

December 30, 2016

VIA HAND-DELIVERY AND EMAIL

Pamela G. Monroe, Administrator
New Hampshire Site Evaluation Committee
21 South Fruit Street, Suite 10
Concord, NH 03301-2429

**RE: New Hampshire Site Evaluation Committee Docket No. 2015-06
Joint Application of Northern Pass Transmission, LLC and
Public Service Company of New Hampshire d/b/a Eversource
Energy for a Certificate of Site and Facility for Construction of
a New High Voltage Transmission Line in New Hampshire**

Dear Ms. Monroe:

Enclosed for filing in the above-captioned matter with the New Hampshire Site Evaluation Committee is the Direct Pre-Filed Testimony of Raymond Lobdell, including Exhibits 1-3, submitted on behalf of the Society for the Protection of New Hampshire Forests.

Copies of this letter and its enclosure have this date been forwarded via email to all parties on the Distribution List.

If you have any questions or concerns, please do not hesitate to contact us.

Very truly yours,



Nicole M. Manteau
Firm Administrator

Enclosures

cc: Distribution List (Rev. 12/27/2016) via email
Client



THE STATE OF NEW HAMPSHIRE
SITE EVALUATION COMMITTEE
DOCKET NO. 2015-06

APPLICATION OF NORTHERN PASS TRANSMISSION LLC
AND PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE
D/B/A EVERSOURCE ENERGY
FOR A CERTIFICATE OF SITE AND FACILITY

PRE-FILED DIRECT TESTIMONY OF RAYMOND LOBDELL

ON BEHALF OF THE SOCIETY FOR THE PROTECTION OF
NEW HAMPSHIRE FORESTS

DECEMBER 30, 2016

1 **Q: Please state your name and business address.**

2 A: Raymond D. Lobdell, 88 Gale Chandler Road, Landaff, NH 03585.

3 **Q: What is the name of your organization?**

4 A: Lobdell Associates, Inc.

5 **Q: What is your current position?**

6 A: President and sole owner.

7 **Q: What are your qualifications?**

8 A: I have more than 30 years of experience in the soil and wetland science
9 fields, including environmental assessment, permitting, and monitoring on energy-related
10 projects. Prior to forming Lobdell Associates, Inc., I held several positions including soil
11 conservationist with the U.S. Department of Agriculture, hazard mitigation specialist with
12 the Federal Emergency Management Agency (reservist), and environmental planner with
13 two regional planning commissions. I hold a Master's Degree in Soils and Hydrology from
14 the University of New Hampshire and a Bachelor's Degree in Biology from the University
15 of Vermont. I am a certified soil scientist and a certified wetland scientist in New
16 Hampshire. Please see attached Resume at Exhibit 1 for further details.

17 **Q: What is the purpose of your testimony?**

18 A: The purpose of my testimony is to review and assess the proposed 192-mile
19 transmission line project with respect to wetlands and associated environmental impacts.

20 **Q. What have you considered to prepare this testimony?**

21 A: I considered the following:

22 1. Documents and information exchanged between DES and the Applicants
23 that were publicly available;

1 2. Applicable statutes and regulations;

2 3. Portions of the Application dated October 19, 2016, including:

3 a. Project Overview Maps;

4 b. Executive Summary;

5 c. U.S. Army Corps of Engineers Individual Wetlands Permit

6 Application;

7 d. N.H. Department of Environmental Services Wetlands

8 Application;

9 4. Department of Energy NEPA documents, including:

10 a. Draft Project Environmental Impact Statement Summary, July

11 2015;

12 b. Draft Environmental Impact Statement, Volume 1: Impact

13 Analyses, July 2015:

14 c. Draft Environmental Impact Statement, Volume 2: Appendices,

15 July 2015:

16 d. Draft Environmental Impact Statement, Supplement, November

17 2015;

18 e. Related Technical Reports And Visual Resources;

19 5. Correspondence among federal agencies, including a letter from the U.S.

20 Environmental Protection Agency to the Region 1 Army Corps of Engineers dated

21 July 14, 2016;

22 6. U.S. Army Corps Highway Methodology Workbook Supplement Sept.

23 1999;

1 7. State and Federal Permits and application materials, and other information
2 associated with the Clean Power Link project approved to be located in Vermont;

3 8. Various online tools, such as Web Soil Survey, Google Maps, N.H. Granit,
4 etc.

5 9. Attended technical sessions on Natural Resources with Robert Varney,
6 Jacob Tinus, Lee Carbonneau, Dennis Magee, Sarah Barnum on September 20,
7 22, and October 18, 2016; and

8 10. Various pleadings to and decisions from the Site Evaluation Committee,
9 discovery information, and more.

10 **Q. Have you considered any information associated with this proposed project**
11 **provided on or after December 15, 2016?**

12 A. No, I have not. I was not able to review any such information. I may do so in
13 supplemental pre-filed testimony.

14 **Q. Have you considered any information associated with data requests resulting**
15 **from technical sessions of the Applicants' witnesses?**

16 A. No, I have not. I was not able to review any such information. I may do so in
17 supplemental pre-filed testimony.

18 **Q. What is your overall opinion of the project as it has been proposed with**
19 **respect to wetland impacts?**

20 A. The route proposed by the Applicants is not the one with the least impact to
21 wetlands or surface waters. The Wetlands Application does not directly address whether the
22 proposed route is the least impacting alternative. The project as proposed would have
23 unreasonably adverse impacts to wetlands throughout the State of New Hampshire and their

1 related functions and values relative to water, wildlife habitat, and other wetland values and
2 functions.

3 **Q. Please explain the basis for your opinion that the Wetlands Application does**
4 **not directly address whether the proposed route is the least impacting alternative?**

5 A. There are a number of reasons. First, an alternative studied in the Draft Northern
6 Pass Transmission Line Project Environmental Impact Statement Supplement¹ (“Supplement”)
7 which buries the project along existing highway right of ways (Alternative 4a) would have
8 significantly less impact than the proposal. The proposed project calls for 95 acres of wetland
9 impact. However, Alternative Number 4a calls for only 10.1 acres of wetland impacts.

10 Second, the proposal as it exists today is different than the original proposal in that they
11 propose to bury an additional 52 miles along state highways from Bethlehem to Bridgewater.
12 The impacts to wetlands in this buried section are virtually none compared to any other section
13 where the project is above ground.

14 Third, a similar HydroQuebec project in Vermont, called the Clean Power Link, recently
15 received State of Vermont, federal Army Corps of Engineers’, and Presidential permits. The
16 Clean Power Link, at 154 miles in length, is comparable to the proposed Northern Pass. Of the
17 154 miles, 97 miles will be under Lake Champlain and the entirety of the remaining 57 miles
18 will be buried within existing roadways, rather than constructed overhead. In the 57 miles buried
19 along roadways, there are no permanent wetland impacts and only 2.2 acres of temporary
20 wetland impact.

21 The NH Wetlands Application does not include any consideration of this.

¹ US Department of Energy, Draft Northern Pass Transmission Line Project Environmental Impact Statement Supplement, November, 2015.

1 **Q. How do wetland impacts of the proposed Northern Pass compare for buried**
2 **versus overhead portions.**

3 A. Wetland impacts are substantially less in the buried sections. Let us compare the
4 wetland impacts within two sections of the proposed transmission line. First, section UG-Central
5 is the 52.3 mile section proposed to be buried within roadway corridors from Bethlehem to
6 Bridgewater. Second, section N2 is the 30.2 mile section just to the north, which is proposed to
7 be overhead and above ground within the existing PSNH right-of-way.

8 In every wetland impact category the buried section minimizes and often avoids wetland
9 impacts. On a per mile basis the total wetland impacts for the buried UG-Central section are 71
10 square feet per mile compared to 90,828 square feet per mile for the overhead N2 section. This is
11 an extremely large difference in impact.

12 In fact, when discussing the buried UG-Central section in the application, the Applicants
13 state that burying “substantially reduced impacts on sensitive plant communities, wildlife habitat,
14 wetlands, and streams along that entire stretch of the route” and “... reduced direct, permanent
15 wetland impacts by approximately 0.6 acres, reduced temporary impacts by over 30 acres, and
16 reduced secondary impact to wetlands, stream and vernal pools by over 70 acres.”²

17 **Q. Quantitatively, how does the proposed Northern Pass project compare with**
18 **the Clean Power Link Project with respect to wetlands impacts?**

19 A. The Clean Power Link wetland permit calls for no permanent wetland impacts
20 along the entire 57 mile overland portion and approximately 2.29 acres of temporary wetland and
21 wetland clearing impacts (1,755 square feet per mile). The proposed Northern Pass Wetland
22 Application calls for 2.5 acres of permanent wetland impacts (567 square feet per mile) and 139

² Normandeau Associates Inc., *Northern Pass Project Natural Resource Mitigation Plan*, 10/2015, page 2-2.

1 acres of temporary wetland impacts (31,535 square feet per mile) for Northern Pass, as proposed.
2 This is a 2.5 acre difference in permanent impacts and a 136.7 acre difference in temporary
3 wetland impacts.

4 Additionally, the Clean Link Project obtained an individual permit from the U.S. Army
5 Corp of Engineers which allows, for the entire 154 mile route, no permanent impacts and 5.93
6 acres of temporary wetland and stream impacts (4.5 acres of temporary wetland impacts and 1.43
7 acres of temporary stream bottom impacts).³ This compares to NP's proposed federal impacts of
8 2.53 acres of permanent impact and 139.96 acres of temporary impacts. Thus, on a per mile
9 basis, the proposed Vermont project avoids all permanent wetland impacts and substantially
10 more temporary impacts by burying the entire overland portion of the line.

11 **Q. Aside from quantity and square footage of impacts, are there any other**
12 **wetland impacts to consider?**

13 A. Yes, impact to wetland functions and values. The proposed project is not the least
14 impacting alternative for the majority of the 13 functions and values considered. According to
15 the Applicants, no principal wetland functions and values are permanently impacted in the buried
16 Section UG Central.⁴ In the above ground In Section N2, for example, of the 13 wetland
17 functions evaluated, 12 have permanent impacts which are critical to wetland ecosystem
18 functioning including: groundwater recharge, floodflow, fish and shellfish habitat,
19 sediment/toxicant retention, nutrient removal, production export, sediment/shoreline
20 stabilization, wildlife habitat, recreation, uniqueness/heritage, visual quality aesthetics, and

³ US Army Corps of Engineers, Region 1, Wetland Permit No. NAE-2-13-2689, January 29, 2016.

⁴ Normandeau Associates Inc., *Northern Pass Transmission Project Wetlands, Rivers, Streams, and Vernal Pools Resources Report and Impact Analysis*, October, 2015. Section 4.7.1, page 4-25.

1 endangered species habitat.⁵ Burying the line along road rights-of-way not only decreases the
2 number of wetland impact sites and spatial extent of those impacts; it also significantly decreases
3 impacts to wetland functions and values.

4 **Q. Would burying the proposed line along existing transportation corridors be**
5 **the least impacting alternative?**

6 A. Yes. Burying the entire proposed transmission line within existing transportation
7 corridors would be by far the least impacting alternative for the proposed Project. Of course,
8 burying the line with blasting and/or trenching must be done with care. Nevertheless, whether
9 directional drilling, trenching, and even if blasting is needed, burial along existing transportation
10 corridors would have less wetlands and environmental impacts than would the placement of the
11 transmission line on towers above ground within existing and new utility rights-of-way.

12 The project as proposed calls for the disturbance of 1,011 acres of land and impacts to
13 over 141 acres (6,061,013 square feet) of wetlands and streams. If the entire line was buried,
14 assuming similar overall impacts on a per mile basis as shown above for Section UG-Central,
15 wetland impacts could be reduced from 141 acres to 10 acres or less and overall land
16 disturbance could be reduced from over 1,000 acres to less than 300 acres—and these impacts
17 would occur along existing roadways. This would represent a two-thirds reduction in land
18 disturbance and possibly a 90% or more reduction in total wetland impacts. The configuration
19 that maximizes avoidance of and minimizes impacts to wetlands and has the least overall impact
20 to water resources is a route that buries the entire line along existing transportation corridors.

21 **Q. Do others share your opinions?**

⁵ Normandeau Associates Inc., *Northern Pass Transmission Project Wetlands, Rivers, Streams, and Vernal Pools Resources Report and Impact Analysis*, October, 2015, Section 4.5.1, Table 46.

1 A. Yes. Both the federal Department of Energy (“DOE”) and the Environmental
2 Protection Agency Region 1 (“EPA”) have expressed similar opinions.

3 The DOE, in its Supplement,⁶ analyzed 12 project alternatives. Under the Department of
4 Energy analysis, the proposed project (Alternative 7) indicates wetland impacts of 95 acres of
5 direct, temporary, and secondary wetland impacts. Six of the other alternatives disturb less
6 wetland than the proposed alternative. Alternatives 4a, 4b, and 4c (underground in roadway
7 corridors) impact 10.1, 10.3, and 10.1 acres of wetland respectively. This represents a ninefold
8 decrease in wetland impacts compared to the proposed route. The Supplement also analyzed a
9 number of other environmental impacts, some of which relate to wetland functions and values. In
10 its Supplement, the DOE found that most of the impacts are significantly less in the bury
11 alternatives (alternatives 4a, 4b, and 4c) than in the proposed project.

12 Second, in a letter about the proposed project dated July 14, 2016, the EPA stated that
13 putting the cable underground next to existing highways would cause less damage to wetlands
14 and upland habitat and that Alternative 7 (the proposed alternative) cannot pass the alternatives
15 test required for a federal permit.

16 The Supplement and letter from EPA are attached as Exhibits 2 and 3.

17 **Q. Are there other ways the Applicants could reduce wetland impacts?**

18 A. While there are actions that could be taken to impact less wetland, such as more
19 off-right-of-way access roads (“ORARs”) to divert heavy equipment around wetlands and
20 additional site information about organic soil extent to avoid impacting them, the only way to
21 significantly reduce the 140 acres of wetland impacts is to bury the line along highway right of

⁶ US Department of Energy, Draft Northern Pass Transmission Line Project Environmental Impact Statement Supplement, November, 2015.

1 ways.

2 **Q. Why minimize wetland impacts since the Applicants state that most are only**
3 **temporary impacts?**

4 A. The temporary wetland impacts proposed by Northern Pass are substantial both
5 in extent of acreage and impacts to wetland functions and values. Most of the temporary impacts
6 are related to the construction of temporary access roads and other construction-related uses,
7 such as work pads within the utility ROW, with proposed temporary impacts lasting up to 3
8 years, according to the Applicants. The amount of temporary wetland impacts is significant and,
9 while they are classified as temporary, some may in fact be permanent.

10 **Q. What leads you to conclude that some wetland impacts the Applicants**
11 **characterize as temporary may in fact be permanent?**

12 A. Several things. First, according to the Applicants, of the 139 acres of temporary
13 wetland impact, 42.35 acres are within wetlands with organic and/or very poorly drained soils.
14 Some of these wetlands may have organic and/or very poorly drained soil over 20 feet deep and
15 saturated to the surface or ponded. Impacts to these soils can include compaction and rutting
16 which can lead to hydrologic discontinuity within the wetland, changes in water chemistry, and
17 alterations to plant and animal habitat. Disturbed wetlands with organic soil are not easily
18 restored and severe soil disturbance may permanently alter wetland hydrology. This is a very
19 significant amount of impact. Consider that 42 acres of impact is equivalent to 17 miles of a 20-
20 foot wide access road through some of the wettest wetlands.

21 **Q. Have the Applicants addressed impacts to these 42 acres of organic and very**
22 **poorly drained soil wetlands?**

23 A. No. The actual extent of impact is not known since the 42 acres is the Applicants'

1 estimate and not based on actual delineation of organic or very poorly drained soils in the field,
2 but on information from the county soil surveys which are only general in nature. The Applicants
3 have not submitted any detailed, site specific information which allows us to know how many of
4 these crossings are proposed, their extent, or anything about the soil morphology of each of these
5 sensitive wetland areas. Thus, we know little about the depth or type of organic matter, depth or
6 type of existing root mat, soil compactability, underlying mineral soils, or hydrology.

