergent system is a large beaver dam which has resulted in an impoundment. South of the beaver dam Page Brook disperses and then becomes channelized for approximately 120 feet before reaching the crossing. South of the crossing Page Brook remains channelized for approximately another 115 feet prior to dispersing into an emergent wetland system where a central channel remains present. This emergent wetland on the south side of the project area is classified as palustrine, emergent, persistent system that is seasonally flooded/saturated (PEM1E).

The project location is shown on the FEMA maps within the 100-year floodplain zone A. According to the FEMA map base elevations within zone A have yet to be determined.

Function and Value Assessment

The functions and values of the wetland system associated with the project were assessed on July 11, 2018 by Deidra Benjamin CWS, CESSWI of SRE, using the Army Corps of Engineers' Highway Methodology Workbook Supplement (Appendix A, USACE, September 1999). Wetlands were classified by SRE utilizing the criteria outlined in the "Classification of Wetlands and Deepwater Habitats of the United States" (Cowardin et al. 1978).

Thirteen functions and values were assessed for the system including: groundwater recharge/discharge, floodflow alteration, fish and shellfish habitat, sediment/toxicant retention, nutrient removal, production export, sediment/shoreline stabilization, wildlife habitat, recreation, educational/scientific value, uniqueness/heritage, visual quality/aesthetics and endangered species habitat. Wetland functions are considered to be principal if they are an important physical component of a wetland system. Wetland values are considered to be principal if they are of special value to society, from a local, regional and/or national perspective. The rationale for the assigned functions and values for the wetland system is shown on the attached Wetland Function-Value Evaluation Forms. It should be noted that the following assessment is not for the Page Pond Prime Wetland, but only for the areas that will be impacted, located outside of the limits of the Prime Wetland.

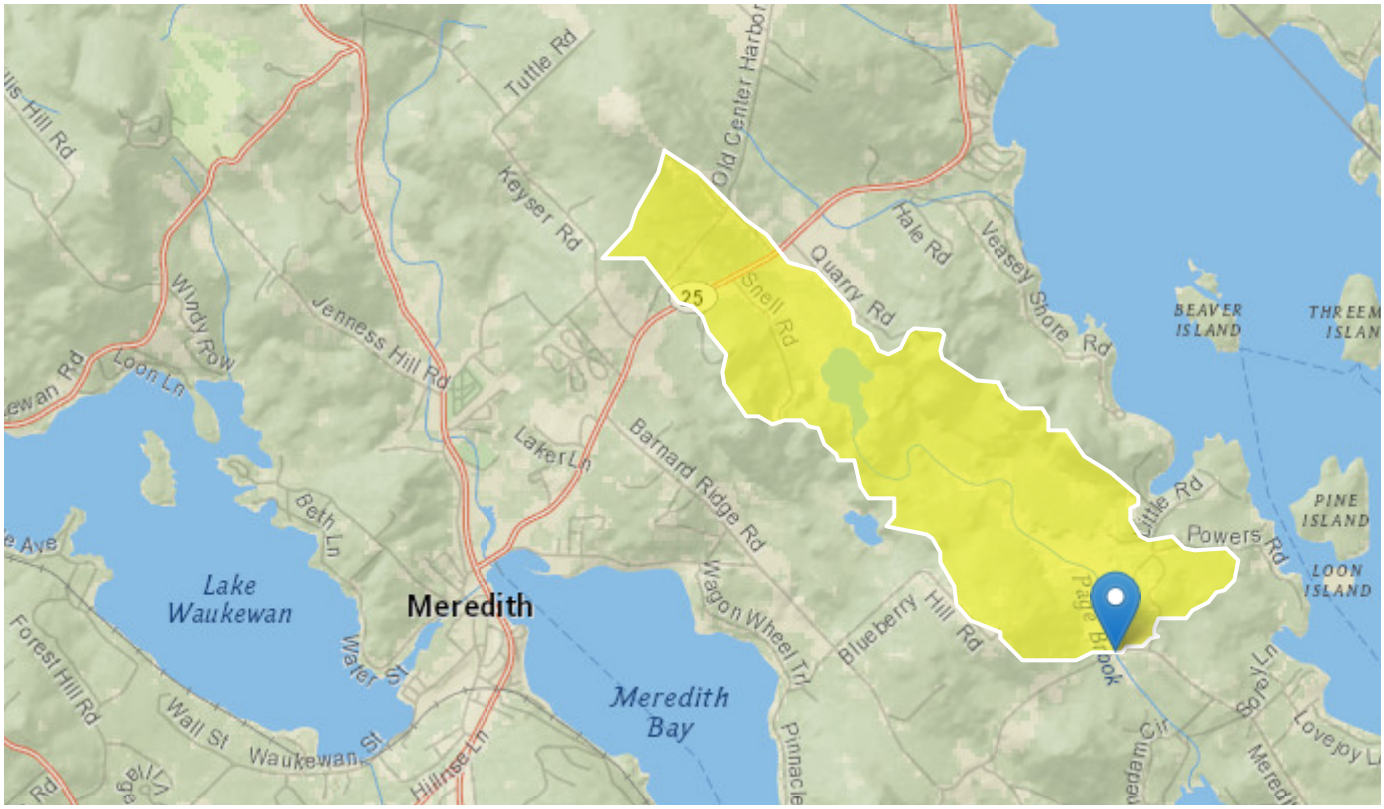
During the assessment SRE identified three suitable functions and two principal functions. The principal functions for the portions of the wetland systems within the project area are floodflow alteration and sediment/shoreline stabilization. This wetland is constricted at the outlet by a culvert. Given the generally flat topography with some adjacent flood storage potential it is likely that this portion of the wetland is suitable for retaining water following precipitation events. The remaining suitable function is fish and shellfish habitat. This function is only considered to be suitable due to the presence of a beaver dam upstream of the project area. SRE utilized NH Department of Resource and Economic Development, Natural Heritage Bureau (NHDRED NHB) Data Check Tool to run a scan for threatened and endangered species and exemplary communities. The NHB scan did not find any threatened or endangered species or any exemplary communities within the project limits. An IPaC (Information for Planning and Consultation) Report was filed with the U.S. Fish and Wildlife Service regarding this proposed project. The report came back identifying the Northern Long-eared Bat as a species that may

occur within the project boundaries. Given the lack of trees within the project area and the adjacent road endangered species habitat is not considered a suitable or principal value of this wetland. The limited vegetation, existing outlet and close proximity to the road and other structures prevent the additional functions/values from being considered suitable. It should be noted that immediately upstream and downstream of the project location are wetlands that likely have much higher quality functions and values.

The project site has no history of flooding. The crossing is being replaced due to the deterioration of the existing concrete culvert. The proposed changes will include an upgrade in size and length allowing for enhanced hydrologic capacity which enhancing connectivity while maintaining basal flows. Maintaining basal flows will allow for continued aquatic organism passage and the larger culvert size makes it possible for increases in potential for wildlife passage under Meredith Neck Road. The proposed culvert will tie into existing inlet and outlet inverts and will not be a barrier to sediment transport. This crossing has been designed under the NHDES Alternative Design (Env-Wt 904.09) to accommodate the 100 year storm event. The Env-Wt 904.09 alternative design was used for this crossing due to the proximity of adjacent structures on both the upstream and downstream sides of the culvert. It was not possible to achieve strict adherence to the stream crossing guidelines, mostly concerning culvert width, with private structures in the immediate vicinity.

StreamStats Report

Region ID: NH
Workspace ID: NH20190109191428525000
Clicked Point (Latitude, Longitude): 43.65303, -71.44508
Time: 2019-01-09 14:14:51 -0500



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	1.83	square miles

USGS Software Disclaimer: This software has been approved for release by the U.S. Geological Survey (USGS). Although the software has been subjected to rigorous review, the USGS reserves the right to update the software as needed pursuant to further analysis and review. No warranty, expressed or implied, is made by the USGS or the U.S. Government as to the functionality of the software and related material nor shall the fact of release constitute any such warranty. Furthermore, the software is released on condition that neither the USGS nor the U.S. Government shall be held liable for any damages resulting from its authorized or unauthorized use.

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Application Version: 4.3.0

General Application Criteria

This crossing qualifies as a Tier 3 crossing per Env-Wt 904.04 (a)(1) as the contributing watershed is 1,171 acres, which also qualifies this project as a major impact project per Env-Wt 903.01 (g)(1) and Env-Wt 303.02(p).

This crossing has no history of flooding but some limited signs of high velocity flows and scouring were observed within the project area during the delineation. NHDOT is upgrading the size of the culvert. The existing 4.8 ft by 4.2 ft arched concrete culvert is very degraded and needs to be replaced for public safety. This will be replaced with an 8 ft by 4 ft concrete box culvert that will accommodate the 100 year storm, increase aquatic passage, maintain basal flows and provide continued stream function.

Consistent with Env-Wt 302.03(a), describe the impact of the proposed project design and provide evidence which demonstrates that,

(1) *Potential impacts have been avoided to the maximum extent practicable; and The proposed alternative avoids impacts to the maximum extent practicable.*
The proposed project avoids impacts to the maximum extent practicable. The applicants are proposing to replace an existing culvert in the same location as the existing culvert. The adjacent rip rap slopes and round river rock aprons will also be replaced in the same approximate footprint as the existing structures. The existing structure is degraded and needs to be replaced. The NHDOT is proposing to replace the structure for the safety of the public. The NHDOT is making an overall improvement because the crossing is undersized and deteriorating from age.

(2) *Any unavoidable impacts have been minimized.*
All unavoidable impacts have been minimized by the proposed project. All proposed construction is within the immediate vicinity of the crossing. The project consists of the replacement of an existing structure in the same location. A bypass pipe will be utilized to maintain hydrologic connectivity during construction. Upon completion the pipe will remain in place to act as a secondary overflow pipe during high water events and as wildlife passage. As stated above the existing crossing is in need of replacement due to degradation of the structure, associated with age.

As part of this application submittal, all elements of Env-Wt 302.04 have been evaluated and addressed in the attached documents (Attachment A). Further, all the elements under Env-Wt 904, Design and Construction of Stream Crossings have been addressed below.

Stream Crossing Alternative Design

Page Brook is classified as a Tier 3 stream at the Stevens Road crossing because the contributing watershed is greater than 640 acres consistent with Env-Wt 904.04 (a). Consistent with Env-Wt 903.01 (g) a project shall be classified as a major impact if (1) the stream crossing is a new or replacement tier 3 crossing. Per Env-Wt 904.08 (b), a replacement Tier 3 stream crossing shall comply with the specific design criteria in Env-Wt 904.05, unless a request for an alternative

design is submitted. Consistent with Env-Wt 904.09 (a) the NHDOT believes that installing a structure specified under the applicable rule Env-Wt 904.05 (c) is not practicable due to site limitations associated with the existing crossing. There are existing residential structures adjacent to the crossing on the upstream and downstream sides of the crossing, making it infeasible to accomodate the size of the structure that would be required under Env-WT 904.05. Env-Wt 904.05 (c) requires that replacement stream crossings be designed and constructed to provide a vegetated bank on both sides of the watercourse to allow for wildlife passage. The existing crossing is very narrow and located immediately adjacent to a residential property. Expanding the size of the existing crossing to allow for a vegetated bank on both sides of the watercourse is not practicable in this location.

