Joint Application for a Certificate of Site and Facility

■

NEW HAMPSHIRE SITE EVALUATION COMMITTEE

Docket No. 2015–05

JOINT APPLICATION OF NEW ENGLAND POWER COMPANY d/b/a NATIONAL GRID & PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE d/b/a EVERSOURCE ENERGY

FOR A CERTIFICATE OF SITE AND FACILITY

FOR CONSTRUCTION OF A NEW 345 kV ELECTRIC TRANSMISSION LINE IN SOUTHERN NEW HAMPSHIRE

July 2015

Barry Needleman, Esq.
McLane, Graf, Raulerson & Middleton, PA
11 South Main Street, Suite 500
Concord, NH 03301
(t) (603) 226-0400 · (f) (603) 230-4448
barry.needleman@mclane.com

Christopher J. Allwarden, Esq.
Public Service Company of New Hampshire d/b/a Eversource Energy
Energy Park
780 North Commercial Street
Manchester, NH 03101
(t) (603) 634-2459 · (f) (603) 634-2438
christopher.allwarden@eversource.com

Mark R. Rielly, Esq.
New England Power Company d/b/a National Grid
40 Sylvan Road
Waltham, MA 02451
(t) (781) 907-2111 · (f) (781) 296-8091
mark.rielly@nationalgrid.com

TABLE OF CONTENTS

i. LIST OF ACRONYMS

AAL	Annual Average Load
AC	Alternating Current
ACSR	Aluminum Conductor, Steel Reinforced
AEP	American Electrical Power
AM	Amplitude
AN	Audible Noise
AoT	Alteration of Terrain
APA	American Planners Association
ARM	Aquatic Resource Management
BLM	Bureau of Land Management
BMP	Best Management Practice
CSS	Certified Soil Scientist
CCVT	Coupling Capacitor Voltage Transformer
CEC	Commission for Environmental Cooperation
CGP	Construction General Permit
CL&P	Connecticut Light & Power Company
CM	Construction Manager
CPR	Cardio-Pulmonary Resuscitation
CRM	Cultural Resource Management
DC	Direct Current
DEM	Digital Elevation Model
DOM	Days on Market
EDR	Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C
EFH	Energy Future Holdings
EHS	Extra High Strength
EIS	Environmental Impact Statements
ELF	Extremely Low Frequency
EMF	Electric and Magnetic Fields

EPRI	Electric Power Research Institute
ESA	Endangered Species Act
ESRI	Environmental Systems Research Institute
EUA	Eastern Utilities Associates
FAA	Federal Aviation Administration
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
GDP	Gross Domestic Product
GIS	Geographic Information System
GPS	Global Positioning System
HASP	Health and Safety Plan
HVDC	High Voltage Direct Current
HVTL	High Voltage Transmission Line
IARC	International Agency for Research in Cancer
IBEW	International Brotherhood of Electrical Workers
ICES	International Committee for Electromagnetic Safety
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IEEE	Institute of Electrical and Electronics Engineers
IPaC	Information Planning and Conservation
IRP	Interstate Reliability Project
ISO-NE	Independent System Operator – New England, Inc.
ITE	Institute of Transportation Engineers
JPAC	Joint Public Advisory Council
KOPs	Key Observation Points
MA	Massachusetts
MLS	Multiple Listing Service
MUTCD	Manual on Uniform Traffic Control Devices
MVRP	Merrimack Valley Reliability Project
NAFTA	North American Free Trade Agreement
NEDC	Northeast Distribution Center
NEMA	Northeastern Massachusetts

NEP	New England Power Company
NEPOOL	New England Power Pool
NERC	North American Electric Reliability Corporation
NESC	National Electric Safety Code
NH	New Hampshire
NHDES	New Hampshire Department of Environmental Services
NHDHR	New Hampshire Division of Historical Resources
NHDOT	New Hampshire Department of Transportation
NHDRED	New Hampshire Department of Resources and Economic Development
NHF&G	New Hampshire Fish & Game Department
NHNHB	New Hampshire Natural Heritage Bureau
NHOSP	New Hampshire Office of State Planning
NHPUC	New Hampshire Public Utilities Commission
NHT	New Hampshire Transmission
NIEHS	National Institute of Environmental Health Sciences
NLCD	National Land Cover Dataset
NPCC	Northeast Power Coordinating Council
NPDES	National Pollutant Discharge Elimination System
NRC	United States Nuclear Regulatory Commission
NRCS	Natural Resources Conservation Service
NRPC	Nashua Regional Planning Commission
OEP	Office of Energy and Planning
O&M	Operation and Maintenance
OPGW	Fiber Optic Ground Wire
OSHA	Occupational Health and Safety Administration
PAB	Palustrine Aquatic Bed
PAC	Planning Advisory Committee
PAL	The Public Archaeology Laboratory, Inc.
PE	Professional Engineer
PEM	Palustrine Emergent
PFO	Palustrine Forested

PGP	Programmatic General Permit
PM	Project Manager
PNGTS	Portland Natural Gas Transmission
POW	Palustrine Open Water
PPA	Proposed Plan Application
PPE	Personal Protective Equipment
PSNH	Public Service Company of New Hampshire
PSS	Palustrine Scrub-Shrub
PTOE	Professional Traffic Operations Engineer
RAPID	Research and Policy Information Dissemination
RBS	Rated Breaking Strength
REMI	Regional Economic Models, Incorporated
RGGI	Regional Greenhouse Gas Initiative
RN	Radio Noise
ROW	Right-of-Way
RPC	Regional Purchase Coefficients
RPR	Request for Project Review
RPS	Renewable Portfolio Standard
RTE	Rare, Threatened, and Endangered
SCENIHR	Scientific Committee on Emerging and Newly Identified Health Risks
SEC	Site Evaluation Committee
SEMA	Southeastern Massachusetts
SHA	State Highway Administration
SNHPC	Southern New Hampshire Planning Commission
S&P	Standard & Poors
SP/LP	Sale Price to Listing Price
SWPPP	Stormwater Pollution Prevention Plan
SWQPA	Shoreland Water Quality Protection Act
TNC	The Nature Conservancy
UAM	Utility Accommodation Manual
USACE	United States Army Corps of Engineers

USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VHB	Vanasse Hangen Brustlin, Inc.
VIA	Visual Impact Assessment
WAP	Wildlife Action Plan
WCMA	Western Central Massachusetts
WHO	World Health Organization
WMECO	Western Massachusetts Electric Company
WPI	Worchester Polytechnic Institute

ii. LIST OF APPENDICES

Volume III -	**Continued**
Appendix X.	National Grid Service Territory Map
Appendix Y.	Eversource Corporate Organization Chart
Appendix Z.	Eversource Service Territory Map
Appendix AA.	Written Notification to Governing Bodies of Each Community
Appendix AB.	Visual Impact Assessment, Merrimack Valley Reliability Project, Towns of Pelham, Windham, Hudson and Londonderry, NH, May 2015

Volume IV	
Appendix AC.	NHDHR to NH Division of Corps of Engineers, June 2, 2015
Appendix AD.	NH Impaired Waters Maps
Appendix AE.	Regulatory Agency Consultation Summary Table
Appendix AF.	Current Status of Research on Extremely Low Frequency Electric and Magnetic Field and Health, Merrimack Valley Reliability Project, April 27, 2015
Appendix AG.	Eversource/National Grid Merrimack Valley Reliability Project Electric Field, Magnetic Field, Audible Noise, and Radio Noise Modeling in New Hampshire, June 16, 2015
Appendix AH.	Traffic Management for Public Highways and Local Streets, Merrimack Valley Reliability Project, June 17, 2015
Appendix AI.	Review of Land Use and Local and Regional Planning, The Merrimack Valley Reliability Project, June 29, 2015
Appendix AJ.	Economic Impact of the Merrimack Valley Reliability Project, REMI Analysis of Construction Spending and Property Taxes, June, 2015
Appendix AK.	High Voltage Transmission Lines and Real Estate Markets in New Hampshire: A Research Report, June 30, 2015
Appendix AL.	Pre-Filing Public Information Session Transcripts: Londonderry, NH (Rockingham County), May 6, 2015; Hudson, NH (Hillsborough County), May 7, 2015
Appendix AM.	CONFIDENTIAL - Summary Report, NEP 345 kV 3124 Merrimack Valley Reliability Project, Pelham, Windham, Hudson and Londonderry, New Hampshire, Phase IA Sensitivity Assessment and Walkover Survey, June 26, 2015 and Refined Archaeological Sensitivity Maps, May 2015

iii. LIST OF FIGURES

iv. LIST OF TABLES

EXECUTIVE SUMMARY

New England Power Company d/b/a National Grid (NEP) and Public Service Company of New Hampshire d/b/a Eversource Energy (PSNH) (collectively the Applicants or the Companies) propose to construct and operate a new approximately 24.4-mile 345 kV electric transmission line from Tewksbury, Massachusetts to Londonderry, New Hampshire with approximately 18 miles located in New Hampshire. The entire transmission line is known as the Merrimack Valley Reliability Project (MVRP) while the New Hampshire portion of MVRP is referred to in this Application as the Project.[1]

This Executive Summary briefly addresses topics that are covered in great detail in the attached Application to the Site Evaluation Committee (SEC) as required by RSA Ch. 162-H.[2] In particular, the Applicants address the need for MVRP, its location and the alternatives considered, public involvement to date, and the potential impact of the Project and efforts undertaken, or to be undertaken to eliminate or mitigate those impacts. The Project meets all statutory requirements and, as discussed below, and in far greater detail in the Application itself, the Project advances New Hampshire's energy needs and objectives, provides significant economic benefits to the State and to host communities, and does so with minimal impact to cultural and historic resources and the environment.

The Applicants

NEP is a wholly-owned subsidiary of National Grid USA, which operates one of the largest electric transmission systems in the Northeast. National Grid USA's subsidiary companies serve approximately 3.4 million electric customers across Massachusetts, Rhode Island and upstate New York, and own and operate approximately 8,600 miles of transmission facilities spanning these areas as well as New Hampshire and Vermont. NEP owns and operates over 2,300 miles of these transmission lines, approximately 400 miles of which are located in New Hampshire.

PSNH is a wholly-owned subsidiary of Eversource Energy,[3] New England's largest utility system serving more than 3.6 million electric and natural gas customers in Connecticut, Massachusetts, and New Hampshire. Eversource engages in electric and gas delivery to businesses and residences throughout the northeast. The Company owns and operates approximately 4,270 circuit miles of transmission lines, 72,000 pole miles of distribution lines, 578 transmission and distribution stations, and 449,737 distribution transformers.

Both National Grid and Eversource have extensive experience in planning, designing, constructing, and operating electric transmission infrastructure projects. Both companies

1 The Project will also include 7.6 miles of relocation and a rebuild of the Y-151 Line, an existing 115 kV electric transmission line in the Towns of Pelham, Windham, and Hudson.

2 As "[a] new electric transmission line of a design rating in excess of 200 kilovolts," the Project is an "energy facility" as defined in RSA 162-H: 2, VII (e) and subject to review by the Site Evaluation Committee.

3 Eversource Energy was formally known as Northeast Utilities.

have been enhancing the reliability of the electric grid with a number of significant construction projects involving high-voltage transmission lines throughout New England and New York. The electric transmission investment over the next five years by Eversource and NEP is projected to be approximately $4.3 billion and $1.2 billion respectively.

The Need for, and Benefits of, MVRP

The Independent System Operator of New England (ISO-NE) has concluded that additional transmission capacity is necessary to support the reliable delivery of electric power to meet the current and future electric demands in the New England region. This area has the most concentrated and fastest-growing electric demand in New England. MVRP is one of a number of reliability projects selected by the ISO-NE to improve the reliability of the regional electric transmission system.[4] MVRP will strengthen system reliability by addressing specific thermal and voltage issues identified by ISO-NE on the portion of the transmission system connecting southern New Hampshire and northeastern Massachusetts. If these thermal and voltage issues are not addressed, under certain circumstances transmission equipment could overload, resulting in unsafe conditions, equipment damage and power outages.

In addition to providing the reliability improvements necessary to support anticipated demand and avoid power interruptions, the Project will play an important role in New Hampshire's economic growth by providing local and statewide benefits. The Applicants will invest approximately $82 million in the Project, thus contributing to economic growth through significant investment in infrastructure, materials and labor, to the creation of over 600 annual jobs during construction, to increases to the State's Gross Domestic Product, personal income, and state and local property tax revenues. All of these benefits will be provided with minimal impact to the host communities and the environment.

The Location of the Project and Alternatives Considered

MVRP will be constructed in an existing heavily developed transmission line corridor between NEP's Tewksbury 22A Substation in Tewksbury, Massachusetts and PSNH's Scobie Pond 345 kV Substation in Londonderry, New Hampshire. The Project will consist of approximately 18 miles of new 345 kV transmission line construction (the "3124 Line") and also the relocation of existing facilities along some sections of the corridor, including the existing 115 kV line (the "Y-151 Line"), in order to accommodate the proposed 3124 Line. The Project will traverse the Towns of Pelham, Windham, Hudson and Londonderry.[5] The details of the Project route are described in section (h)(1) of the Application. NEP and PSNH currently have all the property rights needed to construct,

4 The New England transmission network or "grid" is the backbone of the regional electric system consisting of a network of high-voltage lines that transmit bulk power from generating resources to substations where the power is converted to a lower voltage and fed into the distribution system for delivery to homes and businesses. The grid is designed to meet all Federal Energy Regulatory Commission, Northeast Power Coordinating Council, and ISO-NE reliability criteria.

5 For a depiction of the route, please see Figure 1 in the Application, USGS MVRP Overview Map.

operate and maintain the Project, which consist of fee-owned parcels and/or various easements.

MVRP was developed through ISO-NE's long-term planning process. Beginning in 2008, planners from ISO-NE, Northeast Utilities, National Grid, and NSTAR formed a Working Group to assess transmission system reliability in northeastern Massachusetts and southern New Hampshire, identify needs within the study area, and develop transmission solutions to address any identified needs. The Working Group study determined that the existing transmission system did not have sufficient capacity to reliably serve this area either at peak or off-peak load when certain generation or transmission facilities are out of service, i.e. "reasonably stressed conditions." In February 2015, ISO-NE announced its selection of a preferred group of projects to address the identified needs, including the construction of a new 345 kV transmission line between the Tewksbury 22A and Scobie Pond 345 kV Substations, now identified as MVRP.

Once the endpoints of the new 345 kV line were determined, the Applicants evaluated potential routing options to connect those endpoints, including railroad corridors, the interstate highway system, and existing overhead transmission line corridors. An in-depth evaluation was conducted of three potential routes along overhead transmission corridors, including the preferred route, a Western Alternative, and an Eastern Alternative. The Western Alternative is approximately 21.2 miles longer than MVRP, while the Eastern Alternative is approximately 33.6 miles longer. Use of either the Alternatives would have required the Applicants to widen the existing transmission corridors to accommodate the new 345 kV transmission line.

As part of the routing analysis, the Applicants also considered the potential for an underground route along existing linear corridors (e.g., roadways, transmission line corridors). However, this alternative was rejected due to significantly higher costs and also because modeling results indicated that operating an underground transmission line in parallel with existing overhead lines would result in load imbalances that would prevent the underground option from addressing the identified need. After consideration of the relative costs and impacts of each route, including the underground alternative, the Applicants selected their preferred route, namely, the existing overhead right-of-way(ROW) directly connecting the Tewksbury 22A and Scobie Pond 345 kV Substations.

Public Involvement

The Applicants have made significant pre-filing efforts to inform officials, business leaders and residents in the host communities of the Project and of its benefits and its implications. Pre-application open houses and public information sessions were noticed in local and statewide news media in April 2015 and were held on May 6 and 7, 2015 in Londonderry and Hudson. During those sessions, representatives of the Applicants provided an overview of the project, answered questions posed by attendees and received comment from members of the public. Where concerns were expressed, the Applicants have followed-up with individual attendees to provide additional information. The Applicants

also continue to work directly with abutting property owners to assess and mitigate anticipated property-specific impacts to the extent possible.

Potential Impacts and Proposed Mitigation Measures

The Applicants have engaged a number of expert consulting firms to review and study the impact of MVRP and the Project, including an assessment of visual impact, the impact on cultural and historic resources and on air and water quality and the natural environment. As detailed in the Application, these studies address efforts to avoid impacts wherever possible and to minimize and mitigate effects where they occur.

Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C. of Syracuse, New York, (EDR) was engaged to prepare a visual impact assessment (VIA) for Project. The VIA concludes that the Project will not have an unreasonable adverse effect on aesthetics. In particular, the location of the Project within an existing heavily-developed transmission ROW significantly reduces any potential visual impacts associated with the Project and minimizes disruption to existing land uses and the amount of new clearing required.

The Public Archaeology Laboratory Inc. (PAL), of Pawtucket, Rhode Island reviewed and confirmed a prior Phase IA archaeological survey and assessment of the Project's impact on cultural resources.[6] That prior Phase IA covered ten miles of the Project ROW in connection with a prior PSNH project and resulted in a determination of no effect issued by the New Hampshire Division of Historical Resources (NHDHR). An additional Phase IA archaeological survey was conducted on the remaining eight miles of the Project route, south of Scobie Junction in Hudson. Although about 40% or three miles of this eight mile segment is considered archaeologically sensitive for pre-contact resources (i.e., resources that pre-date interaction between Native Americans and Western culture) and has the potential to be impacted by the Project, the remaining five miles of the transmission line corridor south of Scobie Junction was not considered archaeologically sensitive. At the conclusion of its work, PAL concluded that the Project would not have an unreasonable adverse effect on archaeological resources. The Applicants are working with NHDHR to avoid, minimize and/or mitigate potential impacts to archaeological resources.

In addition to the archaeological surveys, the Applicants also commissioned a survey to identify actual and potentially eligible historic properties within one-quarter mile on either side of the corridor that could be affected by the Project. The inventory file review revealed that there are no properties that have been previously listed or determined eligible for listing within the Project study area. As a result, the Project will not result in any adverse effects on historic architectural resources. The Applicants have consulted and will continue to consult with NHDHR to avoid, minimize and/or mitigate impacts to above-ground and below-

6 The Phase 1A survey is designed to field check visible evidence of the known archaeological sites listed in the due diligence report and verify the preliminary assessment of the potential for archaeological sites to be present within the Project ROW.

ground cultural or historic resources, and in sensitive areas the Companies will utilize construction practices to avoid, minimize and mitigate impacts to resources in those areas.

Vanasse Hangen Brustlin, Inc. (VHB) conducted a study of environmental resources along the Project route and consulted with the appropriate state and federal agencies. As designed, the Project avoids and minimizes environmental impacts to the greatest extent practicable. The Applicants propose best management practices (BMPs) that, when implemented during construction and operation of the Project, will prevent and minimize any potential negative impacts to the natural environment and air and water quality. Unavoidable impacts will be mitigated in accordance with State and federal regulations and guidance.

VHB's study included an evaluation of the impact of the Project on air quality, water quality and the natural environment. VHB concluded that the operation of the Project would have no impact on air quality and that air quality impacts associated with construction would be negligible. No air applications or permits regarding issues of air quality are being submitted for this Project.

With respect to water quality, the Project design results in avoidance of the majority of water resources. Permanent impacts to wetlands and surface waters are limited to just over one-tenth of an acre for structure placement and permanent upgrades to wetland crossings. Direct impacts (i.e. fill) to vernal pools, temporary pools of water that provide habitat for distinctive plants and animals, were avoided. Temporary impacts to wetlands and surface waters for construction access will be minimized through the implementation of best management practices including the use of swamp mats and installation of sediment and erosion controls as depicted on Wetland Permitting Plans included in Appendix F and in accordance with the Applicant's guidance documents contained in Appendices S and T. Total permanent wetland impacts are below 10,000 sq. ft. and, therefore, do not need to be mitigated in accordance with New Hampshire Department of Environmental Services (NHDES) regulations. A Wetlands Permit Application is included in Appendix F.

The Project will require limited land disturbance to discrete areas along the Project ROW for construction access and temporary work areas. The Applicants will ensure that the alteration of terrain within the Project area will not have an adverse effect on water quality in surface waters of the state. An Alteration of Terrain Permit Application is included in Appendix O.

The majority of the Project is located outside of the protected shoreland of waterways jurisdictional under the Shoreland Water Quality Protection Act (SWQPA) apart from two locations in Windham and Hudson where four new electric transmission utility structures are proposed. The impact of this work is discussed in section (i)(4) of the Application. A Shoreland Permit Application is included in Appendix G.

The Project requires a Section 401 Water Quality Certificate authorization from the United States Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act. The

principal water quality concern is increased sediment erosion and movement during the construction of the Project. The Project will not construct any facilities or significant impervious surfaces, or involve any water withdrawals or process water discharge that could impact water quality. Best management practices will be implemented to prevent potential negative impacts to water quality during construction. A Water Quality Permit Application is included in Appendix H.

VHB also assessed impacts to the natural environment, including plant communities, wildlife habitat land cover type, and rare, threatened, and endangered species. Surveys have been conducted and are proposed to be conducted within the Project ROW. VHB conducted plant community surveys during the course of wetland delineations in 2014. Rare, threatened and endangered plant species were not observed during the 2014 surveys because they took place after the flowering period of identified species. Targeted surveys for identified plant species are occurring during the flowering periods identified by the NH Natural Heritage Bureau (NHNHB). Summer of 2015 plant survey protocols were accepted by NHNHB and are included as Attachment D to the NHDES Wetlands Permit Application in Appendix F. The Applicants will work with the Bureau to avoid and mitigate any potential impacts to protected plant species.

VHB also assessed and field verified wildlife habitat land cover types as developed by the New Hampshire Fish and Game Department (NHF&G) under the statewide *Wildlife Action Plan* (WAP). Four main land cover habitat types were identified within the Project ROW including Appalachian oak-pine forest, grasslands, hemlock-hardwood-pine, and wet meadow/shrub wetland. The different land cover types within the Project ROW provide habitat for a variety of wildlife species as described in section (i)(5) of the Application. Land cover types and plant communities within the existing corridor will not be impacted by Project construction activities. Although clearing of forested land will change the vegetative composition and wildlife habitat within the corridor, the minimal amount of forest habitat conversion along the length of the Project will not significantly affect existing wildlife habitats. Moreover, because the Project ROW has been established and maintained for many decades, impacts to wildlife resources are minimal. Finally, VHB conducted rare, threatened, and endangered species surveys in the Spring of 2015 and will continue into 2016 in order to evaluate the presence of listed species within the Project corridor. Animal survey protocols have been accepted by NHF&G and are included as Attachment D in the NHDES Wetlands Permit Application contained in Appendix F.

Public Health and Safety

The Applicants are committed to constructing and operating the Project in a safe manner and will adhere to all applicable safety and electrical codes, including the National Electrical Safety Code and all Eversource and National Grid transmission line design standards. Before construction, the Applicants will develop a project safety plan that will be followed by all employees and contractors, will retain qualified project management and staff with experience managing and executing similar projects, and will follow all local, State, and federal worker safety regulations and ensure that each person on-site has

adequate training to ensure the Project is constructed safely. The Applicants have also retained a construction traffic engineer to ensure the safety of workers and the public and to minimize impact on local traffic flows.

To address public health concerns while the Project is in operation, the Applicants retained the services of an engineering and scientific consulting firm, Exponent, Inc., to assess the potential effect of the Project on extreme low frequency (ELF) electric and magnetic fields (EMF). Exponent modeled the existing and expected electric and magnetic fields when operating the new line under certain average and peak load conditions and found levels of both electric and magnetic fields to be below exposure thresholds developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and the International Committee for Electromagnetic Safety (ICES). Exponent also prepared a summary of the current status of research on EMF. Exponent has concluded that there will be no unreasonable adverse effects on public health and safety as a result of Project-related EMF. Exponent's summary of the research and the data on which it relied is included in section (i)(6) of the Application.

Orderly Development of the Region

The Application addresses the impact of the Project on local land use, property values and the local economy and employment. The Applicants believe that location of the Project in an existing ROW will minimize the impact on local land use and property values. By contrast, the Project will have a number of positive economic impacts on local host communities and the State.

Land uses along the Project corridor include forestry, agriculture, residential, commercial/ industrial, transportation, institutional/government, recreation, conservation, historical, and natural features such as rivers, wetlands, and wildlife habitat. By virtue of its location exclusively within the existing heavily developed transmission line corridor, the Project will have little impact on local land use. As the SEC has previously recognized, siting a new transmission line in an already developed corridor is "consistent with orderly development of the region and has less impact on the environment."[7]

7 The SEC found that "the use of [an] existing right of way is much more consistent with the orderly development of the region and has less impact on the environment." Decision in Portland Natural Gas Transmission System Maritimes & Northeast Pipeline Company, NH SEC, Docket No. 96-01 and Docket No. 96-03, 1, 17 (July 16th, 1997). In addition, the SEC found that, in the context of sighting transmission projects, "the single most important fact bearing on this finding [that the facility will not unduly interfere with the orderly development of the region] is that the proposed transmission line occupies or follows existing utility transmission rights-of-way." Findings of the Bulk Power Facility Site Evaluation Committee, NH SEC DSF 850-155, 1, 11 (Sept. 16th, 1986).

The Applicants engaged Chalmers & Associates, LLC (Chalmers) to review published research and to develop New Hampshire-specific research on impacts to property values and real estate markets associated with high voltage transmission lines (HVTL). Chalmers concluded that the Project will not have a discernable effect on property values or real estate markets in the region and that there would be no material adverse impacts to property values in the Project area. The results of Chalmers' research are included in section (i)(2) of the Application.

The Applicants believe that the Project will have numerous positive economic impacts on local host communities and the State that will continue throughout the life of the Project. The Project's local and statewide benefits include:

- Investment of over $82 million in local and State infrastructure and improvements;
- The creation of approximately 618 annual jobs during the construction phase of the Project, or an average of 253 jobs per year;
- Investment of $60.7 million on labor and job creation in the State;
- Investment of $21.1 million on materials in the State;
- An estimated $73.5 million increase in New Hampshire's Gross Domestic Product (GDP) during the four-year planning and construction phase;
- An estimated $35.1 million increase in personal income tax revenue paid to New Hampshire during the construction phase of the Project; and
- An increase of nearly $1.6 million in state and local property tax revenues.

Public Interest and Other Benefits

Finally, the Project and MVRP as a whole will serve the public interest in New Hampshire by ensuring a reliable and adequate power supply for both New Hampshire and regional electric consumers. MVRP will address thermal and voltage issues identified in ISO-NE's Greater Boston and Vermont–New Hampshire Planning Studies, and will improve electric transmission system reliability and flexibility by providing an additional transmission path between northeastern Massachusetts and southern New Hampshire, thus reducing the potential for power outages, equipment damage and other conditions that could jeopardize public safety. MVRP, along with other projects identified by ISO-NE, will provide a least-cost solution to regional transmission system needs and enhance the reliable operation of the regional electric system.

The Project will also provide significant benefits to the State and local communities as detailed above, including the creation of jobs, investment in labor and materials, and an increase in New Hampshire's GDP. The Applicants will invest approximately $82 million in New Hampshire's electric transmission infrastructure. Within the first year of operation alone, the Applicants will pay nearly $1.6 million in property taxes to the Project's four

host communities, to Rockingham and Hillsborough Counties, and to the State of New Hampshire for redistribution to local school districts.

Based on the above-discussed factors, the Project will not only serve the public interest in southern New Hampshire and the host communities, but also provides significant benefits to the State of New Hampshire as a whole, its residents, and its businesses.

Conclusion

MVRP is a cost-effective, low-impact solution designed to address transmission system reliability needs identified by ISO-NE, fully consistent with the State of New Hampshire's goal of promoting and developing reliable energy projects that help ensure an adequate power supply. The Project will have minimal effects, if any, on public health, aesthetics, archaeological or historic resources, or the environment due to the siting of the entire Project within the existing transmission line corridor. Moreover, the Project will bring substantial economic benefits to the region by creating additional direct and indirect jobs in the State, increasing tax revenue for host communities, and investing in local and State infrastructure to ensure continued reliability. Accordingly, the Applicants seek favorable consideration of the Project.

APPLICATION INFORMATION

(a) SIGNATURES OF APPLICANTS

Certification by Rudolph L. Wynter of New England Power Company d/b/a National Grid:

In accordance with RSA 162-H:8, I, Rudolph L. Wynter, President of New England Power Company d/b/a National Grid, do hereby swear and affirm that the information contained in this Application is true and accurate to the best of my knowledge and belief. I also certify that, as an Applicant to the New Hampshire Site Evaluation Committee, New England Power Company d/b/a National Grid agrees to provide such information as the Committee will require to carry out the purposes of RSA 162-H.

Rudolph Wynter

Name: Rudolph L. Wynter
Title: President
Date: July 14, 2015
Commonwealth of Massachusetts
County of Middlesex

On this 14th day of July, 2015, personally appeared before me the above-named Rudolph L. Wynter, President of New England Power Company d/b/a National Grid and swore and affirmed that the information contained in this Application is true and accurate to the best of his knowledge and belief.

Gifty A. Bentum-Eshun

Notary Public
My commission expires on May 14, 2021

GIFTY A. BENTUM-ESHUN
Notary Public
COMMONWEALTH OF MASSACHUSETTS
My Commission Expires
May 14, 2021

Certification by David H. Boguslawski on behalf of Public Service Company of New Hampshire d/b/a Eversource Energy:

In accordance with RSA 162-H:8, I, David H. Boguslawski, Vice President – Transmission Strategy and Operations of Eversource Energy, do hereby swear and affirm that the information contained in this Application is true and accurate to the best of my knowledge and belief. I also certify that, as an Applicant to the New Hampshire Site Evaluation Committee, Public Service Company of New Hampshire d/b/a Eversource Energy agrees to provide such information as the Committee will require to carry out the purposes of RSA 162-H.

David H. Boguslawski

Name: David H. Boguslawski
Title: Vice President – Transmission Strategy and Operations
Date:
State of Connecticut
County of Hartford

On this 14th day of July, 2015, personally appeared before me the above-named David H. Boguslawski, Vice President – Transmission Strategy and Operations of Eversource Energy and swore and affirmed that the information contained in this Application is true and accurate to the best of his knowledge and belief.

Lynn M. Mancini

Notary Public
My commission expires on 4-30-2017

(b) APPLICANTS' INFORMATION

1) Names

Public Service Company of New Hampshire d/b/a Eversource Energy, and New England Power Company d/b/a National Grid

2) Mailing addresses, telephones, faxes and email addresses

New England Power Company d/b/a National Grid
40 Sylvan Road
Waltham, MA 02451
Attn: Mark R. Rielly, Senior Counsel
Tel. 781-907-2111
Fax 781-298-8092
mark.rielly@nationalgrid.com

Public Service Company of New Hampshire d/b/a Eversource Energy
780 North Commercial Street
Manchester, NH 03101
Attn: Christopher J. Allwarden, Senior Counsel
Tel. 603-634-2459
Fax 603-634-2438
christopher.allwarden@eversource.com

3) Name and address of Applicant's parent company, association or corporation if Applicant is a subsidiary

National Grid USA
40 Sylvan Road
Waltham, MA 02451

Eversource Energy
107 Selden Street
Berlin, CT 06037

4) If Applicant is a corporation

a. Place of incorporation

NEP - Commonwealth of Massachusetts
PSNH - State of New Hampshire

b. Principal place of business

NEP
40 Sylvan Road
Waltham, MA 02451

PSNH
780 North Commercial Street
Manchester, NH 03101

c. Names and addresses of principal directors, officers and stockholders

The names and addresses of the principal directors and officers of New England Power Company d/b/a National Grid can be found in Appendix A. National Grid USA holds 100% of the outstanding common stock of New England Power Company.
The names and addresses of the principal directors and officers of Public Service Company of New Hampshire d/b/a Eversource Energy can be found in Appendix B. Eversource Energy is the owner of 100% of the outstanding common stock of Public Service Company of New Hampshire.

