Application for State of New Hampshire Department of Environmental Services Wetland Permit for Major Dredge and Fill Project for the Northern Pass Transmission Project New Hampshire

Prepared for

Northern Pass Transmission, LLC and
Public Service Company of New Hampshire
d/b/a Eversource Energy
Energy Park
780 North Commercial Street
Manchester, NH 03101

Submitted:

October 2015

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Note: Items are numbered according to the NH DES "Wetlands Permit Application Required Information" document Revised 3/30/15[1]

1-3 NH DES Wetlands Permit Application Form

[1] http://des.nh.gov/organization/divisions/water/wetlands/categories/forms.htm

NHDES-W-06-012

WETLANDS PERMIT APPLICATION

Water Division/ Wetlands Bureau
Land Resources Management

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

RSA/Rule: Env-Wt 100-900

1. REVIEW TIME:
Indicate your Review Time below. Refer to Guidance Document A for instructions.

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

2. PROJECT LOCATION:
Separate applications must be filed with each municipality that jurisdictional impacts will occur in.

ADDRESS: **Multiple - Linear Transmission Line ROW - See USGS Map, Narrative** TOWN/CITY: **Multiple - See Maps**

TAX MAP: **Multiple - See Att.** BLOCK: LOT: UNIT:

USGS TOPO MAP WATERBODY NAME: **Multiple - See USGS Mapping** ☐ NA STREAM WATERSHED SIZE: **Various** ☐ NA

LOCATION COORDINATES (If known): **45.017687,-71.4999903; 43.140305,-71.187099**
☒ Latitude/Longitude ☐ UTM ☐ State Plane

3. 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.

Northern Pass is a 192-mile transmission line project that will bring 1,090 megawatts (MW) of clean, affordable energy to New Hampshire and to the rest of New England. The project will build a new 158.3 mile long HVDC transmission line from the Canadian border to Franklin, NH. From Franklin, a new 33.7 mile long AC transmission line will carry the energy to an existing substation in Deerfield, NH and into New England's electric grid.

4. SHORELINE FRONTAGE

☒ NA This lot has no 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.

5. RELATED PERMITS, ENFORCEMENT, EMERGENCY AUTHORIZATION, SHORELAND, ALTERATION OF TERRAIN, ETC...

App. for Certificate of Site and Facility, Alteration of Terrain & others. See narrative for list.

6. 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 **15** - **0611**

b. ☒ Designated River the project is in ¼ miles of: **Multiple, see narrative.** ; and
date a copy of the application was sent to Local River Advisory Committee: Month: 10 Day: 19 Year 2015
☐ NA

7. APPLICANT INFORMATION (Desired permit holder)			
LAST NAME, FIRST NAME, M.I.: **Clarke, Robert P. & McCune, Kevin F. (See Attached for Additional Detail)**			
TRUST / COMPANY NAME: **Eversource Energy Service Corporation (See Attached for Additional Detail)**	MAILING ADDRESS: **780 North Commercial Street**		
TOWN/CITY: **Manchester**		STATE: **NH**	ZIP CODE: **03101**
EMAIL or FAX: **robert.clarke@eversource.com & kevin.mccune@eversource.com**	PHONE: **781-441-8057 & 339-987-7020**		
ELECTRONIC COMMUNICATION: By initialing here: **RC/KM**, I hereby authorize DES to communicate all matters relative to this application electronically			

8. PROPERTY OWNER INFORMATION (If different than applicant)			
LAST NAME, FIRST NAME, M.I.:			
TRUST / COMPANY NAME:	MAILING ADDRESS:		
TOWN/CITY:		STATE:	ZIP CODE:
EMAIL or FAX:	PHONE:		
ELECTRONIC COMMUNICATION: By initialing here _____, I hereby authorize DES to communicate all matters relative to this application electronically			

9. AUTHORIZED AGENT INFORMATION			
LAST NAME, FIRST NAME, M.I.: **Carbonneau, Lee E.**	COMPANY NAME: **Normandeau Associates, Inc.**		
MAILING ADDRESS: **25 Nashua Road**			
TOWN/CITY: **Bedford**		STATE: **NH**	ZIP CODE: **03110**
EMAIL or FAX: **lcarbonneau@normandeau.com**	PHONE: **603-637-1150**		
ELECTRONIC COMMUNICATION: By initialing here **LEC**, I hereby authorize DES to communicate all matters relative to this application electronically			

10. 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 be reviewed for the presence of historical/ archeological resources.
8. I authorize DES 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 New Hampshire Department of Environmental Services 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 DES correspondence. DES will not forward returned mail.

⇨ **See Attachment after page 4 of 4** Property Owner Signature	Print name legibly	/ / Date

MUNICIPAL SIGNATURES

11. 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

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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 reviewed in the standard review time frame.

12. 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.

⇨ Town/City Clerk Signature	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.

13. 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 complete.

JURISDICTIONAL AREA	PERMANENT Sq. Ft. / Lin. Ft.		TEMPORARY Sq. Ft. / Lin. Ft.	
Forested wetland	75676	☐ ATF	781179	☐ ATF
Scrub-shrub wetland	11673	☐ ATF	2949350	☐ ATF
Emergent wetland	see Wet meadow	☐ ATF	see Wet meadow	☐ ATF
Wet meadow	20586	☐ ATF	2176691	☐ ATF
Intermittent stream	971	☐ ATF	33854	☐ ATF
Perennial Stream / River	<1 / <3	☐ ATF	54831 / 20760	☐ ATF
Lake / Pond	134 / 0	☐ ATF	65108 / 0	☐ ATF
Bank - Intermittent stream	incl. above / incl. above	☐ ATF	incl. above / spanned	☐ ATF
Bank - Perennial stream / River	incl. above / incl. above	☐ ATF	incl. above / spanned	☐ ATF
Bank - Lake / Pond	incl. above / incl. above	☐ ATF	incl. above / spanned	☐ ATF
Tidal water	n/a / n/a	☐ ATF	n/a / n/a	☐ ATF
Salt marsh	n/a	☐ ATF	n/a	☐ ATF
Sand dune	n/a	☐ ATF	n/a	☐ ATF
Prime wetland	0	☐ ATF	0	☐ ATF
Prime wetland buffer	0	☐ ATF	0	☐ ATF
Undeveloped Tidal Buffer Zone (TBZ)	n/a	☐ ATF	n/a	☐ ATF
Previously-developed upland in TBZ	n/a	☐ ATF	n/a	☐ ATF
Docking - Lake / Pond	n/a	☐ ATF	n/a	☐ ATF
Docking - River	n/a	☐ ATF	n/a	☐ ATF
Docking - Tidal Water	n/a	☐ ATF	n/a	☐ ATF
TOTAL	109040 / <3		6061013 / 20760	

14. 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)	**6170053** sq. ft.	X	$0.20 =	**$ 1234010.55**
Temporary (seasonal) docking structure:	sq. ft.	X	$1.00 =	$
Permanent docking structure:	sq. ft.	X	$2.00 =	$
Projects proposing shoreline structures (including docks) add $200			**=**	**$ 200**
			Total =	**$ 1234210.55**
The Application Fee is the above calculated Total or $200, whichever is greater			=	**$ 1234210.55**

NORTHERN PASS TRANSMISSION LLC

51-44
119

Check No.	Date	Payment Amt	
0001431968	10/14/15	$1,234,210.55	USD

PAY **********1,234,210.55********** DOLLAR

TO THE ORDER OF

STATE OF NEW HAMPSHIRE TREASURER
TREASURY DEPARTMENT
25 CAPITOL ST ROOM 121
CONCORD NH 03301

Authorized Signature

Bank of America

THIS CHECK HAS A PINK BACKGROUND VOID AFTER 6 MONTHS

⑈1431968⑈ ⑆011900445⑆ 000000002262⑈

AD6266-1 REV. 2-15 ATTACHED CHECK ISSUED AS FULL PAYMENT OF ITEMS BELOW. PLEASE DETACH STUB AND DEPOSIT CHECK PROMPTLY.

Vendor ID	Personnel ID	Check No.	Date
SONH	23	0001431968	10/14/15

Payor: NORTHERN PASS TRANSMISSION LLC

Date	Invoice No.	PO/Cntrct	Rel	Payment Amount	Cur
10/13/15	1013015C			$1,234,210.55	USD

DES Standard Dredge and Fill (Wetlands) Filing Fee

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⇨	Print name legibly	Date

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⇨ Marise Burns	Marise Burns	Pittsburg	Oct 15, 15
Town/City Clerk Signature	Print name legibly	Town/City	Date

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⇨ Hélène L. Dionne	Hélène L. Dionne	Clarksville	10/15/15
Town/City Clerk Signature	Print name legibly	Town/City	Date

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⇨ Rita M Hibbard Town/City Clerk Signature	Rita M Hibbard Print name legibly	Stewartstown Town/City	10/15/2015 Date

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⇨ Jennifer Fish	Jennifer Fish	Dixville	10/14/15
Town/City Clerk Signature	Print name legibly	Town/City	Date

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⇨ Jennifer Fish	Jennifer Fish	Millsfield	10/14/15
Town/City Clerk Signature	Print name legibly	Town/City	Date

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Dummer

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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 reviewed in the standard review time frame.

12. 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.

⇨ Margo Lavertue	Margo Lavertue		10-15-15
Town/City Clerk Signature	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.

MUNICIPAL SIGNATURES

11. 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 reviewed in the standard review time frame.

12. 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.

⇨ Susan H. Croteau Town/City Clerk Signature	SUSAN H. CROTEAU Print name legibly	STARK Town/City	10/15/15 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.
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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.

MUNICIPAL SIGNATURES

11. 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

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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 reviewed in the standard review time frame.

12. 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.

⇨ Melinda Kennett Town/City Clerk Signature	Melinda Kennett Print name legibly	Northumberland Town/City	10/14/2015 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;
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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
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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.

MUNICIPAL SIGNATURES

11. 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.
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12. 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.

⇨ Carolyn Whipple deputy Town Clerk Town/City Clerk Signature	Carolyn Whipple Print name legibly	Lancaster Town/City	10.14.15 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;
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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.

MUNICIPAL SIGNATURES

11. CONSERVATION COMMISSION SIGNATURE

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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

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12. 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.

⇨ Tina Wright	Tina Wright	Whitefield	10/14/2015
Town/City Clerk Signature	Print name legibly	Town/City	Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

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DIRECTIONS FOR APPLICANT:

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MUNICIPAL SIGNATURES

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⇨	Print name legibly	Date

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12. 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.

⇨ R M Town/City Clerk Signature	Rhiannon Moyer Print name legibly	Dalton Town/City	10/15/15 Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

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DIRECTIONS FOR APPLICANT:

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MUNICIPAL SIGNATURES

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⇨	Print name legibly	Date

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12. 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.

⇨ Marie Brockway Town/City Clerk Signature	Marie Brockway Print name legibly	Bethlehem Town/City	10-15-15 Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

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MUNICIPAL SIGNATURES

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2. Believes that the application and submitted plans accurately represent the proposed project; and
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⇨	Print name legibly	Date

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12. 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.

⇨ Lissa M. Boissonneault	Lissa M. Boissonneault	Sugar Hill	10/15/15
Town/City Clerk Signature	Print name legibly	Town/City	Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

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MUNICIPAL SIGNATURES

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3. Has no objection to permitting the proposed work.

⇨	Print name legibly	Date

DIRECTIONS FOR CONSERVATION COMMISSION

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12. 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.

⇨ Carol F. Wills Town/City Clerk Signature	Carol F. Wills Print name legibly	Franconia Town/City	10-15-15 Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

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MUNICIPAL SIGNATURES

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⇨	Print name legibly	Date

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12. TOWN / CITY CLERK SIGNATURE

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⇨ Toni Woodruff	Toni Woodruff	Easton NH	10/15/15
Town/City Clerk Signature	Print name legibly	Town/City	Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

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3. Has no objection to permitting the proposed work.

⇨	Print name legibly	Date

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12. 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.

⇨ Judy R Welch	Judy L. Welch	Woodstock	10/15/15
Town/City Clerk Signature	Print name legibly	Town/City	Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

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MUNICIPAL SIGNATURES

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3. Has no objection to permitting the proposed work.

	Print name legibly	Date

DIRECTIONS FOR CONSERVATION COMMISSION

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12. 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.

Town/City Clerk Signature	Timothy J Tyler Print name legibly	Thornton Town/City	10-15-15 Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

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MUNICIPAL SIGNATURES

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⇨	Print name legibly	Date

DIRECTIONS FOR CONSERVATION COMMISSION

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12. 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.

⇨ Hannah B. Joyce Town/City Clerk Signature	HANNAH B JOYCE Print name legibly	CAMPTON, NH Town/City	10/16/2015 Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

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⇨	Print name legibly	Date

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⇨ Karen A Freitas Town/City Clerk Signature	KAREN A. FREITAS Print name legibly	PLYMOUTH Town/City	10/15/15 Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

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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 reviewed in the standard review time frame.

12. 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.

⇨ Colleen Kenny Town/City Clerk Signature	Colleen Kenny Print name legibly	Bridgewater Town/City	10/14/15 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.

MUNICIPAL SIGNATURES

11. 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.
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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 reviewed in the standard review time frame.

12. 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.

⇨ Patricia Tucker	Patricia Tucker	Ashland	10/15/15
Town/City Clerk Signature	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.

MUNICIPAL SIGNATURES

11. 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.

per Eversource CC sig. not required. DKeeley	Donna Keeley Print name legibly	10/15/15 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 reviewed in the standard review time frame.

12. 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.

Cynthia M. Torsey Town/City Clerk Signature	Cynthia M. Torsey Print name legibly	New Hampton Town/City	10/15/15 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;
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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.

MUNICIPAL SIGNATURES

11. 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

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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 reviewed in the standard review time frame.

12. 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.

⇨ Raymah W. Simpson	RAYMAH Simpson	Bristol	10-15-15
Town/City Clerk Signature	Print name legibly	Town/City	Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

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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.

MUNICIPAL SIGNATURES

11. CONSERVATION COMMISSION SIGNATURE

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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

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12. 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.

⇨ Desiree L Mahurin	Desiree L. Mahurin		
Town/~~City~~ Clerk Signature	Print name legibly	Town/City Hill	Date 10/16/15

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

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DIRECTIONS FOR APPLICANT:

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MUNICIPAL SIGNATURES

11. CONSERVATION COMMISSION SIGNATURE

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1. Waives its right to intervene per RSA 482-A:11;
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3. Has no objection to permitting the proposed work.

	Print name legibly	Date

DIRECTIONS FOR CONSERVATION COMMISSION

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12. 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.

Katie A. Gargano	Katie A. Gargano	Franklin	10/15/15
Town/City Clerk Signature	Print name legibly	Town/City	Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

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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.

MUNICIPAL SIGNATURES

11. 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

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12. 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. Received 4 Memorysticks CLC

Town/City Clerk Signature	Print name legibly	Town/City	Date
⇨ Cindy L. Caveney	Cindy L. Caveney	Northfield	10/15/2015

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

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MUNICIPAL SIGNATURES

11. CONSERVATION COMMISSION SIGNATURE

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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

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12. 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.

⇨ Town/City Clerk Signature	Print name legibly: Benjamin Bynum	Town/City: Canterbury	Date: 10/15/15

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.
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MUNICIPAL SIGNATURES

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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

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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 reviewed in the standard review time frame.

12. 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.

⇨ Janice Bonenfant Town/City Clerk Signature	Janice Bonenfant Print name legibly	Concord Town/City	Oct 16, 2015 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.
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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.

MUNICIPAL SIGNATURES

11. CONSERVATION COMMISSION SIGNATURE

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

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2. Believes that the application and submitted plans accurately represent the proposed project; and
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⇨	Print name legibly	Date

DIRECTIONS FOR CONSERVATION COMMISSION

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12. 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.

⇨ Town/City Clerk Signature	JAMES F. GOFF Print name legibly	PEMBROKE Town/City	10-15-15 Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

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MUNICIPAL SIGNATURES

11. CONSERVATION COMMISSION SIGNATURE

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

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2. Believes that the application and submitted plans accurately represent the proposed project; and
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⇨	Print name legibly	Date

DIRECTIONS FOR CONSERVATION COMMISSION

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12. 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.

⇨ Kathleen Rogers Town/City Clerk Signature	Kathleen Rogers Print name legibly	Allenstown Town/City	10/15/15 9:40AM Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

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MUNICIPAL SIGNATURES

11. CONSERVATION COMMISSION SIGNATURE

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2. Believes that the application and submitted plans accurately represent the proposed project; and
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⇨	Print name legibly	Date

DIRECTIONS FOR CONSERVATION COMMISSION

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12. 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.

⇨ Town/City Clerk Signature	Kevin T. Barry Print name legibly	Deerfield Town/City	10/15/15 Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

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MUNICIPAL SIGNATURES

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⇨	Print name legibly	Date

DIRECTIONS FOR CONSERVATION COMMISSION

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12. TOWN / CITY CLERK SIGNATURE

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⇨ Sharon E Walls	Sharon E. Walls	Raymond	10/15/15
Town/City Clerk Signature	Print name legibly	Town/City	Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

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⇨	Print name legibly	Date

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⇨ Barbara L Gagnon	Barbara L Gagnon	Chester	10-16-15
Town/City Clerk Signature	Print name legibly	Town/City	Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

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MUNICIPAL SIGNATURES

11. 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 reviewed in the standard review time frame.

12. 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.

⇨ Sharon A Farrell	Sharon A Farrell	Londonderry	10/15/2015
Town/City Clerk Signature	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.

Additional Detail for Sections 7, 8 and 10 on NH DES Wetlands Permit Application Form

1. Eversource Energy Service Corporation, as duly authorized agent for
   Northern Pass Transmission LLC
   Robert P. Clarke
   Director, Transmission Business Operationskevin
   780 North Commercial Street
   Manchester, NH 03101
   Tel: 781-441-8057
   Robert.Clarke@eversource.com

   By Robert P. Clarke, duly authorized

2. Eversource Energy Service Corporation, as duly authorized agent for
   Public Service Company of New Hampshire d/b/a Eversource Energy
   Kevin F. McCune
   Supervisor, Environmental Affairs Licensing and Permitting
   780 North Commercial Street
   Manchester, NH 03101
   Phone: 339-987-7020
   Kevin.mccune@eversource.com

   By Kevin F. McCune, duly authorized

4 Pre-Application Notes

A list and copy of the relevant pre-application correspondence and meeting minutes is included below.

In addition, as requested in Block 5 of the Wetlands Permit Application form (see above), a list of the related permits and other authorizations required on behalf of the Project is also included.

Federal Agencies

- United States Department of Energy ("USDOE") (authority over U.S.A.-Canada border crossing and environmental impact of Project);
- US Army Corps of Engineers ("USACE") (Clean Water Act, 33 U.S.C. § 1344 *et. seq.*, relative to wetland protection as addressed through the New Hampshire Programmatic General Permit);
- US Environmental Protection Agency ("USEPA") (Clean Water Act, 33 U.S.C. § 1251 *et. seq.*, relative to the National Pollutant Discharge Elimination System ("NPDES") Construction General Permit);
- United States Forest Service ("USFS") (authority over federally owned and managed land crossings);
- United States National Park Service (authority over Appalachian Trail crossing as delegated to the United States Forest Service);
- Federal Aviation Administration ("FAA") (14 C.F.R. § 77.9 relative to the preservation of navigable airspace, an air obstruction determination under FAA Regulation Part 77.9(b) is required);[2] and
- US Fish and Wildlife Service ("USFWS") Endangered Species Act (ESA) of 1973, 16 U.S.C. § 1531, *et. seq.*, relative to protection of federally-listed threatened and endangered species as addressed under the New Hampshire Programmatic General Permit).

[2] The Applicants will submit FAA Form 7460-1, Notice of Proposed Construction or Alteration, to the FAA at least 45 days before commencing construction.

State Agencies

- NH Department of Environmental Services ("NHDES"), Water Division, Wetlands Bureau (RSA Ch. 482-A, relative to dredge and fill in wetlands as addressed under the NHDES Wetlands Permit Application);
- NHDES, Water Division, Alteration of Terrain ("AoT") Bureau (RSA 485-A:17, relative to surface water runoff from land disturbance as addressed under the NHDES Alteration of Terrain Permit Application);
- NHDES, Water Division, Watershed Management Bureau (Clean Water Act, 33 U.S.C. § 1341 *et. seq.*, related to state certification that the Project will meet state water quality standards);
- NHDES, Water Division, Shoreland Program (RSA Ch. 483-B, the Shoreland Water Quality Protection Act, establishes standards for development adjacent to the state's public water bodies as addressed under the NHDES Shoreland Permit Application);
- NH Department of Transportation ("NHDOT") (RSA Ch. 236, 231 and 265 relative to regulation of the highway system, requires permits for utility crossings and use of NHDOT ROWs); and
- NH Public Utilities Commission ("NHPUC") (jurisdiction relative to crossings of public waters and lands under RSA 371:17 as addressed under the four NHPUC License Applications, and a Petition to Commence Business as a Public Utility under RSA 374:22).

Other State Agencies

- NH Division of Historical Resources ("NHDHR") (National Historic Preservation Act, 16 U.S.C. § 470 and RSA C. 227-C regarding cultural resource protection);[3]
- NH Natural Heritage Bureau ("NHNHB") (authority under RSA Ch. 217-A, the NH Native Plant Protection Act, to review impacts to state-listed rare, threatened, and endangered plant species as addressed under the NHDES Wetlands Permit Application);[4]

- NH Fish & Game Department ("NHF&G") (authority under RSA Ch. 212-A, the NH Endangered Species Conservation Act, to review impacts to state-listed rare, threatened, and endangered wildlife species as addressed under the NHDES Wetlands Permit Application); and
- NH Department of Safety, Division of Fire Safety, State Fire Marshal (RSA Ch. 21- P:12 relative to the responsibilities of the State Fire Marshal, ensuring compliance with the NH State Fire Code and the NH State Building Code through the review of plans prior to construction).[5]

Northern Pass Transmission Project

Summary of DES Agency Correspondence

Prepared For:
Northern Pass Transmission, LLC
780 North Commercial Street
Manchester, NH 03105

Submitted:
October 2015

Prepared By:
Normandeau Associates, Inc.
25 Nashua Road
Bedford, NH 03110
603.472.5191
www.normandeau.com

NORMANDEAU ASSOCIATES
Environmental Consultants

Table 1. Summary of DES Agency Correspondence. *Documents can be accessed via the Link column within the Table or through the Bookmark Pane.*

Link	Organization	Contact	Address/Meeting Type	Date	Project Attendees	Topics addressed include, but are not limited to, the following:
1	NHNHB	Melissa Coppola,	Meeting	6/18/2010	Adele Fiorillo, Susan Hegarty, Dan Sperduto	Proposed project surveys for state and federal rare, plants and exemplary natural communities.
2	NHDRED	Bill Carpenter	DRED 172 Pembroke Road, Concord, NH 03301	7/12/2010	Adele Fiorillo, Patrick McDermott	Project route, survey update, agency concerns,
3	NHF&G	Mike Marchand	e-mails	9/2/2010	Sarah Barnum	Comments regarding T&E Wildlife survey protocols, in particular lepidopterans, snakes, and New England cottontails.
4	NHF&G	Carol Henderson	e-mail	12/7/2010	Sarah Barnum	Wildlife study recommendations
5	NHF&G	Carol Henderson, Mike Marchand, Heidi Holman	NHF&G, 11 Hazen Drive, Concord, NH	3/9/2011	Sarah Barnum	Modeling and field survey for the ROW from Franklin south, specifically for Karner blue butterfly, eastern hognose snake, northern black racer, Blandigs, spotted and wood turtles.
6	NHF&G	Mike Marchand	e-mail	4/5/2011	Sarah Barnum	Snake and turtle survey recommendations: combine hognose and black racer surveys, Allenstown to Deerfield highest priority for surveys, April to May; identify important turtle nesting locations and egg shell collection.
7	NHF&G	Lindsey Webb	e-mail	1/25/2012	Lee Carbonneau	Approval of work plan for lynx and marten tracking.
8	NHF&G	Kent Gustafson	phone conversation	2/13/2012	Sarah Barnum	Deer Wintering Areas in NH, and survey guidance

Link	Organization	Contact	Address/Meeting Type	Date	Project Attendees	Topics addressed include, but are not limited to, the following:
9	NHF&G	Kristine Rines	phone conversation	2/23/2012	Sarah Barnum	Moose concentration areas in NH and survey guidance.
10	NHF&G	John Magee	NHF&G, 11 Hazen Drive, Concord, NH	2/24/2012	Adele Fiorillo, Drew Trested, Lee Carbonneau	Agency concerns regarding fisheries resources, including rare, threatened and endangered species, cold water fish, and Essential Fish Habitat.
11	NHF&G	Mike Marchand	meeting	3/6/2012	Lee Carbonneau, Adele Fiorillo, Don Mason (Normandeau)	Discussion of rare, threatened and endangered aquatic species.
12	NHF&G	Will Staats	phone conversation	3/23/2012	Sarah Barnum	Guidance on surveys for important mast areas, VT 2011 guidance, and best professional judgement.
13	NHF&G	Mike Marchand	phone conversation	4/3/2013	Sarah Barnum	Recommends focus on northern harrier, nesting raptors, and Bicknell's thrush. Habitat-based approach, surveys would demonstrate due diligence. Forest conversion analysis for general avial impacts.
14	NHDES	Collis Adams, Lori Sommer, Craig Rennie, Ridge Mauck, Gregg Comstock, Rene Pelletier, Darlene Forst, Tim Drew, Mike Wimsatt	NHDES 29 Hazen Drive, Concord, NH	9/4/2013	Derrick Bradstreet, Jake Tinus, Lee Carbonneau, Bob Varney, Barry Needleman, Dana Bisbee	Pre-application meeting: Provide impact assessment similar to recent PSNH projects; consider air quality effects; AoT and 401 WQ certificate information needs are similar; construction monitoring important; consult with municipalities for mitigation ideas; reach out to Local River Advisory committees; no shoreland tree counts;
15	NHF&G	Mike Marchand	NHDES 29 Hazen Drive, Concord, NH	9/4/2013	Derrick Bradstreet, Jake Tinus, Lee Carbonneau, Bob Varney, Barry Needleman, Dana Bisbee	Pre-application meeting

Link	Organization	Contact	Address/Meeting Type	Date	Project Attendees	Topics addressed include, but are not limited to, the following:
16	NHNHB	Melissa Coppola	NHDES 29 Hazen Drive, Concord, NH	9/4/2013	Derrick Bradstreet, Jake Tinus, Lee Carbonneau, Bob Varney, Barry Needleman, Dana Bisbee	Pre-application meeting, project overview
17	NHPUC	Michael Ladam	NHDES 29 Hazen Drive, Concord, NH	9/4/2013	Derrick Bradstreet, Jake Tinus, Lee Carbonneau, Bob Varney, Barry Needleman, Dana Bisbee	Pre-application meeting, project overview
18	NHDES - Alteration of Terrain	Ridge Mauck	NHDES 29 Hazen Drive, Concord, NH	12/18/2013	Lee Carbonneau, Jake Tinus, Derrick Bradstreet, Dana Bisbee	Pre-application Meeting: AC upgrade work not likely to require AOT review; waivers could be requested for hydrologic analyses, soil mapping, floodplain reports and other details in existing ROW. Application can focus on site developments, steep slopes. no aerial background on plans, standard BMPs and details called out.
19	NHF&G	Emily Preston	phone conversation	8/8/2014	Sarah Barnum	Discussed F&G perspective on protecting northern long-eared bats and eastern small-footed bats.
20	NH DES	Collis Adams, Lori Sommer, Rene Pelletier, Tim Drew	NHDES 29 Hazen Drive, Concord, NH	10/1/2014	Lee Carbonneau, Jake Tinus, Robert Young, Dana Bisbee, Laura Games	Pre-application meeting: Alternative to full stream crossing approach may be acceptable for culvert replacements, further discussion needed. Directed to avoid displaying RTE data on plans. Requested protocols for preventing spread of invasive species. Delineations over 5 years old allowable, but additional information requested. Mitigation suggestions.

Link	Organization	Contact	Address/Meeting Type	Date	Project Attendees	Topics addressed include, but are not limited to, the following:
21	NH DES Shoreland	Darlene Forst	NHDES 29 Hazen Drive, Concord, NH	10/1/2014	Lee Carbonneau, Jake Tinus, Robert Young, Dana Bisbee, Laura Games	Pre-application meeting: In existing ROW, NPT project would fall under the public utility clause that allows permitting by the Commissioner without waivers, and stem counts and other requirements do not apply. May need waivers in new ROW.
22	NH DES Watershed Bureau	Ridge Mauck, Gregg Comstock, Owen David	NHDES 29 Hazen Drive, Concord, NH	3/5/2015	Lee Carbonneau, Jake Tinus, Dana Bisbee	Project overview, design elements and AoT and 401 Water Quality permitting requirements for transition stations, substation expansions, converter terminal site, and transmission line. Waivers, pollutant loading, detention basins.
23	NHDES Shoreland	Darlene Forst	NHDES 29 Hazen Drive, Concord, NH	3/5/2015	Lee Carbonneau, Jake Tinus, Dana Bisbee	Project overview and permit application requirements; separate applications by waterbody and town.
24	NH DES Shoreland	Darlene Forst	emails	3/10/2015	Lee Carbonneau	Shoreland application questions; beaver ponds and deeds
25	NH DES Shoreland	Darlene Forst	NHDES 29 Hazen Drive, Concord, NH	3/20/2015	Lee Carbonneau	GIS review of unlisted waterbodies to include in shoreland applications
26	NH DES Shoreland	Darlene Forst	email	4/14/2015	Lee Carbonneau	Shoreland application questions; no abutter lists or lengthy project background or alternatives are required.
27	NHF&G	John Kanter	USFWS 70 Commercial St # 300, Concord, NH 03301	4/29/2015	Lee Carbonneau, Sarah Barnum, Jake Tinus, Dan Belin	Section 7 species discussion: Project should determine what percent of the main Karner blue butterfly population will be impacted; consider snakes in the minimization efforts. Federal process will meet state requirements for KBB and norhtern long-eared bat.

Link	Organization	Contact	Address/Meeting Type	Date	Project Attendees	Topics addressed include, but are not limited to, the following:
28	NHDES Shoreland	Darlene Forst	email	5/30/2015	Lee Carbonneau	Shoreland application questions: tax maps required, no abutter lists
29	NHDES Wetlands Bureau	Lori Sommer	phone conversation	6/12/2015	Lee Carbonneau	Mitigation: Outreach to towns with > 10,000 sf of mitigatable impacts is acceptable; local culvert projects need some watershed context.
30	NHNHB	Amy Lamb, Sabrina Stanwood	DRED 172 Pembroke Road Concord, NH 03301	6/15/2015	Lee Carbonneau, Susan Hegarty, Dennis Magee, Jake Tinus	RTE plant impacts, avoidance, minimization and mitigation
31	NHDES - Shoreland	Craig Day	email	6/24/2015	Lee Carbonneau	Waiver can be requested from RSA 483-B:9V.(g) for stormwater plans on permit applications that just barely exceed the 20-30% threshhold because the river runs parallel to an existing road.
32	NHDES AOT 401WQ	Ridge Mauck, Gregg Comstock	NHDES 29 Hazen Drive, Concord, NH	7/2/2015	Lee Carbonneau, Brian Sakidovich, Dana Bisbee, Katie Baragar	Pollutant loading analysis and other permit related details.
33	NHF&G	Heidi Holman	NH National Guard Grounds, Concord, NH	7/15/2015	Sarah Barnum, Susan Hegarty, Lee Carbonneau	Training in ID and survey for Karner Blue Butterfly eggs for NPT surveys in Concord and Pembroke
34	NHDES	Lori Sommer, Tim Drew	NHDES 29 Hazen Drive, Concord, NH	7/15/2015	Lee Carbonneau, Jake Tinus, Dana Bisbee	Compensatory Mitigation Meeting: DES and EPA agreed that for secondary impact assessment, stream buffers of 100 ft for perennial streams, 50 ft for intermittent streams, and 25 ft for ephemeral streams is acceptable and consistent with their approach on other projects.
35	NHF&G	Mike Marchand	NHDES 29 Hazen Drive, Concord, NH	7/15/2015	Lee Carbonneau, Jake Tinus, Dana Bisbee	Compensatory Mitigation Meeting: NHF&G will review avoidance and minimization table to help NHF&G make informed recommendations

Link	Organization	Contact	Address/Meeting Type	Date	Project Attendees	Topics addressed include, but are not limited to, the following:
36	NHNHB	Amy Lamb	NHDES 29 Hazen Drive, Concord, NH	7/15/2015	Lee Carbonneau, Jake Tinus, Dana Bisbee	Compensatory Mitigation Meeting: RTE species survey results/plans reviewed
37	NH DES Shoreland	Darlene Forst	email summary of phone conversation	8/18/2015	Lee Carbonneau	Shoreland application questions; deeds for Road ROW not necessary, but a document indicating the projects position on the right to construct in road ROW should be included.
38	NHDES - Wetlands	Collis Adams	e-mail	8/24/2015	Lee Carbonneau	Answers to application questions: Include only wetland photos representative of all types of permanently impacted wetland resources, but request waiver. Include tax maps, abutter lists, and notify abutters for work outside of the ROW.
39	NHF&G	Glenn Normandeau, Carol Henderson, Mark Ellingwood, Evan Mulholland, Heidi Holmann, John Magee, Will Staats, Mike Marchand, John Kanter, Kim Tuttle, Jillian Kilborn	NHF&G, 11 Hazen Drive, Concord, NH	9/3/2015	Lee Carbonneau, Sarah Barnum, Dana Bisbee, Jake Tinus	Pre-application meeting to discuss the draft wildlife report impact results and potential mitigation options, and additional information that would help their review.
40	NHNHB	Amy Lamb	Letter	9/4/2015	Lee Carbonneau	NHB requested clarification regarding the new route and potential impacts to listed plants in the WMNF and AC support area; requested submittal of all new survey results; and requested a meeting.

Link	Organization	Contact	Address/Meeting Type	Date	Project Attendees	Topics addressed include, but are not limited to, the following:
41	NHNHB	Amy Lamb	comments	9/4/2015	Lee Carbonneau	NHB provided comments on the proposed RTE Plant Impact Avoidance and Minimization measures proposed by NPT.
42	NHDES	Lori Sommer, Tim Drew, Collis Adams	NHDES 29 Hazen Drive, Concord, NH	9/10/2015	Lee Carbonneau, Jake Tinus, Dana Bisbee	Pre-application meeting to discuss mitigation, including the new UG route, impact numbers, status of the mitigation parcel easement holder discussions, NHDES Preliminary Mitigation Agreement Form, and submittal of the form and as much relevant information as we have with our applications.
43	NHDES Shoreland	Darlene Forst	phone conversation	9/14/2015	Lee Carbonneau	Call to discuss the need for waivers - Darlene said that we should not request waivers, instead include narrative referencing "IV-b. Public utility lines ...shall be permitted by the commissioner as necessary and consistent with the purposes of this chapter and other state law" and state efforts to comply.
44	NHNHB	Amy Lamb, Sara Cairns	NHDES 29 Hazen Drive, Concord, NH	10/1/2015	Lee Carbonneau, Jake Tinus, Dennis Magee, Susan Hegarty	Project route change (new underground) and RTE plant species survey/impact update; avoidance and minimization; locational info on plan sets.

Memorandum

To: Melissa Coppola, NH Natural Heritage Bureau (NHNHB)
Susi von Oettingen, US Fish and Wildlife Service (USFWS)
Sarah Barnum, PhD (Normandeau RTE Wildlife Team Lead)
Curt Thalken (Normandeau SEC Team Manager)
Mark Hutchins (Normandeau EIS Team Manager)

From: Adele Fiorillo and Susan Hegarty, Normandeau Associates, Inc. (Normandeau)

Date: 7/1/2010

Re: Summary of June 18, 2010 meeting to discuss rare plant survey methodology
Northern Pass Transmission Line Project
Franklin to Northumberland, NH

Points discussed during our June 18, 2010 meeting are summarized below.

Meeting Summary:

Attendees:
Melissa Coppola, NHNHB
Susi von Oettingen, USFWS
Adele Fiorillo, Normandeau
Susan Hegarty, Normandeau
Daniel Sperduto, Normandeau

- There are no federally-listed rare plant species of concern within the existing corridor project area between Franklin and Northumberland. Depending on the wildlife species listed for the project, other USFWS personnel may be contacted (Tony Turr). Specific wildlife species of concern include:
    - Dwarf Wedge Mussel would be a concern west of the Franklin to Northumberland corridor.
    - Even though the Brook Floater is not federally-listed, it is on the Federal watch list. Therefore in areas where this state-listed species occurs, USFWS would want to know how it could be potentially impacted.
    - The Long-eared Bat (of primary concern) may use large trees near the edge of the corridor as roost sites and the Small-footed Bat (of secondary concern) may use talus slope habitat. In areas where there would be cutting of large trees, time of year restrictions might be imposed for cutting to avoid impacts to these bat species.

- Scrub-shrub habitat should be mapped to identify potential habitat for the New England cottontail within its current extant range. Tony Turr of the USFWS may be contacted regarding the cottontail. Hooksett contains the northern-most population of cottontail; other populations are found to the east and south.

- Normandeau will provide copies of existing and proposed transmission line maps to NHNHB and USFWS as soon as they are available.

- The rare plant survey this season will focus on the existing transmission corridor between Franklin and Northumberland.

- Small Whorled Pogonia is not a concern in the Franklin to Northumberland project area. However, in some areas south and east of Franklin, there is potential for Small Whorled Pogonia to occur. As the study moves forward and begins to evaluate locations with potential habitat for Small Whorled Pogonia, the specific habitat/soil types for this species will need to be identified.

- For each additional area of the project (which will be evaluated in subsequent phases), Normandeau will review available rare species data, soil and bedrock types, mapped habitat types, and the habitat/growth requirements of the nearby rare species and communities to prioritize areas that should be surveyed. Normandeau will provide NHNHB and USFWS (if the area contains habitat for federally-listed species) with a table and maps showing proposed survey priorities and search locations (using similar methods and format presented for the Franklin to Northumberland project area).

- The need to consider plants in areas immediately adjacent to the transmission corridor to provide for a buffer was stressed. The amount of buffer needed to provide protection to a plant population (and therefore the distance from the edge of the corridor that should be searched) will depend on the species. Normandeau does not currently have permission to search in areas outside of the existing corridor.

- It was questioned whether herbicide is used in the corridor. Normandeau will research the availability of a vegetation management plan and policy on the use of herbicides.

- The need to survey proposed construction access roads was discussed. The locations of the access roads are still to be determined. However, once these locations are known and property owner permission is obtained, these areas will be evaluated in a similar manner as the Franklin to Northumberland corridor stretch to determine survey needs.

- The NHNHB rare species data for the Northern Pass Transmission Line site includes several state-listed species that are classified as “sensitive”. NHNHB will provide Normandeau with a list of these species early next week. Normandeau’s maps, which show rare species populations, and the list of sensitive species shall not be made available to the public or be included in any documents available to the public.

- The project has a Resource Evaluation Team (RET), a Site Evaluation Committee (SEC) team and an Environmental Impact Statement (EIS) team. The

recommendations for impact avoidance, minimization and mitigation would be included in both the SEC and the EIS tasks. An organizational chart showing the division of responsibilities will be provided.

- NHNHB requested that the botanists performing the survey provide recommendations regarding measures to avoid, minimize, and mitigate potential impacts. The botanists who have seen the plants in the field should be the ones formulating the recommendations.

- Normandeau's *Proposed Methodology for Survey of Rare Plant Species and Exemplary Natural Communities* (dated June 15, 2010) states that Pickering's Bluejoint (*Calamagrostis pickeringii*) is no longer state-listed and therefore would not be surveyed. NHNHB considers this a watch species and believes that it should still be surveyed. Goldie's Fern (*Dryopteris goldiana*) and Squirrel Corn (*Dicentra canadensis*) have also been delisted (or are in the process of being delisted) but NHNHB wants it to be surveyed, where appropriate.

- Rare species populations will be flagged in the field and located using GPS. NHNHB recommended that flagging be left in place except for sensitive species. No flagging shall be used for sensitive species.

- Normandeau's Proposed Survey Areas map sheets were reviewed. Both NHNHB and USFWS indicated that they accept the survey methodology. NHNHB indicated its concurrence to exclude areas identified on the basis of calcium-rich bedrock if those areas are overlain with deep sand and gravel surface deposits.

- The methods will need to be modified appropriately for proposed new or expanded sections of powerline corridor when Normandeau receives corresponding final locations and necessary permissions for these sections from Northern Pass.

- Following NHNHB recommendations, the following additional search areas were added for the existing ROW:
    - In Lancaster, a segment located between Wesson Road and the border to Whitefield.
    - In Whitefield, a wetland area located between Lancaster Road and Jefferson Road.
    - All known populations of Pickering's Bluejoint located within the corridor, and areas of the corridor located in the vicinity of populations mapped outside of the corridor.
    - Any sensitive plant population mapped within the corridor and areas of the corridor located in the vicinity of sensitive plant populations mapped outside of the corridor.

- The northernmost survey area (in Northumberland) is located in Cape Horn State Forest. The Nature Conservancy is in the process of purchasing Potter Farm, also located in the vicinity. NHNHB recommended that Normandeau contact Brad Simpkins from NH Division of Forests and Lands (DRED) to inform him of Normandeau's survey work in the Cape Horn State Forest.

- If Normandeau delineates a rare plant occurrence within the corridor, NHNHB indicated that mowing/cutting should be performed after the growing season.
- NHNHB will check the records for Jack Pine and any other species that might apply to the project area that are in the backlog of element occurrences that need to be added to the database.
- A revised methodology that incorporates comments of the meeting will be provided.

Memorandum

To: Bill Carpenter, Department of Resources and Economic Development (DRED)
Patrick McDermott, Public Service of New Hampshire (PSNH)
Jeff Simmons, Normandeau Associates, Inc. (Normandeau)

From: Adele Fiorillo, Normandeau

Date: 7/12/2010

Re: Summary of July 7, 2010 meeting to discuss resource evaluation team (RET) work
Northern Pass Transmission Line Project

Points discussed during our July 7, 2010 meeting are summarized below.

Meeting Summary:

Attendees:
Adele Fiorillo, Normandeau
Bill Carpenter, DRED
Patrick McDermott, PSNH

- DRED was previously included in preliminary meetings on the Northern Pass Transmission Line project (NPT project).

- An update on the status of the NPT project was provided:

  The NPT project goal is to have a preliminary route selection completed Summer 2010. Various routing studies are ongoing. The use of existing Right of Ways (ROW's), where feasible, is generally preferred by NPT. Existing ROW's appear to be wide enough to site the NPT line in most areas, but there are some sections where the ROW may need to be widened. Hydro Quebec is working on entrance points from Canada into New Hampshire.

- DRED has very accurate and up to date surveys on land holdings which may be helpful and can provide these data to Normandeau. Ron Duddy , the DRED surveyor, has electronic maps and can provide any survey plans. The Granit database has good property boundary lines

- Normandeau explained the current focus of Resource Evaluation Team (RET) work (Lost Nation to Deerfield) along existing ROW's and showed the existing ROW with an overlay of state and federal lands. The work of the RET along the existing ROW includes wetland resource identification and delineation

(State and Army Corps Jurisdiction), rare/threatened and endangered species reviews and Phase 1A archeological review (walk over and photo documentation). Flagging tape is used to demarcate features.

- Concerns of DRED are:

  The area between Lost Nation and Canada includes significant land blocks and high priority areas for wildlife habitat. Any proposed new corridors in this area will need to be evaluated carefully.

  Flagging is used in timber operations and since the RET uses flagging also, conflicts may arise. It was agreed that Normandeau will call Bill prior to conducting field work on DRED property. Bill provided his contact information.

- Action Items:

  The DRED Land Management Team has a committee meeting scheduled for July 13, 2010 and Bill will inform the committee of the project status.

  The NPT project team will set up meetings with stakeholder groups once routing alternatives and potential new ROW's are identified.

  Cc: Victoria Bunker
  Curt Thalken
  Mark Hutchins
  Robert Varney

From: Marchand, Michael
To: Sarah Barnum
Subject: RE: NP Field work
Date: Monday, June 20, 2011 3:29:24 PM
Thanks. Good data being collected from all our sites including Allenstown....if only they were 'sending' it to us though... The study should lead to good recommendations for management down the road.
Mike

From: Sarah Barnum [mailto:sbarnum@normandeau.com]
Sent: Monday, June 20, 2011 3:17 PM
To: Marchand, Michael
Subject: RE: NP Field work

Hi Mike,
In May we survey about 90% of the line from BearBrook to the Deerfield substation, just one walk through of each section of line. No more racers…in fact, not too many snakes in general, but a nice selection of species – garter, ribbon, water and ring-necked. Also, Dan Sperduto saw a smooth green snake in the Concord portion of the line while he was doing lupine surveys last week.
I've been swamped with report writing for the last few weeks, but will get back in the field for some turtle/nesting habitat suitability surveys the first week of July, and then write up all my Northern Pass findings to date.
Are the snake you caught in Bearbrook sending you good data?
Sarah

From: Marchand, Michael [mailto:Michael.Marchand@wildlife.nh.gov]
Sent: Monday, June 20, 2011 3:08 PM
To: Sarah Barnum
Subject: RE: NP Field work

Hi Sarah. Just curious if you have been able to do any snake surveys?
Mike

From: Sarah Barnum [mailto:sbarnum@normandeau.com]
Sent: Thursday, April 07, 2011 1:54 PM
To: Marchand, Michael
Cc: Adele Fiorillo; Henderson, Carol
Subject: RE: NP Field work

Hi Mike,
Thank-you for this summary of our phone conversation. I will update my work plan to reflect your recommendations regarding the targets and locations of the snake survey, as well as field effort to verify turtle habitat model predictions.
I will meet you in Allenstown on the 15th, weather permitting – just let me know where. Cross your fingers for good weather,
Sarah

From: Marchand, Michael [mailto:Michael.Marchand@wildlife.nh.gov]
Sent: Tuesday, April 05, 2011 3:52 PM
To: Sarah Barnum
Cc: Adele Fiorillo; Henderson, Carol
Subject: RE: NP Field work

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All of the above only applies to existing ROW as I understand you don't have permission to survey new lines.
-Mike

From: Sarah Barnum [mailto:sbarnum@normandeau.com]
Sent: Tuesday, March 22, 2011 2:48 PM
To: Marchand, Michael
Cc: Adele Fiorillo
Subject: NP Field work

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and we do not have the resources to search the whole ROW intensively. Avoidance and mitigation is likely to be a more cost-effective approach for the project, and that approach can hopefully be informed and refined by the results of your radio transmitter survey.

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25 Nashua Road
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sbarnum@normandeau.com
Please consider the environment before printing this e-mail

From

From: Henderson, Carol [mailto:Carol.Henderson@wildlife.nh.gov]
Sent: Tuesday, December 07, 2010 3:33 PM
To: Sarah Barnum
Subject: RE: Northern Pass

Hi Sarah:

As you know, a number of staff members met at HQ for a meeting on the Northern Pass project, including the biologists from the Region 1 office. Both Will and Jill have been hearing a lot about this project in the North country, more specifically the development of the new transmission line from Canada into NH, where there presently is not an existing line. Obviously, they are very concerned about the impacts this new line will have in the North Country. In addition, fisheries staff are concerned about the cutting of the trees for the lines over streams, as well as the potential impacts of stream crossings. I have included their recommendations, as well. Discussion at the meeting involved a number of questions regarding the project, which should probably be addressed by the planners of the project rather than yourself. It may be beneficial to have a presentation of the project sometime in the near future for Department staff, so some of the questions regarding the corridor could be answered.

Thank you, Carol Henderson

The following are wildlife study recommendations:

General Wildlife Issues:

Identify:
- Osprey (locations and habitat)
- Harrier (locations and habitat)
- Marten (locations and habitat)
- Lynx (locations and habitat)
- Deer yards
  - Utilize existing deeryard maps for Coos County
  - (deer yard model for the rest of the state, or where no GIS layer is available?)
- Moose concentration areas
- Important mast areas (beech and oak)
- Low elevation spruce/fir (other than deer yards) – tracking for marten and lynx
  - Utilize USFS and Maine protocols
- Important travel corridors—use to help inform decision making for wildlife crossings

Potential Survey Needs:
- Directed surveys for marten lynx moose concentration areas and deer yards
  - Methods: track transects
    - Potential expanded work on marten locations and densities to supplement current research
- Ground truth/verify mast areas and deer yards

General Stream Issues:

Reduce impacts to streams by:
1) Riparian vegetation

a. water temperature: Provide conditions that completely shade the stream
b. water quality: don't use herbicides
2) Stream crossings
a. Minimize the number of new crossings, where possible utilize existing crossings.
b. Of all types of crossings, bridges have the least impacts to sediment transport and fish passage. Ensure that runoff from the road (both water and sediment) do not flow directly into the stream. There must be adequate 'treatment' (i.e., flow through vegetation) before flow enters a stream.

Additional information that would be helpful to inform Stakeholders relative to streams that may be impacted:

3) The drainage area at each crossing. This can be estimated various ways, including by StreamStats (USGS)
4) Determination of the nature of flow (whether perennial or intermittent) and a description of the information used in this conclusion.
5) Determination of the type of stream at each crossing (Rosgen classification, thermal regime [this can only be done in summer], and existing riparian vegetation condition [species, whether upland or wetland, DBH, general stand characteristics such as stems/acre])
6) Fish surveys at each proposed stream crossing.

From: Sarah Barnum [mailto:sbarnum@normandeau.com]
Sent: Monday, December 06, 2010 1:54 PM
To: Henderson, Carol
Cc: Adele Fiorillo
Subject: Northern Pass

Hi Carol,

Just checking to see when the summary of tasks to support wildlife-related permitting for Northern pass project will be available. The client would like to start the decision making process for some the alternatives. The feasibility of, and amount of effort required to, permitting wildlife impacts is one of the prime considerations, so there is a lot of interest in NHFG's recommendations. So I get the task of pestering you.

Sarah

Sarah A. Barnum, Ph.D.
Senior Wildlife Ecologist
Normandeau Associates, Inc.

25 Nashua Road
Bedford, NH 03110
603.637.1157 - direct line
603.472.5191 - general
sbarnum@normandeau.com

From: Marchand, Michael
To: Sarah Barnum
Subject: RE: NP Field work
Date: Monday, June 20, 2011 3:29:24 PM

Thanks. Good data being collected from all our sites including Allenstown....if only they were 'sending' it to us though... The study should lead to good recommendations for management down the road.

Mike

From: Sarah Barnum [mailto:sbarnum@normandeau.com]
Sent: Monday, June 20, 2011 3:17 PM
To: Marchand, Michael
Subject: RE: NP Field work

Hi Mike,

In May we survey about 90% of the line from BearBrook to the Deerfield substation, just one walk through of each section of line. No more racers...in fact, not too many snakes in general, but a nice selection of species – garter, ribbon, water and ring-necked. Also, Dan Sperduto saw a smooth green snake in the Concord portion of the line while he was doing lupine surveys last week.

I've been swamped with report writing for the last few weeks, but will get back in the field for some turtle/nesting habitat suitability surveys the first week of July, and then write up all my Northern Pass findings to date.

Are the snake you caught in Bearbrook sending you good data?

Sarah

From: Marchand, Michael [mailto:Michael.Marchand@wildlife.nh.gov]
Sent: Monday, June 20, 2011 3:08 PM
To: Sarah Barnum
Subject: RE: NP Field work

Hi Sarah. Just curious if you have been able to do any snake surveys?

Mike

From: Sarah Barnum [mailto:sbarnum@normandeau.com]
Sent: Thursday, April 07, 2011 1:54 PM
To: Marchand, Michael
Cc: Adele Fiorillo; Henderson, Carol
Subject: RE: NP Field work

Hi Mike,

Thank-you for this summary of our phone conversation. I will update my work plan to reflect your recommendations regarding the targets and locations of the snake survey, as well as field effort to

verify turtle habitat model predictions.

I will meet you in Allenstown on the 15th, weather permitting – just let me know where. Cross your fingers for good weather,

Sarah

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NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

MEMO

To: **Adele Fiorillo**
From: **Sarah Barnum**
Re: **NHFG Meeting March 9, 2011 Summary**
Date: **March 22, 2011**

I met with personnel from NHFG on March 9, 2011 to discuss next steps for wildlife species of concern in the portion of NP ROW from Franklin south. Meeting attendees included myself, Carol Henderson (permitting specialist, my primary point of contact with NHFG), Heidi Holman (lepidopterans), and Mike Marchand (herps, permitting). The primary topics of discussion are summarized below, and a proposed Level of Effort to conduct the recommended field work is attached.