This is a view of the existing crossing. Residential development within the project area is immediately adjacent to the crossing on both the upstream and downstream sides. Due to the area constraints in the project location, it is not feasible to expand the crossing to meet the design criteria in Env-Wt 904.05.

SRE has prepared this Request for Alternative Design and Technical Report consistent with stream crossing rules Env-Wt 904.09 (b) and (c). The following technical report prepared

consistent with Env-Wt 904.09 (b) clearly explains how the proposed alternative meets the criteria for approval specified under Env-Wt 904.09 (c) for tier 3 stream crossings.

Env-Wt 904.09 (c) The department shall approve an alternative design for a replacement tier 3 crossing if:

(1) The report must demonstrate that adhering to the stated requirements is not practicable; and
The fluvial geomorphic survey indicates that a structure having 1.2 times bankfull width plus two feet would be 12.5 feet wide. The existing crossing is only 4.8 ft wide and immediately adjacent to a residential property. The NHDOT has taken the initiative to begin replacing this crossing immediately for public safety concerns. Due to the narrow size of the existing crossing and the limitations surrounding the existing stream, the NHDOT has chosen to replace this crossing under the "alternative design" track. Installation of a 12.5' wide culvert is not needed to accommodate the 100-year frequency flood, but would result in substantial additional impacts to the stream banks above and below the culvert. Also, including vegetated banks on both sides of the culvert is not practicable because of the additional structure height that would be necessary to allow sunlight to support plant growth beneath the structure.

(2) The proposed alternative meets the specific design criteria specified in Env-Wt 904.05 to that maximum extent practicable, and

The elements of the proposed design which meet Env-Wt 904.05 to the maximum extent practicable, for replacement tier 3 stream crossings have been addressed below.

(a) *In accordance with the NH Stream Crossing Guidelines, University of New Hampshire, May 2009;*
The proposed replacement crossing has a larger hydraulic opening than the existing crossing and has been sized to accommodate the 100 year storm event. The proposed culvert includes stream simulation along the bottom of the culvert using the natural substrate and round river rock to improve aquatic passage, and matching inlet and outlet elevations to natural elevations (Please see attached plans). The proposed culvert will maintain the existing conditions by providing adequate passage of water, sediment, aquatic biota, and organic matter at all flow levels.

(b) *With the bed forms and streambed characteristics necessary to cause water depth and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing;*
As noted above the proposed culvert crossing has been designed with stream simulation, utilizing natural substrate and round river rock, to ensure that the substrate in the bottom of the culvert mimics the same natural conditions found both upstream and downstream of the crossing. Including natural substrate and widening the crossing will result in stream velocities and water depths that more closely mimic those of the natural conditions found upstream and downstream.

(c) *To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage;*

The proposed crossing will not provide a vegetated bank on either side of the watercourse. A wider crossing is not practicable given the right-of-way constraints, funding and the residential property that is immediately adjacent. The NHDOT is proposing to leave the bypass pipe in place after construction is complete to provide a secondary dry shelf for wildlife passage.

(d) *To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the functioning of the natural floodplain;*
The proposed replacement crossing provides a greater cross sectional area to accommodate more of the natural flow regime but is not wide enough to support floodplain development through the crossing. The proposed crossing will be constructed to match existing inlet and outlet inverts and will maintain the existing slope. The proposed culvert will also be installed in the same location and configuration so as to maintain the current alignment.

(e) *To accommodate the 100-year frequency flood, to ensure that:*
The proposed crossing has been designed to pass the 100 year storm event without overtopping Meredith Neck Road (see calculations provided).

(1) *There is no increase in flood stages on abutting properties;*
The stream crossing will incorporate a culvert that is slightly larger than the average bankfull width of the existing crossing. The average bankfull width for the crossing is 7', the project proposes the installation of an 8' wide box culvert. This design effectively allows for increased flows through the crossing, more closely mimicking the natural channel. Based on this design it is anticipated that there will likely be a reduction in flood stages on abutting properties.

(2) *Flow and sediment transport characteristics will not be affected in a manner which could adversely affect channel stability;*
Flow and sediment transport characteristics will be improved as a result of the proposed, upgraded crossing. The existing crossing is significantly undersized and is a barrier to both flow and sediment transport. The proposed crossing will increase the culvert size from 4.8' to 8' wide, allowing for increased flow through the crossing and overall reducing channel instability. The proposed culvert will also tie into the existing inlet and outlet inverts which will allow for continued sediment transport through the crossing.

(f) *To simulate a natural stream channel; and*
A natural stream channel will be simulated within the embedded concrete culvert with native stream substrate. The inlet and outlet elevation of the simulated channel will tie into the natural inlet and outlet elevations. The culvert is designed to accommodate natural flow regimes.

(g) *So as not to alter sediment transport competence.*

The proposed replacement crossing provides greater cross sectional area and improves the connectivity of fluvial processes. The embedded concrete culvert will maintain natural stream velocities simulating native conditions. These natural conditions preserve and maintain existing sediment transport competence.

(3) The alternative design meets the general design criteria specified in Env-Wt 904.01.

The elements under Env-Wt 904.01, General Design Considerations have been addressed below.

Env-Wt 904.01 All stream crossings shall be designed and constructed so as to:

a) *Not be a barrier to sediment transport*
The concrete box culvert with stream simulation is designed to tie into the existing inlet and outlet elevations. The project has been designed to increase the existing fluvial geomorphology. The proposed culvert will be 8' wide, as opposed to the existing 4.8' wide culvert. The increased width of the new crossing will improve sediment transport through the crossing.

b) *Prevent the restriction of high flows and maintain existing low flows*
The proposed crossing has been designed to pass the 100-year storm event (see attached drainage report). The specifications will embed the culvert one foot into the natural substrate. The inlet and outlet elevations will match the existing natural elevation ensuring aquatic passage as well as maintenance of existing basal flows.

c) *Not obstruct or otherwise substantially disrupt the movement of aquatic life*
As noted above, the box culvert has been designed to maintain stream flows which will ensure continued aquatic passage.

d) *Not cause an increase in the frequency of flooding or overtopping banks*
The size of the culvert has been sized to accommodate the 100-year flood event. The proposed culvert will greatly improve the existing crossing. The increased culvert size will all for additional high flows to pass through the culvert unrestricted. This will decrease the likelihood of flooding at this crossing.

e) *Preserve watercourse connectivity where it currently exists*
The existing concrete culvert provides watercourse connectivity. The proposed concrete culvert exceeds the width of the existing culvert ensuring watercourse connectivity will be maintained. Additionally, the project is proposing to install a diversion pipe during construction to maintain the hydrological connection. Once construction is completed the diversion pipe will remain in place to act as secondary flood storage and wildlife passage.

f) *Restore watercourse connectivity*
As noted above, the existing concrete culvert provides watercourse connectivity. The proposed concrete culvert exceeds the width of the existing culvert ensuring watercourse connectivity will be maintained. Additionally, the project is proposing to install a diversion pipe during construction to maintain the hydrological connection. Once

construction is competed the diversion pipe will remain in place to act as secondary flood storage and wildlife passage.

g) *Not cause erosion, aggradation, or scouring upstream or downstream of the crossing*
By matching the proposed inlet and outlet elevations of the proposed culvert to the naturally occurring conditions of the stream bed and increasing the size of the culvert, the proposed crossing will greatly reduce erosion, aggradation and scouring upstream and downstream of this crossing. Nearly doubling the width of the crossing is going to allow higher capacity and therefore, less possible erosion and aggradation.

h) *Not cause water quality degradation*
During construction, the project will utilize a variety of best management practices to prevent erosion and subsequent sedimentation. Silt fence or similar perimeter controls will be installed as shown on the attached plans to prevent sediment transport from the work area. Sand bags and a bypass pump will be utilized if necessary to maintain a dry work site and bypass clean stream flow during construction into a diversion pipe as shown on the attached plans.

Stream Crossing Assessment

In order to comply with Env-Wt 904.08 (a), the applicant is required to submit an assessment of the fluvial geomorphic compatibility of the existing stream crossing based on the NH Stream Crossing Guidelines.

SRE conducted geomorphic stream surveys at the inlet and outlet of the existing crossing, as well as at a reference reach. Geomorphic surveys were conducted on July 11, 2018. NHDOT Stream Crossing Assessment Worksheets were completed for each site. Attached to this application are the drainage area map generated by USGS Stream Stats, the completed NHDOT Stream Crossing Assessment Worksheets, and photos that have been included in the photo log showing the crossing inlet, outlet and associated reference reach.

The existing slope at this crossing is consistent from the reference reach through the culvert. Field data was collected during what appeared to be low flow conditions. Upstream of the culvert no backwatering was observed. There were some signs of erosion along the upstream banks including exposed root systems of nearby trees. The stream channel immediately downstream of the crossing does not show any signs of down cutting or bank instability. This is by all measurements a very low gradient and low energy channel with potential for higher velocity discharge during storm events.

The reference reach for this crossing is located approximately 80 feet upstream of the crossing inlet. The reach is characterized by a sinuous channel with nearly vertical (densely vegetated) banks, a nearly level slope with sandy substrate material cut through a forested wetland system.

This reference reach was selected because the stream channel is not influenced by the crossing and has developed in a natural state. This reference reach is best used for stream simulation design as the channel dimensions, pattern, slope and materials represent the watershed inputs at the crossing inlet. The characteristic geomorphologic measurements of the reference reach and both sides of the crossing are shown in the following table.

Measurements	Crossing Inlet	Crossing Outlet	Reference Reach
Bankfull Width (ft)	7	6	15
Mean Bankfull Depth (ft)	2.03	1.3	1.23
Flood Prone Width (ft)	7	6	15
Entrenchment Ratio	1 (7/7)	1 (6/6)	1 (15/15)
Width/Depth Ratio	3.45 (7/2.03)	4.6 (6/1.3)	21.74 (15/0.69)
Sinuosity	1.06 (203.88/193)	1.06 (203.88/193)	1.06 (203.88/193)
Channel Slope	2%	2%	2%
Rosgen Classification	A4	A4	F4b

Compensatory Mitigation

This project consists of replacing and upgrading an existing, undersized stream crossing. The applicant is proposing significant improvements to the existing crossing by nearly doubling the width of the culvert, providing stream simulation and passing the 100 year storm events. As part of this project a diversion pipe will be installed and will remain in place post construction to allow for wildlife passage and additional floodflow alteration. This increase in culvert size, stream simulation and the overall increase in functions and values at this crossing make this project self mitigating.

New Hampshire DOT
Department of Transportation

THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

Victoria F. Sheehan
Commissioner

William Cass, P.E.
Assistant Commissioner

March 4, 2019

Cindy Balcius
Stoney Ridge Environmental LLC
229 Prospect Mountain Road
Alton, NH 03809

RE: Page Road Crossing
Meredith Neck Road
Meredith, NH

Dear Cindy,

District 3 has evaluated the hydraulic capacity of the proposed 4' x 8' pre-cast box culvert to pass Page Brook under Meredith Neck Road. We have calculated the flow in a 25 year, 50 year and 100 year storm event. The calculations were performed using HydroCAD™ for these storm events and routed through the culvert.