5) If Applicant is an association, names and residences of association members

Not applicable.

6) Whether Applicant is owner or lessee of site or facility, or has some legal or business relationship to it

NEP and PSNH will own and operate their respective portions of the Project. The Applicants' ownership of the new 3124 Line will change at the boundary between the NEP easement area and the PSNH easement area situated between NEP's Structure 150 and PSNH's Structure 200, which is located on the south side of David Drive in Hudson, NH about one mile north of the Pelham, NH town line (the "Demarcation Point.") The Demarcation Point will not affect operation of the Project, but will define maintenance responsibilities between the Applicants.

PSNH presently has the rights to construct, operate and maintain the Project on its ROW that extends from the point of change of ownership with NEP to the Scobie Pond 345 kV Substation in Londonderry, NH. The entire PSNH-owned portion of the Project will follow an existing, continuous PSNH ROW through the Towns of Londonderry and a part of Hudson, where the Demarcation Point is located. This ROW varies in width from 216.5 feet to 635 feet comprising either fee-owned PSNH land or permanent easements owned by PSNH specifically for the purpose of constructing, operating and maintaining electric power transmission lines.

NEP presently has the rights to construct, operate and maintain the Project on its ROW that extends from the Massachusetts border to the Demarcation Point. The rights are via fee-owned parcels and/or various easements. NEP will own and operate that portion of the Project from the Demarcation Point south to the Massachusetts border through a portion of the Town of Hudson and then through the Towns of Pelham and Windham.

7) Statement of assets and liabilities of Applicant

Relevant excerpts of NEP's and National Grid USA's most recent audited Balance Sheets for the three years ending March 2014 are attached hereto as Appendix C.
Relevant excerpts of PSNH's and Eversource's most recent audited Balance Sheets for the three years ending March 2014 are attached hereto as Appendix D.

(c) SITE INFORMATION

1) Location and site address of proposed facility

MVRP involves the construction of a new 345 kV electric transmission line within the existing transmission ROW between the NEP-owned Tewksbury 22A Substation in Tewksbury, Massachusetts and the PSNH-owned Scobie Pond 345 kV Substation in Londonderry, New Hampshire, together with the relocation of portions of the 115 kV Y-151 transmission line to accommodate construction of the new 345 kV line. Refer to Figure 1 titled USGS Project Overview Map.

The portion of MVRP located within New Hampshire, referred to herein as the "Project", extends from the Massachusetts border in Pelham, New Hampshire to the Scobie Pond 345 kV Substation. The Project includes construction of 17.9 miles of a new 345 kV transmission line within the Towns of Pelham, Windham, Hudson and Londonderry, and the relocation of 7.6 miles of the 115 kV Y-151 transmission line within the Towns of Pelham, Windham and Hudson.

For purposes of discussion in this Application, MVRP has been divided into four Segments delineated by state, ownership, and line alignment. Segment 1 is located entirely in Massachusetts and is not discussed in this Application. Segments 2, 3 and 4 are described below. Refer to Figure 2 titled NH USGS Project Overview. A more detailed description of the routes in each of these Segments is provided in Section (h) below.

Segment 2 (NEP): Massachusetts border to NEP/PSNH Demarcation Point (Between NEP Structure 150 and PSNH Structure 200)

Segment 2 is the 8.1-mile section of the Project to be owned and operated by NEP. The Segment begins in Pelham at the Massachusetts border and passes through the Towns of Windham and Hudson, where it ends at the Demarcation Point. The Segment is currently occupied by three existing overhead transmission lines (the 230 kV O-215 and N-214 Lines and the 115 kV Y-151 Line) for 7.6 miles.

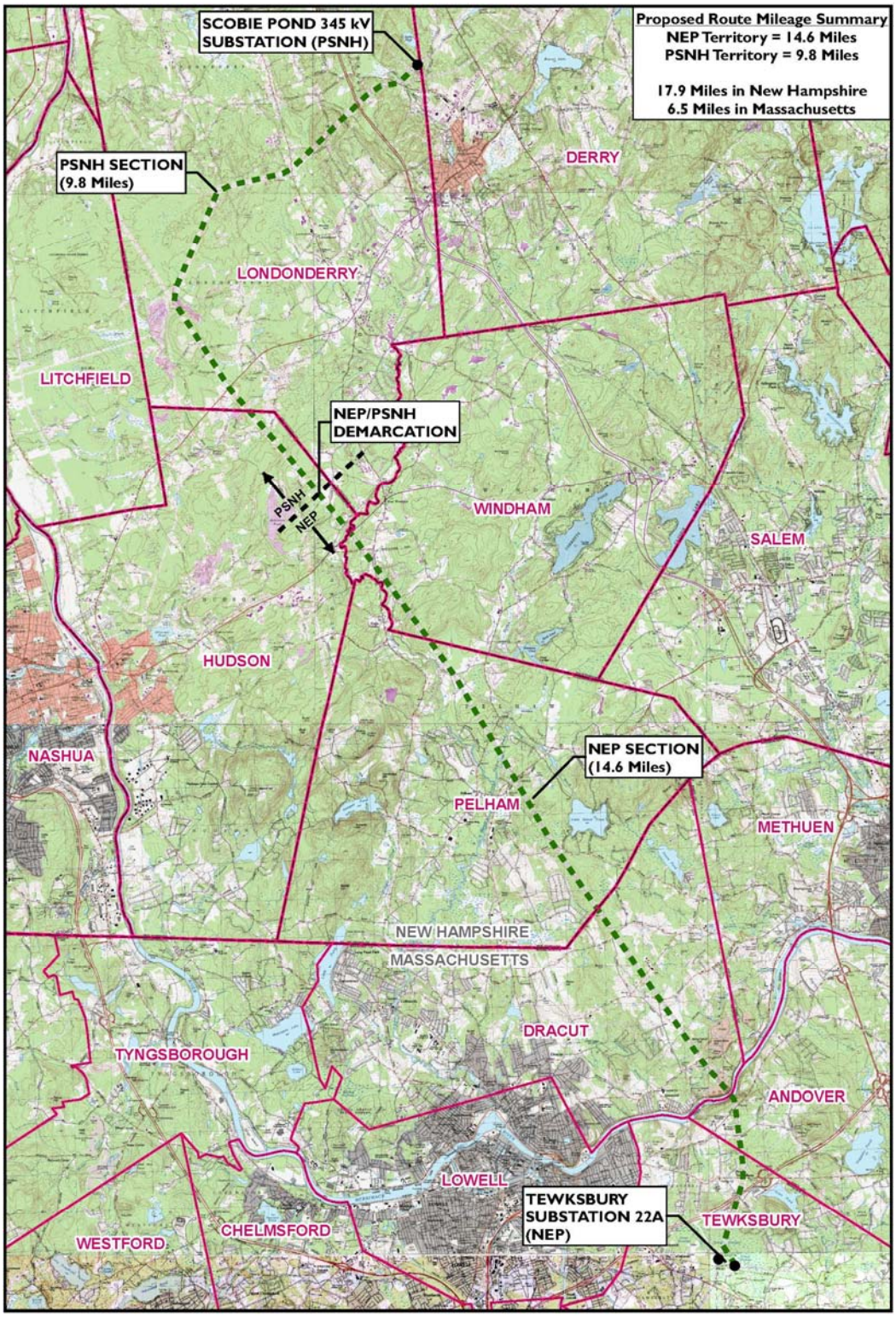
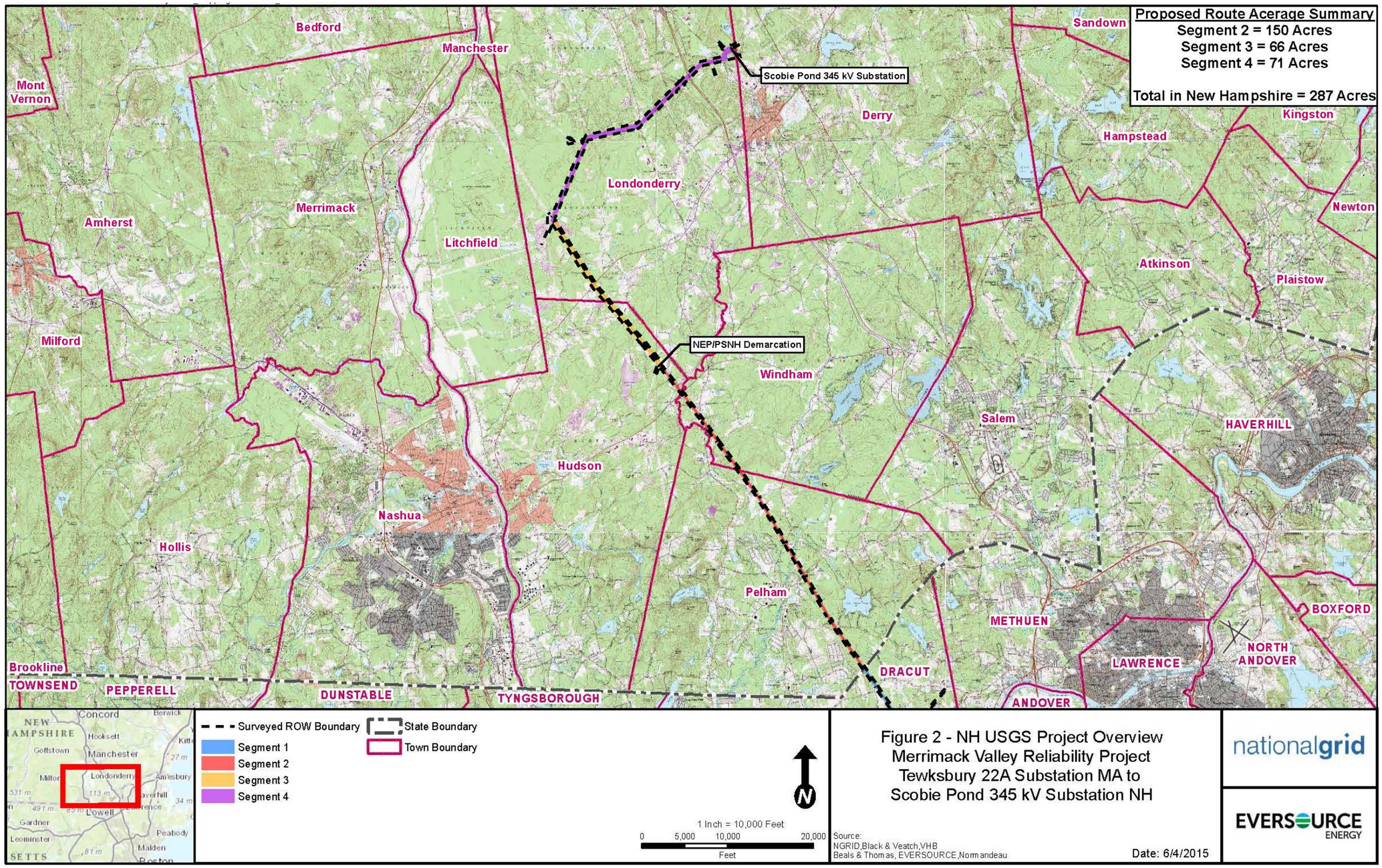


Figure 1 - USGS MVRP Overview Map
Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

nationalgrid
EVERSOURCE ENERGY


Proposed Route Acerage Summary
Segment 2 = 150 Acres
Segment 3 = 66 Acres
Segment 4 = 71 Acres
Total in New Hampshire = 287 Acres
Scobie Pond 345 kV Substation
NEP/PSNH Demarcation
Bedford
Manchester
Mont Vernon
Derry
Sandown
Kingston
Hampstead
Londonderry
Merrimack
Amherst
Litchfield
Newton
Atkinson
Plaistow
Milford
Windham
Salem
HAVERHILL
Hudson
Nashua
Hollis
Pelham
METHUEN
BOXFORD
NORTH ANDOVER
LAWRENCE
Brookline
TOWNSEND
PEPPERELL
DUNSTABLE
TYNGSBOROUGH
DRACUT
ANDOVER
Surveyed ROW Boundary
State Boundary
Segment 1
Segment 2
Segment 3
Segment 4
Town Boundary
N
1 Inch = 10,000 Feet
0 5,000 10,000 20,000
Feet
Source:
NGRID,Black & Veatch,VHB
Beals & Thomas, EVERSOURCE,Normandeau
Date: 6/4/2015
Figure 2 - NH USGS Project Overview
Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH
nationalgrid
EVERSOURCE ENERGY

Segment 3 (PSNH): NEP/PSNH Demarcation Point to Structure 236

Segment 3 is the 3.9 mile portion of the Project located within PSNH's ROW that runs parallel to a continuation of the NEP ROW. The new 3124 Line will be installed within the eastern edge of the PSNH ROW. Segment 3 of the Project will be owned and operated by PSNH. This Segment begins as the 3124 Line leaves the NEP ROW and enters the 216.5-foot wide PSNH ROW north of Griffin Road in Hudson. It continues northwest parallel to the northeastern border of the Town of Hudson until it crosses into the Town of Londonderry, where it ends at the point in Londonderry where the PSNH ROW diverges from the parallel NEP ROW. The Segment is currently occupied by a single existing overhead 345 kV transmission line. The parallel NEP ROW contains two 230 kV lines and one 450 kV DC line.

Segment 4 (PSNH): Structure 237 to Scobie Pond 345 kV Substation

Segment 4 is the 5.9 mile portion of the Project that is located within PSNH's ROW after it diverges from the parallel NEP ROW. In this Segment, the new 3124 Line will be installed within the center of the PSNH ROW. Segment 4 will be owned and operated by PSNH. The Segment is located entirely in the Town of Londonderry. It begins south of Wiley Hill Road, and terminates at PSNH's Scobie Pond 345 kV Substation, located at 6 Brewster Road, Londonderry, NH. The number and arrangement of existing facilities along Segment 4 within the PSNH ROW varies along its length. Segment 4 is currently occupied by up to five transmission lines, depending on the location. In some areas, the ROW also contains a distribution circuit.

2) Site acreage shown on attached property map and located by scale on a U.S. Geological Survey or GIS map

The Project acreage, defined as the area required to operate and maintain the 3124 and Y-151 Lines after construction, is approximately 287 acres. This acreage includes the portions of the ROW that will contain the new structures and be maintained for line clearance, as well as the portion of the Scobie Pond 345 kV Substation to be occupied by the new 345 kV transmission line terminal. Refer to Figure 2 titled NH USGS Project Overview. The acreage of the entire Project, including both the substation footprint and the full width of the ROW from the Massachusetts border to the Scobie Pond 345 kV Substation, is 840 acres.

3) Location of residences, industrial buildings, other structures and improvements within or adjacent to the site

Refer to Appendix E, Existing Conditions Mapping that depicts the location of residences, commercial property, and other improvements within or adjacent to the Project.

4) Identification of wetlands, surface waters of the State within or adjacent to the site

Wetlands within or adjacent to the site

One-hundred and eighty-one wetlands have been identified along Segments 2, 3 and 4, accounting for approximately 163 acres. Delineated wetlands and surface waters are depicted in Appendix E, Existing Conditions Mapping.

Wetlands along Segment 2 of the Project were delineated wetland scientists from VHB in April of 2014 in accordance with the Corps of Engineers Wetland Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0 (January 2012). Wetlands along Segments 3 and 4 of the Project were previously delineated in 2012 by Normandeau Associates, Inc. in support of a previous PSNH project. During the Fall of 2014 and Spring of 2015, VHB wetland scientists reviewed and confirmed previously delineated wetland areas and extended boundaries, as needed, to include the entire Project area. VHB also delineated a number of wetlands, not previously delineated by Normandeau, that were outside the study area for the previous PSNH project.

Wetlands within the Project area include palustrine forested (PFO), palustrine scrub-shrub (PSS), palustrine emergent (PEM) and scattered palustrine open water (POW) and palustrine aquatic bed (PAB) components according to Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al., 1979, revised 1985). However, the majority of the delineated wetlands are within the limits of the existing maintained transmission ROWs and thus exhibit characteristics (e.g., vegetative cover) typical of this ROW environment.

The majority of these wetlands have seasonal hydrological regimes and a PSS cover type due to recurring ROW maintenance. Vegetation proximate to existing assets is maintained to prevent capable species from reaching a height tall enough to interfere with the overhead lines.

Several large PEM wetland complexes within the Project ROW have hydrological regimes of semi-permanently flooded to permanently flooded. The majority of these complexes lie within the northern portion of the Project area in the Towns of Hudson and Londonderry (Segments 3 and 4). These wetland complexes span the width of the ROW and in some instances extend expansively into the landscapes outside of the ROW. Some of the emergent wetland complexes are associated with unnamed perennial streams and many have an open water or aquatic bed component. The open water or aquatic bed components are likely attributable to beaver activity observed during field delineations.

Surface waters within or adjacent to the site

Thirteen perennial stream crossings and twenty intermittent stream crossings were delineated within the ROW in accordance with NH Wetlands Rules (Env-Wt 100-900) and the Corps of Engineers Wetland Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0 (January 2012). Intermittent and perennial stream designations were verified by reviewing US Geological Survey (USGS) topographic maps.

The most significant perennial streams that intersect the Project ROW are Golden Brook and Beaver Brook. Golden Brook is located in Segment 2 between Bridge Street and Windham Road in the Town of Pelham. The stream is associated with a town-designated prime wetland, known as "Lower Golden Brook Prime Wetland." Golden Brook is a tributary to Beaver Brook.

Beaver Brook crosses Segment 2 as a fourth order stream on the Windham/ Hudson town boundary and crosses Segment 4 as a second order stream south of Scobie Pond 345 kV Substation. It comes near the western limits of the Project ROW to the south of the Windham/Hudson town boundary between Winter Street and Glance Road in Windham and then flows southerly across the Massachusetts border and into the Merrimack River.

Nesenkeag Brook and Chase Brook are also tributaries to the Merrimack River. These perennial streams cross Segment 3 in the Town of Londonderry and flow in a westerly direction, discharging into the Merrimack River in the Town of Litchfield. The streams have been impacted by beaver activity, with inundated beaver ponds associated with these streams existing on the eastern side of the ROW; PEM/PSS wetland cover types are found on the western side of the ROW.

Wetlands and surface waters within or adjacent to the Project site are described in detail in the application forms, design plans, and maps provided in support of NHDES Wetlands Permit Application, NHDES Shoreland Permit Application, and NHDES 401 Water Quality Certification Application, referenced in Section (d) of this Application. These documents are included in Appendix F through H.

5) Identification of natural and other resources at or within or adjacent to site

a. Natural Resources

Rare, Threatened or Endangered Plants, Animals and Natural Communities

Review of the Project area by the NHNHB for the occurrence of known rare plant, animal and/or natural communities near the Project indicated historical records of ten rare plants, one invertebrate species, two exemplary natural communities, and five vertebrate species. The NHNHB response memorandum, dated December 17, 2014, is included as Attachment D in the NHDES Wetlands Permit Application in Appendix F. Historical

records of species identified in the NHNHB response memorandum are described in more detail in Section (i)(5).

The Project was also reviewed for the presence of federally-listed or proposed, threatened or endangered species, designated critical habitat or other natural resources of concern through the United States Fish and Wildlife Service (USFWS) Information Planning and Conservation (IPaC) System. A result letter dated May 15, 2015, indicated no listed species or critical habitats are located within the Project area. The USFWS letter is included as Attachment D in the NHDES Wetlands Permit Application in Appendix F.

The applicants will develop an approach to completing surveys for listed species in consultation with these agencies and with the New Hampshire Fish and Game Department (NHF&G). These surveys have been and will be conducted in accordance with approved protocols to identify or exclude species within Project impact areas and to help refine avoidance measures and determine whether additional mitigating actions are required for listed species. Additional information regarding these surveys and agency consultations is set out in Section (i)(5).

Wildlife Habitat Resources

NHF&G has identified wildlife habitat cover types across New Hampshire as part of the statewide WAP. VHB field-verified wildlife habitat land cover types for the Project area and those delineated types were modified in accordance with the field observations. Refer to Appendix I, Wildlife Habitat Land Cover Type Mapping to view mapped wildlife habitat land cover type maps for the Project area. Additional information on these wildlife habitat resources is provided in Section (i)(5).

The ROW is predominantly surrounded by residential development and undeveloped forested land, with some limited agricultural land use and also intersects several conservation land parcels. Additional information is provided in Section (i)(5).[8]

b. Cultural and Historical Resources

The NHDHR cultural resource files were reviewed to identify previously recorded above-ground historic properties and below-ground archaeological sites within the Project's study area. The review of above-ground historic resources covered a one-quarter mile area on each side of the Project's centerline; for archaeological resources, the review covered an area one-half mile on each side of the Project's centerline. The review also included

8 The maintained ROW provides an important travel corridor within suburban areas and early successional habitat that complements large mature forest blocks. An example of these two complimentary habitats is found in the Musquash Conservation area in Londonderry, NH that is adjacent to the Project ROW. The forested conservation area and the adjacent ROW are ranked as "Highest Ranked Habitat in New Hampshire" according to the WAP. In addition, the Project area includes other areas of wildlife habitat identified as "Highest Ranked Habitat in New Hampshire", Appendix I.

properties and resources that are listed or evaluated as eligible for listing in the State or National Registers and other surveyed properties that have not been evaluated for registration, as well as cultural resource management (CRM) reports, town histories and historic maps salient to the Project study area and immediate vicinity.

PAL conducted a file review and field survey. The results of this work are set out in a Due Diligence Report (Appendix J), and a Phase IA Report (Appendix AM).[9] PAL conducted a Phase IA walkover inspection of Segment 2 (the NEP portion of the ROW).[10] Segments 3 and 4 of the Project previously underwent a Phase IA archaeological survey and NHDHR project review[11] for a prior PSNH project. This prior Phase IA review did not recommend further archaeological survey, and the prior project received a determination of no effect from NHDHR (R&C #4356). See Appendix L.

Photographs were taken of the ROW and of known historic properties adjacent to the ROW. Information as to whether the archaeological sites and the historic architectural properties are listed or have been evaluated as eligible for listing in the State or National Registers is provided in the tables below. Archaeological sensitivity maps of the ROW are provided in Appendix AM. The Phase IA report meets the standards and guidelines set forth in NHDHR's *Archaeological Standards and Guidelines* (revised May 2004) and in the Secretary of the Interior's *Standards and Guidelines for Archaeology and Historic Preservation*.

Table 1. Evaluated Architectural Properties Recorded within One-Quarter Mile of the Project

NHDHR #	Historic Name	Date Built	Type of Structure	Address	Architectural Style	NR/SR Eligible Yes/No
LON0097	Unknown	1940	Single Family Dwelling	10 Rockingham Rd, Londonderry	Colonial Revival	No
LON0098	L.A. McGregor House	1855	Single Family Dwelling	18 Rockingham Rd, Londonderry	Greek Revival	No
LON0099	Unknown	1920	Single Family Dwelling	22 Rockingham Rd, Londonderry	Bungalow	No
PEL0012	Castle Hill Road Bridge	1905-1914	Bridge	Castle Hill Rd, Pelham/Windham	Timber Stringer	No

9 The Phase IA survey is designed to field check visible evidence of the known archaeological sites listed in the Due Diligence Report and verify the preliminary assessment of the potential for archaeological sites to be present within the Project ROW (sensitivity).

10 PAL archaeologists conducted the systematic walkover of potentially sensitive areas within the ROW to examine the ground surfaces and existing conditions.

11 The review was conducted for the PSNH 326 Line Thermal Uprate Project (Bunker, 2011).

The Project study area does not include any historic properties listed in the National Register of Historic Places ("National Register"). Four architectural properties are recorded in the NHDHR inventory within a one-quarter mile area on either side of the Project's centerline and were evaluated for their potential to be listed in the National Register. Archaeological sites within the study area include four post-contact sites and seven pre-contact sites in New Hampshire.[12]

Seven pre-contact sites are recorded within one-half mile of the Project centerline, the majority of which have little information on file. Results of research indicate that several find spots (defined as less than three pieces of cultural material) and three larger pre-contact Native American archaeological sites (27-HB-209, 27-RK-301 and 27-HB-225) are within one-half mile of the Project centerline. The Pelham Incinerator Site is located within the ROW along Golden Brook in Pelham. The Beaver Brook Site (27-HB-225) is located on Beaver Brook approximately a quarter mile south of the Project in Pelham. This site is interpreted as a pre-contact open habitation site (NHDHR site files). Site 27-RK-301, also along Beaver Brook, is approximately one mile north in Londonderry (TRC 1999). Several isolated finds are also within one mile of the Project area. Of particular interest is a single non-diagnostic lanceolate bifacially-flaked tool identified on the north side of Beaver Brook, just north of the Project area (TRC 1999). The Parmenter Farm Site (27-RK-0022) in Londonderry yielded Late Archaic (ca. 5000 to 3000 years before present) small stemmed projectile points and large blades. The site is located approximately one-half mile northeast of the ROW along Nesenkeag Brook.

Table 2. Unevaluated Post-Contact Archaeological Sites Recorded within One-Half Mile of the Project

Name	NHDHR #	Town	Site Type and Period
Lithia Springs	27-RK-0108	Londonderry	Residential and commercial/unknown
Stonehenge Road Farmstead	27-RK-372	Londonderry	Residential/20th century
Aiken Saw Mill	27-RK-0021	Londonderry	Industrial/ca. 1722
Melvin Farm	27-HB-0186	Hudson	Residential and agricultural/1858-1900

12 Pre-contact sites are sites that date before written records or European contact. Post-Contact sites date from the time of European contact.

Table 3. Unevaluated Pre-Contact Archaeological Sites Recorded within One-Half Mile of the Project

Name	NHDHR #	Town	Site Type and Period
Parmenter Farm	27-RK-0022	Londonderry	Unknown/Late Archaic
Viner Site	27-RK-106	Londonderry	Unknown/Indeterminate Woodland
Unknown	27-RK-107	Londonderry	Unknown/Unknown
Unknown	27-RK-301	Londonderry	Open habitation/Indeterminate Woodland
Access Road Site	27-RK-442	Londonderry	Unknown/Unknown
Pelham Incinerator Site	27-HB-209	Pelham	Habitation and workshop/Late Archaic
Beaver Brook	27-HB-0225	Pelham	Open habitation/Late Archaic

The geographical location of the Project, within the Merrimack Valley and adjacent to several feeder streams including Beaver, Golden, and Nesenkeag brooks, situates it within a zone of resources that would have been exploited by groups of pre-contact Native Americans. The discovery of an "Indian dugout canoe" in Scobie Pond in 1936 (NH-45-109) also suggests passable waterways and travel routes would have been easily accessible from this area (NHDHR site files).

For the post-contact period, the majority of the Project area falls outside the cores of major post-contact period development. A review of historical sources indicates that the Project area was sparsely settled and likely used for agricultural activities during most of the post-contact period (Hurd 1885, 1892; Sherburne 1900; USGS 1905). Four post-contact archaeological sites are recorded within a half mile of the Project centerline, three in Londonderry and one in Hudson. The Aiken Saw Mill Site (27-RK-21), located approximately one-half mile north of the Project, consists of a stone lined mill race, a stone wall, mill pond (Aiken Pond) and foundation dating to 1722 (NHDHR site files). The remaining three sites are residential in nature, containing foundations, and date to the late nineteenth and twentieth century.

A Request for Project Review (RPR) form has been prepared and submitted to the NHDHR. Refer to Appendix K. The components of the RPR form include a Project description; identification of the lead federal agency; a topographic map; description of the Project's areas of potential effect both visual and physical; known past disturbances or alterations; proposed Project plans; photos of the Project area; results of the site file research and field review; and information on prior cultural resource surveys.

c. Community Resources and Development

A map series depicting community resources in relation to the Project is included in Appendix M. No boat launches, correctional institutions, fire stations, hospitals, law enforcement buildings, nursing homes, and public health departments were identified

within 1,000 feet of the Project ROW.[13] The majority of identified community resources are publicly-owned lands, some of which are designated for conservation.

Conservation and Public Lands Proximate to the Project

Conservation and public lands are generally available for use by the public and thus are considered to be community resources. The Project ROW crosses eleven parcels designated as conservation land in Pelham, one in Windham, three in Hudson and five in Londonderry. It also crosses one publicly-owned parcel in Windham, one in Hudson, and four in Londonderry.

Table 4. Conservation and Public Lands Proximate to the Project

Town	Conservation Land	Number of Lots	Public Land	Number of Lots
Pelham	Unnamed Conservation	3		
	Peabody Town Forest	4		
	Unnamed Conservation	1		
	Unnamed Conservation	3		
Windham	Beaver Brook Parcel	1	Unnamed Public Land	1
Hudson	Leslie C. Bockes Memorial Forest	1	Unnamed Public Land	1
	Griffin Road Lot	1		
	David Drive Lot	1		
Londonderry	Unnamed Conservation	1	Unnamed Public Land	1
	Sunnycrest Orchards	1	Unnamed Public Land	1
	Lordes Parcel	1	Unnamed Public Land	1
	Musquash Conservation Area	1	Unnamed Public Land	1
	Granite State Rail Trail	1		

The Project ROW was established prior to the designation of these lands for conservation. Therefore, public use of these lands has always co-existed with the utility use of the ROW. Any limitations placed on public use of these lands during construction (e.g., restrictions on access to the ROW) will be temporary. Required tree clearing within conservation and public lands in the Towns of Hudson and Londonderry will be coordinated with the landowners.

13 Atwood Cemetery in Pelham is located in the vicinity of Segment 2 and Christian Fellowship Baptist Church is located in the vicinity of Segment 4. Also, a Londonderry recreational facility is located in the vicinity of Segment 4.

6) Information to show site and facility will not unduly interfere with orderly development of the region and due consideration was given to views of municipal and regional planning commissions and municipal governing bodies

The Project is consistent with the goals and strategies of local and regional plans and will not unduly interfere with the orderly development of the region. The Project will ensure the reliability of electric service in the region and will use existing corridors so as to minimize impact on local land use patterns.

The SEC has previously found that utilizing pre-existing corridors is consistent with the orderly development of the region because it maintains current development patterns and minimizes impacts to local land use.[14] Because the Project is located in a pre-existing electric utility corridor, it minimizes impacts to local land use and is thus consistent with the SEC's prior findings. The existing transmission lines within the ROW have not hindered the significant residential and commercial growth that has occurred adjacent to the corridor over the past few decades.