Karner Blue Butterfly (FE, SE), Frosted Elfin (SE): These two species are closely linked to pine barrens type habitats where their exclusive host plant, wild lupines, grow and are known to be present in the existing section of ROW in the Towns of Concord and Pembroke. If rare plant surveys identify any other locations within the ROW where wild lupines are present, these sites should be evaluated for other habitat suitability characteristic (e.g., canopy density). Highly suitable sites should be surveyed for Karners and elfins during the appropriate flight period (Karners = late may-late June, mid July – mid August; elfins late April – early June).

Heidi and Carol agreed that a meeting with USFWS (Mike Ameral) is desirable to 1) confirm the suitability of the approach described above; and 2) discuss federal permitting requirements. This meeting would included Heidi, Mike A., myself, and Mike M., if he is available. The permitting discussion would focus on the section of ROW where Karners are currently known to be present, to determine if federal permitting requirements (Section 7 consultation under the Federal ESA) could be sufficiently onerous to force the project to use an alternative route. Currently, the NP preferred route does not follow the existing ROW in the Concord/Pembroke area (to meet FAA concerns), so this might be moot point, but it's worth understanding the ramifications that federal T&E concerns could have on the project.

The proposed preferred route around Concord/Pembroke contains no New Hampshire Wildlife Action Plan (NHWAP)-mapped pine barrens habitat. However, the NHWAP habitat mapping has not been ground-truthed and may present an incomplete picture of conditions on the ground. If access to the preferred route is granted in the future, rare plant surveys of this route would be used as the basis to identify any potential habitat for these species, using the protocol described above.

Eastern Hog-nosed Snake (SE): This species is known be present in the Concord/Pembroke section of the existing ROW. This is the northernmost extent of its range in NH. This population is the largest known population of this species in the state and is currently being studied with radio transmitters. According to Mike M., the individual snakes being followed use the ROW as their primary habitat. Because this species appears to be so tightly linked to the habitats created by the ROW, locations in the ROW with similar habitat features south of Concord should be surveyed for hog-nosed snakes early in their active season (April, early May). Because of this species' apparent limited distribution, sufficient effort can reasonably be allocated to this limited area to create reliable results.

Based on soils similarity, a roughly one mile-long stretch of the ROW in Allenstown appears to be the only other area in the ROW highly likely to provided suitable habitat for hog-nosed snakes. See attached work plan for a recommended level of effort and associated cost.

Northern Black Racer (ST): This species likely is present in low densities throughout the eastern part of NH, south of the Lakes Region. An on-going radio transmitter study of this species in the Concord area shows that they use a wide variety of habitats, especially in and around areas of open canopy. No transmittered animals have been observed in the existing ROW to date, but the study is in its initial stages. Because this species is flexible in its habitat use, the presence of open canopy habitats suitable for basking and egg laying likely raises the quality of all adjacent habitats. The ROW from the Lakes Region south should be assumed to provide habitat for this species, and should probably be assumed to be occupied.

The utility of conducting limited surveys across the entire ROW south of Franklin to confirm presence/absence of this species is questionable – just because we don't see them one day, doesn't mean they might not be there at some other point during the summer. In my professional opinion, a more reasonable approach would be to: 1) use the results of the transmitter study to create a model of habitat use; 2) analyze the habitats in and around the ROW to identify the areas most likely to be occupied; and 3) either follow up with surveys in those locations or assume occupancy in those locations and adopt avoidance and mitigation measures during construction to limit impacts. The results of the current study will not be available for at least two more years, so this approach needs to be weighed against the anticipated construction schedule.

Blanding's Turtle (SE): This species uses permanent, shallow wetlands with emergent vegetation and also vernal pools in spring, where it may overwinter. Blanding's turtle travels widely among wetlands, making extensive use of terrestrial habitats for travel, as well as for nesting. Blanding's turtles are known to use variety of open habitats for nesting, including power line ROWs.

Spotted Turtle (ST): This species uses clean, shallow, slow moving bodies of water with muddy or mucky bottoms and some aquatic and emergent vegetation. It commonly uses vernal pools in spring, and may overwinter in these features, and often nests in fields. However, any location with dry, loose soils and good exposure to the sun may provide nesting habitat, including power line ROWs.

Wood Turtle – This species is listed as Species of Special Concern, and is a NHWAP Species in Greatest Need of Conservation. Wood turtles commonly use slow-moving streams and channels with sandy bottoms, and overwinter in these types of features. Terrestrial as well as wetland habitats are used extensively during summer, including floodplains, meadows, woodlands, and fields. Eggs are laid in shallow depressions in sandy, well-drained soils. Nest sites are usually near streams but may also be in clearings, agricultural fields, or other disturbed areas, including power line ROWs.

Turtle Summary: In general, any open area with loose, relatively dry soils located within 1,000 m of a suitable water body is likely to be used for travel and nesting by turtles to some extent. The closer the water body and suitable nesting habitat are, the more likely the upland area between is to be used. Because NH hosts a vast number of wetlands and water bodies, the entire ROW likely has some probability of being used by turtles. As with the black racers above, I recommend using a GIS-based model to look at habitat suitability, and based on the results, adopt avoidance and mitigation measures

to limit impacts. In locations identified as highly likely to be used for travel or nesting, construction should be avoided during the active season, or proceed only the after the area has been cleared.

The GIS-based model can be developed with existing information, and an appropriate ground truthing effort. Locations with suitable ponds, wetlands, and sandy soils in close proximity would be identified as the areas with the highest potential for use. This potential would be modulated by the type of vegetation in the ROW. Dense woody vegetation (shrubs) creates shady conditions and root mats that reduce suitability for nesting. Locations dominated by herbaceous plants and grasses, with only scattered shrubs, especially if interspersed with open, unvegetated patches would provide the best nesting habitat. Aerial photos may provide sufficient detail to assess the vegetation present in the ROW; some ground-truthing would be required to determine if aerial photo interpretation could be used to assess this aspect of the habitat.

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Please consider the environment before printing this e-mail.

From: Lee Carbonneau
To: "Webb, Lindsay"
Subject: RE: Winter Tracking for the Northern Pass Project
Date: Wednesday, January 25, 2012 8:13:40 AM

Thank you, Lindsey. Although Tony did not mention collection of lynx scat, we would certainly collect that if we are fortunate enough to encounter some!
Lee

From: Webb, Lindsay [mailto:Lindsay.Webb@wildlife.nh.gov]
Sent: Wednesday, January 25, 2012 7:44 AM
To: Lee Carbonneau; Kanter, John
Cc: Sarah Barnum
Subject: RE: Winter Tracking for the Northern Pass Project

Lee,

Thanks for sending the summary of your tracking protocol. It looks good and sounds very similar to other tracking efforts being conducting in Northern NH for lynx and marten. In addition to hair samples, did Tony also suggest that a portion of scat be picked up?

Please let me know if you have any other questions or if you need any assistance in getting samples down to USFWS.

Thanks,
Lindsay

Lindsay Webb
Wildlife Diversity Biologist
New Hampshire Fish and Game
Nongame and Endangered Wildlife Program
11 Hazen Drive
Concord, NH 03301
Phone: 603-271-2605
lindsay.webb@wildlife.nh.gov
www.wildnh.com

From: Lee Carbonneau [mailto:lcarbonneau@normandeau.com]
Sent: Monday, January 23, 2012 10:14 AM
To: Webb, Lindsay; Kanter, John
Cc: Sarah Barnum
Subject: Winter Tracking for the Northern Pass Project

Hi Lindsay and John –
In a December 7, 2010 e-mail, the New Hampshire Fish and Game Department (NHFG) recommended that snow tracking surveys for American marten (ST) and Canada lynx (FT, SE) be conducted within the proposed Northern Pass project area in areas of spruce/fir forest. To address this recommendation, a protocol was developed to conduct snow tracking surveys in the winter of

2011 south of the Lost Nation Substation. The survey last winter found Canada lynx tracks in Whitefield, and American marten tracks in Whitefield and Lancaster. Sarah Barnum and I just wanted to follow up with you regarding Normandeau's 2012 winter tracking effort for the Northern Pass Transmission Line along potential routes under consideration north of the Lost Nation Substation. The protocol described below is the one employed in 2011, and discussed with you by phone, with a few minor modifications that address specific requests from Tony Tur at the USFWS regarding lynx hair samples and habitat descriptions:

In summary, the tracking protocol will follow the following guidelines:

- All sites/transects chosen for tracking will be visited three times over the course of the tracking period;
- The tracking period will begin in early January, or as soon as suitable snow conditions are available, and end March 31, 2011;
- Tracking will be conducted a minimum of 24 hours after a snow/wind event that creates suitable tracking conditions;
- Transect length will be dictated by the amount of suitable habitat present, and safe and reasonable access;
- Locations of Canada lynx and marten tracks will be collected by GPS. Additional data will be collected at each track - date, direction of travel, snow conditions, cover type;
- Information regarding large woody debris and vegetation structure will be recorded;
- Hair samples will be collected if observed, and given to USFWS for DNA analysis; and
- Trails will not be backtracked or followed.

Please let me know if this meets your expectations.
Thanks!
Lee

Lee E. Carbonneau
Principal Scientist
Normandeau Associates, Inc.
25 Nashua Road
Bedford, NH 03110
www.Normandeau.com
Office: (603) 472-5191 Direct: (603) 637-1150 Cell: (603) 714-3084

Please consider the environment before printing

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Phone Log

Date: February 13, 2012
Participants: Sarah Barnum, calling Kent Gustafson
Subject: Survey for Deer Wintering Areas in the NP Project Area

Sarah posed four questions to Kent, the questions and answers are summarized below.

1. Question: Does NHFG consider the sign left on vegetation by a history of winter browsing sufficient evidence to indicate that an area is used as a DWA?

Answer: Yes

2. Question: Does NHFG ever use aerial surveys to identify DWAs?

Answer: No, Kent was unfamiliar with this approach to ID DWAs and indicated that the dense canopy that usually occurs in NH's DWAs would likely make it difficult to see deer from the air.

3. Question: Are deer currently yarding in NH?

Answer: Yarding conditions likely do not currently exist south of the White Mountains. Deer may be yarding up north, any place there is 12-15 inches of snow. There is a lot of winter feeding in DWAs by citizens up north too, deer may move to DWAs just for the food, regardless of snow conditions.

4. Questions: Who would be the best contact(s) for info about DWA locations in the unmapped towns?

Answer: The district biologists

Phone Log

Date: February 23, 2012
Participants: Kristine Rines, returning Sarah Barnum's call
Subject: Survey for Moose Concentration Areas in the NP Project Area

Sarah and Kristine had a discussion, which answered the five questions summarized below.

1. Question: Are moose concentration areas (MCAs) analogous to deer wintering areas?

Answer: Yes

2. Question: What are the defining characteristics of an MCA?

Answer: Moose use a variety of locations as MCAs, characteristics of MCAs vary according to what is available in the area. There is not a generally accepted definition of an MCA. MCAs are usually located in an area of soft wood cover with low growing hardwoods intermixed or adjacent. These areas may be at different elevations and exposures.

3. Question: Is it possible to use elevation as an indicator for MCAs?

Answer: No. Moose may use the higher elevations as they are available, but some MCAs are at lower elevations.

4. Question: Is vegetation scarring an acceptable way of identifying MCAs?

Answer: Yes. Locations which show vegetation scarring due to repeated winter browsing (e.g., "broomed" hobble bush, heavy barking of striped maple) can be considered MCAs.

5. Questions: Are MCAs restricted to the northern part of the state?

Answer: No, moose use MCAs in the southern part of the state in locations where snow gets deep, but moose densities are lower, so these areas may be less apparent.

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www.normandeau.com

Northern Pass Transmission Project
Meeting With NH F&G to Discuss Fisheries
February 24, 2012

Distribution: John Magee, NHFG
Carol Henderson, NHFG
Brian Bosse, Northern Pass
File

1. Project Description:
   a. Transmission line from US/Canada Border to Deerfield, NH with converter terminal in Franklin.
   b. Proposed route from Northumberland south to Deerfield is within existing/cleared right of way with some existing/partially cleared right of way.
   c. Proposed route from Northumberland north to the US/Canada Border is yet to be determined, and may be new/uncleared right of way.

2. Specific NH F&G Concerns re: addressing project impacts
   a. Temperature Changes
   b. Culvert Crossings (most will be temporary for construction)
   c. Vegetation Management
   d. Revegetation potential (native species such as Alder)
   e. Restricted/no Herbicide Use
   f. BMP's for construction (refer to Forestry/ROW Maintenance and DOT BMP's)

3. RTE/EFH
   a. RTE: Bridle shiner – Soucook and Suncook Rivers (possibly upstream of the dam on the Pemigewasset)
   b. NH Species of Conservation Concern: Brook trout and slimy sculpin
   c. EFH: Atlantic Salmon (defined by NMFS)

4. Agency coordination - Normandeau will coordinate meetings with the following Agencies:
   a. NHFG
   b. USFWS
   c. USFS
   d. NMFS

5. What's next?
   a. Normandeau will provide a PDF of the project map used at the meeting that shows Cold water fisheries streams crossed by the existing right of way per the NAHCS data layer.

Bedford, NH (Corporate)

Arcata, CA	Falmouth, ME	Westmoreland, NH	Stowe, PA	Stevenson, WA
North Haven, CT	Falmouth, MA	Oswego, NY	Aiken, SC	Vancouver, WA
Lewes, DE	Hampton, NH	West Haverstraw, NY	Moncks Corner, SC	E. Wenatchee, WA
Gainesville, FL	Portsmouth, NH	Drumore, PA	Seattle, WA	

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b. John to confirm if the bridle shiner has been documented upstream of dam on the Pemigewasset River.
c. John will work with NH F&G GIS to match electrofish data with streams and provide Normandeau with guidelines relative to drainage area for cold water fisheries.
d. Normandeau will develop a work plan for assessing potential project impacts on cold water fisheries. The work plan will include:
    i. a modeling approach for identifying cold water fisheries potentially affected by the project area based on NH F&G electrofish data/drainage area guidance, Normandeau field data (identified perennial streams), and project design; and
    ii. field sampling protocols for selected streams where modeling results are not clear, or additional information would be useful for project design and permitting purposes.
e. Normandeau will provide the draft work plan to NH F&G and coordinate a follow up meeting that will also include Federal Agencies.
f. For project permitting Normandeau will develop BMP's for temporary crossings and mitigation measures commensurate with an impact assessment.

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

Northern Pass Transmission Project
Meeting with NH F&G and USFWS to discuss RTE Aquatics
March 6, 2012

Attendees: Lee Carbonneau, Normandeau
Adele Fiorillo, Normandeau
Mike Marchand, NHFG
Don Mason, Normandeau
Susi vonOettingen, USFWS

Distribution: Mike Marchand, NHFG
Susi vonOettingen, USFWS
Brain Bosse, Northern Pass
File

1. Project Description
   a. Transmission line from US/Canada Border to Deerfield, NH with converter terminal in Franklin.
   b. Proposed route from Northumberland south to Deerfield is within existing/cleared right of way with some existing/partially cleared right of way.
   c. Proposed route from Northumberland north to the US/Canada Border is yet to be determined, and may be new/uncleared right of way.

2. Project Areas of Focus

   Note: Property access is limited and the stream bottom is owned by the landowner, so unless work can be done safely by floating there may be restrictions as to how far up or down stream studies can be undertaken.

   a. Dwarf Wedge Mussels

      Location of dwarf wedge mussels that may be impacted/recommended surveys:
      - Main stem of the Connecticut River from the breached dam (Northumberland NH) to Moore Dam (in Littleton, NH)
      - The Johns River at the confluence with the Connecticut (in Dalton, NH)
      - The northern portion of Strafford is the known limit. However, the historic records include the Connecticut Lakes so if there are any impacts in that region those locations should be surveyed

Brook Floaters

Location of brook floaters that may be impacted/recommended surveys:

- Main stem of the Merrimack River and tributaries south of Franklin Dam (Hayward, Burnham, Punch and Bryant Brooks – with habitat survey first)
- Ames Brook (if *Elliptio* there then look for Brook Floater)
- Soucook River
- Suncook River
- Unlikely north of Franklin Dam
- Deerfield may be too far up the Lamprey River watershed – Mike will check and let us know, but recommends survey at project impacts on Lamprey

b. Cobblestone Tiger Beetle – not likely In project area so no surveys required

c. Pearlshells – they are not listed but populations are declining. It is not likely they will be listed in the next few years. They are found in cold water assemblages in the Pemigewasset River from Franklin north. Trout is one of their host fish so pearlshell presence/absence may be assessed in conjunction with the fisheries work.

d. Wood turtles – the wood turtle is a species of special concern which occurs in riverine areas throughout the state

e. Other aquatic species? None at this time

3. Specific concerns re: addressing project impacts
   a. Focus In areas where work is specifically in a river, do surveys for mussels/mussel diversity if habitat is present
   b. Focus in areas where new clearing is to occur and mussel habitat is present
   c. For wood turtles consider seasonal constraints for construction, long term management of vegetation, other potential mitigation measures.

4. Agency Coordination
   a. NHFG: Normandeau has been coordinating with NHFG on a variety of habitats and species or groups (tracking for Canada lynx and American marten, fisheries, state listed birds, snake, bat, and turtle species, deer wintering and moose areas, mast areas)
   b. USFWS: For non-endangered wildlife species Normandeau has been coordinating with Maria Tur, and with Tony Tur on marten and lynx tracking; and will coordinate with Tony and through Carol Henderson for the Karner Blue butterfly.
   c. Normandeau has contacted USFS to see if they want to participate in meetings relative to developing work plans for future field surveys.
   d. Other agencies include NMFS to discuss Essential Fish Habitat. Matt Carpenter with NHFG also works with salmon.
   e. Joe McKeon is the Project Leader for the USFWS Central New England Fisheries Resources Office and he should be contacted.

5. What's next?
    a. Mike will provide reports on mussel surveys
    b. Don will provide a list of rivers by name or , if unnamed, by lat and long for Mike to use so he can provide historical information on mussels in those rivers from the NHF&G database.
    c. Normandeau will develop a draft work plan for review and comment. The work plan will describe where habitat and mussel surveys will be undertaken, how the surveys will be conducted and will include methods for preventing the spread of invasive species.

Phone Log

Date: March 23, 2012
Participants: Will Staats, returning Sarah Barnum's call
Subject: Definition of "Important Mast Areas" in New Hampshire

Sarah and Will discussed the following topics:

1) Will indicated NHFG does not have a standard definition of an "important mast area".

2) NHFG does do a survey each fall of annual mast production by WMU, looking at both hard and soft mast production. Results are summarized into an annual report by Andy Timmons. Beech is the focal species, but all species considered.

3) Will will ask Andy to send me a copy of the most recent annual mast report.

4) NHFG does not have any standards in place to assess the long term value of a mast stand. Guidelines from VT (*VT ANR Management Guidelines for Optimizing Mast Yields in Beech Mast Production Areas*, 2011) would provide a good frame work for assessing historic use and long term value of beech. However, using good professional judgment is the best approach. Will would be happy to come into the field with us if we have questions.

5) Beech is obviously the species most easily assessed for long term use (by bears) but other species may have scratches and broken branches from bears as well.

Phone Log

Date: April 3, 2013
Participants: Sarah Barnum, calling Mike Marchand
Subject: NHFW requests for Avian Surveys

This phone conversation was in response to the attached e-mail exchange.

Regarding my questions about which species to conduct surveys for, Mike reiterated NHFG's desire to focus on northern harrier, nesting raptors, and Bicknell's thrush. Bicknell's thrush is of interest due to its likely immanent Federal listing, and surveying for this species does not trigger a need to survey for other NH species of special concern to maintain a consistent approach. If high quality habitat is present in the project area for other state listed species, Mike indicated that a survey for those species would demonstrate due diligence. However, he emphasized taking a habitat based approach and focusing any survey effort on habitats most likely to support the species of interest.

Mike stated that an analysis of the effect of converting forest habitats to shrubby habitat on the species composition of the avian assemblage in the project area was sufficient to address general avian impacts.

From: Marchand, Michael [mailto:Michael.Marchand@wildlife.nh.gov]
Sent: Friday, March 22, 2013 11:51 AM
To: Sarah Barnum; Henderson, Carol
Cc: Lee Carbonneau; Holman, Heidi
Subject: RE: Avian Studies for northern Pass

My priority would be:

1) Northern Harrier
2) Raptor nesting on existing poles and habitat suitability along new lines.
3) If Bicknells habitat present, it might be good to include them as well.

Mike

From: Sarah Barnum [mailto:sbarnum@normandeau.com]
Sent: Monday, March 18, 2013 3:24 PM
To: Henderson, Carol
Cc: Lee Carbonneau; Marchand, Michael; Holman, Heidi
Subject: Avian Studies for northern Pass
Carol,

Spring planning is in full swing, and one of my projects for the coming season may be avian surveys for the Northern Pass project. I am looking to NHFG for some guidance about the need for avian surveys, and which species should be the focus of surveys. I'd like conformation that a survey is needed for listed species that might be nesting in the project ROW. Past discussions also indicated that surveys for Bicknell's thrush might be warranted if the ROW passes through suitable habitat. Would surveys for other species of special concern be warranted as well? (e.g, spruce grouse, olives-sided flycatcher). As you see, I have cc'd Mike and Heidi on this, if they have feedback for the project regarding species in addition to birds, I can incorporate that into my planning as well.

I look forward to hearing back from you,

Sarah

SARAH A. BARNUM, Ph.D. *Senior Wildlife Ecologist*
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Northern Pass Transmission Project
Natural Resource Agency Pre-application Meeting
September 4, 2013

Attendees: see attached list

Tim Drew (NHDES) welcomed the attendees, passed around a sign-in sheet, and then asked attendees to introduce themselves. Mike Wimsatt was identified as the DES point of contact for the project, as he will not sit on the SEC. Lee Carbonneau briefly described the meeting agenda and goals, and Dana Bisbee provided an overview of the project, recent changes, schedule, and outreach efforts. Derrick Bradstreet described the engineering design, status, and walk downs, and Lee Carbonneau summarized the natural resource surveys conducted for the project and mentioned the intent to provide resource technical reports to the agencies in November. Jake distributed draft examples of USGS maps and permitting plans were for comment and reference.

Discussion and questions ensued, with highlights summarized below.

- Mark Kern (US EPA) suggested that it appeared that roughly 75% of the project area is presently cleared. He asked how much additional clearing would be needed in the existing ROW. Mark suggested screening back the wetland shading on the plans so the extent of tree canopy can be seen through it. Quantification of clearing in wetlands will be needed.
- Lori Sommer (NH DES Wetlands) expects the impact assessment and plans to be similar to those of recently permitted PSNH projects that Normandeau has worked on. She added that we should work with landowners to avoid and minimize impacts that would otherwise be needed for temporary access.
- Ridge Mauck and Craig Rennie (NH DES AoT) requested larger scale plans with proposed grading and E&S controls for the AoT application package. The entire project, including structure locations, access road improvements, laydown areas, helicopter pads, etc. will need to be addressed in the application. Ridge indicated that one application is needed. Soil survey for the converter terminal site will be needed, but a soil survey waiver for the rest of the line can be requested.
- Changes in hydrology associated with any grading and clearing, particularly in the north, will also need to be addressed in the AoT application, with dispersal of peak flows the primary goal.
- Collis Adams (NH Wetlands) mentioned that the DES air resources division was not represented at the meeting, and mentioned that fuel storage, use of temporary generators, etc. should consider air quality effects.
- Tim Drew asked if there were hazardous waste sites known along the route.
- Dave Keddell (US ACE) requested that technical reports be provided on DVDs.

- Maria Tur (US FWS) inquired about possibility of other projects connecting into the HVDC line. Derrick explained that it was only possible to tie into the project on the AC portion of the line, i.e., from the Franklin S/S to the end of the line in Deerfield. Since time has elapsed since the prior USFWS review, Maria suggested that Normandeau submit another request for USFWS review that includes the areas north of Lost Nation and south of Deerfield. USFWS will also expect an Effects Determination for the Karner Blue Butterfly and Canada Lynx. The role of the DOE in the section 7 Consultation was discussed.
- The information needed for the 401 Water Quality Certificate will be similar to the AoT application information, except the application form. All waters in the WMNF are Outstanding Resource Waters (ORW); therefore, permanent impacts are not allowed. Construction monitoring will be very important to minimize effect of temporary impacts.
- Mark Kern said EPA has a soft preference for in-lieu-fee for mitigation, but preservation of parcels with high resource values as shown on the Wildlife Action Plan (WAP) maps are also worth considering.
- Lori Sommer suggested consulting with the local communities in which any substantial wetland impacts are expected, such as Deerfield, where the substation expansion will have wetland impacts.
- Ted Diers (NH DES Watersheds) suggested we reach out directly to the Local River Advisory Committees for work in Designated Rivers (2 crossings).
- Collis said that no tree counts would be required within the SWQPA waterfront buffer for the Shoreland permit application.
- Rene asked if other lines for high-speed internet or telecommunications can be installed on the new line. Derrick indicated that communications equipment will be installed, i.e. Optical Ground Wire, but this is used for monitoring the direct current. [Didn't we add that the issue of internet fiber is still open?]
- Rene Pelletier (Asst. Dir. NH DES) suggested that we notify the natural resource agencies directly about open houses, particularly up north.
- Tim offered to assist with setting up follow up meeting with the group or parts of the group, and subgroups by resource type (wetlands, RTE, etc.) was suggested. Tim can participate until the SEC application is filed, then must step out of the project.

The State of New Hampshire

DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

Pre-application Meeting

Northern Pass Hydroelectric Transmission Project

State & Federal Natural Resource Agencies

Convened at:

The Offices of the
New Hampshire Department of Environmental Services
Conference Rooms 213-214
P. O. Box 95
29 Hazen Drive
Concord, NH 03302-0095

September 4, 2013
1:00 to 3:00 PM

ATTENDANCE

Name	Affiliation	Telephone No.	Email
David Keddell	Corps	978-318-8692	david.m.Keddell@USACE.army.mil
Tim Drew	NH DES	603-271-2306	timothy.drew@des.nh.gov
Michael Ladam	NHPUC	603-271-6039	michael.ladam@puc.nh.gov
DERRICK BRADSTREET	BURNS & McDONNELL	816-823-7093	dbradstreet@burnsmcd.com
Mike Marchand	NH FG	603-271-3078	michael.marchand@wildlife.nh.gov
CRAIG RENNIE	NH DES	603 271-0676	craig.rennie@des.nh.gov
Melissa Coppola	DRED-NHB	271-2215	melissa.coppola@dred.state.nh.us
Ted Diers	NHDES	271-3289	ted.diers@des.nh.gov
Ridgely Mauck	NHDES	271-2303	Ridgely.Mauck@ " " "
Gregg Comstock	NHDES	271-2983	Gregg.Comstock@des.nh.gov
Barry Needleman	McLane Law Firm	226-0400	barry.needleman@mclane.com
Lee Carbonneau	Normandeau Assoc.	637-1150	lcarbonneau@normandeau.com
Rene PELLETIER	NHDES	271-2951	Rene.Pelletier@des.NH.GOV.
Brandy Chambers	OEP	271-8316	Brandy.Chambers@nh.gov
Maria Tur	USFWS	223-2541	maria_Tur@FWS.GOV
Mike Wimsatt	NHDES	271-1997	michael.wimsatt@des.nh.gov
Collis Adams	NHDES	271-4054	collis.adams@des.nh.gov
LORI SOMMER	NHDES	271-4059	lori.sommer@des.nh.gov
Mark Kern	EPA	617-918-1589	Kern.Mark@EPA.GOV
Jacob Tinus	Burns & McDonnell	603-634-2571	jtinus@burnsmcd.com
Dana Bisbee	Devine Millimet	603 695-8626	dbisbee@devinemillimet.com

OVER

The State of New Hampshire

DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

Pre-application Meeting

Northern Pass Hydroelectric Transmission Project

State & Federal Natural Resource Agencies

Convened at:

The Offices of the
New Hampshire Department of Environmental Services
Conference Rooms 213-214
P. O. Box 95
29 Hazen Drive
Concord, NH 03302-0095

September 4, 2013
1:00 to 3:00 PM

ATTENDANCE

Name	Affiliation	Telephone No.	Email
Bob Varney	NAE	637-1125	[illegible]

DES Web site: **www.des.nh.gov**
P.O. Box 95, 29 Hazen Drive, Concord, New Hampshire 03302-0095
Telephone: (603) 271-3503 • Fax: (603) 271-2867 • TDD Access: Relay NH 1-800-735-2964

Northern Pass Transmission Project
Alteration of Terrain Pre-application Meeting
December 18, 2013

Attendees: Ridge Mauck - NH DES AoT
Lee Carbonneau - Normandeau Associates
Jake Tinus - Burns & McDonnell
Derrick Bradstreet - Burns & McDonnell
Dana Bisbee - Devine, Millimet & Branch

Lee opened the meeting with a brief overview of the major components of the Northern Pass project, including: the overhead transmission lines, underground transmission segments, AC system upgrades, converter terminal in Franklin, Deerfield and Scobie Pond substation upgrades, four transition stations, access roads and laydown areas. Derrick then provided additional details on these project components, construction equipment and methods. He explained the types of details and specifications which will not be finalized at the time of permit application submittal, leaving the contractors some flexibility to accommodate their unique equipment and construction protocols within certain guidelines. The discussion then focused on how to address the permit application requirements for each of these components of the Project.

- Ridge stated that the ROW work in the AC system upgrade area to the south of the Deerfield Substation is not likely to require AoT review, based on the widely spaced work areas and use of existing access roads. Discussion ensued regarding what constitutes a “project”, which Ridge said is not well-defined in the NHDES rules, and the concept of “contiguous”, as it pertains to AoT jurisdiction. As described by Ridge, the intent of the rules is to prevent applicants from designing minor physical separations between project components just to avoid jurisdictional thresholds.
- The use of duct banks in the underground segments, with a daily cut and cover approach – as opposed to direct bury, with trenches left open for longer periods - would qualify for a permit exemption, but since the underground work is part of the larger “project”, plans for these segments should be included in the application.
- Ridge suggested that work in the ROW for crane pads, foundations and access to these locations is unlikely to affect the watersheds given the inconsequential increase in impervious surfaces, lack of changes to drainage, and minimal impact on floodplains. Ridge suggested that waivers could be requested for hydrologic analyses, soil mapping, floodplain reports, and other details for the existing ROW portion of the project. Justification for the waiver requests should be robust, perhaps including a narrative and examples of the calculations for a conservative foundation, showing minimal effects on curve numbers.

- Work on steep slopes, including clearing, access roads or construction activities, may need closer review and special BMPs, such as water bars. Derrick indicated that Burns & McDonnell can run a GIS analysis to determine potential steep slope areas. A slope threshold for such areas requiring additional analysis or special BMPs will be suggested by Ridge.
- Crane pads and access roads are conservatively shown on the example plans for permitting purposes – slight shifts and relocations may occur during construction to reduce impacts to wetlands and other natural resources. All access roads and crane pads are temporary; although some access roads may be in place for 3 years, they will be restored after construction.
- Laydown areas should be shown if known, recognizing that others may be identified by the contractors. A change in cover (e.g. grass to gravel) requires review, but if no improvements are needed, then locations are sufficient.
- Plan sets were discussed, and Ridge indicated he would like to see an overall route map; ROW plans at the 1”=250’ scale on 11”x17” sheets, with the same level of detail as our example plans show, including perhaps a generic BMP symbol. His preference is for no aerial background. The 1”= 400’ aerial plan set that will be part of the SEC permit application package may be sufficient for the aerial requirements in the rules. The seven sites (two substations, four transition stations and the converter terminal) will require the specified 1”=50’ plans at the 24”x 36” size.
- There should be a set of standard detail plans for the universe of BMPs and other standard details and representative cross sections, and a narrative explaining each BMP and how to select the appropriate one for each location. The detail sheet set can come before or after the plan view set.

A few other details regarding the application forms were discussed.

- Ridge indicated that the new application form should be available on January 1st, and will require a groundwater protection plan if blasting more than 5,000 CY of rock in one area (9B). Derrick believes the NPT project will not meet this threshold.
- The Project type (5) will be “other”.
- The calculation of total road length (8F) is designed for subdivisions, and can be marked N/A.
- Cut and fill in floodplains (8K) will be inconsequential, and an explanation of why that information is not included can be attached, as can any other explanations associated with the application form.
- The filing fee will be calculated based on land disturbance associated with the 3 substations and 4 transition stations, access roads and crane pad work areas, and any laydown areas requiring earthwork. As discussed, the filing fee calculation will not include work to the south of the Deerfield Station.

Follow-up:

- Lee and Jake will draft minutes of the meeting and circulate the draft for review before finalizing.
- After design work progresses, another pre-application meeting will be held to go over lingering questions and to review a list of potential waiver requests and draft justification.

Phone Log

Date: August 8, 2014
Participants: Emily Preston, calling Sarah Barnum in response to an e-mail request to discuss NLEBs
Subject: NHFG perspective on NLEBs and SFBs

Emily and Sarah spoke briefly about the NHFG's perspective on protecting northern Long-eared bats and small-footed bats.

NLEBs

1. NHFG assumes NLEBs are present state-wide
2. NHFG assumes that all forested habitats may be used by NLEBs, cannot exclude any forest types based on characteristics
3. Goal is to prevent take, since there is not identified "critical" habitat to protect instead.
4. Commit to cutting in winter to avoid take, and there will be no need to survey for P/A
5. NHFG will not commit to agreeing with the USFWS protocols for P?A surveys, Emily is fairly certain that these protocols will change soon, and she doesn't know what they are/is NHFG will be ok with the changes
6. Construction BMP: Avoid disturbance to maternity roosts on the ROW edges by starting construction in spring, so that the bats know what's up when they choose their roosts

SFBs

7. NHFG assumes SFBs are present state-wide
8. If potential roosts will be impacted, do P/A surveys or avoid disturbance during critical life stages (hibernation, pup rearing)
9. Impacts to rocky out crops could occur due to blasting, pile driving, vibration from heavy equipment
10. SFBs may have less opportunity to roost switch then another species, so avoiding disturbance may be more important.

Meeting Notes

Meeting Subject:	State and Federal Wetland Resource Agency Pre-Application Meeting
Meeting Date:	October 1, 2014
Start Time:	10:00 AM
End Time:	12:00 PM
Location:	NHDES Offices, Concord, NH

Project Name:	Northern Pass Transmission Project
Project No.:	58467

Attendees	Organization	Title
See attached attendance sheet.		

Notes Prepared By:	Jake Tinus, Lee Carbonneau
Date Notes Issued:	October 23, 2014

Meeting Notes:

The purpose of the meeting was to provide an update on the project to state and federal resource agency staff and to serve as a forum within which to discuss the current wetland-related impacts, plan sheet details, and possible mitigation concepts.

1. Lee Carbonneau provided an overview of the Northern Pass Transmission (NPT) project, referencing the exhibit board and pointing out major features of the project including: the design route, overhead transmission lines on existing ROW and new ROW, 8 miles of underground transmission cable, 4 transition stations in Pittsburgh, Clarksville (2) and Stewartstown, the Converter Terminal Site in Franklin, and 2 substation upgrades in Deerfield and Londonderry, NH.
    a. Mark Kern indicated that he is most interested in the northern section of the project where new ROW and underground facilities are being proposed.

2. Lee Carbonneau described the overall permit filing schedule, mentioning that the team is currently preparing various applications including wetlands, shoreland and AoT that roll-up into the SEC application which is expected to be submitted in late May 2015 subsequent to release of the Draft EIS by the Department of Energy (DOE) anticipated for late March 2015.

3. Lee Carbonneau mentioned that the DOE is evaluating alternate routes for the project and NPT also reviewing these routes. Several attendees questioned where information on the alternate routes is located. Jake Tinus added that the alternate routes are shown in the Scoping Report Alternatives Addendum issued by DOE in May 2014 and can be found on-line at: www.northernpass.us.
    a. Mark Kern questioned how NPT will respond to the preferred alternative that is presented by the DOE in the EIS if it differs from the current NPT route. Dana

Meeting Notes *(continued)*

indicated that we are reviewing the alternate routes being considered by the DOE but it is premature to gauge how the project will respond to the preferred alternative identified by DOE.

4. Lee Carbonneau described the format of the project's permit applications which will include the application forms, detailed narratives, and permit plans. She also indicated that a mitigation report will be appended. Lee also noted that over the past year, many changes have been made to DES application forms which are updated twice per year; she queried whether the forms would be changing again in 2015. Collis Adams indicated that they are not anticipating any major changes to the application forms in 2015.

5. Dana Bisbee asked about the status of the Corps' New England General Permit (NE GP) which would replace the six state general permits in our region.
    a. Rene Pelletier indicated that he had recently heard that the Corps may be shelving the idea of a regional GP meaning that the individual state GPs would remain in place.

6. Jake Tinus distributed the example wetland permit plans for review and comment and explained the features, i.e. a note page and side-by-side planimetric and aerial photo-based plans. Jake stated that at the 1:100-scale, more than 600 sheets would be generated for the wetlands permit plans. Jake indicated that since the plan set is so large, NPT wanted the resource agencies to not be burdened with unclear plans and unnecessary details. Accordingly, Jake asked that each agency representative review the example plans for content, style and appearance. He asked they provide feedback by mid-October 2014.
    a. Lori Sommer indicated that the plans appear readable and seem to follow the style and format of recent PSNH applications.
    b. Lee Carbonneau indicated that NPT would like to discuss with DES how to address culvert replacement, i.e., in-kind replacement or upgrades. DES seemed receptive to an approach different from the full-blown application of stream crossing requirements and agreed to discuss the issue further.
    c. Mark Kern requested that we provide another example plan showing the buffer areas (lines) to vernal pools and wetlands so that he could compare them to the example provided. This would allow him to visualize the areas of secondary impact more clearly. Jake Tinus took this as an action item.
    d. Lori Sommer questioned how we would address Natural Heritage Bureau (NHB) RTE plant and animal species and other sensitive areas on the plans. Lee Carbonneau indicated that we would need to talk with NHB and NHFG due to concern of the sensitivity of data and signed confidentiality agreements. Rob Young proposed a possible solution based on a project in CT, i.e., reference the NHB sensitive areas with a color-coded bar across the bottom of the project

Meeting Notes *(continued)*

corridor which then references specific BMPs and construction oversight measures that would address avoiding and minimizing impacts and protective measures to the sensitive areas without divulging the protected species.

e. Lori Sommer asked how we would address invasive plants along the project corridor, and indicated that for linear projects, NHDOT typically maps them out and shows them on the plan and indicates specific measures for identification and control. Lee Carbonneau said that invasive species have not been specifically mapped, but notes were taken in the field and could be used to identify hot spots. Rob Young suggested that specific BMPs could be incorporated into the plans that would guide contractors to properly identify and prevent spreading of the invasive plants. Collis Adams suggested that if contractor training were part of our protocol to managing invasive species, he would be in favor of our suggested approach and mapping them on permit plans would not be necessary.

7. Lee Carbonneau indicated she has a list of additional questions, mostly concerning specific application form requirements and, due to time constraints of this meeting, would contact the appropriate person at each agency for consultation.

8. Jake Tinus distributed and described the example Shoreland Water Quality Protection Act (SWQPA or Shoreland) plans for review and comment. Similar to the wetlands plans, the SWQPA plans are produced at a 1:100-scale and are proposed to have side-by-side planimetric and aerial photo-based plans for a total of 29 sheets. Lee Carbonneau indicated that there are 21 crossings of protected streams, rivers and ponds, some of them crossed more than once by the project.

   a. Darlene Forst stated that for the areas of the project that are located along an existing ROW, only locations where excavation or other earthwork is taking place with in the 250-ft protected shoreland will require a permit. The Shoreland rules indicate that the NPT project would fall under the public utility clause that allows permitting by the Commissioner without waivers, and stem counts and other requirements do not apply. With respect to new ROW where the project approaches the Connecticut River and where it crosses Hall Stream, NPT would need to request waivers for stems counts, limits on clearing, etc. from DES for those segments where the SWQPA would apply.

9. Lee Carbonneau explained NPT's process for categorizing and calculating project-related impacts that were deemed unavoidable. She explained that as presently calculated, permanent wetland impacts equal ± 2.69 acres and temporary impacts equal ± 161.5 acres. Secondary impacts (for the purposes of calculating compensatory mitigation) equal ±34 acres, based on assumed ratios of 10% for forested wetland (PFO) conversion, 15% for vernal pool/stream buffer clearing and 5% for mats on deep organic soils.

Meeting Notes *(continued)*

a. Mark Kern indicated that the Corps and EPA have recently specified that a 15% ratio for PFO conversion is more appropriate. Lee Carbonneau indicated that 10% was used on recent PSNH projects, to which Laura Games agreed. Mark suggested a follow-up phone call between NPT, DES, EPA and Corps.

10. Lee Carbonneau mentioned the wetland delineation status, i.e., some of the delineations that were performed in the field are approaching the 5-year limit as of May 2015.
    a. All agency representatives assented to using ±5-year old delineations.
    b. Collis Adams requested additional information regarding the delineation anniversaries, including dates and locations of expiring delineations.

11. Referring to a plan showing potential mitigation parcels presently owned by NPT, Lee Carbonneau presented the NPT's current thinking on our approach to compensatory mitigation. Lee pointed out that approximately 5,000 acres are owned by NPT and these are currently being evaluated for suitability as preservation or conservation parcels. Some of the properties appear to be suitable for wildlife habitat, though few appear to offer viable restoration opportunities. Lee noted the concern of finding willing easement holders for conservation parcels. She also noted that it is assumed that some part of the mitigation package would likely include payment to the Aquatic Resource Mitigation (ARM) Fund. Lee and Jake indicated that NPT was open to ideas from the agency representatives.
    a. Mark Kern questioned if our mitigation report would include all project mitigation or just that for natural resource impacts, the latter being favorable. Lee Carbonneau concurred that while other types of mitigation will occur during the siting process, mitigation for impacts to natural resources would only be included in the mitigation report.
    b. Referring to the draft mitigation plan, Mark Kern commented that it appeared that most of the NPT land holdings are located in the North Country and that, in general, NPT should look for ways to mitigate within the same watershed that impacts are proposed.
    c. Lori Sommer suggested that NHFG and USFWS should be consulted to see if NPT could assist with some of their projects. She also indicated that NPT might consider contacting the Trust for Public Lands who might be willing to hold conservation easements for some of the mitigation parcels.
    d. Mark Kern suggested that NPT should review Wildlife Action Plan (WAP) maps to see if any of the parcels possess high value for wildlife, and that lands adjacent to F&G lands would be desirable.
    e. Collis Adams suggested that any properties located adjacent to or near Coleman State Park and/or the Connecticut Headwaters area may be favorable for mitigation.

Meeting Notes *(continued)*

f. Lori Sommer suggested there is an existing "mitigation enhancement fund" associated with 15-Mile Falls. (http://www.nhcf.org/page.aspx?pid=673)
g. Lori Sommer indicated that DES is currently working with UNH and NHDOT to identify culverts that need to be upgraded across the state. She stated that these are being evaluated and ranked by NHDOT and suggested contacting Kevin Nyhan or Marc Laurin at NHDOT. NPT might be able to provide some technical or financial assistance.

12. Confirming NPT's understanding, Lee Carbonneau queried if DOE is the lead agency on ESA Section 7 and NHPA Section 106 coordination. Dave Keddell affirmed this understanding and indicated that NPT should provide a separate set of plans to identify cultural resources.

13. Other closing comments and requests included:
    a. Tim Drew asked about electronic management of documents. Dana Bisbee indicated that NPT would need to continue that discussion to determine how electronic data will be provided and maintained.
    b. Tim suggested that NPT provide the example permit plans on a DVD or CD to the agencies. Jake took this as an action item.
    c. Lori Sommer requested that meeting minutes from NPT's coordination efforts with NHFG, NHDHR and other agencies be provided to DES and other resource agencies. Lee Carbonneau indicated that these materials would be provided in the application but could be provided more quickly. Lee took this as an action item.
    d. Collis Adams requested that NPT provide a summary of the delineation history. This could include a map of the locations/time of delineations and other information. Lee Carbonneau took this as an action item.

14. It was decided by the group that our next meeting would occur in early January 2015 at which time we would provide another project update and largely focus our discussion on mitigation.

The State of New Hampshire

DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

Pre-application Meeting

Northern Pass Hydroelectric Transmission Project

State & Federal Natural Resource Agencies

Convened at:

The Offices of the
New Hampshire Department of Environmental Services
Conference Rooms 313
P. O. Box 95
29 Hazen Drive
Concord, NH 03302-0095

October 1, 2014
10:00 AM to 12:30 PM

ATTENDANCE

Name	Affiliation	Telephone No.	Email
Collis Adams	DES	271-4054	Collis.adams@des.nh.gov
Lori Sommer	DES	271-4059	lori.sommer@des.nh.gov
Dana Bisbee	Devine Millimet	695-8620	dbisbee@devinemillimet.com
Robert Young	Burns & McDonnell	860.416.5155	rtyoung@burnsmcd.com
Jacob Tinds	BMCD	693-634-2571	jtinds@burnsmcd.com
Lee Carbonneau	Normandeau	603 472-5191	lcarbonneau@normandeau.com
Laura Games	PSNH	603-634-2906	Laura.Games@NU.com
Rene Pelletier	NHDES	603-271-2951	Rene.Pelletier@des.nh.gov
Mark Kern	EPA	617-918-1589	Kern.Mark@EPA.GOV
David Reddell	Corps	978-318-8692	david.m.reddell@usace.army.mil
[illegible]	NHDES	603-[illegible]	[illegible]
Timothy Drew	NHDES	603-271-3306	timothy.drew@des.nh.gov

DES Web site: **www.des.nh.gov**
P.O. Box 95, 29 Hazen Drive, Concord, New Hampshire 03302-0095
Telephone: (603) 271-3503 • Fax: (603) 271-2867 • TDD Access: Relay NH 1-800-735-2964

Northern Pass Transmission Project

Pre-application Meeting – NHDES Offices, Concord, NH – 3/5/15

Alteration of Terrain Permit Application and Request for a 401 WQ Certificate

Attendees:
Lee Carbonneau
Jake Tinus
Dana Bisbee
Ridgely Mauck
Greg Comstock
Owen David

Dana provides project overview describing the major elements of the current proposed project including:

- Overhead transmission line (mostly located in existing ROW)
- 8 miles of underground cable located in Coos County
- A new HVDC converter terminal located in Franklin
- Improvements at Deerfield and Scobie Pond Substations
- 4 new transition stations that connect overhead line to underground cables

Dana added that Northern Pass continues to evaluate the alternative routes announced by the DOE.

<u>1065 Rule – Pollutant Loading</u> - Jake describes the Deerfield site and notes that the existing substation conditions make compliance with the 1065 rule impossible. Jake indicates that the site is constrained by existing build out and the presence of wetlands. He says that presently the site comprises more than 10 percent estimated impervious cover (EIC) and 65 percent undisturbed cover (UDC). Hence, the design takes this into consideration.

<u>Detention Basins in Wetlands (Deerfield example plans)</u> – Ridge indicates that placement of the detention basin within wetlands will need to be approved by the Wetlands Bureau. Ridge says the language in the AoT application mirrors that of the wetlands rules, and if the Wetlands Bureau approves the placement of detention basins in wetlands, then AoT will review them from the stormwater aspect. Ridge suggests that this design looks very conservative, and Jake concurs (for the reason noted above). Ridge urges B&M to check the curve numbers, review what was considered impervious (the gravel inside substations is generally quite pervious), and perhaps consider a less conservative design based on a review of the CNs. Ridge asks if the basin can be squeezed into the area between the wetlands. Jake indicates that would involve removal of a hill and would involve impacts to those wetlands as well. Jake indicates that he will discuss the design with the engineers and that a follow-up meeting may be requested of AoT. Ridge indicates that he is happy to meet with the engineers or discuss informally (email is better than telephone).

Transition Station 4 –Jake describes the site and lack of infiltration options due to shallow bedrock. Ridge says if geotechnical borings show that there is no other location on the parcel that does not have shallow bedrock to allow infiltration, then it would be reasonable to request a waiver for the groundwater recharge volume at this site or others like it. This is not uncommon in NH. Ridge also suggested that NPT consider innovative treatment methods.

Threshold Questions and Application Format Questions:

- For AoT Application questions that trigger compliance thresholds, such as 5,000 CY of blasting, they would logically consider the sites separately, unless they are in close proximity to one another, such as Transition Stations 1 and 2. Further, blasting plans should be provided with the application.
- The application format and order of attachments is not meant to be so rigid to prevent reasonable presentation of data.
- Ridge agrees that length of roads was established for subdivisions; a total length of access roads is not that informative for a transmission project. After reviewing draft plans, Ridge again indicates that the scale of the transmission line plans is adequate, and Greg concurs.

Section 401 Water Quality Certification

Greg agrees that even if the project were to receive a programmatic permit from the USACE, DES would likely require a 401 WQ Certificate application to allow the imposition of permit conditions.

Greg made the following comments:

- Label the named waterbodies on all plans, including any named wetlands.
- Pollutant loading analyses for the 7 sites is recommended. He does not want to just rely on the AoT submittal.
- Temperature impacts on streams should be included. Lee mentioned the SSTEMP modeling conducted by the fisheries scientists, and Greg suggests including the results, any F&G responses, and attaching the report.
- All waters in the WMNF are Outstanding Resource Waters (ORWs); demonstrate that there will be no permanent degradation of these, and any other sensitive waters/wetlands along the Transmission line. Consider including:
    - discussion of the minimal project footprint and temporary impacts for most
    - need calculations for the change in impervious cover within WMNF
    - describe role of env. monitors
    - minimal clearing width
    - sampling and analysis plan for turbidity monitoring during construction, especially where open trenching is planned; baseline pre-construction monitoring may be in order.
    - attach CLDs HDD monitoring plan
    - long-term BMP maintenance/inspection plans, for example for catch basins, detention basins, etc., should be included with the stormwater plans at each site
    - statements about proposed use (or not) of herbicides, fertilizer and salt

    - prevention of unauthorized trails through streams/wetlands though gates or other means
- A long-term monitoring plan may be appropriate, particularly at the 7 sites, but he is not sure about this. It could include periodic aquatic macroinvertebrate sampling, both pre-construction and post-construction. If we don't propose it, and he believes, upon review of the application that it is necessary, it would be added as a permit condition.

Ridge asked about handling of stormwater on steep slopes, both temporary and possible permanent methods, including waterbars, ditching, cross culverts, detention ponds. He suggested checking the BMP manual for trails for ideas. NPT should include detail sheets for specific measures to be used. We should address this where we think it may be necessary, and if he has further questions about particular areas during his application review, he can request additional information. Jake indicates that a draft SWPPP is being produced, and can be attached to the applications.

Waivers
We asked about waivers, and Ridge agreed that we should probably request waivers for the reduced scale transmission line plans and no site-specific soil survey along the transmission line. If we draft a list and submit it to him ahead of time, he will be happy to review and advise.

From: Forst, Darlene
To: Lee Carbonneau
Cc: jtinus@burnsmcd.com
Subject: RE: SWQPA questions for Northern Pass
Date: Tuesday, March 10, 2015 12:04:40 PM

We are uncertain. Sorry not helpful but honest. We have started to look at these ponds and have close to 200 "questionable waters." If we start regulating 10 acre beaver swamps it could lead to the demise of a lot of beavers. We developed a data layer of ponds to investigate. If you would like to come in and compare what you have against what we are looking at, that may be the best approach. We may be able to eliminate a few.