The calculations indicate that as designed, the proposed box culvert will pass all three storm events without overtopping Meredith Neck Road. The results are summarized in the table below.

Design Storm Event	Design Flow [cfs]	Peak Elevation (upstream)	Depth [ft.]
25-year (5.0 in.)	106	542.1	2.06
50-year (5.5 in.)	131	542.4	2.4
100-year (6.2 in.)	168.6	542.9	2.9

If you have any questions regarding the information provided, please contact me @524-6667.

Sincerely,

William Rollins, PE

Attachments
s:\district-3-gilford\towns\meredith\projects\41890 page brook box culvert replacement\drainage report 2019_03_04.docx

Summary for Subcatchment 3S: Page Brook Water Shed

Runoff = 105.99 cfs @ 23.45 hrs, Volume= 84.291 af, Depth> 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-28.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
* 1,171.000	61	Woods, Fair, HSG B
1,171.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
100.5	3,423	0.0204	0.57		**Lag/CN Method,**
119.2	4,932	0.0260	0.69		**Lag/CN Method,**
591.4	9,069	0.0028	0.26		**Lag/CN Method,**
811.1	17,424	Total			

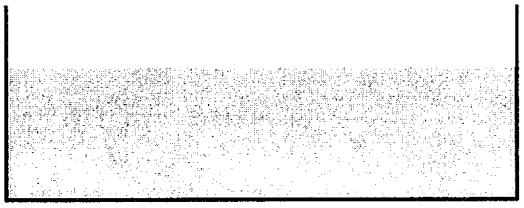
Summary for Reach 4R: Proposed Box Culvert

Inflow Area = 1,171.000 ac, 0.00% Impervious, Inflow Depth > 0.86"
Inflow = 105.99 cfs @ 23.45 hrs, Volume= 84.291 af
Outflow = 105.99 cfs @ 23.45 hrs, Volume= 84.272 af, Atten= 0%, Lag= 0.1 min

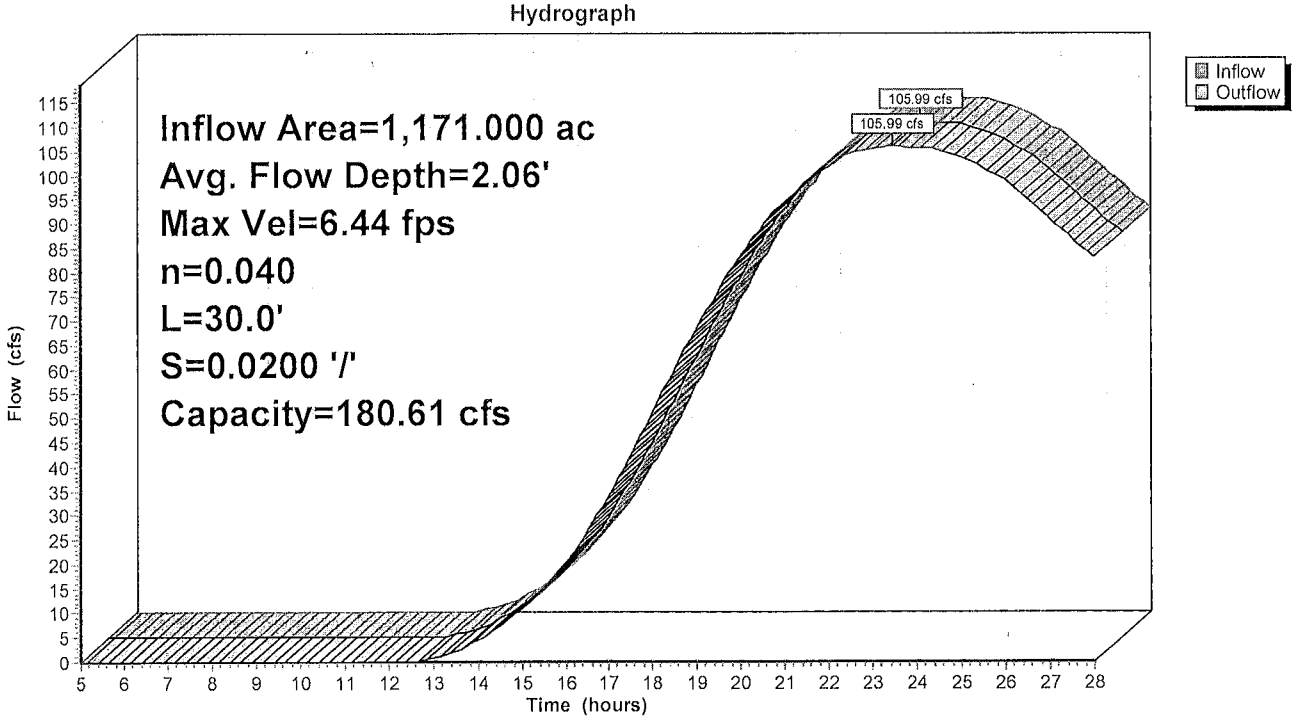
Routing by Stor-Ind+Trans method, Time Span= 5.00-28.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.44 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.06 fps, Avg. Travel Time= 0.1 min

Peak Storage= 493 cf @ 23.45 hrs
Average Depth at Peak Storage= 2.06'
Bank-Full Depth= 3.00' Flow Area= 24.0 sf, Capacity= 180.61 cfs

8.00' x 3.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Length= 30.0' Slope= 0.0200 '/'
Inlet Invert= 538.90', Outlet Invert= 538.30'



Reach 4R: Proposed Box Culvert



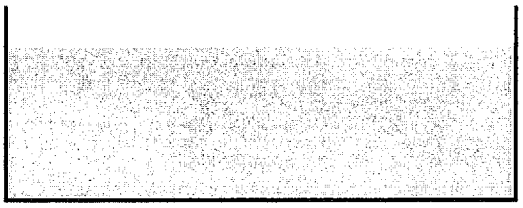
Summary for Reach 4R: Proposed Box Culvert

Inflow Area = 1,171.000 ac, 0.00% Impervious, Inflow Depth > 1.07"
Inflow = 131.03 cfs @ 23.43 hrs, Volume= 104.478 af
Outflow = 131.03 cfs @ 23.43 hrs, Volume= 104.457 af, Atten= 0%, Lag= 0.1 min

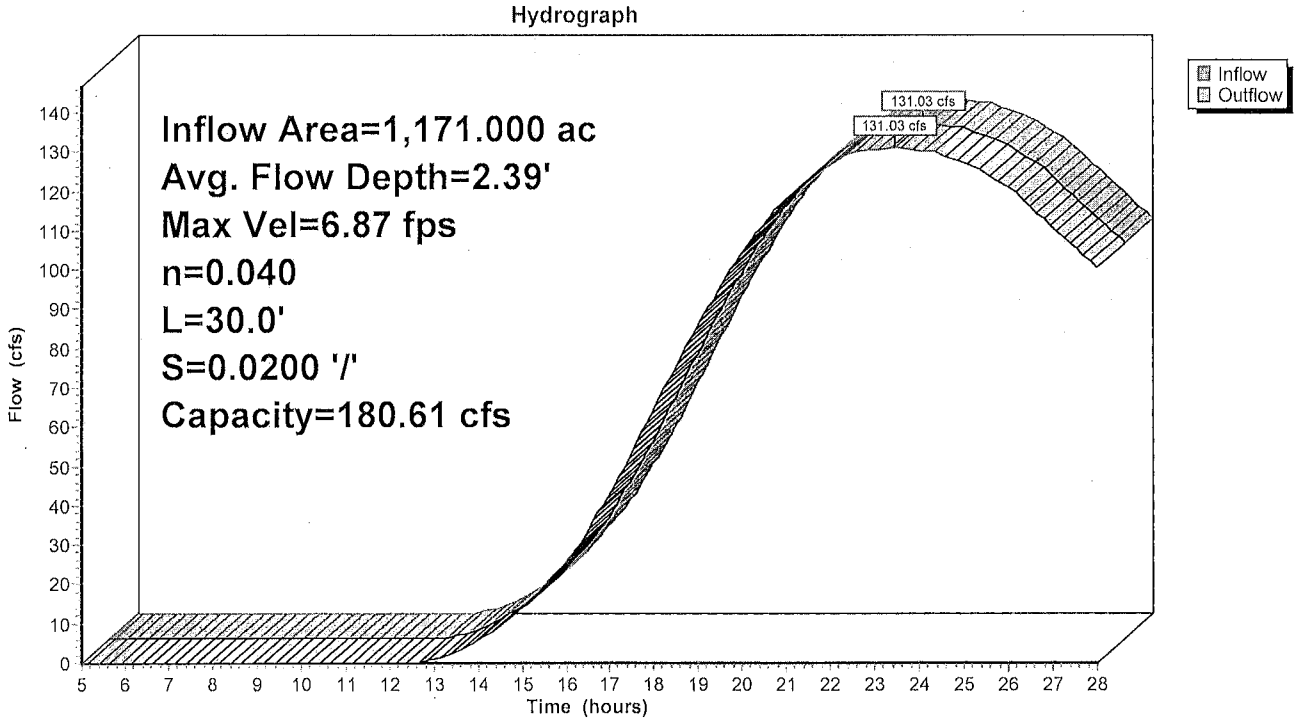
Routing by Stor-Ind+Trans method, Time Span= 5.00-28.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.87 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.43 fps, Avg. Travel Time= 0.1 min

Peak Storage= 572 cf @ 23.43 hrs
Average Depth at Peak Storage= 2.39'
Bank-Full Depth= 3.00' Flow Area= 24.0 sf, Capacity= 180.61 cfs

8.00' x 3.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Length= 30.0' Slope= 0.0200 '/'
Inlet Invert= 538.90', Outlet Invert= 538.30'



Reach 4R: Proposed Box Culvert



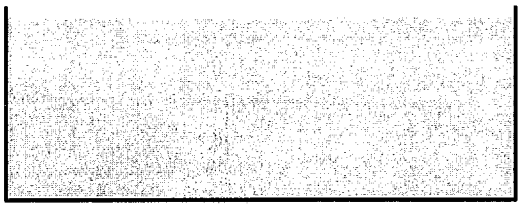
Summary for Reach 4R: Proposed Box Culvert

Inflow Area = 1,171.000 ac, 0.00% Impervious, Inflow Depth > 1.38"
Inflow = 168.57 cfs @ 23.40 hrs, Volume= 134.822 af
Outflow = 168.57 cfs @ 23.40 hrs, Volume= 134.797 af, Atten= 0%, Lag= 0.1 min