The Applicants have considered information from local and regional planners, planning commissions and municipal governing bodies (as expressed in local and regional master plans and in other long range planning documents and local ordinances), as well as public comment from planning boards, town councils and boards of selectmen.

Project Consistency with Regional Plans

The Project area encompasses two regional planning commissions, the Southern New Hampshire Planning Commission (SNHPC) and the Nashua Regional Planning Commission (NRPC). Each commission's long-range planning documents were reviewed to understand their respective development goals and policies. The effects of the Project on orderly development were then evaluated for each planning commission's region.

14 *See* Decision in Portland Natural Gas Transmission System Maritimes & Northeast Pipeline Company, NH SEC, Docket No. 96-01 and Docket No. 96-03 (July 16, 1997); Findings of the Bulk Power Facility Site Evaluation Committee, NH SEC DSF 850-155 (Sept. 16, 1986).

The regional plans for both the SNHPC[15] and the NRPC[16] contain data and analysis for the long-term future of the regions. Both plans discuss energy in general terms, but are not directly applicable to the Project; however, both note the need for more reliable energy in the region. The Project will help to meet this need while utilizing existing transmission corridors to minimize impact on local land use patterns, which is also consistent with the orderly development of the region.

Project Consistency with Municipal Plans

In addition to regional plans, local master plans and zoning ordinances were also reviewed. In general, the Project is consistent with local master plans in Londonderry,[17] Hudson,[18] Windham,[19] and Pelham[20] as it will be located within an existing transmission corridor that pre-dates much of the development in the communities and thus minimizes impacts to local land use. The municipal master plans call for new development to occur adjacent to already developed areas in order to protect open space and minimize environmental impacts from

15 The SNHPC is the regional planning agency for 15 communities in the Manchester area. The region includes portions of Rockingham, Hillsborough, and Merrimack Counties. The Project area communities of Londonderry and Windham are located within the SNHPC Region. The SNHPC Regional Plan is called "Moving Southern New Hampshire Forward FY2012-2015". The Energy Chapter discusses the need to balance environmental policy decisions with the need for energy choices, prices, and reliability. The Chapter does not make any specific recommendations directly applicable to the Project, however; as the Project proposes to use existing ROW, it will not alter local land use patterns. The Project will not unduly interfere with the SNHPC development plans.

16 The NRPC is the regional planning agency for 13 communities in the Nashua area. The region is located entirely in Hillsborough County. Project area communities of Hudson and Pelham are located within the NRPC Region. The NRPC updated its regional plan in 2014 and one of its main goals is to maintain a high quality of life, characterized by the Region's small-town feel and suburban setting. The NRPC regional plan discusses energy as part of the Environmental Chapter. The Chapter is primarily focused on energy efficiency and green building in the region and is not directly relevant to the Project though, in assessing existing conditions in the region, the plan notes the region lacks any large scale energy production. The Project is consistent with the NRPC regional plan as it seeks to support the need for reliable energy. The Project will not interfere with the orderly development of the region, contradict NRPC's future development goals or alter local land use patterns because of the Project's use of an existing ROW. The Project will not unduly interfere with the NRPC development goals.

17 Londonderry's 2012 Town Master Plan recognizes that investment in infrastructure is necessary for future economic success, includes a discussion of energy and fuel supplies and recognizes that future expansion will be necessary to meet increased demand.

18 Hudson's 2006 Master Plan outlines goals and objectives and addresses population and housing, natural resources, economic development, transportation, existing land use, historic resources, community facilities and future land use. The Town encourages commercial growth in already developed areas with adequate utility services and direct access to the State-designated highway system.

19 The 2005 Windham Master Plan and the 2015 Master Plan update (in progress), contain the goal of strengthening the electric infrastructure while avoiding development impacts by remaining consistent with existing land use patterns.

20 The most recent Pelham Master Plan was adopted in 2002 and promotes the preservation, protection and enhancement of well-balanced land use patterns capable of meeting present and future community needs in an efficient, environmentally sound, economical, equitable and aesthetically pleasing manner.

development. The Project is consistent with this goal and will not disrupt or interfere with the implementation of local master plans.

Public Input

In addition to consideration of information from the local and regional planning commissions and municipal governing bodies described above, the Applicants considered input received at public presentations with those bodies during the required pre-filing public information sessions.

Input from Local Government and Planning Commissions

The Applicants held a series of meetings with and conducted presentations to municipal boards in the Towns of Londonderry, Hudson, Windham and Pelham. At these meetings, the Applicants and Project consultants made oral presentations, provided written information, answered questions about the Project, and engaged in discussions about the Project with municipal officials and planners from each town. The Applicants also met with staff from the Nashua and Southern NH Regional Planning Commissions. A comprehensive list of outreach meetings can be found in the Merrimack Valley Reliability Project Outreach Summary, Appendix N.

Pre-Filing Sessions

Following specific notice[21] to municipal officials and other elected representatives, to residents living along and near the Project route, and to other interested parties, the Applicants hosted combined open houses and public information sessions in Rockingham and Hillsborough Counties.[22]

During the open house components of each session, members of the public had the opportunity to talk one-on-one with Project representatives and subject matter experts and to obtain informational materials. Several informational kiosks were available for individual discussion on various Project-related subjects, including the fundamentals of electricity delivery, the need for the Project and its benefits, and Project environmental impacts. Route locators were set up to help the public identify the proposed structure and line locations, along with the ROW and abutting property boundaries.

The open house portion of the event was immediately followed by a public information session which began with the presentation of a Project video and a brief presentation from

21 Legal notices for the public information sessions were placed in the Union Leader, Nashua Telegram and Lawrence Eagle Tribune on April 15, 2015. Paid advertisements were also placed in the local newspapers to further inform the public of the upcoming public information sessions. The notices included information concerning the date, time, location and purpose of the sessions.

22 Each session was held from 5:30 pm to 9:00 pm. The Rockingham session was held in Londonderry at the Matthew Thornton Elementary School on May 6, 2015. The Hillsborough session was held in Hudson at Hudson Memorial School on May 7, 2015.

the Applicants. The presentation was followed by a moderated question and answer and public comment period which was transcribed and is being provided to the SEC as part of the Application.

In addition to above, NEP hosted additional community meetings in Windham and Pelham on March 11 and March 12, respectively. Similar notice was provided to local officials, elected representatives and residents, especially abutters. As with the open houses, the events followed an information trade show style format where members of the public could speak one-on-one with various experts from the project team.

Post Filing Sessions

Within 45 days after the Application has been reviewed and accepted by the SEC, the Applicants will host two additional public information sessions in Hillsborough County and in Rockingham County. Each public information session will be preceded by a second open house to discuss the Project and record further comment from the public.

Summary

All of the foregoing information, together with the additional information in Sections (j)(1) through (j)(3) and the pre-filed testimony of Robert Varney, James Chalmers, Alfred Morrissey, and Lisa Shapiro, demonstrates that the Project is consistent with the orderly development of the region.

(d) INFORMATION ABOUT OTHER REQUIRED PERMITS AND APPLICATIONS

1) Identification of all other federal and state government agencies having jurisdiction, under state or federal law, to regulate any aspect of the construction or operation of proposed facility

RSA 162-H:7, IV provides that "[e]ach application shall contain sufficient information to satisfy the application requirements of each state agency having jurisdiction, under state or federal law, to regulate any aspect of the construction or operation of the proposed facility, and shall include each agency's completed application forms."[23] The statute thus requires an Applicant to submit information that satisfies the application requirements of the "state agencies having permitting or other regulatory authority."[24] The Applicants acknowledge that under Site 301.03(d) the SEC may require the filing of additional information relative to other agencies and other aspects of regulation and regulatory compliance under its rulemaking authority. However, as discussed below, the Applicants submit that the statute limits the agencies that may make agency-specific completeness determinations to those state agencies that make final decisions.

Pursuant to the statute, each state agency having permitting or other such regulatory authority must determine if an Application contains "sufficient information for its purposes" to make a final decision.[25] Accordingly, the Applicants believe that only those state agencies that make a final decision by issuing a permit, order or decision within the time limits established in RSA 162-H:7, IV-c, may participate in making a completeness determination under the statute. Those state agencies include NHDES, New Hampshire Public Utilities Commission (NHPUC), and New Hampshire Department of Transportation (NHDOT).

An agency's purpose under the statute must be read in the context of its other requirements under the statute, namely, those that require an agency having permitting or other regulatory authority to report its progress to the SEC within 150 days and to make a final decision within 240 days.[26] This position is consistent with the fundamental goal of resolving all issues in an integrated fashion, as set forth in RSA 162-H:1. Moreover, the statute recognizes that agencies having permitting or other such regulatory authority over a project comprise only those agencies that may dictate terms and conditions in a permit or decision, or deny a necessary approval altogether.[27]

The Applicants' view is further reinforced by the recent amendments to RSA 162-H, specifically, the addition of RSA 162-H:7-a, which recognizes the two basic ways in which state agencies may participate in SEC proceedings, i.e., as an agency that makes a final

23 RSA 162-H:7, IV.
24 *Id*.
25 *Id*.
26 RSA 162-H:7, VI-b and VI-c.
27 RSA 162-H:16, I.

decision, or as an agency that takes a position on how the SEC should make a particular finding.

Federal Agencies

- US Army Corps of Engineers (USACE) (Clean Water Act, 33 U.S.C. § 1344 *et. seq*., relative to wetland protection as addressed through the New Hampshire Programmatic General Permit);
- US Environmental Protection Agency (USEPA) (Clean Water Act, 33 U.S.C. § 1251 *et. seq*., relative to the National Pollutant Discharge Elimination System (NPDES) Construction General Permit);
- Federal Aviation Administration (FAA) (14 C.F.R. § 77.9 relative to the preservation of navigable airspace, an air obstruction determination under FAA Regulation Part 77.9(b) is required);[28] and
- US Fish and Wildlife Service (USFWS) Endangered Species Act (ESA) of 1973, 16 U.S.C. § 1531, *et. seq*., relative to protection of federally-listed threatened and endangered species as addressed under the New Hampshire Programmatic General Permit).[29]

State Agencies[30]

a. State Agencies That Make An Agency Completeness Determination

- NH Department of Environmental Services (NHDES), Water Division, Wetlands Bureau (RSA Ch. 482-A, relative to dredge and fill in wetlands as addressed under the NHDES Wetlands Permit Application);
- NHDES, Water Division, Alteration of Terrain (AoT) Bureau (RSA 485-A:17, relative to surface water runoff from land disturbance as addressed under the NHDES Alteration of Terrain Permit Application);
- NHDES, Water Division, Watershed Management Bureau (Clean Water Act, 33 U.S.C. § 1341 *et. seq*., related to state certification that the USACE permit complies with state water quality standards as addressed by Water Quality Certification # 2012-404P-002);

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

29 The USFWS results letter is included as an Attachment within Appendix F.

30 NHDES, Water Division, Groundwater Discharge Permitting and Registration Program and NH Department of Resources and Economic Development (NHDRED), Bureau of Trails will not be exercising jurisdiction or participating in the Site Evaluation Committee Process. See Appendix AE for a summary of regulatory agency consultations.

- NHDES, Water Division, Wetlands Bureau, Shoreland Program (RSA Ch. 483-B, the Shoreland Water Quality Protection Act, establishes standards for development adjacent to the state's public water bodies as addressed under the NHDES Shoreland Permit Application);
- NHDES, Solid Waste Management Bureau (RSA Ch.149-M, Solid Waste Management Act, relating to proper management of solid waste);[31]
- NH Department of Transportation (NHDOT) (RSA Ch. 236, 231 and 265 relative to regulation of the highway system, requires permits for utility crossings and use of NHDOT ROWs); and
- NH Public Utilities Commission (NHPUC) (jurisdiction relative to crossings of public waters and lands under RSA 371:17 as addressed under the two NHPUC License Applications).

b. Other State Agencies

- NH Division of Historical Resources (NHDHR) (National Historic Preservation Act, 16 U.S.C. § 470 and RSA Ch. 227-C regarding cultural resource protection as addressed under the New Hampshire Programmatic General Permit);[32]
- NH Natural Heritage Bureau (NHNHB) (authority under RSA Ch. 217-A, the NH Native Plant Protection Act, to review impacts to state-listed rare, threatened, and endangered plant species as addressed under the NHDES Wetlands Permit Application);[33]
- NH Fish & Game Department (NHF&G) (authority under RSA Ch. 212-A, the NH Endangered Species Conservation Act, to review impacts to state-listed rare, threatened, and endangered wildlife species as addressed under the NHDES Wetlands Permit Application); and
- NH Department of Safety, Division of Fire Safety, State Fire Marshal (RSA Ch. 21-P:12 relative to the responsibilities of the State Fire Marshal, ensuring compliance with the NH State Fire Code and the NH State Building Code through the review of plans prior to construction).[34]

31 The NHDES Solid Waste Management Bureau advised the Applicants that a permit is not required for this Project; however, the Bureau requested a schedule for construction and the submittal of information following construction.

32 The NH Division of Historical Resources Request for Project Review and correspondence with NH Division of Historical Resources is documented in Appendices K, L and AC.

33 NH Natural Heritage Bureau's data check results letter and correspondence with NH Natural Heritage Bureau, NH Fish and Game Department, and US Fish and Wildlife Service is included as Attachment D within Appendix F.

34 The State Fire Marshal within the NH Department of Safety, Division of Fire Safety, was consulted and will not be participating in the Site Evaluation Committee Process. See Appendix AE for documentation of consultation with the State Fire Marshal's office.

2) Documentation that demonstrates compliance with the application requirements of such agencies

Documentation demonstrating compliance with the application requirements of the State and federal regulatory agencies listed in (d)(1) above has been included within the agency application forms and supporting documentation contained in the Appendices listed in the following Section (d)(3).

Applications for certain construction related approvals from State and federal agencies will be filed by contractors after: (1) the SEC site certificate and other approvals listed above are issued; (2) equipment is ordered; and (3) field work is ready to begin. These may include, if necessary:

- NHDOT Special Permit to move a load in excess of legal limit;
- NHDOT Driveway / Curb Certification;
- New Hampshire Department of Resource and Economic Development (NHDRED) Notice of Intent to Cut;
- NPDES Construction General Permit;
- FAA Form 7460-1, Notice of Proposed Contruction or Alteration;
- Blasting Permit (local Fire Department); and
- NHDES approval of marshalling yards, laydown areas, and accessways.

3) A copy of the completed application form for each such agency

Copies of the relevant permit application forms have been included in the filings appended as follows:

Appendix F: NHDES Wetlands Permit Application

Appendix G: NHDES Shoreland Permit Application

Appendix H: NHDES Section 401 Water Quality Certification

Appendix O: NHDES Alteration of Terrain Permit Application

Appendix P: NHDOT Permit Applications[35]

- Driveway permit application(s)

35 Appendix P also includes an Application for a Railroad Crossing Agreement and Temporary Use Agreement for the Manchester/Lawrence Recreational Rail Trail.

- Aerial utility permit application(s)

Appendix Q: NHPUC Petition for Licenses[36]

- Construct and Maintain Electric Lines, Static Wires and Fiber Optic Cable Over and Across Beaver Brook and a parcel of land owned by NHDOT in the Town of Windham, New Hampshire
- Construct and Maintain Electric Lines, Static Wires and Fiber Optic Cable Over and Across State Lands in the Town of Londonderry, New Hampshire

4) Identification of any requests for waivers from the information requirements of any state agency or department whether represented on the committee or not.

The Applicants are requesting a waiver from Alteration of Terrain Rule Env-Wq 1504.09 that specifies the requirements to prepare a Stormwater Drainage Report, Drainage Area Plans and Hydrologic Soil Group Plans in support of an Alteration of Terrain Permit Application.[37]

36 Along with the Application for a Certificate of Site and Facility, the Applicants will have contemporaneously submitted two petitions for licenses with the New Hampshire Public Utilities Commission, namely, for approval to construct and maintain electric transmission lines, static wires, and fiber optic cables over and across public waters and certain state lands.

37 For additional information on the waiver request, please see NHDES Alteration of Terrain Permit Application, Appendix O, p. 46.

(e) ENERGY FACILITY REQUIREMENTS

It is the position of the Applicants that the Project is not subject to Site 301.03(e).[38] However, the Applicants will address this section of the rules, as follows:

1) The type of facility being proposed

As described in Sections (g) and (h)(1), the type of energy facility proposed is a new 345 kV electric transmission line.

2) A description of the process to extract, produce, manufacture, transport or refine the source of energy;

Not applicable.

3) The facility's size and configuration

As described in Sections (g) and (h)(1), the Project will consist of a new 345 kV electric transmission line that is 24.4 miles long, 17.9 miles of which will be located in New Hampshire, and will primarily be constructed on H-frame suspension structures.

4) The ability to increase the capacity of the facility in the future

The capacity of the new 345 kV electric transmission line could not increase in the future without additional construction, namely, the replacement of the currently proposed conductor. The new line is designed to serve foreseeable needs and, therefore, the Applicants have no plan to undertake such construction.

5) Raw materials used

a. An Inventory, including amounts and specifications

Not applicable.

b. A plan for procurement, describing sources and availability

Not applicable.

c. A description of the means of transporting

Not Applicable.

38 Indeed, the draft SEC rules specifically provide that section 301.03(e) is not applicable to an "electric transmission line." *See* N.H. Site Evaluation Committee, Draft Rules Site 301.03(e) (Dec. 22, 2014).

6) Production information

a. An inventory of products and waste streams

Not Applicable.

b. The quantities and specifications of hazardous materials

Not Applicable.

c. Waste management plans

Not Applicable.

(f) ELECTRIC GENERATING UNIT: BULK POWER FACILITY OR RENEWABLE ENERGY FACILITY

The Project is not an electric generating unit that is either a bulk power facility or a renewable energy facility; therefore, this section does not apply.

(g) TRANSMISSION LINE

1) Location shown on U.S Geological Survey Map

A USGS map depicting the Project location is included as Figure 1 and 2.

2) Corridor width

a. New route

Not applicable; the Project is proposed wholly within existing NEP and PSNH ROW.

b. Widening along existing route

The existing ROW for the Project, which varies in width from 216.5 feet to 635 feet, will not be expanded.

Within the existing ROW there will be some tree clearing. As described in Section (c)(1) above, for purposes of discussion in this Application, MVRP has been divided into four Segments, delineated by state, ownership, and line alignment with Segments 2–4 located in New Hampshire and defined as the Project. The clearing requirements for Segments 2, 3 and 4 are described below. Multiple cross-sections applicable to each Segment are set out in the Engineering Drawings, Appendix R, and referenced in the narrative associated with each Segment below.[39]

Segment 2 (NEP): Massachusetts border to NEP/PSNH Demarcation Point (Between NEP Structure 150 and PSNH Structure 200)

Segment 2 encompasses NEP cross-sections 8 and 9.[40] Side line trimming to accommodate the relocated 115 kV Y-151 line and meet current vegetation management standards is expected in select areas.

Segment 3 (PSNH): NEP/PSNH Demarcation Point to Structure 236

Segment 3 is represented by PSNH cross-section I.[41] In this Segment, up to 90 feet of tree clearing within the existing limits of the ROW will be required to the east of the existing

39 NEP cross-sections 1–7 are related to Segment 1 in Massachusetts and are not part of this Application. In the Project sections described herein and in the drawings, NEP cross-sections utilize an Arabic numbering order. PSNH cross-sections utilize Roman numerals.

40 Engineering Drawings, Appendix R, National Grid Drawings 400298-C-X-08(E/P) and. 400298-C-X-09(E/P)

41 Engineering Drawings, Appendix R, Eversource Drawing S3124-P005 SH. 1

345 kV line. The area to be cleared is entirely within the existing PSNH ROW and the entire width of the ROW needs to be cleared to accommodate the 3124 Line.

Segment 4 (PSNH): Structure 237 to Scobie Pond 345 kV Substation

Segment 4 encompasses PSNH cross-sections II through XII.[42] In this Segment, approximately 50 feet of tree clearing will be required within the middle of the existing ROW to accommodate the 3124 Line.

3) Length of line

Within New Hampshire, the new 345 kV 3124 Line will be approximately 17.9 miles long. The Project also includes the relocation and reconstruction of 7.6 miles of the 115 kV Y-151 Line in New Hampshire.

4) Distance along new route

Not applicable.

5) Distance along existing route

Within New Hampshire, the new 345 kV 3124 Line will be approximately 17.9 miles long. The Project also includes the relocation and reconstruction of 7.6 miles of the 115 kV Y-151 Line in New Hampshire.

6) Voltage (design rating)

The 3124 Line has been designed and will operate at a nominal system voltage of 345 kV alternating current (AC). The Y-151 Line will continue to operate at its design voltage of 115 kV.

7) Any associated new generating unit or units

Not applicable.

42 Engineering Drawings, Appendix R, Eversource Drawing S3124-P005 SH. 1 and SH. 2

8) Type of Construction

Transmission Line Construction Activity Sequence

The new 3124 Line and required line reconfigurations will be constructed utilizing conventional overhead electric transmission line construction techniques. The transmission line will be constructed in a progression of activities typically proceeding as follows:

- Establishment of marshalling yard and laydown area locations;
- Removal of ROW vegetation and mowing in advance of construction;
- Installation of soil erosion and sedimentation controls;
- Construction of access improvements, as needed
- Construction of work pads and pulling sites;
- Removal and disposal of existing transmission line components;
- Installation of foundations and structures;
- Installation of conductor and shield wire;
- Restoration of the ROW; and
- Testing and Commissioning.

Removal and disposal of existing transmission line components will be necessary only in Segment 2 as existing 115 kV Y-151 line assets will need to be removed from the ROW prior to the new 3124 Line assets being installed. Each of the transmission line construction activities listed above is described in detail in the following sections.

Establishment of Marshalling Yard and Laydown Area Locations

Project marshalling yards are defined as off-ROW locations generally consisting of existing open areas approximately three to five acres in size. These yards will be selectively located off-ROW along the length of the Project and utilized for material and equipment storage, work force parking and field offices. The Applicants will seek to establish these marshalling yards in previously disturbed areas which will be selected, in part, because they will have little to no environmental or community impacts. Marshalling yards will: typically be located away from residential areas; be of sufficient size to accommodate necessary vehicles and equipment; have a means to restrict access; not require tree clearing or extensive grading; not require any disturbance to wetlands or waterbodies; and be often located on land under control of the Applicants or their contractors, by lease agreement or otherwise. Sites typically chosen include parking lots, gravel pits and industrial sites.

As necessary, construction best management practices will be implemented at the marshalling yards in accordance with National Grid's Environmental Guidance (EG-303NE) Manual (see Appendix S) and/or the New Hampshire Department of Resources and Economic Development Best Management Practices Manual for Utility Maintenance in and Adjacent to Wetlands and Waterbodies in New Hampshire (see Appendix T) to

ensure no sediment or erosion from the marshalling yards occurs onto public ways or into any jurisdictional wetlands or water bodies.

The location of marshalling yards will be determined by the Applicants or their contractors prior to construction, and therefore, are not specifically identified in the Application. As part of this Application, and to the extent any other post-decision authorizations are necessary, the Applicants request that the SEC delegate authority to NHDES to issue such approvals. As the need for such post-decision approvals arise, the Applicants will submit the necessary information to NHDES and will identify the appropriate BMPs to be utilized at an individual marshalling yard location and how any potential environmental impacts will be mitigated.

Laydown areas, as this term applies to the Project, are located within the Project ROW and are used for the temporary staging of materials and swamp matting prior to installation. Laydown areas may also be used for equipment staging when the equipment is not in use. Laydown areas within the ROW have been selected in relatively level upland areas. In most cases, the potential laydown areas have been previously disturbed and have exposed soils or modified vegetation such as a maintained field. If minor grading is required or if soil disturbance occurs in any proposed laydown areas, the laydown area will be restored to pre-existing topography and seeded, as appropriate.

Laydown areas have been designated within the Project ROW and are depicted on the Wetland Permitting Plans in Appendix F. Additional laydown areas may be identified, as necessary, during the course of construction. As part of this Application, and to the extent any other environmental approvals are necessary, the Applicants request that the SEC delegate authority to NHDES to issue such approvals.

Removal of Vegetation and Mowing in Advance of Construction

In some areas tree removal, tree pruning, brush cutting or mowing may be required prior to construction. These activities will be limited to what is necessary to provide access to proposed structure locations, to facilitate safe equipment passage, to provide safe work sites for personnel within the ROW and to maintain safe clearances between vegetation and transmission line conductors. Vegetation management-related activities will be carried out in accordance with the Applicants' BMPs.

Tree removal operations, where required, will include the removal of all tall-growing woody species within the targeted portions of the ROW. In Segment 2, any tree removal or pruning will be limited to the western edge of the ROW. In Segment 3 an approximately 90-foot wide area along the entire eastern edge of the ROW will be cleared. In Segment 4, an approximately 50-foot wide area in the middle of the ROW will be cleared.

Generally, trees will be cut close to the ground, leaving the stumps and roots in place to minimize ground disturbance. Stumps will only be removed where required to facilitate structure installations, access, or a safe working environment. Trees are the property of the

landowner; and the Applicants will coordinate with each landowner on tree disposal prior to commencing clearing operations. Trees may be stacked at the edge of the ROW or removed from the ROW, depending upon landowners' preference. In all cases, logs and slash will be removed from wetland areas.

Small trees and shrubs within the ROW will be mowed, as necessary, with the intent of preserving roots and low-growing vegetation to the extent practical. Where the ROW crosses streams and brooks, low-growing vegetation along the stream bank will be selectively cut to preserve a riparian buffer that will minimize the disturbance of stream bank soils and reduce the potential for erosion and sedimentation. In addition, the Applicants will preserve low-growing vegetation in accordance with regulatory guidance or permit conditions, as necessary, to protect rare, threatened, and endangered (RTE) species or habitats. This Project will span more than one growing season; therefore, additional mowing of accessways and work pads may be required as vegetation re-generates in these locations.

Tree removal equipment will utilize existing accessways which may be improved as necessary to facilitate a safe and productive working environment while minimizing overall disturbance. The boundaries of wetlands will be clearly marked prior to equipment mobilization to prevent unauthorized vehicular encroachment into wetland areas. Forestry equipment will be operated from upland areas. Trees within wetland areas that are inaccessible by equipment staged in upland areas will be removed manually.

Impacts to archaeological resources are not anticipated to result from vegetation removal activities. Archaeological resources are not present within Segments 3 and 4, where the majority of clearing will occur. Segment 2, which is maintained to its full width presently, will have minimal vegetation management work done prior to the start of construction and therefore should not impact archaeological resources.

Installation of Soil Erosion and Sedimentation Controls

Soil erosion and sedimentation controls will be implemented as depicted on Wetland Permitting Plans included in Appendix F as part of the NHDES Wetland Permit Application; and in accordance with Applicants' BMPs. The environmental controls shown on the Wetland Permitting Plans may need to be supplemented due to seasonal work, the work methods proposed and to comply with any additional permit requirements. Any change to established environmental controls in a particular work area would require the approval of the Project's environmental monitor(s).

A Construction Access Plan (Appendix U) has been developed containing additional BMPs for Project areas that have a higher potential to impact water quality, due mostly to steep slopes and proximity to water resources. Temporary erosion and sedimentation controls will be installed to prevent impacts to water quality resulting from land disturbance. In general, the installation of these controls will proceed in parallel with the construction of accessway

improvements. Temporary and permanent stabilization will occur in accordance with Applicants' guidance documents located in Appendices S and T and Project permits.

Stormwater management controls will be described in the Project Stormwater Pollution Prevention Plan, to be completed prior to construction in accordance with the National Pollutant Discharge Elimination System Construction General Permit (CGP). Stormwater controls will be installed, inspected, and maintained during the course of construction in accordance with the requirements of the CGP.

Construction of Accessways, Improvements and Maintenance

Accessways are required within the ROW to access work pads, pulling sites and laydown areas during construction. Where possible, construction contractors will use existing accessways and will establish new accessways where necessary. Accessways for the Project are depicted on the Wetland Permitting Plans included in Appendix F as part of the NHDES Wetlands Permit Application.

Existing Accessways

Existing accessways may require maintenance or upgrading to support the proposed construction activities. For example, widening of existing accessways, grading, and placement of clean gravel or trap rock may be necessary to stabilize and level the roads for construction vehicles. Crushed stone aprons will be used at accessway entrances to public roadways to mitigate the potential for construction vehicles to track soil onto public streets and to minimize the migration of soils off-site. Exposed soils on accessways will be wetted and stabilized as necessary during construction to suppress fugitive dust. Accessway improvements and/or maintenance will be carried out in compliance with the conditions and approvals of the appropriate regulatory agencies.

Permanent Upgrades to Existing Accessways along the ROW

Accessway improvements in upland areas will remain in place following construction. Road surfaces will be left as gravel or stone. Water bars and other BMPs will be installed as needed to maintain pre-existing drainage patterns and prevent erosion. The Construction Access Plan (Appendix U) contains additional BMPs to be employed in areas with steep slopes adjacent to water resources. Edges/shoulders of roads will be stabilized with loam and seeded with a native seed mix, as needed. Crushed stone aprons placed at the intersection of an access road with a public road will remain in place except in agricultural areas, lawns and on private property if the property owner wishes to have the stone apron removed. Gates will be installed to prevent un-authorized access as needed, and with permission of the landowner.

Temporary Accessways to Work Pads and Laydown Areas

In some locations, accessways will be temporary. For temporary construction access to work pads, required work will be limited and will mostly consist of vegetation maintenance (e.g. mowing) to facilitate access. Temporary accessways to structures will follow the contour of the existing land formation and will have been designed to avoid environmentally sensitive areas to the greatest extent practicable. Temporary construction accessways will be restored to pre-construction condition. Project environmental monitors will oversee restoration activities.

Temporary Accessways in Wetlands and Streams

Where upland access is not available, access across wetlands and streams will be accomplished by the temporary placement of swamp mats. Swamp mats typically consist of timbers that are bolted together and placed over wetland areas so as to distribute equipment loads and minimize disturbance to the wetland and soil substrates. Temporary swamp mat accessways will be removed following completion of construction. Care will be taken to avoid any deposition of soil and other debris into wetlands. If rutting, compaction, or other impacts to the wetland substrate occur during construction, these areas may require minor grading to restore preexisting topography prior to stabilization. Disturbed areas may be seeded with a native wetland seed mix, if necessary. Exposed soils at risk of erosion will be stabilized with straw, tackifier or erosion control blankets as necessary. The use of swamp matting may be reduced during specific ground conditions where the risk of soil disturbance would be minimal (dry or frozen ground).

Permanent Accessways in Wetlands

Four new permanent wetland crossings are proposed, as shown the Wetland Permitting Plans, Appendix F. The crossings have been designed to maintain hydrology of adjacent wetlands and minimize impacts to the natural system to the greatest extent feasible. Stone fords or similarly functioning pre-fabricated crossings have been proposed at permanent wetland crossings, where practical, to minimize wetland impacts. The selected types of permanent crossings allow for vegetation to grow between gaps in the stone or concrete and allow water to seasonally flow over the crossing. The selected permanent crossings do not restrict wetland hydrology.