From: Lee Carbonneau [mailto:lcarbonneau@normandeau.com]
Sent: Tuesday, March 10, 2015 11:54 AM
To: Forst, Darlene
Cc: Jacob Tinus (jtinus@burnsmcd.com)
Subject: SWQPA questions for Northern Pass

Hi Darlene,
A few more questions prompted by our discussions last Thursday at the Northern Pass pre-application meeting, where you indicated that the official list of Public Waters for NH is not comprehensive. We are looking for some clarification on public waters for our Northern Pass Shoreland Applications. There are several un-named ponds/shallow marshes located within the project boundaries that are larger than 10 acres that do not appear on the list of Public Waters. An example is a pond just west of the Substation in Deerfield, NH. These ponds may be quite shallow (often 1-4 ft deep) and have emergent vegetation interspersed with open water. Should we include Shoreland Applications for these waterbodies? Many appear to be ponded by beaver dams, not man-made dams, and may be ephemeral on the landscape. (However, we are not permitted access to private property outside of the ROW to verify outlet conditions; we must rely on aerials and dam bureau databases). Does SWQPA apply to a water body 10 acres or larger that results from a beaver dam? Any clarifications would be welcome. NPT would lean towards including any questionable waterbodies, to avoid omissions in the applications.
Thanks!
Lee

LEE E. CARBONNEAU, *Senior Principal Scientist*
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From: Forst, Darlene
To: Lee Carbonneau; Dana Bisbee; jtinus@burnsmcd.com
Subject: RE: Meeting notes
Date: Tuesday, March 10, 2015 9:23:03 AM
Attachments: image001.png
image002.png

- Do we need to attach deeds to a PBN? **No**
- Since the transmission structures are primary structures in the ROW – if a pole is located within the waterfront buffer – should we be requesting a waiver from the minimum waterfront buffer standards for that pole if there is no way to move it further from the reference line? **No**

From: Lee Carbonneau [mailto:lcarbonneau@normandeau.com]
Sent: Monday, March 09, 2015 4:30 PM
To: Forst, Darlene; Dana Bisbee; Jacob Tinus (jtinus@burnsmcd.com)
Subject: RE: Meeting notes

Hi Darlene –
Attached is the final version of meeting notes. I have two additional questions –

- Do we need to attach deeds to a PBN?
- Since the transmission structures are primary structures in the ROW – if a pole is located within the waterfront buffer – should we be requesting a waiver from the minimum waterfront buffer standards for that pole if there is no way to move it further from the reference line?

Thanks!
Lee

From: Forst, Darlene [mailto:Darlene.Forst@des.nh.gov]
Sent: Monday, March 09, 2015 3:17 PM
To: Dana Bisbee
Cc: Lee Carbonneau; Tinus, Jacob J (Jake)
Subject: RE: Meeting notes

My thoughts.

D. Forst
Shoreland Section Supervisor
Land Resource Management Programs

From: Dana Bisbee [mailto:dbisbee@devinemillimet.com]
Sent: Monday, March 09, 2015 2:37 PM
To: Forst, Darlene
Cc: 'Lee E. Carbonneau (lcarbonneau@normandeau.com)'; 'Tinus, Jacob J (Jake)'
Subject: Meeting notes

Darlene,

Thank you again for meeting with us last Thursday. Your willingness to provide pre-application guidance is always appreciated.

Attached is our set of notes from the conversation. Please let us know if we missed anything -- by error or omission.

Dana

George Dana Bisbee
Devine, Millimet & Branch P.A.
Manchester, Concord & Portsmouth NH
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DEVINE MILLIMET
ATTORNEYS AT LAW

my LinkedIn profile

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NH DES Shoreland – Pre-application Meeting Notes

March 5, 2015

Attendees
Dana Bisbee
Jake Tinus
Lee Carbonneau
Darlene Forst

- Since the Shoreland impacts are spaced along the project route, Darlene suggested we address them separately, using Permit-By-Notifications (PBNs) wherever possible. The threshold for PBNs is less than 1,500 square feet of earthwork and construction in uplands within the Shoreland[1]. No wetland impacts are included, as these will be fully addressed in the Wetlands Application.
- Earthwork in uplands exceeding 1,500 sf associated with any one crossing will need to be addressed by a full application. Darlene suggested grouping non-PBN crossings into Town applications.
- Darlene referred to several locations in the statute that relate to utilities, including the minimum standards (483-B:2 [2]) where the law provides for economic development; and specific reference to public utility lines(483-B:9 IV-b [3]) which may be permitted by the commissioner as necessary and consistent with the law. Her point generally was that utility ROWs cannot have trees for safety reasons, utilities are critical to economic development, and therefore clearing of trees for utilities in the Shoreland does not need to meet minimum standards.
- Darlene emphasized that NHDES does not issue permits to cut trees. They are concerned with earthwork and construction in the Shoreland. If tree clearing is also occurring, it can be shown on the plans and quantified (she suggested adding the Waterfront Buffer clearing and Natural Woodland Buffer clearing together); however, if clearing is the only activity in the Shoreland, no permit application is needed for that crossing.
- We reviewed the plan set examples and discussed presentation.
    - Darlene suggested we keep the background aerial photo but at a 50% to 60% transparency.
    - Having pre-and post-conditions on one plan is fine. Darlene expects that impervious surfaces will not be an issue, and we concur.
    - We will need to show local setbacks on the plans (shoreland buffer zones)
    - Reference lines that are from aerials are fine for Off-ROW locations.

[1] Darlene Forst adds (after the meeting) that there is a limit of 900 sq ft of new impervious per PBN.

[2] **483-B:2 Minimum Standards Required. XVI.** Provide for economic development in proximity to waters.

[3] **483-B:9 IV-b Minimum Shoreland Protection Standards**. Public utility lines and associated structures and facilities, public roads, and public water access facilities including boat ramps shall be permitted by the commissioner as necessary and consistent with the purposes of this chapter and other state law.

  - Darlene confirmed that Chance Pond, if over 10 acres, should be included. In addition, any other waterbodies if over 10 acres should be included even if not shown on the DES Shoreland list. Ham Branch, if approved, may also be needed, but this designation will have no effect on permitting of the project, in her opinion.
- We discussed other application form specifics and Darlene indicated the following:
  - Trenchless crossings that have no other earthwork in the Shoreland also do not need to be included in an application.
  - A statement that none of the ROW can remain in an unaltered state is appropriate, given that the ROW vegetation must be kept low. However, low woody-stemmed shrubs and ground cover should be maintained wherever possible in the natural woodland buffer for its soil retention and habitat value.
  - A deed for each parcel within the 250 ft shoreland will be required.
  - Any part of the application that calls for quantities within lots should be for the ROW only.
  - There is no application fee for public utilities, and abutter notification is not required.
  - Darlene directed us to extract the NHB GIS data for each crossing and present this for any regular application. NHB data is not needed for PBNs.
  - Transmission lines and structures (together) are considered the Primary Structure.

2

Memorandum

To: Files

From: Lee Carbonneau

Date: March 27, 2015

Re: Northern Pass Project – Meeting with Darlene Forst, NHDES Shoreland, 3/20/15

I sat with Darlene at her computer station on March 20, 2015 and reviewed the GIS maps of waterbodies that the Shoreland Department is considering adding to the consolidated list of waters protected under the Shoreland Water Quality Protection Act. These are in many cases beaver influenced waters. The screening included review of hydrography layers with F codes, that are 10 acres or larger, and appear to have standing water either on aerial photos or on USFS topographic quads. In some cases, multiple aerials are reviewed to determine the permanence of water.

The eight un-named waterbodies that are within 250 feet of the NPT line that appeared to be greater than 10 acres were not highlighted as waterbodies that the Shoreland department is considering for jurisdiction. In addition, Chance Pond, the dammed outlet stream of Webster Lake in Franklin, is not regulated under SWQPA.

I asked how to approach work that will occur within the protected shoreland that is not adjacent to (or on the same plan sheet) as the ROW crossing – for example, the CT River is crossed by the project, but there are off-ROW access roads that are within 250 ft of the CT River several hundred feet from that crossing. Darlene explained that the Shoreland rules and applications were set up for parcels, not linear projects, and there is no obligation in the Shoreland rules to include all work in one complete application – these separate shoreland activities can and should be submitted as separate PBN applications wherever possible. When asked about how to group regular SWQPA applications in towns where more than one waterbody is regulated, she asked that these be submitted for each waterbody.

We also looked at the PBN form, and I asked about the correct boxes to check for D, PBN Criteria and E. Impact Area and Application Fee, since this is a public utility, but not a maintenance or repair project. Darlene responded that we should check Box 1, the 1,500 sq ft impact area threshold, and also check box 1 under E., and write in the following: Fee exempt per 483-B:5-b (which exempts public utilities from the application fee).

From: Forst, Darlene
To: Lee Carbonneau
Subject: RE: Northern PAss Shoreland applications
Date: Tuesday, April 14, 2015 11:48:39 AM

Save the ink and paper. Shoreland permitting is not need based like Wetlands. All of that is superfluous. All we need is a description of the impacts on that particular PBN and "… for construction of power transmission lines."

D. Forst
Shoreland Section Supervisor
Land Resource Management

From: Lee Carbonneau [mailto:lcarbonneau@normandeau.com]
Sent: Tuesday, April 14, 2015 10:16 AM
To: Forst, Darlene
Subject: Northern PAss Shoreland applications

Hi Darlene –
Quick question on submitting multiple shoreland applications for one project. We already have a project overview narrative describing the NP project, route, SWQPA resources crossed, type of work taking place, range of foundation sizes, structure types, etc. It provides both context and some details for the whole project and is several pages long. I am pretty sure you don't want this general info repeated in each application now that we are separating them by River and Town (or maybe you do?). Right now, the draft individual applications list the activities in each particular Shoreland, without repeating much of the overview narrative. Shall we put the overview narrative in a cover letter and submit all of the applications under that one cover letter? Omit it entirely? Separate cover letter for each application with limited info? Any other suggestions?
Lee

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MEMORANDUM

To: Tony Tur USFWS, John Kanter NHFG
From: Sarah Barnum, Normandeau Associates
Date: May 1, 2015
Re: Notes from April 29, 2015 Meeting Regarding Kbbs, NLEBs, and Northern Pass

The participants listed below met on April 29 at 1:00 at the USFWS's New England Field Office conference room to discuss the approach to estimating impacts to Karner blue butterflies as a result of the Northern Pass project, as well as the proposed survey for northern long-eared bats in the Northern Pass project area.

Participants: Anthony Tur, USFWS; John Warner, USFWS; John Kanter, NHFG; Dan Belin, Ecology + Environment; Jake Tinus, Burns and McDonnell; Lee Carbonneau, Normandeau Associates; Sarah Barnum, Normandeau Associates.

Karner Blue Butterfly Discussion

Tony stated that in spring 2014, Praxair, owner of the Concord lupine site, planted nectar plants and lupine in ROW and the adjoining area to the east that is being actively managed to benefit Kbbs.

Since data on lupines was collected in 2011 and the populations have expanded since this time, everyone agreed that these parcels will have to be resurveyed to determine the current extent of lupine patches.

Tony stated that in lupine patch in Pembroke (LP-17), transient Kbb males have been observed but there is no reproduction and it is not considered a self-sustaining population. Impacts here will not cause take, and no further consideration of this area is needed. The Air National Guard surveys this area periodically, and may actively manage it for Kbbs in the future, but currently no management actions are being implemented in this location.

Tony stated that there are multiple individual populations of Kbbs in the Concord area, and they do not function in a classic meta-population manner, as there is very little exchange of individuals between each sub-population. The population in and around the Concord lupine patches is known as the "Main Population", as it was the last remaining population in the Concord area when active management began in the 1990s. Tony indicated that immediately south of Regional Drive, there is a population that is considered an important part of the Main Population. Lee indicated that NPT did

not perform studies outside of the ROW due in part to the complexity of getting permission to access properties. The population on the Airport is now the largest population in Concord.

Tony discussed primary (lupine) vs secondary habitat (nectaring plants, grasses shrubs), and stated that the Biological Opinion (BO) will need to address impacts to both. So the Biological Assessment (BA) will have to evaluate impacts to both.

There was general discussion and general agreement that direct impacts to Kbbs should be evaluated by determining what percent of the Main population will potentially be impacted by construction activities, and that this should be evaluated by counting eggs/stem of lupine then estimating the number of lupine stems that will be impacted during construction. The egg survey should be conducted for the second brood, sometime in July. Exact methods and timing should be based on the literature and the results of previous studies, especially the study conducted for the Concord Airport by Smart Associates. The population estimate based on egg counts can also be augmented with results of NHFG's mark/recapture studies of adults.

Tony stated that he will send Normandeau a copy of the report produced by Smart Associates.

John K. stated that the will send Normandeau a copy of the mark/recapture study results

There was a general discussion about the practicality of reducing impacts by shifting structure locations. Jake and Lee informed everyone that shifting the corner structure is not possible, and that shifting other structures would have a ripple effect, causing adjacent structures to be shifted as well. Some avoidance may be possible, but it is likely to be limited. John W. expressed that it would be a little premature to re-engineer structure locations at this time until the data from this year's fieldwork is collected and analyzed. The structure locations will be reviewed once more after further lupine survey.

There was a general discussion of how construction timing could increase or decrease impacts to Kbbs. Winter construction would have the fewest impacts to Kbbs, and other species. Lee and Jake stated that Northern Pass would prefer to construct during the winter, but coordinating the timing of receiving multiple permits was difficult and that summer season construction may result from these timing issues.

John K. stated that listed snakes, i.e., hognose and black racer, should also be considered where looking at impacts based on timing of construction, and that impacts to hibernacula could occur in winter. John K. asked if Normandeau had sufficient information about known locations of listed snakes in the Project Area, and Sarah replied that she was unsure if the information she had was comprehensive. John K. stated that he would have his staff make sure NHFG provides complete information to Normandeau about how listed snakes use the Project Area.

There was a general discussion about calculating the amount of mitigation needed. John W. explained that the ESA requires that a project have no significant impacts to a listed species or that if impacts will occur, conservation measures must be implemented to create an overall net benefit to the species. Mitigation is not the appropriate concept. There was general agreement that post-construction restoration of on-site disturbance will provide some benefits to the species.

Sarah stated that because there will be take and some permanent loss of habitat due to the structure footings, additional conservation measures would almost certainly be needed to provide a net benefit, and this precipitated a general discussion of off-site conservation measures. There was general agreement that both acquiring an off-site parcel and managing it to benefit Kbbs, and managing other locations of the existing ROW to benefit Kbbs would be desirable from the point of view of improving the long term survival of the overall Concord Kbb population. Tony and John K. agreed that the current program to manage habitat for Kbbs was effective but running out of accessible land to manage. More real estate anywhere from the Praxair site to Garvin's Falls would be a benefit. Also, the existing ROW can provide a dispersal corridor if more of it were managed to create suitable Kbb habitat. PSNH has a very good track record of committing to and conducting vegetation management to benefit Kbbs, and the agencies would view commitments to expand this type of vegetation management as likely to be successful.

John K. stated that the federal Kbb consultation process will meet State requirements for this species, but he noted that the other state listed species that are present in the project area will be needed to be addressed for state permitting.

Action items resulting from the Kbb discussion:

1. Normandeau will create a work plan to:
    a. survey the current extent of lupine in the portion of the Project Area that coincides with the Concord Main Kbb population, and to
    b. estimate what percent of the Main population will be impacted by construction of the Project.
2. Tony will provide a copy of the study that estimated the Kbb population size for the Concord Airport BA to Normandeau.
3. John K. will provide a copy of NHFG's mark recapture study to Normandeau.
4. John K. will have his staff make sure NHFG provides complete information to Normandeau about how listed snakes use the Project Area.
5. John K. and Tony will review map of Concord area to take a closer look at identifying potential properties for off-site mitigation.

Northern Long-eared Bat Survey Discussion

Sarah stated that the survey methodology described in the 2015 Guidelines was clear and that she had no questions about how to conduct the survey. Rather, she had two questions about where to conduct the survey, based on interpretation of the Interim 4(d) rule.

First, the vast majority of the Project Area that follows an existing, cleared ROW requires no survey, as the clearing required for the Project does not exceed 100 feet. The 4(d) rule grants an exemption from take if clearing along an existing, cleared ROW does not exceed 100 feet. However, there are some (less than 10) small areas (less than 200 feet in length) that do exceed 100 feet. Do these areas need to be surveyed? Should they be surveyed under the linear or the non-linear protocol?

Second, some of the access roads that will be used in Coos County are old logging roads and will need to be widened. How big/well maintained do these roads need to be to be considered "an existing, cleared ROW"? If these roads are not considered existing, cleared ROW, should they be surveyed under the linear or the non-linear protocol?

Sarah also stated she would like some guidance on how the USFWS will determine if the weather requirements for a valid survey night are met. The Berlin NOAA weather station serves the entire survey area which is large, and may not adequately reflect weather conditions throughout the survey area. Lee stated that the Project could consider providing suitable weather station equipment to the NPT project office in Groveton.

John W. stated Susi von Oettingen would provide guidance on these questions. He and/or Tony would convey the questions to Susi, but Sarah should identify the areas along the existing ROW and send a description of these areas and maps to Susi for her review.

John K. indicated that the State F&G would defer to the USFWS on the NLEB issues as well, and Dan Belin indicated that the USFS had indicated the same. Dan also affirmed that the DOE team is leading the Section 7 consultation process for all federal species and that is would run parallel with preparation of the draft Environmental Impact Statement (EIS).

Action items resulting from the NLEB discussion:

1. Sarah will identify, describe, and map the areas on the existing ROW where clearing will exceed 100 ft, and provide this information to Tony, who will pass it over to Susi.

From: Forst, Darlene
To: Lee Carbonneau
Subject: RE: Shoreland Question
Date: Saturday, May 30, 2015 2:27:15 AM

I don't believe we require abutter lists but I think tax maps are appropriate.

_____
From: Lee Carbonneau [lcarbonneau@normandeau.com]
Sent: Wednesday, May 27, 2015 3:42 PM
To: Day, Craig
Cc: Forst, Darlene
Subject: Shoreland Question

Hi Craig –
Quick question, regarding the Northern Pass shoreland applications:
If a project is exempt from notification of abutters:

per RSA 483-B:5-b-III. Construction of public roads, public utility lines and associated structures and facilities, and public water access facilities shall be exempt from the permitting fees of paragraph I and the abutter notification requirements of paragraph IV-a.

do the Shoreland applications still need to include the tax maps and abutter list?

Thanks!
Lee

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Phone Conversation: Lee Carbonneau, Normandeau Associates, Inc, and Lori Sommer, NH DES Wetland Mitigation Specialist, June 12, 2015, 1:15 PM

I spoke with Lori about our mitigation outreach efforts, preliminary feedback from the towns, and the project-acquired lands for conservation. Lori agreed that our approach of reaching out only to towns with >10,000 square feet of mitigatable impacts was a reasonable one. We discussed the concept of culvert replacements and bank stabilization projects as mitigation, and I mentioned that the NPT project stream impacts are all either temporary crossings, or buffer clearing. She said that for NHDES to accept culvert replacements and bank stabilization as mitigation they would need an analysis of the associated benefits to the watershed. She mentioned the work with NHDOT to collect culvert data and apply a model to prioritize remediation efforts that would enhance stream function, which is still a work in progress, and directed me to Shane Csisky in DES for any available data. I will Call Shane to see if there are high priority culverts in NPT Project towns that match the requests we have received. We also discussed the red-listed bridge in Deerfield. Lori indicated that given the importance of the Lamprey River, if the bridge replacement could be shown to improve aquatic habitat somehow (relieve scouring, or something similar), then it might be relevant for mitigation. If remediating the deficiency does not protect or enhance the ecological resource, then that would not be a great fit for the mitigation package. And it would be expensive. Lee will visit the site to see if there is an argument to be made. Lori wished me luck setting up the mitigation meeting, and offered to review any interim mitigation information we have and provide feedback.

Northern Pass Transmission Project

NH Natural Heritage Bureau Pre-Application Meeting Agenda

June 15th 1:00 to 3:00 PM

- Introductions – attendance sheet
- Project Overview and Status
    - Project Location and Overview
    - History and Status of Botanical Surveys Since 2010, limited to ROW, all botany done to work plans (April 2011 work plan and Addendum May 2014) Currently working on addendum to work plan. Need to survey access roads this year.
- Plant Packets from 2014 surveys (to be submitted)
- Preliminary Impact Assessment—waiting on DOE draft EIS.
    - Data/Map Package--need info from WMNF, Normandeau will circle back to NHB on that because they are still reviewing alternative routes.
    - Project-related activities--Isotria surveys and proposed widening areas this summer
    - Direct, Indirect, Temporary and Permanent impacts
    - Draft SEC rules and S3 Communities-What would NHB look for in S3 communities? In new ROW vs. existing transmission ROW? What level of effort would we look for in mapping out S3 communities in each of these areas?
    - NHB Concerns, Resource Issues
- Impact Avoidance, Minimization and Mitigation NHB Thoughts, recommendations—Engineers and staff have worked in citing the location prior to submitting to NHB. Resurveys needed and will happen prior to work. Is a permit required to collect seed?
- Follow-up / Next steps—see attached follow ups document
    - Additional information needs from NPT?
    - Consultation/Coordination needs for permit applications
    - Meeting notes

Follow ups:

- Utilities guidance document—Sabrina spoke with Melissa and this document is for maintenance work only.
- Hierarchy of protecting species at each site i.e.,avoid, perform clearing/construction in winter, then flag or fence off areas, etc.
- Amy reviewed the April 2011 work plan from Normandeau and May 2014 Addendum—Amy looked for these documents (and Sabrina spoke with Melissa) and the documents that we have are the "21812 Northern Pass Plant Survey Workplan pdf—when opened the title is "Methodology for survey of rare plant species and exemplary natural communities March 2011." NHB does not have an Addendum. Lee—could you please email it to us?
- Evolution of S3 Communities: What level of effort required to evaluate the S3 communities in existing ROWs (current management) and non-existing ROW?—This proposed rule is still in the public comment period.
- Jake will get info on engineering avoidance and minimization efforts near the potential exemplary natural community near Sugar Hill/Dixville. Could Susan and Dennis examine if it is a *northern hardwood seepage forest* instead of a *circumneutral hardwood forest seep?*
- Sabrina will ask Melissa Coppola/Bill Nichols about timber matting or light weight matting as an option for the species that prefers disturbed areas.
- Any activities that involve filling and grading negatively impact all plant species (including species that prefer disturbance). Matting in winter is acceptable, but matting on top of rare species during the growing season would mostly likely compress and damage/kill rare plants. Delineating and avoiding and minimizing is preferable.
- NHB to provide recommendations for seed mixes to be used for restoration.
- NHB to verify with Bill Nichols whether there are any restrictions on collecting seed of RTE plants.
- Need info from WMNF, Normandeau will circle back to NHB on that because they are still reviewing alternative routes
- Northern Pass is asking for a letter in writing from NHB

From: Day, Craig
To: Lee Carbonneau
Subject: RE: Shoreland Question for Northern Pass
Date: Wednesday, June 24, 2015 11:55:07 AM

Afternoon Lee,

The roads would be considered accessory structures and for the impervious surface going over 20% and/or 30%, ask for a waiver from RSA 483-B:9V.(g) and the reason for the request.

Have a good day,

Craig

From: Lee Carbonneau [mailto:lcarbonneau@normandeau.com]
Sent: Wednesday, June 24, 2015 11:43 AM
To: Forst, Darlene; Day, Craig
Cc: Jacob Tinus (jtinus@burnsmcd.com); Tracy Coolidge
Subject: Shoreland Question for Northern Pass

Hi Darlene and Craig –
We have a few shoreland applications for Northern Pass where the pre-construction impervious area (calculated within the road ROW [for underground lines] or transmission ROW [for overhead lines]) either already exceeds 20%, or in some cases 30%, or is so close to the threshold that the addition of a single structure foundation might tip it over. These are locations where there is an existing paved or gravel road that parallels a river. (By the way, we are calling the roads accessory structures, since they are not transmission related – is this correct?). From a common sense standpoint, it seems unreasonable to require a stormwater management plan in these instances – can we/should we request a waiver from this requirement? Advice is welcome!
Lee

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Northern Pass Transmission Project

Pre-application Meeting – NHDES Offices, Concord, NH – 7/2/15

401 Water Quality & Alteration of Terrain Pre-Application Meeting

Attendees:
Ridge Mauck
Gregg Comstock
Owen David
Lee Carbonneau
Brian Sakidovitch
Katy Baragar
Dana Bisbee

Lee provided project overview describing the major elements of the current proposed project including:

- Expecting a Draft DEIS in July
- Working to submit the SEC application by the end of September
- There were floodplain complications at Transition Station 2 so the site was relocated

Pollutant Loading – Brian and Katy provided a summary of the seven (7) sites (Transition Stations #1, #2, #3, #4, Franklin, Deerfield, and Scobie Pond) and their calculated pollutant loads using the Simple Method spreadsheet. They walked through the calculations and assumptions using the Franklin site as an example. The following items were discussed and agreed upon:

- The analysis area for each site is the watershed. The watershed is defined by all flow upstream of the site to the most downstream outlet/discharge point, located at the site's property line or where drainage from the site flows into the first surface water (as defined in Env-Wq 1700). The analysis area boundary must be the same between pre- and post-development. Loads will be presented in both pounds and percentages.
- There was discussion of land use classification for the developed areas, whether to categorize the sites as Rural Open or Urban Open in the post-development condition. Upon review of the pollutant loading guidance, it was decided that Rural Open is more appropriate and more conservative, so Rural Open shall be used.
- The surface waters at Transition Stations 1 through 4 are classified as Outstanding Resource Waters (ORWs). In accordance with Env-Wq 1708.05, there can be no permanent degradation in ORWs. Post-development loads may not exceed pre-development loads. The remaining stations (Franklin, Deerfield, and Scobie Pond) shall also match or be below the pre-development pollutant loadings to the maximum extent possible, at the discretion of the DES.
- There was discussion about Disconnected Impervious Area (DIA) and how to incorporate credit for this design. The station pads are surfaced with gravel and not entirely impervious. A site may take credit for DIA if disturbed area drains though appropriate best management practices (BMPs) prior to discharge. According to the pollutant loading guidance, the percent impervious

in the pollutant loading analysis can be set to zero for areas that drain to an infiltration system that is designed in accordance with AoT design standards (i.e., stores and treats the 1" rainfall Water Quality Volume (WQV), has no underdrain, maintains minimum separation from the water table, etc.) .

- Disconnected Impervious Area credit will be incorporated into the new calculations and analyzed again to ensure the loads are reduced. If the loads still do not meet standards, the design team will modify the stormwater management BMPs to ensure post-development loads are equal to or less than pre-development loads to meet the antidegredation regulations and Outstanding Resource Water requirements. Gregg indicates that in most freshwaters its usually more important to limit phosphorus and total suspended solids than total nitrogen.
- For the purposes of the pollutant loading requirements, the point of analysis is the most downstream outlet/discharge point which is located at the site's property line or where drainage from the site flows into the first surface water (as defined in Env-Wq 1700) and it includes the complete limits of disturbance for each respective station.
- All sites discharge to waterbodies identified in the NE Regional Mercury TMDL. DES confirmed the Mercury TMDL does not impact the sites because the proposed development does not create any mercury byproducts (which was confirmed by Katy).

Owen raised the issue of access road deicing during the winter and questioned the use of chlorides on the sites' access roads as a potential source of pollution. It could not be confirmed at the meeting that chlorides would be used or how the access roads will be maintained. This question will be addressed in the application.

Lee informed the attendees that the Deerfield station layout was modified to avoid the need for detention basins being placed in wetlands. The area of disturbed wetlands is approximately equal; however, the drainage patterns are improved.

Lee inquired if the DES would like to see all 47 HUC 12 watershed report cards included in the project applications. DES responded saying they do not need to review all of the watersheds, they only need the watersheds associated with the station sites. The watersheds associated with transmission line design do not need to be submitted.

Lee asked if the project should adhere to and reference the turbidity monitoring protocols in the February 2, 2009 DES Inter-Department Communication entitled "*Amendment of the November 16, 2006 Guidance for BMP Inspection and Maintenance and Turbidity Sampling and Analysis Plan for I-93 Expansion Project Water Quality Certification*,". Gregg indicated that the DOT reference document for a large highway project may not be entirely appropriate for BMP inspection and turbidity monitoring for Northern Pass, but it's a good start. DES typically requires applicants to submit a BMP Inspection/Turbidity monitoring plan which is where specifics can be worked out. Gregg will provide Normandeau with the updated version of the I-93 guidance document for our review.

Action Items:

- Northern Pass Design team to re-evaluate each site based on discussion
- DES to provide the updated I-93 BMP/Turbidity guidance to Normandeau

Memorandum

To: Files

From: Lee Carbonneau

Date: July 20, 2015

Re: Northern Pass Project – Meeting with Heidi Holman, NHF&G 7/15/15

Sarah Barnum, Susan Hegarty and I met with Heidi Holman at NHF&G on July 15, 2015 and then carpooled to the Karner blue butterfly captive rearing facility on the grounds of the NH National Guard. The goal of the meeting was to get training in the identification and survey for Karner blue butterfly (Kbb) eggs, which Normandeau will conduct in the Northern Pass ROW in Concord and Pembroke.

Ms. Holman explained the captive rearing procedures, showed us larval and adult butterflies, and gave us first-hand experience looking at vegetative material with Kbb eggs, which F&G personnel had arranged for our use prior to our arrival. We discussed the Kbb work plan, including the alternative of counting stems, rather than plants, as in some locations the plants are very dense, which was acceptable to Ms. Holman. We discussed what was known about egg laying preferences, such as sun or shade, stem or leaf, etc. Ms. Holman also suggested delaying the search for another week or two, as there were not as many females flying as expected this week.

We also discussed the funding of the program, and the limiting factors in the recovery of the species. Funding is provided from several sources, including Praxair, a landowner in the Concord Karner population area. This company also has provided important equipment for overwintering the eggs that should improve survival. The primary limiting factor in the recovery is currently the availability of suitable habitat in the vicinity of the main population in the Concord airport area. Lee asked if there would be any value to providing suitable habitat that is slightly disjunct from the main population area, such as transmission ROW south of the managed area. Ms. Holman indicated that it would still be of value, since any new population location that is established would continue to be sustained and enhanced with input from the captive rearing program, just as the current population is enhanced now. Ms. Holman indicated that all populations in the Concord area are likely to require some level of enhancement into the foreseeable future, as the remaining suitable habitat for Kbbs in the Concord area is likely insufficient for these populations to thrive if not managed in this way.

We left with a good search image for Kbb eggs, and gratitude to NHF&G for sharing this important information. The work plan will be revised slightly based on things learned, and will be submitted to F&G prior to the field survey.

Northern Pass Transmission Project

Pre-application Meeting – NHDES Offices, Concord, NH – 7/15/15

Compensatory Mitigation Meeting

Attendees:
Lori Sommer – NHDES
Tim Drew – NHDES
Mark Kern – USEPA
Mike Marchand – NHF&G
Amy Lamb – NHDRED-NHB
Lee Carbonneau – Normandeau
Jake Tinus - Burns & McDonnell
Dana Bisbee – Devine Millimet

Lee Carbonneau provided an overview of the project status, schedule, and ongoing fieldwork, including bat surveys, Karner blue butterfly egg surveys, rare plant surveys, and site walks with the Army Corps of Engineers (Army Corps) to review wetland delineations. Components and details of the mitigation package are still being prepared. Lee indicated the upcoming filing milestones include issuance of the Draft Environmental Impact Statement (DEIS) likely to be issued the week of July 20 and submittal of the New Hampshire Site Evaluation Committee (SEC) application by the end of September 2015. Lee handed out a number of documents for reference and discussion with the group and indicated that none would be left behind as they are all in draft form and subject to change.

Avoidance and Minimization
Lee reviewed the table summarizing efforts by Northern Pass Transmission (NPT) System to avoid and minimize impacts to various habitats and species and for compensating for unavoidable impacts.

- Northern Long-eared Bats (NLEB)
    - Lee explained that Normandeau Associates, Inc. (Normandeau) is performing acoustic monitoring and that a few hits have been recorded. Due to the limited distribution of the species, mist netting is likely not going to be performed, rather, time-of-year clearing restrictions would prevent incidental take. Lori Sommer inquired if the survey would need to be repeated prior to construction and Lee responded that the U.S. Fish & Wildlife Service (USFWS) had previously indicated to the NPT team that that would not be necessary, as NLEB populations are expected to continue declining in New Hampshire.

- Mike Marchand indicated that he would like to review the avoidance and minimization criteria table prior to the SEC filing as that would provide information to help New Hampshire Fish &Game (NHF&G) make recommendations to the NPT team ahead of filing. (Prior to the start of

the meeting Mike also suggested that NPT meet with NHF&G at its next project review meeting to be held on August 6, 2015 from 9 am to 12 pm. Where?) Lee indicated that the NPT team would discuss this request and would likely provide the requested information and attend the meeting on August 6.

Preliminary Permanent, Temporary and Secondary Impact Calculations

Lee said that permanent jurisdictional wetland impacts amount to less than three acres. Temporary and secondary impacts amount to approximately 160 acres and 30 acres, respectively. Lee described the methods used and assumptions made by NPT to arrive at these numbers.

- Wetland, Stream and Vernal Pool Buffer Impacts
  - Mark Kern indicated that direct wetland impacts are not likely to be the biggest issue for NPT. Mark explained that the percentages of secondary impacts that must be mitigated (15% of wetland conversion, stream and vernal pool buffers and 5% for temporary impacts on organic soil) are appropriate for portions of the project located along an existing right-of-way (ROW). However, for a new ROW, the Army Corps and the U.S. Environmental Protection Agency (EPA) are now requesting that 20% be used for wetland conversion, stream and vernal pool buffers calculations for secondary impacts along new ROW. Mark suggested contacting Ruth Ladd or Paul Minkin at the Army Corps with questions or comments.

- Vernal Pools
  - Lee explained that vernal pools were surveyed along the project corridor during the appropriate time of year and pools were ranked in accordance with the methodology similar to that used by the State of Maine. Lee indicated this was consistent with the approved work plan. Mark indicated that buffer impacts to vernal pools cannot be just calculated for "high value" pools. EPA would like most vernal pools to be included in the secondary impact calculation but would entertain excluding very low value vernal pools which would require further justification and review at a follow-up pre-application meeting. Mike indicated that he had concerns about ranking vernal pools based on egg mass counts and a single field visit and said that ideally surveys are performed over multiple years as there is variability in vernal pools from year to year. Lee explained that a lot of data was collected for each vernal pool in addition to egg mass counts, including hydrology, vegetation, temperature, inlets and outlets, etc. Jake Tinus suggested that Normandeau could review its data again to see which of the other pools might be ranked higher and therefore included in buffer impact calculations.

- Streams/Fisheries/Aquatic Organisms
  - Lee described the types of fisheries surveys and modeling that was performed to assess potential impacts to brook trout and cold water fisheries habitat. The primary risks to streams include sedimentation, which is minimized through best management practices,

and thermal impacts associated with tree canopy removal. Results of the assessment indicate there are a few locations in the new ROW where daily mean water temperatures would rise at the hottest time of the year, and one location where the temperature rise might cause brook trout to avoid that small segment of the stream for a short period of time. Lee stated that the following buffer distances were assumed and used to calculate secondary impacts: perennial streams, 100 feet; intermittent streams, 50 feet; ephemeral streams, 25 feet. Mark indicated that these assumptions are fine with EPA, but NPT should contact the Army Corps for concurrence. Lori indicated that she would like to see a breakout of the amount (acreage) of tree clearing in the riparian areas associated with perennial, intermittent and ephemeral streams included in the wetlands permit application. Mike requested reports associated with fisheries and aquatic organisms. Jake indicated that natural resource reports were provided to agencies previously in 2014. Lee indicated that the previous reports included existing conditions descriptions but did not address impacts. Further, she said that the reports are in the process of being updated to be included in the SEC filing.

Animal Surveys

- Lee indicated that no dwarf wedge mussels or eastern pearlshells were observed during mussel surveys.
- Lee stated that surveys for Bicknell's thrush in likely habitats, i.e. high elevation spruce-fir forest, were conducted and no Bicknell's thrush were observed.
- Lee mentioned that winter tracking surveys were conducted for Canada Lynx, Bobcat and Marten. Potential denning habitat was observed for Canada Lynx in one location.

NPT's Approach to Wetlands Mitigation

- Lee explained that NPT has been contacting towns along the Project route that would see 10,000 square feet or greater of mitigatable wetland impacts (permanent and secondary) for their ideas on potential mitigation projects. Out of 31 towns along the route, 15 towns were contacted that meet this threshold. In addition, five Local River Advisory Committees and seven land trusts were contacted, most of which did not offer specific ideas for mitigation.
    - Only a few towns responded with project ideas; mostly culvert replacement projects or streambank stabilization projects. There was general concurrence that these ideas were likely to be unsuitable, as Project stream impacts are minimal, the culverts are not priorities based on the watershed survey by the New Hampshire Department of Environmental Services (NHDES), and most of the projects suggested were not in the project area. Lee indicated that she had conferred with Kevin Nyhan at the New Hampshire Department of Transportation (NHDOT) regarding the statewide culvert assessment project, but Kevin indicated that he did not think there was a mechanism to enable third party funding, i.e. from NPT, to assist with this program, and that funding

through the New Hampshire Aquatic Resource Mitigation (ARM) Fund was more appropriate.

  - Other ideas that were dismissed by the state or EPA included a Japanese knotweed removal project (in Mark's opinion, not viable unless monitoring and maintenance were included for several years) and an educational project involving wetlands assessments.
  - The City of Franklin (Franklin), within the Webster Lake watershed (currently phosphorus-limited), proposed several conceptual stormwater improvement projects that would be helpful in reducing phosphorus loading into the lake. Franklin indicated that it was looking to obtain funding from NPT to assist with this effort, possibly using the money to match money from other grant sources. Mark indicated that this type of arrangement was not really appropriate or supportable by EPA unless the work was being performed by the applicant, or there was a specific defined shovel-ready project such as wetland restoration or installation of stormwater infrastructure enhancements. Mark felt that if the project was not shovel-ready, a contribution to the ARM fund was probably more appropriate, and the city could apply for funding from this source.

- Lee reviewed the maps of properties in the northern part of the state in Coos County which are the centerpiece of the mitigation package. She said that these properties were purchased for the project and that many of them have good conservation value, including intact buffers to aquatic resources and wildlife habitat to offset project-related impacts. Some are logged and in various states of regeneration. Others include rare species or provide good wildlife habitat.
- In addition to conservation values, other folks on the NPT team are working with ATV/snowmobile trails groups to potentially use portions of these properties to enhance the network of existing trails used for recreational activities. Tim Drew pointed out that he was familiar with the "Ride the Wilds" effort. Lori and Mark indicated concern about trail development for motorized vehicles as being potentially at odds (due to potential "wandering" riders) with conservation efforts unless the parcels to be conserved could be separated from ATV trails through deed restrictions (reserved rights) or by segregating the recreational activities from the conserved areas. Mark indicated that "commercial forestry" is also viewed as contrary to conservation efforts.
- Mark indicated that the federal mitigation rules require a demonstration that a proposed conservation parcel is under threat of development. He also emphasized that it would not be appropriate to conserve land only in the northern part of the state for the impacts from the Project without additional conserved parcels near where the impacts are located or payment to the ARM fund for these impacts.
- Lee explained that the project is looking at other parcels in other parts of the state but they are smaller parcels of land suitable for preserving land for Karner blue butterfly in the Concord area. She indicated that Normandeau is presently resurveying parcels along the right-of-way for wild lupine and Karner blue butterfly. However, if suitable parcels are not available, alternative mitigation for impacts to pine barren species would be needed. Lee asked if a contribution to

the Wildlife Foundation of NH would be appropriate, and Mike indicated that it would need to be considered by the NHF&G Department.

- Given the lack of suitable parcels identified along the southern portions of the route, an ARM Fund contribution would be necessary to compensate for impacts in that part of the Project route. Mark and Lori indicated that they are receptive to the idea of conserving land as long as it can be shown to compensate for lost functions and values and habitat.
- Lori asked about an easement holder, and Lee indicated that NPT is working confidentially with an organization with which to potentially team as a conservation easement holder for the various parcels of land. However, should the organization decide not to team with NPT, Lee asked if an ARM fund payment could be made for the entire project. Lori and Mark indicated that this would be acceptable to the agencies should it come to bear.
- Other agency guidance included:
    - The level of effort expended by NPT to identify potential mitigation projects is satisfactory as far as NHDES and EPA are concerned.
    - Lori indicated that HUC8 (modified) watersheds could be used to classify the location of impacts vis-à-vis designated conservation parcels if it is not possible to find a suitable conservation property to mitigate for impacts in each of the towns where they are located.
    - NPT should use the DES template to determine setback distances from aquatic resources.
    - Lori said that the conservation deed language should require management plans for the conservation parcels.
    - Lori indicated that for any conserved parcels, the DES Baseline Conservation Reports are not necessary for the filing but must be completed prior to the Project receiving approval.
    - Lori stated that the ARM fund calculator was recently updated and that the current version should be used to calculate payment, and Mark concurred that the ARM fund calculation worksheet would be suitable from the federal agency perspective also.
    - Lori indicated that the ARM fund payments could also be used for mitigating wildlife and listed plant impacts, as NHDES is able to specify what types of projects for which the ARM funds are available. Amy Lamb concurred that this could work for listed plant impacts.
    - Mike indicated that NHF&G has newly conferred authority to charge for environmental reviews and that this is likely to be mentioned in the meeting on August 6 should NPT attend.

<u>Other Mitigation Package Components</u>

- Lee and Jake described the donation to the National Fish and Wildlife Foundation (NFWF) on behalf of NPT. They specified that this $3 million donation, half of which is contingent upon permit issuance, would be used for existing NFWF initiatives in New Hampshire related to

forests, streams and wildlife habitat, and could also be used for other NH projects that are relevant to NPT mitigation.

- Jake stated that the Project is still open to hearing of any other mitigation opportunities that the agencies deem as potentially suitable for inclusion in the NPT mitigation package.

Action Items:

- NHF&G requested GIS shapefiles of the potential conservation parcels to enable its biologists to overlay its information onto that presented by NPT.
- NHF&G requested additional information on the natural resource assessments that were performed by NPT. NPT to consider how best to approach this given that documents are still being revised to be included in SEC application. Perhaps a summary document could be prepared.
- NPT should consider attending the meeting on August 6 as invited by NHF&G. Other agencies to attend?
- Mike Marchand will inquire whether a Wildlife Heritage Foundation of New Hampshire donation would be a possible mitigation option for wildlife impacts.
- Mike requested that the wetland permit application indicates that black racers and other (rare, threatened, or endangered) RTE species will be protected during construction.

Follow up:

- Lee Carbonneau sent the Northern Pass wetland impact categories (direct, temporary, and secondary) and methods being used to calculate these impacts to Dave Keddell, Ruth Ladd and Paul Minkin of the Army Corps, and received a note back from Dave Keddell that they concur with the approach.

6

From: Lee Carbonneau
To: "marvin.bellis@eversource.com"; Stearns, Phil
Cc: theresa.eberhart@eversource.com; Perron, Jon; Fanara, Scott; Jacob Tinus (jtinus@burnsmcd.com); Minchello, Gail; Emerson, Brian
Subject: RE: Shoreland/UG impacts List
Date: Tuesday, August 18, 2015 9:22:00 AM
Attachments: image001.png

I just spoke with Darlene Forst at the Shoreland Dept to discuss the needs for the road ROW easement deeds, and she said as an alternative, the project can provide a document describing its legal right to be in the road ROW. I discussed this with Marvin, and he indicated that the legal team can write something that will suffice (needs to address all UG segments in the protected shoreland).

From: marvin.bellis@eversource.com [mailto:marvin.bellis@eversource.com]
Sent: Tuesday, August 18, 2015 8:55 AM
To: Stearns, Phil
Cc: Lee Carbonneau; theresa.eberhart@eversource.com; Perron, Jon; Fanara, Scott; Jacob Tinus (jtinus@burnsmcd.com); Minchello, Gail; Emerson, Brian
Subject: Re: Shoreland/UG impacts List

Let us know how you would plan to obtain the easements and we'll figure out whether this needs a meeting. Thanks.

Sent from my iPhone

On Aug 18, 2015, at 8:53 AM, Stearns, Phil <PStearns@cornerstoneenergyinc.com> wrote:

> To All,
>
> None of the easements for the UG section, where the NH DOT roads intersect the Shoreland Protection Act area, have been obtained.
>
> Jon & I determined that a conference call was needed to determine exactly what was needed and the best way to obtain the necessary information.
>
> Reading through the chain of emails, during my absence yesterday afternoon, I believe a decision was made regarding the need for a conference call.
>
> Please advise.
>
> _____ _____
> _____ _____
>
> **Phil Stearns**
> Right of Way Specialist
> *Energy Infrastructure*

9 State Street
Suite# 3
Groveton,NH 03582
Office: 603.636.0014
Cell: 603.631.2195
pstearns@cornerstoneenergyinc.com
www.CornerstoneEnergyInc.com

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From: Lee Carbonneau [mailto:lcarbonneau@normandeau.com]
Sent: Monday, August 17, 2015 2:40 PM
To: Emerson, Brian; Stearns, Phil
Cc: theresa.eberhart@eversource.com; marvin.bellis@eversource.com; Perron, Jon; Fanara, Scott; Jacob Tinus (jtinus@burnsmcd.com)
Subject: RE: Shoreland/UG impacts List

Brian –
I don't have a list that calls those parcels out separately, and it would take me time to go through the applications to get it done. We have been working closely with Phil on what we need for deeds for shoreland, so he may be able to give you that list more easily than I can. My shoreland assistant is in the field today..

From: Emerson, Brian [mailto:BEmerson@cornerstoneenergyinc.com]
Sent: Monday, August 17, 2015 2:17 PM
To: Stearns, Phil
Cc: theresa.eberhart@eversource.com; marvin.bellis@eversource.com; Perron, Jon; Fanara, Scott; Lee Carbonneau
Subject: Shoreland/UG impacts List

Phil,
Marvin is wondering if you have researched the full list from Normandeau of all of the properties where the UG routes intersect with the Shoreland Protection Act (SPA) areas. I know you did some road easement research on some of those areas a while back but I am not sure what the status of that research is. Please give Marvin or Terri a call and let them know where that stands. Thanks.

Lee,
Could you please forward the most-current list of the SPA impacted UG parcels to all on this email. Thanks.

Brian Emerson
Right of Way Specialist - Energy Infrastructure
Cornerstone Energy Services, Inc.
PO Box 249
9 State Street - Suite# 3
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From: Adams, Collis
To: Lee Carbonneau; Sommer, Lori; Keddell, David M NAE
Cc: Dana Bisbee; Jacob Tinus (jtinus@burnsmcd.com); Mark Kern (kern.mark@epa.gov); William McCloy
Subject: RE: Northern Pass wetland application questions
Date: Monday, August 24, 2015 11:05:16 AM

Lee –

See my comments below in red, sorry for the delay. Collis

From: Lee Carbonneau [mailto:lcarbonneau@normandeau.com]
Sent: Friday, August 21, 2015 2:23 PM
To: Sommer, Lori; Keddell, David M NAE; Adams, Collis
Cc: Dana Bisbee; Jacob Tinus (jtinus@burnsmcd.com); Mark Kern (kern.mark@epa.gov); William McCloy
Subject: RE: Northern Pass wetland application questions

Thank you all for agreeing to meet on September 10th.
We are still hoping to get some feedback ASAP regarding our questions below (thanks Mark for already chiming in on these). The answers have a substantial impact on the permit application package!
Thanks!
Lee

From: Lee Carbonneau
Sent: Monday, August 10, 2015 5:22 PM
To: Sommer, Lori; 'Keddell, David M NAE'; Mark Kern (kern.mark@epa.gov)
Cc: Collis Adams (collis.adams@des.nh.gov); Dana Bisbee; Jacob Tinus (jtinus@burnsmcd.com)
Subject: Northern Pass wetland application questions

Greetings! I have a few Northern Pass permit application questions for your consideration, and I understand that the answers may be different for the NHDES and 404 applications:

1. Photographs - The Northern Pass project will have some level of impact on approximately 1,680 wetlands/streams/vernal pools. If we include one photo of every impacted resource, 4 to a page, that would be 420 pages of photos. (As you can imagine, many of these photos show a dense wall of green leaves, while others are more useful). We are wondering if you might want to consider requiring photos of just the *permanently impacted* wetlands, streams and vernal pools? That would be 256 photos (64 pages). Or maybe representative photos? Our existing conditions report has representative photos for all wetland cover types, plus photos of all of the high value wetlands. We could do something similar for the impacted set of wetlands. If a subset of photos is acceptable, would we need to request a waiver for not including photos of every affected wetland resource? Please advise. You can limit photos to those areas of permanent impacts as the temporary impacts will be restored to their original condition. If the wetland type and condition is typical of other areas then a representative photo will suffice. If there is an area that has distinctive features then include photos of those areas. To be safe and protect against an appeal on this issue you should request a waiver.
2. Abutter Notifications: The wetland permit application states: *Abutter notification shall not*

be required for logging operations, projects in utility rights-of-way, or public highway construction. Northern Pass has several development sites that are part of the transmission project, but not necessarily entirely in the ROW – for example, the substation expansions in Deerfield and Londonderry. Are these elements of the project also exempt from abutter notification? The Shoreland rules do exempt related facilities, but the wetland rules do not specify. If you are doing it for the SEC process then it seems easy enough to provide DES with the same info. I suggest you notify abutters for any work outside of the right of way.

3. Abutter lists: Do you still want us to attach a list of abutters (landowners) to the wetland applications? The list/table of landowners will also be attached to the SEC application, and all landowners along the route will be notified in accordance with the SEC rules, and obviously public meetings will be held. See 2. above.
4. Tax Maps: Does the NHDES or USACE want to see tax maps attached for the entire project route? The plan sets for the SEC and Wetlands applications will have parcel identification information that can be keyed into the list/table of landowners along the project route that is included in the SEC application (and Wetland applications, if desired). See 2. above.
5. Next Mitigation Meeting - As a follow up to the last mitigation meeting on July 15th, we would like to present our plan again, with more specificity, before we file. We expect to meet with NHF&G in the morning of September 3 to discuss wildlife impacts and mitigation in greater detail, and would like to discuss wetlands in the same timeframe. Are there any other mornings or early afternoons during the weeks of August 31 or September 6 that you might be available? I suggest you send out a Doodle poll for this item.

Thanks!
Lee

LEE E. CARBONNEAU, *Senior Principal Scientist*
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lcarbonneau@normandeau.com www.normandeau.com
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Northern Pass Transmission Project

Pre-application Meeting – NH Fish & Game Office, Concord, NH – 9/3/15

Attendees: F&G	Northern Pass (NPT) Team
Glenn Normandeau	Lee Carbonneau - Normandeau
Carol Henderson	Sarah Barnum - Normandeau
Mark Ellingwood	Dana Bisbee – Devine Millimet
Evan Mulholland	Jake Tinus – Burns & McDonnell
Heidi Holmann	
John Magee	
Will Staats	
Mike Marchand	
John Kanter	
Kim Tuttle	
Jillian Kilborn	

- Lee provided an overview of the project and status of the wildlife studies, and Sarah Barnum went through the highlights of the draft Wildlife Resources and Impact Assessment Report. This document will be finalized and included in the SEC Application submittal (anticipated in October, 2015).

- John Magee asked about the fisheries studies and Mike suggested it could be combined with the wildlife report into one document or alternatively an aquatics report that also included freshwater mussel results. Lee will send Fisheries report to John Magee for initial review.

- Sarah began a more detailed presentation of the results of the field surveys, starting with federally listed species.

- Lynx - Sarah asked about the State view of breeding lynx? Will – Pittsburg breeding, yes; expanding west of Rte 3.

- NPT NLEB acoustic surveys – calls detected in perhaps 10% of project area. NPT is awaiting clear guidance from federal government on habitat issues, but don't have it yet. John Kanter indicated that a thoughtful review of roosting habitat would be good to include in our report. Perhaps compare habitat in and out of locations with NLEB hits.

- Karner blue butterfly –

    - Lee mentions negotiations with a landowner in Concord potentially willing to sell a conservation easement to the project. Dana asks for details about management approach. Heidi and John describe that they would remove all but 10-30% of tree canopy; leave shrubs; requires 4-5 years of folks doing heavy management, then every

2-4 years thereafter for management. Expect 2 weeks of monitoring per summer with several people.

- Kbb – F&G notes that it is important to make sure that the parcel is suitable for Kbb and not currently an exemplary natural community. It will also be necessary to do an archeological survey before management. A fund for management would also be needed. This would go into the non-game account on an annual basis – similar to the New England cottontail fund related to the Eversource Scrubber.

- Reptiles – Normandeau surveyed higher sensitivity areas for reptiles – plus known locations. Mike notes that wetland impacts could affect turtles in the active or inactive season depending on the type of wetland impacted. In turtle sensitive areas, upland habitat work will be most impacting during April-October. Wood turtles hibernate in streams and rivers from Nov – March but are active in the uplands from March – October. Dense vegetation is preferred and wood turtles can be difficult to detect and therefore direct mortality during construction is a concern. For snakes (black racers, hognose), impacts to hibernacula can be most impacting and eliminate a local population, so active season work may be less impacting. A few hibernacula are known from NHFG work but most areas have not been surveyed by NHFG. There are no known good predictors for hibernacula, could be in openings or forests. To minimize impact to reptiles, detailed best management plans should be developed for each species and applied in the most likely habitats for those species. Future ROW management and maintenance is also very important. A map of Eversource ownership vs easement parcels was requested and additional discussion on construction and maintenance/management BMPS.