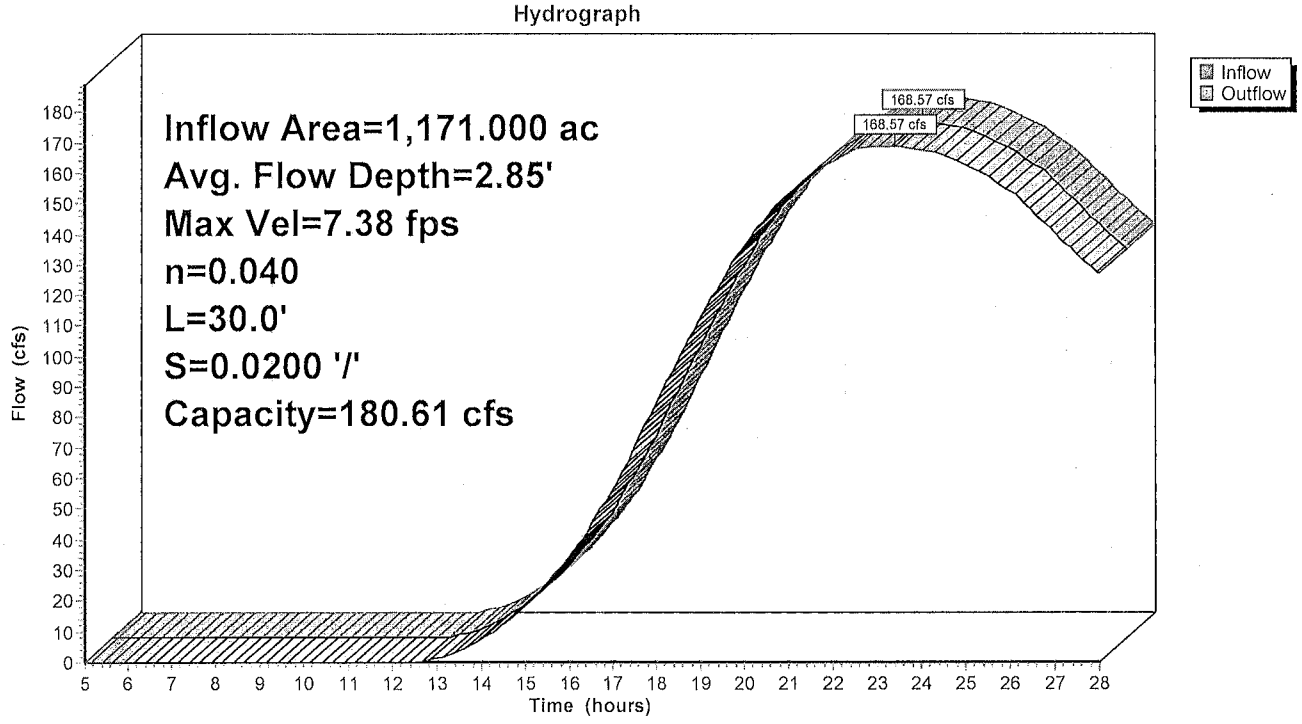
Routing by Stor-Ind+Trans method, Time Span= 5.00-28.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.38 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.33 fps, Avg. Travel Time= 0.1 min

Peak Storage= 685 cf @ 23.40 hrs
Average Depth at Peak Storage= 2.85'
Bank-Full Depth= 3.00' Flow Area= 24.0 sf, Capacity= 180.61 cfs

8.00' x 3.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Length= 30.0' Slope= 0.0200 '/'
Inlet Invert= 538.90', Outlet Invert= 538.30'



Reach 4R: Proposed Box Culvert



New Hampshire Natural Heritage Bureau

To: Deidra Benjamin
229 Prospect Mountain Road
Alton, NH 03809

Date: 7/27/2018

From: NH Natural Heritage Bureau

Re: Review by NH Natural Heritage Bureau of request dated 7/27/2018

NHB File ID: NHB18-2368

Applicant: NH Department of Transportation

Location: Tax Map(s)/Lot(s): Tax Map S05, ROW
Meredith

Project Description: The applicant is proposing to replace an existing degraded crossing with an upgraded crossing.

The NH Natural Heritage database has been checked for records of rare species and exemplary natural communities near the area mapped below. The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government. We currently have no recorded occurrences for sensitive species near this project area.

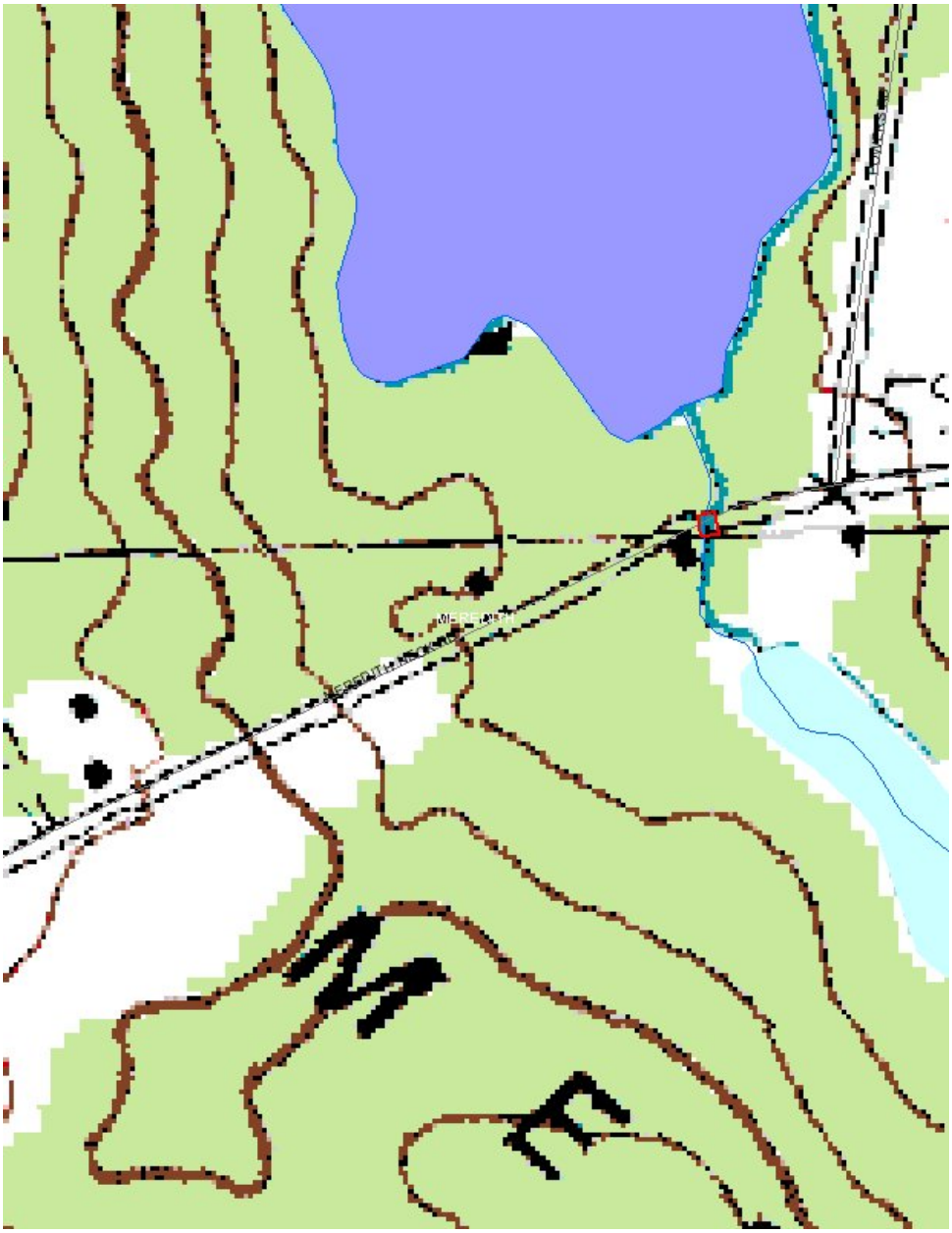
A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed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

This report is valid through 7/26/2019.

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

DRED/NHB
172 Pembroke Road
Concord NH 03301

MAP OF PROJECT BOUNDARIES FOR NHB FILE ID: NHB18-2368



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

DRED/NHB
172 Pembroke Road
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
http://www.fws.gov/newengland

In Reply Refer To:
Consultation Code: 05E1NE00-2018-SLI-2547
Event Code: 05E1NE00-2018-E-05971
Project Name: DOT Meredith

July 27, 2018

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

To Whom It May Concern:

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

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

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

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

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

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

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

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

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

Attachment(s):

- Official Species List

Official Species List

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

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Consultation Code: 05E1NE00-2018-SLI-2547

Event Code: 05E1NE00-2018-E-05971

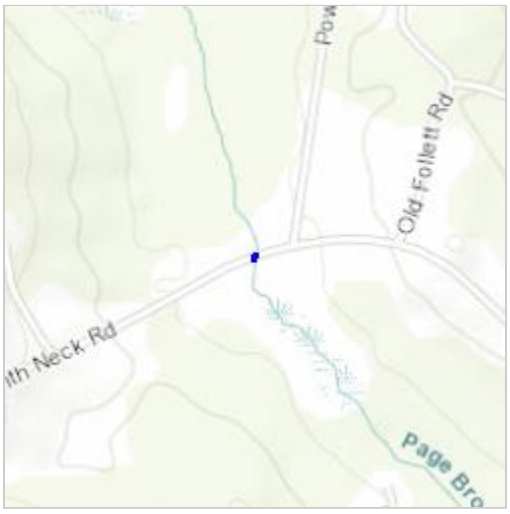
Project Name: DOT Meredith

Project Type: STREAM / WATERBODY / CANALS / LEVEES / DIKES

Project Description: The applicant is proposing to upgrade and existing, degraded crossing in the same location.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/43.65295553356769N71.44518471051157W



Counties: Belknap, NH

Endangered Species Act Species

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

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

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], 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 *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Flowering Plants

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

Critical habitats

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

Devin Batchelder

From: vonOettingen, Susi [susi_vonoettingen@fws.gov]
Sent: Monday, February 25, 2019 11:55 AM
To: Devin Batchelder
Subject: Re: [EXTERNAL] IPaC Endangered Species NHDOT

Hi,

No questions or concerns.

Susi

****

Susi von Oettingen
Endangered Species Biologist
New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301
(W) 603-227-6418
(Fax) 603-223-0104

www.fws.gov/newengland

On Thu, Feb 14, 2019 at 11:45 AM Devin Batchelder <dbatchelder@stoneyridgeenv.com> wrote:

> Hello Susi,
>
> My name is Devin I work at Stoney Ridge Environmental. We are assisting NHDOT with the permitting for the replacement of two existing culverted stream crossings, one in Meredith and one in New Hampton. We received IPaC hits for both projects (I have attached the IPac Reports and an aerial of each project area). In Meredith we received a hit for Northern Long-eared Bat as well as Small Whorled Pogonia, and in New Hampton we received a hit for Northern Long-eared Bat. Both projects involve existing crossings on developed roads within the NHDOT right of way, and neither project proposes any tree removal. As a result we do not feel that any potential bats should be impacted. As for the Pogonia, the crossing in Meredith has emergent wetland on either end of the project area, which would not be suitable habitat for the Pogonia. I would really appreciate your concurrence on our conclusions that these projects should not pose any potential impact to these species. Please let me know if you have any questions or concerns! Thank you very much for your time.
>
> Best,

Devin Batchelder, CWS

Assistant Project Manger

Stoney Ridge Environmental LLC

229 Prospect Mountain Road

Alton, NH 03809

(p) 603-776-5825 (f) 603-776-5826

dbatchelder@stoneyridgeenv.com

Wetland Application – NHDOT Cultural Resources Review

For the purpose of compliance with regulations of the National Historic Preservation Act, the Advisory Council on Historic Preservation's *Procedures for the Protection of Historic Properties* (36 CFR 800), the US Army Corps of Engineers' *Appendix C*, and/or state regulation RSA 227-C:9, *Directive for Cooperation in the Protection of Historic Resources*, the NHDOT Cultural Resources Program has reviewed the enclosed Standard Dredge and Fill Application for potential impacts to historic properties.