Additional Off-ROW Accessways

Proposed off-ROW accessways are shown on the Wetland Permitting Plans. If additional accessways are needed, the Applicants will select locations that have been previously disturbed, to the extent practicable. As part of this Application, NEP and PSNH request that the SEC delegate the authority to NHDES to issue such approvals. Once the off-ROW accessways are identified, the Applicants will submit the necessary information to NHDES seeking authorization for these additional accessways.

Construction of Work Pads and Pull Pads

Upland work pads and pull pads will be created through minor grading or the addition of gravel or crushed stone to provide a level work surface for crews, equipment, and materials. Work pads are generally 100 feet by 100 feet. In the majority of cases, the location of work pads is centered at the structure location. Pull pads are typically rectangular areas located 300 feet ahead and back of structure locations and are approximately 100 feet in width. Most pull pads are located at angle structures and dead ends. Pulling equipment will generally be set up at a 1:3 distance or greater from the highest wire attachment point on the pulling structure as called for in the Institute of Electrical and Electronics Engineers (IEEE) Standard 524.

In certain locations for the Project, work pads were designed off center or pull pad sites were shifted to avoid potential impacts to environmentally sensitive areas. In other locations, the size of works pads and pull pads were reduced to avoid or minimize impacts to wetlands. In locations where wetlands and environmentally sensitive areas cannot be avoided, work pads and pull pads will be created through the temporary placement of swamp mats.

Once construction is complete, the work pad and pull pads will be restored to their pre-construction condition. Restoration efforts, including removal of construction debris and materials, minor grading to match adjacent contours, and stabilization of disturbed soil, will be completed following the construction operations. All disturbed areas around structures and other graded locations will be seeded with an appropriate seed mixture and/or mulched to stabilize the soils in accordance with applicable regulations. In wetlands, swamp mats installed for work pads and pull pads will be removed in their entirety, including pieces that may have broken off during construction. Disturbed areas will be immediately restored and stabilized. Care will be taken to avoid any deposition of soil and other debris into wetlands. If rutting, compaction, or other impacts to the wetland substrate have occurred during construction, these areas may require minor grading to restore preexisting topography prior to stabilization. In disturbed areas, seeding with a native wetland seed mix may be necessary. Exposed soils at risk of erosion will be stabilized with straw, tackifier or erosion control blankets as necessary, and according to the BMPs. Temporary erosion and sediment controls will be removed following the stabilization of disturbed areas.

Removal and Disposal of Existing Transmission Line Components

Construction of the Project will require the removal of approximately 86 existing structures in Segment 2, including wood H-frame structures, wood three pole suspension pull-off structures and wood three pole dead-end structures. Structures and components not re-used for the Project will be removed or salvaged and as much of the removed material as possible will be recycled. Those components not salvaged and any debris that cannot be recycled will be removed from the ROW to an Applicant approved off-site disposal

facility. Handling of such materials will be performed in compliance with applicable laws and regulations.

The removal of wood pole structures will involve disassembling the cross-arm, insulator, and hardware structure elements first. Once those elements have been removed, the wood poles will be removed completely. The full length of the wood pole will be removed, inclusive of the embedded section in upland areas only and the remaining hole will be backfilled with common backfill. The removal of wood poles in wetland areas will be reviewed on a case-by-case basis to determine if greater disturbance can be avoided by allowing embedded sections of the pole to remain in the wetland. In the majority of locations, the existing wood pole will be cut flush with the existing grade. Where a wood pole cannot be cut flush with existing grade, the embedded section of the pole as well as a four foot section of pole above ground will remain in place to reduce tripping hazard risks and the potential for damage to equipment during future maintenance activities.

Removals of existing transmission line components are not required for Segments 3 and 4.

Installation of Foundations and Structures

Proposed structures include steel pole H-frame, single pole and three pole structures with either direct embedment or caisson foundations.

Excavation for direct embedment structures will be performed using an excavator or soil auger. Excavations will range from approximately five to fifteen feet in depth and of varying diameter, typically three to five feet, based upon the diameter of the base of the steel pole. A steel corrugated metal pipe will be placed vertically in the hole. Direct embed steel pole structures will be installed by placing the bottommost steel pole section or sections into the corrugated metal pipe with suitable backfill material, then assembling the upper portion of the steel pole structure. Where rock is encountered, rock hammering or drilling will be used to extend the excavation to the appropriate depth.

For those structures with bolted flange connections, the assembly of the uppermost section will vary by structure type. Generally speaking, for a single pole structure, the second and third (if necessary) vertical segments of the steel pole will be bolted to the lowest steel pole element, the appropriate structure arms will be installed and lastly the insulators and hardware to connect the conductors to the structure will be attached. In the case of H-Frame structures, a similar process will occur with two vertical poles being erected followed by the installation of the interior cross-arm and outboard arms, then the insulators and associated hardware will be affixed to the cross-arms at the appropriate attachment points.

For those steel pole structures featuring slip joint connections, the assembly of the uppermost sections will involve fitting the second and possibly third and fourth steel pole segments over the smaller diameter top of the lower steel pole element. The appropriate structure arms will be installed and lastly the insulators and hardware will be attached.

Three pole dead-end and angle structures in Segments 3 and 4 are not self-supporting and will require the use of structural guying. This is consistent with other similar existing structures within the ROW. These guys will be affixed to the steel pole structure and anchored to the ground via the use of excavated log anchors (aka dead-men) in upland areas. In wetlands and other environmentally sensitive areas, screw anchors will be utilized to minimize ground disturbance.

NEP dead-end and angle structures and PSNH two pole dead-end H-Frame structures will require reinforced concrete caisson foundations. These foundations will typically be 20 to 30 feet deep, with diameters of between 6 and 10 feet. Caissons will be constructed by drilling a vertical shaft, installing a permanent casing, lifting a steel reinforcement cage into place via a crane, placing steel anchor bolts, pouring concrete, and backfilling as needed. Steel pole elements will then be lifted into place with a crane and built out according to structure type. Should soil conditions, structure loads, or a combination of those considerations warrant, the review of alternate foundations types will be undertaken to ensure that the most appropriate and cost efficient foundation type is being utilized.

Excavated material will be temporarily stockpiled next to the excavation; however, this material will be managed to prevent run off into any resource areas. If the stockpile is in close proximity to wetlands, it will be enclosed by staked straw bales or other erosion and sedimentation controls. Additional controls, such as watertight mud boxes may be used for saturated stockpile management in work areas in wetlands (i.e., swamp mat platforms) where sediment-laden runoff would pose an issue for an adjacent wetland. Following the backfilling operations, excess soil will be spread over upland areas or removed from the site in accordance with each Applicant's policy.

In locations where rock is encountered, the foundation hole will be excavated to the rock depth and the contractor will use approved methods to remove the rock including drilling, ripping and hoe ramming to achieve the required depth.

In certain areas along Segments 3 and 4, blasting may be employed by PSNH where occasional shallow-to-bedrock soil depths and subsurface boulders are encountered that cannot be removed by mechanical means. For transmission line construction any blasting activity, where required, will be limited to the small volume of material needed to be removed to set and plumb the pole structures.

No adverse effects from blasting activity upon either sensitive natural resources or adjacent property owners are anticipated due to the small charges required for this activity. A project specific blasting specification will be included in the requirements for contractors. If a contractor is required to employ blasting during the execution of the work, the contractor must comply with PSNH's standards, as well as all applicable local, state, and federal permitting requirements regarding blasting and the safe handling of explosives. All blasting will be performed by qualified personnel who are licensed by the applicable local, state, and/or federal agencies. (*See* Section (i)(6) for a further discussion on the blasting procedures that PSNH will use to ensure the safety of the public and all workers.)

Dewatering may be necessary while excavating or placing concrete for foundations. At all times, dewatering will be performed in accordance with Applicants' guidance documents as well as Project permits and approvals.

Installation of Conductor and Shield Wire

Following the erection of transmission structures and installation of the insulator assemblies, conductors, shield wire, and fiber optic ground wire (OPGW) will then be installed using stringing blocks, wire pulling ropes, and wire stringing equipment. Once the stringing blocks are in place, pulling ropes will be installed by: driving the ropes from structure to structure, walking the ropes from structure to structure or via helicopter.

Once installed, the pulling rope is attached to wire stringing equipment and used to pull the conductors from a wire reel on the ground through stringing blocks attached to the structure. Once the conductor or shield wire has been installed, the wire pulling equipment is then used to sag the wire to obtain the specified conductor tension.

During the stringing operation, temporary guard structures or boom trucks will be placed at road and highway crossings and at crossings of existing utility lines. These guard structures are used to ensure public safety and uninterrupted operation of other utility equipment by keeping the wire off the traveled way and away from other utility wires at these crossing locations. Shield wires and OPGW will be installed on top of the structure in a similar manner. Helicopters may be used for certain activities during the stringing operation. Swamp mats will be used when temporary guard structures must be located within wetlands.

Restoration of the ROW

Temporary work areas and pre-construction drainage patterns will generally be restored to their pre-existing condition. Restoration efforts, including removal of construction debris, minor grading, and stabilization of disturbed soil, will be completed following the construction operations. Ditches, roads, walls, and fences will generally be restored to their former condition. All disturbed areas around structures and other graded locations will be seeded with an appropriate seed mixture and/or mulched to stabilize the soils in accordance with applicable regulations. Regulated environmental resource areas that are temporarily disturbed by construction will be restored in accordance with applicable permit conditions to pre-existing conditions under the supervision of Project environmental monitors. Temporary sediment control devices will be removed following the stabilization of disturbed areas.

Testing and Commissioning

Following the installation and prior to energization, an extensive electrical testing process begins to confirm that each piece of equipment and all protection and control systems are

installed and operating in accordance with Project specifications. The energization is a sequential process that energizes the equipment and facilities in a logical order and coordinates with the system and equipment requirements. Transmission line or equipment outages will be necessary and will require coordination with local control centers and ISO-NE. No interruption to distribution customers is anticipated.

Modifications at Scobie Pond 345 kV Substation

All construction-related activities will occur within the existing footprint of the substation and will begin with survey to lay out the proposed substation structures followed by installation of foundations for the terminal dead end structure, switch stands, coupling capacitor voltage transformer (CCVT) stands, circuit breakers and bus supports. Small excavators will be utilized to excavate the holes for the foundations. The bottom of the excavations are then levelled and compacted at the appropriate grade prior to building the form work required for the footings and piers. Once form work is complete and anchor bolts are in place, concrete is placed in the forms. The forms are stripped on the following day and the new foundation is backfilled with the soil removed from the initial excavation. Foundation construction will proceed in this fashion until all foundations are complete. Additional excavation to install conduits for control and power cables will also occur, with the cables to be installed at later during construction. Once conduit installation is complete, the contractor will install a grid of copper wire at about 20 inches below grade to provide grounding for the substation. Each piece of equipment in the substation is connected to this ground grid. The contractor then brings in a series of processed gravels and stone to raise the substation surface to finished grade.

Next, cranes and man lifts will be used to erect the steel terminal structure, equipment stands and bus supports, followed by installation of the switches and CCVTs. The contractor will then assemble the 345 kV circuit breakers on their new foundations. These breakers will be adjusted per the manufacturers' recommendations, tested and filled with SF6 insulating gas. Once all of the equipment is installed, the contractor can make up final conduit connections to the equipment, then pull in the power, control and communications cables from the control house to the electrical equipment in the yard. At the same time, the fabrication and installation of the aluminum pipe buswork will be completed.

The line construction contractor can pull in the new 345 kV line conductor to the new terminal structure and complete connections to the line disconnect switch shortly after the structure is erected. This work will be carefully coordinated with the substation construction contractor.

Several new relay and control cabinets will be installed in the existing control house and pull in various cables to interconnect the cabinets to each other and to other control cabinets in the control house, along with the cables previously pulled to the new equipment in the yard.

Following the construction of the major components, the Applicants will begin an intensive process of high voltage electrical testing as well as continuity testing of each and every

cable connection that has been installed, followed by functional testing of the equipment to ensure that it performs as designed.

The contractor will then need to connect the new 345 kV bus work to the existing 345 kV bus work. After these connections are made and tested, the contractor will begin the commissioning process, which systematically energizes and tests each component of the new line terminal. After all components are energized, a series of final "load checks" are performed to ensure that the system performs as expected under actual load. The line disconnect switch can then be closed to complete the circuit to Tewksbury. Additional checks are made at this time to verify functionality.

The new line and terminal are declared "in service" after completing these final checks. Construction of the new terminal addition for the 3124 Line at the Scobie Pond 345 kV Substation will take approximately nine months to complete.

9) Construction schedule, including start date and scheduled completion date

Project construction is anticipated to begin in the fourth quarter of 2016. The planned in-service date for the Project is December 2017. In Segment 2, the Y-151 circuit will be relocated and energized prior to removal of the existing Y-151 structures and construction of the 3124 Line.

Construction phasing will be carefully planned and executed. The timing and coordination of construction activities will be developed to minimize the number and duration of outages, maintain efficiencies in the construction process, maintain a safe work environment for personnel and contractors, and comply with environmental regulatory requirements.

	Scheduled Start / Finish Date
SEC Application Submittal	Early 3Q15
SEC Approval	Late 3Q16
Transmission Line Construction	4Q16 / 4Q17
Scobie Pond 345 kV Substation Upgrades	4Q16 / 4Q17
3124 Line In Service	Dec 2017

10) Impact on system stability and reliability

The NEP and PSNH transmission systems are integral parts of the regional power system that deliver electricity to customers throughout New England. To maintain the integrity of this system, the Applicants must ensure that adequate transmission capacity exists to meet existing and projected load. As transmission providers, the Applicants must maintain their respective systems consistent with the reliability standards and criteria developed by the North American Electric Reliability Corporation (NERC), the Northeast Power

Coordinating Council (NPCC), and ISO-NE, as well as the Applicants' own reliability standards and criteria. These standards and criteria expressly require the Applicants to design their systems to withstand representative contingencies under stressed conditions (e.g., summer peak or minimum load levels or generator unavailability). If the transmission system does not have the capacity to reliably serve forecasted load under these conditions, the Applicants must plan and implement system additions and upgrades to address the identified performance issues.

In 2008, transmission system planners from ISO-NE, NU, National Grid, and NSTAR formed a working group to assess transmission system reliability in northeastern Massachusetts and southern New Hampshire, identify needs within this study area, and develop transmission solutions to address any identified needs. The results of this study, entitled "The Greater Boston Area Updated Transmission Needs Assessment" ("Updated Needs Assessment") were published by ISO-NE in 2014. The Updated Needs Assessment evaluated transmission system reliability within the study area for 2018 and 2023 projected system conditions. One section of this report focused on the existing 115 kV, 230 kV, and 345 kV transmission circuits that connect New Hampshire and Massachusetts. It found that at times of peak load, the 115 kV, 230 kV, and 345 kV transmission paths between New Hampshire and Massachusetts would overload under certain contingencies, as would some connecting 115 kV and 230 kV circuits in both states. The Updated Needs Assessment also found the potential for unacceptably high voltages at certain area substations under minimum load or off-peak load contingency conditions. Thus, if the identified criteria violations are not addressed, transmission equipment could overload, line clearance above ground could sag to hazardous levels, or voltage levels could be outside of acceptable operating ranges under certain system conditions. The impacts could include unsafe conditions, equipment damage, and line or power outages. In sum, the existing transmission system does not have sufficient capacity to reliably serve southern New Hampshire and northeastern Massachusetts either at peak or off-peak load levels under reasonably stressed conditions.

In February 2015, ISO-NE selected a group of transmission upgrades, including MVRP, to address the full spectrum of needs identified in the Updated Needs Assessment. MVRP addresses the need for additional transmission capacity in northeastern Massachusetts and southern New Hampshire by providing an additional 345 kV transmission path between Massachusetts and New Hampshire. This new transmission path will alleviate overloads of 345 kV and 115 kV transmission circuits terminating at New Hampshire substations. In doing so, it both ensures continued compliance with applicable federal and regional transmission system reliability standards and criteria and maintains reliable electric service to New Hampshire and Massachusetts electric customers.

A separate ISO-NE study focusing on New Hampshire and Vermont also identified potential overloads on 345 kV transmission circuits between New Hampshire and Massachusetts. ISO-NE's "New Hampshire/Vermont Transmission System 2023 Needs Assessment Report" ("New Hampshire/Vermont Needs Assessment") documented potential thermal violations on the 326 345 kV circuit between PSNH's Scobie Pond 345 kV Substation in

Londonderry, NH and NEP's Sandy Pond Substation in Ayer, MA, as well as on the 394 345 kV circuit between New Hampshire Transmission's (NHT) Seabrook Station in Seabrook, NH and NEP's Ward Hill Substation in Haverhill, MA. This report also found that several 345 kV buses in southern New Hampshire could have unacceptably high voltages under certain contingencies during light load conditions with minimal generation online. Construction of MVRP will also address these thermal and voltage issues.

The Updated Needs Assessment and the New Hampshire/Vermont Needs Assessment both focused on the ability of the existing transmission system to reliably serve regional electric customers. MVRP is being developed to address specific needs identified in these reports.

As part of the ISO-NE planning process, NEP and PSNH are required to demonstrate that proposed transmission projects will not have an adverse impact on the regional transmission system. The Applicants are currently working with ISO-NE to establish the scope of the study required to support such a determination for all the projects arising out of the Updated Needs Assessment, including the Project. The study results will be presented to ISO-NE working groups in the summer and fall of 2015. The Applicants expect to receive a "no adverse impact" determination by the end of 2015.

(h) FACILITY DESCRIPTION AND ALTERNATIVES, ENVIRONMENTAL IMPACTS, AND FINANCIAL, TECHNICAL AND MANAGERIAL CAPABILITY

1) Description in detail of the type and size of each major part of the proposed facility

New 345 kV 3124 Line

The new overhead 345 kV transmission line, which will be known as the 3124 Line, will be located within existing transmission corridors connecting NEP's Tewksbury 22A Substation in Tewksbury, Massachusetts to PSNH's Scobie Pond 345 kV Substation in Londonderry, New Hampshire. See description in Section (c)(1) above. The proposed 3124 Line will be supported by horizontally configured structures over the majority of length of the Project. This is consistent with the structure configurations of the existing lines along the length of the route.

As described in Section (c)(1), the Project has been divided into four Segments. The four Segments are delineated by state, ownership, and line alignment. Segment 1 of the Project is located in Massachusetts and is not discussed herein. Segments 2, 3 and 4 are discussed in greater detail in the following sections.[43]

Segment 2 (NEP): Massachusetts border to NEP/PSNH Demarcation Point (Between NEP Structure 150 and PSNH Structure 200)

The NEP portion of the line (Segment 2) proposes to utilize narrow-based H-Frame steel pole construction for suspension structures, in-line dead-end structures, and minor angle structures with three pole dead-end structures utilized to address major line angles. One vertically configured steel pole structure will be utilized to transition the 3124 Line from the NEP ROW to PSNH's Structure 200. These structure configurations are depicted in Engineering Drawings, Appendix R.[44]

Segment 2 of the Project extends from the Massachusetts border (Mile 6.5 of MVRP)[45] 8.1 miles to a location in the Town of Hudson where the Project transitions from NEP to PSNH ownership. In Segment 2, the new 3124 Line will be installed within an existing corridor within the Towns of Pelham, Windham and Hudson. There are two distinct ROW configurations associated with this Segment. The first configuration extends from Mile 6.5

43 Cross-sections applicable to each Segment are provided in Appendix R, Engineering Drawings. The specific cross-sections associated with each Segment are referenced in the Segment descriptions below. See also Section (g)(2)(b) above. The proposed configuration was arrived at via a design process that sought to create the optimal configuration within the ROW that balanced the reliability, visual impact, construction duration, environmental impact, outage requirements and cost necessary to construct the Project.

44 Engineering Drawings, Appendix R, National Grid Drawing 400298-C-R-003.

45 Mile 0.0 of MVRP is located at the Tewksbury 22A Substation in Tewksbury, MA.

to Mile 14.1 and is depicted in cross-section 8.[46] The second configuration extends from Mile 14.1 to Mile 14.6 and is depicted in cross-section 9.[47] From Mile 6.5 to Mile 14.1 this Segment contains three existing overhead transmission lines designated in the 230 kV O-215 Line, the 115 kV Y-151 Line and the 230 kV N-214 Line, respectively from west to east. Mile 14.1 to Mile 14.6 contains only two of these transmission lines, i.e. O-215 and N-214.

To incorporate the new 3124 Line, NEP proposes to relocate the existing 115 kV Y-151 Line to the western side of the existing ROW and install the new 3124 Line in the ROW position previously occupied by the Y-151 Line. The proposed new configuration for 7.6 miles of Segment 2 from west to east will be: Y-151, O-215, 3124, and N-214. New Y-151 structures will be erected approximately 28.5 feet east of the western edge of the ROW. Once the structures for the relocated Y-151 line have been constructed, the existing Y-151 line will be cut over onto this new alignment. The old structures that previously supported the Y-151 Line will then be removed from the ROW, which will create space for the new 3124 Line H-Frame structures.

The new 3124 Line will occupy the centerline of the existing NEP ROW in Segment 2, until the Project transitions to PSNH ownership at the start of Segment 3. The 3124 Line will be located in the center of the ROW approximately 91.5 feet to the east of the existing O-215 line and approximately 91.5 feet to the west of the existing N-214 line. The new 3124 Line will maintain its alignment between the O-215 and N-214 lines after the Y-151 line diverges from the main ROW at a point north of Bockes Road in Hudson.

Currently, 86 new transmission structures are proposed in Segment 2 for the 3124 Line. In this Segment there are four distinct structure types proposed for use on the 3124 Line: narrow based H-Frame suspension structures, self-supporting narrow based H-Frame dead-end structures, self-supporting three pole dead-end structures, and a self-supporting single pole dead-end structure.[48]

All 3124 Line structures proposed in Segment 2 will be steel structures with a weathering finish (see below for Y-151 Line relocation structure detail). The narrow based H-Frame suspension structures will utilize direct embed foundations while the self-supporting narrow based H-Frame dead-end, self-supporting three pole dead-end structures, and self-supporting single pole dead-end structure will be set on reinforced concrete caisson foundations. The use of alternate foundation types may become necessary depending upon structure loading and soil conditions. Alternate foundations may include, but are not limited to, any of the following: steel vibratory caisson, driven H-pile, micro-pile and helical pile. National Grid standard structures utilize bolted flange connections. Average structure height in the NEP section of the 3124 Line is approximately 80 feet above grade.

46 Engineering Drawings, Appendix R, National Grid Drawing 400298-C-X-08.
47 Engineering Drawings, Appendix R, National Grid Drawing 400298-C-X-09.
48 Engineering Drawings, Appendix R, National Grid Drawings 400298-C-S-51, 52, 53, 54.

The energized conductors on the full length of Segment 2 on the new 3124 Line will be twin-bundled 1590 kcmil aluminum conductor, steel reinforced (ACSR) "Falcon" (54/19) conductor. All conductor installed on the NEP Segment of the Line will have a non-specular or flat finish. Due to the bundled nature of the energized conductors, 18 inch spacers will be utilized in all spans and in the jumper loops to keep each of the conductors associated with a single phase the appropriate distance apart. The 3124 Line will be shielded by two static wires in all locations. In Segment 2, the static wires on the western side of the new structures will be 3/8" Extra High Strength (EHS) seven strand steel wire and the static wire on the eastern side of the structures will be a 48 count OPGW.

Table 5. Segment 2 - New 3124 Line Conductor and Shield Wire Table

Position	Cable Type	Code Name	Diameter (in)	Weight (lbs/ft)	RBS* (lbs)
Conductor	1590 ACSR (54/19)	Falcon	1.545	2.042	54,500
Shield Wire	3/8" EHS Steel (7 Strand)	-	0.360	0.273	15,400
Shield Wire	OPGW	-	TBD	TBD	TBD

* Rated Breaking Strength

NEP will determine the specific OPGW type to be utilized on the project as design evolves. Regardless, it will be a 48 count OPGW with mechanical characteristics similar to that of 3/8" EHS steel wire.

Segment 2 (NEP): Relocated 115 kV Y-151 Line

There are a number of different structure types proposed for the relocated Y-151 Line. The majority of structures will feature a delta davit arm configuration and be inclusive of restrained delta davit arm suspension structures and delta davit arm dead-end structures featuring single and double insulator assemblies. Other structure types proposed for use include H-Frame dead-end structures, H-Frame switch structures, three pole dead-end structures, single pole dead-ends and single pole switch structures. All structures proposed on the relocated Y-151 line are steel and will have a weathering finish. A total of approximately 87 structures are proposed in Segment 2.

The single monopoles will utilize direct embed foundations while the remainder of the 115 kV structure types will be set on reinforced concrete caisson foundations. The use of alternate foundation types may become necessary depending upon structure loading and soil conditions. Alternate foundations may include but are not limited to any of the following: steel vibratory caisson, driven H-pile, micro-pile and helical pile. Average structure height will be approximately 75 feet above grade.

The conductor associated with the existing 115 kV Y-151 line is currently of 4/0 copper but will be upgraded to single 795 kcmil ACSS "Drake" (26/7) HS285 conductor to address the need for increased capacity on this line, as identified in the Greater Boston Study. All conductor installed on the relocated Y-151 line will have a non-specular finish. The relocated Y-151 line will be shielded by a single static wire. This static wire will be a

144 count OPGW, which is consistent with what is located on the line presently. Please refer to Table 6 for conductor and shield wire details related to the Y-151 line.

Table 6. Relocated Y-151 Conductor and Shield Wire Table

Position	Cable Type	Code Name	Diameter (in)	Weight (lbs/ft)	RBS* (lbs)
Conductor	795 ACSS HS285 (26/7)	Drake	1.108	1.093	32,600
Shield Wire	AFL OPGW S1-57/71/0.630	-	0.630	0.462	22,027

* Rated Breaking Strength

Segment 3 and Segment 4 General Information

The PSNH section of the line (Segments 3 and 4) also proposes to utilize steel pole H-Frame construction with a self-weathering finish. The tangent structures will be two-pole direct embed H-Frame structures. Angle and deadend structures will primarily be three-pole direct embed structures with structural guying similar to the existing wood H-Frame three pole structures currently along the route. Two exceptions to this will be the two-pole H-Frame deadend structure near Mammoth Road (Str 264) and a monopole deadend transposition structure near Scobie 345 kV S/S (Str 287); these structures will be self-supported structures with reinforced concrete caisson foundations. All of these structure configurations are depicted in Engineering Drawings, Appendix R.[49]

Similar to NEP, all direct embed foundations the steel poles will be placed within corrugated steel culverts then backfilled with select backfill and compacted in lifts. Due to the increased loading at angles and cable terminations, the pull-off and deadend structures will require the addition structural guying to maintain structure stability. PSNH currently proposes to utilize log anchors in upland locations and screw anchors in environmentally sensitive areas. Alternatives to the log anchors would be a helical type anchor encased in concrete or pre-stressed concrete anchors. Given the expected subsurface conditions, the use of grouted rock anchors at some locations may also be required. The use of alternate foundation types may become necessary depending upon soil conditions and proximity of guying to adjacent circuits. These alternate foundation types may include but are not limited to concrete caisson and helical/battered pile foundations. Average structure height in Segments 3 and 4 of the 3124 Line is approximately 90 feet above grade.

The new conductors for the 3124 Line in Segments 3 and 4 will be twin bundled 1590 kcmil ACSR "Falcon" (54/19) conductors. Due to the bundled nature of the energized conductors, 18 inch spacers will be utilized in all spans and in the jumper loops to keep each of the conductors associated with a single phase the appropriate distance apart. The 3124 Line will be shielded by two OPGW static wires in all locations. With the exception of the last span into the Scobie Pond 345 kV Substation, both static wires in Segment 3 and 4 will be 48 count OPGW. For the last span into Scobie Pond 345 kV Substation both static wires will be 19#10 Alumoweld. PSNH standard guy wire is 19#10 alumoweld, but may

49 Engineering Drawings, Appendix R, Eversource Drawing, S3124-P0001 SH.4.

be upgraded to 19#6 alumoweld depending upon the loading analysis and any site specific constraints. Please refer to Table 7 below for details pertaining to all wire types to be utilized on Segments 3 and 4.

Table 7. New 3124 Line Conductor and Shield Wire Table

Position	Cable Type	Code Name	Diameter (in)	Weight (lbs/ft)	RBS* (lbs)
Conductor	1590 ACSR (54/19)	Falcon	1.545	2.042	54,500
Shield Wire	Brugg-48F/36SM/12TW	-	0.650	0.407	17,618
Shield Wire	19#10 Alumoweld	-	0.509	0.449	27,190

* Rated Breaking Strength

Segment 3 (PSNH): NEP/PSNH Demarcation Point to Structure 236

Segment 3 consists of the approximately 3.9 miles of PSNH ROW from the ownership line of demarcation with NEP in Hudson, NH to where the new 3124 Line departs the generally north-south corridor running parallel to NEP's ROW and turns northeasterly towards the Scobie Pond 345 kV Substation in Londonderry, NH (Segment 4).

Segment 3 extends from Mile 14.6 to Mile 18.5 of MVRP. Currently this section of ROW contains the 345 kV 326 Line, which is located 31.5 feet from the western edge of a 216.5-foot wide ROW. The 3124 Line will be installed approximately 100 feet to the east of the existing 326 Line and approximately 85 feet from the western edge of the existing ROW. The proposed configuration following the installation of the new 3124 Line will now contain two circuits respectively from west to east; the 345 kV 326 Line and the 345 kV 3124 Line. In this section, the centerline of the proposed 3124 Line is not occupied by a transmission facility. Approximately 90 feet of vegetation clearing within the unoccupied eastern edge of ROW will be required to construct the new 3124 Line in its proposed location.

Currently, 37 structures are proposed in Segment 3. In this Segment there are three general structure types proposed: H-Frame suspension structures, guyed three pole suspension pull-off structures, and guyed three pole dead-end structures.[50]

There is one cross-section associated with Segment 3.[51] The new 3124 Line remains parallel to the existing 326 Line for the entire length of this Segment along the long-preserved 345 kV centerline.

Segment 4 (PSNH): Structure 237 to Scobie Pond 345 kV Substation

Segment 4 of the Project begins from the point that the PSNH ROW diverges from running parallel with the NEP ROW and continues east to the Scobie Pond 345 kV Substation for approximately 5.9 miles. In this Segment, the new 3124 Line will be installed in the center

50 Engineering Drawings, Appendix R, Eversource Drawings S3124-P0003 SH-1 through SH-5.
51 Engineering Drawings, Appendix R, Eversource Drawing S3124-T0005, Section I.

of the existing ROW in an area that has not been previously cleared. As noted previously, the ROW contains several existing overhead transmission lines (345 kV 380 line, 345 kV 326 line, 115 kV Z119 line, 115 kV X116 Line) and, in some locations, additional overhead distribution circuits. No reconfiguration of the existing transmission or distribution lines is required in this Segment. Approximately 50 feet of vegetation will need to be cleared from the center of the PSNH ROW to enable construction of the new line.