- Grassland Bird. Normandeau indicated no habitat for at risk grassland bird specialists.

- Common nighthawk – NH Audubon indicate these nest in ROW. Normandeau confirmed presence in Concord Project area.

- Jill notes that Bicknell's Thrush have been recorded on lower slopes of spruce-fir.

- Wetland birds – 1 rusty blackbird nest seen in ROW.

- F&G would like to have shapefiles for stream crossings. John M. mentioned that he expects that NHDOT will need to upgrade many of the stream crossings in the WMNF underground route, and this project should take that into consideration in the design of the cable locations at stream crossings.

- F&G requested that NP provide safe alternative nest locations, perhaps place nest platforms on structures where they would not interfere with operations. Osprey, ravens, red-tails are most common structure nests.

- To address the state listed lepidopterans in Kbb habitat, NP could state that there may be impacts, but their needs are diverse, and there are no good solutions for mitigation. Kbb management is more relevant to this project.

- Small Footed Bats – F&G requested that we investigate blasting effects and be specific about locations and impacts.

- Lynx and marten – Calculate the cover type area that will be altered by clearing in the new ROW

- Deer Wintering Areas, Moose Concentration areas and bear scarred beech were discussed. Will requested that NP consider vegetated crossings on the ROW that are permanent. The vegetation should be as tall as possible given the topography, at least 100' wide, and located to connect habitats (DWA, locations where lynx tracks were observed, etc.) for maximum value. Valleys provide good opportunities. A long term commitment/contract to preserve and maintain these crossings is essential. Placing crossings to connect protected lands that will not be developed would also increase their value.

- Will is concerned that cleared ROWs become de facto motorized vehicle corridors, regardless of intent. He is concerned about the impacts adding another motorized corridor will have on wildlife.

- Dana asks about the willingness of NHF&G to hold easements. Glenn says their preference is to own land in fee. Funding for management is critical in every case, even fee ownership. When asked about an amount, Glenn mentioned that OEP has a formula used for determining an appropriate amount.

- For easements, it was noted by John K. that the Garvins Falls parcel was an important parcel to consider for conservation because of its landscape context and potential habitat for many of the species potentially impacted by the project in southern NH, but Dana noted that Eversource must keep in mind future infrastructure needs. As for the 5,000 acres that NP holds in Coos County, the best parcels for F&G would be those that are easily monitored and have habitat value. Management and monitoring funds would also be needed. A long-term contract regarding management of the new ROW would be needed.

- F&G is also interested in research/assessment of the success of protection and mitigation measures, as a contribution to the overall mitigation package. This should be part of future mitigation discussions.

NEW HAMPSHIRE NATURAL HERITAGE BUREAU
DIVISION OF FORESTS & LANDS - DRED
172 PEMBROKE ROAD, CONCORD, NH 03301
(603) 271-2214 WWW.NHDFL.ORG

To: Lee Carbonneau, Normandeau Associates, Inc.

From: Amy Lamb, Ecological Information Specialist/Environmental Reviewer

Date: September 4, 2015

Subject: Northern Pass Plant Survey Follow-Up Questions

Hello Lee,

I wanted to check in with you about the rare plant and natural community surveys that have been done for this project to date, as well as surveys that were planned for this summer that we have not yet discussed.

First, I would like to clarify a summary table in the "Rare, Threatened, and Endangered Plants and Exemplary Natural Communities" document submitted on November 22, 2013. The summary table is on page 26 and is entitled "Summary of Rare, Threatened, and Endangered Species and Exemplary Natural Communities Verified in 2010, 2011, or 2013 within the Project Area." In this table, there is a list of several endangered and threatened plants and two exemplary natural communities, as well as several state watch or indeterminate species. Several of the species listed on this table are not included in the Northern Pass Botanical Survey Summary impacts document of 2015. Would you explain the exclusion of the plant species listed below? For example, was it determined that none of the plants occurring between the Deerfield and Scobie Substations would be impacted?

Wiegand's Sedge (*Carex wiegandii*)	State Endangered	Lincoln (WMNF)
Medium Level Fen System	Exemplary natural community	Lincoln (WMNF)
Poor Level Fen/Bog System	Exemplary natural community	Lincoln (WMNF)
Blunt-leaved Milkweed (*Asclepias amplexicaulis*)	State Threatened	Concord/Pembroke
Spiked Needle Grass (*Aristida longespica* var. *geniculata*)	State Endangered	Raymond
Hairy Thoroughwort (*Eupatorium cf. pubescens*)	State Endangered	Derry

Second, NHB requests the results of the additional surveys referenced in the May 2014 Addendum, including those for small *(Isotria medeoloides)* and large whorled pogonia (*Isotria verticillata)*, peatland areas, and poor level fen/bogs. Additionally, I'd like to inquire about the status of the additional surveys in ROW expansion areas and proposed access roads, as discussed in previous meetings and communications. Please send NHB any data resulting from these additional surveys.

I also wanted to inquire whether a determination was made in regards to the classification of the circumneutral hardwood forest seep/northern hardwood seepage forest?

NEW HAMPSHIRE NATURAL HERITAGE BUREAU
DIVISION OF FORESTS & LANDS - DRED
172 PEMBROKE ROAD, CONCORD, NH 03301
(603) 271-2214 WWW.NHDFL.ORG

Please send any new survey results and the other information requested above to the Natural Heritage Bureau, either electronically or to our office at:

NHB – DRED
Attn: Amy Lamb, Ecological Information Specialist
172 Pembroke Road
Concord, NH 03301

We would also like to schedule a meeting to discuss the implications of the newly proposed route, namely the new 52-mile section of underground lines extending from Bethlehem to Bridgewater. Thank you for your continued cooperation, and I look forward to hearing from you.

Best,

Amy Lamb
Ecological Information Specialist
NH Natural Heritage Bureau

NHB Comments Regarding:

Northern Pass – RTE Plant Impact Avoidance and Minimization Measures

**Note: Numbers before comments refer to section numbers in original document.*

2. Add "structure removal and installation" as a bullet point

3. Can data be available electronically (as GPS data) for Environmental Monitors?

4. - Not having rare plants on construction plans could result in accidental impacts.

- Are all staging areas included on impacts plans?

- Locations of rare plants should either be on construction plans used in the field (but treated as confidential on public documents). Or, they could be depicted as "Rare plant area #X", with environmental monitors having corresponding fact sheets for each area.

5. Similarly, would there be a vague 'sensitive area' noted on plans directing construction workers to more information?

6. Pondicherry was not mentioned explicitly in previous documents about project impacts. Are there T&E species or exemplary natural communities here that will be impacted? A 2013 document noted impacts in the White Mountain National Forest, but this was not included in the May 2015 impacts document. What is the status in the White Mountain National Forest?

7. - Add "vehicle traffic" to bulleted list.

- More details are needed regarding seed collecting and transplanting. This is species-specific and warrants further discussion.

8. A schedule should be developed, in consultation with NHB, that prioritizes where winter work should occur (focusing on disturbance-sensitive plants), in the event that it is not practicable in all rare plant locations.

9. Mats should only be used on certain plants, ie perennials with large root systems that could recover after being covered in matting. Please demonstrate exact locations of proposed mat usage.

12. Who will be doing the monitoring?

13. Cut invasive plants when dormant, or at least prior to seed set.

17. - This differs in rare plant areas versus non-T&E areas.

- In non-T&E areas, please use a native seed mix, approved by NHB.

- In areas where T&E species occur, NHB requests that impacted areas be allowed to naturally revegetate. Seed mix species, by their nature, can often outcompete the rare species whose seeds occur naturally in the seed bed.

18. As noted above, NHB requests electronic data about the threatened and endangered species and exemplary natural communities that occur in the White Mountain National Forest.

19. Contact NHB prior to purchasing seed mix for approval.

In summary, please provide more information about project impacts and scheduling in order to develop species-specific recommendations and scheduling priorities for work near T&E species and exemplary natural communities.

We appreciate the continued efforts of Normandeau Associates, Inc. and Northern Pass Transmission, LLC to best protect rare plants and exemplary natural communities. NHB would be willing to meet to discuss our comments and concerns.

Best,

Amy Lamb
Ecological Information Specialist, NH Natural Heritage Bureau

Page **2** of **2**

Northern Pass Transmission Project

DRAFT Pre-application Meeting – NHDES Offices, Concord, NH – 9/10/15

Wetland Impacts and Mitigation Plan Meeting

1:00 PM to 3:00 PM

Attendees:
Collis Adams – NHDES
Lori Sommer – NHDES
Tim Drew – NHDES
Mark Kern – USEPA
Dave Keddell – USACE
Lee Carbonneau – Normandeau
Jake Tinus - Burns & McDonnell
Dana Bisbee – Devine Millimet

Lee Carbonneau provided an overview of the project, including the new route alignment with 52 miles of additional underground, fieldwork status (now largely complete), the current status of the filing schedule, and the overall components of the mitigation package.

Mark Kern requested a map showing the segments of the underground cable and overhead transmission lines, existing ROW, new ROW and area requiring clearing or not requiring clearing. He explained that this would help him in his alternatives analysis as he is reviewing the Draft EIS. Jake Tinus said that Burns & McDonnell is presently working on map figures for the SEC application and that he would forward it to Mark when it is ready.

Dana Bisbee described the project in more detail starting at the international border in Pittsburg.

Lee Carbonneau distributed impact tables and described how permanent, temporary and secondary impacts were calculated for wetlands, stream and vernal pools. She summarized impacts as follows:

- Approximately 50 perennial stream crossings would involve trenchless, horizontal direction drill (HDD) in order to avoid permanent impacts to streams.
- Only very minor temporary impacts are proposed to streams from underground cable installation.
- Other temporary impacts, mostly to wetlands, are associated with matting for equipment access and from construction work pads around structures. There are approximately 140 acres of temporary impacts to wetlands.

- Tree clearing alone is not tallied in temporary impact numbers, unless timber matting is proposed. Secondary impacts from tree clearing in wetlands, and stream and vernal pool buffers, totals approximately 180 acres.
- The quantity of permanent impacts plus the agency-required secondary impact percentages that must be included in the mitigation package is approximately 30 acres.
- Some unavoidable vernal pool impacts are being proposed to accommodate necessary upgrades at the Scobie Pond substation. The site is very constrained and a small adjacent parcel was acquired by NPT to accommodate the expansion.

Mark stated that NPT will need to assume a "worst case scenario" and account for full impacts to the vernal pools even if only partially permanently or temporarily impacted, as these habitats would likely be diminished or possibly eliminated by the construction activities, except perhaps where the impact is a single pole in an otherwise intact pool. He also noted that clearing shrubs in a pool may temporarily reduce the amount of egg attachment sites and limit productivity. Lee will revisit these calculations for the impacted pools in the project area.

Lori Sommer requested that a narrative be provided in the permit application to describe how impacts were calculated. Lee said that a separate narrative report is being provided that describes wetlands, streams and vernal pools, and impacts to them, and there are other reports for wildlife, aquatic resources, RTE species and mitigation.

Dave Keddell suggested that NPT needs to address federally listed species as well as state listed species as USFWS will review and comment on the SEC application. Lee indicated that federally listed species are addressed in the wildlife report. Further, she explained that acoustic surveys for Northern Long-eared bat and Small-footed bat were performed during summer 2015 and that there are a few "hits" in the data, particularly in the southern part of the project. The survey data is presently being reviewed by an expert. As such, NPT will need to avoid impacts to roost trees in the areas where the species are confirmed. Dave suggested that NPT refer to the federal highway guidance for the bats as the NPT is a similar to a highway project in that it is linear.

Dave asked if NPT has a list of locations for Karner blue butterfly. Lee indicated that NPT trained with NH F&G to identify Kbb eggs, has conducted Kbb egg surveys, and is working with USFWS and NHF&G on determining how to quantify the impacts to Kbb where a take will occur. Dave noted that DOE did not fully address federally endangered species in the Draft EIS. He said that Tony Tur (USFWS) asked how information will be provided to them with respect to these species and indicated that USFWS is likely going to request quite a bit of additional information from DOE, thereby requiring a Supplemental EIS.

Lori requested that the impact table show linear measurements of streams. This will help DES in their review of the Draft EIS. Mark indicated that there is a big difference in the data presented for stream impacts in the Draft EIS compared to what NPT is calculating for impacts and this is representative of the different methodologies used to calculate impacts for different purposes.

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Lee then explained the major components of the mitigation package, i.e. conserved properties in the north, potentially conserved properties in the Concord area for Kbb and ARM fund payment to compensate for the remaining impacts. Alternatively, if easement holders cannot be identified, an ARM fund payment of $4.7 million would be provided. Lee mentioned that NPT has been having focused discussions with a regional conservation group, but that group is not ready to commit at this time.. Lee mentioned that she and Lori had discussed the Eversource Land Trust (ELT); however, Lori had indicated that ELT might not be a good fit as a holder of the conservation easements. She compared the situation whereby a town proposes to hold its own conservation easements. As explained by Lori, this arrangement is not acceptable to NHDES. Dave stated that ELT has been approved by the USACE as a mitigation easement holder in Connecticut and that ELT had produced a "justification paper" to explain how they operate and how they would steward the easements. Dana added that ELT may fully qualify under the mitigation rules and that Northern Pass would like to keep this option open as a fall back option if needed.

Dana said that NPT would like to formalize the proposed mitigation package by using the Mitigation Agreement Form. Lori indicated that the new wetland rules currently being revised would not likely allow use of the form. Rather, an applicant would be required to meet with NHDES and USACE to discuss mitigation. Lori said that DES would allow use of the Mitigation Agreement Form with NPT for the project since current rules allow for it. Dave indicated that the USACE is okay with the mitigation package as discussed stipulating that the agency wouldn't issue the Section 404 wetlands permit until the mitigation package is finalized. Mark suggested that NPT submit the mitigation as in-lieu fee in total, with options for land as a backup position. Dana stated that NPT would probably propose as described by Lee, as NPT feels that a lot of the land up north does have good conservation value, with the full ARM payment as an alternative option. Either way, all agreed that the final package would be resolved as the permit process continues. Mark pointed out that NPT will need to identify development threat to any parcels that are proposed to be conserved by easement. Regardless of the final scenario, Jake explained that the ARM fund would be receiving a large sum of money, likely in the millions of dollars, for compensatory mitigation. Regarding payment into the ARM fund, Lori indicated that NHDES requires that the check be provided within 120 days of issuance of the NHDES letter.

Dana indicated that he wanted to confirm our understanding of the abutter notification requirements. For abutters adjacent to the transmission line ROWs, notification is not required. For abutters adjacent to the substations and transition stations and converter terminal, notification is required. Collis Adams confirmed that Dana stated the requirements correctly and indicated that NHDES does want copies of tax maps provided with the abutter information, per the wetlands rules.

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Follow-up Action Items:

- Tim Drew requested a second copy of the entire SEC application, in addition to the one the Commissioner receives as a member of the SEC.
- Lori requested that Lee provide a copy of the meeting minutes from the 9/3/15 meeting with NHF&G.
- Lori suggested that NPT contact the Trust for Public Lands to determine if they would be a willing conservation partner.

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Phone Conversation: Lee Carbonneau, Normandeau Associates, Inc., and Darlene Forst, NH DES Shoreland Department, September 14, 2015 9:15 AM

I spoke with Darlene about the need for waivers for the Northern Pass shoreland applications, and the applicability of the SWQPA to parcels that F&G might manage for KBB along the Soucook River. For the Northern Pass applications, Darlene said that no waivers should be requested; instead we should put in narrative form, in cover letters perhaps, that the project is a utility project, and:

- under RSA 483-B:2 Minimum Standards Required, there is provision XVI, which "Provide for economic development in proximity to waters";
- Under RSA 483-B:9 Minimum Shoreland Protection Standards IV-b. Public utility lines and associated structures and facilities, public roads, and public water access facilities including boat ramps shall be permitted by the commissioner as necessary and consistent with the purposes of this chapter and other state law; and
- the project will conform to the extent possible with the minimum standards in the SWQPA.

The management of land for Kbb along the shoreland should include maintaining the point counts in the 50 ft waterfront buffer, and between 50 and 150 ft, 25% of the land should be left in an unaltered state. This should not prevent F&G from managing the parcel for Kbb, as they would want to leave 10 to 30% of the canopy.

New Hampshire Natural Heritage Bureau

DRED – Division of Forests & Lands
172 Pembroke Road, Concord, NH 03301
(603) 271-2214

To: Lee Carbonneau, Normandeau Associates, Inc.

From: Amy Lamb, Ecological Information Specialist

Date: October 5, 2015

Subject: Northern Pass Pre-Application Meeting Summary (NHB15-0611)

On March 30, 2015, Melissa Coppola issued a NH Natural Heritage Bureau (NHB) memo (NHB15-0611) to Normandeau Associates, Inc. that listed Threatened and Endangered species populations that will potentially be impacted by the proposed Northern Pass project. Since that date, NHB and Normandeau have met on several occasions to discuss project impacts, avoidance and minimization measures, route changes, and the remaining survey work to be completed.

This memo summarizes the most recent pre-application meeting, which took place on October 1, 2015. This meeting was held in order to review current rare plant and natural community information, refine avoidance and minimization measures, and determine additional steps to be taken in preparation for permit application submittal at the end of October, 2015.

The meeting resulted in the following determinations regarding data and documentation:

- NHB last provided digital data to Normandeau in February of 2015, and will continue to provide any new data (i.e., new plant surveys within the project area) as they become available.
- Normandeau will provide the final reports on Vegetation and Threatened and Endangered species to NHB upon completion.
- Normandeau will provide NHB a table summarizing the anticipated impacts to all rare plants and exemplary natural communities within the selected corridor. This table will distinguish between the different types of impacts and their resulting (long-term) effects on rare plants and exemplary natural communities.

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- Any reports that are filed as publicly available information will not contain specific locations of rare plants; this information will be restricted to an appendix and treated as confidential, and will be removed from publicly available reports.
- The rare plant avoidance and minimization measures that the applicant has proposed were developed in consultation with NHB. NHB will provide additional species-specific avoidance and minimization guidance during the permit review period. This will consist of a table with prioritized actions for each species.
- As any new areas for access, staging, etc. become known, Normandeau (or any subsequent contractor) will conduct rare plant surveys in the areas and provide the results to NHB.
- Normandeau identified Lee Carbonneau as the point person for future Natural Heritage communications, and the NHB point person will be Amy Lamb.

The meeting also resulted in the determination of several measures to avoid and minimize impacts to Natural Heritage resources during construction:

- Meetings will be held among contractors, environmental monitors, and inspectors, prior to contractors working in or near areas where listed plants are located, that will include making contractors aware of sensitive areas and the appropriate best management practices for each area.
- Plans that are provided to contractors will contain a color-coded bar indicating the extent of a sensitive area; no further information will be revealed on such plans.
- Normandeau (or any subsequent contractor) will have "Sensitive Area" signs installed around rare plant populations and exemplary natural communities to alert work crews to their presence.
- It was agreed that it is critical that environmental monitors have the power and authority to stop work immediately if they become aware that any action will violate agreed-upon BMPs.
- NHB will make a recommendation to NHDES regarding qualifications of Environmental Monitors, to be included as a permit condition.

NHB and Normandeau will continue to communicate as the project progresses, in particular as any route changes or new impacts to rare plants become known.

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5 Statements in Response to the 20 Questions (Env-Wt 302.04)

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

Water Division/ Wetlands Bureau/ Land Resources Management
Check the Status of your application: http://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 purpose of the Northern Pass Transmission Project is to addresses the important state goals of adding a substantial source of clean power to the state and regional electric grid, and lowering energy costs for the State's business and residential customers, while also minimizing potential impact to New Hampshire's natural resources. The Northern Pass will allow the delivery of 1,090 megawatts (MW) of clean base load hydropower from Hydro-Quebec's generation facilities. The project is needed to reduce regional wholesale power prices; reduce CO2 emissions to assist in achieving the recently enhanced goals of the Regional Greenhouse Gas Initiative (RGGI) and the New Hampshire Climate Action Plan; potentially postpone the addition of fossil fuel generation and associated transmission projects; provide electrical system benefits that result from the fact that high voltage direct current (HVDC) systems are highly dispatchable and can help balance intermittent resources like wind, provide emergency support after outages and help meet New England reserve requirements that are falling because of expected retirements of coal- and oil-fired units; and reduce New England's heavy dependence on natural gas for power generation and thereby contribute to the solution of a reliability problem that Independent System Operator-New England Inc. (ISO-NE) has characterized as unsustainable.

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

The Northern Pass has been committed to avoiding and minimizing natural resource impacts, including wetland and surface water, since the initial stages of development. In concert with reviewing route alternatives that achieved the purpose and need for the project and which met the required engineering and design standards for safe and efficient operation of the facility, Northern Pass analyzed GIS data to identify potential paths for the HVDC and AC transmission lines. Social and environmental resources were quantified on existing ROW options and compared mathematically to screen the alternatives. Public comments were also considered in the ultimate selection of the proposed project route, and further modifications were made in response to the Draft EIS and its identified route alternatives. Field investigations were performed between 2010 and 2015 to further inform the siting process, with a goal of minimizing impacts to streams, vernal pools, threatened and endangered species, wildlife habitat, and sensitive archeological and historical sites. Several rounds of field constructability and plan set reviews were conducted to shift the location of project elements to avoid and minimize wetland and water resource impacts. By using existing ROW and transportation corridors for 83% of the route, and locating substantial portions of the Project underground, the Project will have minimal impact on prevailing land uses and is consistent with local patterns of development. Siting a new transmission line in already developed corridors is a sound planning and environmental principle because it reinforces local patterns of development and minimizes environmental impacts. There will be no changes to prevailing land uses as a result of the operation of the Project.

The Project will have no effect on local lands uses along the 160 miles of the route that follow existing transmission corridors. Only 32 miles of the 192-mile transmission line is on new right-of-way. Twenty-four of those 32 miles are in a working forest, and forest management activities within this entire area will continue uninterrupted after construction.

3. The type and classification of the wetlands involved.

According to the Cowardin system, as described in the U.S. Fish and Wildlife Service's 1979 Classification of Wetlands and Deepwater Habitats of the United States (Cowardin, et al.) there are five predominant wetland types and more than 35 differnent wetland classifications within the project boundary. Wetland types include palustrine marshes, wet meadows, ponds, forested and shrub swamps. Most of the wetlands in the existing ROW are PSS and PEM cover types due to decades of vegetation maintenance. Wetland classifications include PEM1 and PEM1,4 with several hydrological variations; PSS1, 2 and 3 with various hydrological regimes; and PUB. At some locations where the ROW is not fully cleared, or where new ROW is proposed, the dominant classification is PFO1 or 4. In addition, there will be temporary impacts to several Riverine wetlands, including perennial and intermittent streams classified as R2, R3, and R4 with several class and subclass variations. Detailed tables of the types of wetlands located in each geographical section and town associated with the Project route are included in Appendix B.

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

As the project area is predominantly a long and narrow ROW corridor that crosses six HUC 8 watersheds and approximately 48 HUC 12 watersheds. Many of the wetlands within the project area are small portions of larger wetlands that extend beyond the existing or proposed new ROW, and ultimately connect to down-gradient perennial streams. None of the identified wetlands are completely, hydrologically or ecologically isolated from other nearby systems; and most of the areas that are hydrologically isolated at the surface are associated with historic disturbances. In addition, there are many streams that cross the existing and proposed ROW. Most of these wetlands and streams will be spanned by the proposed transmission line with little to no permanent direct impacts. Construction BMPs, erosion prevention and sediment control plans and measures will be implemented in all phases of construction to protect neaarby wetlands and surface waters. In general, the ROW and other portions of the project (substation expansions, transition stations) represent a small portion of the watersheds of these wetlands and streams. A detailed list of the streams and wetlands within the project area can be found in Appendix B.

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

The vast majority of the wetlands within the project ROW are common wetland types consisting primarily of wet meadow/shrub wetlands in existing ROW, and hardwood or softwood forested wetlands in the new ROW corridor. One potential state exemplary natural community, a Circumneutral hardwood forest seep (enriched calcareous seepage swamp) is located within the project area in Dixville; six state watch plant species were observed within this area. No other exemplary natural communities were observed within project limits. Other uncommon wetland types occurring within the project area include peatlands and floodplain wetlands. Several wetlands occur within the project boundary with northern white cedar. There are 20 waterbodies subject to the SWQPA located within the project area, and five of these are Designated Rivers under the Rivers Management and Protection Act. While not rare in New Hampshire, many of the streams and rivers are considered valuable cold water fisheries, supporting native brook trout. No dunes or other tidal areas are involved in this project. See Appendices B, C and D for more details.

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

Direct Permanent Wetland Impacts: 2.48 acres (structure foundations, substation expansion, transition stations)

Direct Temporary Wetland Impacts: 137.11 acres (timber mats for access roads, crane pads, stream crossings, etc.)

Detailed impact tables by town, cover type, and wetland ID are included in the narrative (Section 6) and Appendix B.

Secondary impacts for mitigation are also addressed in the Appendices B and G.

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.

The proposed route does not cross land that the USFWS has designated as a critical habitat for any endangered species. Two federally endangered wildlife species (Canada lynx, Karner blue butterfly) and one federally threatened species (Northern long-eared bat) are known within the project area and are either not adversely impacted or have been considered in the construction sequencing or mitigation plan. Impacts to other state-listed wildlife species will be avoided, minimized and/mitigated, as construction and mitigation plans include timing restrictions and provisions to avoid disturbance or injury, as well as compensation for the remaining unavoidable impacts. The project will impact three state endangered, one state threatened, nine state watch and four state indeterminate plant species and four potential state exemplary natural communities. One of the state endangered species that will be impacted, butterfly milkweed (Asclepias tuberosa), is probably an introduced garden plant, a remnant of plantings conducted by NH Fish and Game to enhance habitat for the state and federally endangered Karner blue butterfly. Various measures will be implemented to minimize impacts to RTE plant species and exemplary communities, including avoidance to the extent possible, construction protocols to minimize disturbance, and the transplantation of plants and/or collection and sowing of seed to re-establish plants in affected populations. Appendices C and D address rare, special concern, state and federally listed threatened and endangered species and species at the extremities of their geographical ranges. There are four vernal pools (out of 271) which will be directly permanently impacted by the proposed project, and 1,208 square feet (SF) (0.03 acres) of permanent vernal pool impact. 12,056 SF (0.28 acres) of temporary impacts to vernal pools are also proposed. In addition, there will be 9.88 acres of upland clearing within 100 ft of vernal pools in the ROW. All of these direct and secondary impacts have been addressed in the mitigation plan for the Project as outlined in Appendix G.

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

By using existing ROW and transportation corridors for 83% of the route, and locating substantial portions of the Project underground, the Project will have minimal impact on prevailing land uses and is consistent with local patterns of development. There will be no changes to prevailing land uses as a result of the operation of the Project. The Project will have no effect on local lands uses along the 160 miles of the route that follow existing transmission corridors. Only 32 miles of the 192-mile transmission line is on new right-of-way. Twenty-four of those 32 miles are in a working forest, and forest management activities within this entire area will continue uninterrupted after construction. Also, the operation of the line will not place any new demands on local or regional services or facilities. The Project will stimulate the economy by reducing electric costs by $35 million annually in New Hampshire and increasing the State Gross Domestic Product by $150 million during construction and by $90 million during operation. The Project will also pay $30 million annually in taxes to the state and local communities and will create 2,400 jobs during construction and provide 600 more permanent jobs.

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 project design has considered the potential visual impacts of the project and worked to minimize them to the extent practicable. This has been accomplished through route selection and project design, with assistance from a visual impact assessment specialist. For example: the northern route was changed to a more remote location in response to public comment; portions of the project were placed underground in response to public comments on visual impacts; and the height of structures were reduced in as many locations as possible, and the selection of lattice versus monopole was made based in part on visual effects. In addition, co-location with existing structures was also a goal. Northern Pass has completed a Visual Impact Assessment (VIA) of the Project. The VIA concludes that the Project will not have a noticeable effect on the public's continued use and enjoyment of the scenic resources. There is no basis to conclude that people will not continue to drive the scenic byways, visit the parks, swim at the beaches, canoe and kayak the rivers, fish in the lakes, and hike the trails – in a manner that they have for decades – due to the presence of the Project. Consequently, they conclude that the Northern Pass Project will not create an unreasonable adverse effect on aesthetics.

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 Project will not create any such impediments, except in the immediate area of the nine development sites. When complete, the Project will enhance public access for ATV trails and other recreational uses.

Temporary disruptions to traffic are anticipated during construction of the underground sections of the line, but these will be limited in scope at any given time and similar in nature to those associated with common types of road construction, maintenance and municipal street/infrastucture improvements. Similar disruptions are expected when stringing new conductors over existing public roads and highways; however these will be managed by the contractor and very short in duration.

Temporary disruptions along existing recreational trails that currently utilize project ROW areas are also anticipated; however these disruptions are dictated by safety considerations during active construction and will be minor in scope. The Project and contractors will work to establish safe alternatives if possible and communicate trail closeures and detours where applicable.

By spanning the majority of rivers, streams and ponds overhead or underground the Project minimized direct impacts to these resources. All transmission lines spanning rivers and streams will meet safety requirements and comply with PUC requirements.

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.

There will be some increased visual effects from constructing the Project. Those effects have been effectively avoided and minimized by placement of the route along an existing transmission corridor, by placing 60 miles underground along existing roadways, and by selecting a route in the northern section of the Project that largely avoids negative impacts on abutting property owners. As indicated in both the DEIS and the report from Nichols Tourism Group, there will be no discernible impact from the Project on New Hampshire's tourism industry. As for property values, the Research Report and testimony prepared by Dr. James A. Chalmers concludes that impacts are isolated to a limited number of properties with specific characteristics, but do not represent a widespread or common occurrence.

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

The Project will improve air quality and reduce greenhouse gases in New Hampshire and New England, consistent with national, regional, and state air quality and climate change goals. The Project will reduce carbon dioxide emissions in the region by as much as 3 million metric tons a year, which is equal to the emissions of approximately 600,000 cars.

The U.S. Environmental Protection Agency (EPA) and the New England states have long recognized that regional approaches are needed to help reduce air emissions. The New England Governors Association, Coalition Of New England Governors (CONEG), Northeast States for Coordinated Use Management (NESCAUM), the Ozone Transport Commission (OTC), the Regional Greenhouse Gas Initiative (RGGI) and other groups have been working together cooperatively for many years to improve air quality and address climate change in the region.

New Hampshire's Climate Action Plan sets goals to reduce greenhouse gas emissions 80% below 1990 levels by 2050, which is consistent with the New England Governors' and Eastern Canadian Premiers' resolutions. The Plan supports the construction of high voltage transmission lines to import clean power generated from Canadian hydro and wind sources as a complementary policy to developing non-carbon emitting sources of power in New Hampshire.

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 construction of new transmission line is not expected to have a substantial impact on the quantity or quality of surface water entering or leaving the site. Construction BMPs will be employed to protect streams and wetlands. There will be some minor secondary effects on some streams from permanent canopy reduction. However, following stream/fisheries studies and modelling, it has been determined that no significant impact to mean annual water temperature for any of the impacted streams is anticipated. Furthermore, the maximum estimated temperature after vegetation clearing is not significantly higher than the estimated maximum for the pre-existing conditions for the majority of impacted streams. The Project will comply with all requirements of the New Hampshire Quality Protection Act (SWQPA), and obtain a Water Quality Certificate and NPDES permit. Natural resource mitigation is expected to include active restoration of temporary Project impacts by grading, seeding, and planting appropriate native vegetation and preservation of in-kind resources in geographically appropriate locations. Additionally, Northern Pass anticipates an in-lieu-fee component of mitigation, in the form of a contribution to the NHDES Aquatic Resource Mitigation Fund. See Appendix G.

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

It is not expected that there will increse in flooding, erosion or sedimentation as a result of the Project. Floodplains were avoided by all nine site developments and permanent impacts from structures within floodplains were avoided and minimized where possible. Several floodplains were unavoidable due to engineering constraints; however overhead transmission structures in floodplains do not cause any increase in flooding or reduce flood storage capacity. The installation of underground cable will also result in a restoration of previous grades, with no loss of flood storage capacity. In addition, the implementation of rigorous construction BMPs and active monitoring of erosion control measures will prevent or mitigate short-duration construction related dischargesof sediment. No permanent destabilization of sensitive or erodible soils is expected. Pre-construction and post-construction water quality monitoring, with event sampling during construction, associated with underground portions of the Project in sensitive watersheds is also proposed.

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.

Current or wave energy will not be reflected or redirected by any portions of the project. Underground portions of the line will be installed over, under or around existing culverts and other stream crossings by utilizing several construction techniques including horizontal directional drilling (HDD), jack and bore technology, micro-tunneling and trenching.

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.

Impacts to wetlands and/or wetland complexes by the Northern Pass have been avoided whenever possible in project design. Some wetlands are completely contained within the ROW area; however most extend beyond the existing or proposed ROW as discussed above (Question 4). In the unlikely event that all abutting landowners permitted alterations to specific wetlands, those impacts would likely have a larger effect on the wetland or wetland complex because the majority of the proposed impact sites (excluding the site developments) are associated with new structures which have a very limited footprint and do not significantly effect the functions and values of a given wetland. The few exceptions include a two transition stations (TS1/TS5) and two substation expansions (Deerfield and Scobie Pond), where larger permanent impacts are proposed. The affected wetland systems are relatively small and all of the affected wetland complexes have experienced some historic disturbance. Mitigation measures proposed will more than compensate for the direct and secondary impacts. Therefore, there should be little/no cumulative impact to wetlands and/or complexes from the Project.

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

Impacts to wetlands and/or wetland complexes by the Northern Pass have been avoided whenever possible in project design. The majority of the permanent impact sites are associated with proposed new or relocated structures which have a very limited permanent spatial footprint. These constricted footprints are generally very small relative to the wetland or wetland complex and have a negligible effect on a wetlands functional significance or values. The few exceptions include two transition stations (TS1/TS5) and the two existing substation expanstions (Deerfield and Scobie Pond) where larger permanent impacts from fill are proposed. Wetland functions and values associated with these systems will be lost as a result of the Project; however these have been addressed in the mitigation plan (Appendix G). Therefore, there should be little/no net impact to wetlands and/or complexes and their associated functions and values from the Project. Temporarily impacted areas have also been minimized and wetlands have been avoided where possible. Temporarily impacted areas will be restored when construction is complete and effects on the associated functions and values are not expected to be significant.

Detailed calculations of the area of permanent impact for each of the thirteen wetland functions and values defined by the Corps Highway Methodology by project section and town are included in the impact analysis section of Appendix B.

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 Northern Pass assessment of historic resources concludes that of the approximately 191 properties along the route that were older than 50 years and potentially in view of the Project, there are about 12 that could potentially have indirect adverse visual effects from the Project. This limited effect is largely due to the decision by Northern Pass to place 60 miles of the route underground and an additional 99 miles along existing rights-of-way. In addition, Northern Pass engineers have modified structure heights, designs, and locations to further avoid and minimize effects on historic resources. The project will not create an adverse effect in the setting of a National Historic Landmark. The indirect visual effects on the Weeks Estate, which is listed on the National Register of Historic Places, will not cause that historic property to be removed from the registry because of a loss of integrity. Indirect impacts to the Rocks Estate, also on the National Register, have been minimized by placing the transmission lines underground in the vicinity of this resource.
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.
The portion of the Lamprey River federally designated as Wild and Scenic is downstream of the project area and will not be affected by Northern Pass. Five waterbodies in the project area have been Designated under the Rivers Management and Protection Program. By spanning these overhead (Ammonoosuc, Pemigewasset, Merrimack, and Lamprey), or passing under through directional drilling (Connecticut) direct impacts will be limited to the possible removal of shoreline trees within the existing transmission or road ROW if not fully cleared already, and indirect impacts will be visual only in overhead locations. The project passes through two portions of the White Mountain National Forest; the northern portion of the WMNF is associated with an existing transmission corridor and in the southern portion of the WMNF the project will be located underground in road rights-of-way in Easton, Lincoln and Woodstock, with no permanent impact to the forest or the wilderness areas within it. The project crosses several State-owned, local, and private conservation lands on existing transmission ROWs, most of which pre-date the designation of the conservation lands. There will be no expansion of clearing in these areas, and no changes in land use or substantial wetland functional impacts will result from the project.
20. The degree to which a project redirects water from one watershed to another.

Water will not be directed from one watershed to another.

Additional comments

See narrative and appendices for additional detail.

6 The Northern Pass Transmission Line: Project Description & Existing Conditions Narrative

The Northern Pass Transmission Line Project (the "Project") is a 192-mile transmission line proposed to carry 1,090 MW of renewable hydroelectric power from Canada to the State of New Hampshire (NH) and the New England region. The Project includes construction of 158.3 miles of 320-kV, direct current ("DC") transmission line from the New Hampshire/Canadian border to a new terminal in the City of Franklin, where the electric power will be converted to AC. It will then be sent, via a 33.7 mile, 345-kV transmission line, to a substation in the Town of Deerfield, to connect to the New England power grid, which serves customers throughout the region.

The proposed Project route follows existing Public Service Company of New Hampshire ("PSNH" d/b/a Eversource Energy) transmission line right-of-way ("ROW"), or public road ROW for over 80% of its length. Within the existing PSNH ROWs, approximately 82 miles of existing transmission lines of various voltages will be relocated to make room for the new line. Approximately 32 miles of the Project route requires clearing of new ROW. Other activities associated with the Project include upgrades to existing AC facilities ("AC System Support facilities") at the Deerfield Substation in the Town of Deerfield and the Scobie Pond Substation in the Town of Londonderry, (including expansion of both existing substation yards) and modifications to approximately 10 structures and hardware replacements on certain poles between these two substations along two existing 345-kV lines.

The proposed Project route follows existing PSNH transmission line ROW or public road for over 83% of its length. Within these existing PSNH ROWs, approximately 80.5 miles of existing transmission and distribution lines of various voltages will be relocated to make room for the new line. Approximately 32 miles of the Project route requires clearing of new ROW.

An overview of the Project route, as described below, is depicted in Figure 1. United States Geologic Survey ("USGS") maps showing the vicinity of the route are provided in Section 11 and Appendix A, below; Project plans are provided in Appendix I.

Project Purpose

The purpose of the Project is to build and operate a transmission line to deliver 1,090 MW of competitively priced, clean, low-carbon baseload power (approximately 98% hydropower) from Québec to New Hampshire and the rest of New England. The Project arose in direct response to a long standing, demonstrated need in New Hampshire and the New England region for a more diverse, low cost, clean energy supply. When the Project was first conceived, regional energy prices were largely driven by high cost oil and gas, with the price of each tending to move in parallel. In the intervening years, changes in the energy market drove some generators to retire, leaving the region with fewer resources to meet its energy needs. Today, energy prices are primarily driven by the cost and availability of natural gas, a fuel that is in short supply at

certain times of the year due to gas pipeline capacity constraints in New England. Northern Pass was designed to bring a reliable source of competitively priced, clean, renewable hydro power into the region, thereby delivering energy savings as well as environmental and economic benefits to the state of New Hampshire.

The Project will:

- Lower energy prices by $80 million annually for New Hampshire customers and add $30 million annually in new tax revenue;
- Reduce regional carbon emissions by up to 3 million tons a year which is equivalent to taking 600,000 cars off the road. This will assist in achieving the recently enhanced goals of the Regional Greenhouse Gas Initiative ("RGGI") and the New Hampshire Climate Action Plan;
- Create 2,400 jobs in New Hampshire over the project's construction phase;
- Increase New Hampshire's gross domestic product by $2.1 billion during construction and beyond;
- Potentially postpone the addition of fossil fuel generation and associated transmission projects;
- Provide electrical system benefits resulting from the fact that high-voltage direct current ("HVDC") systems are highly dispatchable and can help balance intermittent resources like wind, provide emergency support after outages, and help meet New England reserve requirements that are declining because of expected retirements of coal- and oil-fired units; and
- Reduce New England's existing level of dependence on natural gas for power generation, and thereby contribute to the solution of a reliability problem that Independent System Operator-New England Inc. ("ISO-NE") has characterized as unsustainable.

Primary Project Overview

The Project route enters New Hampshire from Canada at Hall's Stream, approximately 1,500 feet north of the Vermont state line and 1,000 feet west of Hall's Stream Road in the town of Pittsburg. Starting at this point, a 320-kV, DC overhead transmission line will be constructed for approximately 2 miles in new ROW. The transmission line will transition underground for a 0.7 mile segment beneath the Connecticut River and Route 3, resurface in the Town of Clarksville, and continue overhead for 2.3 miles in new ROW to the vicinity of Wiswell Road and Route 145.

The overhead transmission line will then transition underground for an approximately 7.5 mile segment along the road ROW's of Old County Road, North Hill Road and, Bear Rock Road to the junction with Heath Road in the Town of Stewartstown. It will then transition to an overhead segment along a new 28 mile ROW through the towns of Stewartstown, Dixville,

Millsfield and Dummer, primarily through timber management property, and join an existing PSNH transmission ROW in the Town of Dummer near Route 16.

The overhead transmission line will then follow existing PSNH ROW for 40.5 miles to Route 302 in the Town of Bethlehem. This portion of the line passes over the Upper Ammonoosuc River in the Town of Stark, Otter Brook and the Israel River in the Town of Lancaster, John's River in the Town of Dalton, and the Ammonoosuc River in the Town of Bethlehem. Along this segment the new transmission line will pass through, but not electrically interconnect with, the Lost Nation Substation in the Town of Northumberland and the Whitefield Substation in the Town of Whitefield.

At Route 302, the transmission line transitions underground and follows the road ROW of Routes 302, 18, 112, 116 and 3 for approximately 52 through the towns of Bethlehem, Sugar Hill, Franconia, Easton, Woodstock, Thornton, Campton, Plymouth and into Bridgewater.

The underground transmission line will then transition to overhead line at the location where the existing Eversource transmission line ROW crosses Route 3, and follows existing PSNH transmission line ROW for 26 miles though the towns of Ashland, Bridgewater, Bristol, New Hampton, Hill, and Franklin. This segment of the line will pass over the Squam River (Town of Ashland) and the Pemigewasset River (several towns).

In the City of Franklin, an 8-acre converter terminal will be constructed to convert the 320-kV, DC transmission line to a 345-kV AC transmission line. The AC line will then continue overhead for 34 miles within existing PSNH ROW through the towns of Northfield and Canterbury, the City of Concord, and the Towns of Pembroke and Allenstown to the Deerfield Substation in the Town of Deerfield. This portion of the line will cross the Merrimack River (Franklin/Northfield line), Turtle Pond (City of Concord), The Soucook River (Concord/Pembroke town line), the Suncook River (Pembroke/Allenstown town line), and the Lamprey River (Town of Deerfield).

Figure 1. Overview Map of Northern Pass Project

Other Work Overview

As part of the Project, minor upgrades (i.e., the replacement or vertical extension of approximately 10 existing H-frame structures) are required to two existing 345-kV transmission lines between Deerfield Substation and Scobie Pond Substation. These upgrades are required to support the operation of the new transmission interconnect resulting from the Northern Pass Project at Deerfield. The operating temperature of the lines will increase, which introduces additional line sag. The 10 structure modifications will be necessary ensure that all conductor to ground clearances meet the requirements of the National Electrical Safety Code (NESC). Hardware replacements may be necessary on other structures, requiring only helicopter or bucket-truck access to selected poles within this 18-mile long corridor.

New Transmission Structures

The Project proposes to use lattice steel, tubular steel monopole, and tubular steel H-frame (AC line) structures. These structures will range in height from 48 to 160 feet, with an average height of 90 feet.

Lattice structures will be approximately 30 feet by 30 feet at the base, tapering to a 6-foot by 5-foot column halfway up the structure. These structures will be anchored to 3-foot to 5-foot diameter concrete foundations at each corner of the base. Land between the foundations will be temporarily disturbed and restored.

Monopole structures will be approximately 5 to 10 feet in diameter at the base, tapering to approximately 1 to 2 feet in diameter at the top. These structures will be anchored to concrete foundations approximately 7 to 12 feet in diameter.

Tubular steel H-frame structures will consist of two vertical poles (“legs”) connected near the top of the structure with a crossarm. Each structure leg will have an approximate base diameter of 2-3 feet, tapering to approximately 1 foot at the top. A typical H-frame structure’s legs will be placed approximately 26 feet apart; the crossarm (the widest part of the structure) will have an overall width of approximately 52 feet. H-Frame structures will have a combination of direct embed and concrete foundations. Concrete foundations will be approximately 3 to 4 feet in diameter. Direct embed foundations will consist of placing a portion of each structure leg into a 3 to 4-foot diameter hole and backfilling with compacted native material, crushed rock, or a mixture of the two.

The majority of Norther Pass structures will be spaced approximately 600 to 650 feet apart; maximum spacing will be approximately 1,000 feet. The distance between structures will depend on terrain, structure height, and proximity to adjacent structures within the ROW. Larger spans between structures generally require taller structures. Guy wires are not needed for these structures.

Existing Facility Relocation

The Project has sought to utilize existing transmission ROW to the maximum extent practicable in order to minimize overall environmental and other impacts. In order for the Project to use certain segments of the existing ROW, some existing 115-kV transmission lines and 34.5-kV distribution lines will be relocated accommodate Project facilities.

The need to relocate existing transmission or distribution lines is determined by total space available within the ROW, required clearances between lines within the ROW, and distances to the edges of the ROW. Clearances required between lines and between lines and vegetation (tall-growing trees) at ROW edges are governed by NESC requirements designed to assure safe and reliable transmission and distribution line operation.

In order to maximize the use of existing ROW and reduce structure heights in the High Voltage Direct Current ("HVDC") portion of the Project, approximately 39.5 miles of existing-115-kV lines and 11.7 miles of 34.5-kV lines will be relocated. For the 345-kV AC portion of the Project, approximately 22.8 miles of existing 115-kV lines and 6.5 miles of 34.5-kV lines must be relocated. There are some areas in the City of Concord where relocation of existing facilities is not necessary to meet clearance requirements, but the Project will relocate lines in order to significantly reduce structure heights for the new 345-kV line. Specifically, six additional miles of 115-kV line will be relocated to allow use of H-frame structures. The H-frame has a typical height of 80 feet, which is the lowest height of the AC structure design alternatives. Guy wires may be needed on angle structures for relocated line in the ROW. Guy wires typically result in negligible impacts.

Underground Lines

The Project will include three underground segments:

1. An approximately 0.7-mile long segment in the towns of Pittsburg and Clarksville (in the vicinity of the Route 3 bridge-crossing of the Connecticut River);
2. An approximately 7.5-mile long segment in the towns of Clarksville and Stewartstown (beginning on property owned by Northern Pass in the Town of Clarksville, continuing onto Route 145, and progressing along Old County Road into the Town of Stewartstown where it will continue onto North Hill Road, Bear Rock Road, and property owned by Northern Pass on Heath Road); and
3. An approximately 52-mile segment beginning in the Town of Bethlehem and terminating in the Town of Bridgewater. This segment will be located within the ROW of NH Routes 302, 18, 116, 112, and 3. It includes portions of the Towns of Bethlehem, Sugar Hill, Franconia, Easton, Woodstock, Thornton, Campton, Plymouth and Bridgewater.

In the DC segment of the Project, two parallel XLPE, 1,090 MW cables will be installed using a combination of construction techniques including direct bury of the cable, installation of the cable in a duct bank, or the use of trenchless technology (directional boring and jack and bore). The application of each technology will be based on geotechnical data that will be collected after permit applications are submitted, therefore exact locations for each method are not currently known. These techniques are discussed below:

- Direct-buried cable is installed approximately four feet below grade in a trench that would be approximately 3 ft wide and 4.5 feet deep. Splice vaults are generally necessary at intervals of approximately 1,800 feet.
- Cables installed in a duct bank provide greater mechanical protection than direct-buried line, but require larger construction areas. Excavation of a trench approximately 4 feet wide is required during installation. Depth varies based upon specific configurations, but would have at least 2.5 feet of cover. Duct banks are approximately three feet by five feet and are encased in concrete or flowable backfill for physical protection. Installation of cable splice vaults or splicing pads approximately 30 feet long, 10 feet wide and 6 feet tall (vaults only) are necessary, and are located approximately every 1,800 feet.
- Cables installed via jack-and-bore would be installed approximately 10 to 15 feet below crossing obstruction. This technology is used where obstacles such as roads, railroads, or large utility structures must be crossed and the geological conditions allow. A pit for equipment operation is needed at either end of the jack-and-bore operation.
- Directional drilling sections would be installed where geological conditions allow, and a large stream or river must be crossed. Directional borings are generally installed at a maximum depth of approximately 65 feet below grade.

The exact depth of the direct buried cable, duct bank, or trenchless conduit installation may be adjusted based upon the final design. No cathodic protection is required for the underground segments.

Transition Stations

A transition station, resembling small switching station, must be installed at each of the six points where the line transitions between an overhead and an underground (or an underground and an overhead) configuration. Transition stations will be approximately 80 feet by 130 feet in size and enclosed by a fence. The equipment will be installed on a stone foundation that has been graded and provided with stormwater controls. The resulting footprints range in size from just under 1 acre to just over 3 acres. Equipment at each transition station will include a line terminal structure, surge arresters, instrument transformers, disconnect switches, cable terminators, communications equipment, and a small control building. Project transition station locations and details are included in the Project Plans (Appendix I).

HVDC Converter Terminal

The conversion from DC to AC will occur at an HVDC converter terminal in the Town of Franklin, on approximately 8 acres of a 106-acre former campground site. The converter terminal will be designed for a continuous DC to AC transfer rating of 1,090 MW using Voltage Sourced Converter (VSC) DC converter technology, will be configured as a symmetric monopole system. The converter terminal has been sited to avoid impacts to wetlands and areas of potential archeological sensitivity. BMPs will be employed to prevent water quality impacts outside of the Project footprint.

AC System Interconnection

The Project's interconnection to the New England electrical system will be at the existing PSNH Deerfield Substation located in the Town of Deerfield. The 345-kV AC line from the HVDC converter terminal will connect to an existing terminal in the Deerfield Substation. In order to establish the new line position, an existing 345-kV line connection in the substation will be relocated. This will require the addition of terminal structures, 345-kV switches, breakers, bus work, instrument transformers, and associated protection and control devices inside the existing Deerfield Substation.

AC System Support Facilities

Deerfield Substation

The Project's interconnection to the New England electrical system will be at the existing PSNH Deerfield Substation located in the Town of Deerfield. The 345-kV AC line from the HVDC converter terminal will connect to an existing terminal in the Deerfield Substation. In order to establish the new line position, an existing 345-kV line connection in the substation will be relocated. This will require the addition of terminal structures, 345-kV switches, breakers, bus work, instrument transformers, and associated protection and control devices inside the existing Deerfield Substation.

As part of the Project, a 345-kV AC line from the Town of Buxton, Maine to the Town of Londonderry, New Hampshire presently goes by the Deerfield Substation with no electrical connection. This line will be terminated at the Deerfield Substation splitting it into two segments: Buxton to Deerfield and Deerfield to Londonderry. Terminating this line will require the construction of an additional 345-kV bay position at the Deerfield Substation, which will be also done within the existing substation yard.

Also at the Deerfield Substation, it will be necessary to construct 345-kV capacitor banks and Static VAR Compensator (SVC) to provide voltage support for the Project. This will be done in a 8.4-acre area adjacent to the existing substation yard. This expansion area has been located to minimize wetland impacts, but will require fill in a wetland swale for access to the new bay position.

Scobie Pond Substation

To provide voltage support for the Project, 345-kV capacitor banks will be constructed at the Scobie Pond Substation in an area adjacent to the existing substation yard. Land was purchased for this expansion, as the existing land owned by Eversource around the substation is quite wet. This expansion will be similar to the Deerfield Substation expansion in appearance, and approximately 3.2 acres in size. Based on current design, minor wetland and vernal pool fill is required to construct the new capacitor banks and relocate an access road to an adjacent property.

Existing Structure Replacement

To provide additional power flow capabilities for the Project, two existing 345-kV AC transmission lines between the Deerfield Substation and the Scobie Pond Substation will be uprated, requiring the replacement/modification of approximately 10 structures. These are primarily H-frame structures that will be modified or replaced in the same location to increase their height. Hardware will be modified on additional structures. Natural resource impacts associated with this work are primarily temporary associated with wetland crossings for temporary access. These impacts are included in the Project permit applications. These upgrades are required to support the operation of the new transmission line in accordance with the requirements of the NESC.