7 **Q. Should we be concerned about impacts to wetlands with organic and very**
8 **poorly drained soil?**

9 A. Yes. The Applicants propose to use wood mats and/or fabric and gravel to cross
10 these very wet areas. These measures may or may not be adequate to prevent heavy equipment
11 being bogged down or wetland rutting or compaction. If the matting is not sufficient to support
12 the weight of the vehicles the mats may sink into the organic soil, potentially causing severe and
13 permanent damage to the wetland root mat and organic soil morphology. Also, the longer the
14 mats are in place and the more heavy equipment crosses them, the more wetland impact can
15 occur.

16 The Applicants also indicate they plan to cross wetlands on frozen ground “as much as
17 possible”.⁷ Depending on the winter, some wetlands may freeze, while others may not. A heavy
18 vehicle entering the ROW on frozen ground could experience unfrozen ground further down the
19 road. If heavy equipment is used on unfrozen sections or during mud season there could be
20 significant, permanent compaction of the organic soils and permanent damage to wetland
21 morphology and functions and values. It would be difficult to minimize impacts particularly with

⁷ Normandeau Associates Inc. , *Northern Pass Transmission Project Natural Resource Mitigation Plan*, October, 2015, pp 2-7.

1 the length of the some of the proposed wetland crossings, their remoteness, and the length of
2 time the temporary impacts may be in place.

3 When you permanently compact organic soils and change soil morphology soil chemistry
4 and hydrology can be altered leading to changes in wetland soil structure and biotics. If this
5 occurs, these impacts are no longer temporary, but have become permanent, resulting in a less
6 valuable wetland.

7 **Q. Will the Applicants restore impacts to wetlands with organic and very poorly**
8 **drained soil?**

9 A. Even though the Applicants propose to restore impacted wetlands with organic
10 and very poorly drained soil after construction by removing the access roads, the project
11 structures would have to be maintained for the long-term⁸. This means that roads, including
12 crossings of wetlands with organic and very poorly drained soil, would need to be reconstructed
13 to carry this out. Also, the improvement to access roads within the utility ROW resulting from
14 this proposed project may increase recreational vehicle use and cause the restored wetlands to be
15 re-impacted continuously. Additionally, when decommissioning takes place the roads would
16 have to again be reconstructed to accommodate the large equipment necessary to remove the
17 structures. Thus wetland functions and values would be repeatedly impacted for decades.

18 Furthermore, if after removing mats or gravel/fabric wetland crossings there are still
19 depressions in the wetland, the Applicants state that “In the event that additional soil is needed to
20 meet grades (in restored wetlands) commercially acquired topsoil or salvaged wetland topsoil

⁸ Northern Pass Transmission, LLC and Public Service Company of New Hampshire, *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*, October, 2015. Section 6.1.19.2. pp 69.

1 will be evaluated for project use”.⁹ Adding limited amounts of topsoil to restore wetlands is a
2 normal practice as often the topsoil has been removed. However, in this case most, if not all of
3 the original organic soil, should still be in place, only compacted. Covering the original surface
4 layers, particularly the root mat at the upper level of organic soil, with additional fill to achieve
5 pre-existing elevations could significantly alter the wetlands morphology and thus its functions
6 and values. In fact, the placing of commercially acquired topsoil over the natural organic soil
7 surface horizon may act like fill and lead to permanent wetland impact rather than restoration.

8 **Q. How does the Applicants’ wetland restoration plan address these issues?**

9 A. Only in a very general manner. Restoration should mean restoring the wetland to
10 its pre-existing condition. That means the wetland should have its soil morphology restored, be
11 restored to its pre-existing elevation, and have its functions and values reestablished. Unless all
12 of the previous characteristics of the wetland are restored, the restoration is not complete and the
13 impact is permanent. The Applicants have not provided detailed information on the over 800
14 wetland restoration sites. The restoration plan submitted provides no site by site existing
15 conditions information that would be important for not only restoration, but also to minimize
16 impacts during layout and construction. This includes site elevations, topography, photos, test
17 pits, soil borings, and vegetative inventories to determine organic material depth, existing
18 vegetation, etc. It would be very difficult to assess if restoration has actually been accomplished
19 without this information.

20 **Q. Does the Applicant call for monitoring of the wetland restoration to insure its**
21 **success?**

⁹ Normandeau Associates Inc., *Northern Pass Transmission Project Natural Resource Mitigation Plan*, October, 2015. pp 4-1.

1 A. Wetland restoration cannot be deemed successful for 3 to 5 growing seasons after
2 the work is complete. Monitoring should be required each growing season during that period and
3 any issues addressed by doing remedial work. Based on my review of the application, the type,
4 frequency, duration, or qualifications of restoration monitors has not been detailed in the
5 application. Without detailed restoration plans, premised on site-specific pre-existing conditions
6 information for each site, restoration monitors would have a difficult time determining if a
7 restoration site had been successfully restored. Additionally, because of the length of many of
8 the access roads without any off-ROW access, if a wetland restoration site is deemed to need
9 remedial work, access to it with equipment most likely would mean re-impacting additional
10 wetland to get to the site.

11 **Q. Does anyone else share your concerns about the significance of the proposed**
12 **temporary impacts?**

13 A. In the same letter mentioned above, the EPA raised concerns that the temporary
14 wetland impacts can be substantial in size and remain long after the fill is removed and that soil
15 compaction can alter the movement of surface and groundwater resulting in a change in wetland
16 type and some cases result in changing wetland to upland.

17 **Q. Have all wetland impacts been identified?**

18 A. I do not think so. The Applicants have indicated that the number or location of all
19 storage areas, staging areas, laydown areas, other off site yards, and other construction-related
20 areas have not been accounted for. The Applicants also state that if additional ORARs are
21 needed “appropriate permit amendments would be requested”.¹⁰ Proposed locations for

¹⁰ Normandeau Associates Inc., *Northern Pass Transmission Project Wetlands, Rivers, Streams, and Vernal Pools Resource Report and Impact Analysis*, October, 2015, pp 4-3.

1 alternative accesses to structure sites should be part of the application. Many of the ORARs now
2 proposed are in commercial forests and the roads were permitted for only forest management and
3 wetland impacts may need to be permitted for the change of use. In order to properly assess
4 overall wetland impacts of this project, all the impacts should be identified and both the extent of
5 impact and the impact to functions and values quantified during the permitting process not after
6 the permits are issued.

7 **Q. Have the Applicants adequately assessed wetland functions and values?**

8 A. No. The wetland functions and value assessment is inadequate for a project
9 impacting over 800 wetlands as summarized in Appendix B of the report “Wetlands, Rivers,
10 Streams, and Vernal Pools Resources Report and Impact Analysis (10/1/2115) by Normandeau
11 Associates.

12 The USACE “Highway Methodology” (USACE, 1999) was used to evaluate 13 functions
13 and values for each of the over 1800 wetlands in the proposed project area, then wetlands were
14 “rated based on a cumulative score where principal functions or values =2 and suitable functions
15 or values = 1. Any wetland with a score of 14 or greater was considered of high quality”.¹¹

16 This is a misapplication of the methodology. The USACE Highway Methodology states
17 clearly that principle functions and values should be evaluated individually and that numerical
18 methods should not be used and “[i]n no case, however, should arbitrary weighting be applied to
19 wetland functions, or should dissimilar functions be ranked”¹². Using the Applicants’ system for
20 assessing functions and values, only about 2% of the wetlands assessed were rated as “high

¹¹ Normandeau Associates Inc., *Northern Pass Transmission Project Wetlands, Rivers, Streams, and Vernal Pools Resources Report and Impact Analysis*, October, 2015. pp 2-3.

¹² US Army Corps of Engineers New England District, *The Highway Methodology Workbook Supplement*, September, 1999. pp 8.

1 quality”, a very low percentage in my opinion.

2 **Q. Did the Applicants assess all wetlands for functions and values?**

3 A. It appears that the Applicants assessed only the area of wetland within the right of
4 way, not the entire wetland complex. This may show wetlands to have less value than if the
5 entire wetland were evaluated. Thus, the assessment needs to be expanded to include the entire
6 wetland complex, not just a small portion of the wetland. For example, a wetland in Lancaster
7 near the Northumberland town line (Wetlands #LC57) is shown to be only 0.3 acres in size and
8 not a high value wetland in Appendix B.¹³ However, looking at the revised wetland delineation
9 on the new Project Maps, Wetland #LC57 is in fact part of a several hundred acre wetland
10 complex with high functional values. Appendix B needs to be revised and the wetland functional
11 assessment redone to provide a true assessment of wetland functions.

12 **Q. Is it appropriate to for regulators to request redesign of proposed projects**
13 **for purposes of avoiding, minimizing, or mitigating wetland impacts?**

14 A. Yes. Projects often have to be altered, re-configured, or redesigned to minimize
15 and avoid wetland impacts. Without viewing alternative layouts it’s difficult to determine if the
16 proposed plan is the least impacting. This often occurs during the wetland application view
17 process.

18 **Q. Aside from state wetland permitting, what other wetland permitting is**
19 **associated with this project?**

20 A. A federal Section 404 wetlands permit is necessary for this project from USACE.
21 Additionally wetlands and water resource impacts are also part of the consideration in granting

¹³ Normandeau Associates Inc., *Northern Pass Transmission Project Natural Resources Mitigation Plan Appendix B. Summary of Delineated Wetlands and Proposed impacts*, October, 2015.

1 the federal Presidential Permit to construct the proposed line across the US-Canada border.

2 **Q Have these permits been issued?**

3 A. No. According to the EPA letter of July 14, 2016, which I mentioned previously,
4 the EPA recommended that federal permits not be issued for this project as proposed. The
5 recommendation is primarily based on their conclusion that there are alternatives available that
6 would have less environmental impacts.

EXHIBIT 1



LOBDELL ASSOCIATES, INC.

Environmental & Community Planning

Sampling of Raymond Lobdell's Energy and Linear Project Experience

- **New England Power
HydroQuebec**

Provided environmental services for two years on the northern 60 miles of Phase II N.E. Power's Hydro Quebec \$400 million DC power line project in Northern New Hampshire from Littleton south, including daily monitoring of construction, erosion and sediment control planning and layout, wetland restoration, responding to landowner and community complaints, and permit condition compliance as required by state and federal agencies.

- **Noble Environmental Power
Granite Reliable Power Wind Farm**

Provided environmental services for planning and permitting 33 wind turbines and associated transmission lines and access roads in northern New Hampshire. Services included coordinating 12 wetland scientists to complete an accelerated delineation and classification of wetlands, prepared wetland functional assessment of impacted wetlands and vernal pools, prepared wetland accepted mitigation assessment and plan to mitigate the proposed 13.5 acres of wetland impact, participated in pre- and post- wetland application meetings at the state and federal level, and testified as an expert witness before the NH Site Evaluation Committee (SEC).

- **Portland Pipe Line Corporation
Portland Montreal Line**

Portland Pipe Line has two crude oil pipe lines that carry oil from Portland, Maine to Montreal, Quebec, a segment of which is located on a right of way across Coos County, NH. Lobdell Associates has been under contract with Portland Pipe Line Corporation for over 10 years providing environmental services on an as needed basis with regard to pipe repair and

maintenance projects including permitting and environmental compliance monitoring of major stream crossing repairs, stream bank restoration and stabilization, and pipe inspections in wetlands.

- **New England Power Company**

Wetland functional assessment and classification for New England Power for wetlands associated with the three hydroelectric dams on the Connecticut River as part of the Fifteen Mile Falls FERC re-licensing application. Developed innovative methodology for assessing wetland functional impacts within wetlands adjoining and impacted by reservoir draw downs.

- **New Hampshire Electric Cooperative**

Provided environmental monitoring and stream bank restoration planning for a new transmission line at South Peak at Loon Mountain Ski Area in Lincoln, NH.

- **Littleton Water and Light Department**

Provided wetland mapping and permitting services for projects related to waterline improvements and in-stream water supply structures.

- **Bethlehem Precinct**

Provided wetland mapping and permitting services for projects related to waterline improvements and in-stream water supply structures.

Description of Firm

Lobdell Associates is a small environmental and community planning firm located in northern New Hampshire which specializes in providing environmental and natural resource planning services to a variety of clients including state agencies, cities, towns, utilities, precincts, conservation districts, land trusts, architects, lawyers, developers, surveyors and engineers. Principal Raymond Lobdell performs most of the company's work personally. Specific services provided include:

- Wetland delineation and classification.
- High intensity soil surveys.
- Wetland permitting at the state and federal level.
- Environmental assessments including NEPA.
- Wetland mitigation assessment and planning.
- Wetland restoration and creation plans.
- Vernal pool inventories and creation planning.
- Shoreland permitting and restoration planning.
- Construction monitoring for erosion, environmental, and land use permit compliance.
- Watershed and river corridor plans.
- Town natural resource inventories and prime wetland studies.
- Town and city master plans.
- Town and city zoning ordinance/regulation drafting.

For over 25 years Lobdell Associates has offered environmental and planning services in northern New Hampshire and statewide, developing innovative assessment and evaluation methodologies for our clients.

Resume

RAYMOND LOBDELL

Raymond Lobdell, principal of **LOBDELL ASSOCIATES INC**, combines a technical natural resource background with practical experience in rural land use planning. At Lobdell Associates, Inc., and prior placements, he has worked over 30 years in New Hampshire and Vermont. As a consultant, wetland/soil scientist, soil conservationist and community planner, he has experience in all phases of resource mapping and evaluation, site planning and environmental construction monitoring. Mr. Lobdell teaches and lectures on resource issues and has developed several innovative land use planning programs.

SKILLS

Environmental Assessment - Mitigation Assessment - Shoreland Protection- Soil Mapping - Wetland Mapping - Erosion & Sediment Control - Gravel Pit Restoration - Natural Resources Inventories - Impact Assessment - Environmental Monitoring

EDUCATION

B.A. Biological Sciences, University of Vermont (1971)

M.S. Soils and Hydrology, University of New Hampshire (1975)

USDA-SCS, Training Programs in Erosion & Sediment Control, Conservation Planning, and Soil Mapping (1982-87)

Wetland Mapping, graduate course, University of Massachusetts (1989)

US Army Corps of Engineers Wetlands Delineator Certification Program, UNH (1994)

AFFILIATIONS

NH Board of Natural Scientists-Soil Science Society of Northern New England (Past President) - Soil and Water Conservation Society (VT/NH Chapter Past President) - New Hampshire Planners Association (past member) - Certified Soil Scientist (New Hampshire) - Certified Wetland Scientist (New Hampshire) - Certified Soil Erosion and Sediment Control Specialist (American Society of Agronomy)

SAMPLING OF ACTIVITIES

Wetland mapping, permitting, functional assessment, and mitigation planning for the proposed Granite Reliable Wind Farm in northern New Hampshire.

Environmental Construction Monitoring, 60 miles of Phase II of N.E. Power's Hydro Quebec DC power line project in Northern New Hampshire, including daily monitoring of construction, erosion and sediment control planning and layout, wetland restoration, abutter and municipal relations, complaints, permit condition compliance, etc. as required by federal and state regulators.

Wetland function assessment for New England Power for 15 Mile Falls FERC re-permitting.

Wetland Permitting and Construction Monitoring for the Portland Pipe Line Corporation for the past 12 years on a variety of wetland and stream crossings for crude oil pipe lines in Coos County.

Route 2 Corridor Study (Phase II) for the NH Office of State Planning and NHDOT.

Environmental mapping, assessment, planning, and permitting for a variety of local and state departments and agencies including: NHDOT, NHF&G, NHOEM, DRED, NHDES, Littleton Water & Light, Colebrook School District, Lancaster Water Department, Franconia Elementary School, Towns of Easton, and Town of Bethlehem.