Currently, 52 structures are proposed in Segment 3 and five general structure types are proposed: H-Frame suspension and deadend structures, guyed three pole suspension pull-off structures, guyed three pole dead-end structures, a two-pole deadend structure, and a monopole deadend transposition structure.[52]

There are a total of eleven cross-sections associated with Segment 4.[53] These cross-sections predominately vary with respect to the lines which enter and leave the ROW along the eastern edge. The new 3124 Line remains parallel to the existing 326 line for the entire length of this Segment along the long-preserved 345 kV centerline.

Mile 18.5 to Mile 20.4 and Mile 20.4 to Mile 20.5 are characterized by two cross-sections[54] and are 460 feet in width. These sections of ROW contain four existing transmission lines respectively from west to east; the 345 kV 380 line, the 345 kV 326 line, the 115 kV Z119 line, and the 115 kV X116 line. The proposed configuration following the installation of the new 345 kV 3124 Line will contain five transmission lines respectively from west to east; the 345 kV 380 line, the 345 kV 326 line, the 345 kV 3124 Line, the 115 kV Z119 line, and the 115 kV X116 line. In these cross-sections, the new 3124 Line would be located along a centerline alignment that does not contain any existing facilities. The new 3124 Line would be located approximately 100 feet to the east of the existing 326 line and approximately 87.5 feet to the west of the existing Z119 line. The removal of approximately 50 feet of vegetation located in the approximate center of the ROW will be required to construct the new 3124 Line in its proposed location.

The ROW width is approximately 635 feet for the cross-sections[55] associated with Mile 20.5 to Mile 20.6 and Mile 20.6 to Mile 21.6. These sections of ROW presently contain five transmission lines respectively from west to east; the 345 kV 380 line, the 345 kV 326 line, the 115 kV S188 line, the 115 kV X116 line and the 115 kV Z119 line. The proposed configuration following the installation of the new 3124 Line will contain six transmission lines respectively from west to east; the 345 kV 380 line, the 345 kV 326 line, the 345 kV 3124 Line, the 115 kV S188 line, the 115 kV X116 line, and the 115 kV Z119 line. The new 3124 Line would be located 100 feet to the east of the existing 326 line and approximately 70 feet to the west of the S188 line. The removal of approximately 50 feet

52 Engineering Drawings, Appendix R, Eversource Drawings S3124-P0003 SH01 through SH06, SH7a.
53 Engineering Drawings, Appendix R, Eversource Drawing S3124-T005, Sections II-XII.
54 Engineering Drawings, Appendix R, Eversource Drawing S3124-T005, Sections II, III.
55 Engineering Drawings, Appendix R, Eversource Drawing S3124-T005, Sections IV and V.

of vegetation located in the approximate center of the ROW will be required to construct the new 3124 Line in its proposed location.

The ROW width between Mile 21.6 to Mile 21.7[56] is approximately 635 feet. This section of the ROW presently contains five transmission lines and three distribution lines respectively from west to east; the 34.5 kV 3184 line, the 345 kV 380 line, the 345 kV 326 line, the 115 kV R187 line, the 115 kV X116 line, the 115 kV Z119 line, the 34.5 kV 365 line, and the 3128X distribution line. The proposed configuration following the installation of the new 3124 Line will contain six transmission lines and three distribution lines respectively from west to east; the 34.5 kV 3184 line, the 345 kV 380 line, the 345 kV 326 line, the 345 kV 3124 Line, the 115 kV R187 line, the 115 kV X116 line, the 115 kV Z119 line, the 34.5 kV 365 line, and the 3128X distribution line. The new 3124 Line would be located approximately 100 feet to the east of the 326 line and generally 70 feet to the west of the R178 line. The removal of approximately 50 feet of vegetation located in the approximate center of the ROW will be required to construct the new 3124 Line in its proposed location.

All three cross-sections[57] between Mile 21.7 and Mile 23.0 are approximately 535 feet in width. These sections of the ROW presently contain five transmission lines and a distribution line respectively from west to east; the 345 kV 380 line, the 345 kV 326 line, the 115 kV R187 line, the 115 kV X116 line, the 115 kV Z119 line, and the 34.5 kV 365 line. The proposed configuration following the installation of the new 3124 Line will contain six transmission lines and a distribution line respectively from west to east; the 345 kV 380 line, the 345 kV 326 line, the 345 kV 3124 line, the 115 kV R187 line, the 115 kV X116 line, the 115 kV Z119 line, and the 34.5 kV 365 line. The new 3124 Line would be located approximately 100 feet to the east of the 326 line and approximately 70 feet to the west of the R187 line. The removal of approximately 50 feet of vegetation located in the approximate center of the ROW will be required to construct the new 3124 Line in its proposed location.

Mile 23.0 to Mile 23.8[58] is approximately 535 feet in width. This section of the ROW presently contains five transmission lines, respectively from west to east; the 345 kV 380 line, the 345 kV 326 line, the 115 kV R187 line, the 115 kV X116 line, and the 115 kV Z119 line. The proposed configuration following the installation of the new 3124 Line will contain six transmission lines respectively from west to east; the 345 kV 380 line, the 345 kV 326 line, the 345 kV 3124 Line, the 115 kV R187 line, the 115 kV X116 line, and the 115 kV Z119 line. The new 3124 Line would be located approximately 100 feet to the east of the 326 line and approximately 70 feet to the west of the R187 line. The removal of approximately 50 feet of vegetation located in the approximate center of the ROW will be required to construct the new 3124 Line in its proposed location.

56 Engineering Drawings, Appendix R, Eversource Drawing S3124-T005, Sections VI.
57 Engineering Drawings, Appendix R, Eversource Drawing S3124-T005, Sections VII, VIII, IX.
58 Engineering Drawings, Appendix R, Eversource Drawing S3124-T005, Section X.

Mile 23.8 to Mile 24.1[59] is approximately 535 feet in width. This section of the ROW presently contains five transmission lines and two distribution circuits supported by a double circuit structure respectively from west to east; the 345 kV 380 line, the 345 kV 326 line, the 115 kV R187 line, the 115 kV X116 line, the 115 kV Z119 line, and the double circuit 32W4 and 32W3 distribution lines. The proposed configuration following the installation of the new 3124 Line will contain six transmission lines and two distribution circuits supported by a double circuit structure respectively from west to east; the 345 kV 380 line, the 345 kV 326 line, the 345 kV 3124 Line, the 115 kV R187 line, the 115 kV X116 line, the 115 kV Z119 line, and the double circuit 32W4 and 32W3 distribution lines. The new 3124 Line would be located approximately 100 feet to the east of the 326 line and approximately 70 feet to the west of the R187 line. The removal of approximately 50 feet of vegetation located in the approximate center of the ROW will be required to construct the new 3124 Line in its proposed location.

The final cross-section[60] extends from Mile 24.1 to the Scobie Pond 345 kV Substation on PSNH fee-owned property. This section of the ROW presently contains two transmission lines respectively from west to east; the 345 kV 380 line and the 345 kV 326 line. The proposed configuration following the installation of the new 3124 Line will contain three transmission lines respectively from west to east; the 345 kV 380 line, the 345 kV 326 line and the 345 kV 3124 Line. The new 3124 Line would be located to the east of the 326 line. The removal of vegetation located on the eastern edge of the 326 line will be required to construct the new 3124 Line in its proposed location.

Scobie Pond 345 kV Substation

A new 345 kV transmission line terminal will be constructed at the Scobie Pond 345 kV Substation. The new terminal will be similar in design to the existing 345 kV terminations at the Substation The new terminal addition consists of one line terminal structure, two circuit breakers, five manual and one motor operated disconnect switches, three surge arrestors, and three coupling CCVTs. The substation yard lighting will be extended to the new terminal bay. No yard expansion or fence modifications will be required for the terminal addition.

2) Identification of the Applicants' preferred location and any alternative locations it considers available for the site of each major part of the proposed facility

Preferred Location

The location of the Project is described in Sections (c)(1) and (h)(1) above. The preferred route for the Project was selected among all other alternatives considered because it:

59 Engineering Drawings, Appendix R, Eversource Drawing S3124-T005, Section XI.
60 Engineering Drawings, Appendix R, Eversource Drawing, S3124-T005, Section XII.

- Has the shortest overall length of line (24.4 miles, 17.9 of which are in New Hampshire);
- Will be built within an existing ROW;
- Has the least impact to residential/commercial structures (due both to proximity and the need for additional clearing);
- Requires the acquisition of no additional land rights;
- Requires the least amount of land to be cleared (approximately 71.2 acres);
- Has the lowest cost; and
- Has the lowest level of transmission system impacts associated with construction-related line outages.

Site Selection Process

The Applicants considered a number of possible alternate means to connect the existing Tewksbury 22A Substation in Tewksbury, MA to the Scobie Pond 345 kV Substation in Londonderry, NH with a new overhead 345 kV transmission line. As the terminal locations of the line are fixed, the Applicants reviewed and considered other existing infrastructure corridors and also conducted a screening level review for potential new ROW.

Route Options Considered and Rejected

After a review of existing aerial and USGS mapping, the alternative of establishing a new ROW corridor was dismissed given density of development in close proximity to both substations, the length of time it would take to acquire land rights in both Massachusetts and New Hampshire to accommodate the new Line. As space was available within an existing overhead electric transmission ROW to accommodate the new Line, the alternative of establishing an entirely new ROW was removed from further consideration.

Railroad Corridors: There are no railroad corridors that run generally north to south between Tewksbury, MA and Londonderry, NH. The railroad corridor located just south of the Tewksbury 22A Substation extends generally east and west. To the west, the corridor extends through the City of Lowell, MA and to the east the corridor extends into Andover, MA before connecting in with the Haverhill branch of the Commuter Rail and extends into the City of Lawrence, MA.

Interstate Highway Corridors: The Applicants also considered using the interstate highway system. Due to restrictions on activities allowed within the bounds of the highway corridor, ROW for the new Line would need to be created just outside the highway boundary. Locating the new Line generally parallel to I-93 would be the most direct means to connect the Tewksbury 22A Substation to the Scobie Pond 345 kV Substation. However this option was removed from further consideration due to the fact that entirely new ROW would need to be acquired adjacent to both Interstate 495 and I-93 to accommodate the new Line and

the density of development adjacent to both highway corridors precluded this option from being developed further.

Possible Underground Construction: The Applicants also considered a conceptual underground option consisting of a single AC circuit with two 345 kV cables per phase installed within local and state public roadways along an approximately 25.7-mile route between the Scobie Pond 345 kV and Tewksbury 22A Substations. The direct construction cost of this alternative was estimated at $558 million, not including engineering, permitting, allowance for funds used during construction, and other related costs. In addition, preliminary load flow simulations indicated that the installation of this underground option in parallel with the existing overhead 345 kV circuits would result in line loading imbalances—that is, the underground alternatives would "hog load" to such an extent that it would overload under certain design contingencies. Because of its extremely high cost and propensity to induce load imbalances, this option was not pursued further.

Alternate Routes Evaluated

The most technically feasible, cost effective and environmentally practicable route of all the options considered was an overhead line utilizing an existing ROW. During the course of assessing the potential for established ROWs to accommodate the new Line, a Preferred Route (presented as the Project in this Application), and two alternatives were identified. The Preferred Route is described in detail in Section (c)(1) and (h)(1) of this Application. The two alternative routes are summarized below.

The Western Alternative: This alternative extends south from Scobie Pond 345 kV Substation along the Project ROW to Hudson where, instead of transitioning to a NEP ROW, it would then continue within a PSNH ROW extending to the southwest and running parallel to the PSNH 345 kV 326 Line and the NEH-TC 451 and 452 lines to the Massachusetts border, where the new line would then transition ownership to NEP. The Western Alternative is roughly 45.5 miles in length, with approximately 18.3 miles in New Hampshire. It would be located in the Towns of Londonderry and Hudson, New Hampshire and the Towns of Tyngsboro, Dunstable, Groton, Ayer Littleton, Westford, Chelmsford, Billerica, and Tewksbury, Massachusetts. See Appendix V.

The Western Alternative is approximately 21.1 miles longer than MVRP, and also would require significant ROW line reconfiguration in Massachusetts and also requires expansion of the existing ROW adjacent to the 345 kV 326 Line, and 450 kV 451 and 452 Lines in both New Hampshire and Massachusetts. Specific to New Hampshire, the Western Alternative would require the purchase of an additional 85 feet of ROW adjacent to the existing ROW to accommodate the new line (equivalent to approximately 88 acres of new ROW), whereas the Preferred Route does not require any additional ROW. Along with the additional ROW that would need to be acquired, the Western Alternative would require approximately 232 acres of clearing, in comparison to the approximately 71.2 acres required for the Preferred Route. In addition, the Western Alternative is estimated to cost significantly more than the Preferred Route due to its substantially greater length and the

need to purchase the additional ROW. In consideration of the above, the Western Alternative was not selected as the Preferred Route for MVRP.

The Eastern Alternative: This second option would also be located entirely within PSNH ROW in New Hampshire extending east from Scobie Pond 345 kV Substation and then southeast to the Massachusetts border where ownership would then transition to NEP.

The Eastern Alternative is approximately 58 miles in length, with roughly 26.7 miles in New Hampshire. The Eastern Alternative extends through the Towns of Londonderry, Derry, Chester, Sandown, Danville, Kingston, East Kingston, Kensington and South Hampton, New Hampshire. In Massachusetts the Eastern Alternative would be located in the Towns of Amesbury, Merrimac, West Newbury, Groveland, Georgetown, Boxford, Haverhill, Methuen, Dracut, Andover, and Tewksbury. (See Appendix V). This route heads generally east from the Scobie Pond 345 kV Substation then south to the Massachusetts border. From the Scobie Pond 345 kV Substation, the Eastern Alternative parallels PSNH's 345 kV 363 Line to where the 345 kV 394 Line insects the 363 Line ROW. The Eastern Alternative then parallels the 394 Line, extending generally to the south, to the Massachusetts border. In Massachusetts, the Eastern Alternative parallels the 345 kV 394 Line to the Ward Hill Substation after which it parallels the 345 kV 397 Line to the Tewksbury 22A Substation.

The Eastern Alternative is approximately 33.6 miles longer than MVRP, would require significant line reconfiguration in Massachusetts and also requires expansion of the existing ROW for virtually its entire 26.7 mile length in New Hampshire. PSNH would need to acquire various widths of additional ROW adjacent to the existing corridor to accommodate the new line. Along with the additional ROW that would need to be acquired, the Eastern Alternative would result in a greater amount of tree clearing (approximately 327 acres in comparison to the 71.2 acres associated with the Preferred Route). In addition, the Eastern Alternative is estimated to cost significantly more than MVRP due to its greater length and the need to acquire additional ROW. In consideration of the above, the Eastern Alternative was not selected as the Preferred Route for MVRP.

Selection of the Preferred Route

In summary, due to the need to acquire additional ROW, along with the greater impacts from the additional clearing required and the greater length of the line, resulting in increased cost, neither of the alternative routes was determined to be as desirable as the Preferred Route.

Configuration and Optimization of the Preferred Route

Once the Applicants determined the Preferred Route, a range of design configurations were assessed to optimize the structure type and ROW configuration. In Segment 2, NEP investigated the use of double circuit structures to alleviate the need to relocate the 115 kV Y-151 Line to the western edge of the ROW. Two structure design options were considered:

one that would double-circuit the new 3124 Line with the existing 230 kV N214, and a second that would double-circuit the new 3124 Line with the existing Y-151 Line.

The first option consisted of utilizing 345 kV/230 kV double circuit steel pole structures to support both the new 3124 Line and the existing 230 kV N-214 Line on the centerline of the existing N-214 Line. This option resulted in significantly taller structures than those currently proposed. In addition, this option would require either long duration outages on the 230 kV N-214 Line, or temporary relocation of the N-214 Line in the event that long duration outages were not available. Further, placing the 3124 Line on double circuit structures with the 230 kV N-214 Line creates the potential for the simultaneous loss of the two lines in a single event. Additional load flow analysis would be required to determine whether this arrangement would meet all transmission planning standards and criteria.

The second structure design option consisted of utilizing 345 kV/115 kV double circuit steel pole structures to support the new 3124 Line and the 115 kV Y-151 Line together at the location of the existing Y-151 Line. For reasons similar to that of the first double circuit design option, this design option was not considered further.

In Segments 3 and 4, the Applicants considered the use of monopoles instead of H-Frame structures. The Applicants' preferred design utilizes H-frame structures that would stand approximately 90 feet above ground. Monopole structures provide a narrower profile; however, they would need to be approximately 40 feet taller than the H-Frame structures, making the monopole design more visible from greater distances. Additionally, monopole structures of this height (approximately 130 feet), generally require individual foundations, which results in higher construction costs for monopole design. The need for more substantial foundations also adds to the construction time required to install a structure.

3) A description in detail of the impact of each major part of the proposed facility on the environment for each site proposed

NEP and PSNH have sited and designed the Project to avoid, minimize or mitigate environmental impacts from the Project. A full description of studies conducted to assess and minimize potential adverse impacts is discussed in Sections (i)(3) through (i)(5). A brief summary of environmental impacts expected to result from major construction components is provided below.

Environmental impacts resulting from the construction of the Project include clearing of forested areas within the Project ROW; land disturbance for temporary construction accessways and temporary work areas; permanent land disturbance, and temporary and permanent wetland impacts resulting from permanent accessways, structures, and future maintenance activities.

New 345 kV 3124 Line and Y-151 Relocation

Environmental impacts resulting from the installation of the new 3124 Line and relocated Y-151 Line are limited to the footprint of utility pole structure installations, clearing and additional maintained ROW. The Project was designed to avoid structure placement in wetlands where possible. The existing ROW will be cleared, as necessary, to accommodate the proposed new Line and Y-151 Line relocation. Secondary wetland impacts include conversion of forested wetland habitat to scrub-shrub habitat in portions of the existing ROW where tree clearing or side trimming is required to accommodate new or relocated lines. In addition, tree clearing is required in environmentally sensitive areas including riparian and vernal pool buffers, and within forested vernal pools.

Wildlife will be permanently displaced from structure installation locations and may be temporarily displaced from temporary work areas. In addition, forested wildlife habitat within the Project ROW will be permanently converted to scrub-shrub or grassland habitat as a result of the Project. Applicants are working with NHF&G and NHNHB to avoid or minimize any detrimental impacts to protected species and habitats known to occur within the ROW.

Temporary work areas will require land disturbance in the form of vegetation clearing and minimal grading. Work pads, pull sites, and laydown areas were sited outside of wetlands and minimized where possible. Where wetland impacts could not be avoided, swamp mats will be used in wetland areas to minimize wetland disturbance. Areas of temporary disturbance will be restored following construction, as necessary.

Work pads, pull sites and laydown areas were sited outside of known locations of RTE species locations. Wildlife may be temporarily displaced during construction for the establishment of these work areas. Environmental monitors will oversee establishment of all temporary work areas to ensure avoidance of wildlife and installation of appropriate BMPs.

Accessways may result in land disturbance and wetland impacts. Access will include temporary construction access and permanent accessways in designated locations. Environmental impacts have been limited by utilizing existing accessways where possible. Construction and forestry crews will use public roads intersecting the ROW and other established access points to enter the transmission corridor. Wetland crossings have been sited at the narrowest portion of the wetland or in previously disturbed wetland areas to minimize impacts. Swamp mats will be used in temporary wetland impact areas to limit soil and vegetation disturbance.

Upgraded accessways in upland areas will remain in place and result in permanent land disturbance and wetland impacts in designated areas. A Construction Access Plan for accessway improvements on steep slopes near water resources has been developed and is included in Appendix U. The four permanent wetland crossings have been designed to maintain hydrology of adjacent wetlands and minimize impacts to the natural system to the greatest extent feasible.

Applicants are working with NHF&G and NHNHB to conduct surveys for protected species and avoid and minimize any detrimental impacts to rare species or habitats known to occur within the ROW. Accessways have been sited to the greatest extent possible within existing accessways to minimize impacts and will be adjusted, as necessary, to avoid critical wildlife habitat identified within the Project ROW.

Scobie Pond 345 kV Substation

All work proposed at the Scobie Pond 345 kV Substation is within the existing footprint of the Substation. Foundations and equipment will be installed on the existing gravel surface of the substation. Permanent stormwater controls have been installed at the Substation to manage stormwater inputs. In addition, a new section of underground conduit will be installed approximately 10 feet outside of the Substation fence within an upland area to facilitate bringing the fiber optic cable from Structure 288 into the Substation. No environmental impacts are expected from the Project work activities at the Scobie Pond 345 kV Substation.

4) A description in detail of the Applicants' proposal for studying and solving environmental problems

Extensive environmental studies and analyses have been conducted and additional studies are proposed to evaluate and address environmental impacts resulting from the Project. A full description of studies conducted to assess impacts and minimize potential adverse impacts is discussed in Sections (i)(3) through (i)(5) and further information and specific details are contained in the NHDES Wetlands Permit Application, NHDES Shoreland Permit Application, and NHDES 401 Water Quality Certification Application, Appendices F, G and H, respectively.

Impacts to wetlands and surface waters from the construction and operation of the Project have been identified and quantified in the NHDES Wetlands Permit Application and as part of the federal mitigation proposal for unavoidable impacts. The proposed configuration of structures and access locations was arrived at via a design and assessment process that sought to avoid and minimize environmental impacts to the greatest extent feasible. Environmental monitors will oversee construction and work with contractors to implement appropriate BMPs to avoid or minimize detrimental environmental impact. Unavoidable direct impacts, secondary wetland impacts, and clearing in sensitive environmental areas have been identified and assessed in accordance with guidance from the USEPA and the USACE. Unavoidable impacts will be mitigated in accordance with the mitigation proposal presented in the NHDES Wetlands Permit Application included in Appendix F.

NEP and PSNH have coordinated with USFWS, NHNHB, and NHF&G to develop appropriate survey protocols to identify the presence or absence of RTE species within the Project ROW. Pre-application meetings and numerous communications have occurred to receive approval of a survey strategy that will determine the occurrence of RTE species

that may occur within the ROW. Surveys completed to date include vernal pool and initial snake surveys. Additional studies to be conducted likely include further snake surveys, turtle nesting survey, New England cottontail survey, and flora surveys for state-listed species. BMPs will be implemented during construction and operation to avoid and minimize impacts to identified species and critical habitats. If impacts to protected wildlife and flora cannot be avoided, a mitigation plan will be developed in coordination with the appropriate agencies. Impacts to wildlife and wildlife habitat are addressed in greater detail in Section (i)(5).

5) A description in detail of the Applicants' financial, technical and managerial capability to construct and operate the proposed facility

NEP's Financial Capability

NEP constructs, operates and maintains over 2,300 miles of interstate electric transmission facilities in Massachusetts, New Hampshire and Vermont. NEP is a wholly-owned subsidiary of National Grid USA, a public utility holding company with regulated subsidiaries engaged in the generation of electricity and the transmission, distribution and sale of both natural gas and electricity. National Grid USA is a direct wholly-owned subsidiary of National Grid North America Inc. and an indirect wholly-owned subsidiary of National Grid plc, a public limited company incorporated under the laws of England and Wales. A corporate organizational chart is provided as Appendix W.

NEP has a proven track record of financing large energy projects. Over the three years ending December 31, 2014, NEP invested approximately $500 million in energy infrastructure. NEP financed these investments with a combination of internally generated cash flows, short-term debt issuances and capital contributions from National Grid USA. National Grid USA has financed and invested more than $5.5 billion in energy projects over the 2012-2014 period. Summaries of the audited statements of cash flows for NEP and National Grid USA are provided in Appendix C.

National Grid manages its financing and liquidity on a group basis. For the US subsidiaries, including NEP, short-term liquidity requirements are managed via the group's regulated money pool. All of the regulated subsidiaries can lend and borrow from the pool.

NEP has an investment-grade corporate credit rating and a stable long-term outlook. Specifically, NEP's senior unsecured rating is A3 by Moody's and A- by Standard & Poors (S&P), which are investment-grade ratings assigned to the best quality and lowest risk issuers to indicate a very strong capacity to meet financial commitments. These credit ratings provide NEP with access to the full spectrum of public and private debt markets.

National Grid USA has over $8 billion of outstanding long-term debt. National Grid plc's equity trades on the London Stock Exchange.

See Section (b)(7), (h)(6) and Appendix C for a copy of the most recently audited balance sheets for NEP and National Grid USA.

NEP's Technical and Managerial Capability

National Grid USA, operates one of the largest electric transmission systems in the Northeast. Its subsidiary companies serve approximately 3.4 million electric customers across Massachusetts, Rhode Island and upstate New York and own and operate approximately 8,600 miles of transmission facilities spanning upstate New York, Massachusetts, New Hampshire, Rhode Island and Vermont. NEP owns and operates over 2,300 miles of these interstate electric transmission lines, approximately 400 miles of which are located in New Hampshire, with the remainder located throughout Massachusetts and Vermont. These transmission facilities are regulated by the Federal Energy Regulatory Commission (FERC). NEP and its predecessor companies have owned, operated and maintained transmission facilities in New England for over a hundred years. Accordingly, NEP has comprehensive experience in planning, designing, engineering, permitting, constructing, financing, operating, maintaining and managing electric transmission infrastructure projects. Appendix X is a map of the service territory of National Grid and its subsidiary companies.

NEP is a transmission owner with approximately $1.4 billion in transmission rate base and has placed over $1.1 billion in service since 2006. National Grid and its subsidiary companies, including NEP, are currently enhancing the reliability of the electric grid with a number of significant construction projects involving high-voltage transmission lines in Massachusetts, Rhode Island, New Hampshire and Vermont. National Grid's electric transmission investment over the next five years is projected to be approximately $1.2 billion.

Consequently, NEP has the resources to use in-house and contract labor as needed for the installation, operation, maintenance, repair, and removal of the Project.

PSNH's Financial Capability

PSNH is a wholly-owned utility subsidiary of Eversource Energy (formally Northeast Utilities), which engages in electric and gas delivery to businesses and residences throughout the northeast. PSNH's business consists primarily of the generation, delivery and sale of electricity to its residential, commercial and industrial customers. It also owns and operates approximately 1,200 MW of primarily fossil-fueled electricity generation plants. PSNH's distribution and generation segments are subject to regulation by the New Hampshire Public Utilities Commission, which has jurisdiction over rates, certain dispositions of property and plant, mergers and consolidations, issuances of securities, standards of service and construction and operation of facilities. PSNH's transmission facilities that are part of an interstate power transmission grid over which electricity is transmitted throughout New England that are regulated by the FERC. A corporate organizational chart is provided as Appendix Y.

PSNH has a proven track record of financing large energy projects such as MVRP. Over the three years ended December 31, 2014, PSNH invested $646 million in new energy infrastructure. It financed these investments with a combination of internally generated cash flows, long- and short- debt issuances and capital contributions from Eversource. PSNH has an investment grade corporate credit rating and a stable long-term outlook from each of the credit rating agencies, including an extremely strong corporate credit rating of A (stable) from S&P.

Eversource is listed as number 359 on the 2014 Fortune 500 list of largest U.S. companies with an equity market capitalization of approximately $15.5 billion. Eversource's equity trades on the New York Stock Exchange. Eversource has corporate credit ratings of A, Baa1 and BBB+ from S&P, Moody's, and Fitch's, respectively. Eversource is the highest ranked U.S. utility holding company by S&P. PSNH also holds corporate credit ratings of A, Baa1 and BBB+ from S&P, Moody's and Fitch's respectively.

See Sections (b)(7), (h)(6) and Appendix D for a copy of the most recently audited balance sheets for PSNH and Eversource.

PSNH's Technical and Managerial Capability

Eversource operates New England's largest utility system serving more than 3.6 million electric and natural gas customers across Connecticut, Massachusetts, and New Hampshire. Eversource owns and operates approximately 4,270 circuit miles of transmission lines, 72,000 pole miles of distribution lines, 578 transmission and distribution stations, and 450,000 distribution transformers. PSNH and its predecessor companies have owned, operated and maintained transmission facilities in New Hampshire for over one hundred years. Appendix Z is a map of the service territory of Eversource and its subsidiary companies.

The company is a leading expert in building, owning and operating transmission facilities and is an Edison Award recipient for transmission ownership and providing service. Eversource is a transmission owner with approximately $4.5 billion in transmission rate base and has placed over $4.2 billion in service since 2006.

Eversource is currently enhancing the reliability of the electric grid with a number of significant construction projects involving high-voltage transmission lines in Connecticut, Massachusetts and New Hampshire. Eversource's electric transmission investment over the next five years is projected to be approximately $4.3 billion.

Consequently, PSNH has the resources to use in-house and contract labor as needed for the installation, operation, maintenance, repair, and removal of the Project.

Describe in reasonable detail the elements of and financial assurances for a facility decommissioning plan (RSA 162-H:7, V(g)).

The Companies do not anticipate the need to decommission the new transmission line. Such lines are typically rebuilt, as needed, and continue in service indefinitely. If at some time in the future it is determined that the Project needs to be decommissioned, the Companies would, at that point, add include this Project to their respective business plans, and would begin collecting future decommissioning costs through the FERC-approved transmission tariff.

Summary

Based on the preceding discussion, coupled with the pre-filed testimony of Brian McNeill and Michael Ausere, and the joint pre-filed testimonies of Bryan Hudock and David Plante, and Jessica Farrell and Garrett Luszczki and the supporting appendices, both NEP and PSNH have the financial, technical, and managerial capability to construct and operate the Project, in continuing compliance with the terms and conditions of the Certificate of Site and Facility. The Applicants also have the requisite financial capability to assure a facility decommissioning plan.

6) A statement of assets and liabilities of the Applicants

Relevant excerpts of NEP's and National Grid USA's most recent audited Balance Sheets for the three years ending March 2014 are attached hereto as Appendix C.

Relevant excerpts of PSNH's and Eversource's most recent audited Balance Sheets for the three years ending March 2014 are attached hereto as Appendix D.

7) Documentation that written notification of the proposed project, including appropriate copies of the application, has been given to the governing body of each community in which the facility is proposed to be located.

The governing body of each municipality where the Project is proposed to be located—as listed below—will be provided with a copy of this concurrently with the filing with the SEC. NEP and PSNH will file a copy of the return receipt or other documentation of receipt by each town with the SEC and has reserved Appendix AA for this purpose.

- Londonderry, Town Council
- Windham, Board of Selectmen
- Hudson, Board of Selectmen
- Pelham, Board of Selectmen

(i) INFORMATION REGARDING EFFECTS OF THE FACILITY ON, AND PLAN FOR MITIGATION OF ANY EFFECTS FOR, THE FOLLOWING

1) Aesthetics

Visual Impact

Environmental Design & Research (EDR) prepared a visual impact assessment (VIA) for the Project in accordance with accepted VIA methodologies. See Appendix AB. The VIA also considered draft regulations being prepared in New Hampshire ("draft SEC Rules"). The visual study area is defined as a two-mile radius around the center line of the proposed transmission line, totaling approximately 77 square miles, in the Towns of Pelham, Windham, Hudson, Londonderry, Litchfield and Derry (the "Study Area"). The EDR assessment describes existing landscape character, viewer groups, and scenic resources. Potential Project visibility and visual impact were evaluated through viewshed analysis, field review, preparation of visual simulations and evaluation of visual contrast by a panel of experienced visual impact assessors.