Description of General Environmental Setting

6.1.1 Topography and Geology

6.1.1.1 Description of Project Rights-of-Way (ROW)

The Project route has been selected to maximize the use of existing ROW to the extent practicable, with approximately 160 miles (83%) of the 192 mile route following existing PSNH transmission line ROW or public road ROW. The transmission ROW are routinely maintained and managed for vegetation by PSNH, as described below. Landowners also maintain various residential, agricultural and recreational uses within the ROW easements where compatible with the safe operation and maintenance of the existing transmission lines. Approximately 32 miles of the Project route requires clearing of new ROW.

The existing PSNH transmission line ROWs to be used by the Project range in width from approximately 150 to nearly 500 feet (with the majority approximately 250 feet wide), and currently support one or more transmission lines and/or distribution lines ranging from 34.5-kV to 345-kV. Some of the existing lines in these ROW were first installed as early as 1929, many during the 1960's and others more recently. These ROW pass through many different land uses and habitats, including heavily developed commercial and industrial areas, urban lands, residential neighborhoods, rural residential and agricultural areas, woodlots and timberlands, and relatively undisturbed natural areas. Each of these is described in the sections that follow.

All of the existing PSNH ROWs are maintained to remove and control vegetation that could impact the safe operation of the existing transmission or distribution lines; however some are

not cleared or maintained to their full width. Most transmission ROWs in the PSNH system are maintained on an approximate three to five year cycle, during which any species of woody vegetation (trees and tall shrubs) that are capable of growing up to and potentially interfering with the existing lines are removed or controlled. Lower growing shrubs and herbaceous vegetation, including species common in wetland and stream buffer areas, are typically left as they do not pose a risk to safety or reliability.

The new overhead transmission line ROW will be 120 feet wide. The majority of the new ROW crosses through mountainous terrain currently managed for timber, with recent or ongoing logging and other related activities. The remaining portion of the new ROW crosses though rural, lightly populated residential and agricultural areas on lands owned by the Project, some of which are forested. All portions of the new ROW that pass through forested areas will be cleared using techniques described in Section 6.1.14.

The existing public road ROWs along the Project route where the line will be installed underground contain roads ranging from small gravel town roads to paved two-lane NH and US Routes. The transportation ROWs range in width from three rods, or approximately 50 feet in width, to eight rods or approximately 132 feet. The majority of the road ROW along the Project alignment is 4 rods, or 66 feet wide. This area typically includes the finished gravel or paved travel surface, shoulder areas, and side-slopes along with an additional cleared buffer area. As with the existing transmission ROWs, these road ROWs pass through a diverse mix of land uses and support development including commercial and residential areas within towns and villages, and rural residential and non-residential areas where more remote. The non-travel surface portion of the road ROWs are currently maintained to keep them clear of encroaching tall woody vegetation that could impact the roadway, obstruct visibility, or interfere with existing electrical distribution lines. Bridges and culverts are present, along with networks of drainage and stormwater control ditches. Driveways and similar man-made features are also present.

6.1.1.2 Topography

The State of New Hampshire represents the northern limits of the Appalachian Highlands geologic province of the United States. Within the New Hampshire section of the Appalachian Highlands, there are three major physiographic regions: the White Mountains, the Eastern New England Upland, and the Coastal Lowland regions. The Project traverses the Eastern New England Upland and the White Mountains regions. Within these two physiographic regions, seven ecological regions are recognized: North Country, White Mountains, Connecticut River Valley, Monadnock - Sunapee Highlands, Southwest NH Lowlands, Lakes, and Merrimack

River Valley.[6] The majority of the Project area lies within the North Country, White Mountains, Lakes, and Merrimack River Valley regions.

The northernmost portion of the Project is located within the North Country region, north of the Presidential Range in Coös County. The terrain is generally a combination of mountains and large river valleys, including the upper reaches of the Connecticut, Androscoggin, and Ammonoosuc rivers. Elevations in this portion of the Project area range from 700 to 4,000 feet above sea level.

As it continues south, the Project crosses the White Mountains region. The White Mountains region is dominated by tall peaks, with elevations ranging from less than 1,000 to more than 6,000 feet. This region of New Hampshire is home to the Presidential Range and the upper reaches and headwaters of several rivers. The majority of the region drains into the Pemigewasset and Saco river systems, with northern portions of the region draining to the Connecticut and Androscoggin rivers.

South of the White Mountains region the Project passes through the Lakes Region, which is characterized by an abundance of lakes, hills, broad plains, and small mountain ranges. This region is home to several moderate sized rivers including the Saco, Bearcamp, and Winnipesaukee rivers. Elevations in this region range from 300 to more than 3,000 feet. The Lakes Region is bordered to the south by the Merrimack River Valley.

The new NPT line reaches its southern terminus in the Merrimack River Valley, in the Town of Deerfield; however, some work on existing transmission infrastructure will take place south of this location in the towns of Deerfield, Raymond, Chester, Derry and Londonderry, Rockingham County. The Merrimack River Valley is characterized by low hilly terrain and lowlands with elevations ranging from less than 500 feet near the river to 1,000 feet on hilltops.

6.1.1.3 Bedrock Geology

Most of the Project area is underlain by igneous and metamorphic rock of the Cambrian-Silurian-Devonian era (520–360 million years ago ["Ma"]). The bedrock along the southern portion of the corridor, between Londonderry and Franklin, is composed of Cambrian and Silurian age metamorphic rocks (*aluminous schist, quartz, calc-silicate granofels, biotite granofels and bimodal metavolcanic rocks*). Farther north, between Franklin and Northumberland, the bedrock transitions to Silurian and Devonian age igneous and metamorphic rock (*granite, tonalite, granodiorite, slate, phyllite, aluminous schist, calc-silicate, granofels, bimodal metavolcanic rocks, quartz diorite and two-mica granite*).[7] Farther north towards the border of Canada, between

[6] Sperduto, D.D. and Ben Kimball. 2011. The nature of New Hampshire: natural communities of the granite state. 1st Edition. NH Natural Heritage Bureau, Concord, NH. Pub. University Press of New England, Hanover and London, NH.

[7] Lyons, J.B., W.A. Bothner, R.H. Moench and J.B. Thompson, 1997. Geologic Map of New Hampshire. New Hampshire Department of Environmental Services and United States Geological Survey, scale 1:250,000.

Northumberland and Stewartstown, the bedrock consists of Devonian and Silurian age Metamorphic and Igneous rock (*Schist, quartzite, minor carbonate rocks, slate, gneiss, and granite*), with smaller inclusions of Triassic-Cretaceous age (245–150 Ma) Igneous rock (White Mountain plutonic and volcanic rocks consisting of *granite, syenite, and rhyolite*). A simplified map of the bedrock geology of New Hampshire is available online.[8]

"Calcium-rich" bedrock refers to bedrock units in NH with higher potential to yield elevated calcium levels in soil upon weathering compared to other bedrock types. The proposed ROW extends through areas of calcium-rich bedrock in the towns of Dummer, Millsfield, Dixville, Stewartstown, Clarksville, and Pittsburg. Calcium-rich bedrock has a higher probability of supporting rare plants in New Hampshire, and therefore these areas were mapped to help guide rare plant searches in the Project area (Appendices C and D).

6.1.1.4 Surficial Geology

The surficial geology in the vicinity of the Project is dominated by glacial till (a heterogeneous mixture of sand, silt, clay, and boulders) deposited during the retreat of glacial ice (15 thousand years ago ["Ka"], ± 5K) at the end of the Wisconsinan Glaciation. Low lying areas, such as fluvial plains and valleys consist of stratified drift (mostly fine grained sediments deposited by wind and water) that becomes more prevalent in the southern portion of the state due to lower elevations and increased frequency of water bodies. The southernmost section of the Project area, from Franklin to Londonderry, is approximately 50% glacial till covered bedrock and 50% stratified drift. Most of the stratified sedimentary deposits in the southern half of the Project area are associated with the Merrimack River and its tributaries[9]. From Stewartstown to Franklin, the Project area consists of approximately 60% glacial till covered bedrock and 40% stratified drift. The New Hampshire Geological Survey is in the process of preparing detailed, 7.5 minute quadrangle, surficial geology maps for New Hampshire, but to date only about 50% of the state has been completed.[10]

6.1.2 Soils

The Project area traverses areas with surficial geology dominated by glacial tills and stratified drift, as discussed above. Soil types vary widely within the glacial tills and stratified drifts, ranging from excessively drained gravel to very poorly drained organic soils. The organic soils generally occur in depressions and lowlands within glacial till, glaciofluvial, and glaciomarine deposits. Thin drift is usually associated with higher elevations occurring in areas of outcrops and bedrock. A description of common soil types within the Project area is provided in Table 1.

Table 1. General Soil Types of the Project Area

[8] http://des.nh.gov/organization/commissioner/pip/publications/geologic/ documents/generalized_bedrock.pdf
[9] USGS, 1990 – 1997. Various – Surficial Geologic Maps of Selected Portions of New Hampshire, scale 1:24,000.
[10] http://des.nh.gov/organization/commissioner/gsu/gmp/documents/surf-geo-status.pdf

Soil Type[11]	Description
Glacial till	A mixture of sand, silt, clay, and stones forming sandy loam, stony loam, or stony silty loam. Found on hills, ridges, and till plains. e.g., Marlow
Glaciomarine sediments	Silt, clay, and local sand, forming silty loam, fine sandy loam. Found mainly on coastal lowlands and major river valleys. e.g., deposition in a low flow underwater environment
Thin drift	Thin surficial deposits overlying bedrock or outcrops; soil may contain a high percentage of bedrock fragments or stone
Glaciofluvial materials	Near previous drainage channels and eskers, composed of sand and gravel. e.g., out-washed sand and gravel; delta deposits
Organic soils	Peat, muck, clay, and silt in swamps, marshes, bogs, and floodplains along rivers and streams. e.g., anoxic soils

To date, detailed soil mapping has been completed at the location of proposed transition stations, the converter terminal, and substation expansions in Deerfield and Londonderry. Refer to the Alteration of Terrain Permit Application for additional details. Microsite-specific samples of surface soils were reviewed with hand augers and shovels, where required, during wetland delineations to determine the nature of the soil and whether it was hydric or non-hydric. These observations were documented at representative wetlands in US Army Corps of Engineers ("USACE") Wetland Data Forms, which were provided to USACE separately in electronic format.

See below for additional information about wetlands and wetland soils within the Project alignment.

6.1.3 Wetlands and Watercourses

Wetland and watercourse delineations were completed over the course of several years using methodologies and protocols required by the New Hampshire Department of Environmental Services ("NHDES") and USACE. Delineation methodologies, results, and additional analyses are contained in Appendix B: Wetlands, Rivers, Streams and Vernal Pools Resource Report and Impact Analysis. Table 2, below, summarizes natural resource survey dates (including wetland and watercourse delineations).

[11] DOE (U.S. Department of Energy), 1995. Final Environmental Impact Statement for Construction and Operation of Proposed Bangor Hydro-Electric Company's Second 3450kV Transmission Tie Line to New Brunswick, DOE/EIS-0166, Office of Fuels Program, Washington, D.C.

Table 2. Summary of Summary of Natural Resource Survey Dates

Portion of Project Route	Survey Date
Existing PSNH transmission line ROW from the Town of Dummer to the Deerfield Substation in the Town of Deerfield	May 2010 through September 2011
Existing PSNH ROW between the PSNH Deerfield Substation and the Scobie Pond Substation in the Town of Londonderry	2013
US/Canada Border in Pittsburg to the PSNH Lost Nation Substation in Northumberland	April and May 2013 and between June and November 2014
Proposed underground alternatives and proposed ORAR	September and November 2014; April through July 2015
Bat surveys on existing and proposed transmission ROW	May 2015 through August 2015

Field protocols for the mapping of natural resources were developed to ensure consistency in data collection, and agency coordination for the Project was undertaken to ensure sufficient information was collected for agency review. The Project team has either met with or contacted the following agencies: NHDES, USACE, US Fish and Wildlife Service ("USFWS"), US Forest Service ("USFS") including WMNF staff, the New Hampshire Fish and Game Department ("NHFG"), and the New Hampshire Natural Heritage Bureau ("NHNHB").

Wetland delineations were completed in the field using the routine determination method according to the Wetland Delineation Manual as amended through regional supplements.[12,13] This methodology includes a three-parameter approach to the field determination of wetland boundaries and requires the presence of hydric soils, hydrophytic vegetation, and hydrology. As required in New Hampshire, wetland boundaries were delineated either directly by, or under the supervision of, a New Hampshire Certified Wetland Scientist ("NHCWS"). In addition, USACE wetland data forms for paired plots were collected in representative adjacent wetland and upland communities throughout the Project study area[14]. Wetlands were classified based on the dominant cover type class according to the USFWS classification system

[12] U.S. Army Corps of Engineers (USACE). 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1,U.S. Army Engineer Waterways Experiments Station.

[13] U.S. Army Corps of Engineers. 2011. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)*, ed. J. S. Wakeley, R. W. Lichvar, C. V. Noble, and J. F. Berkowitz. ERDC/EL TR-12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

[14] These forms are available upon request

(Cowardin system), and principal and suitable functions and values were determined following the USACE "Highway Methodology."[15,16]

Multiple site visits were conducted with representatives of the USACE and Normandeau in 2014 and 2015 to review wetland delineations in the field. Site visits were conducted between the Pittsburg and Deerfield. Site visits focused on a representative sample of typical wetland types for the general geographic and ecological areas of the Project route as well as on challenging and atypical areas to determine of the wetland boundaries were accurately mapped based on the methodology. Wetlands that were reviewed in the field with the USACE are noted on the figures included in Appendix I.

Rivers and streams were delineated concomitantly with wetlands and flagged in the field where accessible on foot; where inaccessible, LIDAR and high-resolution aerial photography was used. Watercourses were documented by gathering information about various characteristics, including flow regime, Cowardin classification, average width, and general bed and bank characteristics.

Wetlands and watercourses were located with a Trimble® Global Positioning System ("GPS") unit, and individual wetlands and watercourses were documented using a combination of standardized field data forms, summary forms, and aerial photograph field maps. All resources were photographed in the field.

6.1.3.1 Wetlands

Wetland delineations were conducted between 2010 and 2015 across the more than 6,000 acre Project study area, which includes the primary route and multiple alternatives. ORAR and other accessory areas were also reviewed and delineated. Table 9, below, summarizes the number of wetlands delineated within the various sections of the Project. Not all of these resources are proposed to be impacted during construction. Table 9 does not include Project alternatives that were also reviewed. Detailed results for each section, along with summaries by cover type, are included in the Wetlands, Rivers, Streams and Vernal Pools Resource Report and Impact Analysis (Appendix B).

The identified wetlands varied based upon their geographic and topographic location on the landscape and the existing land uses and disturbance regime associated with the resource and surrounding area. In general, wetlands were more common, based on acreage, across the northern sections of the Project between Pittsburg and Bethlehem where the topography is

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[15] Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Jamestown, ND: Northern Prairie Wildlife Research Center Online. http://www.npwrc.usgs.gov/resource/wetlands/classwet/index.htm (Version 04DEC1998).

[16] USACE, New England District. 1999. *The Highway Methodology Handbook: Supplement. Wetland Functions and Values – A Descriptive Approach.* NAEEP-360-1-30a, September 1999.

more rugged and the climate is colder and wetter. The central portion of the Project route, between Bethlehem and the Franklin converter terminal was significantly drier due primarily to the route following existing road ROW areas and broad river valleys, particularly the Pemigewasset River Valley, which is sandy and generally well drained. From the Franklin converter terminal to the Deerfield Substation and on to the Scobie Pond Substation, the topography is flatter with fewer and larger wetland systems, especially as the route approaches the coastal plain from Deerfield south to Londonderry.

Wetlands identified within the northern section of the Project where new ROW will be established were dominated by palustrine forested ("PFO") communities with emergent and scrub-shrub components in recently logged areas and areas of past or ongoing disturbances, including along roads and near residential development. Wetlands located within the existing transmission line and road ROW areas south of the Dummer were fairly uniform and consisted of emergent and scrub-shrub wetlands and combinations of the two. This is due to the routine vegetation management, including mowing and/or selective tree cutting, to maintain safety clearances for conductors. Several ponded wetlands, often associated with beaver, and with emergent and scrub-shrub fringes are located throughout the Project area with concentrations between Northumberland and Whitefield and between Deerfield and Londonderry.

Table 3. Summary of Wetlands, Rivers, Streams and Vernal Pools in the Proposed Project Area

ROW Survey Section (North to South)	Wetlands	Prime Wetlands	Rivers and Perennial Streams	Intermittent Streams	Ephemeral Streams	Vernal Pools
US/Canada Border to Existing ROW in Dummer (Section N1)	495	0	67	101	139	30
Transition Stations (TS1 – TS4)	32	0	3	7	16	4
Existing ROW in Dummer to Whitefield S/S (Section N2)	240	0	33	25	21	35
Whitefield S/S to Bethlehem TS (TS5)(Section C1)	110	None	11	9	2	17
Bethlehem TS (TS5) to Bridgewater TS (TS6)(Section UG Central)	144	None	66	61	61	17
Transition Stations TS5 and TS6	1	0	0	0	0	0
Bridgewater TS to Franklin Converter Terminal (Section C2)	166	0	39	23	48	5

ROW Survey Section (North to South)	Wetlands	Prime Wetlands	Rivers and Perennial Streams	Intermittent Streams	Ephemeral Streams	Vernal Pools
Franklin Converter Terminal to Deerfield Substation (Section S1)	258	0	31	40	36	16
Franklin Converter Terminal	13	0	1	1	1	2
Deerfield Substation	5	0	0	6	2	0
Deerfield Substation to Scobie Pond Substation	230	6	26	8	9	98
Scobie Pond Substation	6	0	1	0	0	2
ORAR	272	0	37	77	79	45
Total	**1,972**	**6**	**315**	**358**	**414**	**271**

6.1.3.2 Watercourses

Watercourses, including streams and rivers, were identified across all sections of the Project route. These ranged from small, ephemeral drainages that flow only following snowmelt or precipitation events to major rivers including the Pemigewasett and Merrimack. Table 9, above, summarizes the number of watercourses delineated within the various sections of the Project. Detailed results for each section, along with summaries by flow regime are included in the Wetlands, Rivers, Streams and Vernal Pools Resource Report and Impact Analysis in Appendix B.

The spatial distribution of watercourses within the Project study area mimicked that observed with the delineated wetlands. Drainages of all types were more common across the hilly and mountainous areas in the north, most of which are associated with wetlands, including stream-side seeps and other wetlands. In the southern portions of the Project area, the number of identified watercourses declined; however the percentage of streams that were perennial increased due to the flatter topography and sandier, drier soils. Most of the larger rivers, including Designated Rivers under the NH Rivers Management and Protection Act, and those subject to regulations under the NH Surface Water Quality Protection Act, are located south of the White Mountains.

6.1.4 Floodplains

6.1.4.1 Federal Emergency Management Agency (FEMA) Mapping

Special Flood Hazard Areas

Based on Federal Emergency Management Agency ("FEMA") Flood Insurance Rate Maps ("FIRMs"), the Project crosses over approximately 75 Special Flood Hazard Areas ("SFHA") associated with several rivers, streams, brooks, and unnamed watercourses. These areas are depicted on the plans in Appendix I. SFHAs include areas expected to be inundated by a base flood, and are commonly referred to as the 100-year floodplain. The Project passes through two types of SFHAs, including A and AE flood zones. Base flood elevations ("BFEs") have been established and are shown on the FIRMs for AE zones, but have not been established for A zones. Of the 75 SFHAs crossed by the Project, 50 are within zone A and 25 are within zone AE.

Several of these floodplain areas are mapped as wetlands, and as such have been avoided where possible. All floodplain areas were taken into consideration during the siting and engineering design process. Floodplains will be spanned either overhead or underground, with only minimal additional structures added, and no expected impacts to flood storage capabilities.

Moderate Flood Hazard Areas

The Project crosses 30 moderate flood hazard areas associated with Otter Brook and Israel River in the Town of Lancaster, in the northern portion of the Project area; Chance Pond Branch in the City of Franklin, in the central portion of the Project area; the Pemigewasset River and Glove Hollow Brook in the towns of Plymouth and Bridgewater, in the underground portion of the Project area; the Merrimack, Soucook, and Suncook Rivers in the towns of Franklin, Northfield, Concord, Pembroke, and Allenstown within the southern portion of the Project area; and Shields Brook in the towns of Derry and Londonderry, in the AC support portion of the Project area. Labeled as Zone X (shaded), these moderate flood hazard areas are between the 100-year flood and 500-year flood (or 0.2-percent-annual-chance) zones.

The moderate flood hazard areas discussed above should not be confused with other areas labeled as Zone X (unshaded), which denote areas that are outside of the 500-year flood zone and generally not considered at risk of major flooding

Regulatory Floodways

The Project crosses regulatory floodways associated with 10 rivers. Regulatory floodways are "the channel of a river or other watercourse and the adjacent areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height."[17] Regulatory floodways crossed by the Project are associated

[17] Federal Emergency Management Agency (FEMA). "National Flood Insurance Program:

with the Israel River and Otter Brook in the Town of Lancaster in the northern portion of the Project area; the Pemigewasset River and Chance Pond Branch in the towns of Bridgewater, Ashland, and Franklin, in the central portion of the Project area; the Baker River in the Town of Plymouth, in one underground portion of the Project area; the Merrimack, Soucook, and Suncook Rivers in the towns of Concord, Pembroke, and Allenstown, in the southern portion of the Project area; and the Lamprey River and Shields Brook in the towns of Candia, Raymond, and Derry in the AC support portion of the Project area.

6.1.5 Groundwater Resources

Groundwater table depth within the Project area is typically 10–20 feet below the land surface, but does range from a few feet to several hundred feet deep. The water table fluctuation mirrors that of annual stream flow data with a high occurring in the spring and a low occurring in the late summer/early fall.

Based on a review of NHDES GIS data layers for aquifers, drinking water supply sources, public water supply sources, registered water withdrawals, water wells, water supply intake protection areas, and groundwater reclassification areas (GAA/GA1), discussions related to groundwater aquifers and wells in the vicinity of the Project route are below. Many of these data layers are not publically available due to security concerns, and have therefore not been included on Project mapping.

6.1.5.1 Aquifers

Nearly 80% of New Hampshire's groundwater supply comes from either stratified drift aquifers or fractured crystalline bedrock. Stratified drift aquifers cover about 14% of the state and are typically found in river valleys and other lowlands. The southern portion of the state has higher concentrations of these aquifers primarily due to lower elevations and increased frequency of large fluvial/glacial deposits. Nearly 80% of the higher-capacity wells in the state are found in these areas.

Fractured crystalline bedrock typically has a much lower yield and slower recharge than sedimentary deposits. Groundwater extracted from bedrock has a greater chance of naturally occurring arsenic and radon contamination, and man-made contaminants in bedrock are often difficult and expensive to remediate.

The Project route crosses a number of locations classified as potentially valuable stratified drift aquifers as designated GA2 by NHDES, in particular the central and southern portions of the Project ROW. These data were provided in GIS format by NHDES. The Project ROW includes a total of 207 acres of GA2 aquifers, with the majority of these areas located along the Pemigewasset River valley in Woodstock, Thornton, Plymouth, Ashland, Bridgewater and New

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Flood Hazard Mapping." 10 Nov. 2014. Web. 20 Jan. 2015. <http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping>.

Hampton. This includes the underground areas along Route 3 and the TS6 site. Through the use of BMPs for equipment/vehicle maintenance and refueling activities, adherence to a Project-specific Spill Prevention, Control, and Countermeasures plan ("SPCC") and the use of environmental monitors, Project construction and operation are not expected to have a detrimental effect on these resources.

6.1.5.2 Wells

A combination of public water supply wells and private individual wells provide water supplies to approximately 60% of New Hampshire's population.[18] Higher-yield public water supply wells are typically associated with stratified drift aquifers, while smaller public water supplies and individual private wells are typically associated with bedrock wells (also called drilled or artesian wells). Statewide, there are a small number of individual dug wells (<10%) and point wells (<2%) in areas with suitable soil conditions.

The majority of New Hampshire's wells are bedrock wells. The median depth of bedrock wells drilled from 2000 to 2010 was 365 feet, with a range of about 100 to 700 feet.

According to the NHDES GIS data layers, over 11,000 wells are registered within the 37 towns crossed by the Project route, 10 of which are located within the Project ROW. Among public water supply wells, 821 are located within the Project towns, with three located within the ROW: one associated with the former campground at the proposed Franklin converter terminal site in the City of Franklin, one associated with Crystal Springs in the Town of Plymouth, and one associated with Govoni's Restaurant in the Town of Woodstock. The reviewed data layers also indicate 393 registered water withdrawals are located within the towns crossed by the Project route; one, associated with the Ashland wastewater treatment facility, is located within the Project ROW.

Wellhead protection areas, including areas classified as GAA and GA1 according to New Hampshire's Groundwater Protection Act (RSA 485-C), along with water supply intake protection areas, were reviewed in the context of the Project ROW. The wellhead protection areas contain groundwater for wells that are presently in use, or for well sites that have been identified for future use as drinking water supply for public water systems.

According to NHDES GIS data, no water supply intake protection areas are located within the Project ROW. Two wellhead protection areas classified as GAA are located within the ROW: one associated with the Pembroke Water Department in the towns of Pembroke and Concord, and one associated with the Plymouth Village Water and Sewer District in Plymouth along Route 3.[19]

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[18] http://des.nh.gov/organization/commissioner/pip/factsheets/dwgb/documents/dwgb-22-1.pdf
[19] http://des.nh.gov/organization/commissioner/pip/factsheets/dwgb/documents/dwgb-22-1.pdf

One GA1 area, defined as a zone of high value for present or future drinking water supply, is located within the ROW in the Town of Raymond and is associated with the Town of Raymond's Water Department. This area is not located near planned structure upgrades associated with the AC System Support portion of the Project so no impacts are anticipated.

6.1.6 Vernal Pools

Vernal pools were field delineated within the Project study area during spring amphibian breeding seasons between 2011 and 2015, according to vernal pool definitions from the Department of the Army Programmatic General Permit – State of New Hampshire[20] and the NHDES Wetland Rules[21]. In addition, guidelines adapted by the NHFG were utilized.[22] Surveys targeted primary and secondary vernal pool indicator species, as defined by the USACE and NHDES, along with physical characteristics that are necessary for the successful reproduction of these indicator species. A pool's physical characteristics, surrounding habitat and land use, and other parameters were collected using standardize field data forms.

Preliminary vernal pool surveys were conducted concurrently with wetland delineations in 2010. In the spring of 2011, more detailed surveys were conducted in those areas identified in 2010 as having potential pools. Surveys between the US/Canada border and Dummer and the Deerfield Substation to Scobie Pond Substation segment were performed in April and May of 2013 and 2014. Surveys along the underground sections of the Project, along ORARs, and at transition stations 5 and 6 were performed in April and May 2015.

Vernal pools were evaluated based on their biological value and habitat condition (Calhoun and Klemens, 2002). High quality pools are those that meet the following criteria:

- Associated with state-listed or special concern species; or
- Contain two or more primary indicator species; and exhibit
    - high levels of amphibian breeding activity (25 or more egg masses) at the time of the survey;
    - adjacent habitat comprised of at least 75% undeveloped area within the first 100 feet from the vernal pool seasonal high water line (critical terrestrial habitat); and
    - adjacent habitat comprised of at least 50% undeveloped area within 750 feet of the critical terrestrial habitat.

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[20] New England District of the U.S. Army Corps of Engineers. 2012. Department of the Army Programmatic General Permit State of New Hampshire. General Permit No: NAE-R-2012-00339. Effective Date: August 3, 2012; Expiration Date: August 3, 2017.

[21] New Hampshire Code of Administrative Rules. Chapter Env-Wt 100-900.

[22] New Hampshire Fish and Game Department, Nongame and Endangered Wildlife Program. 2004. *Identification and Documentation of Vernal; Pools in New Hampshire*. Online: http://www.wildlife.state.nh.us/Wildlife/Nongame/RAARP/Vernal_pool_manual.pdf

Information on species composition within each pool was recorded in the field and surrounding habitat information was collected from field notes and high-resolution aerial imagery. All pools were cross referenced with prior RTE species surveys to determine if sensitive plant or animal populations were identified in the vicinity. A list of vernal pools that qualify as "high quality" was generated and revised based on direct field observations.

Based on the above methodology, a total of 271 vernal pools were identified along the Project route, 23 (8%) of which were deemed high quality. Vernal pool documentation represents conditions at the time of a single survey (spring 2011, 2013, 2014, and 2015); therefore annual variability was not part of this evaluation.

Shallow water pools, such as those confined to tire ruts within all-terrain vehicle ("ATV") trails and woods roads and other areas subject to disturbance, are unlikely to provide successful breeding areas and are not included on the list of high quality vernal pools.

Identified vernal pools were generally distributed evenly across the Project area, with the highest concentration identified between the Deerfield and Scobie Pond substations. Pools were found within existing PSNH ROWs and forested areas where new ROW will be established. Detailed results for each Project section are included in the Wetlands, Rivers, Streams and Vernal Pools Resource Report and Impact Analysis in Appendix B.

6.1.7 Protected Species and Natural Communities

The Project route was reviewed to document existing vegetation and ecological communities, RTE plant species, and exemplary natural communities. It was also reviewed to evaluate common wildlife and existing wildlife habitat. Targeted field studies designed to determine presence/absence of important or RTE animals and their significant habitats were performed based on the results of the general reviews. There is currently no federally-designated critical wildlife habitat in New Hampshire.

6.1.7.1 Existing Vegetation and Ecological Communities

Normandeau Associates, Inc. ("Normandeau") identified vegetation and ecological communities in the vicinity of the Project area. This evaluation is summarized below and is described in detail in the Vegetation and Ecological Communities Report (Appendix C). Vegetation and ecological communities were identified based on results of a desktop analysis and natural resource field investigations performed by botanists and wetland scientists. Information utilized to complete this analysis included USGS topographic data, bedrock maps, wildlife habitat maps from the New Hampshire Wildlife Action Plan ("NHWAP"), NHNHB natural community and natural community system classifications, and USFS ecoregion data.

For each segment of the Project, biophysical conditions and characteristic vegetation and natural communities are described. Vegetation is described at two scales: in the general vicinity of the Project area, and within the Project area.

Biophysical conditions for each segment are categorized, in part, based on USFS ecoregion boundaries. Ecoregion boundaries were delineated by USFS from patterns of vegetation, wildlife, geology, soils, water quality, climate, and human land use, as well as other important components of an ecosystem. Ecoregions are further divided into subsections, which represent a unique combination of climate conditions, bedrock and topography, soils, and vegetation. Natural communities are grouped according to size distribution within a particular ecoregion: "matrix" forest communities dominate the uplands of a region, covering tens of thousands of acres; "patch" communities are smaller, occupying areas from < 1 to hundreds of acres, or less commonly thousands of acres.

The vegetation descriptions for each of the Project areas include a listing of dominant and characteristic natural communities and plant species, RTE species, and invasive species.

The Project area between the US border with Canada and the Scobie Pond Substation in the Town of Londonderry traverses a broad diversity of the state's physical features and natural vegetation, spanning seven ecoregion subsections within the state. Spruce-fir and northern hardwood forests dominate in the White Mountains and northward; mixes of hardwoods, hemlock, and white pine dominate in central areas; and pitch pine and oaks appear in forests in the southern section where they are locally abundant on the extensive sand plains of the Merrimack River Valley.

The vast majority of vegetation in the Project area consists of native species or non-invasive, non-native species (such as common pasture grasses). Native species predominate in the northern section of the Project that is currently forested. Non-native, invasive species are generally present at low frequencies, especially in the northern portion of the Project; they are most frequent and abundant near roads in developed areas and agricultural fields. Most of the documented rare plant species within the existing transmission ROWs are dependent on open (non-forested) conditions, which are partially or entirely maintained by the existing vegetation management regime, disturbance associated with recreational activities, or both. Much of the northern section of the Project has been intensively logged, although it does include some areas of intact forest that has not been disturbed in recent decades. Most of the rare plant species observed in the forested portions of the Project area are strongly associated with forested habitats and would be unlikely to be found in habitats with an open tree canopy.

6.1.7.2 Rare, Threatened and Endangered Plants and Exemplary Natural Communities

Normandeau botanists performed field surveys for RTE plant species and exemplary natural communities within the Project study area from 2010 to 2015. The results of these surveys are described in the Rare, Threatened, and Endangered Plants and Exemplary Natural Communities report (Appendix D).

Desktop research was performed prior to initiating field investigations. This research included compilation of maps and imagery along the Project corridor and obtaining information relative to known occurrences of rare plants and exemplary natural communities. NHNHB data for the

site were obtained annually under a data sharing agreement that included provisions to protect the sensitive information. These data include all documented occurrences of state- and federally listed species and exemplary natural communities within the transmission line corridor. A list of species that should be considered for evaluation of environmental effects within the WMNF was obtained from USFS.

A prioritized search strategy was developed, focusing on specific locations along the ROW most likely to harbor RTE plant species and exemplary natural communities. Survey methodologies for the portion of the Project located within existing transmission line ROW were discussed and agreed upon during a June 18, 2010, meeting with the NHNHB and USFWS. On June 23, 2010, the Project team met with the USFS and additional protocols were added for survey work on USFS lands.

Survey methodologies for Project areas located within existing ROW between Northumberland and Deerfield are described in a work plan dated April 2011, entitled *Methodology for Survey of Rare Plant Species and Exemplary Natural Communities* (Appendix D) The April 2011 work plan was reviewed and approved by NHNHB, USFWS, and USFS. In May 2014, an *Addendum to the Methodology for Survey of Rare Plant Species and Exemplary Natural Communities* (Appendix D) was drafted to describe proposed search methodologies for additional Project areas not covered in the April 2011 work plan. The May 2014 addendum provides search methodologies for the following Project areas: new ROW located between the US/Canada Border and Dummer; existing ROW located between Dummer and Northumberland, and Deerfield to Scobie Pond Substation; and substation and transition area properties. The May 2014 work plan addendum was reviewed and approved by NHNHB. A second addendum to the work plan (Addendum II) dated September 2015, includes survey protocols for RTE plants and exemplary natural communities within the proposed access roads, the underground route between Bethlehem and Bridgewater and associated transition stations, the Lost Nation Substation, and areas of proposed vegetation clearing within the existing ROW corridor. It also includes protocols for surveying natural communities with a state rank of S3 or rarer within the northern (currently forested) portion of the Project area.

From 2010 to 2015, botanists searched relevant Project areas for RTE plant species and exemplary natural communities as described in these work plan documents, targeting the following areas for survey:

1. State-Threatened or Endangered plant populations or watch species occurrences mapped within the Project area.
2. Areas of the Project area within 0.5 mile of a State-Threatened or Endangered rare plant population or watch species occurrence, if the species has habitat requirements that may occur within the Project area.
3. Exemplary natural communities mapped within the Project area.
4. Areas of the Project area within 0.5 mile of an exemplary natural community, if the community has the potential to extend into the Project area.

5. Areas within the Project area with bedrock mapped as calc-silicates, carbonate-bearing, intermediate, or mafic, and areas within a mile in a southerly direction of these rock types.
6. Areas of the existing corridor with soil drainage classes of excessively or somewhat excessively drained. Areas mapped as Cliff, Peatland, and Rocky ridge or Talus slope that occur within the Project area.
7. Areas of the existing corridor within 200 meters of a documented small whorled pogonia population (a federally threatened species currently known to exist outside the existing PSNH ROW) that correspond to potentially appropriate soil and slope conditions (pan layer and 11–17% slopes).
8. Areas within 5 miles of a known extant small whorled pogonia population, that are wooded, have appropriate soil, slope and forest cover characteristics (pan layer, 11–17% slope, deciduous or mixed cover).
9. Natural communities classified as S3 (very rare and local; or found locally [even abundantly at some of its locations] in a restricted range; or vulnerable to extinction because of other factors) by NHNHB, as may be required in the proposed SEC rules.
10. Any additional areas that may have relatively high potential to support rare species, as communicated by NHNHB to Project botanists.
11. Any cedar swamps occurring within the Project area.

Protocols required by NHNHB for validation of new or extant populations of RTE species were followed (collection of specimen and/or adequately diagnostic photograph), and the boundaries of populations were located using a handheld Trimble® GPS receiver. Flagging was not used to demarcate the occurrence of any species considered "sensitive" by NHNHB. The boundaries of other rare plant element occurrences were flagged but cryptically labeled. A Rare Species Occurrence Record field form (Special Plant form) was completed for each state-threatened or endangered plant species surveyed and was submitted to NHNHB.

Exemplary natural communities occurring within the Project area were identified and the boundaries of these areas were located using GPS where practicable and inferred beyond the Project area using aerial photos. An Exemplary Natural Community Reporting Form was completed for each occurrence encountered within the Project area. Additionally in the northern (currently forested) portion of the Project area (between Dummer and Pittsburg), natural communities with a state rank of S3 or rarer were identified and mapped.

Locations of state-watch and indeterminate species were also recorded. Data collection included, at a minimum, a GPS located point and accompanying notes on extent, abundance, and habitat. Although these species are not presently listed as threatened or endangered, data submitted in association with the Project will help NHNHB evaluate current status or changes in status of subject plants.

Nine state-listed threatened or endangered plant species, 12 state watch plant species, four state indeterminate plant species, two state exemplary natural community systems, and six natural community types ranked as S2 or S3, including four communities that are potentially state exemplary occur within the proposed Project area (Table 10). No federally listed threatened or endangered plant species were observed within the Project area based on desktop and field inventory efforts.

Table 4. Summary of Rare, Threatened, and Endangered Plants and Exemplary Natural Communities Verified within the Project Area

RTE Species or Exemplary Natural Community	State Status	Towns
Plants		
Swamp Buttercup (*Ranunculus caricetorum*)	State Indeterminate	Pittsburg, Clarksville, Stewartstown, Dixville, Millsfield
Wild Leek (*Allium tricoccum* var. *tricoccum*)	State Watch	Pittsburg, Clarksville, Stewartstown, Dixville
Canada Violet (*Viola canadensis*)	State Watch	Stewartstown, Dixville
Northern Wild Licorice (*Galium kamtschaticum*)	State Watch	Stewartstown, Dixville
Goldie's Fern (*Dryopteris goldiana*)	State Watch	Dixville
Pale Jewelweed (*Impatiens pallida*)	State Watch	Dixville, Millsfield
Squirrel Corn (*Dicentra canadensis*)	State Watch	Dixville
Millet Grass (*Milium effusum*)	State Watch	Pittsburg, Clarksville, Stewartstown, Dixville
Dwarf Scouring-rush (*Equisetum scirpoides*)	State Watch	Stewartstown
White-tinged Sedge (*Carex albicans* var. *albicans*)	State Watch	Stewartstown
Narrowleaf Sedge (*Carex grisea*)	State Indeterminate	Lancaster
Wild Lupine (*Lupinus perennis*)	State Threatened	Concord, Pembroke
Blunt-leaved Milkweed (*Asclepias amplexicaulis*)	State Threatened	Concord, Pembroke
Spiked Needle Grass (*Aristida longespica* var. *geniculata*)	State Endangered	Concord, Pembroke, Raymond
Branching Needle Grass (*Aristida basiramea*)	State Indeterminate	Canterbury, Concord, Pembroke, Raymond
Fall Witch-grass (*Digitaria cognata*)	State Indeterminate	Canterbury, Concord, Pembroke
Licorice Goldenrod (*Solidago odora*)	State Endangered	Pembroke, Derry
Butterfly Milkweed (*Asclepias tuberosa*)	State Endangered	Concord
Toothed White-topped Aster (*Sericocarpus asteroides*)	State Watch	Concord
Sensitive species	State Endangered	Chester

RTE Species or Exemplary Natural Community	State Status	Towns
Hairy Thoroughwort (*Eupatorium* cf. *pubescens*)	State Endangered	Derry
Sensitive species	State Endangered	Derry
American Chestnut (*Castanea dentata*)	State Watch	Derry
Early Azalea (*Rhododendron prinophyllum*)	State Watch	Derry
Communities		
Moderate-gradient Sandy-cobbly Riverbank System	S3S4 State Exemplary	Dixville, Dix Grant
High-gradient Rocky Riverbank System	S3 – State Exemplary	Easton
Northern Hardwood Seepage Forest*	S3 (Vulnerable)/Potential Exemplary natural community	Dixville
Northern White Cedar – Balsam Fir Swamp	S2– Potential Exemplary natural communities	Stewartstown, Dummer
Northern Hardwood – Black Ash —Conifer Swamp	S3	Clarksville, Stewartstown
Boulder-cobble River Channel	S3	Dixville
Lowland Spruce-fir Forest	S3	Clarksville, Stewartstown, Dixville, Millsfield, Dummer
Rich Mesic Forest	S3	Pittsburg, Clarksville

6.1.7.3 Existing Wildlife Habitat

The Project passes through a numerous habitat types and will potentially affect a variety of special status wildlife species. The desktop and field-based wildlife studies completed for the Project area, through September 30, 2014, are documented in Appendix E and summarized below.

The study area included the existing and proposed ROW only and the ORARs. The suite of wildlife resources assessed for presence within the Project area, and for potential impacts as a result of the Project was developed based on the habitat types defined in the NHWAP and on feedback from a variety of agencies.

The NHWAP defines and maps the extent of 19 different wildlife habitat types in the state based on vegetation and land form. In addition to the habitat types, the NHWAP also ranks and maps all habitat area by value to wildlife. These NHWAP-defined habitat types and values were used to assess the existing conditions in the Project area. In addition to these habitats, NHFG requested that three specific wildlife habitats, Deer Wintering Areas ("DWAs"), Moose Concentration Areas ("MCAs"), and Important Mast Areas also be considered. Important mast areas in New Hampshire generally consist of oak (*Quercus* spp.) or American beech (*Fagus grandifolia*) stands.

The wildlife habitat within one half mile of each side of the Project route was evaluated based on information available from the NHWAP GIS data layers. NHFG also maps DWAs throughout the towns crossed by the Project footprint, and this digital data layer was also evaluated using GIS. However, MCAs and mast stands have not been mapped. Extensive on-the-ground observations made during various wildlife surveys were used to augment and verify the GIS-based evaluation, and to identify locations were the Project footprint coincided with MCAs and notable mast stands.

From the US-Canadian border to the Town of Dummer, no current ROW exists and forest will be cleared for the Project. Habitat within the proposed Project footprint is similar, in composition and value, to the surrounding landscape, and has been heavily influenced by historic and ongoing forest management activities, including logging. This area provides high quality forest habitat for species that are adapted to or benefit from forest lands with young or multiple age-classes, including snowshoe hare (*Lepus americanus)*, moose (*Alces alces*), white-tailed deer (*Odocoileus virginianus*), and American black bear (*Ursus americanus*). Due to past and ongoing logging operations, older age-classes are relatively rare in the region, including within the Project footprint. Over-mature forest stands/trees, or those stands that have begun to decrease in commercial value because of size, age, decay, or other factors, provide important feeding, denning, and sheltering resources for a wide variety of wildlife, including woodpeckers, bats, American marten (*Martes americana*), fisher (*Martes pennanti*), mice, squirrels, and North American porcupine (*Erethizon dorsatum*). Mature beech trees produce larger numbers of beech nuts, an important food resource for many species of birds, small mammals, and especially black bears. Due to their rarity in the landscape, older forest stands and individual remnant over-mature trees have a relatively high habitat value, but these resources are not mapped by the NHWAP. A small amount of mature second growth tree habitat is present in the new ROW, but there is no reason to believe this resource is present in a greater density in the Project footprint than in the surrounding landscape. Much of the northern forest in the Project area is relatively young forest due to short rotation timber management activities. Wetlands, which are mapped as part of the NHWAP habitat analysis, also provide high quality habitat for a wide range of wildlife. Based on the NHWAP mapping, wetland habitats are present in the Project footprint in this section of the Project area at a similar density and extent as the surrounding landscape.

The Project route from the Town of Dummer to Deerfield Substation is located within an existing transmission ROW. In this portion of the Project route, the existing ROW is maintained as early successional, shrubby cover by periodic mowing. The majority of the surrounding cover is forest. Mature second growth forest types dominate this section of the State and are also the most common habitat types adjacent to the existing ROW. Early successional habitats, such as grasslands and shrublands, are less common in New Hampshire, and in some locations, the existing ROW itself may provide the largest expanse of these habitat types in the local landscape. Transmission ROWs are known to provide valuable habitat to many species that depend on shrubby or open habitats for part or all of their life cycle, and are therefore relatively rare in New Hampshire's predominantly forested landscape. These species include eastern

whip-poor-will (*Caprimulgus vociferous*), prairie warbler (*Setophaga discolor*), eastern towhee (*Pipilo erythrophthalmus*), northern black racer (*Coluber constrictor*), and eastern hognose snake (*Heterodon platirhinos*). Open habitats can also provide important turtle nesting habitat. Based on NHWAP mapping, wetland habitats in this section of the Project area are present in the Project footprint at a similar density and extent as the surrounding landscape.

The most unique habitat type within and along the existing ROW is the pine barrens area near the Concord Municipal Airport. Soil conditions and fire regime created this habitat type prior to construction of the existing ROW, but ROW maintenance practices have become integral to maintaining this habitat as fire suppression is now the norm. Because of its unique ecology, this area supports a variety of species, especially lepidopterons, which do not occur in any other habitat type. This habitat is therefore considered of high value.

The overhead line portion of the Project ROW intersects 17 mapped DWAs. In most cases, the ROW passes through an edge or lobe of the DWA, rather than bisecting it. All mapped DWAs were identified and confirmed in the field, based on presence of deer sign and vegetation characteristics. Moose browse was common to abundant throughout the Project area from the Town of Bridgewater northward. In many locations from the Town of Whitefield northward, nearly every shrub in the existing ROW showed some damage caused by moose browsing during the growing season. Only currently forested portions of the Project corridor (along the new ROW) had browse patterns suggesting winter feeding. MCAs were identified in two areas in the Town of Dixville, two areas in the Town of Millsfield and one area in the Town of Dummer. These MCAs range in their extent along the proposed ROW from, approximately, 1,000 to 6,000 feet, for a total length of 13,900 feet.

Important mast stands were uncommon along the Project route. Oaks are generally found in the forest cover adjacent to the existing ROW from the Town of Ashland southward, and in many locations are the dominant species. Beech is not abundant in the Project area, either in the uncleared portion of the proposed ROW, or adjacent to the cleared portion of the existing ROW. The only notable area of beech observed along the cleared portion of the ROW was in the Town of New Hampton, where beech grew along both sides of the proposed ROW for about 3,700 feet. In general, beech in the uncleared portion of the proposed ROW comprised about 1-3% of the overstory.

6.1.7.4 Rare, Threatened and Endangered Wildlife and Habitat

NHFG has requested all state-listed wildlife species, including reptiles, amphibians, birds, invertebrates, and mammals be screened for their potential to be present in the Project area. NHFG also specifically asked that some Species of Special Concern ("SSC") be included. These species are wood turtle (*Glyptemys insculpta*), osprey (*Pandion haliaetus*), and Bicknell's thrush (*Catharus bicknelli*). All SSC were subsequently reviewed to meet the SEC's requirements. USFWS personnel indicated that the NHFG-requested assessments would provide sufficient baseline information for USFWS' initial review of the Project because all federally listed species are also state-listed.

The USFWS also expressed concern for forest-nesting birds, and consequently this group was added to the analyses. The USFS provided a list of 17 Forest Service Sensitive ("FSS") bird species for consideration in the WMNF, seven of which were unique to the FSS list, and 10 of which were also state and/or federally listed. Additionally, the USFS requested that two bat species, the tri-colored bat and northern long-eared bat, also be considered, as these two species are likely to be added to the WMNF FSS species list in the near future. Changes to the proposed alignment after the USFS provided the list of species to consider resulted in the removal of high elevation WMNF lands from consideration. Based on this change, the Project area now contains no suitable habitat for many of the USFS species.

The initial assessment of the potential presence of RTE wildlife species in the Project area was conducted though desktop analyses. The results of these analyses provided a basis for determining the need for subsequent species-specific field surveys, which were conducted between the summer of 2011 and the summer of 2015. The desktop analyses were GIS-based and considered existing conditions within 0.5 mile of each side of the proposed Project area, and the known habitat preference of the species of interest, based on the literature. Habitat and vegetation types present in and around the Project area were determined from digital habitat data layers created for the NHWAP, and known occurrences of sensitive wildlife species within this buffer were provided by the NHNHB.

NHFG requested direct field surveys for three species, Canada lynx (*Lynx canadensis*), American marten, and northern black racer. For all other species, NHFG recommended assessing the potential habitat in the Project area for each species, by reviewing its known distribution in the state, and developing appropriate protocols for field surveys where warranted on a case-by-case basis. Resource-specific assessment methods were designed as needed with approval by the agencies (USFWS, USFS, and NHFG).

Various assessment approaches were used because the potential for species to be present in the Project area varied; the quality of the information regarding that potential varied; and the best methods for assessing presence varied. The methods used are as follows:

- **Direct Surveys**—were used for species that can easily be observed using the right survey methods and/or that could reasonably be expected to be in a specific, identifiable location within the ROW. Direct surveys were conducted for Bicknell's thrush, common nighthawk, small-footed bat, northern long-eared bat, and northern black racer.
- **Snow Tracking Surveys**—as requested by NHFG, for Canada lynx and American Marten.
- **Targeted Habitat Surveys**—desktop analysis was used to identify specific locations likely to host habitats of interest, followed by field observations. This approach was used for turtle nesting habitat, lynx denning habitat, and all FSS Species.
- **General Habitat Surveys**—during all fieldwork, observations of the following habitat resources were noted: DWAs, MCAs, potential bat roosting areas, bear-scarred beech trees, and wetlands suitable for the ringed bog haunter.

- **Desktop**—the assessment of habitat suitability and potential presence in the Project area for some species was restricted to desktop methods, based on their known rarity in the state and the low potential to encounter them during field surveys. These species included all special status bird species except for Bicknell's thrush and common nighthawk. Incidental observations of any special status bird species made during other field surveys were noted.
- **Presence Assumed**—some species were assumed to be present in the Project area, based on existing information on their known distribution in the State. These species included eastern hognose snake, Karner blue butterfly (*Lycaeides melissa samuelis),* Persius duskywing skipper (*Eryniss persius persius*), and pine pinion moth (*Lithophane lepida lepida*).

Based on the results of the desktop assessment and field surveys, the species listed in Table 11 were determined to be present within the Project area, or to have suitable habitat within the Project area and therefor have potential to be present. Based on habitat affinity and known distribution, 12 of the 26 species with state status were determined to have no possibility of being present in the proposed Project area. Of these 12 species, 10 have habitat requirements that are not provided in the Project area. The gray wolf (*Canis lupus*) and the eastern cougar (*Puma concolor couguar*) are currently believed to be extirpated from the state and so were excluded from further consideration. Similarly, 7 of the 17 FSS species and 29 of the 50 SCC were also determined to have no potential to be present within the Project area.