Ammonoosuc River Corridor Study Project Coordinator for successful application to NHDES and NH Legislature for river designation.

Environmental Construction Monitoring for several projects including South Peak at Loon Mountain (Lincoln) , Baker Hill Golf Course (Newbury), Mittersill Expansion at Cannon Mountain, Jericho Windpark (Berlin) and Gile Housing Project (Hanover).

Author of a 38 page booklet on shoreland protection, funded by NH-DES through Section 319 of the Clean Water Act.

Environmental Assessments for several major subdivisions and developments, including Langley Cove (Laconia), Wal-Mart (Tilton) and the Fenwood Subdivision (New London).

Teaching graduate and graduate level courses for the UNH School of Life Long Learning in Community Planning, Soils & Community Planning and Soil Morphology. Also, lecturing throughout the state on shoreland protection.

PUBLICATIONS/REPORTS

Mitigation Banking Feasibility Study-Ammonoosuc River Corridor Study-Natural Resource Inventory-Newbury, NH- Planning Study/Buildout Analysis For Paugus Bay-NH Emergency Operations Plan Mitigation Annex - Blueprint For Shoreland Protection - A Natural Resources

Planning Study of Wells, Vt. - Wetlands of the North Country, A Community Guide - Wetlands of Hampstead, NH, Inventory and Evaluation - Agriculture in the North Country, A Community Planning Guide- Land Evaluation and Site Assessment System for Agricultural Land - Interim Soil Survey Reports, Plaistow and Hampstead, NH - Model Soil Based Lot Size Regulation for NH - Soil Potential for Development in Grafton County - Environmental Impact Statement, Restationing of Troops from Korea * - Seasonal Population Study of the Mt. Washington Valley, Prime Wetlands Study - Franconia, NH; Prime Wetlands Study - Lancaster, NH; Water Resources Plan - Lancaster, NH. * Portions of report

PLANNING STUDIES

Town Master Plans: Deerfield, Berlin, Whitefield, Enfield, Haverhill, Chesterfield, Conway, Lisbon, Bethlehem, Landaff, Wolfeboro.

Town Resource Inventories: Lancaster, Littleton, Bethlehem, , Franconia, Newbury, Wolfeboro, Salem, Hampstead, Enfield, Bristol, Haverhill, Sunapee, Laconia, Wells (VT).

Ordinance Drafting: Jefferson, Milan, Randolph, Shelburne, Rumney, Stark, Whitefield, Campton, Carroll, Clarksville, Columbia, Brookfield, Deerfield, Eaton, Franconia, Conway, Jackson, Salem, Sugar Hill, Hampstead, Kingston, Plaistow, Landaff, Littleton.

Subdivision Review & Environmental Assessment: Randolph, Jefferson, Lancaster, Littleton, Haverhill, Lisbon, Sugar Hill, Franconia, Hanover, Piermont, Jackson, Bath, Conway, Albany Nottingham, Plaistow, Atkinson, Kingston, New Durham, Ossipee, Tuftonboro, Wolfeboro, Merrimack, New Durham, Gilmanton, Barnstead, Moultonboro, Plymouth, Rumney, Bristol, Lebanon, Hampstead, Laconia, New Hampton.

PROFESSIONAL HISTORY

Environmental Consultant: 1987-present

Disaster Reservist: Federal Emergency Management Agency, 1990-2003

As a disaster reservist, prepared NEPA environmental assessments and responded to declared federal disasters to assist communities and individuals in disaster mitigation including flood proofing, relocation planning, stormwater management, and erosion control. Responded to disasters including Mid-west floods of 1993, Hurricane Bob, San Francisco Earthquake, Allagash Ice Jam , and floods in Kentucky, Connecticut, Vermont and New Hampshire.

Soil Conservationist: USDA Soil Conservation Service 1982-87

Assisted landowners and units of government in developing erosion and sediment control plans and installing practices to solve natural resource and land use related problems. Planned, designed and inspected contraction of manure storage facilities, waste management systems,

ponds, diversions, water ways, drainage systems, and other erosion control best management practices.

Community Planning Coordinator: North Country Council, Franconia, NH 1978-82

The North Country Council is the regional planning and economic development agency for northern New Hampshire. Responsible for administering the land use planning activities of the Council, including master planning, ordinance drafting and solid waste planning, establishing work programs, drafting grant proposals, and acting as legislative liaison for land use and municipal legislation which might impact the region. Supervised from one to six staff members.

Environmental Impact Specialist: The Mitre Corporation, McLean, VA 1978

Worked on several NEPA environmental impact statements prepared for the US Army Corps of Engineers by the Mitre Corporation, including the environmental impact of returning 200,000 U.S. troops from Korea to several U.S. bases. Duties included preparing various sections of EIS's and on-site evaluations at army bases throughout the country.

Environmental Planner: So. Rockingham Reg. Plan. Comm., Salem, NH 1975-77

As part of an interdisciplinary team involved with the "208" water quality program, soil mapped over 25,000 acres, inventoried wetlands and modeled recreational lakes. Also worked to revise state statutes relating to wetlands and groundwater, as well as wrote model zoning regulations based on land capability, which have since been used by towns throughout the State. In addition, performed over 50 on-site environmental assessments for residential subdivision, town landfills, septage disposal areas, gravel pits, and hazardous waste facilities.

EXHIBIT 2



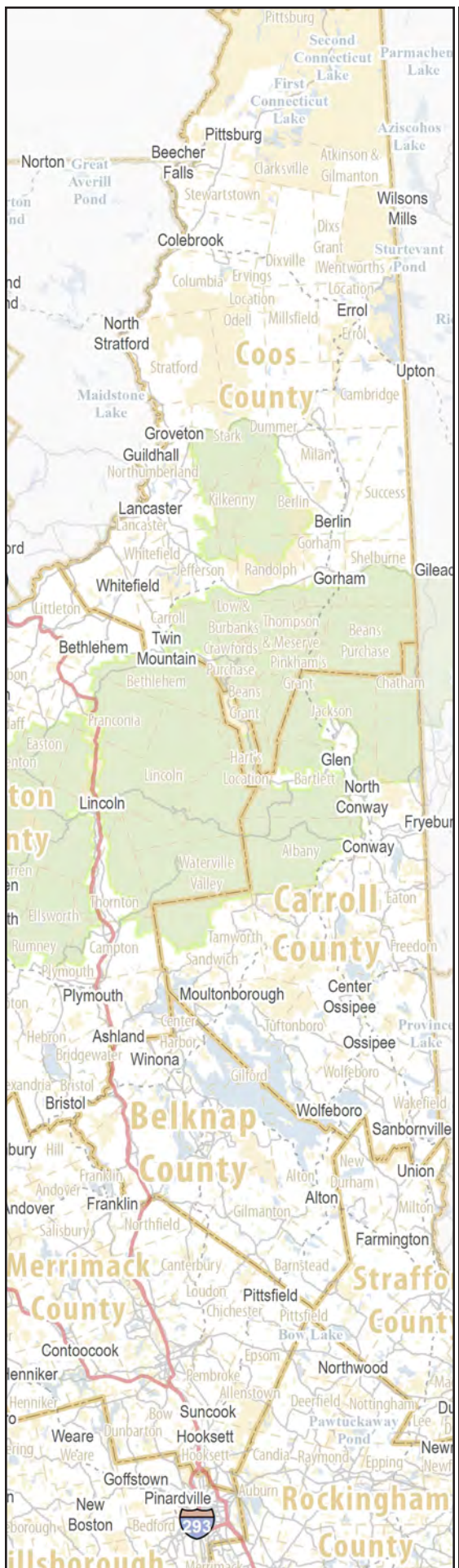
DOE/EIS-0463-S1

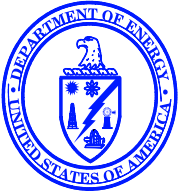
DRAFT

**NORTHERN PASS
TRANSMISSION LINE PROJECT
ENVIRONMENTAL IMPACT STATEMENT
SUPPLEMENT**

**U.S. DEPARTMENT OF ENERGY
OFFICE OF ELECTRICITY DELIVERY
AND ENERGY RELIABILITY
WASHINGTON, DC**

NOVEMBER 2015





Department of Energy
Washington, DC 20585
November 2015

Dear Sir/Madam:

The U.S. Department of Energy (DOE) has prepared a *Supplement to the Draft Northern Pass Transmission Line Project Environmental Impact Statement* (DOE/EIS-0463-S1) pursuant to the National Environmental Policy Act (NEPA) of 1969 as amended (42 U.S.C. 4321 et seq.), the Council on Environmental Quality (CEQ) NEPA regulations (40 CFR §§1500-1508), and the DOE NEPA implementing procedures (10 CFR §1021).

On August 31, 2015, the DOE received an amendment to the July 31, 2013, Presidential permit application for the Northern Pass Transmission Line Project proposed by Northern Pass, LLC which made changes to the proposed project. Specifically, the August 2015 amendment proposes to bury an additional 52 miles (84 km) of the transmission line, shift the international border crossing location by less than 100 feet (30 m), construct new transition stations (one in Bridgewater, NH, and one in Bethlehem, NH, to transition the line between overhead and underground), change the project size from 1,200 megawatts (MW) to 1,000 MW, and incorporate other design changes (e.g., change in converter technology and type of cable).

DOE invites public and agency comment on the Draft EIS and the Supplement to the Draft EIS. These documents are available online at <http://www.northernpasseis.us/>.

The public comment period to receive comments on the Draft EIS and the Supplement to the Draft EIS is extended to close 45 days after the U.S. Environmental Protection Agency publishes a notice of its availability in the *Federal Register*.

DOE will conduct public hearings on the dates identified below to receive comments on the Draft EIS and the Supplement to the Draft EIS in the following locations: Tuesday, December 15, 2015 in Whitefield, NH; Wednesday, December 16, 2015 in Concord, NH; and Thursday, December 17, 2015 in Plymouth, NH.

Hearing information will be announced in the *Federal Register* and in local media, and will be posted on the project website, <http://www.northernpasseis.us/>. The Draft EIS and the Supplement to the Draft EIS are available on this website and DOE's NEPA website at <http://energy.gov/nepa/environmental-impact-statements-eis>.

Printed hard copies and CD copies of the Supplement to the Draft EIS will be sent to those who requested to receive the Draft EIS in those formats. Printed hard copies and CD copies are also available for public review at locations specified here: http://media.northernpasseis.us/media/DraftEIS_Hard_Copy_Locations.pdf.

Comments on the Draft EIS and the Supplement to the Draft EIS can be submitted verbally during public hearings or in writing to Mr. Brian Mills at: Office of Electricity Delivery and Energy Reliability (OE-20), U.S. Department of Energy, 1000 Independence Avenue, SW, Washington, DC 20585; via e-mail to draftEIScomments@northernpasseis.us; or on the project website at <http://www.northernpasseis.us/>. Please mark envelopes and electronic mail subject lines as "Northern Pass Draft EIS Comments." Written comments must be received no later than 45 days after the notice of availability is published in the *Federal Register*. Comments submitted after that date will be considered to the extent practicable.

Sincerely,

A handwritten signature in blue ink, appearing to read "B. Mills", is positioned above the name Brian Mills.

Brian Mills
National Electricity Delivery Division,
Office of Electricity Delivery and Energy Reliability
U.S. Department of Energy

DRAFT

**NORTHERN PASS TRANSMISSION LINE PROJECT
ENVIRONMENTAL IMPACT STATEMENT
DOE/EIS-0463-S1**

Supplement

**U.S. DEPARTMENT OF ENERGY
OFFICE OF ELECTRICITY DELIVERY
AND ENERGY RELIABILITY**



COOPERATING AGENCIES

**United States Forest Service – White Mountain National Forest
United States Environmental Protection Agency– Region 1
United States Army Corps of Engineers – New England District
New Hampshire Office of Energy and Planning**

November 2015

COVER SHEET

RESPONSIBLE FEDERAL AGENCY: U.S. Department of Energy (DOE), Office of Electricity Delivery and Energy Reliability

COOPERATING AGENCIES: United States Forest Service (USFS) – White Mountain National Forest (WMNF); United States Environmental Protection Agency (EPA) – Region 1; United States Army Corps of Engineers (USACE) – New England District; and New Hampshire Office of Energy and Planning (NHOEP)

TITLE: Supplement to the Northern Pass Transmission Line Project Environmental Impact Statement (DOE/EIS-0463-S1)

LOCATION: Coös, Grafton, Belknap, Merrimack, and Rockingham counties in New Hampshire

CONTACTS: For additional information on this supplement contact:

Mr. Brian Mills, National Environmental Policy Act (NEPA) Document Manager
Office of Electricity Delivery and Energy Reliability, OE-20
U.S. Department of Energy
1000 Independence Ave. SW
Washington, DC 20585
Telephone: (202) 586-8267
Brian.Mills@hq.doe.gov

For general information on the DOE NEPA process, please write or call:

Ms. Carol M. Borgstrom, Director
Office of NEPA Policy and Compliance, GC-54
U.S. Department of Energy
1000 Independence Ave. SW
Washington, DC 20585
askNEPA@hq.doe.gov
Telephone: (202) 586-4600 or leave a message at (800) 472-2756

ABSTRACT: Northern Pass Transmission, LLC (Northern Pass) has applied to the DOE for a Presidential permit to construct, operate, maintain, and connect a 192-mile (309-km) electric transmission line across the United States (U.S.)/Canada border in northern New Hampshire (NH). The draft EIS analyzes potential environmental impacts from the proposed project (as described in the amended Presidential permit application filed by Northern Pass Transmission, LLC [Northern Pass] on July 1, 2013) and the range of reasonable alternatives (collectively referred to as “the Project”). In August 2015 subsequent to the publication of the draft EIS, Northern Pass submitted a “Further Amendment to Presidential Permit Application” which made changes to Northern Pass’ proposed project. In light of the August 2015 amendment to the application, this supplement identifies the revised proposal (hereafter referred to as “Alternative 7”), rather than Alternative 2, as the Proposed Action. This supplement to the draft EIS addresses the potential environmental impacts of Alternative 7 in comparison to the No Action Alternative and nine additional action alternatives analyzed in the draft EIS (Alternatives 2 through 6, with variations). The NH portion of Alternative 7 would be a single circuit ± 300 kilovolt (kV) high voltage direct current (HVDC) transmission line running approximately 158 miles (254 km) from the U.S. border crossing with Canada in Pittsburg, NH, to a new direct current-to-alternating current (DC-to-AC) converter station to be constructed in Franklin, NH. From Franklin, NH, to the Project terminus at the Public Service of New Hampshire’s existing Deerfield Substation located in Deerfield, NH, the

Project would consist of 34 miles (55 km) of 345 kV AC electric transmission line. The total length of the Project would be approximately 192 miles (309 km).

PUBLIC COMMENTS: In preparing the draft EIS and this supplement, DOE considered comments received during the scoping period, which extended from February 11, 2011 to June 14, 2011, and was reopened from June 15, 2011 to November 5, 2013 (DOE accepted and considered all comments during the scoping period from February 11, 2011 to November 5, 2013). Additional comments were received during 11 public meetings that took place throughout the same time period in the following communities: Pembroke, Franklin, Lincoln, Whitefield, Plymouth, Colebrook, Haverhill, and Concord, NH. Comments received during this period were considered during preparation of the draft EIS and this supplement.

The draft EIS and this supplement analyze the potential environmental impacts of DOE issuing a Presidential permit for the proposed Northern Pass Project, which is DOE's proposed federal action. DOE will use the draft EIS and this supplement to inform its decision on whether to issue a Presidential permit. Additionally, Northern Pass has applied to the USFS for a special use permit (SUP) authorizing Northern Pass to construct, operate, and maintain an electric power transmission line crossing portions of the WMNF. The WMNF Forest Supervisor will use the draft EIS and this supplement to inform its decision regarding: 1) whether to issue a SUP under the Federal Land Policy and Management Act; 2) the selection of an alternative; 3) any need to amend the Forest Plan; and 4) what specific terms and conditions should apply if a SUP is issued.