The visual setting of the Project is an existing, well-established electric transmission corridor running through an area dominated by suburban residential development and remnant forest land. Farms and agricultural land within the Study Area occur primarily in the western portion of Londonderry, with two smaller agricultural areas occurring in the northern and southern portions of Pelham. Higher density residential and commercial development is concentrated in the village/downtown areas of Derry, Londonderry and Pelham. Review of existing databases revealed that there are no National or State Parks, National Forests, National Heritage Areas, National Wildlife Refuges or State Wildlife Management Areas, National Natural Landmarks, or National/State Designated Wild, Scenic or Recreational Rivers, or other sites that would be typically considered scenic resources of statewide or national significance within the Study Area. An inventory of potentially scenic public resources within the Study Area identified one state forest, four scenic byways/drives, 18 town-designated scenic areas, four recreational trails, numerous local parks and conservation areas, four golf courses, and a number of surface water resources. A full listing of inventoried resources within the Study Area is included in Appendix A of the VIA.[61]

Viewshed analyses were conducted to identify those locations in the Study Area where an unobstructed line of sight is potentially available between a viewer and any portion of the proposed transmission structures. Topographic viewshed maps for the Project were prepared to determine those areas where views of the Project would be blocked by topography alone (i.e., discounting the screening effect of vegetation). To supplement the

61 It should be noted that while compiling the inventory, resources were identified as "potentially scenic" rather than "scenic", because they may actually lack scenic qualities or public access.

topographic viewshed analysis, a vegetation viewshed was also prepared to illustrate the potential screening provided by mapped forest vegetation.

Topographic viewshed analysis indicates that approximately 10% of the two-mile radius Study Area will be screened from view of the Project by topography alone. However, since the Study Area includes a significant amount of forest land, actual areas with potential views of the Project will be much more limited. When also considering the screening provided by mapped forest vegetation, viewshed analysis indicates that no new structures should be visible in 70.5% of the Study Area, and views of the Project are likely to be fully screened from 13 of the 108 identified potential scenic resources. When compared to the viewshed of the existing transmission structures, EDR determined that areas of potential Project visibility cover the same general areas and have the same pattern as the viewshed of the existing lines. The "newly visible" areas associated with the proposed line (i.e., areas where the proposed structures are potentially visible but the existing structures are not) only total 2.3 square miles, or 3% of the Study Area. These newly visible areas are generally quite small and tend to occur in valleys and low lying areas. The Project's viewshed is largely restricted to areas within or directly adjacent to the cleared transmission line ROW and other clearings such as roadways and open water/wetland areas that provide the opportunity for unscreened views. The viewshed analysis also indicates potential Project visibility in some more heavily developed areas, but it is important to note that the screening effect of built structures, and trees along streets and in yards, is not taken into consideration in this analysis.

Field review revealed that actual Project visibility is likely to be much more limited than suggested by viewshed mapping. This is due to the fact that screening provided by buildings is significant in village/town center areas, residential neighborhoods, and other areas of intensive land use. Trees within and adjacent to residential neighborhoods and in undeveloped portions of the study area are also generally more extensive and/or taller than assumed in the viewshed analysis, and typically limit long distance views. Field review confirmed that visibility of the Project is very limited within the study area and generally restricted to sites located within or immediately adjacent to the existing transmission ROW. Consequently, open views of the Project site, in all cases, included views of the existing transmission lines. Open views were documented from the more heavily traveled highways that traverse the Study Area (e.g., State Routes 28, 38 and 102), but generally only at, and immediately adjacent to, the point where the lines cross the road. In general, views of the existing transmission lines, and therefore the Project, were not documented from locations beyond one-half mile from the ROW.

Based on the lack of Project visibility from beyond one-half mile, potential scenic resources within this distance were evaluated to determine if they actually possess scenic qualities, are publicly accessible, and could have potential views of the Project. This evaluation determined that there are 13 scenic resources within the visual study area that could have views of the proposed line. These included the Granite State Rail Trail (a.k.a. Londonderry Rail Trail), Apple Way State Scenic Byway, and Musquash Conservation Area.

Photos from eight key observation points (KOPs) within the 13 scenic resources with potential views of the Project were used for the development of visual simulations. All of these KOPs were on, or directly adjacent to, the existing ROW, and thus present "worst case" visibility and visual impact of the Project. The simulations were prepared by creating three dimensional models of the landscape and the Project using USGS digital elevation model (DEM) data, transmission line clearing limits and structure design, dimensions, and coordinates provided by the Applicants. The models were incorporated into photographs obtained during field review using AutoCAD® and 3D Studio Max® software to create realistic photographic simulations of the Project.

A panel of three experienced visual impact assessors evaluated the visual impact of the Project by reviewing photos of the existing view and simulations of the Project from each of the eight selected KOPs. The simulations indicate that, in most cases where open views are available, the Project will be viewed at foreground distances, on a cleared ROW, and in association with several existing transmission lines. The occurrence of the new line within an existing transmission corridor limits the Project's impact on perceived land use, scenic quality, and the aesthetic expectations of viewers. However, in those instances where the Project resulted in a notable increase in the number of visible structures (both existing and proposed) and/or the width of the cleared ROW, more substantial impact on scenic quality and potential viewer activity or expectations could occur.

The rating panel evaluated visual contrast for each KOP using an evaluation form developed by EDR and based on the U.S. Department of the Interior Bureau of Land Management (BLM) contrast rating methodology.[62] This evaluation indicated that the Project's overall contrast with the visual/aesthetic character of the area will be in the range of minimal to moderate.[63] Appreciable contrast (scores between 2.5 and 3.5) was noted for two of the eight KOPs where the Project increased the perceived intensity and extent of utility development in the view. This effect was primarily associated with vegetation clearing that resulted in multiple transmission structures being added to the view or with the creation of a substantially wider cleared ROW, which could reduce scenic quality and viewer enjoyment. However, low contrast ratings for the majority of the viewpoints indicate that this effect is tempered by the presence of the existing transmission infrastructure, which already compromises visual quality and the aesthetic expectations of viewers at these locations. In addition, the type and extent of adverse visual effects noted for these views will diminish rapidly with increasing distance from the line and even partial screening of the Project.

62 This form, which has been used for the evaluation of the visual impacts of numerous energy generation and transmission projects in New York and New England, provides for a description of existing scenic quality, viewer type, and view duration, in addition to the actual rating of contrast between the Project and the existing view. The procedure involves using a numerical contrast rating system to quantify visual impact at each of the selected KOPs.

63 Composite contrast ratings for individual viewpoints ranged from 0.2 to 3.2 on the scale of 0 (insignificant) to 4 (strong), and averaged 1.5 (minimal-moderate).

In summary, while the contrast presented by the Project may have an impact on scenic quality at a small number of scenic resources within the study area, the visual impact of the Project as a whole is not unreasonably adverse for the following reasons:

1) The Project will have very limited visibility from most locations within the two-mile radius study area (including the majority of scenic resources);
2) Scenic resources located beyond one-half mile from the proposed center line will generally not have views of the proposed Project;
3) Open views from scenic resources will generally present limited contrast with the existing landscape and will have minimal impact on scenic quality and viewer expectations due to the location of the Project within an existing transmission corridor;
4) Even where presenting appreciable visual contrast, the Project will not be a dominant feature of a landscape in which existing human development is not already a prominent feature;
5) The Project will not offend the sensibilities of a reasonable person or violate a clear written community standard intended to preserve scenic resources; and
6) The Applicants have committed to feasible and appropriate impact avoidance, minimization and mitigation measures in the design of the facility. These measures will improve the harmony of the proposed Project with its surroundings, including the following:
    a) Siting the line within an existing transmission corridor to minimize required vegetation clearing and perceived change in land use;
    b) Utilizing self-weathering steel to minimize color contrast with surrounding vegetation;
    c) Utilizing transmission structure designs and spacing that are consistent with existing structures on the ROW; and
    d) Utilizing single circuit H-frame structures to minimize the height of the new 3124 Line.

Based on these determinations and the pre-filed testimony of John Hecklau, and in consideration of the requirements of the draft SEC Rules, the Project will not have an unreasonable adverse effect on aesthetics.

2) Historic Sites

A Request for Project Review (RPR) was submitted to NHDHR. In addition, PAL completed a Phase IA survey for Segment 3 and portions of the NEP ROW to be used for access, and reviewed a previously submitted Phase IA report that was performed along Segments 3 and 4 of the Project. Appendix AM. Based on the work conducted by the Applicants and PAL, coupled with expected ongoing consultations with NHDHR and

implementation of other measures before construction, the Applicants' cultural resource experts have concluded that there will be no unreasonable adverse effects on historic or archaeological resources.

The NHDHR's response to the RPR stated that there was insufficient information to make a determination on the Project and requested the results of a Phase IA archaeological survey of the line. No mention of the need for or review of historic architectural resources was included in that response. PAL subsequently received NHDHR's concurrence with its findings that the Project was unlikely to impact historic architectural resources. (See letter from NHDHR to the NH Division of Corps of Engineers, June 2, 2015, Appendix AC).

The Applicants engaged PAL to review a prior Phase IA assessment of the Project's impact on cultural resources for the ten miles of the Project ROW south of the Scobie Pond 345 kV Substation (Segments 3 and 4). PAL also conducted a separate Phase IA archaeological survey of the remaining eight miles (Segment 2) within one-half mile of either side of the Project's centerline as well as areas of NEP's ROW to be used for access. PAL's Phase IA survey defined areas of archaeological sensitivity. No archaeological sites were identified on the ground surface during the survey.[64] PAL's survey concluded that the Project would not have an unreasonable adverse effect on archaeological resources.

In addition to the archaeological surveys, the Applicants commissioned a survey to identify listed and potentially eligible above-ground historic properties within one-quarter mile of the Project's centerline. The survey revealed that there are no properties that have been previously listed or determined eligible for listing within the Project study area. Accordingly, the Project will not result in any adverse effects on historic architectural resources.

The Applicants have consulted and will continue to consult with NHDHR to avoid, minimize or mitigate impacts to above- and below-ground archaeological or historic resources.

Summary

Based on the preceding discussion, coupled with the pre-filed testimony of Dianna Doucette and Stephen Olausen, the Project will not have an unreasonably adverse effect on historic or archaeological resources. Should sensitive areas be identified through continued consultation and further assessment, the Applicants will utilize construction

64 Approximately 39.6% of Segment 2 is considered archaeologically sensitive for pre-contact resources (i.e., resources that pre-date interaction between Native Americans and Western culture) based on the favorable environmental setting, level topography, undisturbed terrain, well drained soils, and the proximity of other known pre-contact archaeological sites. These archaeologically sensitive sections of Segment 2 have the potential to be impacted by the Project through activities including, but not limited to, subsurface excavations for structure foundations as well as earth moving activities such as grading. The remaining 60.4% of Segment 2 was not considered archaeologically sensitive due to excessive modification of the landscape through soil removal and redisposition, sand and gravel pit operations, deeply cut recreational trails, and landscaping and dumping, as well as the presence of exposed bedrock, wetlands, and steeply sloped terrain.

practices to avoid, minimize and mitigate impacts to resources in those sensitive areas such that there will be no unreasonable adverse effects.

3) Air quality

Operation of the Project will not have any impacts to air quality and air quality impacts associated with construction will be negligible.

The Project is a transmission project and therefore, will not create any air emissions during its operation. Generators that may be used during construction of the Project will be operated in compliance with permitting and emission requirements. Contractors are expected to adhere to NH state laws relative to idling. No air permits are required for the Project.

The potential for fugitive dust resulting from construction activity will be controlled in accordance with conditions of the NPDES CGP (Section 2.1.2.5 Minimize Dust). In accordance with erosion and sediment control requirements of the CGP, the generation of dust is to be minimized through the appropriate application of water or other approved dust suppression techniques. BMPs to control fugitive dust will be addressed in the Stormwater Pollution Prevention Plan (SWPPP) developed for the Project as required under the CGP.

4) Water quality

Surface Waters in or Adjacent to Project Site

The Project will result in land disturbance and some impacts to state jurisdictional wetlands, surface waters, and protected shoreland areas. Permit applications that are required land disturbance and impacts within jurisdictional areas have been included in Appendices F – H.

The applicants submit that the Project qualifies for a General Permit by Rule in accordance with Alteration of Terrain Rule Env-Wq 1503.03, for projects that disturb less than 100,000 square feet of contiguous area and less than 50,000 square feet of contiguous area in the protected shoreland. The Project involves discrete, non-contiguous land disturbances that will not exceed the specified thresholds. An Alteration of Terrain Permit Application has been provided to the AoT Bureau and is included in Appendix O.

Below is a summary discussion of Project impacts within each of the jurisdictional areas together with the plans for avoiding, minimizing or mitigating any unreasonable adverse effects on water quality. For more detailed information, please refer to the application forms, design plans, and/or maps provided in support of the Project's NHDES Wetlands Permit Application, NHDES Shoreland Permit Application, and NHDES 401 Water Quality Certification in Appendix F – H.

Assessment of Impacts to Wetlands

Wetlands and surface waters were delineated within the Project ROW in accordance with NH Wetlands Rules (Env-Wt 100-900) and the *Corps of Engineers Wetland Delineation Manual* and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0* (January 2012). NEP retained VHB to delineate water resources within the NEP ROW, to review wetlands previously delineated in 2012 by Normandeau Associates, Inc. (Normandeau) in the PSNH ROW, and to supplement the wetland delineations, as appropriate, for the Project. Delineated water resources included wetlands, intermittent and perennial streams, and vernal pools. Water resource delineation was conducted during the 2014 field season (April through October) and a portion of the 2015 field season (April through May). Delineated wetlands and surface waters were located in the field using a Global Positioning System (GPS) and are depicted on the Wetland Permitting Plans, included in Appendix F. Prime wetlands were identified by reviewing prime wetland source maps provided by NHDES.

Wetlands were classified in accordance with the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al., 1979, revised 1985). Streams were classified in the field as intermittent or perennial in accordance with definitions in the NH Wetlands Rules (Env-Wt 100-900) and verified by reviewing USGS topographic maps. Wetland and stream classifications are depicted on the Wetland Permitting Plans included as Attachment A contained in Appendix F.

A qualitative assessment of 13 wetland functions and values was made for each identified wetland within the Project ROW. Some of the larger wetland complexes found within the Project ROW provide multiple principal functions and values.[65] These wetlands offer floodwater storage, sediment and shoreline stabilization, sediment and nutrient retention, groundwater discharge or recharge, wildlife habitat, and production export functions as wildlife food sources. The wetlands that are associated with waterbodies may also contribute to fisheries habitat and recreational opportunities such as canoeing and kayaking.

The majority of the remaining Project ROW wetlands are currently maintained as either scrub-shrub or emergent habitat. Scrub-shrub/emergent wetlands associated with streams provide flood alteration, sediment and shoreline stabilization, wildlife habitat and production export functions as wildlife food sources. However, when not associated with a stream, hydrologically isolated and small in size, these wetlands tend to exhibit limited functions and values.

Wetland and surface water impacts were assessed using Environmental Systems Research Institute (ESRI) ArcGIS© desktop software. Temporary and permanent impacts are totaled

65 Large wetland complexes include Lower Golden Brook Prime Wetland, Beaver Brook Floodplain wetland, and other unnamed large emergent/scrub-shrub systems associated with open water components.

by wetland and stream type, presented in the Wetlands Permit Application Form for each municipality, are included in Appendix F. Secondary impacts, the conversion of forested wetlands to scrub-shrub and emergent wetlands, were assessed using ESRI ArcGIS© desktop software. Secondary, vernal pool, and vernal pool buffer impacts are totaled and also presented in the Wetlands Permit Application narrative in Appendix F. Secondary wetland impacts, riparian buffer, and vernal pool buffer impacts are considered jurisdictional impacts under the New Hampshire Programmatic General Permit (PGP) and are included in the Wetlands Permit Application to calculate the required mitigation under the PGP. Below is a summary of proposed wetland impacts.

Table 8. Summary of NHDES Jurisdictional Wetland Impacts

Type of Impact	Description	Impact Calculation
Permanent wetland impact	Structures and permanent crossings	4,428 sq. ft. (.10 acre)
Temporary wetland impact	Construction impacts in wetlands	388,895 sq. ft. (8.93 acre)
Temporary stream impact	Construction impacts in streams	6,365 sq. ft. (.15 acre)
Permanent stream impact	Stream realignment (SA-41)	80 sq. ft. (17 linear feet)

In order to accommodate the installation of proposed 3-pole Structure 253 along the 3124 Line in Londonderry, the Project will involve realignment of the western portion of a single intermittent stream channel, identified as SA-41 on Sheet 87 of the Wetland Permitting Plans (Attachment A of Appendix F). The proposed channel realignment ("the Site") is located within the PSNH ROW approximately 1,200 feet east of High Range Road. Channel realignment is necessary at this location, as it has been determined by project engineers that the stream could interfere with the central support footing and/or the designated guy anchors of proposed Structure 253, thus compromising its long-term stability. The proposed location of Structure 253 cannot be moved, as its location represents a critical turning point in the ROW where the 3124 Line changes direction to the south. Proposed realignment of the western portion of SA-41 will result in approximately 80 sq. ft. and 17 linear feet of permanent stream bed impact.

The watershed to the Site is approximately 19.2-acres with a majority of the drainage area (17.1-acres) located to the east of High Range Road flowing overland into a roadside ditch. The ditch conveys runoff to the south into an 18-inch corrugated metal pipe culvert under High Range Road. Discharge from the culvert enters a partially forested wetland (identified as WA 128A) and is then conveyed in a small channel approximately 5-feet wide and less than 0.5-ft deep. The channel then divides into multiple channels as it continues down slope and channel widths for this reach vary from 1 to 4-feet with depths approximately 1- to 2-inches. From this point, the stream channel broadens and becomes undefined as flow extends into a large scrub-shrub/emergent wetland system (identified as WA 128). Structure 253 will be partially located within this wetland.

VHB completed an evaluation of existing field conditions to develop a solution that would protect the integrity of the stream as well as the proposed structure. Studies included field investigations and creating a hydrologic and hydraulic model using HydroCAD V.10.0.

One of these stream impact areas occurs within the PSNH ROW where the western end of the stream channel is realigned to the north around the center pole of Structure 253 with the channel geometry shown on the Channel Realignment Design Plan included as Attachment A in Appendix F. The model predicts velocities in the channel from the realignment will be less than 2 feet per second, which falls within the acceptable velocity range for a vegetation-lined channel. Temporary erosion control blankets or similar controls will be installed within the realigned channel and around the structure upon completion of the work to allow vegetation to become re-established.

Wetland Impact Avoidance

The Project's engineers designed the Project to avoid permanent and temporary impacts to jurisdictional areas to the greatest extent feasible and still meeting applicable design standards. The preliminary design sought to avoid jurisdictional areas based on available natural resource information obtained from previous work and available public information. The Project design was subsequently revised following the collection of site-specific environmental data in order to avoid direct impacts to wetlands and surface waters that would have resulted from initial design of structure and work pad placement locations. Temporary impacts to jurisdictional areas were avoided wherever feasible by siting construction access, guard protection areas, and laydown areas in uplands and previously disturbed areas. Pull sites and work pads were shifted or trimmed to avoid impacts to jurisdictional areas, wherever feasible.

Subsequent revisions to the 3124 Line design included the adjustment of structure heights and span lengths to eliminate structures and the movement of multiple structures and work pads to avoid jurisdictional wetland, surface water, and vernal pool impacts. At one location, structure redesign (two dead end structures on an angle) was implemented to avoid a wetland. In addition, the 3124 Line was shifted outside of the existing maintained ROW to avoid direct impacts to Beaver Brook.

Wetland Impact Minimization

Project impacts were minimized by limiting permanent and temporary impacts to the extent possible in the design of the line. Permanent wetland impacts have been limited to pole footprints and designated permanent wetland crossings required to maintain access within the ROW. Impacts of pole footprints have been further minimized by utilizing direct embed structures, where feasible. Guy anchor design for in wetland locations were selected based on soil conditions and with a preference for minimizing the excavation required. Utilization of stone fords have been proposed at permanent wetland crossings, where practical, to minimize wetland impacts. The selected types of permanent crossings allows for water to seasonally flow over the crossing. The selected permanent crossings do not restrict wetland hydrology.

Tree clearing in wetlands will be completed from accessways or upland areas to minimize disturbance of regulated areas from clearing equipment. In addition, forested wetlands will

be hand cut and logs will be pulled out of the wetlands using machinery staged in upland areas. All slash and logs will be removed from jurisdictional areas unless permit conditions specify otherwise.

Temporary impacts have been minimized by locating construction access points in areas previously disturbed or at the narrowest point in the wetland complex. Where temporary wetland impacts will occur, swamp mats may be utilized to minimize these impacts. Swamp mats reduce ground pressure of construction vehicles preventing rutting, minimizing soil compaction, and limiting disturbance to vegetation. In addition to construction access, swamp mats are proposed for use in wetlands for temporary construction of work pads around structure locations and other temporary work areas.

As none of the Project impacts are expected to alter the hydrology of wetlands (i.e., no inflow/outflow restrictions) along the Project ROW. The Project will not permanently impact water quality and hydrologic functions (groundwater recharge/discharge, floodflow alteration, or sediment and nutrient retention) which are performed by these wetlands, specifically the larger emergent/scrub-shrub complexes which are present. Some temporary impacts to the wildlife habitat value of some Project ROW wetlands are anticipated during the construction period as a result of noise and the presence of work crews and equipment.

Sediment and erosion controls will be appropriately implemented, as depicted on the Project's Wetland Permitting Plans found in Attachment A of Appendix F and in accordance with the Applicants' guidance documents provided in Appendices S and T. The environmental controls shown on the Wetland Permitting Plans may need to be supplemented due to the season of work, alternate work methods proposed by the contractor, and additional permit requirements. In anticipation of the need for alternate controls a Construction Access Plan has been developed for Project areas that have a higher potential to impact water quality due to work on steep slopes and in close proximity to water resources. The Construction Access Plan is found in Appendix U. Temporary sediment and erosion controls will be installed to prevent impacts to water quality resulting from land disturbance. Temporary and permanent stabilization will occur in accordance with Project plans.

Wetland Impact Mitigation

The Project has avoided and minimized permanent and temporary wetland impacts to the greatest extent feasible through Project design and construction methodology. Permanent wetland impacts are below the NHDES threshold for mitigation (10,000 sq. ft. of permanent wetland impact). However, in accordance with applicable federal regulations and guidance, mitigation is proposed for direct and secondary Project impacts to wetlands and impacts to riparian and vernal pool buffers. Mitigation ratios were applied to these anticipated impacts in accordance with the *New England Army Corps of Engineers Mitigation Guidance* document and in coordination with the USEPA, USACE, and NHDES. A summary of Project impacts and mitigation burden are displayed in Table 9 below.

The Project proposes mitigation in the form of in-kind mitigation (i.e., upland buffer preservation) and/or an In-Lieu Fee contribution to the Aquatic Resource Mitigation (ARM) fund. Requests for potential in-kind mitigation projects have been made to each of the impacted towns as well as to regional land trusts and area conservation groups. To date, Pelham and Londonderry have requested upland buffer mitigation projects that are being evaluated by the Applicants. Windham has responded that they were unable to identify a suitable in-kind mitigation projects. Hudson did not respond to the request for potential in-kind mitigation projects.

Applicants will continue to develop a mitigation package that will be acceptable to NHDES, USEPA, and USACE. A Preliminary Mitigation Agreement has been included in the Wetlands Permit Application in Appendix F.

Table 9. Summary of USACE Jurisdictional Impacts and Mitigation Burden (in acres)

Town	Permanent Wetland/ Stream Impacts	Temporary Wetland/ Stream Impacts	Secondary Wetland Impacts	Vernal Pool Buffer Impacts	Riparian Buffer Impacts	Total Impacts	Mitigated Impacts
Pelham	0.086	3.674	0.422	0.211	0.143	4.536	0.387
Windham	0.006	0.161	0.042	0.061	0.183	0.453	0.057
Hudson	0.003	0.706	2.795	2.090	2.130	7.724	1.097
Londonderry	0.007	4.386	7.617	5.267	2.066	19.343	2.472
Total	0.102	8.927	10.876	7.629	4.522	32.056	4.013

Assessment of Impacts to Protected Shoreland

Jurisdictional areas under the SWQPA were identified within the Project area by reviewing the *DES Consolidated List of Waterbodies Subject to RSA 483-B* and cross referencing that list with the USGS Topographic Maps for the Project area.

The majority of the Project is located outside of the protected shoreland of waterways jurisdictional under RSA Ch. 483-B except for two locations in Windham and Hudson where four new electric transmission utility structures are proposed within the protected shoreland of Beaver Brook.[66]

66 Beaver Brook intersects the Project corridor in two locations along Segment 2. At the first location, Beaver Brook comes near the western cleared limits of the Project ROW in the Town of Windham between Winter Street and Glance Road. The second location is approximately 1.1 miles to the north of the first location where Beaver Brook flows east to west across (perpendicular to) the Project ROW north of Haverhill Road (NH Route 111) in the Town of Windham. Beaver Brook also crosses the Project ROW in Londonderry, but it is a second order stream in this location and, therefore, not jurisdictional under SWQPA.

Shoreland impacts were assessed using ESRI ArcGIS© desktop software. Proposed structure installation work will result in approximately 105 sq. ft. of permanent shoreland impact for the installation of three single pole structures associated with the relocated Y-151 line and one H-frame structure associated with the new 3124 Line. In addition to these permanent impacts, a total of approximately 35,107 sq. ft. of temporary shoreland impact will result from the use of construction work pads and pull pads centered on each structure during installation.

Proposed structure installation work will be confined to previously cleared/maintained upland areas of an existing electric utility ROW. Some selective removal of trees and saplings will occur along the western edge of the ROW in order to achieve required vertical and horizontal line clearance standards for the relocated Y-151 line. No significant ground disturbance is anticipated to occur where vegetative clearing is proposed since stumps will remain in the ground. Approximately 12,891 sq. ft. of vegetative clearing in shoreland areas will result from the Project. Impacts within the protected shoreland of Beaver Brook are described in detail in the Project's Shoreland Permit Application included in Appendix G.

Protected Shoreland Impact Avoidance

Impacts to the protected shoreland could not be avoided given the extent of the jurisdictional area within the existing ROW; however, the Project has been designed such that work is not proposed along the banks of Beaver Brook or within the designated 50-foot Waterfront Buffer Zone. Impacts to other protected shoreland areas are limited to structure installation in upland areas and some minimal tree clearing. Proposed structure installations will not result in any substantial increase of impervious area within the protected shoreland.

Protected Shoreland Impact Minimization

Permanent impacts to the protected shoreland were minimized to the extent feasible by siting proposed structures outside of the 50-foot Waterfront Buffer Zone and limiting impacts within the 150-foot Woodland Buffer Zone to one proposed structure. The remaining proposed structures are located more than 150 feet from Beaver Brook. Proposed structure installations will occur within previously cleared and maintained upland areas of the existing Project ROW.

Temporary impacts to the protected shoreland will be minimized by utilizing existing accessways wherever possible. Required equipment and utility trucks will be staged within the existing limits of the cleared Project ROW while the work is performed. Crews may trim or remove trees along the existing ROW edge as necessary to protect installed electric lines, poles, and anchors and achieve required line clearances. Appropriate BMPs will be implemented during vegetative clearing and structure installation to prevent the migration of sediment from the Project ROW to Beaver Brook.

Protected Shoreland Impact Mitigation

Mitigation for permitted impacts to the protected shoreland is not required. Such permits may be issued, in most instances, if a project conforms to the Minimum Protection Standards set out in RSA 483-B:9. Public utility projects, by their nature, cannot adhere to the minimum protection standards. In accordance with RSA 483-B:9 IV-b, public utility lines and associated structures and facilities will be permitted as necessary and consistent with the purposes of this chapter and other state law.

Impacts to Water Quality

The Project area is largely comprised of vegetated wetlands that have the capacity to perform water quality and hydrologic functions such as groundwater discharge or recharge, flood flow alteration, retention of sediments, toxicants and pathogens, and nutrient removal. The large PEM/PSS wetland systems and wetlands containing open water or aquatic bed components located along the Project ROW may contribute to flood-flow alteration by detaining surface runoff from surrounding slopes during precipitation events and excess floodwaters if they contain a contributing perennial or intermittent watercourse. Pollutant retention or removal function may also occur within these types of wetlands along the Project ROW, but a general lack of erosion, sediment, pollution, or excess nutrient sources within the drainage area limits water quality functions.

The Project does not involve any water withdrawals or process water discharge that could impact water quality. The Project does not involve the construction of any petroleum liquid storage facilities and will not significantly increase impervious surfaces within the Project area. Therefore, the principal water quality concern associated with the Project is the potential for increased sediment erosion and movement during the construction period.

Although the Project will require tree clearing near many of the area streams crossed by or adjacent to the Project ROW, the proposed clearing will be limited to only a minor portion of the overall width of the existing ROW. Given that much of the existing ROW width is already cleared, the added clearing is not expected to result in any discernable effects on water quality or water temperatures in the intermittent or perennial streams.

Construction of the Project will not require the application of any herbicides or chemical treatments. Following completion of the Project, on-going vegetation management controls will be consistent with those currently used in the rest of the existing ROW and will be implemented consistent with NEP and PSNH vegetation maintenance programs. Maintenance primarily consists of periodic cutting and trimming and application of herbicides in accordance with the New Hampshire Division of Pesticide Control Special Permit.

As stated previously, wetlands and surface waters were delineated within the Project ROW in accordance with NH Wetlands Rules (Env-Wt 100-900) and the *Corps of Engineers Wetland Delineation Manual* and the *Regional Supplement to the Corps of*

Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0 (January 2012). Delineated wetlands and surface waters were GPS-located in the field and are depicted on the Project's Wetland Permitting Plans included as Attachment A in Appendix F.

The New Hampshire portion of the Project ROW crosses 181 wetlands, 13 perennial streams, and 20 intermittent streams. The stream crossings are identified and numbered on the Wetland Permitting Plans, included as Attachment A in Appendix F, starting at the southernmost stream which is a tributary to Tonys Brook (SA-11) in Pelham and progressing to the northernmost stream which is Beaver Brook (SA-43) near the Scobie Pond 345 kV Substation in Londonderry. General observations and descriptions of each wetland and stream are summarized in the wetland and stream crossing tables included in the NHDES Wetland Permit Application (Appendix F). As discussed further below, streams along the Project ROW are not expected to be directly impacted by the placement of fill or the use of culverts to enclose streams.

As an indirect measure of the potential impact the Project may have on streams, the amount of tree clearing within 100-feet and 50-feet of a perennial and intermittent stream channel, respectively, was estimated using the available geographic information system (GIS) data and aerial photographs. Of the estimated 4.5 acres of tree clearing that is to occur within the designated buffers of 22 streams, approximately 2.2 acres is associated with perennial streams and the remaining 2.3 acres is associated with intermittent streams.

A general description and assessment of the principal rivers and streams or other surface water bodies crossed by the Project ROW in each Segment is discussed below.