Proposed Project: Replace existing failing concrete arch culvert with new concrete box culvert (PM is Wm Rollins) in same location. The action is associated with wetland permit; replace existing Page Brook stream crossing within the Town of Meredith's Right-Of-Way on Meredith Neck Road. Proposed impacts are limited to the road and embankments.

Above Ground Review

Known/approximate age of structure:

The concrete arch culvert (4.8 ft wide, 4.2 ft high, 27 ft long) and wingwalls are flanked by riprap added to the banks on both the inlet and outlet ends. In 1934 highway plans stated that there was a stone box culvert in this location. Based on the look of the culvert and condition the construction date is estimated to be circa 1940s-1950s. There has been some work stabilizing the north west wingwall on the inlet side, impacting the culvert's integrity.

☒ No Potential to Cause Effect/No Concerns

The parcel associated with the nearest standing structures, including a 1930 residence and garage near the NW side of the crossing, will not be impacted. With the exception of this residential property, the immediate area around the crossing has remained undeveloped. Due to the alterations to the inlet side of the culvert, there is limited integrity remaining and therefore no concerns with the replacement.

☐ Concerns:

Below Ground Review

Recorded Archaeological site: ☐Yes ☒No

Nearest Recorded Archaeological Site Name & Number: 27-BK-0128 Page Brook Sawmill Site
☐Pre-Contact ☒Post-Contact

Distance from Project Area:
1.297 miles (2.08 km) northwest of project area

☒ No Potential to Cause Effect/No Concerns

Evidence of the road crossing of Page Brook in this location appears on the 1860 Woodford map and the nearest occupants include S. Clark occupying a structure west of the northwest quadrant of the crossing and Thompson occupying a structure east of the southeast corner of the crossing. The road crossing also appears on the 1892 Hurd Map and the nearest occupant is S. Lovejoy occupying a structure west of the northwest quadrant of the crossing. The broad pond just north of this crossing does not appear on either of these 19th century maps. The crossing is also depicted on the 1909 Lake Winnipesaukee USGS Topographic map.

There are several obvious impacts to the landscape that infer low sensitivity for encountering archaeological resources. In addition to the culvert construction impacts and the associated rip rapped embankments, there is a 12 inch metal pipe culvert that runs beneath the residential driveway and

drains at the embankment on the northern side of the Page Brook Crossing. There is also a small 3 inch plastic drainage pipe that runs from the adjacent house to the southern side of the Page Brook Crossing.

Due to these impacts and the limited proposed footprint for the replacement, there are no archaeological concerns.

☐ Concerns:

Reviewed by:

Sheila Charles

10/1/2018

NHDOT Cultural Resources Staff

Date:

US Army Corps of Engineers®
New England District

Appendix B

Regional General Permits (GPs)
Required Information and Corps Secondary Impacts Checklist

In order for the Corps of Engineers to properly evaluate your application, applicants must submit the following information along with the New Hampshire DES Wetlands Bureau application or permit notification forms. Some projects may require more information. For a more comprehensive checklist, go to www.nae.usace.army.mil/regulatory, "Forms/Publications" and then "Application and Plan Guideline Checklist." Check with the Corps at (978) 318-8832 for project-specific requirements. For your convenience, this Appendix B is also attached to the State of New Hampshire DES Wetlands Bureau application and Permit by Notification forms.

All Projects:

- Corps application form (ENG Form 4345) as appropriate.
- Photographs of wetland/waterway to be impacted.
- Purpose of the project.
- Legible, reproducible black and white (no color) plans no larger than 11"x17" with bar scale. Provide locus map and plan views of the entire property.
- Typical cross-section views of all wetland and waterway fill areas and wetland replication areas.
- In navigable waters, show mean low water (MLW) and mean high water (MHW) elevations. Show the high tide line (HTL) elevations when fill is involved. In other waters, show ordinary high water (OHW) elevation.
- On each plan, show the following for the project:
- Vertical datum and the NAVD 1988 equivalent with the vertical units as U.S. feet. Don't use local datum. In coastal waters this may be mean higher high water (MHHW), mean high water (MHW), mean low water (MLW), mean lower low water (MLLW) or other tidal datum with the vertical units as U.S. feet. MLLW and MHHW are preferred. Provide the correction factor detailing how the vertical datum (e.g., MLLW) was derived using the latest National Tidal Datum Epoch for that area, typically 1983-2001.
- Horizontal state plane coordinates in U.S. survey feet based on the Traverse Mercator Grid system for the State of New Hampshire (Zone 2800) NAD 83.
- Show project limits with existing and proposed conditions.
- Limits of any Federal Navigation Project in the vicinity of the project area and horizontal State Plane Coordinates in U.S. survey feet for the limits of the proposed work closest to the Federal Navigation Project;
- Volume, type, and source of fill material to be discharged into waters and wetlands, including the area(s) (in square feet or acres) of fill in wetlands, below the ordinary high water in inland waters and below the high tide line in coastal waters.
- Delineation of all waterways and wetlands on the project site,:
- Use Federal delineation methods and include Corps wetland delineation data sheets. See GC 2 and www.nero.noaa.gov/hcd for eelgrass survey guidance.
- GP 3, Moorings, contains eelgrass survey requirements for the placement of moorings.
- For activities involving discharges of dredged or fill material into waters of the U.S., include a statement describing how impacts to waters of the U.S. are to be avoided and minimized, and either a statement describing how impacts to waters of the U.S. are to be compensated for (or a conceptual or detailed mitigation plan) or a statement explaining why compensatory mitigation should not be required for the proposed impacts. Please contact the Corps for guidance.

US Army Corps of Engineers ®
New England District

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

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

1. Impaired Waters	Yes	No
1.1 Will any work occur within 1 mile upstream in the watershed of an impaired water? See http://des.nh.gov/organization/divisions/water/wmb/section401/impaired_waters.htm to determine if there is an impaired water in the vicinity of your work area.*		X
2. Wetlands	Yes	No
2.1 Are there are streams, brooks, rivers, ponds, or lakes within 200 feet of any proposed work?	X	
2.2 Are there proposed impacts to SAS, special wetlands. Applicants may obtain information from the NH Department of Resources and Economic Development Natural Heritage Bureau (NHB) DataCheck Tool for information about resources located on the property at https://www2.des.state.nh.us/nhb_datacheck/. The book Natural Community Systems of New Hampshire also contains specific information about the natural communities found in NH.		X
2.3 If wetland crossings are proposed, are they adequately designed to maintain hydrology, sediment transport & wildlife passage?	X	
2.4 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?	150 sq.ft	
2.7 What is the area of the proposed fill in wetlands?	365 sq.ft.	
2.8 What is the % of previously and proposed fill in wetlands to the overall project site?	2.5%/6%	
3. Wildlife	Yes	No
3.1 Has the NHB & USFWS determined that there are known occurrences of rare species, exemplary natural communities, Federal and State threatened and endangered species and habitat, in the vicinity of the proposed project? (All projects require an NHB ID number & a USFWS IPAC determination.) NHB DataCheck Tool: https://www2.des.state.nh.us/nhb_datacheck/ USFWS IPAC website: https://ecos.fws.gov/ipac/location/index		X

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: • PDF: www.wildlife.state.nh.us/Wildlife/Wildlife_Plan/highest_ranking_habitat.htm. • Data Mapper: www.granit.unh.edu. • GIS: www.granit.unh.edu/data/downloadfreedata/category/databycategory.html.		X
3.3 Would the project impact more than 20 acres of an undeveloped land block (upland, wetland/waterway) on the entire project site and/or on an adjoining property(s)?		X
3.4 Does the project propose more than a 10-lot residential subdivision, or a commercial or industrial development?		X
3.5 Are stream crossings designed in accordance with the GC 21?		X
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?		
5. Historic/Archaeological Resources		
For a minimum, minor or major impact project - a copy of the Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review**)** with your DES file number shall be sent to the NH Division of Historical Resources as required on Page 11 GC 8(d) of the GP document**	X	

*Although this checklist utilizes state information, its submittal to the Corps is a Federal requirement.
** If your project is not within Federal jurisdiction, coordination with NH DHR is not required under Federal law.
`

PAGE POND
PRIME WETLAND
MEREDITH, NH

BARTLETT BROOK

NH ROUTE 25

PAGE POND

PAGE BROOK

LAKE
WINNIPESAUKEE

Project
Location

MEREDITH NECK ROAD

Scale 1:10,000

0 416.5 833 1,666

1 inch = 833 Feet

Legend

- Page Pond Prime Wetland
- Meredith_Parcels 2012
- Streams
- Pond / Lake

ABOUT THIS MAP

Wetlands were derived from National Wetland Inventory maps, NRCS hydric soils maps, and 1998 digital aerial photogrpahy (DOQ's). Final map adjustments of prime wetlands were made in the field using a Garmin 12 XL GPS unit. Precision of GPS points was 3.4 to 7.7 m. Roughly 50% of all prime wetland boundaries were field surveyed, based on private property access permission. EMC / VdP August 2009

Source: Natural Resources Inventory Phase II
of the Town of Meredith, NH
Prepared By: Rick Van de Poll, Ph.D., August 2009
Format Revisions: Town of Meredith, April 2013
Printed: 04-12-2013

PHOTO LOG
NH Department of Transportation
Meredith Neck Road Culvert Crossing
Tax Map S05, Right-of-Way
Meredith, New Hampshire
Photos Taken: July 11, 2018

SRE # 18-061

PHOTO 1: This is a view of the existing crossing with the adjacent house and garage in the background, looking west on Meredith Neck Road.

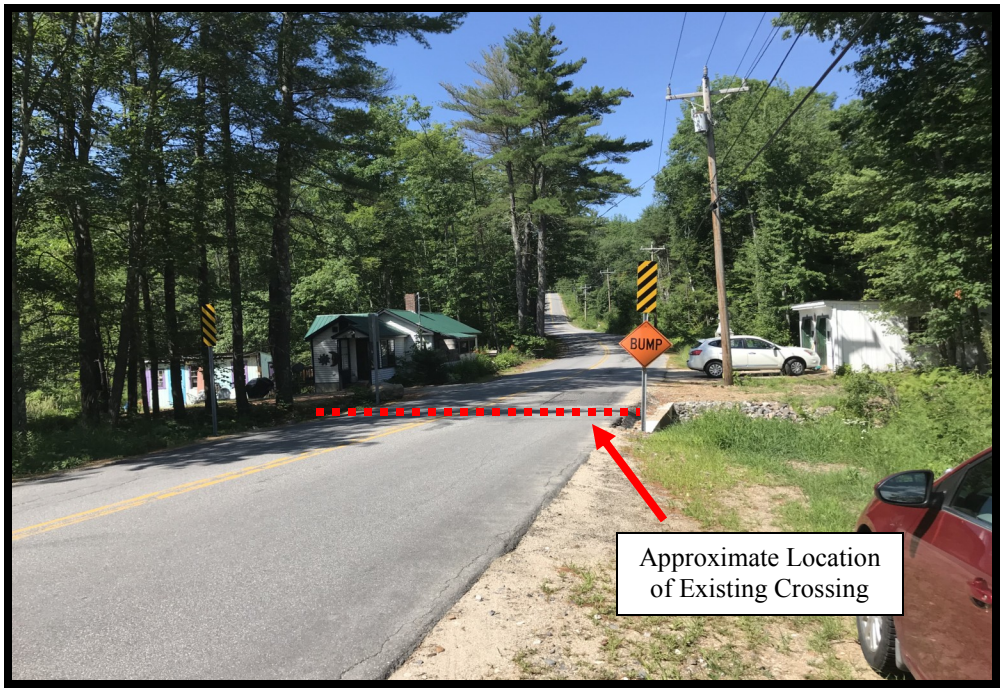


PHOTO 2: A view looking into the inlet of the existing concrete box culvert from the north side of Meredith Neck Road. Both the culvert and headwall have been damaged over time.