Copies of the draft EIS and this supplement are available for public review at 30 local libraries and town halls, or a copy can be requested from Mr. Brian Mills. The draft EIS and this supplement are also available on the Northern Pass EIS website (<http://www.northernpasseis.us/>).

DOE invites comments on the draft EIS and this supplement during the comment period that began with the publication of the EPA's Notice of Availability in the *Federal Register*. As a result of Northern Pass' revision to its proposal, DOE issued a notice of intent to prepare this supplement to the draft EIS (80 Fed. Reg. 58725 [September 30, 2015]). In the same notice, DOE also announced that the public comment period on the draft EIS would be extended to December 31, 2015, to allow for public comment on the draft EIS and this supplement, and DOE announced that public hearings which were to be held in October 2015 would be rescheduled. The comment period on the draft EIS, including this supplement, closes 45 days after publication by the U.S. Environmental Protection Agency (EPA) of the notice of availability of this supplement. In addition to comments on the draft EIS, DOE is seeking public input with respect to the cultural and historic property information presented in the draft EIS in accordance with its cultural and historic property review under Section 106 of the National Historic Preservation Act.

The EIS website (<http://www.northernpasseis.us/>) provides information on the rescheduled public hearings to be held at several locations in New Hampshire during the comment period. Comments on the draft EIS (including this supplement) and Section 106 may be submitted on the EIS website (<http://www.northernpasseis.us/>), sent via email to draftEIScomments@northernpasseis.us or Section106comments@northernpasseis.us, sent to Mr. Brian Mills at the physical address above, or provided verbally or in writing at a public hearing. Written and oral comments will be given equal weight, and any comments received after the comment period ends will be considered to the extent practicable.

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LIST OF ACRONYMS

AC	alternating current
ANST	Appalachian National Scenic Trail
APE	area of potential effects
APM	applicant proposed measure
CO	carbon monoxide
CO ₂	carbon dioxide
dBA	A-weighted decibels
DC	direct current
DOE	(United States) Department of Energy
EIS	environmental impact statement
EMF	electric and magnetic field
EO	Executive Order
EPA	(United States) Environmental Protection Agency
ESA	Endangered Species Act
FE	federally-endangered
FEMA	Federal Emergency Management Agency
FT	federally threatened
ha	hectare
HVAC	high-voltage alternating current
HVDC	high-voltage direct current
I-	Interstate
ISO-NE	New England Independent Systems Operator
km	kilometer
kV	kilovolt
m	meter
MA	Management Area
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NH	New Hampshire
NHB	(New Hampshire) National Heritage Bureau
NHFG	New Hampshire Fish and Game
NO _x	nitrogen oxides
NRHP	National Register of Historic Places
PSNH	Public Service of New Hampshire
RFSS	Regional Forester Sensitive Species
SO ₂	sulfur dioxide
SE	state-endangered
ST	state-threatened
U.S.	United States
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
WMNF	White Mountain National Forest
ZVI	zone of visual influence

SUPPLEMENT TO THE DRAFT NORTHERN PASS TRANSMISSION LINE PROJECT ENVIRONMENTAL IMPACT STATEMENT

1 INTRODUCTION

In July 2015 the Department of Energy (DOE) issued the draft Northern Pass Transmission Line Project Environmental Impact Statement (draft EIS) (80 Fed. Reg. 45652 [July 31, 2015]). The draft EIS analyzes potential environmental impacts from the proposed project (as described in the amended Presidential permit application filed by Northern Pass Transmission, LLC [Northern Pass] on July 1, 2013) and the range of reasonable alternatives (collectively referred to as “the Project”).

In August 2015 subsequent to the publication of the draft EIS, Northern Pass submitted a “Further Amendment to Presidential Permit Application” which made changes to the Applicant’s proposed project. Specifically, the August 2015 amendment proposes to bury an additional 52 miles (84 km) of the transmission line in roadway corridors between Bethlehem and Bridgewater, New Hampshire (NH).¹ Approximately 49 miles (79 km) of this additional burial is the same as was analyzed as part of Alternatives 4c and 5c in the draft EIS. Approximately 3 miles (5 km) of additional burial in Bethlehem, NH is not analyzed in the draft EIS, as it would extend immediately to the north of the alignment analyzed as Alternative 5c. Northern Pass also proposes a minor shift (less than 100 feet [30 m]) in the international border crossing location, two new transition stations (one in Bridgewater, NH, and one in Bethlehem, NH, to transition the line between overhead and underground), a change of the project size from 1,200 megawatts (MW) to 1,000 MW, and other design changes (e.g., change in converter technology and type of cable).

As a result of Northern Pass’ revision to its proposal, DOE issued a notice of intent to prepare this supplement to the draft EIS (80 Fed. Reg. 58725 [September 30, 2015]). DOE regulations provide that DOE may supplement a draft EIS at any time, to further the purposes of NEPA (10 CFR § 1021.314(b)). In the same notice, DOE also announced that the public comment period on the draft EIS would be extended to December 31, 2015, to allow for public comment on the draft EIS and this supplement, and DOE announced that public hearings which were to be held in October 2015 would be rescheduled.

DOE is now updating the schedule for public comment and hearings. The comment period on the draft EIS, including this supplement, closes 45 days after publication by the U.S. Environmental Protection Agency (EPA) of the notice of availability of this supplement. Public hearings have been rescheduled for December 2015. More details, including hearing locations and dates, are available on the Northern Pass EIS website at <http://www.northernpasseis.us>.

Alternative 2 in the draft EIS was identified as the Proposed Action consistent with the application then before DOE. In light of the August 2015 amendment to the application, this supplement identifies the revised proposal (hereafter referred to as “Alternative 7”), rather than Alternative 2, as the Proposed Action. As in the draft EIS, DOE’s Proposed Action remains to issue a Presidential permit for the Project, and the No Action Alternative remains that DOE would not issue a Presidential permit.

This supplement to the draft EIS contains an analysis of the potential environmental impacts of Alternative 7 and supplements the analysis contained in the July 2015 draft EIS. Although Alternative 7 is

¹ The original Proposed Action (Alternative 2 in the draft EIS) included approximately 8 miles (13 km) of underground cable. The revised proposal (Alternative 7) includes an additional 52 miles (84 km) of underground cable, for a total of approximately 60 miles (97 km) of underground cable.

principally evaluated within the draft EIS under a combination of several of the alternatives, DOE determined that providing this supplement would allow the potential environmental impacts of Alternative 7 to be more clearly displayed as an additional singular alternative and facilitate a comparison among the alternatives.

No changes have been made to the analysis of Alternatives 1–6 as presented in the draft EIS, but those findings are presented here alongside the findings for Alternative 7 to allow for comparison. No changes have been made to the draft EIS or the Technical Resource Reports prepared to support the draft EIS. The methods used to analyze Alternative 7 are identical to those used in preparation of the draft EIS and described in the Technical Resource Reports (found online at <http://www.northernpasseis.us/library/draft-eis/technical-reports>). For portions of Alternative 7 that overlap with the alignments of alternatives analyzed in the draft EIS (particularly Alternatives 4c and 5c), data used to describe the existing conditions and potential environmental impacts is already included in the draft EIS and Technical Resource Reports. For portions of Alternative 7 that do not overlap with alternatives previously analyzed (specifically the proposed transition stations in Bethlehem and Bridgewater, NH, and the proposed 3-mile section of burial in Bethlehem, NH, further described in **Section 3** of this supplement), additional data was collected as necessary. Field surveys were conducted in the fall of 2015 for wildlife, vegetation, visual resources, water resources, and historic and cultural resources. For all other resources, a desktop analysis was completed based on data used in the draft EIS. As needed, readers should refer to the glossary and reference list contained in the draft EIS. Analysis of Alternative 7 will be fully integrated into the final EIS (i.e., it will not be prepared as a separate volume such as this supplement).

2 ALTERNATIVES ANALYZED

In addition to the eleven alternatives analyzed in the draft EIS (No Action Alternative and Alternatives 2–6 with variations), this supplement considers Alternative 7 (Proposed Action), as presented in the “Further Amendment to Presidential Permit Application” submitted by Northern Pass on August 31, 2015. **Table 1** briefly describes each alternative analyzed, including the converter stations and substations, and also provides the length of the transmission line (overhead, underground, and total) and the operational capacity. For a visual description of Alternative 7, refer to **Map 1** and **Map 2** in **Appendix A** of this supplement. Maps of all other alternatives can be found in the draft EIS.

Table 1. Alternatives Considered in Detail

Alternative	Description	Length Overhead miles (km)	Length Underground miles (km)	Total Length miles (km)	Operational Capacity (MW)
1	No Action	N/A	N/A	N/A	0
2	Primarily overhead in existing Public Service of New Hampshire (PSNH) transmission route, convert from high-voltage direct current (HVDC) to high-voltage alternating current (HVAC) at Franklin Converter Station, overhead HVAC to Deerfield Substation	179 (288)	8 (13)	187 (301)	1,200
3	Underground in Alternative 2 alignment, convert from HVDC to HVAC at alternate North Road Converter Station, underground HVAC to Deerfield Substation	0	187 (301)	187 (301)	1,000

Table 1. Alternatives Considered in Detail

Alternative	Description	Length Overhead miles (km)	Length Underground miles (km)	Total Length miles (km)	Operational Capacity (MW)
4	Underground in roadway corridors				
4a	Underground in roadway corridors, I-93 through Franconia Notch, convert from HVDC to HVAC at alternate North Road Converter Station, underground HVAC to Deerfield Substation	0	175 (282)	175 (282)	1,000
4b	Underground in roadway corridors, NH Routes 112 and 116 through the White Mountain National Forest (WMNF), convert from HVDC to HVAC at alternate North Road Converter Station, underground HVAC to Deerfield Substation	0	190 (306)	190 (306)	1,000
4c	Underground in roadway corridors, NH Routes 112 and 116 through WMNF, US Route 3 from North Woodstock to Ashland, NH, convert from HVDC to HVAC at alternate North Road Converter Station, underground HVAC to Deerfield Substation	0	182 (293)	182 (293)	1,000
5	Alternative 2 except underground in roadway corridors in the vicinity of the WMNF				
5a	Alternative 2 except underground in I-93 corridor through Franconia Notch	156 (251)	28 (45)	184 (296)	1,000
5b ^a	Alternative 2 except underground in NH Routes 112 and 116 through WMNF	170 (274)	21 (34)	190 (306)	1,200
5c ^a	Alternative 2 except underground in NH Routes 18, 112 and 116 through Sugar Hill, Franconia, Easton, NH, and WMNF	157 (253)	33 (53)	191 (307)	1,000
6	Underground in roadway corridors until Franklin, NH and co-located HVAC between Franklin and Deerfield, NH				
6a	Underground in roadway corridors, I-93 through Franconia Notch, convert from HVDC to HVAC at Franklin Converter Station, co-located overhead HVAC to Deerfield Substation	34 (55)	139 (224)	173 (278)	1,000
6b	Underground in roadway corridors, NH Routes 112 and 116 through WMNF, convert from HVDC to HVAC at Franklin Converter Station, co-located overhead HVAC to Deerfield Substation	34 (55)	154 (248)	188 (303)	1,000
7 (Proposed Action)	Proposed Action – Alternative 2 except underground in NH Routes 18, 112, 116, and US Routes 3 and 302 from Bethlehem to Bridgewater, NH	132 (212)	60 (97)	192 (309)	1,000

This is an updated version of **Table S-1** in the draft EIS. It adds information for Alternative 7; there are no changes to data for the other alternatives.

^aDue to rounding, the total length of the Project may vary slightly from the sum of its parts.

3 ALTERNATIVE 7 – PROPOSED ACTION

Under Alternative 7, the Project would be similar to Alternative 2 (described in detail in **Chapter 2** [Proposed Action and Alternatives] of the draft EIS), but would include an additional 52 miles (84 km) of underground HVDC cable, a minor shift (less than 100 feet [30 m]) in the international border crossing location, two new transition stations (one in Bridgewater, NH, and one in Bethlehem, NH, to transition the line between overhead and underground), a change of the project size from 1,200 MW to 1,000 MW, and other design changes (e.g., change in converter technology and type of cable). Nearly all of the additional burial would be located in the alignments analyzed under Alternatives 4c and 5c in the draft EIS.

As described in the August 2015 “Further Amendment to Presidential Permit Application,” Northern Pass would develop the Project under Alternative 7 as a transmission line to deliver electric power from Québec to southern New Hampshire. Alternative 7 includes a proposed HVDC transmission line that, as currently designed, would be capable of transmitting up to 1,000 MW of power in either direction (Canada to the United States [U.S.] and U.S. to Canada). The northern HVDC converter station is proposed to be constructed at the Des Cantons Substation in Québec, Canada, and would be connected to an HVDC line that would run southward in Québec for approximately 45 miles (72 km) where it would cross the U.S./Canada border into Pittsburg, NH.

The Project would consist of a single circuit ± 300 kilovolt (kV) HVDC transmission line running approximately 158 miles (254 km) from the U.S. border crossing with Canada in Pittsburg, NH, to a new direct current (DC)-to-alternating current (AC) converter station to be constructed in Franklin, NH. From Franklin, NH, to the Project terminus at the Public Service of New Hampshire’s (PSNH’s) existing Deerfield Substation located in Deerfield, NH, the Project would consist of 34 miles (55 km) of 345 kV AC electric transmission line.

The Project would include approximately 60 miles (97 km) of underground HVDC cable. Approximately 8 miles (13 km) would be in two areas in Pittsburg and Clarksville, NH, and Stewartstown, NH where the Project would be buried under the Connecticut River and beneath roadways, as analyzed in Alternatives 2, 3, 5a, 5b, and 5c. In addition, the Project would be located underground for approximately 52 miles (84 km) between Bethlehem and Bridgewater, NH. In Bethlehem, NH the Project would transition from overhead to underground HVDC. For a distance of approximately 3 miles (5 km) in Bethlehem, NH the Project would be buried in the NH Route 18 and US Route 302 corridors in an area that was not analyzed in the draft EIS. Between Sugar Hill and Bridgewater, NH, the Project would be buried in the NH Route 18, 112, and 116 and US Route 3 corridors, an alignment which was analyzed under Alternatives 4c and 5c. The Project would transition from underground to overhead HVDC in Bridgewater, NH and would continue in the existing PSNH transmission route to the proposed Franklin Converter Station in Franklin, NH, as analyzed in Alternatives 2, 5a, 5b, and 5c. From the proposed Franklin Converter Station, the Project would continue as an overhead HVAC transmission line through the municipalities of Northfield, Canterbury, Concord, Pembroke, Allenstown, and Deerfield, NH as analyzed in Alternatives 2, 5a, 5b, 5c, 6a, and 6b. The Project would terminate at the existing Deerfield Substation in Deerfield, NH.

The Project under Alternative 7 would be approximately 192 miles (309 km) in length, with approximately 60 miles (97 km) of underground HVDC cable. Refer to **Map 1** in **Appendix A**. **Map 2** in **Appendix A** illustrates the differences between Alternatives 4c, 5c, and 7.

As a part of the Project, system upgrades to existing PSNH AC transmission facilities would be required, including upgrades to the existing Deerfield Substation, the existing Scobie Pond Substation (Londonderry, NH), and existing 345 kV transmission lines between the Deerfield Substation, Scobie Pond Substation, and Lawrence Road Substation (Hudson, NH). These upgrades were analyzed in the draft EIS.