Table 5. Special Status Wildlife Species Potentially Present or Known to be Present in the Project

Species	Status[1]	Habitat Requirements	Known Distribution	Assessment Result	Notes
Insects					
Frosted Elfin	SE	Pine barrens habitats	Concord	Confirmed via NHB data	Co-occurs with Karner blue butterfly
Karner Blue Butterfly	FE, SE	Pine barrens habitats	Concord	Confirmed via NHB data	Concord Pine barrens only known location in NH
Persius Dusky Wing Skipper	SE	Pine barrens habitats	Concord	Confirmed via NHB data	Co-occurs with Karner blue butterfly
Pine Pinion Moth	ST	Pine barrens habitats	Concord	Confirmed via NHB data	May co-occur with Karner blue butterfly
Ringed Bog Haunter	SE	Fens and Sphagnum bogs surrounded by woodlands; Southern NH only	Auburn	Habitat is marginal; not observed	This species is noted as "potential" for Auburn by NHFG, not confirmed
Amphibians and Reptiles					

Species	Status[1]	Habitat Requirements	Known Distribution	Assessment Result	Notes
Jefferson/Blue-spotted Salamander	SSC	Vernal pools and surrounding upland buffers	Primarily, but not exclusively south of the White Mts	Observed in three locations within Project area	All observations were egg masses in vernal pools
Blanding's turtle	SE	A variety of upland and wetland habitat types; sandy or gravelly soils for nesting	Holderness; Canterbury south	Confirmed via direct observation	Adults present during nesting season only
Eastern Hognose Snake	SE	Pine barrens and other similar open habitats, especially with sandy soils	Concord, Pembroke	Confirmed via NHFG and NHB data	Potentially present year-round as hibernacula may be located in ROW
Northern Black Racer	ST	A variety of upland and wetland habitat types; sandy or gravelly soils for nesting	Concord, southward	Confirmed via direct observation	Potentially present year-round as hibernacula may be located in ROW
Smooth Green Snake	SSC	Grassy upland fields, blueberry barrens, forest openings	Statewide	NHB records from Concord, Pembroke	NHB records are from 2005, 2009
Spotted Turtle	ST	A variety of upland and wetland habitat types; sandy or gravelly soils for nesting	Bridgewater, southward	Suitable habitat present, but this species was not observed	Adults present during nesting season only
Wood Turtle	SSC, FSS	Large, slow moving streams, wooded areas; open sandy or gravelly areas for nesting	Statewide	Suitable habitat present, but this species was not observed	Adults present during nesting season only
Birds					
American Kestrel	SSC	Open habitats for hunting, cavities or nest boxes for nesting	Statewide	Confirmed via direct observation	Active nest in nest box on structure in New Hampton in 2013, hunting adult observed on line in Stark
American Three-toed Woodpecker	ST	Mature spruce-fir forests	White Mountains and northward	Habitat is marginal; not observed	Potentially present in highest elevations only

Species	Status[1]	Habitat Requirements	Known Distribution	Assessment Result	Notes
Bald Eagle	ST, FSS	Shoreline habitats for foraging; tall perches for hunting and nesting	Statewide, near larger waterbodies	Suitable habitat present, but this species was not observed	No nests currently known within 1/4 mile of ROW but active along the Merrimack and Pemi
Bicknell's Thrush	SSC, FSS	Spruce-fir, birch, and krummholz above 2,700 ft.	High elevation habitats	Habitat is marginal; not observed	Potentially present in highest elevations only
Common Gallinule	SSC	Marshes dominated by grass-like species	Potentially Statewide	Habitat is marginal; not observed	No NHB records in Project area
Common Loon	ST, FSS	Lakes, ponds at least 1/4 mile long with suitable nest sites, adequate prey base	Franklin North	Not observed	No nests currently known within 1/4 mile of ROW
Common Nighthawk	SE	Pine barrens and other similar open habitats	Statewide	Confirmed via direct observation	Know to nest within Project footprint.
Eastern Meadowlark	SSC	Mature fields at least 5 ha in size, with a thick layer of dead grass	Potentially Statewide	Habitat is marginal; not observed	Regularly observed at Concord Airport
Eastern Whip-poor-will	SSC	Sparse woodlands	Statewide	Confirmed via direct observation	Observed at Concord Pine Barrens
Forest-nesting birds	MBTA	Various forest types	Statewide	Confirmed via direct observation	Suitable nesting habitat is widespread and common throughout NH
Golden Eagle	SE	Various	Statewide	Not observed	Only present during migration
Grasshopper Sparrow	ST	Grasslands at least 10 hectares (ha) in size	Concord	Habitat is marginal; not observed	Regularly observed at Concord Airport
Horned Lark	SSC	Open habitats with low, sparse plant growth	Southern New Hampshire	Habitat is marginal; not observed	Regularly observed at Concord Airport
Least Bittern	SSC	Marshes dominated by grass-like species	Potentially Statewide	Habitat is marginal; not observed	No NHB records in Project area
Northern harrier	SE	Grasslands at least 10 ha in size for nesting	Primarily Coös County	Habitat is marginal; not observed	Project area is adjacent to known occupied habitat

Species	Status[1]	Habitat Requirements	Known Distribution	Assessment Result	Notes
Olive-sided flycatcher	SSC	Northern forests	Coös County	Some suitable habitat present; not observed	No NHB records in Project area
Osprey	SSC, FSS	Large water bodies for foraging with nearby trees/ structures for nesting	Statewide, near larger waterbodies	Suitable habitat present, not observed	Commonly nest on power line structures; no nests currently known in ROW
Peregrine Falcon	ST, FSS	Cliff faces for nesting, with adequate prey base nearby; preys on birds	Statewide	Suitable foraging habitat present, not observed	Two known nests within 1.5 miles of existing the ROW
Pied-billed Grebe	ST, FSS	Wetlands with intricate shorelines: ~50:50 open water /vegetation mix	Statewide	Habitat is marginal; not observed	No NHB records in Project area
Rusty blackbird	SSC	Forested wetlands with regenerating spruce-fir	Woodstock north, especially Coös County	Observed in ROW in Millsfield	Also reported near Project area in Dixville
Sedge Wren	SE	Emergent wetlands, wet meadows	Southern New Hampshire	Habitat is marginal; not observed	No NHB records in Project area
Spruce Grouse	SSC	Boreal forest types dominated by spruce	Coös County	Habitat is marginal; not observed	No NHB records in Project area
Sora	SSC	Marshes dominated by grass-like species	Potentially Statewide	Habitat is marginal; not observed	No NHB records in Project area
Vesper Sparrow	SSC	Grasslands at least 15 ha in size for nesting	Potentially Statewide	Habitat is marginal; not observed	Regularly observed at Concord Airport
Mammals					
American Marten	ST	Coniferous or mixed forests with high structure	Coös County	Confirmed via tracking	Tracks observed in multiple locations from Whitefield north
Canada Lynx	FT, SE, FSS	Coniferous or mixed forests with abundant snowshoe hare	Coös County, WMNF	Confirmed via tracking	Tracks observed in Whitfield

Species	Status[1]	Habitat Requirements	Known Distribution	Assessment Result	Notes
Eastern Red Bat	SSC	Foliage-roosting bat, migratory	Probably Statewide	Detected during acoustic surveys	Data regarding distribution and habitat use in NH is limited
Eastern Small-footed Bat	SE, FSS	Rocky ridge tops, outcrops, cliff faces, buildings and bridges for roosting	Statewide	Detected at one location during acoustic surveys	Limited acoustic surveys in 2014 did not detect this species
Hoary Bat	SSC	Foliage-roosting bat, migratory	Probably Statewide	Detected during acoustic surveys	Data regarding distribution and habitat use in NH is limited
Northern Long-eared Bat	FT, ST, FSS	Roosts in mature trees under exfoliating bark, in crevices and hollows	Statewide	Detected at 13 locations during acoustic surveys	No acoustic or mist netting surveys conducted as of 2014
Silver-haired Bat	SSC	Roosts in tree hollows, migratory	Probably Statewide	Detected during acoustic surveys	Data regarding distribution and habitat use in NH is limited
Tri-colored Bat	none	Thought to roost in hollow trees and buildings	Foothills, White Mountains	Detected during acoustic surveys	Data regarding distribution and habitat use in NH is limited

[1] FE = Federally Endangered, FSS = Forest Service Sensitive, FT = Federally Threatened, SE = State Endangered, ST = State Threatened

[2] Proposed for Federal listing as Endangered

6.1.8 Cultural Resources

6.1.8.1 Archaeological Resources

The archeological survey conducted for the Project followed NH Division of Historical Resources ("NH DHR") Standards and Guidelines. In addition, the Federal Section 106 review process and consultation is ongoing between the Department of Energy ("DOE") and the State Historic Preservation Officer ("SHPO"). Archeological surveys were performed by archeologists qualified by the NH DHR to conduct archeological surveys in the State of New Hampshire. The archeological survey was initiated in 2010, and is ongoing in 2015. The methods and findings of the archeologist working directly for Northern Pass is described below. The methods and findings of the archeologist working directly for the DOE has been included in the Draft EIS and other documents prepared by the DOE's consultants.

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Phase I-A: Methods and Approach

The purpose of the Phase I-A archeological survey was to collect information through a strategy of archival research and field inspection to identify any known archeological resources (e.g., sites, components, features, artifacts) and any areas of archeological resource sensitivity. The survey included assessment of both pre-contact Native American and post-contact European-American archeological resources, including graveyards or cemeteries. The survey did not address any aboveground resources such as standing structures or architectural elements.

The Phase I-A archeological survey included the following tasks:

a) research using available documentation from individual towns to establish background contexts;
b) consideration of all types of landforms for site sensitivity, including uplands and backlands as part of the archeological landscape, recognizing that rivers have meandered, watercourses may have changed over time, and soils are not necessarily the sole determinant in site location;
c) completion of minimum-level site recording forms for any new sites discovered during walkover (such as European-American cellar holes or Native American surface artifact scatters); and
d) completion of basic recording of any graveyards encountered in the Area of Potential Effect ("APE").

Background research was completed using readily available primary and secondary sources. Such materials were obtained at: the NH DHR, Concord, NH; the NH State Library, Concord, NH; the White Mountain National Forest, Campton, NH; published state, county, town, and thematic histories; archeological publications, including the NH Archeological Society Bulletin; historic town and county maps; historic USGS topographic maps; USDA soils maps; geological maps; NH Old Graveyards data base; and a variety of town web sites.

Field inspection was completed during walkover surveys in which all designated Project areas were viewed. The APE was determined by the DOE, as the lead federal agency. The APE was defined as: the entire ROW width for existing and proposed above-ground corridors; 20 feet on either side of paved or gravel travel ways; the travel way itself for off-right-of-way access roads; and on a case by case basis for development sites including transition stations and substations. Field inspection was completed during non-winter seasons when visibility was not hampered by snow cover. The intent of inspection was to complete a non-invasive surface investigation in order to: study the terrain and topography; locate previously disturbed and impacted areas; identify visible archeological remains; and determine the probability for archeological resource occurrence.

During walkover, representative photographs were taken of prevalent conditions and notations were made on topography, terrain, soil conditions, drainage, and areas of prior ground-disturbing impact. Landscape alterations included such factors as soil movement and erosion,

sand or gravel extraction, and prior construction, as well as cutting, filling, clearing, and soil movement. Notation was also made on impacts from highway and road construction, logging, and other large-scale earthmoving activities. While agricultural activity, such as field cultivation or farming, was noted, it was not considered to constitute a substantial prior impact.

Information collected during research and fieldwork was synthesized and results presented in reports for individual Project components. NH DHR site recording forms were complete for any newly discovered sites.

Phase I-B: Methods and Approach

The purpose of the Phase I-B archeological survey was to continue field investigations within zones of archeological sensitivity recognized during Phase I-A survey to determine site presence or absence and to conduct field investigations at recorded sites to collect information for interpretation within the Project APE. The Phase I-B survey methodology was developed in consultation with NH DHR and approved by NH DHR.

Field study addressed both pre-contact Native American and post-contact European-American sites and sensitivity areas. The fundamental methodology used for field investigations included the following:

- Shovel test excavation utilizing 50 x 50 cm square tests placed on grids and transects
- Walkover and mapping of sampling areas and visible sites (e.g., cellar holes)
- Artifact processing and identification
- Data synthesis
- Preparation and submittal of NH DHR site recording forms for any new sites discovered during subsurface sampling
- Preparation and submittal of technical reports

These efforts were undertaken to complete systematic field study and recording of archeological sites or components. The objective of the Phase I-B effort was to define archeological sites as accurately as possible both horizontally and vertically within the APE.

Archeological survey has been completed at the Phase I-A level for all Project components and at the Phase I-B level for all overhead components (excluding locations where landowners had denied access). Archeological survey at the Phase I-B level has not yet been completed for in road/underground Project components. Archeological survey and consultation will continue until the Section 106 process is complete. Table 12, below, provides a summary of archeological data demonstrating the existence of sensitivity areas and sites by Project component.

Table 6. Summary of Archaeological Sensitivity Areas and Sites

Project Component	I-A Findings	I-A Report	I-B Findings	I-B Report
Existing and New ROW: Overhead				
Existing and New ROW: Pittsburg to Northumberland (Sections N1/N2)	OH: 10 sensitivity areas (including 1 site) UG: 27 sensitivity areas (including 4 sites and 3 cemeteries)	OH: 2013–2015 UG: 2014	OH: 1 Site UG: n/a	OH: 2015 UG: n/a
Existing ROW: Northumberland to Deerfield (OH Only) and Franklin Converter Station (Sections N2/C1/C2/FCS/S1)	129 sensitivity areas	2013	19 sites	2014 for 5 towns
New ROW: Underground				
US Route 302	2 sensitivity areas	2015	n/a	n/a
NH Route 18	0 sensitivity areas	2015	n/a	n/a
NH Route 116	51 sensitivity areas (including 7 sites and 1 cemetery)	2015	n/a	n/a
NH Route 112	18 sensitivity areas (including 7 sites)	2015	n/a	n/a
US Route 3	28 sensitivity areas (including 2 sites and 3 cemeteries)	2015	n/a	n/a
Other Sites				
Transition Stations and Connecting Routes	10 sensitivity areas	2015	Not yet complete, none to date	2015
AC System Support: Deerfield-Londonderry OH and Deerfield and Scobie Pond Substation Expansions	25 sensitivity areas	2014	6 sites	2015
ORAR	6 sensitivity areas (including 3 sites)	2015	n/a	n/a

Project Component	I-A Findings	I-A Report	I-B Findings	I-B Report
Laydown Yards	0 sensitivity areas	2015	n/a	n/a
Land Acquisition Parcels Multiple Towns/Municipalities	2 sensitivity areas (including 2 sites)	2012-2015	n/a	n/a

6.1.8.2 Historical Resources

A historical assessment of the Project route was completed over the course of several years. The work was conducted by professionals who meet the requirements of the Secretary of Interior's *Historic Preservation Professional Qualification Standards* (36 CFR 61) as well as additional qualifications required by the New Hampshire Department of Historic Resources ("NHDHR") for architectural historians. For the Project's overhead sections, a windshield survey of the two-mile wide APE along the corridor was completed. Properties in the APE that pre-date the National Register fifty-year age-eligibility criterion were identified, mapped, and recorded in a database. Additional, more detailed, documentation was done for properties that would have more than minimal views of the Project (as determined by viewshed mapping and on-site analysis). 1284 pre-1966 resources were identified in the APE for the overhead portions of the Project. Of these, 194 resources were identified as having more than minimal views of the Project. A very small percentage of these had been previously identified. Reflecting the overall geographical location of the existing and new ROW, by far a majority of the historic resources in the APE were agricultural or residential single-family residential properties. They reflect a full spectrum of styles and dates of construction.

Along underground portions of the route, all pre-1966 historic resources within the APE (which extended out 20 feet from the pavement edge) were photographed and mapped using Google Maps (Google Street View™ images are available for the entire underground portion of the route). Although much of the underground route is similar to the overhead route in terms of being predominantly rural, one of the underground segments is Route 3/Main Street in the Town of Plymouth- a densely-developed urban area with a number of brick commercial blocks and institutional buildings. There are also smaller concentrations of older buildings in the village centers of Franconia Village and North Woodstock.

6.1.9 Land Use and Recreation

6.1.9.1 Land Use

An examination of local land uses in each community along the project right-of-way (ROW) was completed along with a review of local, regional, state and federal long-range planning documents. Comments received through the applicant's public open houses and discussions with local and regional planners were also considered.

Existing land use and patterns, and other land use information was obtained principally from the applicant, local communities, regional planning commissions, state agencies, University of New Hampshire GRANIT, as well as Google Earth and a windshield survey conducted at numerous locations along the ROW. A wide range of information relating to land use planning and orderly development was considered. Land uses along the corridor include forestry, agriculture, residential, commercial/ industrial, transportation, institutional/government, recreation areas, conservation, historical, and natural features such as rivers, wetlands, and wildlife habitat. This information was compiled into detailed existing land use descriptions for each community in the Project corridor.

Recently completed regional plans from each of the regional planning commissions in the project area were reviewed along with other regional planning documents such as local river corridor management plans, and state and federal plans that involve different aspects of land use, environment, energy, and transportation infrastructure.

While not subject to zoning or other local land use regulations, the facility will meet the legislatively-stated purpose of New Hampshire's zoning and land use statutes. Proposed structure height along both the new and existing ROW corridors is reasonable for this type of facility, and is consistent with heights allowed in some communities for other structures such as telecommunications towers and wind turbines.

Utilizing already-developed ROW corridors minimizes impacts to existing land uses and natural resources, and is therefore a sound siting principle in regards to land use planning and environmental protection.

In line with this principle, approximately 160 miles, or 83%, of the proposed 192-mile Project between Pittsburg and Deerfield is located within or along existing utility and transportation corridors. The proposed Project route will follow approximately 100 miles of existing transmission ROWs for portions its proposed overhead segments, and will follow another approximately 60 miles of state and local roadway ROWs for portions of its proposed underground segments.

The approximately 40-mile northernmost segment between Pittsburg and Dummer includes 32 miles of overhead lines in new ROW and eight miles of underground cable. The new ROW traverses sparsely populated land, which is primarily forested and managed for timber and recreational use. In addition, approximately 24 miles of this new ROW is located within the large area managed by Wagner Forest Management, a sustainable commercial forestry operation, located in Dixville, Millsfield and in Dummer. Commercial timber-harvesting operations and several logging roads are located in this area. Granite Reliable Wind, a 99 MW energy facility with 33 turbines, several miles of roadway and a power line extending to Dummer, also is located in Dixville and Millsfield.

Land uses within and along the Project corridor include forests, agriculture, residential, commercial/ industrial, transportation and utilities, recreation, conservation, historical, wetlands and water resources, and wildlife habitat. In many cases, the existing ROWs predate the establishment of many of these land uses. By primarily following existing corridors, as proposed, the Project will better-maintain these existing land uses (and development patterns), which will be able to continue largely uninterrupted during the operation and maintenance of Project facilities.

6.1.9.2 Orderly Development of the Region

Many local communities, regional planning commissions (RPCs), state and federal agencies, and other entities are required to develop long-range plans for guiding future development.

Local communities that have established planning boards are required to develop a comprehensive master plan that consists of a vision statement and a plan for land use. Likewise, RPCs have a duty to prepare a coordinated plan for the development of a region that examines existing conditions and sets forth a comprehensive plan for future development. State and federal agencies that manage natural resources such as forests or wildlife areas are required to develop management plans. Other entities, such as local river advisory committees and scenic and cultural byway councils, are also required to develop long-range corridor management plans.

The Project "region" consists of over thirty communities and four different NH Regional Planning Commission (RPC) areas. Other entities that have long-range plans that consider land use in the region include local river advisory committees, scenic and cultural byways councils, U.S. Forest Service, U.S. Fish and Wildlife Service, and state agencies

6.1.9.3 Recreation and Tourism

Several sources of information were reviewed in order to determine the potential effects of the project on tourism and recreation. These included attitudinal studies done in relation to wind farms in New Hampshire, listening sessions, a review of Bureau of Labor statistics data in the vicinity of two large transmission lines in New Hampshire and Maine, and a prospective visitor survey.

Outdoor recreational activities such as snowmobile and ATV riding, other off-road vehicle ("ORV") use, hunting, fishing, sightseeing, horseback riding, birding, and photography, along with other forms of outdoor activities and exercise, are important contributors to both local and state economies and are often associated with existing transmission line ROW areas. Many ATV and snowmobile trails are established and maintained by private, local or regional clubs, and many existing trails follow or cross the existing transmission ROW and local and state roads.

The existing PSNH transmission line ROW is presently used for a variety of recreational activities, as permitted by each underlying landowner. Segments of the existing ROW are used for trail-based recreation such as hiking, mountain biking, snowmobiling, ATV riding, and horseback riding. The Project is located underground along the existing Route 112 corridor as it crosses the Appalachian Trail ("AT"), a National Scenic Trail designated under the National Trail System Act of 1968. Hunting blinds and tree stands were noted along the existing PSNH ROWs in many parts of the Project route; and outdoor enthusiasts were encountered in many different locations during field surveys and other activities along the route.

The existing ROW passes through the Canterbury Woods Golf course in Canterbury, and is west of the Concord Country Club. The ROW is underground along U.S. Route 3 as it passes near the Jack O' Lantern Resort and Golf Course in Woodstock and is underground as it passes near the White Mountain Country Club in Ashland.

6.1.10 Air Quality

Air quality issues affecting public health and the environment in New Hampshire include ground-level ozone, small particle pollution, regional haze (visibility), mercury contamination, climate change (greenhouse gases), acid deposition, and air toxics. New Hampshire's approach to improving air quality is through the use of tools such as regulatory source controls, voluntary programs, incentives, as well as local, regional, and national collaborations. Some of the key pollutants and air quality issues that affect New Hampshire include:

Nitrogen oxide (NO_x) emissions caused primarily by the combustion of fuels in power plants, industrial boilers, motor vehicles and off-road equipment. Ground-level ozone, or smog, formed as a result of chemical reactions when nitrogen oxides (NO_x) combine with Volatile Organic Compounds (VOCs) and oxygen in the presence of sunlight and heat. NO_x emissions are the result of burning fuels in utilities, industrial boilers and mobile sources such as cars and trucks. VOCs are emitted by sources such as vehicles, gas stations, solvents, lawn equipment, fuel containers, consumer products, landfills and factories. Sulfur dioxide (SO_2) pollution is emitted by power plants, refineries, smelters, residential oil furnaces, mobile sources (especially those with diesel fuel) and large marine vessels. Carbon dioxide (CO_2) is both a naturally-occurring and human-induced greenhouse gas. While CO_2 is present in the earth's atmosphere as part of the natural carbon cycle, it is the largest single source (82%) of greenhouse gas emitted by human activities. GHG's include water vapor, carbon dioxide (CO_2), methane, nitrous oxide, chlorofluorocarbons (CFC's), ozone and aerosols.

Other air quality issues affecting New Hampshire include: regional haze which is caused by several air pollutants such as SO_2, NO_x, VOC's, fine particles ($PM_{2.5}$) and ammonia (NH_3). These are emitted from stationary sources, areas sources, mobile sources and biogenic sources (trees, grasses, crops). Particulate matter, which is a mixture of solid particles and liquid droplets in the air, is included in smoke, dust, condensing vapors and fly ash. $PM_{2.5}$ refers to fine particles smaller than 2.5 microns in diameter and PM_{10} refers to particles with a diameter between 2.5 and 10 microns in size. Particulate matter pollution can be created by burning of wood, fossil fuels, fires, fugitive dust, and industrial processes. Potential effects include respiratory illnesses, heart and lung disease, as well as reduced visibility. Acid deposition is created when NO_x and SO_2 emissions react with water, oxygen and oxidants to form compounds such as nitric acid and sulfuric acid. These compounds are transported in the atmosphere and fall to our lands and waters as acid rain, snow or fog, or as dry fine particles. Many of New Hampshire's lakes and ponds, especially those which are remote and at high elevation, as well as the health of our forests, have been adversely affected by acid deposition. The NHDES lists about 40 lakes and ponds in New Hampshire which it considers to be too acidic.

6.1.11 Public Health and Safety

6.1.11.1 Noise

Sound is a feature of all environments. When a new sound source is introduced into an area, it may be deemed a nuisance or an annoyance when it is inconsistent with the environment, by being either too loud or by being distinct in character. In order to document the time-varying characteristics of ambient environmental sounds in the study areas, sound monitoring programs were implemented that relied on unattended continuous measurements (3 to 7 days periods), and attended intermittent measurements (15 to 20 minutes intervals) at the proposed stationary facility sites and at 17 measurement locations along the transmission line portions of the Project route. These measurements were conducted during a cold weather season with leaves off the trees, and a warm weather season with foliage and insect sounds present.

A primary objective of these surveys was to quantify the background sound levels that typically occur in the vicinity of the facilities. The background sound level is the nearly steady-state level that occurs in the environment devoid of transient sounds. In most environments, background sound levels reach a minimum during the late night or early morning hours when local traffic is negligible. It is comparisons to these lowest background sound levels that serve as our basis for assessing Project sound impact.

Additionally, these measurements were used to determine acoustic design goals that are used in the engineering and design of facilities in order to achieve certain sound emission criteria. The acoustic design goals are included in the specifications provided to vendors as part of requests for proposals by a developer.

6.1.11.2 Electrical Environment

The electrical environment associated with the NPT was evaluated in terms of the the potential effects of the Project on humans, livestock, wildlife, and plants. The evaluation focused on the magnetic fields, electric fields, and electric charges in the air (space charge) associated with the operation of these facilities. Previous assessments of the scientific research conducted by scientists for both scientific and government agencies, and the relevant standards and guidelines for exposure were reviewed in detail.

Next, the effect of the Project on the potential exposure of adjacent populations and the environment as compared to their background exposure levels derived from other sources was evaluated. Finally, scientific literature was reviewed to identify new relevant research that might shed light on potential mechanisms of interaction with organisms and effects on their biology, health, and behavior to assess the cumulative weight of the evidence, as is customarily done for health risk assessments.

Northern Pass Construction Methods

The Project will be constructed, operated, and maintained in accordance with federal, state, and local regulatory requirements, established industry practices, and Eversource Energy policies

and specifications. Eversource's BMP manual will be implemented as applicable during the construction of the Project.

Additional BMPs and industry standards and guidelines, applicable to transmission line construction activities within New Hampshire include, at least, *Best Management Practices Manual for Utility Maintenance in and adjacent to Wetlands and Waterbodies in New Hampshire*[23]; *Rock Blasting and Water Quality Measures That Can Be Taken To Protect Water Quality and Mitigate Impacts*[24]; *Best Management Practices for Erosion Control on Timber Harvesting Operations in New Hampshire*[25], and BMP worksheets provided on the Alteration of Terrain website.[26]

BMPs such as *Best Management Practices for Fueling and Maintenance of Excavation and Earthmoving Equipment* (WD-DWGB-22-6)[27] will be followed to prevent spills of fuel and other hazardous materials during all construction and clearing activities where equipment is refueled in the field.

The primary goal of these various BMPs is to use techniques that protect natural resources from unnecessary impacts. In addition to BMPs, there are many Project-specific or species-specific timing restrictions, preconstruction surveys, and monitoring techniques that will be used to avoid direct impacts to certain wildlife species. The Project has committed to following these BMPs, conditions, timing restrictions, and guidelines where applicable. BMPs have also been incorporated into the draft Project Construction Plan and will be incorporated into contractor bid documents.

Proposed BMPs include, but are not limited to, the following:

- Seasonal Restrictions (in critical locations, for protection [as needed] of wintering deer, raptors, bats, fragile wetlands, etc.);
- Construction mat use in sensitive areas;
- Ground-based construction techniques and use of smaller, lighter equipment, or low pressure equipment, if practicable within sensitive areas;
- Fenced exclusion zones and wildlife survey areas (for species protection); and
- On-site construction monitoring (to monitor permit compliance, protection of resources, and erosion and sedimentation ["E&S"] control maintenance).

In addition to the Project Construction Plan, permitting plans, BMPs, and standard and Project-specific permit conditions, specific guidance for working in sensitive areas and E&S controls, etc. will be provided to the contractor and their contracts will include obligations to comply

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[23] http://www.nhdfl.org/library/pdf/Publications/DESUtilityBMPrev3.pdf
[24] http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-10-12.pdf
[25] http://www.nhdfl.org/library/pdf/Publications/BMPs%20erosion%20control%202004.pdf
[26] http://des.nh.gov/organization/divisions/water/aot/categories/forms.htm
[27] http://des.nh.gov/organization/commissioner/pip/factsheets/dwgb/documents/dwgb-22-6.pdf

with all applicable laws, regulations, and permits. Environmental inspectors will also be in the field during construction to monitor compliance with plans and permits and to address unanticipated natural and cultural resource issues that may arise.

6.1.12 Construction Procedures

Construction methods will follow industry-established procedures for constructing transmission lines and associated facilities. The construction contractor(s) will generally follow the construction sequences discussed below.

The Project scope is divided into seven major construction groups:

1. HVDC overhead transmission line;
2. HVDC underground transmission line;
3. HVDC overhead/underground transition stations;
4. HVDC/AC converter terminal;
5. AC overhead transmission line;
6. Existing substation modifications; and
7. Existing AC transmission line modifications.

Separating the work into construction groups will allow multiple crews and contractors to work at various locations throughout the Project at the same time; and work to be scheduled and managed efficiently, while maintaining compliance with the requirements of the permits.

6.1.12.1 AC and HVDC Overhead Line Construction

Due to the similarities between construction methods used for the HVDC overhead and AC overhead transmission lines, both HVDC overhead and AC overhead transmission line construction procedures are discussed in this section.

These portions of the Project will be constructed in several stages, some overlapping in time.

In some areas, existing infrastructure or existing AC lines may need to be relocated prior to the construction of the new overhead lines. Such relocations will be planned and included as part of the construction sequencing activities.

The following summarizes the sequence of activities, materials, and equipment generally expected to be involved.

- Survey and stake ROW boundaries (where necessary), vegetation clearing boundaries, and proposed structure locations.
- Mark boundaries of previously delineated wetland and watercourse areas.
- Identify and mark areas to be avoided (e.g., sensitive cultural or environmental resource areas).

- Establish construction field office area(s), typically including space for an office trailer, equipment storage and maintenance, sanitary facilities, and parking.
- Install E&S controls in accordance with BMPs and applicable permits (controls are typically deployed using pickups and other small trucks, or small track vehicles). E&S controls will typically be installed after vegetation removal activities; however, E&S controls may be installed before vegetation removal, depending on site-specific characteristics. After vegetation removal, soil E&S controls will be installed around work limits (e.g., access roads, crane pads, wire pulling pads, and guard structure pads) in or near wetlands and streams.
- Vegetation will be removed along the ROW to establish the area that will be maintained for the safe construction and operation of the transmission lines. Vegetation (all types) also will be cleared, as required, at work sites (work pads), as well as along existing or new access roads. Vegetation also will be removed, as necessary, along existing or new access roads that may be on the ROW (but outside the designated vegetation removal limits) or off the ROW (but required to reach the ROW). In addition, danger trees[28] outside the limits of clearing (on or off the ROW) will be removed as necessary to protect the integrity of the proposed or existing transmission lines. Incidental branches and brushy vegetative materials cut along the ROWs may be scattered, or chipped on the ROW, depending on site-specific environmental features. For example, in DWAs, small branches from winter clearing will be left at the ROW edge as browse. Felled trees will either be harvested or removed from the site. Vegetation removal activities typically require feller bunchers, forwarders, flatbed trucks, brush hogs or other types of mowing equipment, skidders, bucket trucks for canopy trimming, tree shears for larger trees, wood chippers, log trucks, and chip vans. During vegetation removal activities, effects on wetlands, vernal pools, watercourses, or other environmentally sensitive areas will be minimized to the extent practicable. For example, access routes for vegetation clearing will be planned to minimize effects on wetlands, depending on site-specific conditions. In some wetlands, temporary construction mats or log riprap (timber corduroy road) may be used to provide a stable base for clearing equipment. Where mats or riprap are not necessary, vehicles with tracks may be used. Under frozen ground conditions, no special matting or equipment may be needed for clearing equipment to traverse wetlands with minimal adverse effect.

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[28] "Danger trees" are trees that could fall into the conductors and affect the integrity of the transmission lines. To prevent this from occurring, these trees must be removed. In some case to do so clearing access routes will be necessary to reach "danger" trees that must be removed. Such "danger trees" may be identified on un-managed portions of the ROWs or off-ROW. Trees that may constitute a danger to the transmission lines typically cannot be identified until the construction phase of the Project. Danger trees that are evident during construction will be removed during ROW vegetation clearing. Otherwise, danger trees are periodically assessed and removed as needed as part of ROW management activities during the operational life of the Project. Best management practices will be utilized to avoid or minimize impacts to environmental resources, including wetlands, during danger tree removal.

- Construct new access roads or improve existing roads to provide a typical minimum travel-way of 16 feet in width with a 20-foot base. In some locations, access roads will be wider to accommodate turning radii of large vehicles and to allow passing at designated locations. The development of access roads typically requires bulldozers or front loaders, excavators, dump trucks for crushed stone or gravel, pickups or stake-body trucks for culverts, and/or mat installers for wetland mats. Roads will be temporary (for use during construction only). Temporary roads will be constructed of wood mats or gravel, whereas permanent access roads are generally constructed of gravel only. Roads must have sufficient width and capacity for heavy construction equipment for both over-the-road and ORVs, including oversized tractor trailers. The need for access by flatbed trailers and concrete trucks often determines the scope of access road improvements. Road grades must be negotiable for over-the-road trucks; grades are typically less than 10% to minimize wet weather or surface conditions that result in traction problems and increased run-off velocities and energies.
- Prepare level work pads as necessary for new structure installation, guard structure installation/ removal, and wire pulling. Work pads for new transmission line structures will be approximately 5,000 to 14,000 square feet. However, the actual dimensions of individual work pads will vary, depending on site-specific environmental characteristics and on the types of structures to be installed (i.e., angle, tangent). Work pad installation may involve grading and requires the installation of a stable base (consisting of gravel, timber mats, or equivalent) for structure installation equipment. Wire pulling work pads (approximately 200 feet by 100 feet) will be installed using the same methods as described for structure work pads. The locations of the proposed work pads are indicated on the Project Plans in Appendix J.
- Access roads and work pads will be maintained during construction to provide safe travel surfaces; this may include the addition of gravel or mats, as necessary, during the course of construction. To allow construction to proceed safely under winter conditions, access roads and work pads also may be treated with traction agents such as sand.
- Prepare material staging sites (e.g., storage, staging and laydown areas) to support the construction effort. The preferred locations for such areas are typically in the immediate vicinity of the ROWs; all will be located in uplands. Natural and cultural resource surveys were performed on several potential laydown sites which may be used during Project construction. To date, three locations have been identified as potential laydown/staging areas. These areas are shown on permitting plans. Other specific sites for the storage, staging and laydown areas will be selected at a later date. All areas will be previously disturbed upland areas.
- Any distribution line relocation will be carefully coordinated with the installation of new lines to allow workers to safely perform construction and ensure customers continue to receive electrical power with minimal loss of service. Where relocations are required, new poles and wires will be installed in an alternate section of the ROW. The existing structures and wires will then be removed. Concrete foundations will be

removed below grade and the area filled. All demolition debris such as wood poles, steel structures, insulators, conductor, and concrete will be taken off-site to an approved waste management facility for recycling or disposal.

- Construct foundations and erect/assemble new transmission line structures and install guy wires as necessary. This requires the same equipment used for access road preparation, with the addition of flatbed trucks for hauling structure components, hardware, and augers; other trucks for hauling reinforcing rods; drill rigs; cranes; concrete trucks for structures that require concrete for foundations; dump trucks for structures that require crushed rock backfill; and bucket trucks. Dump trucks are also needed for foundation work if excess excavated material has to be removed from the ROW. Drilling of structure foundations may require the use of drilling muds and slurries that could contain polymers, bentonite or other agents to facilitate drilling operations. In wet conditions or if groundwater is encountered during excavation, pumping (vacuum) trucks or other suitable equipment will be used to pump water from the excavated areas. The water will be discharged in accordance with applicable local, state, and federal requirements.
- Install shield wires and conductors. The equipment required for these activities will include conductor reels, conductor pulling and tensioner rigs, and bucket trucks. Helicopters may also be used to install the initial pulling lines for the conductors or shield wires. Some of the conductors may be joined using imploding conductor splices.
- Install counterpoise, where needed. Depending on site-specific soil conductivity, supplemental grounding will be installed. Counterpoise is typically installed within the footprint of the work pad. However, if linear counterpoise is installed outside of the footprint of a work pad within a wetland, it will result in only temporary impacts. The locations of linear counterpoise (if deemed necessary) will be identified at a later date. A ditch witch (or similar) is typical equipment for this activity. All areas impacted by the installation of counterpoise will be restored to preconstruction conditions.
- Remove crane pads, guard structure pads, wire pulling pads, temporary access roads and construction debris and restore disturbed sites. Haul construction debris off the ROW for disposal. In some areas, if allowed, disturbed ground will be back-bladed to preconstruction contours, unless directed otherwise. Where the ROW to be restored is in an agricultural field, the soil may be decompacted by disking.
- Maintain temporary E&S controls until vegetation is re-established or disturbed areas are otherwise stabilized. Steep areas may be stabilized with jute netting or pre-made erosion control fabric containing seed, mulch, and fertilizer. Culverts or crushed stone fords installed along access roads will be either left in place or removed, as directed by agency approvals. After site restoration and stabilization is achieved, all temporary E&S controls that are not biodegradable (e.g., geotextile material, twine, stakes) will be removed from the ROW and disposed of properly.

Structure Type-Specific Construction Methods

For lattice towers, four footings will be installed for each structure. Each leg of the lattice tower will be installed on a foundation. One of the foundation types is a "grillage" or "overburden" foundation, which requires an excavation to occur at each of the four base corners the placement of steel of sufficient surface area into the ground to accommodate groundline reactions. For these particular foundations, there would be no concrete requirement. Another design option, caisson foundations, use embedded steel stubs at each of the four corners; the structure is bolted to each foundation.

Steel pole structures (such as single pole, H-frame or three pole structures) are installed via caisson foundations or as direct-embed where a hole is excavated or blasted to the required depth based on the height of the structure, the base of the structure is inserted, and the hole is filled with a suitable backfill, rather than concrete.

6.1.12.2 HVDC Underground Line Construction

HVDC Underground Transmission Line construction will generally progress in a linear fashion, similar to that of installing a water or sewer main. Typical techniques used for underground construction include open trenching, direct bury duct banks with concrete caps, "jack and bore," micro-tunnel, and Horizontal Directional Drilling ("HDD"). It is expected that work at multiple sites will occur simultaneously in order to meet the Project milestones for energization; therefore multiple techniques could be in progress simultaneously in different locations. For all techniques to be used, construction will begin with survey, staking and protection of any sensitive areas, and contacting Dig Safe for demarcation of existing utilities. The installation of the underground transmission line will follow existing roadway alignments to the extent possible and will include sections that are either under the roadway, in the roadway shoulder, or in undeveloped areas.

Cable splice pits and vaults will be installed along the underground cable route at intervals corresponding to the greatest length of cable that can be transported on a reel, or other engineering or construction restrictions. This distance will vary depending upon the diameter and unit weight of the cable. Approximately 1,500–2,500 feet between locations is typical. The pits and vaults provide a protected location for making cable splices and facilitate replacement cable installation when necessary. Typical pits and vaults are constructed of precast concrete and are likely to be 6 feet high x 10 feet wide x 30 feet long. The vaults are buried with two (2) manhole covers per vault at grade. The splice pits are filled with sand prior to placing the precast concrete cap and then buried.

Cable is installed using puller/tensioner equipment. A cable reel trailer with a braking system or tensioner will be stationed at one end of the pull and a cable puller will be stationed at the other end. The puller will utilize a wire rope attached to the end of the conductor to pull the conductor through the duct system.

Open Trenching and Direct Bury Duct Banks

Where the installation is under a paved road, pavement will be saw-cut on both sides of the trench to limit impact to the road surface. In undeveloped locations, temporary roads will be constructed for safe, efficient, and environmentally compliant access to the work. The trench is typically 3 feet wide and will be excavated to the design depth. Trenches will be backfilled or covered with metal plating in order to protect the public. Conduits (or "duct banks") will be installed into spacers to maintain their position in the trench. The trench will be either backfilled with a granular material or a high slump concrete, and capped with a layer of concrete for protection against accidental dig-ups. Any temporary shoring will be removed as the trench is backfilled. After backfill, roadways will be paved and undeveloped areas will be restored.

Trenches will terminate either at splice pits, vaults, or a transition structure. The conduit systems will be "proofed" or tested by pulling a specified dimensional mandrel through the duct from splice location to splice location. After installation and testing of the duct bank, vault, and transition structure system, the conductors will be pulled to the splice locations. Conductors will be spliced in the pits or vaults, or terminated at the underground-to-overhead transition structures. Once construction on an underground section is completed, a series of electrical tests will be performed on the cable before it is energized.

Jack and Bore and Micro-Tunneling

Jack and bore and micro-tunneling can be used for short distances when crossing under a railroad or highway, particularly when depths exceed 20 feet. For this Application, a reinforced jacking pit will be constructed to the depth of the proposed bore and a reinforced receiving pit will be constructed at the termination point of the pipe. A concrete reaction wall will be poured inside the jacking pit opposite the exit point of the bore. Hydraulic equipment, set up in the jacking pit, will then be used to push the pipe string along its path.

For jack and bore, spoils are removed from the inside of the pipe by auger or by hand. For micro-tunneling, a remote controlled boring machine excavates along the bore path ahead of the pipes, which are then jacked in as spoils are removed. Alignment of the pipe will be monitored, and adjustments made as required until the pipe reaches the termination point in the receiving pit.

Horizontal Directional Drilling

HDD can be used for long distance trenchless crossings (e.g., large streams or waterbodies). Advantages of HDD over conventional open trench installation include reductions in noise, traffic impacts, environmental impacts, and duration of construction.

HDD construction will begin with establishing an electronic positioning sensor system. The crews will set up drill equipment including drill rig, mud mixer/reclaimer, pumps, miscellaneous support equipment, loaders, boom trucks and control booth. A pilot hole will be drilled using a steerable drill bit or mud motor with electronic position sensing equipment attached to a string of steel pipe sections. The pilot hole will be drilled along the pre-determined

bore path to the exit point. During pilot hole drilling the bore will be kept full of bentonite water slurry to provide lubrication and cooling for the drill bit, to help support the hole and to carry cuttings back to the entry hole to be cleaned and reused. The mud motor will be removed when it reaches the exit pit, and replaced with a reamer bit used to enlarge the hole as the drill rig pulls the string back. During the pull back, additional pipe is attached to the reamer from the exit pit so that there will always be a string of pipe in the bore. After the reamer is pulled back, a series of larger and larger reamers are pulled through the bore until the size is adequate for pullback of the casing pipe or conduit. The casing pullback should be completed without stopping, to prevent friction buildup due to collapsed soil, so the entire length of casing is fused together into one long section before the pullback. Once the casing is in place, additional conduits may be attached or it may be terminated in a splice vault near the entry and exit pit.

The amount of water needed for HDD and its source (surface water, groundwater, or truck) will be determined for each crossing during the detailed design process once geotechnical borings are completed. Water will be discharged to the ground surface and treated through filter bags or frac tanks, depending on local conditions. The fate of the residual material will also be determined during final design, but will be disposed of in a manner to preclude impacts to wetlands and surface waters.

A Monitoring and Operations Plan is being established for HDD procedures for the underground transmission line section of the Project. The plan will include a detailed description of actions taken when operating under normal drilling conditions, when there is a loss of circulation during drilling, and when there is a release of drilling fluids. If the circulation loss is a fracout, such actions will include steps needed to stop, contain, and or control the size of the drilling mud loss to the environment, as well as notifying the appropriate state agencies.

6.1.12.3 Substation Modifications, Converter Terminal Construction, and Transition Station Construction

The expansion of the existing Deerfield and Scobie Pond substations, construction of a new converter terminal in the City of Franklin, and construction of transition stations will have similar work activities and will generally follow the same construction sequence.

Work at each site will begin with the survey, staking and protection of any sensitive areas. Access to the work site will be established and required safety measures will be implemented. Each work site will then be cleared of any trees, shrubs and debris (if needed) the temporary environmental erosion controls will be installed. Each site's environmental control measures will be monitored throughout construction until the site is restored and stabilized.

Construction activities at each site will then be conducted in the following sequence:

1. Existing transmission or distribution lines will be relocated, where necessary.
2. The work site will be grubbed, stripped and graded to the designed elevations.

3. Foundations, drainage systems, perimeter fence, ground grid and underground conduits will be excavated for and the installed within the station footprint.
4. Steel structures and equipment will be installed on the foundations and buildings will be erected.
5. Control cables and conductors will be installed and terminated.
6. Electrical testing will be performed to confirm each piece of equipment and circuit is installed and operating in accordance with specifications.
7. The station site will be energized.

When construction is complete at each site, any remaining disturbed areas will be restored. Environmental controls, as needed, will remain on-site until each area is completely stabilized.

6.1.12.4 AC Line Upgrades

The proposed AC line upgrades between the Deerfield Substation and the Scobie Pond Substation involve the replacement of 10 structures. The replacement of these existing OH structures will follow the methods described above Section 6.1.12.1.

6.1.12.5 Blasting

Blasting may be necessary to achieve the engineered specifications associated with all aspects of the Project, especially where shallow bedrock is present

Blasting Procedures

Blasting contractors will be required to adhere to all conditions specified in the Certificate of Site and Facility, to be applied to and issued by the NH Site Evaluation Committee ("SEC"), and will also be required to observe local (municipal) blasting-related ordinances. BMPs to protect water quality before and during blasting activities are outlined in the NHDES technical publication WD 10-12 *Rock Blasting and Water Quality Measures That Can Be Taken to Protect Water Quality and Mitigate Impacts*.

In some cases, controlled blasting to remove rock will be less impactful to nearby landowners than "hoe-ramming" because the blasting will occur over a shorter duration. Blasting will be performed in compliance with the State and Local Fire Marshal regulations. Pre-blast surveys will conducted at nearby properties.

All blasting will be performed by licensed blasting contractor(s), pursuant to the regulations of State and Local Fire Marshals. In addition, blasting near PSNH's existing transmission and distribution lines will be performed in accordance with PSNH minimum specifications.

Blasting will be conducted in a manner that will maintain safe working conditions and avoid damage to adjacent areas and structures. Blasting will be conducted by registered blasters and monitored by blasting inspectors. The precautions that will be taken during blasting include:

- Obtaining applicable state and/or local blasting permits;

- Installing blasting mats as required;
- Posting warning signals, signage and barricades;
- Following procedures for safe storage, handling, loading, firing, and disposal of explosive materials; and
- Conducting blasting between 7 am and 7 pm.

Blasting will be performed to meet all applicable federal, state, and local requirements covering the use of explosives. Excessive vibration will be controlled by limiting the size of charges and by using charge delays, which stagger each charge in a series of blasts.

Post-blast inspections will be performed as necessary. All damage complaints alleged to be associated with construction activities will be investigated by the blasting contractor. In the unlikely event that blasting activities temporarily affect well water, alternative sources of water will be provided, or the owner will be otherwise compensated. If well damage is substantiated, the contractor will compensate the owner of the well for damages or the contractor and owner of the well will arrange for a new well to be drilled at the contractor's expense. In the unlikely event that structural damage occurs at a nearby structure as a result of blasting activities, the owner will be compensated for damages by the contractor or appropriate repairs will be made.

Blasting and Water Quality Protection Measures

All activities related to blasting shall follow BMPs to prevent contamination of groundwater including preparing, reviewing and following an approved blasting plan; proper drilling, explosive handing and loading procedures; observing the entire blasting procedures; evaluating blasting performance; and handling and storage of blasted rock.

(1) **Loading practices**. The following blasthole loading practices to minimize environmental effects shall be followed:

(a) Drilling logs shall be maintained by the driller and communicated directly to the blaster. The logs shall indicate depths and lengths of voids, cavities, and fault zones or other weak zones encountered as well as groundwater conditions.

(b) Explosive products shall be managed on-site so that they are either used in the borehole, returned to the delivery vehicle, or placed in secure containers for off-site disposal.

(c) Spillage around the borehole shall either be placed in the borehole or cleaned up and returned to an appropriate vehicle for handling or placement in secured containers for off-site disposal.

(d) Loaded explosives shall be detonated as soon as possible and shall not be left in the blastholes overnight, unless weather or other safety concerns reasonably dictate that detonation should be postponed.

(e) Loading equipment shall be cleaned in an area where wastewater can be properly contained and handled in a manner that prevents release of contaminants to the environment.

(f) Explosives shall be loaded to maintain good continuity in the column load to promote complete detonation. Industry accepted loading practices for priming, stemming, decking, and column rise need to be attended to.

(2) **Explosive Selection**. The following BMPs shall be followed to reduce the potential for groundwater contamination when explosives are used:

(a) Explosive products shall be selected that are appropriate for site conditions and safe blast execution.

(b) Explosive products shall be selected that have the appropriate water resistance for the site conditions present to minimize the potential for hazardous effect of the product upon groundwater.

(3) **Prevention of Misfires**. Appropriate practices shall be developed and implemented to prevent misfires.

(4) **Muck Pile Management**. Muck piles (the blasted pieces of rock) and rock piles shall be managed in a manner to reduce the potential for contamination by implementing the following measures:

(a) Remove the muck pile from the blast area as soon as reasonably possible.

(b) Manage the interaction of blasted rock piles and stormwater to prevent contamination of water supply wells or surface water.

(5) **Spill Prevention Measures and Spill Mitigation**. Spill prevention and spill mitigation measures shall be implemented to prevent the release of fuel and other related substances to the environment. The measures shall include at a minimum:

(a) The fuel storage requirements shall include:

1. Storage of regulated substances on an impervious surface.
2. Secure storage areas against unauthorized entry.
3. Label regulated containers clearly and visibly.
4. Inspect storage areas weekly.
5. Cover regulated containers in outside storage areas.
6. Wherever possible, keep regulated containers that are stored outside more than 50 feet from surface water and storm drains, 75 feet from private wells, and 400 feet from public wells.
7. Secondary containment is required for containers containing regulated substances stored outside, except for on premise use heating fuel tanks, or aboveground or underground storage tanks otherwise regulated.

(b) The fuel handling requirements shall include:

1. Except when in use, keep containers containing regulated substances closed and sealed.
2. Place drip pans under spigots, valves, and pumps.
3. Have spill control and containment equipment readily available in all work areas.
4. Use funnels and drip pans when transferring regulated substances.
5. Perform transfers of regulated substances over an impervious surface.

(c) The training of on-site employees and the on-site posting of release response information describing what to do in the event of a spill of regulated substances.

(d) Fueling and maintenance of excavation, earthmoving and other construction-related equipment will comply with the regulations of the NHDES [note these requirements are summarized in WD-DWGB-22-6 Best Management Practices for Fueling and Maintenance of Excavation and Earthmoving Equipment" or its successor document.][29]

6.1.13 Temporary Erosion and Sedimentation Controls

Temporary E&S controls for Project construction activities will be installed under the guidance of an environmental inspector and will adhere to the standards described in Federal, NHDES, NHDOT and other state and local guidelines, including those discussed below. All such controls will be installed following vegetation removal and prior to ground disturbance, and will be maintained through final site restoration.

Contractor(s) will perform daily inspections where there are active work areas to monitor controls, devices, and features, will document BMP conditions, and will ensure BMPs are installed, functioning, and being properly maintained.

Federal Requirement

The Project will require a Construction General Permit ("CGP") through the US Environmental Protection Agency ("USEPA") National Pollution Discharge and Elimination System ("NPDES") Phase II program.[30] A significant component of the CGP involves development and implementation of a Stormwater Pollution Prevention Plan ("SWPPP") to govern site-specific construction activities and guide the required management of stormwater pollutants and sediments using BMPs prior to and during construction, and after construction is complete until stabilization is achieved. Additionally, Project contractors will be required to follow BMPs detailed in the *NH Stormwater Manual* (NHDES, 2008)[31] and adhere to stormwater-related conditions specified in the Certificate of Site and Facility to be issued by the NH SEC.

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[29] http://des.nh.gov/organization/commissioner/pip/factsheets/dwgb/documents/dwgb-22-6.pdf

[30] http://cfpub.epa.gov/npdes/stormwater/cgp.cfm

[31] http://des.nh.gov/organization/divisions/water/stormwater/manual.htm

New Hampshire Department of Environmental Services

All work performed by Project contractors must follow the NHDES *Best Management Practices Manual For Utility Maintenance In And Adjacent To Wetlands And Waterbodies In New Hampshire*, published by the New Hampshire Department of Resources and Economic Development ("NHDRED").[32] A supplemental BMP manual will be created for the Project to address items not addresses in this manual.[33] Additionally, PSNH requires that all employees and contractors be trained on wetland BMPs to be followed during construction activities.[34]

NHDOT

Temporary E&S controls will be installed and maintained in accordance with the New Hampshire Department of Transportation ("NHDOT") *Guidelines for Temporary Erosion and Sediment Control and Stormwater Management* (NHDOT 2002).

6.1.14 Vegetation Removal, Including Tree Clearing

To meet electric industry vegetation clearance standards, vegetation that could grow or fall into the electric lines must be permanently removed. No herbicides will be used during construction of the Project.

Land clearing (forestry) contractors are required to comply with New Hampshire Department of Resources and Economic Development ("DRED") *Best Management Practices for Erosion Control on Timber Harvesting Operations in New Hampshire.*[35]

6.1.14.1 Vegetation Clearing Methods

Vegetation clearing crews must be able to access areas where vegetation removal is required for construction and within the clearance zones of the new 320 kV HVDC and 345-kV AC overhead lines, as well as to reach danger and hazard trees (see below). In order to reach areas where vegetation clearing is necessary, clearing crews will use both on- and off-ROW access roads.