PHOTO LOG
NH Department of Transportation
Meredith Neck Road Culvert Crossing
Tax Map S05, Right-of-Way
Meredith, New Hampshire
Photos Taken: July 11, 2018

SRE # 18-061

PHOTO 3: A view looking towards the culvert outlet on the south side of Meredith Neck Road.

PHOTO 4: Looking upstream towards the culvert outlet on the southern side of Meredith Neck Road.

PHOTO LOG
NH Department of Transportation
Meredith Neck Road Culvert Crossing
Tax Map S05, Right-of-Way
Meredith, New Hampshire
Photos Taken: July 11, 2018

SRE # 18-061

PHOTO 5: Upstream of the wetland crossing is the Town of Meredith Designated Page Brook Prime Wetland System. The Page Pond Wetland consists of a large area of open water surrounded by emergent vegetation and pockets of forested wetland.

PHOTO 6: The hydrology of this Prime Wetland system is partially driven by a beaver dam that has been created at the outlet of the wetland, causing an impoundment.

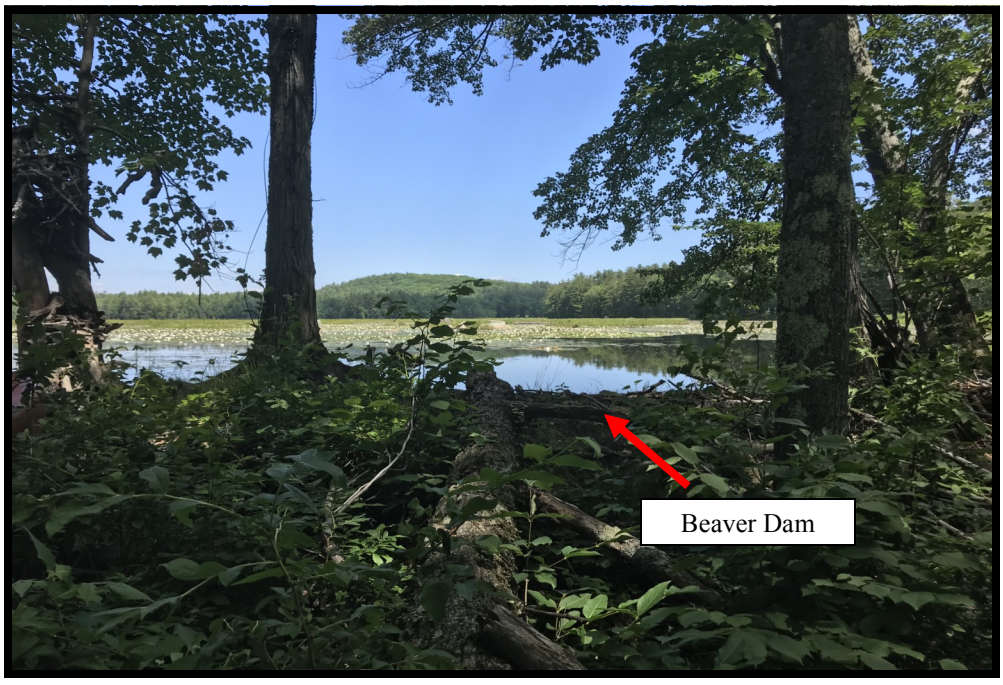


PHOTO LOG
NH Department of Transportation
Meredith Neck Road Culvert Crossing
Tax Map S05, Right-of-Way
Meredith, New Hampshire
Photos Taken: July 11, 2018

SRE # 18-061

PHOTO 7: This photo shows the large beaver dam that is restricting water from flowing down Page Brook.

PHOTO 8: This is a view looking downstream from the beaver dam towards the crossing.

PHOTO LOG
NH Department of Transportation
Meredith Neck Road Culvert Crossing
Tax Map S05, Right-of-Way
Meredith, New Hampshire
Photos Taken: July 11, 2018

SRE # 18-061

PHOTO 9: This photo shows the section of Page Brook that is downstream of the culvert. The flow is focused in a channel immediately downstream of the culvert before it opens up into a narrow emergent wetland.

PHOTO 10: A view of the emergent wetland downstream of the culvert. Page Brook flows into this wetland and remains as a narrow channel in the center of the wetland.

-40 -30 -20 -10 0 10 20 30 40

560

550

LOOA LOOA

540

530

520

THO2 LMO4 TH02 EP00 U000 EP01 TH00

4.8'w x 4.2'h
conc box culv
with arch top

B+02 B+00

538.9'

538.3'

Slope = 2%

MERI

-40 -30 -20 -10 0 10 20 30 40

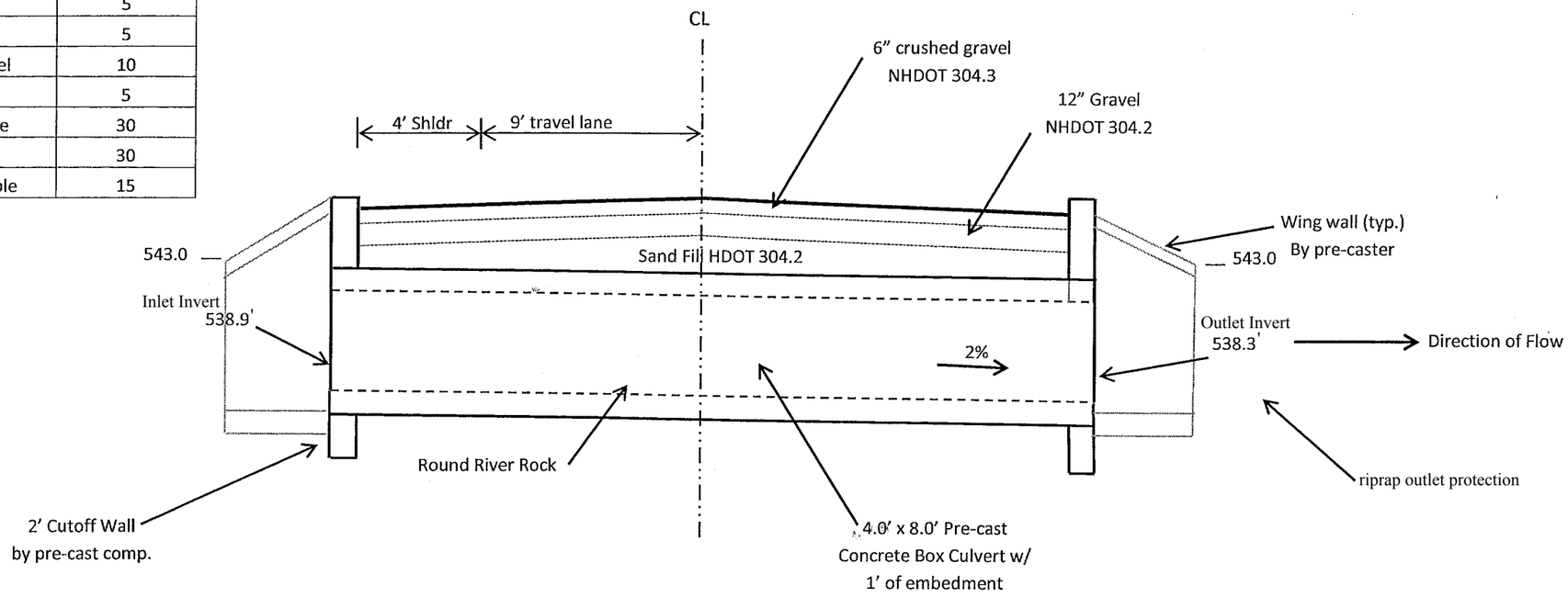
Streambed Fill shall consist of natural field stone or natural river rock. Crushed stone from a quarry or other sources will not be permitted. Stone gradation will approximate the following size distribution; amounts finer than each Laboratory sieve(square openings) (percent by weight):

Size [inches]	Material	Percentage
.01"	Sand	5
.07"	Coarse Sand	5
1 1/2" - 2"	Bank Run Gravel	10
2"-4"	Small Cobble	5
4"-8"	Medium Cobble	30
8"-10"	Large Cobble	30
10"-12"	Very Large Cobble	15

The size of the individual stone particle will be determined by measuring its diameter across the intermediate axis.

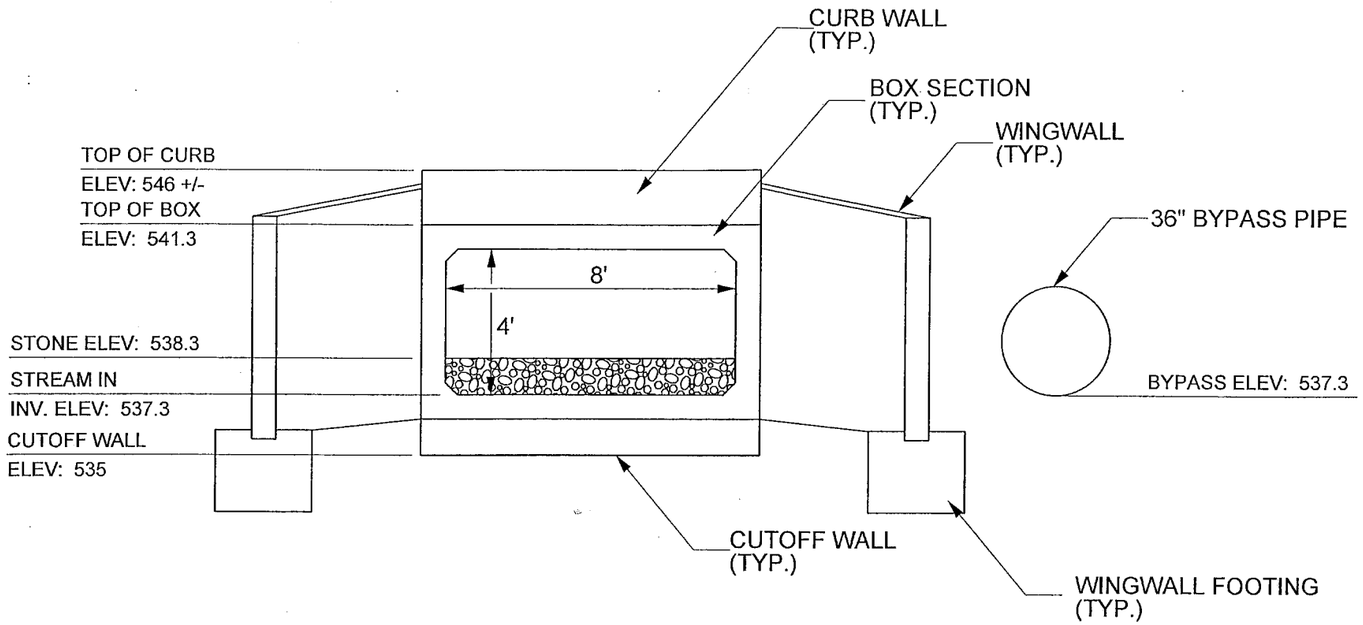
Stone particles shall be tough, dense, resistant to the action of air and water, and suitable in all respects for the purpose intended.