4 SUMMARY OF POTENTIAL IMPACTS ASSOCIATED WITH THE PROJECT

A summary of potential impacts from the construction, operation, maintenance, and emergency repairs associated with the Project under all alternatives is presented in the following resource area discussions. The analysis summarized here describes the potential impacts of the Project as a whole (including the Northern, Central, Southern, and White Mountain National Forest geographic sections). **Chapter 3** (Affected Environment) of the draft EIS summarizes the existing conditions to provide context and explains analysis methods and critical terminology. The detailed impact analysis of Alternatives 1–6, along with Applicant Proposed Measures (APMs) to avoid or minimize potential impacts, is presented in **Chapter 4** (Environmental Impacts), **Chapter 5** (Cumulative Impacts), and **Appendix H** of the draft EIS. All APMs described in **Appendix H** of the draft EIS would be implemented under Alternative 7, as appropriate.

4.1 VISUAL RESOURCES

Potential impacts to visual resources resulting from Alternative 7 would be similar to or less than impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.1, 4.1.1, 4.2.1, 4.3.1, 4.4.1, and 4.5.1** of the draft EIS for a discussion of potential impacts to visual resources. Impacts of the overhead portions of Alternative 7 would be similar to Alternative 2, and underground portions would be similar to Alternative 4a.

Table 2. Visual Resources Summary Impact Table

Alternative	Net Change in Average Scenic Impact	Total Average Scenic Impact	Miles (km) of Road Within Viewshed
1 (No Action)	0	1.62	0
2	0.17	1.79	185 (298)
3	0	1.62	0
4a	0	1.62	0
4b	0	1.62	0
4c	0	1.62	0
5a	0.14	1.76	173 (278)
5b	0.16	1.78	186 (299)
5c	0.15	1.77	185 (298)
6a	0.04	1.66	43 (69)
6b	0.04	1.66	43 (69)
7 (Proposed Action)	0.14	1.76	179 (288)

This is an updated version of **Table S-2** in the draft EIS.

Note: The net change in visual resources is measured in comparison with the existing condition, or Alternative 1, which includes the existing PSNH transmission line. The existing condition has a visual magnitude rating of 1.67 (Very Low to Low), and a scenic impact rating of 1.62 (Very Low to Low). The existing PSNH transmission line crosses 178 roadways as an overhead line.

Refer to the **Glossary** in the draft EIS for a definition of “scenic impact.”

4.2 SOCIOECONOMICS

Potential impacts to socioeconomic resources resulting from Alternative 7 would be within the range of impacts analyzed under Alternatives 1–6 in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.2, 4.1.2, 4.2.2, 4.3.2, 4.4.2, and 4.5.2** of the draft EIS for a discussion of potential impacts to socioeconomic resources. Due to the fact that Alternative 7 includes a greater length of underground cable than Alternatives 5a, 5b, and 5c, but less than Alternatives 4a, 4b, 4c, 6a, and 6b, potential impacts would generally fall between these groups of alternatives.

Table 3. Socioeconomic Resources Summary Impacts – Construction

Alternative	Total Construction Costs (\$ billion)	Economic Impacts from Construction (\$ million)		Annual FTE Construction Jobs (over three years)	Reduction of Taxable Assessed Property Values (\$ million)	Reduction in Annual Residential Property Tax Payments (\$)
		Direct	Total			
1 (No Action)	--	--	--	--	--	--
2	\$1.061	\$330.7	\$564.1	5,369	\$9.6	\$260,000
3	\$2.079	\$648.2	\$1,106.1	10,526	--	--
4a	\$1.987	\$620.2	\$1,059.1	10,076	--	--
4b	\$2.113	\$658.3	\$1,122.9	10,687	--	--
4c	\$2.046	\$638.2	\$1,089.6	10,367	--	--
5a	\$1.153	\$358.1	\$609.5	5,806	\$8.8	\$240,000
5b	\$1.223	\$379.5	\$645.2	6,148	\$9.4	\$256,000
5c	\$1.198	\$371.8	\$632.4	6,025	\$8.8	\$240,000
6a	\$1.832	\$571.2	\$974.9	9,277	\$4.4	\$120,000
6b	\$1.955	\$608.6	\$1,037.4	9,876	\$4.4	\$120,000
7 (Proposed Action)	\$1,377	\$427.2	\$726.4	6,921	\$7.1	\$192,000

This is an updated version of **Table S-3** in the draft EIS.

Table 4. Socioeconomic Resources Summary Impacts – Operation, Maintenance, and Emergency Repairs

Alternative	Annual Economic Impacts (\$ million)		Permanent FTE Jobs	Annual Reduction in Wholesale Electricity Costs – ISO-NE (\$ million)	Annual Reduction in Wholesale Electricity Costs – NH (\$ million)	Increase in Statewide Property Tax Annual Collections (\$ million)	Percent Increase in Net Imported Electricity*
	Direct	Total					
1 (No Action)	--	--	--	--	--	--	--
2	\$55.6	\$120.3	887	\$149.4	\$21.6	\$29.0	37.7%
3	\$80.5	\$199.3	1,505	\$133.8	\$18.3	\$57.2	31.1%
4a	\$78.5	\$193.6	1,461	\$133.8	\$18.3	\$55.2	31.1%
4b	\$81.0	\$201.0	1,518	\$133.8	\$18.3	\$57.8	31.1%
4c	\$79.9	\$197.8	1,493	\$133.8	\$18.3	\$56.7	31.1%
5a	\$53.8	\$120.8	901	\$133.8	\$18.3	\$30.6	31.1%
5b	\$58.6	\$129.0	954	\$149.4	\$21.6	\$32.0	37.7%
5c	\$54.7	\$123.3	920	\$133.8	\$18.3	\$31.4	31.1%
6a	\$73.7	\$179.4	1,352	\$133.8	\$18.3	\$50.4	31.1%
6b	\$76.2	\$186.7	1,408	\$133.8	\$18.3	\$52.9	31.1%
7 (Proposed Action)	\$59.2	\$125.2	974	\$133.8	\$18.3	\$36.0	31.1%

This is an updated version of **Table S-4** in the draft EIS.

*Net imported electricity includes electricity delivered by the Project as well as other lines into New England Independent Systems Operator (ISO-NE) from Canada.

4.3 RECREATION

Potential impacts to recreational resources resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.3, 4.1.3, 4.2.3, 4.3.3, 4.4.3, and 4.5.3** of the draft EIS for a discussion of potential impacts to recreational resources. Impacts of the overhead portions of Alternative 7 would be similar to Alternative 2, and underground portions would be similar to Alternative 4a.

Table 5. Recreational Resources With Potential to Experience Short-term Construction Impacts

Alternative	Point Sites ^a	Potential Federal Wild and Scenic Rivers	Sites with Spatial Area acres (ha)	Trails	
				miles (km)	ANST ^b miles (km)
1 (No Action)	--	--	--	--	--
2	1	1	493 (200)	5 (8)	0.1 (0.2)
3	1	1	493 (200)	5 (8)	0.1 (0.2)
4a	--	1	61 (25)	0.3 (0.5)	0.1 (0.2)
4b	--	1	82 (33)	0.3 (0.5)	0.1 (0.2)
4c	--	--	48 (19)	0.3 (0.5)	0.1 (0.2)
5a	1	1	287 (116)	0.9 (1.4)	0.1 (0.2)
5b	1	1	385 (156)	0.8 (1.3)	0.1 (0.2)
5c	1	1	339 (137)	0.9 (1.4)	0.1 (0.2)
6a	1	1	80 (33)	0.1 (0.2)	0.1 (0.2)
6b	--	1	101 (41)	0.1 (0.2)	0.1 (0.2)
7 (Proposed Action)	1	1	300 (122)	0.8 (1.3)	0.1 (0.2)

This is an updated version of **Table S-5** in the draft EIS.

^a Point Sites include recreational resources such as a picnic area or boat launch that have minimal spatial area.

^b Appalachian National Scenic Trail (ANST) impacts are included in the total mileage of trails potentially impacted.

Table 6. Recreational Resources With Potential to Experience Long-term Visual Impacts

Alternative	Point Sites ^a	Potential Federal Wild and Scenic Rivers	Sites with Spatial Area acres (ha)	Trails	
				miles (km)	ANST ^b miles (km)
1 (No Action)	--	--	--	--	--
2	5	1	663 (268)	4 (7)	0.1 (0.2)
3 ^c	--	--	--	--	--
4a ^c	--	--	--	--	--
4b ^c	--	--	--	--	--
4c ^c	--	--	--	--	--
5a	4	1	563 (228)	3 (5)	0.1 (0.2)
5b	4	1	650 (263)	4 (6)	0.1 (0.2)
5c	4	1	618 (250)	3 (5)	0.1 (0.2)
6a	--	--	91 (37)	--	--
6b	--	--	91 (37)	--	--
7 (Proposed Action)	3	1	505 (204)	2 (4)	0.1 (0.2)

This is an updated version of **Table S-6** in the draft EIS.

Notes:

^a Point Sites include recreational resources such as a picnic area or boat launch that have minimal spatial area.

^b ANST impacts are included in the total mileage of trails potentially impacted.

^c Alternatives 3, 4a, 4b, and 4c would be located underground, and the construction and operation would result in long-term impacts resulting from vegetation management. Therefore, long-term impacts to recreation would occur but would be due to limited aboveground structures.

4.4 HEALTH AND SAFETY

Potential impacts to health and safety resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.4, 4.1.4, 4.2.4, 4.3.4, 4.4.4, and 4.5.4** of the draft EIS for a discussion of potential impacts to health and safety. Impacts of the overhead portions of Alternative 7 would be similar to Alternative 2, and underground portions would be similar to Alternative 4a.

Table 7. Health and Safety Summary Impact Table

Alternative	Summary of Impacts
1 (No Action)	No impacts.
2	Risks related to spills, hazardous materials, petroleum products, hazardous wastes, worker safety, public safety, and fires would be minimized through the implementation of APMs (see Appendix H). In particular, design measures would reduce risks related to extreme weather events. The Project would generate electric and magnetic fields (EMFs), but there would be no impact of the Project due to EMFs outside of the transmission route, and minimal (not harmful) potential impacts due to AC electric fields within the transmission route.
3	Risks related to spills, hazardous materials, petroleum products, hazardous wastes, worker safety, and fires would be similar to those of Alternative 2. Risks related to weather, public safety, and EMFs would be reduced because the cable would be buried. There could be an increased risk of unearthing hazardous materials and/or contaminated groundwater.
4a	Risks would be similar to those of Alternative 3 because both alternatives would be underground cable, however, there could be more transportation-related risks because the cable would be buried in a roadway corridor.
4b	Same as Alternative 4a
4c	Same as Alternative 4a
5a	Same as Alternative 2 for aboveground portions; same as Alternative 4a for underground portions
5b	Same as Alternative 2 for aboveground portions; same as Alternative 4a for underground portions
5c	Same as Alternative 2 for aboveground portions; same as Alternative 4a for underground portions
6a	Same as Alternative 2 for aboveground portions; same as Alternative 4a for underground portions
6b	Same as Alternative 2 for aboveground portions; same as Alternative 4a for underground portions
7 (Proposed Action)	Same as Alternative 2 for aboveground portions; same as Alternative 4a for underground portions

This is an updated version of **Table S-7** in the draft EIS.

4.5 TRAFFIC AND TRANSPORTATION

Potential impacts to traffic and transportation resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.5, 4.1.5, 4.2.5, 4.3.5, 4.4.5, and 4.5.5** of the draft EIS for a discussion of potential impacts to traffic and transportation. Due to the fact that Alternative 7 includes a greater length of underground cable in roadway corridors than Alternatives 5a, 5b, and 5c, but less than Alternatives 4a, 4b, 4c, 6a, and 6b, potential impacts would generally fall between these groups of alternatives.

**Table 8. Traffic and Transportation Impacts – Roads within Study Area and Miles (km)
Buried in Roadway Corridors**

Alternative	Roadways within Study Area					Miles (km) Buried in Roadway Corridor
	Interstates	US Highways	State Highways	Local Roads	Total	
1 (No Action)	--	--	--	--	--	--
2	3	5	22	186	216	6 (10)
3	3	5	22	186	216	6 (10)
4a	3	6	22	440	471	173 (278)
4b	3	6	25	499	533	188 (303)
4c	3	6	22	574	605	179 (288)
5a	3	5	22	208	238	26 (42)
5b	3	5	22	199	229	19 (31)
5c	3	5	22	247	277	31 (50)
6a	3	5	22	413	443	137 (220)
6b	3	5	25	472	505	152 (245)
7 (Proposed Action)	3	5	22	276	306	59 (95)

This is an updated version of **Table S-8** in the draft EIS.

Note: The study area is defined as the Project corridors.

4.6 LAND USE

Potential impacts to land use resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.6, 4.1.6, 4.2.6, 4.3.6, 4.4.6, and 4.5.6** of the draft EIS for a discussion of potential impacts to land use. The majority of the Project under Alternative 7 would be located in either the existing PSNH transmission route or existing roadway corridors, but the portion of new transmission route in the Northern Section would result in the conversion of approximately 454 acres (184 ha) of currently non-developed land into Developed, Open Space (see **Table 9**). This conversion could limit future uses of this private land.

Table 9. Land Use Summary Impact Table

Alternative	Land Use Conversion acres (ha)	Forest Plan Standards Inconsistencies
1 (No Action)	--	--
2	454 (184) non-developed to Developed, Open Space	1) Forest-wide, Recreation General Standard S-2, 2) Management Area (MA) 8.3 – Appalachian National Scenic Trail, Recreation Standard S-2, 3) MA 8.3 – Appalachian National Scenic Trail, Scenery Management Standard S-1, and 4) MA 8.3 – Appalachian National Scenic Trail, Scenery Management Standard S-2
3	454 (184) non-developed to Developed, Open Space	--
4a	28 (11) non-developed to Developed, Open Space	--
4b	28 (11) non-developed to Developed, Open Space	
4c	28 (11) non-developed to Developed, Open Space	--
5a	454 (184) non-developed to Developed, Open Space	--
5b	454 (184) non-developed to Developed, Open Space	1) MA 8.3 – Appalachian National Scenic Trail, Scenery Management Standard S-1
5c	454 (184) non-developed to Developed, Open Space	--
6a	28 (11) non-developed to Developed, Open Space	--
6b	28 (11) non-developed to Developed, Open Space	--
7 (Proposed Action)	454 (184) non-developed to Developed, Open Space	--

This is an updated version of **Table S-9** in the draft EIS.

4.7 NOISE

Noise impacts resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.7, 4.1.7, 4.2.7, 4.3.7, 4.4.7, and 4.5.7** of the draft EIS for a discussion of potential noise impacts. Impacts of the overhead portions of Alternative 7 would be identical to Alternative 2, and underground portions would have no corona noise.

Table 10. Noise Summary Impact Table

Alternative	Audible Corona Noise Level (dBA) During Operation			Exceed EPA Guidance Level of 55 dBA
	HVDC Transmission Line (below conductors)	345 kV AC Transmission Line (below conductors)	345 kV AC Transmission Line (150 feet [46 m] from centerline)	
1 (No Action)	--	--	--	--
2	28	44	36	No
3	No audible corona noise associated with underground lines			
4a	No audible corona noise associated with underground lines			
4b	No audible corona noise associated with underground lines			
4c	No audible corona noise associated with underground lines			
5a	Overhead portions would be identical to Alternative 2; No audible corona noise associated with underground lines			
5b	Overhead portions would be identical to Alternative 2; No audible corona noise associated with underground lines			
5c	Overhead portions would be identical to Alternative 2; No audible corona noise associated with underground lines			
6a	Overhead portions would be identical to Alternative 2; No audible corona noise associated with underground lines			
6b	Overhead portions would be identical to Alternative 2; No audible corona noise associated with underground lines			
7 (Proposed Action)	Overhead portions would be identical to Alternative 2; No audible corona noise associated with underground lines			

This is an updated version of **Table S-10** in the draft EIS.