Water Bodies in Segment 2

The existing ROW in Segment 2 intersects seven perennial streams and eight intermittent streams located in Pelham and Windham. The largest stream crossed by the Project ROW in this Segment is Beaver Brook, which is a fourth order stream that originates in the headwaters of Derry and Chester and empties into the Merrimack River in Massachusetts. Many of the perennial and intermittent streams in this Segment are unnamed tributaries to Beaver Brook. Other named streams located in Pelham and Windham area include a tributary to Robinson Pond and Tonys Brook and Gumpas Pond Brook, which are both tributaries to Beaver Brook. Tonys Brook is the only stream listed as impaired by NHDES for both aquatic life and primary recreation uses.

Beaver Brook in the Windham and Pelham area is not listed as impaired on NHDES' 303(d) list. However, Beaver Brook is listed as impaired for aquatic life uses farther north in Derry and Londonderry due to elevated chloride levels. (Refer to pages 1 to 3 of Appendix AD, *NH Impaired Waters Mapping*).

Segment 2 has the least amount of proposed tree clearing within designated stream buffer areas with approximately 15,832 sq. ft. or 0.36 acres of tree clearing. The largest amount

of tree clearing consists of 4,800 sq. ft. associated with an intermittent tributary to Tonys Brook at the southernmost end of the Segment. For perennial streams, the largest amount of potential tree clearing consists of approximately 2,759 sq. ft. associated with Beaver Brook (SA-21) near Winter Street and Glance Road in Windham. Beaver Brook is close to the Project ROW at this point, but does not cross it.

Farther north in this Segment, Beaver Brook does cross the existing ROW near the Windham and Hudson town boundary (SA-24). The amount of tree clearing estimated to occur within 100 feet of the stream channel at this location is estimated to be 1,658 sq. ft. The estimated amount of tree clearing is considered to be relatively minor in comparison to the overall width of the ROW and the size of the watershed area.

Water Bodies in Segment 3

Segment 3 intersects four perennial streams and six intermittent streams. One of the perennial streams is Chase Brook (SA-30), a small tributary to the Merrimack River that is crossed by the Project ROW near the Londonderry and Hudson town boundary. Chase Brook flows into the Merrimack River approximately four miles west of the ROW. This stream is not on NHDES 303(d) list of impaired water bodies.

Other perennial streams crossed in this Segment are Nesenkeag Brook and two of its tributaries, which are located farther north in Londonderry. Nesenkeag Brook flows into the Merrimack River approximately two miles to the west of the ROW. Nesenkeag Brook is listed as impaired for aquatic life uses due to previously observed low dissolved oxygen levels and low biotic index values derived from previous benthic macroinvertebrate assessments. The source(s) for the low dissolved oxygen levels and low biotic values are listed by NHDES as "unknown." (Refer to pages 3 and 4, Appendix AD, NH Impaired Waters Mapping.)

There are three intermittent streams crossed by the Project ROW that are tributaries to Robinson Pond, which is located in Hudson. The other three intermittent streams are either tributaries to Chase Brook or Nesenkeag Brook.

Segment 3 has more proposed tree clearing within the identified stream buffer areas (totaling approximately 2.96 acres) than the other Segments. The largest area of proposed tree clearing is associated with a small tributary to Robinson Pond with approximately 28,901 sq. ft. or 0.66 acres of clearing. Approximately 16,890 sq. ft. or 0.39 acres of tree clearing is proposed within the stream buffer associated with Chase Brook, while 10,845 sq. ft. or 0.25 acres of tree clearing is proposed within the stream buffer associated with Nesenkeag Brook. Additionally, a total of approximately 26,151 sq. ft. or 0.60 acres of clearing is proposed along Howard Brook.

Water Bodies in Segment 4

Segment 4 intersects two perennial and six intermittent streams. One of the perennial streams is located at the southern end of the Segment and is an unnamed tributary to Nesenkeag Brook (SA-36). The other perennial stream is at the northern end of the Segment (SA-43) and is a branch of Beaver Brook that is located within a few hundred yards south of the Scobie Pond 345 kV Substation in Londonderry. The brook originates on the western side of the I-93 roadway, flows beneath the roadway and joins a larger tributary stream that flows into Hoods Pond and eventually transitions to Beaver Brook farther downstream in Derry. This stream is listed on the NHDES 303(d) list and is considered impaired for aquatic life uses due to elevated chloride levels. (Refer to page 5 of Appendix AD, NH Impaired Waters Mapping.)

Stream buffer clearing in Segment 4 is estimated to be approximately 1.19 acres, and all but a small portion of this clearing is associated with intermittent streams. The only tree clearing associated with a perennial stream buffer consists of approximately 4,410 sq. ft. of clearing around the Beaver Brook crossing near the Scobie Pond 345 kV Substation. This is a relatively minor amount of tree clearing as compared to the rest of the ROW.

Water Quality Impact Avoidance

The Project has been designed to avoid impacts to jurisdictional areas to the greatest extent feasible while still meeting applicable design standards. Permanent impacts to water quality were avoided by siting structures away from surface waters. Potential temporary impacts to surface waters were avoided by siting construction access, guard protection areas, work pads, pull sites, and laydown areas in uplands and previously disturbed areas wherever feasible. Streams will be bridged using swamp mats, wherever possible, to avoid direct impacts to stream beds and banks.

Water Quality Impact Minimization

Various measures will be used during construction to minimize the potential for erosion and sediment migration from the Project work areas. Vehicle refueling will be properly sited out of the wetland and jurisdictional buffer areas and utilize established spill prevention and containment measures consistent with National Grid and/or NHDRED Construction BMP Guidance Manuals.

Prior to the start of construction, proper erosion and sedimentation controls will be implemented in accordance with the Guidance Manuals. A SWPPP will also be prepared to provide specific details on the types of erosion control measures to be used for the Project and will include requirements for the inspections and maintenance provisions. Limits of clearing will also be clearly marked in the field prior to the start of construction to prevent any inadvertent excursion of clearing beyond what has been approved for the Project. Grubbing of stumps will be limited to the new structure locations to allow the installation of the poles and safe access.

During construction, swamp mats may be used in saturated soil areas to minimize soil disturbance and rutting from vehicle access and staging. Construction activity will be monitored and the condition and effectiveness of the erosion control measures will be inspected weekly. Inspection and maintenance logs will be maintained to provide documentation of inspections and provide feedback to the construction contractor and owner as required in accordance with the NPDES CGP. Specified erosion and sedimentation controls will include measures to restore disturbed soils to a stabilized condition.

Alteration of Terrain

The Applicants have submitted an AoT Permit Application in Appendix O, subject to a waiver request of Env-Wq 1504.09. In accordance with, Env-Wq 1503.03, it is the position of the Applicants that the Project qualifies for a General Permit by Rule. Land disturbance is limited to discrete areas along the Project ROW for construction access and temporary work areas. The applicable conditions under the General Permit by Rule ensure that terrain alteration below the threshold limit will not have an adverse effect on water quality in surface waters of the state. The specific conditions include:

1. The project will not significantly alter the characteristics of the terrain as defined in Env-Wq 1502.51(b)(1);
2. The work is conducted in accordance with Env-Wq 1505.04 relative to temporary methods for stormwater management and erosion and sediment control and Env-Wq 1505.05 relative to cold weather site stabilization, as applicable;
3. A wetlands permit has been obtained pursuant to RSA 482-A prior to any work in areas subject to RSA 482-A jurisdiction; and
4. Any permit, waiver, or variance required under RSA 483-B has been obtained prior to any work in areas subject to RSA 483-B jurisdiction.

The Project complies with conditions (3) and (4) by assessing and seeking permits for wetland and shoreland impacts as described above. In order to comply with conditions (1) and (2), a Construction Access Plan was developed to depict how stormwater will be managed at construction access areas and within steep work areas near water resources. The Construction Access Plan is included as Appendix U.

The Applicants submit that the foregoing discussion of impacts on water quality, as supported by the pre-filed testimony of Sherrie Trefry, demonstrates that the Project will not have an unreasonable adverse impact on water quality.

5) Natural environment

a. Plant Communities

As discussed above, the Project will be constructed within an existing transmission line ROW. In Segment 2, the ROW is almost entirely cleared and consists primarily of emergent and shrub vegetation. In Segment 3, an approximately 90-foot forested portion will be cleared along the eastern portion of the ROW. In Segment 4, an approximately 50-foot forested strip in the middle of the ROW will need to be removed. Additional clearing will be required southwest of the Scobie Pond 345 kV Substation. In total, approximately 71.2 acres of forested land, 10.9 acres of which is wetlands, will need to be cleared.[67]
The plant communities within the existing maintained ROW will not be permanently affected by construction and operation of the Project. The existing ROW will be trimmed, mowed, and maintained in accordance with regularly scheduled maintenance cycles prior to Project construction.

Construction of the new 345 kV line and Y-151 line in the ROW would require expanding the existing cleared areas into undeveloped forested portions of the ROW.[68] The newly cleared areas will be permanently converted to shrub and emergent plant communities to maintain line clearances in accordance with electric safety standards.

A number of invasive species occupy the Project area and vary in population density from a few scattered plants to large dense stands.[69] The spread of invasive species will be mitigated through BMPs throughout the duration of Project construction as described in Appendix F.

67 Commonly observed shrubs within the existing cleared ROW include the following: blackberry (*Rubus alleghensis*), raspberry (*Rubus idaeus*), multiflora rose (*Rosa multiflora*), common winterberry (*Ilex verticillata*), speckled alder (*Alnus incana*), maleberry (*Lyonia ligustrina*), meadowsweet (*Spiraea latifolia*), steeplebush (*Spiraea tomentosa*), arrowwood (*Viburnum recognitum*), species of willow (*Salix* spp.), and glossy buckthorn (*Frangula alnus*). Occasional saplings include gray birch (*Betula populifolia*), yellow birch, red maple, white pine, and quaking aspen. Common herbaceous and emergent vegetation includes teaberry (*Gaultheria procumbens*), bristling dewberry (*Rubus hispidus*), bracken fern (*Pterdium aquilinium*), species of golden rod and aster (*Solidago* spp. and *Symphyotrichum* spp.), fringed sedge (*Carex crinita*), woolgrass (*Scirpus cyperinus*), bladder sedge (*Carex intumescens*), soft rush (*Juncus effusus*), sensitive fern (*Onoclea sensibilis*), tussock sedge (*Carex stricta*), dark green bulrush (*Scirpus atrovirens*), broad-leaved cattail (*Typha latifolia*), cinnamon fern (*Osmunda cinnamomea*), reed canary grass (*Phalaris arundinacea*), interrupted fern (*Osmunda claytoniana*) and jewelweed (*Impatiens capensis*).

68 Tree species commonly observed within these forested portions of the ROW include red maple (*Acer rubrum*), white pine (*Pinus strobus*), white birch (*Betula papyrifera*), yellow birch (*Betula alleghensis*), red oak (*Quercus rubra*), white oak (*Quercus alba*), quaking aspen (*Populus tremula*), and green ash (*Fraxinus pennsylvanica*).

69 Invasive species commonly observed within the ROW include purple loosestrife (*Lythrum salicaria*), common reed (*Phragmites australis*), glossy buckthorn, Japanese knotweed (*Polygonum cuspidatum*), and oriental bittersweet (*Celastrus orbiculatus*).

Assessment of Plant Community Impacts

Although construction of the Project would require the additional clearing of approximately 71.2 acres of forested land, 10.9 acres of which is wetland, significant adverse impacts are not expected based on the location of the proposed areas of clearing relative to the surrounding landscapes. In Segment 2, in particular, the amount of forested clearing has largely been previously cleared to its limits. Much of the clearing required is limited to removing select trees along the western edge of the ROW to meet vegetation horizontal clearance standards. Removing large tracts of trees/vegetation along this Segment is not proposed.

The majority of clearing required for the Project will occur within Segment 3, which requires clearing along the eastern edge (+/- 90 feet) of the existing ROW to accommodate the location of the new 3124 Line. Much of the forested cover within the ROW along this Segment is adjacent to residential properties and developed areas.

Clearing activities in Segment 4 are confined to a narrow forested strip running down the center of the ROW. Based on the location (cleared ROW on both sides) and the size of the forested strip (+/- 50 feet), clearing in this area is not expected to have adverse impacts on the present vegetative composition of the surrounding landscape since the Project area is already comprised largely of an existing overhead transmission line corridor which is regularly maintained.

Plant Community Impact Avoidance

Impacts to the plant communities cannot be avoided. The Project requires clearing to the full extent of the ROW to accommodate the new 3124 Line and the relocated Y-151 line. Clearing and maintenance of the ROW is required to meet safety standards.

Plant Community Impact Minimization

Tree clearing will be conducted in accordance with approved BMPs. Stumps will remain in place with the exception of stumps that need to be removed for pole installation. Swamp mats utilized at wetland crossings and within wetland areas will be inspected and cleaned in accordance with BMPs to prevent the spread of invasive plants within the ROW. Forested wetlands will be hand-cut to eliminate rutting in wetlands from machinery and logs and slash will be removed from the wetland area.

Plant Community Impact Mitigation

Tree clearing in forested wetlands, riparian buffers, and vernal pool buffers are considered secondary impacts under federal regulations. Mitigation ratios for each jurisdictional area have been assigned by the USEPA. Mitigation will be provided for jurisdictional impacts as described in the Wetlands Impact Section above.

b. Wildlife Habitat

The Project area provides habitat for a variety of wildlife species from large mammals to small amphibians. Wildlife habitat land cover types (developed and mapped by NHF&G under the statewide WAP) were reviewed to determine the potential for related wildlife species to be present in the ROW. The NHF&G's compilation of Wildlife Habitat Land Cover data predicts wildlife habitat types throughout the State to be used as a conversation tool to maintain critical wildlife habitats. These habitat types fall into the following categories: forest types, freshwater wetland types, coastal habitats. Steep slope habitats, and other small-scale habitats. Assignment of specific wildlife habitat land cover types within the Project area were developed using natural resource data. Field verification of these wildlife habitat land cover types was conducted in April of 2015 to accurately depict and assess impacts that may result from the Project. Field verified wildlife habitat cover maps are provided in Appendix I, Wildlife Habitat Land Cover Types Mapping.

Four main habitat types were identified by NHF&G as occurring within each of the three Project Segments. These include Appalachian oak-pine forest, grasslands, hemlock-hardwood-pine, and wet meadow/shrub wetland (refer to Table 10 below). In addition, rocky ridge or talus slope habitat is identified within Segment 2, and floodplain forest and peatland habitat are present adjacent to the corridor within Segment 2 and Segment 3. The following is a description of each habitat type found within or adjacent to the Project corridor in New Hampshire.

Table 10. Wildlife Action Plan Habitat Types Within the Project Corridor

Wildlife Habitat Land Cover	Segment 2	Segment 3	Segment 4
Appalachian oak-pine	X	X	X
Grasslands	X	X	X
Hemlock-hardwood-pine	X	X	X
Peatland			X
Rocky ridge or Talus slope	X		
Wet meadow/shrub wetland	X	X	X

The following is a description of each habitat type found within the Project area:

Appalachian oak-pine forest: These forests have nutrient-poor, dry, sandy soils and are composed mainly of oak (*Quercus* spp.), hickory (*Carya* spp.), mountain laurel (*Kalmia latifolia*), and sugar maple (*Acer saccharum*). Notable wildlife species found within this habitat type are Whip-Poor-Wills, American black bears (*Ursus americanus*), federally threatened and state special concern northern long-eared bat (*Myotis septentranilis*), and state-listed endangered eastern hognose snakes (*Heterodon platirhinos*). These forests are unique from hemlock-hardwood-pine forests due to their sandy soils and influence by frequent fires. Appalachian oak-pine forests commonly occur at an elevation below 900

feet. These forests cover less than 10% of New Hampshire and mainly occur within the southern portion of the state.

Grasslands: Typical grassland habitats in New Hampshire are hayfields, pastures, fallow fields, wet meadows, and landfills. Areas containing grasses, sedges, wildflowers, and little to no shrubs or trees of 10 hectares (approximately 27.4 acres) or greater are considered grasslands. Large tracts of grassland provide breeding and nesting grounds vital to many bird species. Notable wildlife species found in grasslands are state-listed special concern wood turtles (*Glyptemys insculpta*), butterflies, state-listed endangered eastern hognose snake and Northern Harrier, Upland Sandpiper, and the state threatened Grasshopper Sparrow.

Hemlock-hardwood-pine: This common habitat type covers approximately 50% of New Hampshire and largely occurs below 1,500 feet in elevation. A hemlock-hardwood-pine forest is considered a transitional forest community between hardwood conifer forests in higher elevations and oak pine forests in lower elevations. This habitat type has varying soil types but is typically composed of dry, sandy soils with dominant tree species of red oak and white pine, often transitioning to a dominance of hemlock and beech. Other tree species less commonly found within these forests include sugar maple, white ash (*Fraxinus americana*), red spruce (*Picea rubens*), witch hazel (*Hamamelis virginiana*), black birch (*Betula lenta*), and black cherry (*Prunus serotine*). Common herb species include starflower (*Trientalis borealis*), wild sarsaparilla (*Aralia nudicaulis*), and Canada mayflower (*Maianthemum canadense*). Notable wildlife species found within this habitat include Cerulean Warbler, Tri-colored bat (*Perimyotis subflavus*), bobcat (*Lynx rufus*), Northern Goshawk, and American black bear.

Wet meadow/shrub wetland: These wetlands are emergent marshes, wet meadows, or scrub-shrub wetlands and are mostly influenced by groundwater. These habitats have poorly-drained muck and mineral soils that are often saturated, but rarely permanently flooded. The main functions of these wetlands are to filter pollutants and to hold water which reduces flooding. Notable species found within this habitat are Red-winged Blackbirds, North American beavers (*Castor Canadensis*), painted turtles (*Chrysemys picta*), state-listed endangered Blanding's turtles (*Emydoidea blandingii*), New England cottontails (*Sylvilagus, transitionalis*) Northern Harriers, ringed boghaunters (*Williamsonia lintneri*), sedge wrens, state-listed threatened spotted turtles (*Clemmys guttata*) and Pied-billed Grebes.

Rocky ridge or Talus slope: Rocky ridge or talus slope habitats are areas of loose rock or outcrops on ridge tops with shallow soils and exposed bedrock. The associated forest often has a thin forest canopy. Common tree species found within these habitats include red spruce (*Picea rubens*) and American mountain ash (*Sorbus americana*), and common forest communities within these habitats are hemlock-hardwood-pine forests or oak-pine forests. Notable species found within this habitat are bobcat, state-listed endangered timber rattlesnake (*Crotalus horridus*), state endangered eastern small-footed bats (*Myotis leibii*), and state-listed threatened Peregrine Falcon.

Floodplain forest: These habitats are adjacent to river channels and are prone to periodic flooding. The soils of these forests are rich and, therefore, are commonly converted to farmland. Floodplain forests function as a filter for pollutants and also a buffer zone along rivers, controlling sediment from water runoff and minimizing erosion along river banks. Common vegetation found in these forests include sugar maple and balsam fir (*Abies balsamea*). Less common trees found within floodplain forests include silver maple (*Acer saccharinum*), red maple (*Acer rubrum*), and American sycamore (*Platanus occidentalis*) with swamp white oak (*Quercus bicolor*). Notable wildlife species found within this habitat include Red-shouldered Hawks, Veery, Chestnut-sided Warblers, North American beaver, American mink (*Neovision vision*), North American river otter (*Lontra canadensis*), Jefferson salamanders (*Ambystoma jeffersonianum*), northern leopard frog (*Lithobates pipiens*), state-listed special concern wood turtles, and state-listed endangered Blanding's turtles.

Peatland: This habitat has low nutrient content and high acidity and is characterized by limited groundwater input and little surface water runoff, making the water within peatlands acidic. This habitat is effective in storing carbon and other nutrients due to slow decomposition rates within these systems. Many different peatland systems occur in southern New Hampshire including poor to medium level fens and bogs, kettlehole bogs, and forested peatlands. Poor level fens and bogs have little to no water flow into or out of the system and are more acidic than medium level bogs which have small amounts of water input from groundwater or nearby streams. Kettlehole bogs are glacial depressions in the earth which have filled with water, and over time, peat. Forested peatlands include black spruce peat swamps or dominant hardwood tree species and are less acidic than other peatlands. Common species to peatlands include sphagnum moss (*Sphagnum* spp.), sedges (*Cyperaceae* spp.), leather leaf (*Chamaedaphne calyculata*), northern white cedar (*Thuja occidentalis*), and American larch (*Larix laricina*). Notable wildlife species found in peatlands include the state endangered ringed boghaunter and the northern bog lemming (*Synaptomys borealis*).

VHB refined the landcover type within the Project ROW as upland shrubland where appropriate to more accurately describe existing field conditions. This refinement modified some NHF&G based designations within the Project ROW from forested or grassland habitat types. Forested habitat types were reduced where trees and saplings were removed to prevent arcing with the transmission wires. Grassland habitat types expanded where shrub growth had replaced grass as the dominant vegetation type.

Results of field investigations verified that the four main habitat types (Appalachian oak-pine forest, grasslands, hemlock-hardwood-pine, and wet meadow/shrub wetland) do occur within the Project ROW. Mapped rocky ridge or talus slope and peatland habitat was found to be accurate on NHF&G mapping. Mapped Appalachian oak-pine forest habitat within the uncleared portions of the ROW in Segments 2 and 3 were found to correlate closely to well drained, sandy, upland soils both observed in the field and as mapped by the United States Department of Agriculture (USDA) Natural Resource Conservation Services' (NRCS) web soil survey. All other mapped upland forested habitat within Segments 2 and 3 met the

description of hemlock-hardwood-pine habitat. Mapped grassland areas were modified in several areas to account for shrub growth within the ROW.

Assessment of Impacts to Wildlife Habitat

Because the Project ROW has been established and maintained for many decades, impacts to wildlife resources are minor as compared to construction of a new ROW through undeveloped land.

Impacts to wildlife habitat are generally the result of changes in the natural community for the development and altered use of the land. Common impacts to the upland wildlife habitat land cover types present within the Project area include residential and commercial development, fragmentation of large undeveloped tracts of land, and the spread of invasive plants. Common impacts to wetland wildlife habitat land cover types include changes to water flows and drainage patterns and the increased amount of pollutants entering the system related to surrounding land development. Project work that has the potential to permanently impact wildlife habitat land cover types, beyond current levels of impact, includes tree clearing and the construction of permanent accessways.

Impacts from tree clearing activities will occur in various locations along the Project ROW, ranging from minor side trimming of trees along the west edge of the existing NEP ROW to a 90-foot forested portion to be cleared within the east edge of the existing PSNH ROW. However, these impacts will not appreciably alter the wildlife habitat cover types within the majority of the Project ROW. The side trimming required in Segment 2 of the NEP ROW will not result in appreciable adverse impact to adjacent forested areas. The clearing of the 50-foot wide forested area within the middle of Segment 4 of the PSNH ROW will convert hemlock-hardwood pine cover type to maintained grassland.

Clearing of the 90-foot portion of Segment 3 has a more significant impact within the Project area and to the surrounding landscape. The clearing in this location represents 47 acres of nearly contiguous Appalachian oak-pine and hemlock-hardwood pine forest within the Project ROW. The forested portion of the PSNH ROW has been preserved predominantly as forested land because it is within the existing ROW and not previously available for development. This area of Hudson and Londonderry has a moderate density of residential development adjacent to the ROW with numerous residential subdivisions and roads abutting or traversing the ROW. Undeveloped areas outside of the ROW generally coincide with conservation lands as discussed in Section (c)(5).

Although clearing the ROW to its full extent in this Segment will alter the wildlife habitat land cover type, the maintained ROW will retain its function as a travel corridor and foraging and nesting area for a variety of wildlife species due to the amount of nearly contiguous forested land. Permanent maintenance of the ROW will increase habitat for wildlife dependent on early successional habitat. Maintained transmission line corridors in forested landscapes provide important early successional habitats for a taxonomically rich array of native plant and animal life, including populations of rare species. Early

successional habitat is decreasing in the northeastern United States as abandoned agricultural land is reforested. This has resulted in a decrease of shrub land birds across the region and maintained transmission ROWs have become important early successional habitat areas for rare plants and animals that require this habitat.

Impacts to wildlife habitat land cover types from construction access have been avoided or minimized through Project design and the use of BMPs. Construction access has the potential to alter hydrology and introduce invasive species, however, access to the Project ROW will be from public roads and other identified access points. Within the ROW, existing accessways will be used for construction access, where possible, and new construction access will be created, as necessary. Proposed accessways impact all four main habitat types identified within the Project ROW.

Adverse impacts to the hydrology of wetland wildlife habitat land cover types resulting from construction access will be avoided by implementing appropriate temporary and permanent BMPs. No permanent impacts to the hydrology of habitat land cover types is expected to result from construction access or temporary work areas within wetlands.[70]

Permanent wetland crossings have been designed to maintain current hydrologic conditions within wetlands. Impacts to the hydrology of wildlife habitat have been minimized to the greatest extent feasible. Permanent accessways have been proposed in four locations to prevent repeated impact by future maintenance access needs.

As discussed above, the Project ROW currently contains populations of invasive species. Introduction of non-native species can displace native species can displace native species within identified wildlife habitat land cover types. Invasive species are typically introduced during the construction phase of the Project by vehicles and equipment entering or moving through the Project ROW and have not been cleaned of seeds and plant parts of non-native plants before they are utilized at a new work area within the ROW. BMPs will be adhered to during construction to prevent the spread of invasive species. BMPs include inspecting and cleaning vehicles and equipment prior to mobilizing equipment and vehicles to the Project or between Project work areas. Introduction or spread of invasive species into any wildlife habitat land cover type is not expected to result from Project construction.

Fisheries

The Project will not permanently impact fish in perennial streams or open water habitats. During construction, streams will be bridged with swamp mats to maintain hydrology and limit impacts to fisheries. Fish and shellfish habitat is associated with the perennial streams that intersect the Project area, including Golden Brook, Beaver Brook, Chase

70 As stated earlier, swamp mats may be used at wetland crossings and for temporary work areas in wetlands and can also be used to bridge flowing water to maintain hydrology during construction. Swamp mats distribute the weight of construction vehicles and minimize ground compaction and vegetative disturbance and as a result swamp mats prevent the compaction of wetland soils that can change wetland hydrology and vegetative composition.

Stream, Nesenkeag Brook, and several unnamed perennial tributaries to Beaver Brook. These perennial streams have the potential to provide coldwater fishery habitat. The open water components of the streams formed by beaver activity may provide warm water fish habitat, but the small size of the open water area is not likely to support a significant population of fish.

Vernal Pools

Vernal pools were initially identified within the PSNH ROW during field investigations conducted by Normandeau in 2012. VHB wetland scientists confirmed these and other potential vernal pools during field investigation of the entire Project ROW in 2014 and these areas were confirmed in the Spring of 2015 when the ROW was surveyed for the presence of vernal pool indicator species during the peak breeding season. The survey resulted in 17 vernal pools within the Project area. Installation of the new Line will not result in any direct impacts (i.e. fill) to vernal pools. However, clearing activities within and adjacent to some vernal pools will result in secondary impacts. In accordance with federal mitigation requirements, a percentage of secondary impacts to vernal pools resulting from clearing of vernal pools and buffers will be mitigated. Refer to previous sections for a discussion of mitigation for vernal pool buffer impacts.

Rare, Threatened or Endangered Plants, Animals and Natural Communities

Initial consultations with the NHNHB regarding the occurrence of rare plant, animal or natural communities near the Project revealed historical records of ten rare plants, one invertebrate species, two exemplary natural communities, and five vertebrate species near the Project area. Historical records of species identified in the NHNHB response memo as being located within the limits of the Project area are depicted below in Table 11.

Table 11. Records of New Hampshire listed Rare, Threatened, and Endangered (RTE) Species Occurring within the ROW.

VHB, in consultation with NHNHB, will conduct flora surveys during the 2015 growing season to determine presence or absence of rare plant species. The survey protocols and NHNHB approval letter are provided in Attachment D in Appendix F. A complete summary of agency consultation is provided in Appendix AE, Regulatory Agency Consultation Summary Table. Guidance for avoidance, minimization, and mitigation of impacts to plant species will be developed in coordination with NHNHB and will be based on the results of the pending field surveys.

Table 11. Records of New Hampshire listed Rare, Threatened, and Endangered Species Occurring within the ROW

RTE Species		State Rank
Invertebrate		
Alasmidonta varicosa	brook floater	Endangered
Herpetofauna		
Coluber constrictor constrictor	northern black racer	Threatened
Emydoidea blandingii	Blandings turtle	Endangered
Clemmys guttata	spotted turtle	Threatened
Flora		
Hypoxis hirsuta	common star grass	Threatened
Desmodium rotundifolium	round-leaved trailing tick-trefoil	Threatened
Vulpia octoflora var. tenella	eight-flowered six-weeks grass	Endangered
Paronychia canadensis	smooth forked whitlow-wort	Endangered

Field surveys for New Hampshire listed fauna species are being conducted in 2015 and 2016. VHB has worked closely with NHF&G to develop survey protocols for Blanding's and spotted turtle nesting areas, northern black racers, hognose snakes, and New England cottontail. The survey protocols and NHF&G approval letter are provided in Attachment D in Appendix F. In addition, a summary of agency consultation is provided in Appendix AE. Guidance for avoidance, minimization, and mitigation of impacts to identified fauna species will be developed in coordination with NHF&G and USFWS based on the results of the field surveys.

Assessment of Impacts to Rare, Threatened, and Endangered Animal Species

Brook Floater

Brook floater is known to occur within perennial streams. The Project does not require any impacts within or along the banks of the perennial stream identified by NHF&G as supporting a brook floater population. Therefore, NHF&G does not require survey or additional mitigating action for this species.

Northern Black Racer and Eastern Hognose Snake
Field surveys help develop avoidance and minimization techniques. A survey for snakes was conducted in the spring of 2015 to determine the presence or absence of the northern black racer near a historical observation. The NHF&G noted that the eastern hognose snake could inhabit other portions of the Project area, although there is no known occurrence. Surveys will also include any observations of eastern hognose snake.

NHF&G's primary concern with the black racer is the potential for Project work to destroy hibernation areas (hibernacula). Secondarily, NHF&G is concerned with possible mortality

of snakes if construction occurs in spring, summer, and early fall when snakes could be in the Project area. Surveys will be conducted in early spring as snakes are emerging from hibernacula to determine whether hibernacula occur within the Project area. Snakes were not identified in the spring 2015 survey, however, an additional survey will occur in the spring of 2016. If construction occurs during the active season for snakes, utility field personnel will be made aware of the potential presence and protected status of both the northern black racer and eastern hognose snakes. Informational material on these species will be distributed to field personnel during pre-construction training.