Streambed fill may contain small amounts of fine aggregate but shall contain no amount of soil material.



PAGE BROOK
BOX CULVERT SECTION
1'' = 5' +/-

NHDOT PROJ. # 41890
MEREDITH NECK ROAD
MEREDITH, NH



WINGWALL & BOX CULVERT END SECTION VIEW

NOT TO SCALE

PRECAST BOX CULVERT & WINGWALL NOTES:

1. ALL DETAILS SHOWN ARE REASONABLE GRAPHIC REPRESENTATIONS OF THE PROPOSED STRUCTURES AND ARE NOT FOR CONSTRUCTION (ENGINEERED SHOP DRAWINGS TO BE PROVIDED BY MANUFACTURER PRIOR TO CONSTRUCTION.
2. THE DETAILS REPRESENTED ON THIS SHEET ARE NOT SITE SPECIFIC AND ARE INCLUDED TO DEMONSTRATE DESIGN INTENT ONLY. FINAL ELEVATIONS ABOVE STREAM BED ARE TO BE DETERMINIED BY PRECAST CONSTRUCTION METHODS.
3. ALL SUBGRADE AND BEDDING DEPTHS AND SPECIFICATIONS FOR BOX CULVERT & WINGWALL FOOTING INSTALLATION TO BE PROVIDED BY OTHERS PRIOR TO CONSTRUCTION (GEOTECHNICAL INVESTIGATION AND SPECIFICATION BY OTHERS).

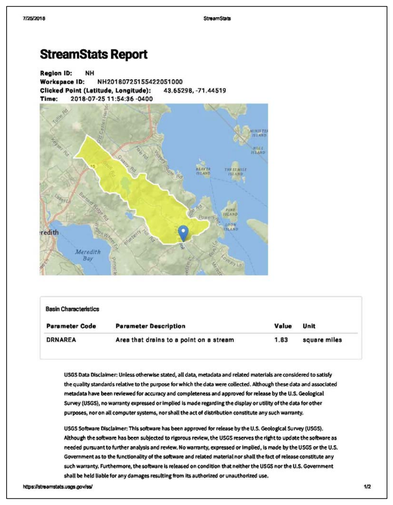
NHDOT Project #41890
Page Brook
Meredith Neck Road
Meredith, NH

Wetland Classification

P = Palustrine
- FO = Forested
- SS = Scrub-Shrub
  - 1 = Broad=Leaved Deciduous
    - E = Seasonally Flooded/Saturated

R = Riverine
- 2 = Lower Perennial
  - UB = Unconsolidated Bottom
    - 1 = Cobble-Gravel
    - 2 = Sand
      - H = Permanently Flooded

Tier 3 Crossing
Contributing Watershed Size
1,171.2 Acres



7/25/2018 StreamStats

StreamStats Report

Region ID: NH
Workspace ID: NH20180725155422051000
Clicked Point (Latitude, Longitude): 43.65298, -71.44519
Time: 2018-07-25 11:54:36 -0400

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	1.83	square miles

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

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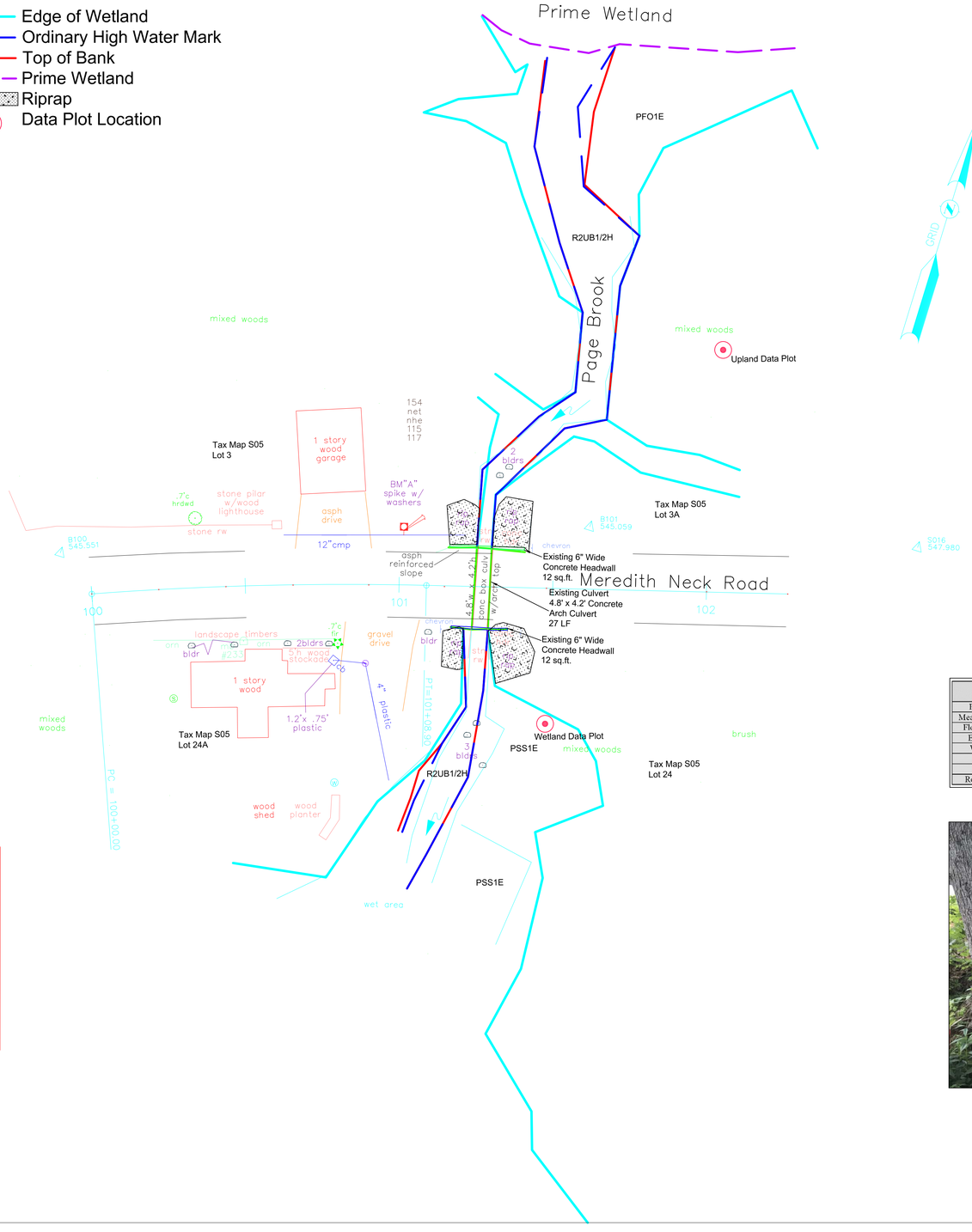
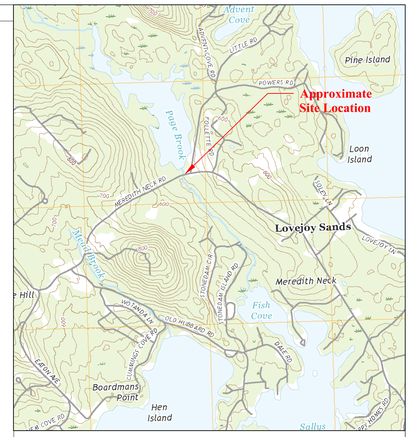
https://streamstats.usgs.gov/ss/ 1/2

Legend

- Edge of Wetland
- Ordinary High Water Mark
- Top of Bank
- Prime Wetland
- Riprap
- Data Plot Location





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Measurements	Crossing Inlet	Crossing Outlet	Reference Reach
Bankfull Width (ft)	7	6	15
Mean Bankfull Depth (ft)	2.03	1.3	1.23
Flood Prone Width (ft)	7	6	15
Entrenchment Ratio	1 (7/7)	1 (6/6)	1 (15/15)
Width/Depth Ratio	3.45 (7/2.03)	4.6 (6/1.3)	21.74 (15/0.69)
Sinuosity	1.06 (203.88/193)	1.06 (203.88/193)	1.06 (203.88/193)
Channel Slope	2%	2%	2%
Rosgen Classification	A4	A4	F4b

MEREDITH
1832-H
PLAN PREPARATION RECORD PLAN
MX SDR FILES PROCESSED BY : SEL
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PLAN PREP COMPLETION DATE : 5-9-18
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SURVEY BOOK NUMBERS : 13430

+ N. H. D. O. T. +
SCALE IN FEET
0 20 40 60

Base Plan Provided by NHDOT

Existing Conditions Plan

NHDOT
NHDOT PROJECT NO 41890
TAX MAP S05, R-O-W
MEREDITH NECK ROAD
MEREDITH, NH

Revisions			
No.	Date	Description	By

DATE: 5/28/19	SCALE: 1" = 10'
PROJECT NO: 18-061	SHEET 1 OF 2

Stoney Ridge Environmental LLC
229 Prospect Mountain Road. Alton, NH
Phone: 603-776-5825

Wetland Classification

P = Palustrine
- FO = Forested
- SS = Scrub-Shrub
  - 1 = Broad=Leaved Deciduous
    - E = Seasonally Flooded/Saturated

R = Riverine
- 2 = Lower Perennial
  - UB = Unconsolidated Bottom
    - 1 = Cobble-Gravel
    - 2 = Sand
      - H = Permanently Flooded

Tier 3 Crossing
Contributing Watershed Size:
1,171.2 Acres

Plan Note:
Dewatering will occur within the immediate project limits if necessary. The majority of the water will bypass the construction zone through a diversion pipe. This diversion pipe is proposed to remain after work is complete. Sandbags will be utilized to section of the immediate construction area. If dewatering is necessary in that area, water will by pumped to a dirt bag located at least 20' from any wetlands.