4.8 HISTORIC AND CULTURAL RESOURCES

Impacts to historic and cultural resources resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS, with the exception of the number of archaeologically sensitive areas within the direct Area of Potential Effects (APE). See **Section 3.1.8.2** for a definition of the APE. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.8, 4.1.8, 4.2.8, 4.3.8, 4.4.8, and 4.5.8** of the draft EIS for a discussion of potential impacts to historic and cultural resources. Impacts to historic and cultural resources would result from construction and operations, maintenance, and emergency repairs of both overhead and underground portions of Alternative 7 (as described in **Section 4.1.8** of the draft EIS). While the number of archaeologically sensitive areas within the direct APE of Alternative 7 is the greatest of all alternatives (based on data collected in field surveys for the draft EIS and in the fall of 2015), the total land area potentially impacted (within the potentially disturbed area) is less than the total land area potentially impacted under Alternatives 4a, 4b, 4c, 6a, and 6b as disclosed in the draft EIS.

Table 11. Number of Archaeological Resources Potentially Impacted during Construction

Alternative	Within Direct APE ^a	NRHP-Listed ^b	NRHP-Eligible	Not Yet Evaluated for NRHP Eligibility
1 (No Action)	--	--	--	--
2	49	--	--	49
3	49	--	--	49
4a	30	--	--	30
4b	35	--	--	35
4c	36	--	--	36
5a	44	--	--	44
5b	52	--	--	52
5c	57	--	--	57
6a	36	--	--	36
6b	41	--	--	41
7 (Proposed Action)	52	--	--	52

This is an updated version of **Table S-11** in the draft EIS.

Notes:

^a APE = area of potential effects

^b NRHP = National Register of Historic Places

Table 12. Number of Archaeologically Sensitive Areas Potentially Impacted during Construction

Alternative	Within Direct APE	Total Land Area within Potentially Disturbed Areas acres (ha)
1 (No Action)	--	--
2	255	85 (34)
3	252	88 (36)
4a	174	117 (47)
4b	216	130 (53)
4c	270	146 (59)
5a	233	76 (31)
5b	252	83 (34)
5c	273	78 (32)
6a	198	136 (55)
6b	241	149 (60)
7 (Proposed Action)	309	95 (38)

This is an updated version of **Table S-12** in the draft EIS.

Table 13. Number of Architectural Resources Potentially Impacted during Construction

Alternative	Within Indirect APE	Within Direct APE	NRHP-Listed or -Eligible (within Indirect APE)	Not Yet Evaluated for NRHP Eligibility (within Indirect APE)
1 (No Action)	--	--	--	--
2	163	33	17	146
3	162	32	16	146
4a	231	226	51 ^a	173
4b	263	253	53 ^a	203
4c	351	319	59 ^a	285
5a	164	56	18	146
5b	163	37	18	145
5c	169	52	18	151
6a	219	190	27	192
6b	250	216	29	221
7 (Proposed Action)	264 ^b	75	35 ^c	223

This is an updated version of **Table S-13** in the draft EIS.

Notes:

^a Seven previously evaluated architectural resources were determined to be not eligible for listing on the National Register of Historic Places (NRHP-eligible).

^b A Zone of Visual Influence (ZVI) analysis has not been completed for the new transition stations for Alternative 7. A conservative assumption that the transition stations under Alternative 7 would be visible from all architectural resources within 1 mile was applied; however, given local vegetation, topography, and structures this is unlikely to be the case and the impact is therefore overestimated.

^c In addition to these 35 sites, six architectural resources within the Indirect APE of Alternative 7 were previously evaluated and determined not NRHP-eligible (see **Section 3.1.8.3** of the draft EIS).

4.9 ENVIRONMENTAL JUSTICE

A detailed evaluation of U.S. Census block group data compared the demographic composition of “potentially affected” population (residing within 1,000 feet [305 m] of the Project) against the surrounding “unaffected” population on a county-by county basis. Three specific demographic measures were identified for each block group: the percentage of minority residents, the median household income, and the percentage of families living below the poverty level.

The demographic composition of the “potentially affected” groups compared to the surrounding “unaffected” population shows very little to no differences in the percentage of minority residents, percentage of families living below the poverty level, and median household income levels for Alternative 7. Therefore, in compliance with Executive Order (EO) 12898, no disproportionately high and adverse human health or environmental effects are expected to affect minority or low-income populations under any of the action alternatives.

4.10 AIR QUALITY

Impacts to air quality resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.10, 4.1.10, 4.2.10, 4.3.10, 4.4.10, and 4.5.10** of the draft EIS for a discussion of potential impacts to air quality. Due to the fact that Alternative 7 includes a greater length of underground cable in roadway corridors than Alternatives 5a, 5b, and 5c, but less than Alternatives 4a, 4b, 4c, 6a, and 6b, potential impacts would generally fall between these groups of alternatives.

Table 14. Construction Emissions and Loss of Carbon Dioxide (CO₂) Uptake from Vegetation Removal

Alternative	Construction Emissions (metric tons) Entire Construction Period			Loss of Carbon Dioxide Uptake from Vegetation Removal (metric tons per year)	Reduction in CO ₂ Emissions from Implementation (million tons per year)	Percent Reduction in CO ₂ Emissions (compared with existing conditions)
	Nitrous Oxides (NO _x)	Carbon Monoxide (CO)	Carbon Dioxide (CO ₂)			
1 (No Action)	--	--	--	--	--	--
2	374	238	93,954	932	3.5	11%
3	164	150	33,734	266	2.9	9%
4a	134	124	27,663	127	2.9	9%
4b	141	130	28,910	145	2.9	9%
4c	140	129	29,998	162	2.9	9%
5a	370	244	91,917	828	2.9	9%
5b	383	250	95,312	906	3.5	11%
5c	374	247	92,638	847	2.9	9%
6a	183	149	41,440	115	2.9	9%
6b	190	155	42,687	133	2.9	9%
7 (Proposed Action)	342	231	83,552	763	2.9	9%

This is an updated version of **Table S-14** in the draft EIS.

4.11 WILDLIFE

Impacts to wildlife resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.11, 4.1.11, 4.2.11, 4.3.11, 4.4.11, and 4.5.11** of the draft EIS for a discussion of potential impacts to wildlife. Due to the fact that Alternative 7 includes a greater length of underground cable in roadway corridors (which would require less vegetation removal) than Alternatives 5a, 5b, and 5c, but less than Alternatives 4a, 4b, 4c, 6a, and 6b, potential impacts would generally fall between these groups of alternatives.

Table 15. Wildlife Habitat Impacts

Alternative	Impacts to Wildlife Habitat acres (ha)
1 (No Action)	--
2	1,217 (493)
3	1,038 (420)
4a	253 (102)
4b	270 (109)
4c	261 (106)
5a	1,119 (453)
5b	1,188 (481)
5c	1,127 (456)
6a	262 (106)
6b	279 (113)
7 (Proposed Action)	1,019 (412)

This is an updated version of **Table S-15** in the draft EIS.

A total of 9 federally- and 29 state-listed wildlife species have the potential to occur in the study area and were therefore considered in this analysis. Based on data collected during field surveys conducted for the draft EIS and in the fall of 2015 for new areas, Alternative 7 would have the same effects determinations for federally-listed species as Alternatives 2, 3, 5a, 5b, and 5c. Alternative 7 would have “No Effect” on the following federally-listed wildlife species: Shortnose Sturgeon, Dwarf Wedgemussel, Puritan Tiger Beetle, Gray Wolf, and New England Cottontail.² Alternative 7 “May Affect, but [is] Not Likely to Adversely Affect” the following federally-listed wildlife species: Canada Lynx, Indiana Bat, and Northern Long-Eared Bat. Alternative 7 “May Affect, and is Likely to Adversely Affect” the Karner Blue Butterfly.

For the majority of state-listed species considered in this analysis, there is no difference in effects determinations between action alternatives (including Alternative 7). For these species, the potential impact of Alternative 7 would be identical to the “Impact for All Alternatives” presented in **Table 4-62** in the draft EIS. For the species with different effects between alternatives, the results are presented below. Alternative 1 would not result in any impacts to wildlife species.

² Endangered Species Act (ESA) Determinations are used here to define potential impacts to federally-listed species, including “No Effect,” “May Affect, but Not Likely to Adversely Affect,” and “May Affect, and Likely to Adversely Affect.”

Table 16. Summary of Project-wide Effects for State Threatened and Endangered Wildlife Species

Species ^a	Effects by Alternative ^b
Fish	
Bridle Shiner (<i>Notropis bifrenatus</i>) ST	Alternative 2, 5a, 5b, and 5c: No effect for construction and maintenance actions. Buried Alternatives in Central and Southern Sections (including sections of Alternatives 3, 4a, 4b, 4c, 6a, 6b, and 7): localized, short-term, adverse effects resulting from disturbance/displacement during construction and maintenance actions.
Invertebrates	
Brook Floater Mussel (<i>Alasmodonta varicosa</i>) SE	Alternative 2, 5a, 5b, 5c, 6a, 6b, and 7: No effect for construction and maintenance actions. Buried Alternatives in Southern Section (including sections of Alternatives 3, 4a, 4b, 4c): localized, short-term, adverse effects resulting from disturbance/displacement during construction and maintenance actions.

This is an updated version of **Table S-17** in the draft EIS.

Notes:

^a The species identified are only those with differences in effects determinations between action alternatives. All other species have the same effects determinations for all action alternatives.

^b Study area is defined as the extent of disturbance for each of the alternatives.

DOE has made the determinations, based on the most current analysis to-date (including the Wildlife Technical Report prepared for the draft EIS as well as field surveys conducted in the fall of 2015 in new areas). Future coordination/consultation with the USFWS, USFS, and NHEG, may influence the final determinations.

Key: SE = state-endangered; ST = state-threatened

4.12 VEGETATION

Impacts to vegetation resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.12, 4.1.12, 4.2.12, 4.3.12, 4.4.12, and 4.5.12** of the draft EIS for a discussion of potential impacts to vegetation. Due to the fact that Alternative 7 includes a greater length of underground cable in roadway corridors (which would require less vegetation removal) than Alternatives 5a, 5b, and 5c, but less than Alternatives 4a, 4b, 4c, 6a, and 6b, potential impacts would generally fall between these groups of alternatives.

Table 17. Vegetation Summary Impact Table

Alternative	Impacts to Vegetated Habitats (including Forestlands) acres (ha)	Impacts to Forestlands acres (ha)
1 (No Action)	--	--
2	1,093 (442)	692 (280)
3	919 (372)	181 (73)
4a	230 (93)	80 (32)
4b	243 (98)	89 (36)
4c	228 (92)	97 (39)
5a	993 (402)	609 (246)
5b	1,062 (430)	668 (270)
5c	998 (404)	618 (250)
6a	239 (97)	84 (34)
6b	253 (102)	93 (38)
7 (Proposed Action)	882 (357)	539 (218)

This is an updated version of **Table S-18** in the draft EIS.

As discussed in **Section 3.1.12** of the draft EIS, the only federally- or state-listed species potentially identified during Project-specific surveys were the beaked sedge and wild lupine (both state-listed). However, even though other federally- and state-listed plant species were not identified during surveys (including the federally-listed small whorled pogonia; the only federally-listed species with potential to occur in the study area), individuals could be present within the study area.

For the majority of these federally- and state-listed species, there is no difference in effects determinations between the action alternatives (including Alternative 7). For these species, the following effects determination applies: “No individuals observed during Project-specific field surveys nor listed in the National Heritage Bureau (NHB) database for the study area (NHB 2014). If populations are present within the study area, impacts to individuals could occur; with the application of APMs (**Appendix H** [of the draft EIS]), no population-level impacts are expected.”

For two species analyzed (alpine brook saxifrage and Robbins’ cinquefoil), it was determined that there is no suitable habitat in the study area and there would therefore be no effect. No federally-listed small whorled pogonia individuals (the only federally-listed species with potential to occur in the study area) were identified during Project-specific surveys or in state databases, but if populations are present in the study area, impacts to individuals could occur but no population-level impacts are expected. The Endangered Species Act (ESA) determination for the small whorled pogonia for all action alternatives (including Alternative 7) is: “May Affect, but Not Likely to Adversely Affect.” Alternative 1 would have “No Effect.” For all species considered, no population-level impacts are expected from any alternative. Effects determinations for all federally- and state-listed species considered in this analysis are presented in **Table 4-64** in the draft EIS. For the species with differences, the results are presented below.

Table 18. Comparison of Project-wide Effects for State-Listed Plant Species

Species	Effects by Alternative
Allegheny-vine/Climbing fumitory (<i>Adlumia fungosa</i>), SE	<p>Impacts for Alternatives 4a, 4b, and 4c: Known populations in the study area in Lancaster, NH based on NHB data (NHB 2014); impacts to individuals are expected; with the application of APMs, no population-level impacts are expected.</p> <p>Impacts for Alternatives 2, 3, 5a, 5b, 5c, 6a, 6b, and 7: if populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p>
Alpine manzanita (<i>Arctostaphylos alpina</i>), RFSS	<p>Impacts for Alternatives 2 and 3: No individuals observed during Project-specific field surveys nor listed in the NHB database for the study area (NHB 2014). If populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p> <p>Impact for Alternatives 4a, 4b, 4c, 5a, 5b, 5c, 6a, 6b, and 7: No effect, study area does not cross suitable habitat.</p>
Red threeawn (<i>Aristida longespica</i> var. <i>geniculata</i>), SE	<p>Impacts for Alternatives 2, 3, 5a, 5b, 5c, 6a, 6b, and 7: Known populations in the study area in the towns of Concord and Pembroke based on NHB data (NHB 2014); impacts to individuals are expected. With the implementation of APMs, no population-level impacts are expected.</p> <p>Impacts for Alternatives 4a, 4b, and 4c: if populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p>

Table 18. Comparison of Project-wide Effects for State-Listed Plant Species

Species	Effects by Alternative
Clasping milkweed (<i>Asclepias amplexicaulis</i>), ST	<p>Impacts for Alternatives 2, 3, 5a, 5c, 6a, 6b, and 7: Known populations in the study area in the Town of Concord based on NHB data (NHB 2014); impacts to individuals are expected. With the implementation of APMs, no population-level impacts are expected.</p> <p>Impacts for Alternatives 4a, 4b, 4c, and 5b: if populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p>
Dwarf white birch (<i>Betula minor</i>), RFSS	<p>Impacts for Alternatives 2 and 3: No individuals observed during Project-specific field surveys nor listed in the NHB database for the study area (NHB 2014). If populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p> <p>Impact for Alternatives 4a, 4b, 4c, 5a, 5b, 5c, 6a, 6b, and 7: No effect, study area does not cross suitable habitat.</p>
Wiegand's sedge (<i>Carex wiegandii</i>), RFSS, SE	<p>Impacts for Alternatives 2 and 3: Known populations in the study area in the Town of Lincoln based on NHB data (NHB 2014); impacts to individuals are expected. With the implementation of APMs, no population-level impacts are expected.</p> <p>Impacts for Alternatives 4a, 4b, 4c, 5a, 5b, 5c, 6a, 6b, and 7: if populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p>
Diapensia (<i>Diapensia lapponica</i>), ST	<p>Impacts for Alternatives 2 and 3: No individuals observed during Project-specific field surveys nor listed in the NHB database for the study area (NHB 2014). If populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p> <p>Impact for Alternatives 4a, 4b, 4c, 5a, 5b, 5c, 6a, 6b, and 7: No effect, study area does not cross suitable habitat.</p>
Mountain avens (<i>Geum peckii</i>), RFSS, ST	<p>Impacts for Alternatives 2 and 3: No individuals observed during Project-specific field surveys nor listed in the NHB database for the study area (NHB 2014). If populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p> <p>Impact for Alternatives 4a, 4b, 4c, 5a, 5b, 5c, 6a, 6b, and 7: No effect, study area does not cross suitable habitat.</p>
Wild lupine (<i>Lupinus perennis</i>) ST	<p>Impacts for Alternatives 2, 3, 5a, 5b, 5c, 6a, 6b, and 7: Project-specific floristic surveys and NHB data (NHB 2014) identified several populations in Concord and Pembroke, NH within the study area; impacts to individuals are expected. With the implementation of APMs, no population-level impacts are expected.</p> <p>Impacts for Alternatives 4a, 4b, and 4c: if populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p>
Alpine arctic cudweed (<i>Omalotheca supine</i>), RFSS, SE	<p>Impacts for Alternatives 2 and 3: No individuals observed during Project-specific field surveys nor listed in the NHB database for the study area (NHB 2014). If populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p> <p>Impact for Alternatives 4a, 4b, 4c, 5a, 5b, 5c, 6a, 6b, and 7: No effect, study area does not cross suitable habitat.</p>