During the vegetation clearing process, the following low-impact clearing measures may be used to minimize impacts, where practicable:

- General consideration of soil and weather conditions, and favoring of frozen ground conditions;
- Maximized use of uplands for access routes and stockpiling of cut timber and brush;
- Directional tree felling (parallel to and within the ROW), to minimize impacts to off-ROW and residual vegetation;

[32] http://www.nhdfl.org/library/pdf/Publications/DESUtilityBMPrev3.pdf
[33] Example at: http://www.transmission-nu.com/contractors/pdf/CT_BMP.pdf
[34] http://www.transmission-nu.com/contractors/pdf/Contractor_Online_Training.pdf

[35] http://www.nhdfl.org/library/pdf/Publications/BMPs%20erosion%20control%202004.pdf

- Cutting stumps close to the ground, while leaving root systems and stumps, to retain soil stability;
- Adherence to Project-specific BMPs; and
- Adherence to Project-specific clearing schedules designed to protect wildlife species during critical life stages, such as breeding

In general, areas to be cleared for the Project will not be stumped or grubbed, except for segments of new ROW where an underground line is proposed. In these locations, the central portion of the ROW through which the underground conduit will be installed, and the immediately adjacent corridor, will need to be stumped and grubbed to remove underground woody material and prevent the future disruption of the underground line by live roots.

6.1.14.2 Danger Trees

"Danger trees" are dead, damaged, or dying trees located outside of the ROW that, due to their location or height, pose a risk of contact with the any electric line. Danger trees outside of the ROW will be identified and cut down during vegetation removal and tree clearing stage of construction. Some danger trees may be within or adjacent to protected natural resources. Landowners will be informed prior to the removal of any off-ROW danger or hazard trees.

6.1.14.3 Timber and Firewood

For landowners who request to retain timber or firewood that is cleared during the construction process, tree tops will be cut, chipped and removed or spread in upland portions of the ROW, and the timber/firewood will be placed on the landowner's property adjacent to the ROW.

6.1.15 Access Roads

Most access to the ROW and Project facilities (e.g., structures that support the transmission lines) will be achieved through upgrading or developing access roads. Access roads are typically constructed along existing gravel roads or ATV trails where practicable; however, placing construction mats on existing roads or developing new roads is sometimes required. Construction mats will typically be used for access in or around wetlands and other environmentally sensitive areas to avoid permanent impacts to these resources. E&S controls, as needed, may also be used along access roads to stabilize soil and protect water resources during construction.

Typical access roads will be approximately 16 feet in width at the surface, with an average 20-foot wide base to account for slope grading. The total length of access roads for the Project will be approximately 192 miles. Access roads will be temporary, and will be restored to pre-construction conditions.

In several areas, such as wetlands that contain deep (up to and greater than 3 feet) organic soil/muck, construction will occur only during frozen conditions to the maximum extent practicable due to difficult access during unfrozen conditions. Work during frozen conditions

will also help to minimize impacts to wetlands and streams. Where frozen/wintertime construction is not possible, access through wetlands and streams will employ swamp mats or other approved BMPs. All access roads across wetlands and streams will be temporary and designed to minimize impacts and surface water disturbance.

6.1.15.1 On-ROW Access Roads

On-ROW access roads proposed for the Project have been generally located along existing access roads, where practicable, unless clearance or other safety issues are present. On-ROW access roads may need to be expanded to accommodate the necessary construction vehicles and materials. Existing On-ROW access roads are identified on the permitting plan sheets.

6.1.15.2 Off-ROW Access Roads

The Project intends to work with landowners during the permitting and construction period to attempt to acquire permission to use ORARs that could reduce temporary wetlands impacts and/or avoid other sensitive areas, equipment hazards, or obstacles. ORARs entirely on parcels owned by Renewable Properties, Inc. or Eversource are included in the Project plans. Any new ORARs would be field surveyed for natural and cultural resources prior to use, and appropriate permit amendments would be requested.

ORARs will primarily utilize existing paved and graveled roads. Many identified ORARs, especially those located in the towns of Dummer, Millsfield, and Dixville, are high quality public or timber haul roads and will need no improvements prior to use for the Project. For others, some grading and/or expansion may be required where the existing road or trail is not sufficient to accommodate the necessary construction vehicles and materials.

6.1.16 Temporary Storage and Staging Areas

Construction of the Project will require temporary storage and staging areas, generally located in the vicinity of the ROW, to temporarily store material, equipment, and supplies. Storage and staging areas will be located on property owned by Northern Pass, when feasible, or leased by the contractors. Previously disturbed upland areas, such as large parking lots or storage sites, will be given priority. Storage and staging areas will be identified in the construction management plan and will receive all necessary approvals prior to establishment and use.

In general, storage areas will require approximately two to five acres of useable land. These areas will primarily be used to store equipment and construction materials, and provide parking for construction crews, meeting locations, and places for equipment maintenance. Temporary storage areas will typically be used while construction is occurring in their vicinity and then be relocated as construction progresses. Following construction, the areas will be restored to preconstruction conditions.

Staging areas will generally be smaller than storage areas (less than two acres) and will most often be used for stockpiling construction materials (e.g., erosion control materials). As with storage areas, staging areas will be relocated throughout the construction process.

6.1.17 Work Pads

Work pads (e.g., crane pads, pulling pads, and guard pads) will be required to safely support and stage construction equipment needed to remove and relocate existing transmission and distribution structures, install new transmission structures, install and remove guard structures, and perform conductor stringing and pulling operations.

Work pads in wetlands will consist of temporary timber mats, with the use of temporary timber stringers as necessary or placement of geotextile fabric and fill.

6.1.17.1 Crane Pads

Structure and foundation work (removal, relocation, and/or construction) will require stable and level temporary crane pads from which materials can be staged and cranes and other construction equipment can safely operate. Where practicable, crane pads (and their immediately associated access roads) have been sized and configured to minimize resource impacts. For example, if access to all sides of a structure is not necessary during construction, the associated crane pad has been shifted to the most accessible side with the least impacts to wetlands. Where soils are saturated or soft, construction mats will be used for stability.

Crane pad sizes and configurations have been determined by the size and type of structures to be built, and the area needed to safely stage materials and operate equipment. Crane pads for the Project will range from 5,000 to 14,000 square feet in size, depending on the type of structure and installation method. Additional temporary grading may be necessary to accommodate these work areas.

6.1.17.2 Pulling Pads

Pulling pads, typically 100 feet by 200 feet in size, will be needed to serve as level staging areas for installing pull ropes and conductors. Pulling angles, the length of the conductor on the reels, the type of equipment required, topography, and access restrictions determine the locations and sizes of pulling pads. Should extreme conditions be encountered, on-site consultation will be performed with the third-party inspector prior to locating any portion of a pulling or tension set-up in or near a protected natural resource.

6.1.18 Clean-Up and Restoration

All areas disturbed during construction activities will be restored as close as practicable to preconstruction conditions, including contours and drainages. There may be exceptions to this, if leaving the grade in a location poses a clearance or NERC issue. Disturbed wetland soils will be mulched with straw for final restoration in accordance with the NHDES *Best Management Practices Manual For Utility Maintenance In And Adjacent To Wetlands And Waterbodies In New Hampshire* (NHDRED 2010). As needed, areas not adjacent to wetlands and streams will be seeded with a suitable seed mix and mulched with straw. Seeding may not be necessary in some areas if vegetation naturally re-establishes quickly. Seeding may be omitted from specific sensitive areas at the direction of the NHNHB or the USFS where recovery of native vegetation or listed species is a priority. Specific revegetation plans may be developed in response to

landowner requests, provided the plans are equally protective of natural resources. Seed mixes will not include any invasive species.

Excess construction debris (litter, hardware, bracing) will be removed from the ROW and disposed of at a licensed recycling or solid waste disposal facility. E&S controls will be installed as needed and maintained through the duration of restoration efforts. All temporary erosion control devices will be removed once the area has been stabilized.

Project personnel and/or qualified representative(s) will inspect the Project route for potential erosion problems and areas requiring additional restoration until all areas are permanently stabilized. Problem areas will be reported and addressed.

Potential Project Impacts and Avoidance and Minimization Measures

6.1.19 Avoidance and Minimization Measures

The Project has been designed to avoid or minimize adverse environmental effects to the extent practicable. To the extent that certain temporary and permanent adverse impacts to water resources are an unavoidable consequence of the Project, compensatory mitigation measures will be implemented. This section summarizes measures already incorporated into the Project design or will implement during Project construction to avoid or minimize adverse impacts to wetlands and waterbodies. The section also briefly reviews the Project's approach for compensatory mitigation (refer to Appendix G for further details).

The proposed Project was identified after an iterative and comprehensive alternatives analysis. This process spanned multiple years and included agency representatives and public stakeholders. The alternatives analysis process commenced with the initial consideration and rejection of the "no action" alternative. Subsequently, alternatives were considered based on conformance to the overall Project purpose of delivering 1,090 MW of renewable energy to the New England power grid. Key factors used to evaluate the alternatives were current technology, logistics (the feasibility of constructing along certain routes), cost, and natural / human environmental factors.

Comprehensive routing studies considered the use of various existing linear corridors (e.g., transmission line ROWs, highways, pipelines) and "greenfield" routes (i.e., not along any existing corridors) for the development of the new transmission lines. Alternative transmission line configurations (i.e., overhead lines vs. underground cables) were considered, along with alternative sites and configurations were considered, as appropriate, for the new converter terminal and transition stations and the existing substation modifications. From the alternatives considered, a preferred route was selected based on reliability, environmental effects, constructability, and cost. Feasible route variations and design options, representing alternatives that could be implemented but are less preferred in comparison to the proposed Project, were then defined. During this process, input from the public and from agency representatives was solicited and considered, particularly the identification and evaluation of transmission line route and configuration options.

During the design phase, Project plans have continued to be refined to avoid or minimize adverse effects to water resources. For example, the new transmission line structures have been sited, to the extent practicable, outside of federal jurisdictional wetlands and vernal pools. As a result, many wetlands, and all perennial watercourses, will be entirely spanned by the overhead transmission lines. Underground lines will be directionally drilled under rivers and larger perennial streams. Similarly, permanent and temporary access roads have been located so as to minimize the crossings of wetlands or watercourses. Such site-specific modifications to further minimize adverse effects to water resources will continue through the final engineering design phase of the Project.

The alternatives evaluation methodology is further described below. This evaluation considered:

- route selection
- route optimization
    - structure locations
    - access road locations
- design requirements
    - clearing requirements
    - structure foundation types
    - conductor types
- construction methods and BMPs
- converter terminal and substation locations

6.1.19.1 Route Selection

In its initial consideration of siting options, Northern Pass sought to minimize impacts to natural resources by, among other things, maximizing the use of existing ROW, avoiding conservation areas, and identifying the shortest route feasible. Specifically, the original routing effort conducted by Northern Pass included examining publicly available information databases and data collected through meetings with state and federal natural resource agencies, nongovernmental organizations and other interested stakeholders. Primary sources of data were color aerial photographs, field identification of residences, businesses and public facilities, and geographic information system (GIS) data from various state and local agencies. The GIS data included federal and state lands, conservation easements, historic and archeological resources, parks, surface waters, and other resources. Most of the data was quantified using GIS software; additional data was calculated by measuring information directly from the aerial photography. Using GIS software, all of this information was incorporated into maps of the project area so that the locations of known constraints, such as publicly or privately held conservation areas, could be identified and taken into consideration and constraint maps could be developed. The objective of this desktop exercise was to identify routes that began at the international border between Canada and NH, extended to a converter terminal location then to

the Deerfield Substation, while avoiding or minimizing impacts to population centers and natural resources.

Route segments were then laid out within the project area to create hundreds of potential route variations, avoiding known constraints to the extent possible, and taking advantage of opportunities to follow existing linear facilities such as transmission line corridors, roads, and railroads where the project could share existing ROW. The potential routes consisted of individual segments that could be combined to form a continuous path between endpoints. This step included consideration of multiple alternatives through each section of the project area. A first level review of these initial alternatives resulted in the elimination or modification of some alternatives because of either potential impacts to human or natural resources, or engineering barriers, such as steep slopes.

Northern Pass then conducted a second level review in which it quantified the social and environmental resources that might be affected by the remaining route alternatives. This evaluation of the routes included applying a numeric value to each of the alternative segments based on the potential effects on resources in that segment. The quantitative data were totaled for all of the potential routes. These data were used in evaluating the remaining alternatives, through the application of a mathematical comparison of the routes, to identify the routes with the least overall social and environmental impacts. This process resulted in the route and the alternative segments Northern Pass proposed in October 2010.

After consideration of public input on the initial route, Northern Pass undertook a partial rerouting effort focused on the portion of the North Section where there is no existing transmission ROW. This reconfiguration focused on routing options in less populated areas to the extent possible, and Northern Pass undertook an extensive property acquisition effort, negotiating mutually acceptable arrangements with willing landowners. Over 70 parcels were reviewed for environmental issues, and where practicable, the ROW was relocated to reduce the potential for natural and visual impacts and to minimize impacts to high elevation areas (above 2,700 feet). The resulting northern segment of the route is located further east than the original route, continues to maximize use of existing ROW, traverses a far less populated portion of northern NH, and relies in large part on property that an affiliate of Northern Pass has acquired in fee or by way of lease or easement for project purposes from willing property owners, as well as public road ROW. The northern section also includes 8.5 miles of underground cable almost entirely along public roadway rights of way. By designing the line to be buried within already disturbed portions of the roadways, the Project largely avoided natural resource impacts there.

In August of 2015 the Project modified the route further by deciding to place an additional 52 miles underground along public roads, avoiding impacts from the overhead design in and around the White Mountain National Forest. This substantially reduces impacts on sensitive plant communities, wildlife habitat, wetlands, and streams along that entire stretch of the route.

Slight shifts in the project route were also made after initial corridor design. Shifts were based on impacts to specific landowners; visual impacts; and natural resource impacts (for example, a ridge near Nathan Pond with steep slopes, shallow soils, and substantial moose wintering evidence). Alternative alignments were reviewed in the vicinity of a potential Exemplary Natural Community (Northern Hardwood Seepage Forest with watch list plant species), and the least impacting alternative was selected.

6.1.19.2 Route Optimization

Structure Locations

The locations of the Project's new and relocated structures have been carefully considered to, when practicable, avoid impacts to rivers, streams, lakes, ponds, floodplains and wetlands. Many will be avoided completely, but engineering constraints such as maximum span distance (which is also a factor of structure height), terrain (rivers, ravines, high points), and transportation features (roads, highways, railroads) affect the ability to achieve total avoidance. When it is determined avoidance is not possible, design changes that minimize impacts are then considered.

The impact minimization process begins with an environmental review of an initial structure layout based primarily on preferred engineering design standards. Based on suggestions made by environmental scientists, engineers and the design team adjusted the initial structure layout to maximize structure spacing to avoid transportation corridors and rivers, as well as avoid or minimize impacts to smaller natural and cultural features, such as wetlands, vernal pools, small streams, stone walls, cultural resources, and RTE plants.

After several iterative rounds of structure placement review, on-site "constructability walkdowns"[36] were conducted to review structure, access, and work pad locations for constructability issues and particularly-localized sensitive resources. Based on these walkdowns, Project plans were further-modified to further-reduce impacts where practicable.

Access Road Locations

Access roads are used both during the construction phase and for routine maintenance of the Project. Given the linear length of the Project and the remoteness of many structure locations, temporary natural resource impacts from the installation of construction access roads are unavoidable. While access roads in upland areas may be retained for future maintenance access, access through wetland areas will be temporary, and will be accomplished through the use of timber mats, or equivalent, to reduce soil compaction and vegetation damage. In an effort to minimize natural resource impacts, the Project team carefully considered the locations of access roads necessary for the construction of the Project, both on and off the existing and proposed ROW.

[36] Constructability walkdowns were conducted by the Project's transmission construction manager and a wetland/wildlife scientist in the fall and winter of 2012 and spring of 2013.

On-ROW Access

To the extent practicable, and in conformance with guidance provided by the NHDES to other transmission projects, on-ROW access roads proposed for use during Project construction will follow existing access roads or trails already present in the ROW and generally visible on aerial photographs. The intent of this approach is to prevent the creation of new wetland crossings that ORVs might use, even if the use of the new crossing locations could potentially lessen resource impacts. Existing on-ROW roads and trails to be used for Project access include:

- roads currently used by PSNH for maintenance access to existing transmission lines;
- ORV trails;
- landowner logging roads; and
- multifunctional roads/trails.

On-ROW access roads were reviewed, confirmed, and/or adjusted by the constructability walkdown team. Where safety issues such as line clearance, steep grades, or tight corners could preclude access by large cranes or other equipment, or where particularly sensitive resources were observed, the walkdown team identified alternative on-ROW access routes.

On-ROW access routes were identified for the entire Project corridor, with the exceptions of:

- where terrain issues require helicopter access, and
- where parcels along the route are both owned by Northern Pass (Properties Inc. and Renewable Properties Inc.) and abut public roads, and off-ROW access provides opportunities to further minimize resource impacts.

Off-ROW Access

Project permit applications do not assume that access agreements with private landowners can be successfully negotiated for construction. However, potential ORARs were identified and initially screened using available GIS data to determine if they could provide viable access for construction and potentially avoid resource impacts associated with the use of on-ROW access roads. The likelihood of impacting additional off-ROW natural resources was also reviewed. The initial screening process included:

- identifying potential access routes via aerial photo review and field walkdowns;
- ranking by necessity/desirability; and
- rating/ranking (low to high) by number of sensitive natural resources.

ORARs on parcels purchased by or under agreement with the Project, or owned by an Eversource Energy company (e.g., PSNH), were field surveyed for natural and cultural resources, and those that offer reduced resource impacts or critical ROW access are included in the Project permit applications. Other ORARs may be pursued once a Project route is finalized, if they reduce resource impact.

6.1.19.3 Design Requirements

Clearing Requirements

To minimize the amount of additional tree clearing within the existing ROW that would be needed for the Project, all proposed direct current (DC) structures were reconfigured with a V-string insulator design. This design modification reduces the amount of clearing needed to meet the required safety and operational clearances.

The recent decision to place approximately 52 miles of the Project underground in roadways and shoulders from Bethlehem to Bridgewater reduced direct, permanent wetland impacts by approximately 0.6 acres, reduced temporary impacts by over 30 acres, and reduced secondary impacts to wetlands, streams and vernal pools by over 70 acres. Almost 2 acres of impacts to sensitive plant communities and state-listed plants were also avoided by placing this portion of the line underground. The change to a V-string insulator design for all HVDC overhead structures allows for a narrower cleared ROW, further reducing secondary impacts, plant community impacts, and wildlife habitat impacts. These route and design changes reduced the area of proposed forest clearing by approximately 160 acres.

Structure Foundation Types

Structure selection considerations for the Project included ROW width, resource impacts, structure height/visibility concerns, and construction issues. The current design includes monopole, H-frame, and lattice structures.

Monopole structures will be anchored to concrete foundations approximately seven to 12 feet in diameter.

H-Frame structures will have a combination of concrete and direct-embed foundations. Concrete foundations will be approximately three to four feet in diameter. The direct-embed foundation process will consist of placing a portion of the poles into a three to four foot diameter hole, backfilling the hole with either native material, crushed rock, or a mixture of the two, and compressing to provide a rigid support system.

Lattice structures will be anchored to three-to-five-foot diameter concrete foundations at each corner of the structure base.

Work Pads

Structure and foundation work will require stable and level temporary construction areas ("crane pads") from which cranes and other construction equipment can safely work. Crane pad sizes and configurations are determined by the size and type of each structure, and the area needed to safely stage materials and operate equipment.

Where practicable, crane pads (and their immediately associated access roads) have been sized and configured to minimize resource impacts. For example, if access to all sides of a structure is

not necessary during construction, the associated crane pad has been shifted to the most accessible side with the least impacts to wetlands.

6.1.19.4 Construction Methods and BMPs

The Project will be constructed, operated, and maintained in accordance with federal, state, and local regulatory requirements, established industry practices, and Eversource policies and specifications. These are described above.

6.1.19.5 Converter Terminal, Substation Expansions, and Transition Stations

The City of Franklin has been identified as the best location along the Project route for the construction of a converter terminal to convert from DC power to AC power. Several parcels of land in Franklin were screened for suitability as a converter terminal site. Site selection criteria included proximity to the existing ROW, sufficient size (>50 acres) and buffering from residential development, accessibility for construction, local zoning and land use restrictions, and the presence of sensitive resources.

The proposed site was has minimal natural resource sensitivity, and was previously developed as a campground. The converter terminal can be constructed at this site with no direct impacts to wetlands, streams, vernal pools, RTE species or habitats, or areas of cultural sensitivity. The site is buffered from inhabited locations, so visual and sound effects will be minimal.

The existing yards at the Deerfield Substation and Scobie Pond Substation will be expanded to accommodate the interconnection of the Project's transmission line. GIS screening and site reconnaissance were conducted to identify expansion areas that minimized resource impacts while allowing for site designs that maintained suitable equipment configurations and proximity to the existing portions of the substations. For Scobie Pond Substation, this resulted in the purchase of an adjacent property to minimize stream and wetland impacts. The Deerfield Substation expansion was placed in an upland area with a narrow connection to the existing substation over a wetland swale, thereby avoiding the need to fill the entire swale.

At either end of each of the three underground segments of the transmission line, a transition station will be constructed to accommodate facilities required for the transition between an overhead line and an underground cable. These fenced-in facilities resemble small substations. Available parcels for the construction of the six required transition stations, which were limited in number, were screened for sensitive resources, and precise facility locations were shifted within the parcels to the extent practicable to minimize resource impacts.

Project efforts to avoid and minimize impacts during construction are further detailed in the sections that follow.

6.1.20 Topography, Geology and Soils

Construction of the overhead and underground transmission line will not result in significant areas of permanent ground or soil disturbances. Construction of the proposed Franklin

converter terminal, the proposed substation expansions, and the construction of the six transition stations will result in permanent grading and disturbance of the local soils and topography.

Detailed soil mapping has been performed at each of these locations and considered during Project siting, design, and engineering. An Alteration of Terrain (AoT) permit application will be filed to address these disturbances and construction methods and erosion and stormwater control will be implemented as discussed in above.

6.1.21 Wetlands and Watercourses

A summary of proposed Project impacts to wetlands, rivers, and stream resources, including direct permanent impacts, direct temporary impacts, and secondary impacts, is presented below.

6.1.21.1 Expected Impact Types

Direct Permanent Impacts

Direct permanent impacts will result from the placement of new and relocated structures, their associated foundations, caissons, and guy wires; and permanent fill in jurisdictional resource areas. Direct impacts will also be associated with grading and/or fill for the expansion of the Deerfield and Scobie Pond substations and transition stations 1 and 5 between aboveground and underground transmission line segments. The Northern Pass DEIS includes the conversion of forested wetlands to shrub or emergent wetlands in this category. Based on direction from state and federal resource agencies, these impacts were considered secondary impacts for permitting purposes, as described below.

Direct Temporary Impacts

Direct temporary impacts will result from the placement of temporary construction mats, or swamp mats for access and construction activities, temporary bridges for stream crossings, and temporary work pads for installing the structures. Direct temporary impacts will also result where the underground portions of the line are installed in trenches through jurisdictional natural resources. Efforts have been made to avoid resource areas, and trenchless technology will be employed in specific locations to further avoid and/or minimize impacts. Conducting work during frozen conditions will also help to minimize disturbances to wetlands and streams. Where winter construction is not possible, access through wetlands and streams will employ construction mats or other approved BMPs. All access roads across wetlands and streams will be temporary and designed to minimize impacts and surface water disturbance.

Secondary Impacts

Based on pre-application meetings with the federal regulatory agencies, secondary wetland, stream and vernal pool impacts for the Northern Pass Project will include the conversion of forested wetlands to scrub-shrub or emergent wetlands through tree clearing; temporary impacts to deep organic soils; clearing of upland forest within 100 feet of perennial streams, 50

feet of intermittent streams, 25 feet of ephemeral streams; and clearing of upland forest within the 100 foot "envelope" associated with vernal pools.

For calculating the amount of secondary impacts that must be compensated for in the mitigation package, the following guidance was provided by the federal agencies:

- 15% of forested wetland conversion in existing ROW
- 20% of forested wetland conversion in new ROW
- 15% of stream and vernal pool buffers in existing ROW
- 20% of stream and vernal pool buffers in new ROW
- 5% of temporary impacts to deep organic soils

The resulting quantities for secondary impacts are added to the direct permanent impacts, and this represents the wetland impacts that must be compensated for at the specified federal mitigation ratios.

Forested wetlands were identified in the field and noted within the Cowardin classification associated with each delineated wetland. The extent of proposed clearing was identified using Project-specific LIDAR information that shows the extent of vegetation >20 ft tall within the ROW, and comparing this to the width of ROW necessary to support the Project design. Wetland conversion from forested to other cover types is expected where proposed clearing overlaps with forested wetland areas. Wetlands with deep organic soils were identified using USDA NRCS soil mapping (very poorly drained soils), NHWAP maps of peatlands, and/or field observations.

Cleared forested wetlands within the ROW will experience a shift in the dominant vegetation assemblage and also a change in hydrology associated with decreased evapotranspiration; however, these areas will likely remain wetland systems and maintain a hydrological and biological connection to adjacent non-impacted portions of the same wetland. Dense herbaceous and low-growing shrub species will be allowed to colonize these areas and will contribute to the functions and values associated with that portion of the affected wetland. It is anticipated that the overall impact on the functions and values associated with a cleared wetland and adjacent portions of the undisturbed wetland system will be minimal.

Wetlands with deep organic soils are expected to have enhanced sensitivity to prolonged temporary disturbances associated with Project construction, due to the slow soil/peat development and recovery of vegetation. Measures will be taken to limit the duration of impacts to these areas and alternative construction practices may be used where practicable.

Secondary impacts to streams include the loss of upland tree canopy within 100 feet of perennial streams and rivers, 50 feet of intermittent streams, and 25 feet of ephemeral drainages. Loss of tree cover may lead to increased stream water temperatures, changes in habitat use, and decreases in organic matter input (leaves and branches). Some of these effects

will be ameliorated over time, as shrub and herb cover adjacent to streams responds to increased light with expanded growth. Additionally, non-capable species of shrub and low-growing trees will be allowed to remain within stream buffer areas, as are often found in riparian wetlands and other natural buffers. Non-capable species are those that do not typically grow to a height that would threaten the reliability and safety of the line, and therefore do not need to be routinely cut.

Forested upland habitat around vernal pools is important for vernal pool-dependent species outside of the breeding season and also provides shade to the pool habitat. The width of new ROW areas (approximately 120 feet) is relatively small compared to the typical distance traveled by mole salamanders and wood frogs to reach vernal pools in the spring. Field observations suggest that pools within existing ROW areas can be very productive. Adult pool-breeding amphibians often travel as much as 750 feet and occasionally over one mile to reach non-breeding habitats and juvenile dispersing amphibians may travel even greater distances to reach new breeding pools.[37]

6.1.21.2 Direct Wetland Impact

Direct impacts to wetlands were avoided and minimized as discussed above. Based on current Project design, 2.48 acres of permanent wetland impacts are anticipated. Approximately 137.20 acres of temporary impacts are also anticipated; these areas will be restored following construction. Table 7 summarizes the total proposed direct permanent and temporary impacts by town.

Table 7. Summary of Proposed Direct Permanent and Temporary Impacts by Town

Town/City	Permanent Impact Area		Temporary Impact Area	
	SF	Acres	SF	Acres
Allenstown	148	<0.01	93,207	2.14
Bethlehem	16,908	0.39	246,678	5.66
Bridgewater	50	<0.01	28,945	0.66
Bristol	64	<0.01	51,489	1.18
Canterbury	42	<0.01	82,788	1.90
Chester	0	0.00	9,935	0.23
Clarksville	101	0.00	80,594	1.85
Concord	501	0.01	319,701	7.34
Dalton	369	0.01	147,447	3.38

[37] U.S. Army Corps of Engineers. 2014. Vernal Pool Best Management Practices (BMPs), Draft 2/24/14. Accessed online: http://www.nae.usace.army.mil/Portals/74/docs/regulatory/VernalPools/VernalPoolsBMP.pdf. Date accessed: 9/5/14.

Town/City	Permanent Impact Area		Temporary Impact Area	
	SF	Acres	SF	Acres
Deerfield	29,134	0.67	380,855	8.74
Dixville	421	0.01	209,466	4.81
Dummer	1,035	0.02	506,668	11.63
Franklin	381	0.01	184,423	4.23
Hill	13	<0.01	21,917	0.50
Lancaster	1,356	0.03	550,968	12.65
Londonderry	4,383	0.10	0	0.00
Millsfield	694	0.02	344,401	7.91
New Hampton	88	<0.01	36,838	0.85
Northfield	7	<0.01	29,925	0.69
Northumberland	1,164	0.03	525,149	12.06
Pembroke	199	<0.01	132,451	3.04
Pittsburg	46,548	1.07	110,992	2.55
Raymond	0	0.00	19,802	0.45
Stark	1,391	0.03	481,377	11.05
Stewartstown	433	0.01	240,396	5.52
Whitefield	2,641	0.06	1,135,915	26.08
Total:	**108,069**	**2.48**	**5,972,328**	**137.11**

The majority of anticipated permanent impacts will be to forested wetlands. The majority of these impacts (89%) are associated with Transition Station 1 in Pittsburg, Transition Station 5 in Bethlehem and the proposed expansions of the Deerfield and Scobie Substation. Throughout the remainder of the Project area, the distribution of proposed permanent and temporary impacts mirrors the overall distribution of cover types, with the majority occurring to scrub-shrub and emergent (wet meadow) wetlands, most of which are combinations of the two. Table 8 summarizes the proposed impacts by cover type across the Project route.

Table 8. Summary of Impacts by Predominant Wetland Cover Type

Predominant Cover Type	Permanent Impact Area		Temporary Impact Area	
	SF	Acres	SF	Acres
PEM	20,586	0.47	2,176,691	49.97
PFO	75,676	1.74	781,179	17.93
PSS	11,673	0.27	2,949,350	67.71
PUB	134	0.00	65,108	1.49
Total:	**108,069**	**2.48**	**5,972,328**	**137.11**

6.1.21.3 Direct Watercourse Impact

Project design has attempted to avoid/minimize direct impacts to watercourses as discussed above. A total of 986 SF (0.02 acres; 272 linear ft.) of permanent watercourse impacts are anticipated. The majority of these impacts (953 SF) are associated with the proposed expansion of the Deerfield Substation and TS1. A total of 112,273 SF (2.58 acres; 26,476 linear ft.) of temporary impacts are anticipated due to temporary stream crossings associated primarily with temporary access roads and work pads, and temporary impacts associated with the installation of the underground transmission line within existing road ROWs. Table 9 summarizes the total proposed direct impacts by type; Table 10 summarizes the total proposed direct permanent and temporary impacts by town.

Table 9. Summary of Direct Watercourse Impacts by flow Regime

Resource Type	Permanent Impact		Temporary Impact	
	Area (sq. ft.)	Length (ft.)	Area (sq. ft.)	Length (ft.)
Perennial Streams	<1	<1	54,831	6,920
Intermittent Streams	971	265	33,854	10,017
Ephemeral Drainages	15	8	23,588	9,539
Total:	**986**	**272**	**112,273**	**26,476**

Table 10. Summary of Direct Watercourse Impacts by Town

Town/City	Permanent Impacts		Temporary Impacts	
	Area (sq. ft.)	Length (ft.)	Area (sq. ft.)	Length (ft.)
Allenstown	0	0	1,408	314
Ashland	0	0	1,247	20
Bethlehem	0	0	2,097	518
Bridgewater	13	4	1,404	257

Town/City	Permanent Impacts		Temporary Impacts	
	Area (sq. ft.)	Length (ft.)	Area (sq. ft.)	Length (ft.)
Bristol	0	0	800	180
Campton	0	0	122	30
Canterbury	0	0	2,616	599
Chester	0	0	83	42
Clarksville	0	0	444	192
Concord	1	<1	1,411	340
Dalton	0	0	667	112
Deerfield	854	212	4,552	880
Dixville	4	<1	32,371	7,289
Dummer	0	0	11,611	3,583
Easton	0	0	845	172
Franconia	0	0	121	30
Franklin	8	4	4,681	1,474
Hill	0	0	1,797	220
Lancaster	0	0	2,614	172
Millsfield	7	4	19,946	5,342
New Hampton	0	0	6,092	1,232
Northfield	0	0	958	274
Northumberland	0	0	2,742	500
Pembroke	0	0	1,214	250
Pittsburg	99	49	747	204
Plymouth	0	0	252	58
Stark	0	0	4,529	885
Stewartstown	0	0	1,841	539
Sugar Hill	0	0	207	93
Thornton	0	0	295	74
Whitefield	0	0	800	193
Woodstock	0	0	1,760	404
Total:	**986**	**272**	**112,273**	**26,476**
Total Acres:	**0.02**	**n/a**	**2.58**	**n/a**

Note: if town is not included, proposed impacts are zero (0)

6.1.21.4 Secondary Wetland and Watercourse Impacts

Secondary wetland and watercourse impact types are discussed above, and include:

- the conversion of forested wetlands to scrub-shrub or emergent wetlands through tree clearing; and
- temporary impacts to deep organic soils and clearing of upland forest within 100 feet of perennial streams, 50 feet of intermittent streams, 25 feet of ephemeral streams, and within the 100 foot "envelope" associated with vernal pools (see Section 6.1.24 for secondary vernal pool discussion).

Table 11 summarizes the secondary impacts associated with wetland conversion, impacts to deep organic soils, and upland tree clearing within stream buffers.

The majority of forested wetland conversion is associated with the clearing needed to establish the new overhead ROW between the international border and Dummer and includes Pittsburg, Clarksville, Stewartstown, Dixville, Millsfield and Dummer. Forested wetland conversion in these towns represents approximately 92% of the proposed forested conversion within the Project area. These areas are predominantly forested and the majority of the area is actively managed for timber and other forest resources. Many of the forested wetlands proposed for clearing have been impacted in the past by timber harvesting and these areas are expected to revert to other wetland cover types including scrub-shrub and/or emergent.

Upland stream buffer clearing and vernal pool buffer clearing are similarly focused on the 32 mile section of new ROW north of Dummer. This area is mountainous and contains many streams where clearing is proposed to support the new ROW. Approximately 75% of the proposed upland stream buffer clearing is proposed in the new ROW area. These secondary impacts are not anticipated to have significant detrimental impacts to affected stream and vernal pool resources because the proposed ROW corridor will be only 120 feet wide and the area will be allowed to revegetate with low-growing native vegetation providing suitable bank stabilization, and shading.

Temporary impacts to wetlands containing deep organic soils are focused in Northumberland, Lancaster and Whitefield where several very large wetland systems intersect the existing ROW area. Large areas of temporary impacts are also proposed in Concord, mostly in the vicinity of Turtle Pond, and in Deerfield where several large wetland systems also intersect with the existing ROW. All of these temporary impacts are within existing transmission line ROW areas and are currently subjected to disturbance associated with vegetation management and ongoing system upgrades and expansions. Work will be prioritized for winter and frozen ground conditions and the duration of wetland matting will be limited where possible. Other potential considerations are the utilization of helicopters and other methods that reduce the amount of matting necessary to construct each structure.

For calculating the amount of secondary impacts that must be compensated for in the mitigation package, the following guidance was provided by the federal agencies:

- 15% of forested wetland conversion in existing ROW
- 20% of forested wetland conversion in new ROW
- 15% of stream and vernal pool buffers in existing ROW
- 20% of stream and vernal pool buffers in new ROW
- 5% of temporary impacts to deep organic soils

The resulting quantities for secondary impacts are added to the direct permanent impacts, and this represents the wetland impacts that must be compensated for at the specified federal mitigation ratios.

Table 11. Summary of Secondary Impacts to Wetlands and Streams by Town

Town	Forested Wetland Conversion (SF)	Upland Stream Buffer Clearing (SF)	Deep Organic Soil Temp. Impact (SF)	Upland Vernal Pool Buffer Clearing (SF)
Allenstown	386	**26,069**	57,417	0
Ashland	3	**18,360**	0	0
Bethlehem	0	**399**	116,964	0
Bridgewater	72,103	**86,074**	0	0
Bristol	23,747	**91,144**	0	0
Canterbury	3,804	**41,011**	22,089	0
Chester	0	0	9,935	0
Clarksville	136,245	**36,488**	0	41,118
Concord	704	**18,931**	110,513	0
Dalton	0	**386**	54,198	0
Deerfield	68,939	**117,838**	214,212	13,946
Dixville	469,051	**1,135,433**	0	123,725
Dummer	479,119	**309,896**	84,504	65,938
Franklin	3,674	**76,299**	89,460	2,089
Hill	0	**18,355**	295	0
Lancaster	5,008	**6,309**	346,675	10,596
Londonderry	3,035	0	0	0
Millsfield	399,583	**665,308**	0	72,932
New Hampton	3,622	**108,030**	0	0
Northfield	182	**25,213**	0	0

Town	Forested Wetland Conversion (SF)	Upland Stream Buffer Clearing (SF)	Deep Organic Soil Temp. Impact (SF)	Upland Vernal Pool Buffer Clearing (SF)
Northumberland	14,821	**35,357**	269,197	12,076
Pembroke	319	**30,738**	0	10,622
Pittsburg	261,133	**54,892**	0	12,199
Raymond	0	0	3,583	0
Stark	922	**59,270**	81,529	14,284
Stewartstown	623,188	**82,270**	0	23,968
Whitefield	0	**2,985**	384,278	349
Total (SF):	**2,569,589**	**3,047,054**	**1,844,849**	**430,214**
Total (Acres):	**58.99**	**69.95**	**42.35**	**9.88**

Note: if town is not included, proposed impacts are zero (0)

6.1.22 Floodplains

Floodplains mapped by FEMA are associated with the majority of the larger rivers and brooks, and many of the larger wetland and waterbody resources located along the Project route.

Potential impacts to floodplains were taken into consideration when siting the converter terminal, the expansions at Deerfield and Scobie Pond substations, and the transition stations. For example, the preliminary sites for Transition Station 2 (TS2) in the Town of Clarksville was rejected in part due to mapped floodplains and shifted away from the Connecticut River and upslope; and the preliminary site and engineering design for the proposed Scobie Substation expansion were adjusted to avoid floodplains near the area.

Total proposed permanent impacts to FEMA 100-year floodplains (Zone A and AE) are 1,604 SF (0.04 acres) with an additional 141 SF of permanent impacts to areas classified as Zone AE Floodway. The permanent AE Floodway impacts are associated with two new overhead DC structures and two relocated 115 KV structures near Otter Creek and the Israel River in Lancaster, which share floodplains due to their close proximity. These areas are currently agricultural fields and/or wetlands. Total proposed temporary impacts to FEMA 100-year floodplains (Zone A and AE) are 937,133 SF (21.51 acres) with an additional 51,365 SF (1.18 acres) of temporary impacts to areas classified as Zone AE Floodway. The majority of the temporary impacts to Zone AE Floodways are also associated with work pads and access roads near Otter Creek and the Israel River in Lancaster, with another small area of impact to floodways adjacent to the Soucook River in Pembroke.

The majority (approximately 97%) of proposed permanent FEMA floodplain impacts are located within existing transmission line ROW areas. One new DC structure is located within the Halls Stream floodplain immediately east of the international border in Pittsburg.

Due to the small spatial footprint and cross-sectional areas associated with these proposed structures, no effect on the flood storage capacity of the affected floodplains is anticipated. Areas along the underground portions of the Project route will be restored to the pre-existing grade, and therefore no detrimental effects on any floodplain areas are anticipated.

In general, floodplains were proactively avoided, and where unavoidable, the impacts were minimized to the extent that no change in the flood storage capacity of any affected floodplain is anticipated. Therefore, no unreasonable adverse effects to floodplains or flood storage are anticipated as a result of the Project.

6.1.23 Groundwater Resources

In general, sensitive groundwater resources including aquifers, wells, and public water supply sources and source and well protection areas were proactively avoided throughout the siting of the major Project development components.

None of the permanent substation, transition station, or converter terminal portions of the Project are located within source or wellhead protection areas. However Transition Station 6 is located in a GA2 aquifer area. The implementation of construction BMPs to control E&S will help protect groundwater resources during and following construction. In addition, other BMPs such as *Best Management Practices for Fueling and Maintenance of Excavation and Earthmoving Equipment* (WD-DWGB-22-6)[38] will be followed to prevent spills of fuel and other hazardous materials during construction and clearing activities where equipment is refueled in the field. Wells and other water supplies will be avoided on a case-by-case basis throughout Project implementation. Therefore, no unreasonable adverse effects to groundwater quality or water supplies are anticipated as a result of the Project.

6.1.24 Vernal Pools

6.1.24.1 Direct Vernal Pool Impacts

Direct impacts to vernal pools have been avoided and minimized as discussed above (Section 6.1.19). As a result of these efforts, a total of only 1,208 square feet (0.003 acres) of permanent vernal pool impacts across four different pools were unavoidable. Neither of these pools is considered high quality. 12,056 SF (0.28 acres) of temporary impacts are also anticipated across 42 different pools; of which three are classified as high quality. Table 12 summarizes the total proposed direct permanent and temporary impacts, by town.

[38] http://des.nh.gov/organization/commissioner/pip/factsheets/dwgb/documents/dwgb-22-6.pdf

Table 12. Summary of Direct Impacts to Vernal Pools by Town

Town	Permanent Impact (SF)	Temporary Impact (SF)
Bethlehem	0	606
Chester	0	0
Deerfield	0	4,595
Dixville	0	510
Dummer	0	787
Lancaster	0	167
Londonderry	1,188	0
Millsfield	0	425
Northumberland	13	492
Pittsburg	0	2,213
Stark	7	2,208
Stewartstown	0	1
Whitefield	0	53
Total (SF):	**1,208**	**12,056**
Total (Acres):	**0.03**	**0.28**

Note: if town is not included, proposed impacts are zero (0)

6.1.24.2 Secondary Vernal Pool Impacts

Upland forest clearing within 100 feet of vernal pools was also calculated based on input from regulatory agencies. Table 11, above, summarizes the quantity of upland forest clearing within the 100-foot vernal pool buffer. Wetland clearing within 100 feet of high quality vernal pools was calculated as part of the wetland conversion quantification process, and is not included in this table. Approximately 84% of the proposed upland vernal pool buffer clearing is associated with the new ROW areas north of Dummer where the majority of clearing is necessary. These secondary impacts are not anticipated to have significant detrimental impacts to affected vernal pool resources because the proposed ROW corridor will be only 120 feet wide and the area will be allowed to revegetate with low-growing native vegetation providing suitable terrestrial habitat for vernal pool-dependent species. The proposed 120 foot wide ROW also makes up a small percentage of the typical terrestrial habitat utilized by vernal pool species (which can extend farther than 750 feet from the pool depression) and much of this area is currently harvested and still supports observed vernal pools and pool-dependent species.

6.1.25 Protected Species and Natural Communities

6.1.25.1 Rare, Threatened and Endangered Plants and Exemplary Natural Communities

An analysis of Project impacts to RTE plant species and exemplary natural communities is included in the *Rare, Threatened and Endangered Plants and Exemplary Natural Communities* report. The impact analysis describes temporary, permanent, direct, and indirect impacts and proposes methods to minimize or avoid impacts.

Impacts to populations and natural communities are estimated based on the locations and numbers of plants (or percent cover of plants) or boundaries of natural communities observed during surveys conducted from 2010 to 2015.

Impacts to plant populations are expressed in terms of total square feet of impact to the area that the population occupies (including spaces between plants but not including spaces between delineated patches of plants) and the total number of specimens estimated to be impacted. These values are also expressed as percentages of the population (i.e., the percent of the population area and the percent of specimens in the population that are impacted).

In some cases, rather than estimating the number of specimens, an estimate was made of the total cover of the plant species within an area. The total cover is the total area covered by the species, as if the plants were growing next to one another. To estimate the square feet of impact to the total cover, the fraction of cover within an area (total cover divided by total area) was multiplied by the square feet of impact.

Impacts to a natural community were also estimated, both on a square- foot basis and as a percentage of the total area of the community.

The types of anticipated Project impacts to RTE plant species and exemplary natural communities are defined as follows:

- Direct: involving a disturbance to the ground surface (i.e., soils and/or vegetation). The areas of direct impacts are quantified in this analysis.
    - Permanent: resulting in a loss of habitat or permanent change in the type of habitat (e.g., the installation of a structure where vegetation once existed or the cutting of trees to create a cleared ROW).
    - Temporary: involving temporary changes to soils, vegetation, or other factors. Following construction these areas will be restored and returned to a natural state. These impacts may include vegetation clearing, soil grading, driving vehicles through areas, etc. Temporary Project impacts may result in either temporary or permanent impacts to RTE plants, depending on the type of impact, the species involved, and the impact minimization measures implemented.

- Indirect: involving changes in factors such as light level and hydrology. They are byproducts that may occur as a result of direct impacts. Areas that are impacted from changes in light level due to tree clearing are quantified in this analysis (the areas of indirect impact are assumed to be equal to the areas of the RTE polygons or parts of polygons located within the zone that will be cleared minus the permanent direct impact areas within those polygons).

In evaluating impacts, the rarity, vulnerability, and growth characteristics of the RTE plant population or natural community were considered, including state or regional rarity status, current condition of the population or community, habitat requirements, ability to tolerate disturbance or changes in light level, and dispersal ability. Based on available information, an evaluation was made about the likelihood of being able to re-establish an impacted species in the same area post-construction. In general, the RTE plant species located within the existing ROW are normally found in open areas and require a disturbance regime for maintenance of ideal habitat conditions. It is likely that these species will become re-established in temporarily impacted areas following construction, assuming appropriate impact minimization measures are used, as applicable. The permanently impacted areas within the existing ROW (i.e., locations of proposed structures) occupy a very small area within the ROW, and would result in only a very minor loss of habitat to the impacted RTE species.

Most of the RTE plants species occurring in the new (currently forested) ROW are found in forested habitats and do not typically occur in open habitats such as transmission line corridors. Their general absence from open canopy areas suggests that they do not tolerate open canopy conditions well and/or that they cannot effectively compete with other species under open conditions.

Tree clearing for the ROW will result in a permanent loss of habitat for these species. Given the permanent change in habitat, it is unlikely that the impacted population areas may be re-established in the same area post-construction. Tree clearing will also result in the loss of portions of forested community types, including portions of two potentially *exemplary Northern white cedar –balsam fir swamps* (S2 ranked) and one potentially exemplary *Northern hardwood seepage forest* (S3 ranked).

Impacts to state threatened and endangered species and potentially exemplary natural communities are summarized below (Table 13).

The Project will impact three state-endangered and one state-threatened plant species; none of these species are located within wetlands. One of the state endangered species that will be impacted, butterfly milkweed (*Asclepias tuberosa*), is probably an introduced garden plant, a remnant of plantings conducted by NH Fish and Game to enhance habitat for the state and federally endangered Karner blue butterfly.

The following measures, which were developed with input from NHNHB, will be implemented to minimize impacts to RTE plant species and exemplary natural communities.

Pre-Construction

1. Avoid impacts to rare species and communities wherever practicable
2. If impacts to threatened and/or endangered are unavoidable - Flag populations/sensitive areas prior to work to minimize impacts. Fence off RTE habitat areas adjacent to impact areas as needed to prevent impacts beyond the permitted work zone. Provide contractors with site-specific requirements for limiting activities to approved work areas, maintaining or rebuilding fences, securing gates at access points, etc. Have the project's Environmental Monitor inspect these areas prior to construction. Any changes to the "Project area" will require complete resource assessment and permitting as required by law. Construction activities that may impact RTE plants include:
    - Tree clearing
    - Excavation/fill
    - Structure removal and installation
    - Vehicle access
    - Staging and laydown of materials
3. Identify locations on project plans where contractors will be required to adjust construction schedules or employ special techniques to protect rare, threatened or endangered species, Forest Service Sensitive Species, and Exemplary Natural Communities. This information will also be provided electronically for each construction crew and environmental monitor.
4. Treat locations of rare, threatened and endangered species or their habitat as confidential. The identity and precise location of rare species will not be shown on permitting drawings available to the public. Location indicators on the plans will be linked to a separate table describing the resource and protective measures required at that location. This table will be developed once permit conditions are finalized, and will be provided to the contractors and Environmental Monitors.
5. Develop a contractor training program prior to construction activities to familiarize the crews with the locations and species that will require special consideration.
6. Install signs along construction access roads alerting Contractors that they are entering an area of resource sensitivity.
7. Construction activities and ROW vegetation restoration and maintenance activities on state and federal conservation lands will be coordinated with the relevant agencies and will comply with current management plans, as appropriate.

8 If advised by NH NHB, collect seed (and/or transplant plants) from the species that will be impacted prior to construction, including:
   - Threatened and Endangered plant species that will be impacted by construction activities involving excavation/fill, or vehicular traffic;
   - Threatened and Endangered plant species associated with forests that will be adversely impacted by tree clearing;

   A Seed collection or transplanting plan will be developed for relevant impacted species for review and approval by NH NHB prior to construction activities, if recommended by NH NHB.

Construction

9 The Environmental Monitor will discuss threatened and endangered plant issues at the daily morning tailboard meetings with Contractors for work taking place in sensitive areas.

10 Perform construction activities (including tree clearing and vehicle access) in sensitive plant locations during winter, when the ground is frozen to the extent practicable. A draft project schedule will be provided in the SEC application. A final project work schedule will be provided to state and federal resource agencies for review prior to construction.

11 If project constraints (e.g., permit requirements) require construction to be performed during the growing season, perform work after the plant has set seed, especially if the plant is an annual, to the extent practicable. If the RTE plant to be impacted is a perennial and construction activities consist of vehicle access or tree clearing (and the plant normally occurs in open conditions), perform construction as late in the growing season as possible and use point-load reducing matting to cover the ground in the areas of perennial RTE plants to minimize impacts.

12 Limit removal of vegetation to that necessary for construction of the project. Limit tree clearing to the minimum required width to meet safety clearances, leave root systems in place, except over underground installations or where other earthwork must be conducted. Leave herbaceous and shrub vegetation intact wherever practicable.

13 Where practicable, fell trees parallel to and within the ROW to minimize the potential for off-ROW vegetation damage. Take care to maintain vegetation along stream banks and within wetlands to the extent possible.

14 Have Northern Pass Environmental Monitors work with the construction contractors to identify and take the necessary steps to avoid or minimize the transport and propagation of invasive species along the Project route.

15 Follow these protocols for controlling the spread of invasive plants:
- Use soil from local sources. To the extent possible, match soil texture with soil texture found in impacted habitat (e.g. sandy soils in impacted *Aristida longespica* habitat). Any soil fill or topsoil used in impacted RTE plant or natural community impact areas will be inspected at the source and be certified as weed free by the Environmental Monitor before being brought on site.
- Use certified weed and invasive-free straw bales for erosion and sediment control.
- Perform regular inspection and cleaning of construction equipment and vehicles on the right-of-way as appropriate where invasive species are present.
- Train construction contractors to identify common invasive plant species.
- Re-vegetate disturbed areas quickly using seed mixes that are devoid of invasive species in accordance with New Hampshire Department of Agriculture regulations.
- If invasive species are removed due to construction activity, cut when dormant or prior to seed set, and dispose of appropriately in a manner and location that precludes spread.

16 Perform environmental monitoring during construction to ensure impacts are limited to designated areas, and BMPs and other protocols are followed. Inspect erosion controls during construction, especially during significant precipitation events.

17 Follow Best Management Practices (BMPs) during construction. Sediment and erosion control plans will be developed that specify the types of BMPs necessary. Depending on the site, BMPs may include installation of silt fence, straw wattles, mulch/stump grinding berms, straw bales, or check dams, and covering bare soils with mulch, blown straw, bonded fiber matrix or fiber rolls to protect drainage ways and streams from sediment runoff.

18 Use BMPs for minimizing soil rutting and compaction in sensitive plant locations.

19 Within sensitive areas, take care during construction to insure that the surficial soil is, to the extent practicable, not compacted. At the conclusion of construction in a particular area, seek to restore the native topsoil that was present prior to construction.

20 Allow RTE plant locations to reseed naturally without seed mix, unless directed by NH NHB to collect seed from adjacent (unimpacted plants) for use during restoration.

<u>Restoration</u>

21 When restoring impact areas without RTE plant species, use seed mix containing all native plants. Seed mix should be selected based on conditions (e.g., upland vs wetland) and should contain common native species associated with the impacted habitat.

Provide NH NHB with a description of the proposed seed mix prior to use in the project area.

22 Revegetate disturbed areas in a timely manner once construction is complete in specific areas.

23 Insure operation and construction of the project within the WMNF will comply with the 2005 or other most recent version of the WMNF Land and Resource Management Plan as it applies to rare, threatened and endangered species.

24 Carry out any necessary revegetation within the White Mountain National Forest in a manner that is consistent with the 2005 or other most recent of the White Mountain National Forest Land and Resource Management Plan.