Legend

- Edge of Wetland
- Ordinary High Water Mark
- Top of Bank
- Riprap
- Wetland Impact
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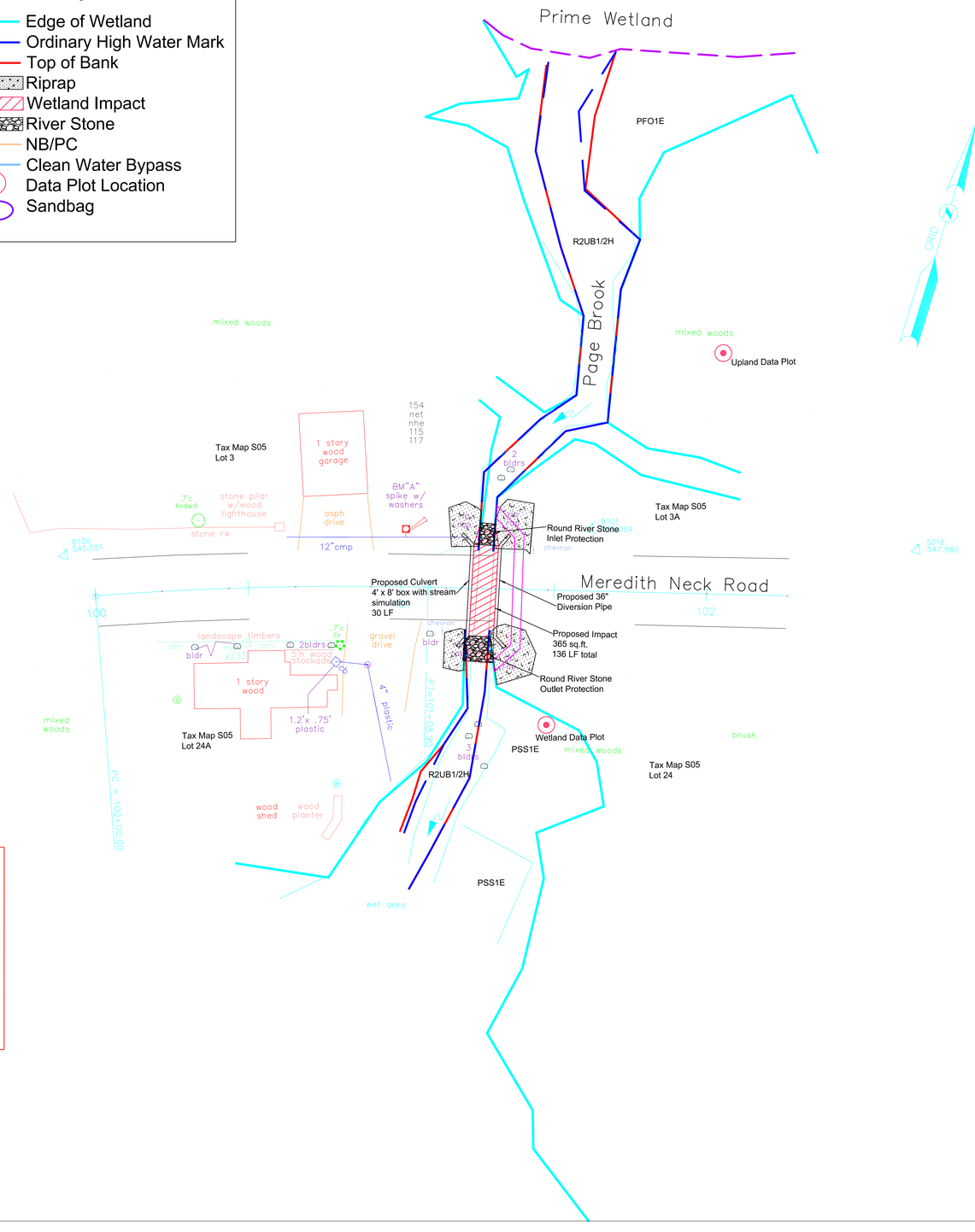
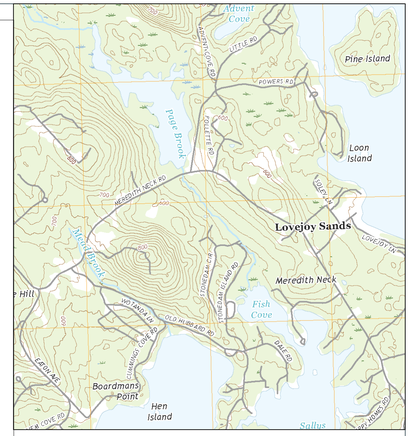


Wetland Impact Chart		
Structure	**sq.ft.**	**Wetland Classification**
Box Culvert	240	R2UB1/2H
Riprap Aprons	125	R2UB1/2H
Total Impact	**365**	



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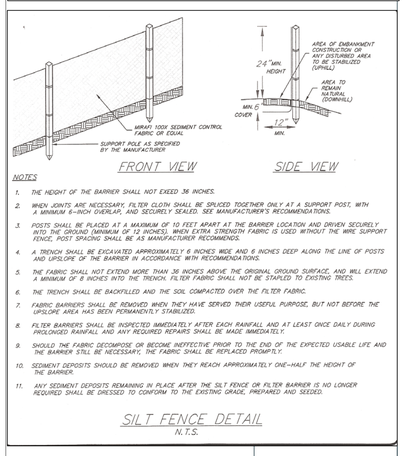

FRONT VIEW — SIDE VIEW

NOTES

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SILT FENCE DETAIL
N.T.S.

MEREDITH
1832-H
PLAN PREPARATION RECORD PLAN

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+ N. H. D. O. T. +
SCALE IN FEET
0 20 40 60

Construction Sequence

1. All principals involved in the construction (i.e. owner, excavator operator, contractor) will meet for a pre construction meeting to discuss the sequence and scheduling of the construction.
2. Prior to any construction all sediment and erosion control structures will be installed and inspected regularly.
3. Install the diversion pipe.
4. Remove the existing culvert.
5. Install box cuvlert and simulated material.
6. All construction debris will be removed and disposed of out of jurisdictional areas.
7. After construction is complete all sediment and erosion control structures will be removed and properly disposed of.

Revisions			
No.	Date	Description	By
DATE: 5/28/19		SCALE: 1" = 10'	
PROJECT NO: 18-061		SHEET 1 OF 2	

Base Plan Provided by NHDOT

Wetland Impact Plan

NHDOT
NHDOT PROJECT NO 41890
TAX MAP S05, R-O-W
MEREDITH NECK ROAD
MEREDITH, NH

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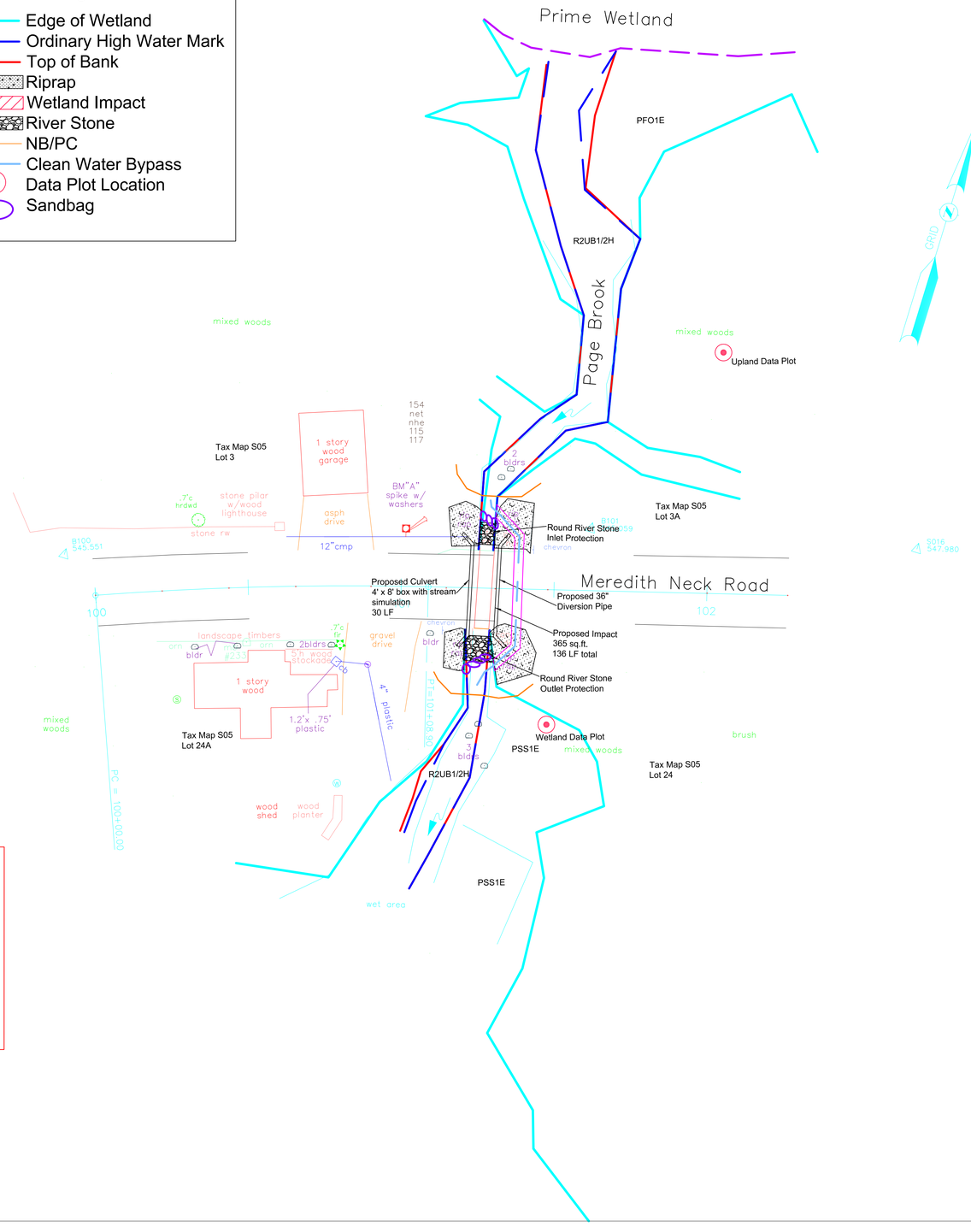

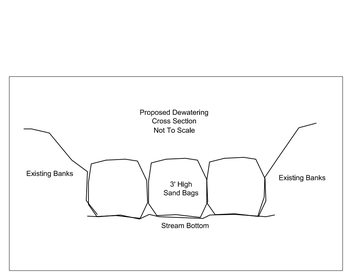

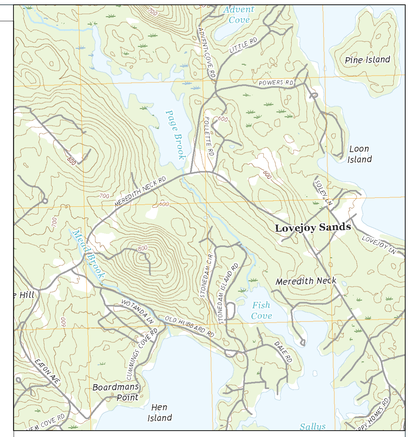

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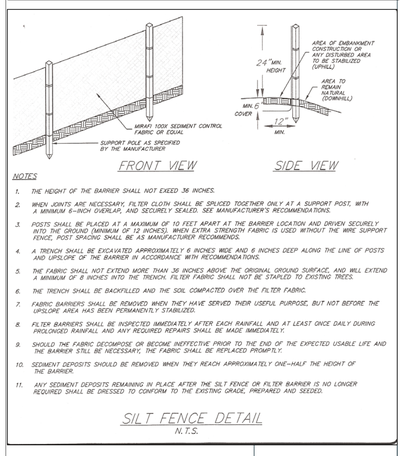

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Base Plan Provided by NHDOT

Erosion Control Plan

NHDOT
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