Table 18. Comparison of Project-wide Effects for State-Listed Plant Species

Species	Effects by Alternative
Mountain sorrel (<i>Oxyria digyna</i>), ST	<p>Impacts for Alternatives 2 and 3: No individuals observed during Project-specific field surveys nor listed in the NHB database for the study area (NHB 2014). If populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p> <p>Impact for Alternatives 4a, 4b, 4c, 5a, 5b, 5c, 6a, 6b, and 7: No effect, study area does not cross suitable habitat.</p>
Boott's rattlesnake-root (<i>Prenanthes boottii</i>), RFSS, ST	<p>Impacts for Alternatives 2 and 3: No individuals observed during Project-specific field surveys nor listed in the NHB database for the study area (NHB 2014). If populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p> <p>Impact for Alternatives 4a, 4b, 4c, 5a, 5b, 5c, 6a, 6b, and 7: No effect, study area does not cross suitable habitat.</p>
Satin willow (<i>Salix pellita</i>), SE	<p>Impacts for Alternatives 4a, 4b, 4c, 6a, and 6b: Known populations in the study area in the towns of Clarksville and Stewartstown, based on NHB data (NHB 2014); impacts to individuals are expected. With the implementation of APMs, no population-level impacts are expected.</p> <p>Impacts for Alternatives 2, 3, 5a, 5b, 5c, and 7: If populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p>
Arizona cinquefoil (<i>Sibbaldia procumbens</i>), RFSS	<p>Impacts for Alternatives 2 and 3: No individuals observed during Project-specific field surveys nor listed in the NHB database for the study area (NHB 2014). If populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p> <p>Impact for Alternatives 4a, 4b, 4c, 5a, 5b, 5c, 6a, 6b, and 7: No effect, study area does not cross suitable habitat.</p>
Moss campion (<i>Silene acaulis</i> var. <i>exscapa</i>), RFSS	<p>Impacts for Alternatives 2 and 3: No individuals observed during Project-specific field surveys nor listed in the NHB database for the study area (NHB 2014). If populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p> <p>Impact for Alternatives 4a, 4b, 4c, 5a, 5b, 5c, 6a, 6b, and 7: No effect, study area does not cross suitable habitat.</p>

This is an updated version of **Table S-19** in the draft EIS.

Source: NHB (2014) and USDA Forest Service (2012b)

Notes: Geographic regions were identified using the USDA NRCS (2015a).

Key: RFSS = Regional Forester Sensitive Species; SE = state-endangered; ST = state-threatened

4.13 WATER RESOURCES

Impacts to water resources resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.13, 4.1.13, 4.2.13, 4.3.13, 4.4.13, and 4.5.13** of the draft EIS for a discussion of potential impacts to water resources. Impacts of the overhead portions of Alternative 7 would be similar to Alternative 2, and underground portions would be similar to Alternative 4a. Due to the fact that Alternative 7 includes a greater length of underground cable in roadway corridors than Alternatives 5a, 5b, and 5c, but less than Alternatives 4a, 4b, 4c, 6a, and 6b, potential impacts would generally fall between these groups of alternatives.

Table 19. Water Resources Summary Impact Table

Alternative	Wetland Disturbance acres (ha)			Impacts to Vernal Pools acres (ha)	Disturbance in Locations Overlying Aquifers acres (ha)	Disturbance in FEMA Flood Zones ^a acres (ha)	Miles (km) of Impaired Rivers Crossed
	Direct	Temporary	Secondary				
1 (No Action)	--	--	--	--	--	--	--
2	26 (11)	82 (33)	8 (3)	0.2 (0.1)	453 (183)	1,196 (484)	0.3 (0.5)
3	2 (1)	162 (66)	4 (2)	0.2 (0.1)	452 (183)	1,003 (406)	0.4 (0.6)
4a ^b	2 (1)	8 (3)	<0.1 (<0.04)	--	216 (87)	255 (103)	0.3 (0.5)
4b ^b	2 (1)	8 (3)	0.3 (0.12)	--	226 (91)	272 (110)	0.3 (0.5)
4c ^b	2 (1)	8 (3)	<0.1 (<0.04)	--	219 (89)	262 (106)	0.3 (0.5)
5a	25 (10)	69 (28)	8 (3)	0.2 (0.1)	462 (187)	1,097 (444)	0.3 (0.5)
5b	25 (10)	78 (32)	8 (3)	0.2 (0.1)	464 (188)	1,166 (472)	0.3 (0.5)
5c	25 (10)	69 (28)	8 (3)	0.2 (0.1)	471 (191)	1,106 (448)	0.3 (0.5)
6a ^b	3 (1)	9 (4)	<0.1 (<0.04)	--	343 (139)	259 (105)	0.2 (0.3)
6b ^b	3 (1)	9 (4)	<0.1 (<0.04)	--	352 (143)	276 (112)	0.2 (0.3)
7 (Proposed Action)	23 (9)	65 (26)	7 (3)	<0.1 (<0.04)	382 (155)	1,124 (455)	0.2 (0.3)

This is an updated version of **Table S-20** in the draft EIS.

Notes:

^a Including all Federal Emergency Management Agency (FEMA) Flood Zones (Zone A, Zone AE, and Zone X).

^b No vernal pools were identified in the Project corridor. Additional surveys may be conducted, as necessary.

4.14 GEOLOGY AND SOILS

Impacts to geologic and soil resources resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.14, 4.1.14, 4.2.14, 4.3.14, 4.4.14, and 4.5.14** of the draft EIS for a discussion of potential impacts to geologic and soil resources. Impacts of the overhead portions of Alternative 7 would be similar to Alternative 2, and underground portions would be similar to Alternative 4a. Due to the fact that Alternative 7 includes a greater length of underground cable than Alternatives 5a, 5b, and 5c, but less than Alternatives 4a, 4b, 4c, 6a, and 6b, potential impacts would generally fall between these groups of alternatives.

Table 20. Geologic and Soil Resources Summary Impact Table

Alternative	Total Ground Disturbance acres (ha)	Disturbance to All Hydric Soils acres (ha)	Disturbance to Prime Farmland, Farmland of Statewide Importance, or Farmland of Local Importance acres (ha)
1 (No Action)	--	--	--
2	1,217 (493)	20 (8)	264 (107)
3	1,038 (420)	40 (16)	285 (115)
4a*	275 (111)	4 (2)	105 (43)
4b*	292 (118)	5 (2)	115 (47)
4c*	291 (118)	5 (2)	119 (48)
5a*	1,119 (453)	19 (8)	234 (95)
5b*	1,188 (481)	20 (8)	262 (106)
5c*	1,127 (456)	19 (8)	244 (99)
6a*	276 (112)	3 (1)	139 (56)
6b*	293 (119)	3 (1)	148 (60)
7 (Proposed Action)	1,019 (412)	18 (7)	227 (92)

This is an updated version of **Table S-21** in the draft EIS.

* For alternatives buried in road corridors, total ground disturbance would depend on whether the cable was buried in the roadway centerline or in one of the shoulders. The total ground disturbance would be less if buried in the roadway centerline. The figures shown in the table are the maximum amount that could occur under each alternative.

4.15 CUMULATIVE IMPACTS

Cumulative impacts for Alternatives 1–6 (including variations) are presented in **Section S.9.15** and **Chapter 5, Section 5.1** of the draft EIS for all resources considered. Past, present, and reasonably foreseeable future actions that could, with implementation of the Project, have cumulative environmental impacts are listed in **Appendix D** of the draft EIS.

Because Alternative 7 would be partially underground and partially aboveground, its contributions to cumulative impacts would be similar to Alternative 5c as presented in the draft EIS. Alternative 7 would result in vegetation clearing, disturbances to wildlife, removal of wildlife habitat types, direct mortality of certain wildlife individuals, soil disturbance and erosion, stormwater runoff, increased noise levels, increased construction traffic and traffic delays along roadways, increased short-term air emissions, decreased long-term air emissions, changes in land use for the new transmission line route, increases in health and safety concerns and roadway workers, changes in socioeconomic indicators, and potential impacts to historic and cultural resources. The portions of Alternative 7 that would be constructed underground along existing roadways would impose the fewest environmental impacts due to the lack of visual impacts and use of previously-disturbed roadway corridors.

Multiple activities occurring at the same time and in the same vicinity would have greater impacts than just one project. Alternative 7 would result in a moderate contribution to cumulative impacts on visual resources and soils and geology; a moderate beneficial contribution to cumulative impacts at a more localized scale on socioeconomics; a minor contribution to cumulative impacts on recreation, health and safety, noise, wildlife, vegetation, and water resources; a negligible contribution to cumulative impacts on land use; no cumulative impact to environmental justice; and a long-term beneficial contribution to cumulative impacts on air quality. Alternative 7 would result in a substantial short-term contribution to cumulative impacts on traffic and transportation. Depending on the resource, the impacts would be short-term and/or long-term in duration. See **Section 5.1** of the draft EIS for a discussion of the types of cumulative impacts expected for each resource.

5 REFERENCES

This supplement incorporates all analysis and sources referenced in the draft EIS and Technical Resource Reports. See **Chapter 7** of the draft EIS and the references section of each Technical Resource Report for a full list of sources. Sources specifically cited in this supplement are presented below.

In-text Citation	Reference
NHB 2014	New Hampshire Natural Heritage Bureau. 2014. GIS data.
USDA Forest Service 2012b	USDA Forest Service. 2012. Regional Forester Sensitive Species List. White Mountain National Forest. Campton, NH.
USDA NRCS 2015a	USDA Natural Resources Conservation Service. 2015. PLANTS Database http://plants.usda.gov/java/ . Accessed March 30, 2015.

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APPENDIX A

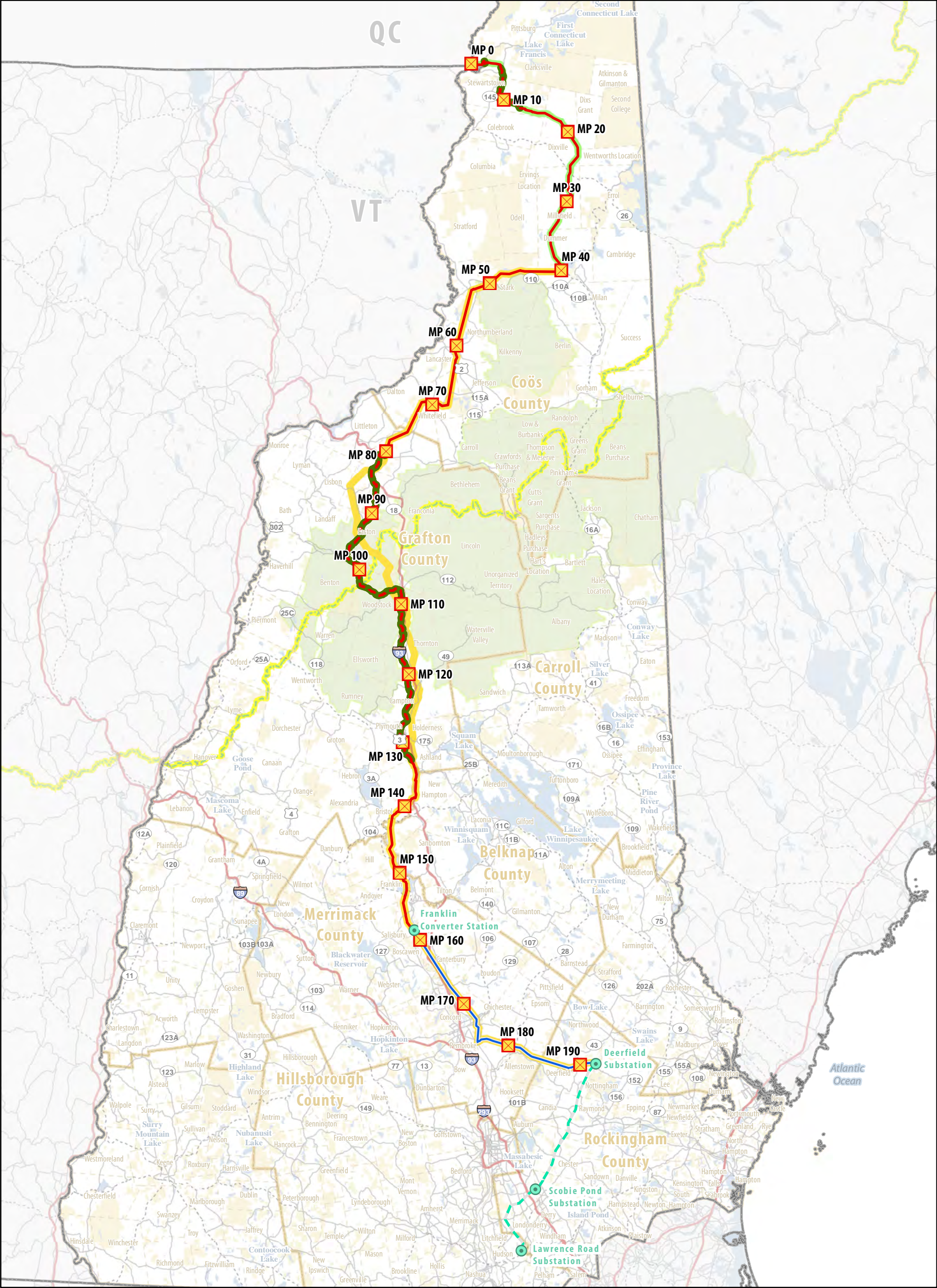
MAPS

APPENDIX A: MAPS

Map 1: Alternative 7 – Proposed Action

Map 2: Alternative 7 Comparison Map

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Legend

Existing Conditions

- State Boundary
- County Boundary
- Political Boundary
- Freeway
- Major Road
- Secondary Road

- Appalachian National Scenic Trail
- Waterbody
- NH Conservation Land (WMA, State Forest, Conservation Areas, etc.)
- White Mountain National Forest
- Existing PSNH Transmission Route

Alternative 7 Projects

- New Transmission Route
- Project in Roadway Corridor
- Overhead High-Voltage Direct Current Centerline
- Overhead High-Voltage Alternating Current Centerline
- Underground High-Voltage Direct Current Centerline
- Existing Transmission Line Upgrades