Post-Construction

25 Perform post-construction monitoring in restored sensitive plant locations for a period of two years following completion of construction activities in that location.

26 Northern Pass anticipates that vegetation management activities will be performed by Eversource Energy (formerly PSNH) under a services agreement with Eversource. Work will be performed in accordance with Eversource's vegetation management program, and all vegetation management and maintenance will be carried out in accordance with the New Hampshire Division of Forest and Lands "*Best Management Practices Manual for Utility Maintenance in and Adjacent to Wetlands and Waterbodies in New Hampshire*."

Table 13. Summary of Impacts to State Threatened and Endangered Plant Species and Potential Exemplary Natural Communities within the Project Area

Species or Exemplary Natural Community	State Status[1]	Towns	Number of Impacted Populations/ Communities	SF of Impact[2]				Reestablish in Same Area?	Habitat Area Permanently Lost	
				Permanent Direct	Temporary Direct	Permanent Indirect	Total		SF	% of Population Area[3]
US/Canada Border to Existing Transmission Line ROW in Dummer										
Northern Hardwood Seepage Forest	S3	Dixville, Millsfield, Stewartstown	5 (one potentially exemplary)	1,140	585,295	1,591,692	1,591,692	No	1,591.692	32%
Northern White Cedar-Balsam Fir Swamp	S2	Dummer, Stewartstown	3 (all potentially exemplary)	0	5,609	23,770	23,813	No	23,770	21% (2)
Franklin Converter Terminal to Deerfield Substation										
Wild Lupine (*Lupinus perennis*)	T*	Concord, Pembroke	2	14	18,160	N/A	18,174	Yes	14	0.05% (1)
Spiked Needle Grass (*Aristida longespica* var. *geniculata*)	E	Concord, Pembroke	3	0	6,567	N/A	6,567	Yes	0	0
Licorice Goldenrod (*Solidago odora*)	E	Pembroke	1	28	30,815	N/A	30,843	Yes	28	0.01%

Species or Exemplary Natural Community	State Status[1]	Towns	Number of Impacted Populations/ Communities	SF of Impact[2]				Reestablish in Same Area?	Habitat Area Permanently Lost	
				Permanent Direct	Temporary Direct	Permanent Indirect	Total		SF	% of Population Area[3]
Butterfly Milkweed (*Asclepias tuberosa*)†	E	Concord	1	0	33	N/A	33	N/A	N/A	N/A

Notes:

[1] State status is as follows: E=Endangered, T=Threatened, W=Watch, I=Indeterminate, S2= imperiled, S3=very rare and local/vulnerable

* Indicates species of regional conservation concern.

[2] Impact values are summed for all affected populations. Within the existing ROW, total impacts are equal to permanent direct + temporary direct impacts. Within the proposed ROW, total impacts are equal to permanent direct + permanent indirect impacts (the temporary direct impacts occur entirely within the permanent indirect impact area).

[3] The number in parentheses refers to the number of populations to which the percent value applies. For example, if there are three impacted populations, but only one has permanent impacts to habitat area, then there would be a 1 in parentheses and the percent would indicate the percent of that particular population area in which habitat was lost. If there is no number in parentheses, then habitat area was lost from all the impacted populations, and the percentage applies to the sum of the areas of the impacted populations.

N/A –not applicable

† Probably an introduced garden plant with a different genetic makeup than native populations in the vicinity.

6.1.25.2 Rare, Threatened and Endangered Wildlife and Associated Habitat

Impacts

From the Canada-New Hampshire border to the Town of Dummer, the Project ROW will be converted from forest to shrubland habitat. After construction, periodic mowing will maintain the ROW in an early successional state. Shrubby habitats in this part of New Hampshire are commonly present in regenerating clear-cuts, but are ephemeral. The conversion of the Project ROW from forest to shrubby habitat will mean a loss of habitat for individual animals living in the Project footprint that use forest cover exclusively, such as forest-nesting birds and forest amphibians. However, forest cover will continue to be the predominant habitat throughout the adjacent landscape, and these species, as a whole, will incur only a very minor loss of habitat. Most species in the region will use the shrubby ROW as part of the mosaic of vegetation age-classes that currently exists in the Project area. Some species will benefit from the added shrub cover, particularly shrubland birds.

Forest clearing in the new ROW portions of the Project route will result in limited forest fragmentation effects. Fragmentation effects generally include habitat loss, edge effects, and disruption of ecological flows (i.e., species movement). The magnitude of these effects depends on the width of the fragmenting feature, qualities of the landscape impacted, and the species and ecological processes affected.

Project-related habitat loss as a result of converting existing forest into shrubby vegetation will have minimal effects on wildlife populations, given the small size of the converted area relative to the amount of forested habitat that will remain available in the surrounding landscape, and some species will benefit from the added shrub cover.

Edge effects from the Project, defined as any effects that occur as a result of the physical *presence* of a vegetation edge, as opposed to the *type* of vegetation, will be blunted as the contrast between forest cover and shrub cover is relatively low. Importantly, local species are already adapted to the existing mosaic of forest age-classes created by ongoing logging in and around the Project area.

Movement by most species across the new ROW is unlikely to be affected, as local species are adapted to moving across various shrub and forest cover types, and the ROW will be relatively narrow (about 120 feet), well within the width of a typical timber harvest patch cut or clear cut. The newly-cleared ROW may act as a travel or dispersal corridor for predators, nest parasites, and exotic plants, which can have an adverse effect on the existing biological community. Increased sunlight, wind, and changes to the evapotranspiration rates will cause some alteration of adjacent forest vegetation, but these effects will not greatly exceed those in other forest openings (due to clear-cuts, wind-throw and beaver activity) to which local wildlife typically adapts.

The existing ROW from Dummer to Deerfield will be subject to minor clearing in some locations to accommodate the new transmission line, converting a minimal amount of forest to shrubby cover type. The existing ROW will continue to be maintained as a shrubby habitat by mowing on a regular basis. The slight widening and continued maintenance will create no impact on or a slight benefit to the shrubland-dependent species currently using the ROW, including the pine barrens specialists. The minor loss of adjacent forested habitat will have little to no influence on forest species, as forest cover will remain widespread and abundant in the vicinity of the Project area.

The Project crosses 17 DWAs that contain a total of 10,362 acres. Based on current design, approximately 25.6 acres (0.25%) of the mapped DWAs will be cleared by the Project. Estimating the relative impact of the Project on either MCAs or significant mast stands is difficult as these resources are not mapped. Field survey teams were not authorized to work outside the Project footprint, and so were unable to compare the Project area to its surroundings. However, there is no reason to believe that MCAs or mast stands are more common within the Project footprint then the adjacent forest cover.

The anticipated risks of impact as a result of the Project on each special status species are summarized in Table 14.

Table 14. Risk of Impact to Special Status Wildlife Species as a Result of Project Construction and Operations*

Species	Construction			Operations and Maintenance		
	Habitat Loss (Temporary)	Direct Mortality	Avoidance/ Behavioral	Habitat Loss (Permanent)	Direct Mortality	Avoidance/ Behavioral
Insects						
Karner blue butterfly	High	High	Low	High	Moderate	Lowest
Frosted elfin	High	High	Low	High	Moderate	Lowest
Persius duskywing skipper	High	High	Low	High	Moderate	Lowest
Pine pinion moth	Low	Moderate	Lowest	Lowest	Lowest	Lowest
Amphibians and Reptiles						
Blue-spotted Salamander	Low	Low	Moderate	Lowest	Low	Low
Blanding's turtle	Low	Low	Moderate	Lowest	Low	Low
Spotted turtle	Low	Low	Moderate	Lowest	Low	Low
Wood turtle	Low	Low	Moderate	Lowest	Low	Low
Eastern hognose snake	Moderate	Moderate	Moderate	Lowest	Low	Low
Green Snake	Low	Low	Moderate	Lowest	Low	Low

Species	Construction			Operations and Maintenance		
	Habitat Loss (Temporary)	Direct Mortality	Avoidance/ Behavioral	Habitat Loss (Permanent)	Direct Mortality	Avoidance/ Behavioral
Northern black racer	Low	Low	Moderate	Lowest	Low	Low
Birds						
Common loon	Lowest	Lowest	Low	Lowest	Low	Lowest
Northern harrier	Low	Lowest	Moderate	Lowest	Lowest	Lowest
Osprey	Lowest	Lowest	Low	Lowest	Low	Lowest
Bald eagle	Lowest	Lowest	Low	Lowest	Low	Lowest
Golden eagle	Lowest	Lowest	Low	Lowest	Low	Lowest
Peregrine falcon	Lowest	Lowest	Low	Lowest	Low	Lowest
American kestrel	Low	Lowest	Moderate	Lowest	Lowest	Lowest
Common nighthawk	High	Lowest	High	Lowest	Lowest	Lowest
American three-toed woodpecker	Low	Lowest	Moderate	Lowest	Lowest	Lowest
Rusty blackbird	Moderate	Lowest	Moderate	Low	Lowest	Lowest
Forest-Nesting Birds	Moderate	Low	Moderate	Moderate	Lowest	Low
Wetland Nesting Birds	Low	Low	Moderate	Lowest	Lowest	Lowest
Grassland or Shrubland Nesting Birds	Moderate	Low	Moderate	Habitat gain	Lowest	Lowest
Mammals						
Canada lynx	Low	Lowest	Moderate	Lowest	Lowest	Lowest
American marten	Low	Lowest	Moderate	Low	Lowest	Lowest
Eastern small-footed bat	Low	Lowest	Low	Low	Lowest	Lowest
Northern long-eared bat	Low	Low	Low	Low	Lowest	Lowest
Special Concern bats	Low	Low	Low	Low	Lowest	Lowest
Habitat Resources						
General Wildlife Habitat	Low	Low	Low	Low	Lowest	Lowest
Deer Wintering Areas	Moderate	Low	Moderate	Moderate	Lowest	Lowest
Moose Concentration Area	Moderate	Low	Moderate	Moderate	Lowest	Lowest

Species	Construction			Operations and Maintenance		
	Habitat Loss (Temporary)	Direct Mortality	Avoidance/ Behavioral	Habitat Loss (Permanent)	Direct Mortality	Avoidance/ Behavioral
Bear-scarred Beech	Moderate	Low	Moderate	Moderate	Lowest	Lowest

*Highest	Large-scale, population-level effect
	Demographic changes leading to population decline
	Threat to species survival regionally
High	Locally to regionally important effect
	Demographic changes leading to local population decline possible
Moderate	Limited and local effect
	Effects to multiple individuals likely
	No demographic changes or population-level effects
Low	Effect limited to individuals, no population-level effects
	Low exposure to species
Lowest	Limited effects if any, to individuals
	Very limited or no exposure of species

Avoidance, Minimization, and Mitigation

Impacts to wildlife and other natural resources were avoided and minimized in all phases of Project planning and design. Through an iterative process, the initial structure layout, which was based on maximum spacing and avoidance of transportation and river corridors, was adjusted to avoid as many wetlands, vernal pools, small streams, stone walls, archeological resources, and RTE plants as possible. Plans were further refined after "constructability walkdowns" by a transmission construction manager and a wetland/wildlife scientist in the fall and winter of 2012 and spring of 2013. The decision to place portions of the Project underground in road shoulders, primarily to reduce visual impacts, also resulted in a reduction in habitat impacts.

The Project team has developed self-imposed seasonal restrictions and survey requirements to minimize impacts to wildlife at critical life stages. Examples include seasonal tree-cutting restrictions wherever acoustical surveys identify possible long-eared bats, avoiding work near DWAs during periods of deep or crusted snow, and removing and excluding listed snakes and turtles from nesting habitat prior to construction to avoid accidental crushing by equipment.

Temporary impacts are addressed in Project restoration plans, which specify techniques and materials for replacing soils and native vegetation depending on location and site conditions. Habitat function is expected to become re-established in these areas over time. Permanent and secondary impacts to wetlands will be mitigated through a compensatory mitigation plan developed with input from state and federal agencies, using the higher federal regulatory wetland impact-to-mitigation ratios as a starting point, and then adding additional components.

The proposed mitigation plan includes the preservation of 1,668 acres of land in three HUC 8 watersheds – the Upper Connecticut, Pemigewasset, and Merrimack River. This acreage includes sites purchased by a Northern Pass subsidiary in Coös and Merrimack Counties, a site in Belknap County, and one in Merrimack County that contains forested wetlands, low elevation spruce-fir forest, high elevation spruce-fir forest, marshes, perennial and ephemeral streams, vernal pools, and upland buffers that will also adequately mitigate for impacts to wildlife habitat. Northern Pass is also identifying land in Concord, NH that would be suitable for the preservation and management of Karner blue butterflies, other state listed lepidoptera, and wild lupine. The total commitment to preservation, as proposed, is more than 3 times the regulatory ratio for wetland mitigation through preservation. Northern Pass is currently seeking conservation easement holders for the properties.

See Appendix G for more details regarding mitigation efforts, including an agreement with the National Fish and Wildlife Foundation ("NFWF").

6.1.26 Cultural Resources

6.1.26.1 Archaeological Resources

Evaluation of impacts to archeological resources has not yet occurred. However, the overall Project approach seeks to (1) identify, (2) avoid and (3) minimize impact to archeological resources. The Project has already taken steps to avoid archeological sites through Project design.

The Section 106 process will ensure that archeological survey phases are completed. These phases will include Phase II determination of site eligibility to the National Register of Historic Places and Phase III mitigation of adverse effect, as needed for sites considered NRHP-eligible that will be impacted by the Project. By following the Section 106 process, any impacts to archeological resources will be addressed and strategies for mitigation will be developed.

6.1.26.2 Historical Resources

Potential impacts to historic resources along the Project route have been reviewed. Most of the potential effects to historic resources will be in the overhead segments of the Project and will be indirect visual effects related to the introduction of new visual elements (i.e., taller, larger structures) to the historic setting of the historic resources. Preliminary assessments that have not been reviewed by DOE or DHR indicate that 12 potential National Register-eligible resources in the viewshed of the Project could be adversely affected by the Project. Typical types of adverse effects include situations where:

1. the transmission line is in the distance but is significantly visible in the main public views of a historic resource or substantially visible in historically significant views from the historic resource;

2. the transmission line cuts directly through an existing or potential historic district and/or rural agricultural district/cultural landscape; or the transmission line goes directly through the domestic space of an individual resource.

The Project will require the demolition of one potentially contributing resource to a possible historic district. This is the only direct effect associated with the Project. At this time it does not appear that there will be adverse effects (direct or indirect) associated with the underground segments of the Project

6.1.27 Land Use, Orderly Development of the Region and Recreation

6.1.27.1 Land Use

Existing utility and transportation ROWs are proposed for 83% of the Project route, and therefore will not constitute a significant change to current land uses in these areas. For the portions of the Project where new ROW will be established, the new facilities will constitute a change from the current land use. These new ROW sections are located in the northernmost portion of the route and are quite remote, and the new line has been sited to minimize visual impacts. The approximately 32 miles of new above-ground right-of-way will be constructed between Pittsburg and Dummer and traverses sparsely populated land, which is primarily forested and managed for uses such as timber harvesting, recreation and a large energy facility. These uses will continue after construction. In addition, approximately eight miles of the Project in Pittsburg, Clarksville, and Stewartstown, and 52 miles from Bethlehem to Bridgewater, will be placed underground which will result in no permanent adverse impact on land uses along the ROW. Other industrial and commercial development, including the Granite Reliable Wind Park and the Balsams ski resort, are located in close proximity to the proposed route and are visible from many areas across the landscape.

By using existing ROW and transportation corridors, locating portions underground and placing the new right of way on sparsely populated land, away from settled areas, the Project will not have an adverse impact on prevailing land uses.

6.1.27.2 Orderly Development of the Region

The region in this case consists of over thirty communities and four different NH Regional Planning Commission (RPC) areas. Each RPC's long-range planning documents were reviewed to understand development goals and policies. In addition, local master plans from all of the corridor communities, river corridor management plans, scenic byway corridor management plans, and statewide plans such as the State Development Plan and the Climate Action Plan, were all reviewed and evaluated with respect to land use patterns and future development.

In most instances, the plans developed by local communities, RPCs and other entities do not directly relate to the construction or operation of the Project. Many of these plans cite the recommendation for new development to occur adjacent to already developed areas in order to protect open space and minimize environmental impacts from development. The Project is

consistent with this goal, and will not disrupt or interfere with the implementation of long-range plans.

The Project is mentioned in both the North Country Council ("NCC") and Southern New Hampshire Planning Commission's ("SNHPC") recently adopted regional plans. It is not mentioned in either the Lakes Regional Planning Commission or the Central NH Regional Planning Commission's regional plans. The Project has addressed the concerns of the NCC by burying the lines underground in key locations and utilizing existing ROW corridors. The SNHPC plan does not identify any specific concerns regarding the Project, but simply identifies it as an issue that the region may consider more closely in the future.

In addition to the regional plans, River Corridor Management Plans and other studies developed by the Local River Advisory Committees of the nine designated rivers within or near the Project area were evaluated, and the Project is consistent with these River Corridor Management Plans. Where the Project is within the existing ROW, the present river corridor uses will continue. The applicant will utilize BMPs to manage impacts of construction and operation throughout the Project area and will comply with state and federal permit requirements.

The Project is consistent with the goals and strategies of local, regional and state plans, and will not interfere with their implementation. The use of existing corridors for over 80% of the route, as well as the location of new right of way in a sparsely populated area where timber harvesting is the primary land use, will ensure the Project is consistent with the orderly development of the region.

The views of municipalities and the public have also been taken into consideration. The Project route utilizes existing transmission and roadway corridors and buries lines underground in many locations, including WMNF. In addition, the City of Franklin has expressed its support for the Project, including construction of the converter terminal facility.

6.1.27.3 Recreation and Tourism

The presence of transmission lines does not impact regional travel demand. Visitors come to New Hampshire because of the diversity of visitor experiences the state can provide, its ease of access and its general affordability. The presence, or absence, of transmission lines does not drive their fundamental decision to choose New Hampshire. Even for those New Hampshire visitors who have a negative attitude towards transmission lines, other destination factors are of far greater importance in their fundamental travel decision. While it is imaginable that the presence of power lines may be a factor in travel decisions for a very small number of New Hampshire visitors, on the overall scale of importance of the mix of destination attributes that influence visitors' choice of destination, the positive attributes of a destination far outweigh any speculative adverse effects.

Over 80% the Project is located along an existing corridor that has been used as a transmission or transportation for decades and will not have an adverse impact on existing passive and active recreational activities.

Short-term construction impacts would include closures of recreational resources and disruption of normal recreational activities and would be limited to the duration of construction, maintenance, and emergency repairs. Regarding impacts to trails, it is likely that trails would be closed at the trailhead during construction, limiting recreational use of portions of these trails beyond the portion directly impacted by construction activities. Short-term construction impacts of underground cable installation could persist for a longer duration, due to the more involved nature of construction

6.1.28 Air Quality

Air Quality Benefits

The Northern Pass Transmission Project will deliver clean, renewable hydroelectric energy which will contribute significantly to improved air quality in New Hampshire and the ISO-New England Region. Specifically, the Project will help meet air quality goals in New Hampshire and the region by reducing regional carbon dioxide (CO_2), nitrogen oxide (NO_x), and sulfur dioxide (SO_2) emissions. These reductions are projected to occur as energy delivered to New England by the Northern Pass Project displaces the production of older, less efficient generation, including fossil fuel-fired plants.

Implementation of the Project could have major, long-term beneficial impacts to air quality within the ISO – NE region by reducing annual criteria pollutants and GHG emissions. The Project may also help improve public health and the environment by helping to reduce ozone levels within New Hampshire and the ISO-New England region, and help the states, counties and local communities maintain or achieve attainment status for ozone as more stringent standards are adopted. Operation of the Project is expected to further reduce SO_2 emissions in New England and the state, improving public health, the environment and visibility. Since SO_2 and NO_x contribute to the formation of particulate pollution, reductions associated with Northern Pass Project will help to reduce particulate emissions, reduce the state's acid rain problem and help improve the health of New Hampshire's lakes, ponds and forests.

Air Quality Impacts

Construction of the Project will result in minor, short-term localized effects on air quality, primarily from fugitive dust (resulting from ground disturbance at work sites and vehicular movements on access roads along the ROWs) and from vehicular emissions associated with operating construction equipment. To minimize short-term adverse effects to air quality during construction, environmental monitors will review ongoing activities, verifying and documenting that appropriate preventative and proactive best management practices (BMPs) are being used and maintained. These practices may include mulching/covering stock piles and installing wind breaks to reduce the potential for the generation of wind-eroded particulates, using water trucks to suppress construction-related (fugitive) dust when necessary, and

installing crushed stone aprons at all access road entrances to public roadways to minimize tracking of soil onto public thoroughfares. In addition, vehicular emissions will be limited by requiring contractors to properly maintain construction equipment and vehicles. In addition to temporary impacts, there may be a potential reduction in carbon sequestering and storage capacity due to the loss of some forest cover as trees are cleared from the right-of-way and access roads. The July 2015 DEIS concludes that reductions in New Hampshire's heavily forested carbon sink will be minimal (Air Quality and Greenhouse Gas Technical Report).

No long-term adverse effects on air quality will result from the operation of the proposed transmission lines.

6.1.29 Public Health and Safety

The Project will not have an unreasonable adverse effect on public health and safety based on a sound, scientific review of noise and the electrical environment associated with the proposed Project.

6.1.29.1 Noise

The acoustic design goals recommended for the stationary facilities, which apply to all property lines, are very stringent, and well below the applicable local and New Hampshire state standards. Furthermore, as an extra margin of confidence, all existing occupied residences are set back from abutting property lines, and thus Project-related sound levels at the residences are expected to be lower than the acoustic design goals and the limits used by the local and state regulatory authorities. If sound produced by the proposed facilities meets the acoustic design goals, it will not have an unreasonable adverse effect on public health and safety.

Audible noise and radio noise were also evaluated for the AC and DC portions of the transmission line itself. The audible noise levels from the lines along the entire NPT route fall within the range of background audible noise that has been measured along the line route. The audible noise levels in fair weather along the entire NPT route are well below the 55 dBA Ldn, outdoor target value published by the Environmental Protection Agency (EPA, 1974) and also below the 40 dBA night time target value at a residence published by the World Health Organization (WHO 1999, 2009). The audible noise levels in foul weather along the NPT route also are well below the EPA guideline and also meet the WHO 40 dBA guideline except for three segments along the NPT AC line route (S1-13, S1-19 and S1-20) between the Franklin Converter Terminal and Deerfield Substation. However, the levels only occur during foul weather and are only a few dB above 40 dBA at the ROW edge; lower levels would be expected at residences, farther from the ROW edge.

Radio noise at 50 feet from the nearest conductor was calculated for fair and foul weather along the DC and AC portions of the Project route. Northern Pass will comply with good design practices to minimize RN (IEEE, 1971) and with the applicable Federal Communications Commission Rules and Regulations (Part 15, Section 15.25). Even though there are no state limits in New Hampshire on radio noise, the proposed line has been designed in a manner

consistent with the IEEE Radio Noise Design Guide for High-Voltage Transmission Lines (IEEE, 1971) that suggests 61 dBμV/m at a distance of 50 feet from an outside conductor as a design guide.

Construction noise was also evaluated. Construction of the Northern Pass Project will take place over a 27 month period. For the most part, construction activities will take place during daytime hours. The construction schedule will include many overlapping phases that will occur throughout the extent of the Project route. Due to the temporary nature of most construction components of this Project, construction noise is not expected to result in an unreasonable impact at sensitive receptors. During the detailed design process and during construction, areas where activities may occur for extended periods of time will be identified. The need for noise mitigation measures at these locations will depend on proximity to sensitive receptors and the anticipated duration of sound impact. Construction noise is difficult to control because of the mobile nature of its sources and the flexibility of schedule inherent in most construction. However, as a starting point, the following noise abatement measures will apply throughout the Project:

- The federal regulations that define limits for truck noise, for the sale of new trucks will be complied with.
- The construction equipment manufacturers' stock sound muffling devices will be used, and will be kept in good repair throughout the construction process.
- The majority of the potentially noisy construction work will be performed during daytime hours, and as permitted by local regulations.
- The Project will maintain communication with the communities during the construction process in order to inform of potential impact during construction, and to respond to community concerns..

6.1.29.2 Electrical Environment

The Project's evaluation considered exposures to electric and magnetic fields, static electric and magnetic fields, and space charge that will be associated with the operation of the NPT project and existing transmission and distribution lines.

At the edges of the right-of-way and beyond, these exposures are within the ranges commonly encountered from other sources. The levels of fields from the NPT 345-kV AC transmission line and the DC line, and space charge from the latter, are all below applicable limits in guidelines designed to protect public health. The evaluation additionally considered the mechanisms by which these exposures may interact with organisms and involved the review of the scientific studies of humans, experimental animals, livestock, wild animals, and plants. Neither this review nor the reviews of the literature performed for scientific and health agencies identified mechanisms of interaction or exposures at the levels associated with the electrical environment of the NPT project that would predict any likely harm to public health or the environment. The mostly likely effect, if it occurs at all, would be non-adverse perception of electric fields.

7 Mitigation Narrative and Agreement Form

Permanent and secondary impacts that are unavoidable due to safety, engineering, or landownership issues or constraints will be mitigated through a compensatory Natural Resource Mitigation Plan ("mitigation plan") included in Appendix G, which was developed with input from state and federal agencies, using federal regulatory wetland impact-to-mitigation ratios (higher option) as a starting point, and then adding additional components. The mitigation plan also includes mitigation for impacts to RTE species and wildlife.

The mitigation plan was developed in accordance with the New Hampshire Wetland Rules (Env-Wt 800) and federal regulatory rules for mitigation in New England under Section 404 of the Clean Water Act (40 CFR Part 230). It incorporates views of state and regional federal regulators with the NHDES Wetlands Bureau, USACE, the US EPA, NHFG, and USFWS per pre-application meeting discussions, as recorded in meeting and phone conversation notes.

The *NHDES Preliminary Mitigation Agreement Form* is included below. The Natural Resource Mitigation Plan is included in Appendix G.

NHDES PRELIMINARY MITIGATION AGREEMENT FORM

We, Robert P. Clarke, Director, Transmission Business Operations for Eversource Energy Service Corporation, as duly authorized agent for Northern Pass Transmission LLC; and Kevin F. McCune, Supervisor, Environmental Affairs Licensing and Permitting for Eversource Energy Service Corporation, as duly authorized agent for Public Service Company of New Hampshire d/b/a Eversource Energy ("for the Applicants"), by Lee E. Carbonneau of Normandeau Associates, Inc. ("Authorized Agent"), and the Department of Environmental Services ("DES") hereby agree to the process described below to streamline the review of Applicant's application for a permit under RSA 482-A.

A **Preliminary Mitigation** package is being submitted with the Standard Dredge and Fill Application in accordance with Env-Wt 501.06 and Env-Wt 800. The package contains the information required as outlined in the DES Compensatory Mitigation Checklist.

The preliminary mitigation proposal type is (please check one or more types):

___ Wetland Restoration
_X_ Upland Buffer Preservation
___ Wetland Creation
_X_ Payment into the Aquatic Resource Mitigation Fund following consideration of the three options noted above and determining them to not be feasible for complete mitigation.

By executing this agreement, DES agrees to accept Applicant's **Preliminary Mitigation** proposal for purposes of determining whether the application is administratively complete. However, the application will not be deemed complete if other basic information is missing, such as the required plans, attachments, and/or fees.

Applicant agrees to submit the final mitigation plans to DES for review by April 10, 2016.

Applicant and DES, by mutual agreement authorized under RSA 482-A:3, XIV(c)(3), agree to extend the response time for DES to review the final mitigation proposal, once received, to 60 days from receipt of the final mitigation plans.

The applicant agrees that if the information required under Env Wt 800 is not submitted by the date specified in this agreement or 120 days from a Request For More Information by DES, the application will be denied.

I, ___ Applicant _X__ Authorized Agent [check one] hereby certify that the information submitted with the application meets the **Preliminary Mitigation** requirements for the DES Wetlands Bureau to understand the nature and appropriateness of the proposed mitigation.

_____ _____
Signature of Applicant or Authorized Agent Date

The NHDES Wetlands Bureau agrees, by the signature below, that the information submitted meets the **Preliminary Mitigation** requirements, and that technical review of the mitigation proposal will not commence until the required items are submitted before or on the date noted above.

_____ _____
NHDES Wetland Mitigation Coordinator Date

Revised 6-26-07

8 NH NHB Review

Northern Pass, via Normandeau Associates, Inc. (Normandeau) and Burns & McDonnell (B&M), has maintained a current *Data Sharing Agreement for the Release of NH Natural Heritage Bureau Data* (DSA) since 2010 when initial field work for the Northern Pass Transmission Line Project (Northern Pass or Project) project was planned. The DSA includes several terms which are required to be followed to protect the sensitive data. A new DSA for 2015-2016 has recently been received. In addition, NHNHB provided a memorandum detailing the ongoing DSA and other coordination (see below).

The DSA covers access to full element occurrences in GIS shapefile format for rare, threatened and endangered species, sensitive species and exemplary natural communities and natural community systems. Bat hibernacula data have also been shared. In addition to the DSAs, Normandeau submitted survey methodology work plans to the NHNHB for review and comment. The development of the survey methodologies utilized the GIS data provided by the NHNHB along with other publically available data including soils and aerial imagery. Survey methodologies for project areas located within existing ROW between Northumberland and Deerfield are described in Normandeau's work plan dated April 2011, entitled Methodology for Survey of Rare Plant Species and Exemplary Natural Communities. The April 2011 work plan was reviewed and approved by NHNHB, USFWS, and USFS. In May 2014, Normandeau compiled an Addendum to the Methodology for Survey of Rare Plant Species and Exemplary Natural Communities, which describes proposed search methodologies for additional project areas not covered in the April 2011 work plan. The May 2014 addendum provides search methodologies for the following project areas: new ROW located between the US Border and Dummer; existing ROW located between Dummer and Northumberland, Deerfield to Scobie Pond Substation, and Scobie Pond to Lawrence Road Substation; and substation and transition station area properties. The May 2014 work plan addendum was reviewed and approved by NHNHB.

Normandeau continued to coordinate throughout the field survey and permitting portions of the Project. This included requests for additional NHNHB records and discussions regarding the avoidance and minimization of proposed impacts, and mitigation for impacts that cannot be avoided (in progress).

NEW HAMPSHIRE NATURAL HERITAGE BUREAU
DRED - DIVISION OF FORESTS & LANDS
PO BOX 1856 -- 172 PEMBROKE ROAD, CONCORD, NH 03302-1856
(603) 271-2214

To: William McCloy, Normandeau Associates, Inc.

From: Melissa Coppola, Environmental Information Specialist

Date: March 30, 2015

Subject: Northern Pass Database Request (NHB15-0611)

This memo is to confirm that Normandeau Associates have coordinated with the NH Natural Heritage Bureau (NHB) regarding information on known locations of rare species and exemplary natural communities for the Northern Pass project.

Due to the size and scope of the project, NHB is not providing a typical NHB review memo for permitting. Instead, this memo summarizes information provided by NHB to date, and notes that specific recommendations should be developed after project plans are close to being finalized:

- Normandeau was provided with digital data for the project under a data-sharing agreement dated 1/16/15 (397 digital NHB records). This is the sixth data-sharing agreement Normandeau has requested for this project: others were provided in 2010, 2011, 2012, 2013, and 2014 for project planning and ecological impact studies. NHB has also reviewed work plans associated with plant and community survey methodology on several occasions, including a meeting on 6/18/10.

- At the request of NHB, Normandeau consultants have conducted rare plant and natural community surveys within the proposed project area. If the project area extends to new locations, or new concerns are identified, additional surveys may be requested.

- As the project progresses and impacts areas are further clarified, Normandeau should set up a meeting with NHB staff to discuss avoiding and minimizing impacts to rare plant species and exemplary natural communities.

9 NH Programmatic General Permit (PGP) Requirements

In addition to this NH DES Wetlands Permit Application, Northern Pass will be submitting an Application for Department of the Army Permit, or Individual Permit, with the Army Corps of Engineers (Corps).

U.S. Army Corps of Engineers New Hampshire PGP Appendix B – Corps Secondary Impacts Checklist

US Army Corps of Engineers®
New England District

Programmatic General Permit (PGP)
Appendix B - 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 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 low lower 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 [insert state grid system] for the [insert state] [insert zone] 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, including vernal pools:
- Use Federal delineation methods and include Corps wetland delineation data sheets. See GC 2; Endnotes 1, 6, 7 and 15 in Appendix A; and www.nero.noaa.gov/hcd for eelgrass survey guidance.
- Appendix A, (e) 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 Programmatic General Permit (PGP)
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 PGP, 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.*		
2. Wetlands	Yes	No
2.1 Are there are streams, brooks, rivers, ponds, or lakes within 200 feet of any proposed work?		
2.2 Are there proposed impacts to SAS, shellfish beds, special wetlands and vernal pools (see PGP, GC 26 and Appendix A)? Applicants may obtain information from the NH Department of Resources and Economic Development Natural Heritage Bureau (NHB) website, www.nhnaturalheritage.org, specifically the book Natural Community Systems of New Hampshire.		
2.3 If wetland crossings are proposed, are they adequately designed to maintain hydrology, sediment transport & wildlife passage?		
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.)		
2.5 The overall project site is more than 40 acres.		
2.6 What is the size of the existing impervious surface area?		
2.7 What is the size of the proposed impervious surface area?		
2.8 What is the % of the impervious area (new and existing) to the overall project site?		
3. Wildlife	Yes	No
3.1 Has the NHB 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 a NHB determination.)		
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.		

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)?		
3.4 Does the project propose more than a 10-lot residential subdivision, or a commercial or industrial development?		
3.5 Are stream crossings designed in accordance with the PGP, GC 21?		
4. Flooding/Floodplain Values	Yes	No
4.1 Is the proposed project within the 100-year floodplain of an adjacent river or stream?		
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 minor or major impact project - a copy of the Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) shall be sent to the NH Division of Historical Resources as required on Page 5 of the PGP**		

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

More details for each question are included below.

1. Impaired Waters

Will any work occur within 1 mile upstream in the watershed of an impaired water?

The list of impaired waters crossed by the Project area is included below (Table 14). The Project is 192 miles long, and therefore crosses many streams and watersheds. The Project will be taking many steps to protect water quality and insure that no further impact will occur to impaired waters. Stormwater associated with the proposed transition stations, converter station, and existing substation expansions will be managed according to the NH Stormwater Rules.

All Project-related work in NH will follow the NHDES *Best Management Practices Manual For Utility Maintenance In And Adjacent To Wetlands And Waterbodies In New Hampshire*. For items not listed in the NH DES requirements, an approach similar to the *NU Construction & Maintenance Environmental Requirements Best Management Practices Manual: Connecticut* will be used. Additionally, Eversource Energy has a wetland Best Management Practice approach that all employees and contractors must be trained on and follow during construction activities. NPT contractors are required to follow all appropriate procedures specified by state law and all permit conditions when they are issued for the Project. Land clearing (forestry) contractors are required to comply with *Best Management Practices for Erosion Control on Timber Harvesting Operations in New Hampshire* (2004) authored by the New Hampshire DRED.

Blasting contractors will be required to adhere to the conditions specified in the Certificate of Site and Facility to be issued by the NH SEC will also observe local municipal ordinances. NHDES has produced technical publication WD-10-12 Rock Blasting and Water Quality Measures That Can Be Taken to Protect Water Quality and Mitigate Impacts which outlines BMPs to protect water quality before and during blasting activities.

With respect to managing stormwater to protect sensitive wetlands and habitats during site preparation activities, NPT's contractors are required to follow the BMPs detailed in the NH Stormwater Manual (NHDES, 2008) and adhere to the conditions specified in the Certificate of Site and Facility to be issued by the NH SEC. At the federal level, the Project will require a CGP through the USEPA NPDES Phase II program. A significant component of the CGP involves development and implementation of a SWPPP to govern site-specific construction activities and guide the required management of stormwater pollutants and sediments using BMPs both during and after construction is completed on the site until stabilization is achieved.

List of impaired waters crossed by the Northern Pass Project

A list of impaired waters within one mile of the Project would be expansive, and given the efforts to avoid and minimize water resources impacts, and the erosion control and construction BMPs that will be enforced during construction, additional detrimental effects to already impaired downstream waters are not anticipated. Table 15 lists the impaired waters crossed by the Project.

Table 15. List of Impaired Waters Crossed by Project

Name	Town	Impairment
Halls Stream	Pittsburg	Lead
Connecticut River	Pittsburg	Lead
Bishop Brook–Pond Brook	Clarksville	Escherichia coli
Burnside Brook–Unnamed Brook	Lancaster	pH
Indian Brook	Lancaster	pH
Otter Brook–Unnamed Brook	Lancaster	Fishes Bioassessments (Streams)
Israel River	Lancaster	pH
Johns River–Unnamed Brook	Dalton	pH
Unnamed Brooks–From Forest Lake to Burns Pond	Whitefield	pH
Ammonoosuc River	Bethlehem	pH
Baker Brook–Unnamed Brook	Bethlehem	Fishes Bioassessments (Streams)
Wild Ammonoosuc River	Easton/Woodstock	pH
Pemigewasset River	Woodstock, Bridgewater, New Hampton, Bristol, Hill	Aluminum, pH, Dissolved Oxygen Saturation
West Branch Brook	Campton	Aluminum
Unnamed Brook to Beebe River	Campton	Escherichia coli
Bog Brook	Campton	Aluminum
Baker River	Plymouth	Escherichia coli
Squam River	Ashland	Benthic-Macroinvertebrate Bioassessments (Streams)
Hayward Brook	Concord	Fishes Bioassessments (Streams)
Turtle Pond	Concord	pH
Bear Brook–Pease Brook	Allenstown	pH
Lamprey River	Deerfield	Dissolved Oxygen Saturation
Back Creek–Unnamed Brook	Deerfield	pH

Name	Town	Impairment
North Branch River	Raymond	pH
Unnamed Brook–Onway Lake	Raymond	Benthic-Macroinvertebrate Bioassessments (Streams)
Shields Brook	Londonderry/Derry	Chloride

2. Wetlands

Are there are streams, brooks, rivers, ponds, or lakes within 200 feet of any proposed work?

There are 315 perennial streams, 358 intermittent streams, 414 ephemeral streams and one named pond within the Project limits, which include the proposed and existing transmission line ROW, nine site developments (six transition stations, two existing substation expansions, and one converter station), and the ORARs. These were delineated in the field, and in most cases will have at least a temporary access road within 200 feet or be crossed by one. The complete list of is included in the Wetlands, Rivers, Streams and Vernal Pools Resource Report and Impact Analysis, which is found in Appendix B to this wetlands application. The list of named streams and ponds within the Project limits is included in Table 16, below:

Table 16. Named Waterbodies and Streams Crossed by the Project*

COÖS COUNTY		
PITTSBURG	Roaring Brook	**STARK**
Connecticut River	South Valley Brook	Phillips Brook
Halls Stream	Sugar Hill Brook	Rowells Brook
CLARKSVILLE	Swift Diamond River	Upper Ammonoosuc River
Connecticut River	Welch Brook	**NORTHUMBERLAND**
Favreau Brook	**DIXS GRANT**	Dean Brook
Pond Brook	South Valley Brook	Roaring Brook
STEWARTSTOWN	Swift Diamond River	**LANCASTER**
Bishop Brook	**MILLSFIELD**	Israel River
East Branch Mohawk River	Clear Stream	Otter Brook
Haines Brook	Millsfield Pond Brook	**DALTON**
DIXVILLE	Newell Brook	Chase Brook
Dixie Brook	**DUMMER**	Johns River
Flume Brook	Lord Brook	
Nathan Pond Brook	Newell Brook	
GRAFTON COUNTY		
BETHLEHEM	Underhill Brook	**CAMPTON**

Ammonoosuc River	Wild Ammonoosuc River	Bog Brook
Baker Brook	**WOODSTOCK**	West Branch Brook
Barrett Brook	Beaver Brook	**PLYMOUTH**
Black Brook	Clay Brook	Baker River
Indian Brook	Glover Brook	Glove Hollow Brook
	Gordon Pond Brook	**ASHLAND**
SUGAR HILL	Hubbard Brook	Pemigewasset River
Indian Brook	Leemans Brook	Squam River
FRANCONIA	Lost River	**BRIDGEWATER**
Coppermine Brook	Smith Brook	Abel Brook
Gale River	Stark Falls Brook	Pemigewasset River
EASTON	Stony Brook	Squam River
Black Brook	Underhill Brook	**BRISTOL**
Clay Brook	Wild Ammonoosuc River	Abel Brook
Ham Branch	**THORNTON**	Pemigewasset River
Kendall Brook	Bagley Brook	Tenmile Brook
Reel Brook	Burleigh Brook	
Slide Brook	Hubbard Brook	
BELKNAP COUNTY		
NEW HAMPTON	Dry Brook	Wallace Brook
Blake Brook	Pemigewasset River	
MERRIMACK COUNTY		
HILL	**CANTERBURY**	Pettingill Brook
Needle Shop Brook	Bryant Brook	Soucook River
Pemigewasset River	Cold Brook	**ALLENSTOWN**
FRANKLIN	**CONCORD**	Little Bear Brook
Bennett Brook	Burnham Brook	Pease Brook
Chance Pond Branch	Hayward Brook	Suncook River
Merrimack River	Mill Brook	
Punch Brook	Soucook River	
Shaw Brook	Turtle Pond	
NORTHFIELD	**PEMBROKE**	
Merrimack River	Ames Brook	
ROCKINGHAM COUNTY		
DEERFIELD	North Branch River	**LONDONDERRY**
Hartford Brook	**CHESTER**	Beaver Brook
Lamprey River	Preston Brook	Shields Brook

Nicholls Brook	**DERRY**	
RAYMOND	Beaver Brook	
Fordway Brook	Shields Brook	

Are there proposed impacts to SAS, shellfish beds, special wetlands and vernal pools?

The Northern Pass Project will have no impacts to shellfish beds. However, there will be minor permanent impacts to:

1. Freshwater marshes (a type of Special Aquatic Site) – minor permanent impacts associated with new structures, and additional temporary impacts associated with temporary access roads and crane pads;
2. Special Wetlands, including:
    a. permanent impacts to a calcareous seepage swamp in Pittsburg at the site of Transision Station 1 that was identified by Normandeau biologists as a potential Exemplary Natural Community but not listed by NHB (for which mitigation is proposed);
    b. minor permanent impacts to several floodplains, but no change in flood storage;
    c. minor permanent impacts to several peatlands, with some additional temporary and secondary impacts associated with access roads and crane pads (for which mitigation is proposed);
    d. minor permanent impacts to four vernal pools, with some additional temporary and secondary impacts to pools and buffers (for which mitigation is proposed); and
    e. minor permanent direct and indirect impacts to wetlands with threatened or endangered species (for which mitigation is proposed). Please see Table 13, above.

Please see the attached Wetlands, Rivers, Streams and Vernal Pools Resource Report and Impact Analysis (Appendix B) for details regarding these impacts.

If wetland crossings are proposed, are they adequately designed to maintain hydrology, sediment transport & wildlife passage?

Yes. All wetland crossings are proposed to be temporary, and will utilize timber mats wherever possible (if frozen ground conditions are not present). Any other type of temporary fill, should it be necessary, will be placed on geotextile and removed from the Project area after construction. Streams and other areas of horizontal flow will be accommodated through the utilization of temporary timber mat bridges and allow for hydrology, sediment transport and wildlife passage. Erosion controls, such as straw waddles, will be used around matting in wetlands so as to not form a wildlife barrier like silt fence does.

Would the project remove part or all of a riparian buffer?

As part of the secondary impact assessment, all proposed clearing of canopy trees within 100 feet of a perennial stream, within 50 feet of an intermittent stream, and within 25 feet of an ephemeral stream has been measured on design plans and tabulated. In accordance with verbal guidance from the US EPA, 15% of the calculated area has been added to the permanent direct wetland impacts and this total amount of impact at the required federal compensation ratios has been addressed in the mitigation package for the Project. See the attached Natural Resource Mitigation Plan (Appendix G).

Clearing of tree species within riparian buffer areas will be necessary to safely accommodate the proposed NPT Project, especially in areas where an existing transmission line ROW is not present. Portions of the Project that are located within existing transmission line and road ROWs are already subject to routine maintenance clearing and limited additional clearing will be required in riparian buffers. Cleared areas will not be stumped or grubbed and ground disturbances will be minor. Timber matting will be used during clearing activities within or over delineated wetlands and near streams. Some tree clearing near streams at the edges of the ROW and within riparian buffers will be required, however low-growing shrub and other common riparian species will remain and it is anticipated that these species will colonize newly opened areas with limited impacts to riparian habitat.

The overall project site is more than 40 acres.

Yes. The total Project area, including ROW areas, transition station, substation and converter station footprints encompasses approximately 4,325 acres.

What is the size of the existing impervious surface area? What is the size of the proposed impervious surface area? What is the % of the impervious area (new and existing) to the overall project site?

The existing impervious area within the entire Project ROW has not been precisely quantified, but is estimated at approximately 294 acres. Most of the existing impervious area is comprised of the existing public roadways within the portions of the Project that will be installed underground; the remainder of the area is generally undeveloped ROW which is generally pervious. The proposed impervious area includes the nine development sites (33.7 acres of impervious area) and new structures (approximately 1.52 acres) yielding a total of approximately 35.3 acres of new impervious area. The percent of impervious area (new and existing) to the overall project site is approximately 7.6-percent.

3. Wildlife

Has the NHB 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?

Normandeau Associates has received data from the NHB regarding RTE wildlife, and completed wildlife and habitat surveys using protocols reviewed by state and federal agencies. While impacts to RTE wildlife are expected to be minimal, some mitigation for habitat loss is being proposed. Please see the Vegetation and Ecological Communities Report, Rare, Threatened and Endangered Plants and Exemplary Natural Communities Report, and the Wildlife Resources Report in Appendices C, D and E.

Would work occur in any area identified as either "Highest Ranked Habitat in N.H." or "Highest Ranked Habitat in Ecological Region"?

Yes. Since the Project area extends from the U.S. Border with Canada down to southern New Hampshire, it does intersect Highest Ranked Habitat in many locations. Consultations with state and federal resource agencies, field surveys, and habitat assessments have been conducted. Please see the Wildlife Report and Natural Resource Mitigation Plan for details (Appendices E & G).

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)?

Yes. The Project will include forest clearing of more than 20 acres of undeveloped land blocks where new ROW is proposed between Pittsburg and Dummer in addition to the proposed permanent and temporary water resource impacts. However, the site developments that are located in undeveloped areas are smaller than 20 acres. The largest site development associated with the Project, the converter terminal in Franklin, is located in a former campground, which includes some minor existing site development, including gravel roads, camp sites, and similar features. The construction envelope (LOD) will be approximately 15.9 acres. The transition station LOD envelopes range from 0.9 acres to 3.1 acres and the substation expansions at the existing Deerfield and Scobie Pond Substations total 8.4 and 3.2 acres, respectively.

Does the project propose more than a 10-lot residential subdivision, or a commercial or industrial development?

The Northern Pass is a proposed 192 mile transmission Project that will carry 1,090 MW of renewable hydroelectric power from Canada to New Hampshire (NH) and greater New England. The Project will construct 157 miles of direct-current (DC) transmission line in New Hampshire from the Canadian border to a converter terminal to be built in Franklin, NH. There it will be converted to AC and sent via a 34 mile AC transmission line to a substation in Deerfield. There, it will connect to the New England power grid, which serves all customers in the region.

The Project is a utility project and not considered "commercial" or "industrial."

Are stream crossings designed in accordance with the PGP, GC 21?

Yes. The majority of stream crossings will be temporary and not impact the bed of banks of the streams, with the exception of where temporary culverts may be needed during construction to facilitate the equipment needed to install the new structures. Stream crossings will be made using timber matting and surrounded by appropriate erosion control BMPs. These areas will be inspected during construction and maintained as appropriate. Matting will be removed promptly when no longer needed.

4. Flooding/Floodplain Values

Is the proposed project within the 100-year floodplain of an adjacent river or stream?

Yes, several transmission structures are located within the 100 year floodplain of various streams in the ROW corridor. These poles are not expected to have an effect on the flood storage capacity of the floodplain. None of the nine site developments are located within floodplain areas. Overall, the Project will not result in any loss of flood storage capacity.

If 4.1 is yes, will compensatory flood storage be provided if the project results in a loss of flood storage?

No flood storage capacity will be lost due to the new structures or the underground portions of the Project within floodplains and therefore compensatory flood storage will not be provided.

5. Historic/Archaeological Resources

For a minor or major impact project–a copy of the Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) shall be sent to the NH Division of Historical Resources as required on Page 5 of the PGP

The Project has been coordinating with NH DHR throughout development. The Project has two RPR numbers form DHR–one for the NPT Project team, and one for the DOE. Considerable survey work for archaeological and historical resources in accordance with Section 106 of the Historical Preservation Act and the SEC requirements for assessing effects of the Project on such resources have been conducted and these studies will continue until the Section 106 process is complete. Phase I-A Archaeological Resource Reports have been provided the NH DHR and the USACE as they have been completed. See Section 9.2, below.

NH Division of Historic Resources (NHDHR) Coordination

All archaeological survey by NPT followed NH DHR Standards and Guidelines. All archaeological survey followed the Section 106 review process and consultation was established with the NH DHR. Several meetings were held with NHDHR to discuss the field protocols, APE, and the coordination with the DOE and their archaeological and historical experts. The USACE and the DOE participated in several of these meetings. Phase I-A and Phase I-B

Archaeological Reports have been submitted to NH DHR and approved. The DOE is the lead federal agency for the NPT Project, and is therefore responsible for Section 106 compliance.

Endangered Species Act

Northern Pass has coordinated with the NH F&G and USFWS throughout Project development. Northern pass has completed the necessary wildlife-related studies for targeted species identified by the NH F&G and the USFWS. The results of these studies and the estimated impact of the Project on each species studied are summarized in the Wildlife Resources Report in Appendix E. The Project will impact one federally listed species (Karner blue butterfly) and a Section 7 consultation is required. The DOE is the lead federal agency for the NPT Project, and is therefore responsible for consulting with USFWS for the formal Section 7 compliance.

10 Designated River Check (RSA 482-A:3,I(d)(2))

The Project will cross six designated rivers that are currently protected under the Rivers Management & Protection Act (RMP)(RSA 483), including the Connecticut River, Ammonoosuc River, Pemigewasset River, Upper Merrimack River, and the Upper Lamprey and North Branch Rivers which are a part of the designated Lamprey River Watershed.

A complete copy of this application has been sent via certified mail to the Local River Advisory Committee (LAC) for each designated river. Contacts are listed below and were updated in September 2014[39]. Copies of the receipts from the mailing are included below.

Connecticut River Headwaters Local Advisory Subcommittee
Edwin Mellett, Chair
1165 Lost Nation Road
Groveton, NH 03582
goldenrockfarm@hotmail.com
636-2630

Ammonoosuc River Local Advisory Committee
Charlie Ryan, Chair
95 Dodge Road
Littleton, NH 03561-3426
cryan1940@gmail.com
444-2398
991-3913 (cell)

Pemigewasset River Local Advisory Committee
Max Stamp, Chair
2110 Summer St.
Bristol, NH 03222
hmstamp@metrocast.net
http://www.lakesrpc.org/pemi_overview.asp
744-8223

Upper Merrimack River Local Advisory Committee
Michele L. Tremblay, Chair
PO Box 3019
Boscawen, NH 03303
MLT@naturesource.net

[39] http://des.nh.gov/organization/divisions/water/wmb/rivers/lac/documents/lac_contacts.pdf

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City, State, ZIP+4: Candia, NH. 03040-0037

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Street, Apt. No.; or PO Box No.: 165 Lost Nation Rd. Headwaters
City, State, ZIP+4: Groveton, N.H. 03582

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USPS DOWNTOWN STATION MANCHESTER NH 03101

Sent To: Charlie Ryan, Chair, Ammonoosuc River Comm
Street, Apt. No.; or PO Box No.: 95 Dodge Road
City, State, ZIP+4: Littleton, NH 03561-3426

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Street, Apt. No.; or PO Box No.: PO B 3019
City, State, ZIP+4: Boscawen, NH 03303

PS Form 3800, June 2002 — See Reverse for Instructions

www.merrimackriver.org/
796-2615

Lamprey Rivers Local Advisory Committee
(*includes Upper Lamprey and North Branch Rivers*)
Richard Snow, Chair
P.O. Box 10037
Candia, New Hampshire 03040-0037
rherbertsnow@netscape.net
www.lampreyriver.org/
483-2722