- Project Milepost
- Converter/Substation Location

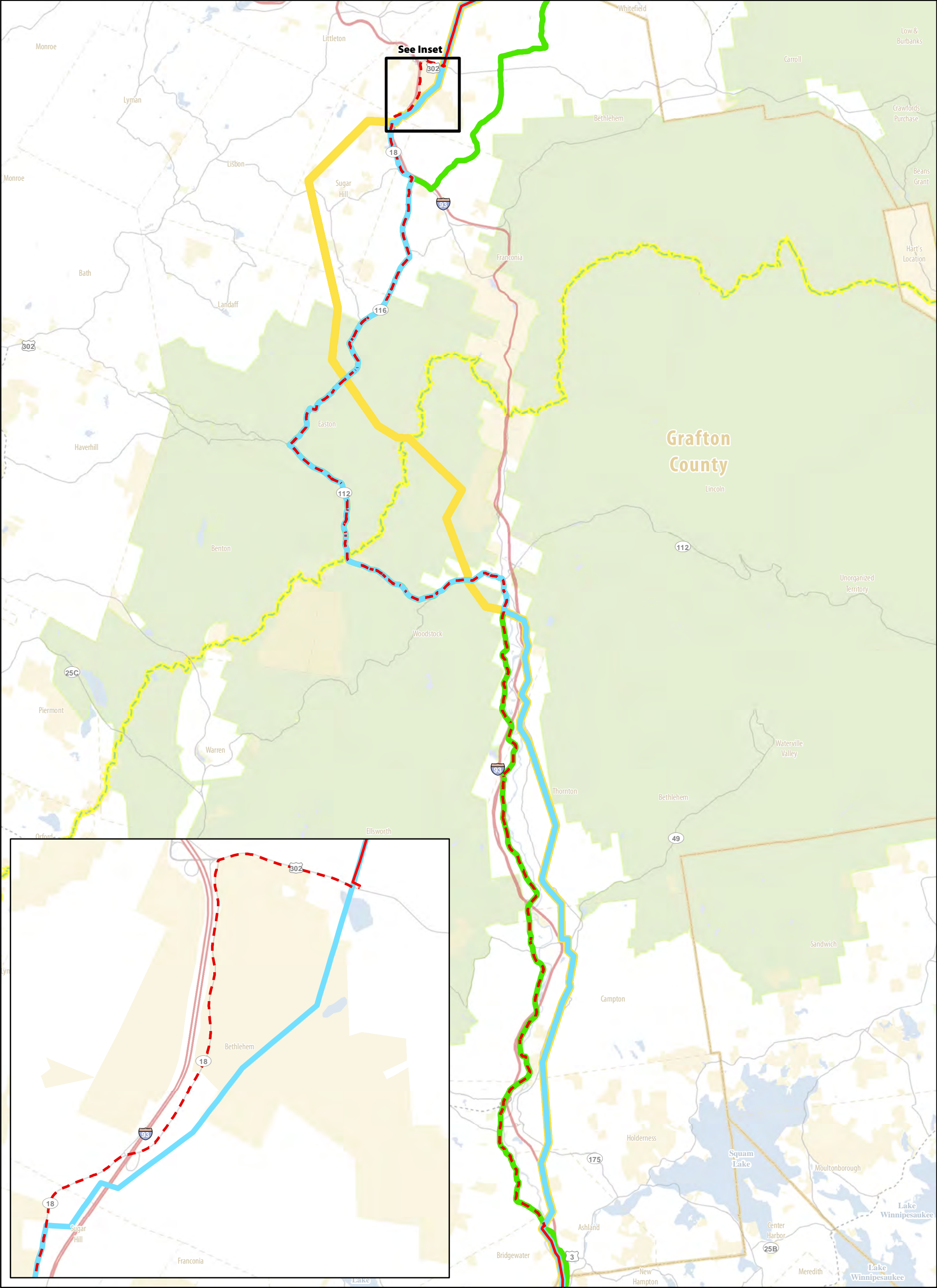
Map 1:
Alternative 7 - Proposed Action
Northern Pass Transmission Line Project
Environmental Impact Statement



SCALE

0 5 10 Miles

SOURCE: ESRI 2011; GRANIT 2012; Burns and McDonnell 2013; USFS 2012; Ecology and Environment 2013



Legend

- | Existing Conditions | | Analized in the Draft EIS | Alternative 7 Projects |
|---------------------|--|---------------------------|--|
| State Boundary | Appalachian National Scenic Trail | Alternative 4c Alignment | Overhead High-Voltage Direct Current Centerline |
| County Boundary | Waterbody | Alternative 5c Alignment | Underground High-Voltage Direct Current Centerline |
| Political Boundary | NH Conservation Land (WMA, State Forest, Conservation Areas, etc.) | | |
| Freeway | White Mountain National Forest | | |
| Major Road | Existing PSNH Transmission Route | | |
| Secondary Road | | | |

SOURCE: ESRI 2010; ESRI 2012; NH GRANIT 2012; USFS 2012

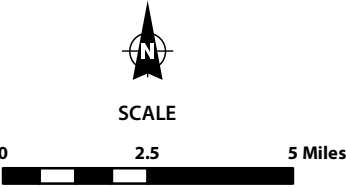


EXHIBIT 3



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1

5 Post Office Square, Suite 100
Boston, MA 02109 - 3912

June 14, 2016

Jennifer McCarthy
Chief, Regulatory Division
U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742

RE: Public Notice 2013-02188 Northern Pass

Dear Ms. McCarthy:

Northern Pass LLC (NP) proposes to fill 2.53 acres of wetland and cause temporary and secondary impacts to 320 acres of wetland, to build a 192 mile electric transmission line in northern and central New Hampshire. NP intends to construct the transmission line to deliver up to 1,090 megawatts (MW) of Canadian electric energy (mostly hydropower) from Quebec to southern New Hampshire (NH) to supply the New England states. Proposed mitigation for wetland impacts consists of preservation of 1,654 acres and a payment of \$3,070,336 into the NH Aquatic Resources Mitigation Fund (ARM fund).

The Department of Energy (DOE) has completed a Draft Environmental Impact Statement (EIS) for the proposed project, as a presidential permit is required for projects crossing the US border. EPA and the Corps of Engineers (Corps) are cooperating agencies along with the US Forest Service, US Fish and Wildlife Service and NH Division of Historical Resources. The applicant's preferred alternative (Alternative 7) for this \$1.4 billion project will be mostly an upgrade of existing transmission line corridors for 140 miles (30 - 40 miles will be on new alignment), with 60 miles put underground on routes that primarily follow existing highway corridors.

Background:

In 2015 and 2016, the DOE produced a Draft EIS and a Supplemental DEIS, since the applicant changed its preferred alternative just after the DEIS came out. In 2016 NP submitted an amended application to the DOE and filed with the NH Site Evaluation Committee. EPA commented on the DOE DEIS and Supplement on April 4, 2016. EPA's comments stated that alternatives to the preferred alternative appear practicable

and would cause less aquatic damage than the applicant's preferred alternative. Our comments also recommended that the DOE consider an additional alternative in the FEIS.

Information generated by the DOE and the applicant regarding impacts to wetlands and streams vary widely. We suspect the differences can be traced to the fact that the DEIS may consider some of the secondary impact totals in its summary of direct impacts to aquatic resources (cutting down forested wetlands). In this comment letter we will use the numbers from the NP application when talking about Alternative 7, the preferred alternative. Because the NP numbers are not available for the other alternatives we will use the DEIS numbers when we compare alternatives.

The PN states that the Corps will finalize its agency action after the DOE publishes the final EIS and the New Hampshire Site Evaluation Committee (NH SEC) finalizes its review. A great deal may change in the next year as new information becomes available in the State SEC and the federal EIS processes, especially for alternatives and mitigation. Depending on the magnitude of these changes, the Corps should consider reissuing another PN that more clearly reflects the scope of the final proposed project and mitigation plan. EPA reserves the right to supplement these comments on the project (with or without a reissued PN) based on the development of new project information related to alternatives, impacts and mitigation.

Alternatives

EPA's Section 404(b)(1) Guidelines set forth the environmental standards which must be met in order for a Section 404 permit to issue. The Guidelines prohibit the discharge of dredged or fill material if there exists a practicable alternative which causes less harm to the aquatic ecosystem. This fundamental requirement is often expressed as the regulatory standard that a permit may only be issued for the "least environmentally damaging practicable alternative" or LEDPA. The term "practicable" means available and capable of being done after taking into consideration cost, existing technology and logistics in light of overall project purpose [40 CFR 230.3(q)].

LEDPA Selection Based on project information we compiled in the chart below, alternatives #4 and #6 are clearly less damaging to wetlands and vernal pools than the proposed alternative (#7), since they cause far less impact to wetlands.

	Alt 7 (Proposed)	Alt 4	Alt 6
Miles below gr.	60	175	139
Cost	1.3 B (press quotes)	1.98 B	1.83 B
Direct Wet. (ac)	23	2	3
Temp. Wet. (ac)	65	8	9
Sec. Wet. (ac)	7	0.1	0.1
Vernal Pools (ac.)	0.1	0	0

All the alternatives in the DEIS appear to be practicable. There appears to be a trivial difference in impact between alternatives 4 and 6; therefore, either alternative could qualify as the LEDPA for the project. Based on current information, Alternative 7 cannot pass the alternatives test and receive a federal wetlands permit. This could change if additional information was provided to clearly demonstrate that less damaging alternatives (Alternatives 4 and 6) are not practicable based on cost, existing technology, or logistics.

Costs are a legitimate consideration in the alternatives analysis. However, increased costs do not necessarily render an alternative impracticable. Neither the DEIS nor the NP application presents sufficient cost information that would justify rejection of any of the alternatives on the basis of cost.

Another Alternative Putting the cable underground next to existing highways will cause less damage to wetlands and upland habitat. This is especially true when one compares this type of underground routing to potential impacts of sections of the corridor proposed to be located on a new alignment that would require major disruptions to the forest matrix. It appears that for NP's current preferred alternative, 30 to 40 miles of overhead transmission lines will be constructed on a totally new alignment in the northern part of the route. The bulk of the impacts to wetlands and uplands appears to take place in this section. Alternative 7 will also cause impacts to rare natural communities including several Northern Hardwood Seepage Forest and Northern White Cedar-Balsam Fir Swamps.

We request that NP investigate another alternative, which would involve putting the 30 to 40 miles proposed transmission line on new location, underground, next to existing roadways. This alternative would result in approximately ½ of the cable being underground, and all the remaining overhead lines would be on existing right-of-ways. Based on the tables in the DEIS, it would clearly be less damaging to the aquatic environment compared to the applicant's preferred alternative. Additionally, there is a good chance that the impacts from this new alternative would be only slightly larger than the impacts of Alternatives 4 and 6.

It appears that an acre of wetland in total will be altered for the creation of stormwater ponds in several areas – Transition Stations 1 and 5; and Deerfield Substation. Wetlands should not be used for stormwater unless it is quite clear that there is no other feasible alternative. This needs to be examined carefully and the ponds should be moved out the wetland habitat whenever possible.

Finally, we could not find any discussion of how the border crossing itself was selected and whether modifications to the crossing location would potentially reduce impacts to wetlands and other waters. Where is the alternatives test for different locations coming in from Canada and why was this location selected?

Impacts to Aquatic Resources

The proposed project would fill 2.53 acres of wetlands, including 4 vernal pools, and cause large temporary (140 acres; mostly from construction mats) and secondary impacts (182 acres; mostly cutting down forested wetlands and removing trees next to streams and vernal pools). Degradation or destruction of wetland acreage correlates with loss of functions and values including habitat destruction, reduced primary and secondary productivity, and alteration of hydrological functions (e.g., flood storage, low flow maintenance, nutrient and toxicant transformation, sediment trapping, and groundwater discharge and recharge).

While the temporary impacts are not permanent, impacts can be substantial in size and remain long after the fill is removed. The application states that some of the staging, storage, and laydown areas could be as large as 50 acres. For example, soil compaction can greatly alter the movement of surface and groundwater in and near the site of the temporary road or work area. This can result in a change in the wetland type and soil temperature, and in some cases result in a conversion to upland. It can take much longer for an area to revegetate and it can also create a window of opportunity for invasive species to gain a foothold. Birds and wind usually bring in the invasive seeds, but sometimes equipment used by the developer can also be a problem.

Most of the secondary impacts, such as cutting wetland vegetation, would be a permanent impact. The project would result in opening the tree canopy and maintaining the vegetation with frequent mowing or application of herbicides. The project would cause direct and secondary impacts to many streams and vernal pools, reducing the overall wildlife productivity. These streams and vernal pools would be impacted indirectly through temperature increases, and removal of over wintering habitat, and reducing overall productivity. Over 40 vernal pools would have secondary impacts to their 100' buffer from tree cutting.

The largest secondary impact proposed would be as a result of the 30 – 40 miles of new corridor in the northern part of the project. Calcium rich bedrock exists in the area resulting in many uncommon plants and plant communities. The proposed project would impact exemplary natural communities (enriched calcareous seepage swamp and northern white cedar swamps), and additional rare plants are likely in the area.

Fragmentation impacts would include changes in the vegetation community, reduction of interior forest available to area-sensitive species, increased nest predation and nest parasitism in forested areas adjacent to the clearing. As a result, this project would entail impacts beyond the footprint of the fill itself resulting in a loss of biological diversity. A change in temperature, humidity, soil salinity, and evaporation rates that may extend 30 m beyond the region of vegetation management. Area-sensitive species and other uncommon species in the remaining adjacent wetland habitat would suffer from increased access for predators. Aquatic dependent birds such as Louisiana waterthrush, northern

waterthrush, hermit thrush, yellow-throated vireo, and red-shouldered hawk, are especially vulnerable to fragmentation.

Increased edge caused by forest fragmentation elevates the frequency of nest predation and brood parasitism by brown-headed cowbirds which greatly reduces fledgling success. Cowbird parasitism can be significant for at least 200 m into a forest from an edge and is a major reason for the decline of forest birds in fragmented landscapes. Increased rates of nest predation by blue jays, crows, raccoons, squirrels and other opportunistic predators may extend well beyond 200 m from an edge.

Minimization and Compensatory Mitigation

Notwithstanding the eventual selection of the least environmentally damaging practicable alternative, we recognize that the applicant has made a solid effort to minimize adverse impacts to aquatic resources. Some of these measures include:

- Spanning streams and many wetlands by the transmission lines.
- Avoiding impacts to streams by using trenchless, horizontal directional drills.
- Maximizing the use of existing ROWs, when they are available.
- Extensive vernal pool mapping and avoidance.

Given the extensive amount of development and land alteration need to build the project, EPA recommends that NP work with a NHDES staff person full-time on all of its avoidance and sediment and erosion control measures. This approach has worked well on another large project – I-93 widening – in recent years. In addition to reducing impacts to sensitive aquatic resources and controlling invasive species, the applicant will need to do a large amount of restoration for all the temporary impacts. All this attention to detail would benefit greatly from a consistent presence of the same NHDES person that knows the details of the project.

The proposed mitigation package consists of protecting nine properties in the northern part of the state (1,668 acres) and NH ARM fund payment (\$3,070,336) to compensate for the remaining impacts (south of the National Forest). NP proposes to have Eversource Land Trust to hold the easements while it tries to find an independent conservation group willing to hold the easements. It appears that this group has been recently formed to accept easements for this project. NP should explain the long-term experience of this group with land stewardship. Alternatively, if experienced easement holders cannot be identified, NP should make an ARM fund payment for the remainder of the impacts.

NP is also donating to the National Fish and Wildlife Foundation on behalf of NP. It 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. This part of the package would get no credit for wetland mitigation.

Summary

Based on the information in the DEIS and the NP application, EPA concludes that the preferred alternative (Alternative 7) would not pass the alternatives test. The options (#4 and #6) that bury most or all of the cable underground, next to existing roadways, are clearly less damaging to the aquatic environment than the options that mostly build overhead transmission lines, since they alter far fewer trees and wetlands. Also, EPA requests that the applicant consider another alternative – an alternative which would bury, next to existing roadways, all the sections that are located on new alignment. It appears that 30 - 40 miles of transmission lines, in the northern part of the proposed project, would be built through the forest on a new alignment. If this section were buried, then all the overhead transmission lines would be located on (mostly) existing ROW.

Until these issues are adequately addressed, EPA recommends that a permit not be issued for this project. Thank you for your careful consideration of our comments. If you have any further questions please call Mark Kern of my staff at (617) 918-1589.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Jacqueline LeClair', with a long horizontal flourish extending to the right.

Jacqueline LeClair, Chief
Wetlands Protection Unit

cc: Dave Keddell, Corps (electronically)
Rick Kristoff, Corps (electronically)
Craig Rennie, NHDES (electronically)
Lori Sommer, NHDES (electronically)