Blanding's Turtle and Spotted Turtle

Blanding's and spotted turtles are known to occur along the Project ROW. Blanding's turtles generally hibernate in vegetated wetlands, whereas spotted turtles hibernate in the mud of shallow wetlands or in muskrat burrows or lodges (Ernst et al. 1994).[71] Female Blanding's and spotted turtles seek terrestrial habitats to nest, typically in open sandy areas. Based on discussions with NHF&G, the primary area of concern is direct impacts to turtles or nests in construction areas. Nesting surveys will be conducted in 2015 in suitable nesting areas. BMPs will be implemented during construction to avoid and minimize impacts to identified nesting areas. BMPs may include deployment of exclusion fencing, utilizing turtle observers, conducting contractor training, and distribution of educational materials. If construction work occurs during the nesting season in turtle habitat areas, additional turtle nesting surveys may be required.

New England Cottontail

The New England cottontail is listed as an endangered species in New Hampshire with known occurrences in Londonderry. This species inhabits dense shrubs generally are found in old fields, regenerating clearcuts, shrub-dominated wetlands, utility ROW, or other areas with thicket vegetation. NHF&G has not expressed specific concerns regarding the impact of the Project on this species. Project structures are planned within currently forested areas in Londonderry, however, existing shrub habitat will not be removed for structure installation or accessways and tree clearing in these areas will increase habitat for this species. In addition, by agreement between PSNH and NHF&G, the maintenance cycle of utility corridors in the area has been modified to allow for some shrub vegetation to remain between cycles so as to preserve cottontail habitat. In consultation with NHF&G, the Applicants are planning a survey in areas of the ROW not currently known to have resident cottontails.

Northern Long-eared Bat

The USFWS listed the northern long-eared bat as threatened effective May 4, 2015. The Project does not impact known roost trees or populations of northern long-eared bat.

71 Ernst, C.H., J.E. Lovich, and R.W. Barbour. 1994. Turtles of the United States and Canada. Smithsonian Inst. Press, Washington, D.C. 578 pp.

However, due to required tree clearing, coordination with USFWS will determine if surveys are required.

The Applicants submit that the foregoing discussion, as supported by the pre-filed testimony of Darrell Oakley, demonstrates that the Project will have not have an unreasonable adverse impact on the natural environment.

6) Public health and safety

The Applicants have taken, and will continue to take, preventative steps to protect the health and safety of workers and the public during the construction and subsequent operation of the Project. The Applicants have designed the Project to adhere to company polices and the National Electrical Safety Code (NESC) requirements for transmission lines and have optimized the design of the proposed phase conductors to minimize levels of magnetic fields at the ROW edge. Moreover, the Applicants have designed the Project to limit any increase in sound beyond the edge of the ROW.

Prior to construction, the Applicants will develop and implement a project health and safety plan for all aspects of the work and will hire and retain qualified workers and contractors to construct the Project. A traffic officer or flagger will be on site to ensure the safety of the public and workers during construction and to minimize impacts to traffic. Once the Project is constructed, the Applicants will continue to adhere to company procedures and ISO-NE, state, and federal regulations relating to the safe operation of transmission lines.

a. Electric[72] and magnetic fields[73]

Electricity used in homes and workplaces is transmitted over considerable distances from generation sources to distribution systems. Electricity is transmitted as AC to all homes and over electric lines delivering power to neighborhoods, factories, and commercial establishments. The power provided by electric utilities in North America oscillates 60 times per second (i.e., at a frequency of 60 Hertz [Hz]).

The Applicants commissioned Exponent, Inc., to model EMF levels associated with the Project, and to undertake an assessment of the most current scientific literature on health

72 Electric fields are the result of voltages applied to electrical conductors and equipment. The electric field is expressed in measurement units of volts per meter (V/m) or kilovolts per meter (kV/m); 1 kV/m is equal to 1,000 V/m. Most objects, including fences, shrubbery, and buildings, easily block electric fields. Therefore, certain appliances within homes and the workplace are the major sources of electric fields indoors, while power lines are the major sources of electric fields outdoors.

73 Magnetic fields are produced by the flow of electric currents, and are commonly expressed in units called gauss (G) or milliGauss (mG), where 1 G = 1,000 mG. The magnetic-field level at any point depends on characteristics of the source (e.g., a transmission line or a household appliance), including the arrangement of conductors, the amount of current flow through the source, and its distance from the point of measurement. The levels of both electric fields and magnetic fields diminish with increasing distance from the source.

research regarding exposure to EMF. Based on this assessment, Exponent concluded that the Project will not have an unreasonable adverse effect on public health and safety as a result of EMF.[74] Exponent's summary of the scientific research into EMF further supports the conclusion of scientific and public health agencies that there are no established effects of EMF on public health and safety at the levels associated with the Project.

Exponent also calculated EMF levels in the vicinity of the Project ROW, both before and after construction. Prior to construction, calculated magnetic fields at annual average load (AAL) levels range from 3.1 mG to 29 mG at the edge of the ROW, while electric-field levels at average conductor height range from 0.1 kV/m to 1.3 kV/m. After the Project is placed into service, calculated magnetic fields at AAL levels are predicted to range from 4.5 to 24 mG at the edge of the Project ROW. Electric-field levels at average conductor height are predicted to range from 0.1 kV/m to 1.3 kV/m. The results of Exponent's modeling can be found in the report Electric Field, Magnetic Field, Audible Noise and Radio Noise Modeling in New Hampshire, Appendix AG, and are summarized in the tables below.

Table 12. Magnetic-field Levels (mG) at AAL

Section Number	Distance from Centerline of ROW					
	Pre-Project AAL			Post-Project AAL		
	-ROW Edge	Max on ROW	+ROW Edge	-ROW Edge	Max on ROW	+ROW Edge
8b	6.2	52	5.5	7.4	75	7.4
8c	6.2	71	5.5	9.0	75	7.4
8d	7.3	60	6.6	8.5	75	7.4
9	6.5	34	5.7	8.6	75	7.4
10	5.3	151	6.0	5.8	124	14
11	28	139	10	23	119	11
12	7.6	140	3.3	5.6	120	4.7
13	29	140	11	24	120	13
14	29	140	3.1	24	120	4.5
15	29	140	7.5	24	120	9.1

74 The assessment is summarized in Current Status of Research on Extremely Low Frequency Electric and Magnetic Fields and Health, Appendix AF. Overall, Exponent concluded that: Recent studies when considered in context of previous research do not provide evidence to alter the conclusion that ELF EMF exposure at the levels we encounter in our everyday environment including transmission lines is not a cause of cancer or any other disease process. (Appendix AF; p. 54).

Table 13. Electric-field levels (kV/m) at Average Conductor Height

Section Number	Distance from Centerline of ROW					
	Pre-Project (Average Height)			Post Project (Average Height)		
	-ROW Edge	Max on ROW	+ROW Edge	-ROW Edge	Max on ROW	+ROW Edge
8b	0.5	2.7	0.5	0.6	4.3	0.5
8c	0.5	2.7	0.5	0.6	4.3	0.5
8d	0.5	2.7	0.5	0.5	4.3	0.5
9	0.5	2.6	0.5	0.6	4.3	0.5
10	0.6	5.2	0.1	0.6	6.6	1.2
11	1.2	5.0	0.5	1.2	6.6	0.4
12	0.2	5.0	0.1	0.2	6.6	0.2
13	1.3	5.0	0.2	1.3	6.6	0.2
14	1.3	5.0	0.1	1.3	6.6	0.1
15	1.3	5.0	0.1	1.3	6.6	0.1

Presently, there are no regulations concerning EMF in the State of New Hampshire or mandated by the federal government. However, some nationally and international scientific bodies, including the International Committee on Electromagnet Safety (a committee of the Institute of Electrical and Electronics Engineers (IEEE)), and ICNIRP (affiliated with the World Health Organization (WHO)) have recommended Basic Restrictions (standards) for public exposure to EMF. Under all operating conditions, the calculated EMF levels resulting from the Project are well below the exposure levels corresponding to the Basic Restrictions published by the Committees as summarized in the Table 14 below.

Table 14. Exposure Levels Corresponding to Basic Restrictions of ICES and ICNIRP[75]

	ICES	ICNIRP
Electric Field (kV/m)	26.8	36.4
Magnetic Field (mG)	9,150	12,400

* Although electric and magnetic fields from the Project and adjacent transmission lines are well below these guidelines, the Applicants have endeavored to minimize changes to the current magnetic-field levels along the Project ROW to the extent possible edge by optimizing the phasing arrangement of the circuits to maximize the magnetic-field cancellation between the different phases.

75 ICNIRP and ICES exposure limits are based on internal doses (physical quantities inside the human body directly related to observed health effects) that should not be exceeded; these limits are called Basic Restrictions. Since internal doses are difficult to measure, Reference Levels or Maximum Permissible Exposures are also set for environmental exposures (2,000 mG and 4.2 kV/m for ICNIRP; 9,040 mG and 10 kV/m within the ROW for ICES). If Reference Levels or Maximum Permissible Exposures are not exceeded, it guarantees that the Basic Restrictions are also met. If environmental exposures, however, exceed the Reference Levels that does not mean that the Basic Restriction is exceeded; rather it means that additional dosimetric determination is needed, such as that performed in conjunction with Kavet et al. (2012).

b. Sound

While most transmission lines do not generate appreciable noise during normal operation, 345-kV transmission lines may be audible under certain weather conditions. When the electric field on a localized portion of the conductor surface exceeds the breakdown strength of air (the electrical-field strength at which air begins to conduct current), a small amount of energy is released in the form of conductor vibration, light, audible noise (AN), and radio noise (RN) in a process known as corona. AN from an AC transmission line is a direct result of corona and is typically experienced as a hissing, crackling sound that may be accompanied by a 120-Hz hum. The intensity is most pronounced directly underneath the line conductors, and decreases with distance from the transmission line. AN generally increases during wet weather.

Exponent modeled the AN levels attributable to corona along the Project ROW before and after Project construction in both fair (dry) and foul (wet) weather conditions. See Table A-3 on page A-6 and A-7 in Appendix AG of the Electric Field, Magnetic Field, Audible Noise, and Radio Noise Modeling in New Hampshire Report. Existing and projected AN levels varied by Segment; however, in both fair and foul weather, post-Project AN levels at the ROW edge were 0 to 2 decibels on the A-weighted scale (dBA) higher than pre-Project AN levels. A change in AN levels under 3 dBA cannot normally be detected by the human ear. Thus, operation of the Project will have a negligible impact on AN levels along the Project ROW. A summary of AN under fair and foul weather conditions is included in the table below.

Table 15. Audible Noise Levels (dBA) in Fair Weather

Section Number	Distance from the ROW centerline					
	Pre-project in fair weather			Post-project in fair weather		
	-ROW Edge	Max on ROW	+ROW Edge	-ROW Edge	Max on ROW	+ROW Edge
8b	18	22	18	20	24	20
8c	18	22	18	20	24	20
8d	18	22	18	20	24	20
9	18	22	18	20	24	20
10[76]	39	43	36	39	43	37
11	23	27	18	23	27	19
12	20	27	17	20	27	17
13	23	27	17	23	27	17
14	23	27	17	23	27	17
15	23	27	17	23	27	17

76 In Segment 10, all calculations of audible noise are made with the EPRI/HVTRC method to account for the existing direct current transmission line in this segment.

c. Traffic Safety during Construction

Construction of the Project is expected to have a minimal impact on the traveling public. Traffic impacts will be limited to locations where the transmission line crosses public roadways and at points of access to the ROW. All traffic controls will be in accordance with the 2009 edition of the *Manual on Uniform Traffic Control Devices* (MUTCD)[77] and NHDOT policies.

The Project will require 37 road crossings, including a single crossing of I-93, seven other State-maintained crossings, and 29 locally-maintained crossings. Police or flaggers will be available to stop traffic to provide up to eight minutes of road closure while lines are pulled across the roads. Permitting requirements are described briefly below, and discussed more fully in Appendices P and AH.

The I-93 crossing will require extensive traffic controls to maintain traffic flow during Project construction. A site-specific traffic control plan for this crossing will be documented in the required NHDOT Aerial Utility Permit, see Appendix P.

The Project will cross state highways at seven other locations. Of these, only one —the crossing of New Hampshire Route 111 in Windham—will require a NHDOT Aerial Utility Permit, see Appendix P. All seven of the non-interstate state highways will require temporary traffic controls based on a NHDOT typical traffic control detail, included in Appendix AH.

The 29 locally-maintained road crossings will require temporary road closure traffic controls generally conforming to the MUTCD's Typical Applications. The Applicants will work with the local jurisdictions on a case-by-case basis to determine the traffic control requirements for each crossing, see Appendix AH.

Crossing of Locally Maintained Highways

The Applicants are requesting that the Certificate of Site and Facility for the Project include the rights to install an electric transmission line, including related conduit, cable, wires, poles, structures and devices across, over, and along 29 locally-maintained roadways. The SEC has exclusive authority to issue a Certificate of Site and Facility, and therefore, also to grant authority to an energy facility within the SEC's jurisdiction to cross locally-maintained highways within municipalities.[78] Utilities of all varieties, including power lines, have long been recognized as appropriate users of public highways, so long as the facilities do not conflict with the general public's vehicular use.

77 *Manual on Uniform Traffic Control Devices* (MUTCD), published by Federal Highway Administration, 2009 Edition.

78 *See generally Public Service Company of New Hampshire v. Town of Hampton,* 120 N.H. 68 (1980).

In addition, utility companies may locate poles, lines, and cables within and across roads, provided they will not interfere with the safe, free and convenient use for public travel of the highway.[79] The DOT has adopted certain standards concerning these utilities in its *Utility Accommodation Manual* (UAM), dated February 24, 2010. This filing constitutes notice of these proposed crossings and locations in accordance with the procedures set forth in the UAM Appendix G-3.1-2.

The Applicants seek approval from the SEC to install its proposed transmission line along, over, and across locally-maintained highways as set forth in the joint testimony of Jessica Farrell and Garrett Luszczki, and testimony of Mark Suennen. This request to construct the Project along, over and across locally-maintained highways includes a typical traffic control detail and will comply with DOT standards for state-maintained highways. As explained in the testimony and Appendices P and AM, the Applicants' proposal will not interfere with the safe, free, and convenient use for public travel of the locally-maintained highways. As a result, there will be no negative impact on public safety.

Safe Delivery of Equipment and Materials to Site

Construction equipment and materials for the new line will be brought to Project work areas, including marshalling yards, utilizing public roads. The Project construction contractor(s) will be responsible for safely moving materials to individual laydown areas. Oversize vehicles or loads may require escorts and/or permits obtained by construction contractor(s). Off-road equipment will be delivered by flatbed trailer to roadside locations for travel into and along the Project ROW. Appropriate traffic control measures (e.g., sign packages, flaggers and/or police details) may be required if public roadways are expected to be encumbered during delivery of equipment and material.

Most major substation materials will be delivered directly to Scobie Pond 345 kV Substation or to the Transmission Storeroom at Legends Drive in Hooksett.

All traffic controls will be in accordance with the MUTCD and NHDOT policies.

Protection of the Public and Workers during Construction

Safety is of the utmost importance to the Applicants. A project safety plan will be developed and incorporated into all contractor agreements. Contractors will be required to comply with all applicable safety regulations and standards; to conduct daily morning crew meetings to discuss that day's activities and potential hazards; and to perform and document site and equipment inspections.

79 Utility companies may locate poles, lines, and cables within and across roads, provided they will not interfere with the safe, free and convenient use for public travel of the highway. RSA 231:168. The authority to erect electric transmission lines and underground cables in state and local highways is codified at RSA 231:160.

Qualified management and staff with experience on similar projects will perform contractor inspections, audits and oversight throughout the construction process. Field observations will be taken and used to identify safety trends occurring on the Project. This information will be communicated through project-wide safety bulletins and formal notices to the contractors. In addition, field safety observations will be reviewed and discussed as part of recurring project team meetings.

Applicants will require construction contractors and field personnel to be trained in Safety/Occupational Health and Safety Administration (OSHA), Basic First Aid/cardio-pulmonary resuscitation (CPR), Environmental Compliance and other relevant topics. In addition, the Applicants will provide Project-specific training.

Security Measures during Construction to Protect Workers, Equipment and Material

The contractor is responsible for planning and executing their construction activities so as to ensure the security of workers, equipment and materials. Security measures to discourage theft and vandalism may include fencing, storage of materials in lockable containers, lighting, cameras, and employment of a security firm for overnight security. Construction equipment will likely be left in the ROW overnight. When this is done, the equipment typically will be moved to a nearby road crossing for visibility to local police patrols and to avoid vandalism to the equipment. If a security concern is identified for any workers on the Project, the Applicants' security personnel will work with local law enforcement to prepare a plan for personnel security.

Blasting

As described in section (g)(8) above, blasting may be required in certain situations where the construction team encounters shallow-to-bedrock soil depths and subsurface boulders. In these instances, PSNH will retain a blasting contractor, who will perform the limited amount of blasting required. All blasting will be done in accordance with applicable local, state, and federal permitting requirements regarding blasting and the safe handling of explosives to ensure the safety of the public and the workers.

Summary

The Applicants submit that the foregoing discussion, as supported by the pre-filed testimony of William Bailey, Gary Johnson, and Mark Suennen, and the joint pre-filed testimony of Bryan Hudock and David Plante, and Jessica Farrell and Garret Luszczki, demonstrates that the Project will not have an unreasonable adverse effect on public health and safety.

(j) INCLUDE INFORMATION REGARDING THE EFFECTS OF THE FACILITY ON ORDERLY DEVELOPMENT OF THE REGION, INCLUDING APPLICANTS' ESTIMATE OF THE IMPACTS OF THE CONSTRUCTION AND OPERATION OF THE FACILITY ON:

1) Local land use

The Project's impacts on local land use during construction and operation of the Project will be minimal. The ROW was originally developed for electric utility purposes in the early to mid-20th century and the transmission and distribution lines sited in the corridor have been actively upgraded and maintained. Over the past 50 or more years, the four communities in which the Project will be located experienced significant increases in growth, as did most of southern New Hampshire. Much of the growth in residential housing and business development occurred adjacent to or near the Project ROW.[80] As a result, construction of the Project entirely within an existing ROW minimizes impacts to existing land uses and is a sound land use siting principle.

There are several forestry, conservation, outdoor recreation, and open space parcels along the Project ROW. Forests located within or along the ROW are periodically harvested for timber, an activity dating back to the 1800's. Public access for recreational use within portions of the ROW requires written permission from landowners. Recreational uses within the ROW and adjacent conservation areas and open space include off-road vehicle riding, hiking, biking, horse-back riding, and walking. The Project will not have an adverse impact on the continued management and use of conservation and recreational land.

The existing ROW crosses recreational paths including: the Trolley Car Path, the Kelly Path, the Granite State Rail Trail (a.k.a. Londonderry Rail Trail in Londonderry), and trails within the Peabody Town Forest in Pelham. There are no new trail crossings associated with the Project. The Applicants will work with the NHDRED Bureau of Trails, and other groups to minimize temporary impacts on the use of trails.

The construction and operation of the Project will not have an adverse impact on the continued management and use of conservation and recreational lands adjacent to the corridor.

Agricultural uses in or near the ROW include orchards, farms and farm stands, livestock, and crops. The Applicants will work with land owners to minimize temporary impacts to agricultural uses due to construction.

80 Current land uses adjacent to the Project ROW include forestry, agriculture, residential, commercial/industrial, transportation, institutional/government, as well as recreation and conservation areas.

Residential development along the ROW is primarily low density single family dwellings, with some more intensive density development consisting of 55+ communities, townhouse condominiums, and duplex units. The addition of another transmission line in the already developed ROW will not have an adverse impact on residential areas or housing development.

Commercial and industrial land uses along the ROW are primarily located in Londonderry near the Scobie Pond 345 kV Substation. The Londonderry Flea Market located on Route 102 adjacent to the ROW, currently uses a portion of the ROW for parking and operates weekends between April and October. Construction and operation of the Project will not have an adverse impact on this use or on other commercial or industrial land uses.

The Project crosses transportation and other utility corridors, including Interstate-93, state and local roads, and two natural gas line crossings. Construction activities will be coordinated with the NHDOT, local municipalities, and gas utility companies. The Project will not have an adverse impact on transportation or utility operations.

There are no New Hampshire Designated Rivers within or adjacent to the Project. The Project is located more than three miles east of the State-designated Lower Merrimack River corridor.

The Project's impacts on local land use during construction of the Project will be temporary and include construction and traffic-related noise, traffic diversion, clearing of vegetation, use of marshalling yards laydown areas for equipment and materials, installation of soil erosion and sedimentation controls, dust control, installation of foundations, structures, conductor and shield wire, use of heavy equipment, access improvements, and other associated construction activities. These activities will utilize BMPs as well as with all state and federal permit requirements. The operation of the new transmission line will not change or interfere with existing or future local land use patterns.

In summary, the Project will not have an adverse impact on local land use. It is located within an existing utility corridor and maintains and reinforces the existing land use pattern within each town and the region. Please also see Appendix AI, Review of Land Use and Orderly Development, The Merrimack Valley Reliability Project, for more detailed information.

2) Local economy

a. Economic Effects

NEP and PSNH used the policy forecasting model by Regional Economic Models, Incorporated (REMI) to estimate the economic impacts during the construction and

operational phases of the Project.[81] The results of this forecast are summarized in the Economic Impact of the Merrimack Valley Reliability Project Report, Appendix AJ.

NEP and PSNH plan to spend an estimated $123 million to construct MVRP, of which $82 million will be spent in New Hampshire. This investment will create hundreds of jobs and boost local income, GDP and tax revenues in the two states. During the planning and construction phase, through 2017, the investment will have an immediate short-term impact on jobs, incomes and local GDP. Over the long-term, the investments will provide permanent economic gains due to on-going operation and maintenance spending and the Project's impact on market electricity prices, efficiency, reliability and the accommodation of load growth.[82]

The REMI model estimates that spending on labor and materials during the 2014 to 2017 planning and construction phase of the Project will raise real New Hampshire GDP by $73.5 million while raising real personal income by $35.1 million and state tax revenues by $1.3 million. These are total economic impacts including the direct, indirect, and induced effects discussed above. Labor and materials spending will also create over 600 job years in New Hampshire over the next four years, or 150 jobs per year on average from 2014 through 2017.[83] Details on the employment impacts can be found in Section (j)(3) below.

After the Project is operational, increased property tax payments to towns will have a positive economic impact. Other operation and maintenance (O&M) spending impacts are expected to be minimal because the new transmission line is being constructed along existing rights of way that already need to be maintained.

Unlike the construction phase economic benefits, which are temporary, the economic impact of higher property tax revenues to the affected towns is long-term. National Grid and Eversource estimated property tax payments based on the expected value of the new equipment placed into service and local property tax rates. Property tax payments to local governments in New Hampshire are estimated to rise by $1,557,550 the first year the Project is placed into service. Assuming the increased property tax payments are spent by

81 REMI is owned by Regional Economic Models, Incorporated and leased to its clients. More information, including model documentation, can be found at www.remi.com. The REMI model is used extensively in planning studies, with over 150 national and international clients, including federal, regional, state and local government planning agencies, energy consultants, universities, non-profit research institutions, and utilities. National Grid leases a 160 industry, 65 region version of the model covering the State of New Hampshire and all Massachusetts counties. The REMI model is a complete representation of the macroeconomic structure of the regional economies of New Hampshire and Massachusetts. By entering assumptions about the amount, timing and type of project expenditures, REMI projects their economic impact for the entire Project located in New Hampshire and Massachusetts.

82 The REMI model estimates the total economic impact of these investments, including the direct, indirect and induced impacts. Direct impacts are tied directly to the project, for example, the number of electrical contractors hired to install new transmission equipment. Indirect impacts are felt in the local supply chain, that is, industries providing goods and services for the project. Induced impacts result from the spending of the direct and indirect workers and are felt mainly in the local service sector, for example, increased retail activity and hiring.

83 A job year is equal to one job for a period of one year.

the affected towns, the REMI model predicts this will lead to the creation of 34 direct, indirect and induced annual jobs, raising real personal income in New Hampshire by $1,800,000.

b. Property Value Issues

The Applicants have prepared an extensive analysis of the possible effect of the Project on real estate markets in the region. The Applicants retained experts to assess the state of knowledge with respect to property value effects of HVTL on property values and to supplement existing research with New Hampshire-specific research. The findings are set forth in the High Voltage Transmission Lines and New Hampshire Real Estate Markets: A Research Report (the "Research Report"), Appendix AK, and in the pre-filed testimony of James Chalmers.

The extensive published literature compares sales of properties potentially affected by HVTL with sales of unaffected properties. A brief summary is as follows.

For residential properties, approximately half of the studies find some measure of negative proximity effects, while the other half find none. Where effects are found, they tend to be small (usually in the 1-6% range), to decrease rapidly with distance from the HVTL, and to dissipate over time. Once proximity has been accounted for, visibility generally has no additional, independent effect in the statistical studies. Encumbrance frequently has no effect on market value or has a small effect relative to the size of the encumbrance.[84]

For commercial and industrial properties, there are generally no effects from proximity to HVTL unless site development is constrained in a way that reduces the income producing potential of the property, such as by reducing the size of the improvements that can be built on the site.

Vacant land is generally not impacted unless development is constrained by the ROW, or unless the HVTL are the principal differentiating feature of otherwise similar parcels.

The results in the published literature are sufficiently consistent across geographies and development patterns to predict similar conclusions regarding New Hampshire. Nevertheless, as described in the Research Report, three New Hampshire-specific research initiatives were undertaken for further study of this issue: Case Studies; Subdivision Studies; and Market Activity Research.

The Case Studies represent a broad spectrum of recently sold properties crossed by, or adjacent to, HVTL in New Hampshire. There is variety in property location, size and value and in the way in which the property is physically affected by the HVTL. While the results of any single case study are necessarily anecdotal, useful generalizations can be drawn when considering the results from all 58 Case Studies. These include the following: 10

84 A property crossed by an easement is referred to as "encumbered" by the easement.

cases found a sale price effect, 11 suggested a possible effect, while 37 (64%) found no effect. Where sale price effects were found, they appear to have been small and to have decreased rapidly with distance. Only one of the 10 cases in which a sale price effect was found concerned a house located more than 100 feet from the edge of the ROW while seven of the 10 were located within 30 feet. With only one exception, for a sale price effect to occur, close proximity was combined with clear visibility of the HVTL. In 41 of the 58 cases, there was no marketing time effect of the HVTL.

In the Subdivision Studies, lot sales were studied at 13 subdivisions where some lots were crossed or bordered by a HVTL ROW and others were not. The market response to each category was analyzed for impact on sale price and marketing time. The lot sale histories indicated a general lack of marketability issues associated with lots encumbered by, or abutting, a HVTL ROW and8 of the 13 subdivisions studied showed no sale price or marketing time effect associated with the HVTL. In those cases where there were price effects, the lots were heavily encumbered and frequently the area in which improvements could be sited was constrained.

In the Market Activity Research, data were initially collected for all sales occurring in towns for which some portion fell within one mile of a HVTL. The sales were categorized by distance into three groups: encumbered or abutting, one foot to 500 feet, and 500 feet to one mile. Multiple Listing Service (MLS) data on sale price to list price ratios and days on market were then analyzed to determine if there was market resistance to the properties in locational zones closest to the HVTL. The analysis indicated no systematic market disadvantage of the encumbered or proximate properties relative to the more distant group with respect to the two measures.

In summary, the findings of the three New Hampshire-specific research initiatives are consistent with the conclusions of the published literature, namely: there is no evidence that HVTL result in systematic or widespread effects on real estate markets and where there are effects, they are small and decrease rapidly with distance.

The research is clear that when adverse effects occur, proximity of residential property to the ROW combined with clear visibility of the HVTL are the critical variables. The Project and the new HVTL will be in an existing ROW; therefore, proximity of homes with respect to the ROW will not change. Based on the Case Studies research, those properties that could potentially be affected are very close to the ROW and do not have clear visibility of existing lines in the corridor, but will have clear visibility of existing, new or relocated lines after the Project is constructed. The number of these properties is small.

There are two sections of the corridor where visibility effects might occur: (1) a 7.6 mile section in Segment 2 from the state line north to Windham where a 115 kV line will be relocated to within 30 feet of the west edge of the ROW; and (2) a 3.8 mile section in Segment 3 in Hudson and Londonderry, where the new 345 kV line will be built about 85 feet from the east edge of the ROW. There are 27 homes in the first section and 25 homes in the second within 100 feet of the ROW boundary. However, not all 52 of these properties

will have changed visibility. There are already three HVTL in the first section and four in the second, so homes close to the ROW are likely to already have clear visibility of the lines. Some homes may also be sufficiently screened so that there is no visibility now and will be no visibility after the Project is built. Of the remaining small number of properties, the research suggests some may experience small market value effects and some will not.

Based on the published research, the three New Hampshire-specific research initiatives and the particular characteristics of the Project, the Project will not have a discernible effect on property values or marketing times in local or regional real estate markets.

c. Tourism

Potential impacts to tourism were considered and reviewed. This review included an examination of tourist-oriented attractions and facilities in the Merrimack Valley area and along the Project corridor. This assessment determined that the Project will not adversely impact tourism.

The most prominent regional tourist attractions are located outside Project area communities. These include Canobie Lake Park, Rockingham Park, and America's Stonehenge, all located in the Town of Salem. Tourist attractions located within Project area towns include Stonyfield Farm (Londonderry) and Benson Park (Hudson). The Hudson Speedway and the Londonderry Raceway are not located near the Project corridor and will not be impacted by the Project. In addition, Elwood Orchards is linked to other orchards and farm stands in Londonderry by Apple Way, a state-designated scenic byway. The Project crosses a portion of Elwood Orchards, Apple Way, and Sunnycrest open space land near Elwood Road all within an existing corridor. Carriage Shack Farm in Londonderry is located adjacent to the ROW, and utilizes land within the corridor for trails. The Project will not interfere with the continued use of the scenic byway, orchards or trails. A segment of the Granite State Rail Trail, a 26-mile corridor located on an abandoned railroad bed, is located in Londonderry and Windham. The Project intersects the rail trail at its crossing of Route 28 in Londonderry. Trolley Car Path and Kelly Path are nearby local trails. All of the trails are crossed by the Project within the existing ROW and their ongoing use will not be impacted.

The Project will not adversely impact nearby conservation and open space areas such as Musquash Conservation Area and Continental Recreation Park in Londonderry, the Bockes/Ingersoll Forest in Londonderry, Hudson and Windham, Beaver Brook in Windham, Peabody Town Forest, and Costa Conservation Area. Recreation activities will continue as they do presently because the Project is located within an existing ROW and will not change these uses.

3) Local employment

The impact of the Project on local employment is described in Section (j)(2) above and in the report entitled Economic Impact of the Merrimack Valley Reliability Project Report

found in Appendix AJ referenced in that Section, which discusses the economic impacts in New Hampshire. Project spending is expected to support 600 job years during the four-year construction phase, or 150 full-time jobs per year, with the greatest job impact felt in 2017 (415 full-time jobs) when Project-related spending is anticipated to be at its highest.

The Project is also expected to raise real New Hampshire GDP by $73.5 million, real personal income by $35.1 million, and real state tax revenues by $1.3 million. Project investment spending, as well as estimated economic impacts, will be spread across Hillsboro and Rockingham Counties.

The distribution of job years into New Hampshire industries is shown in Figure APM-2 in the Economic Impact of the Merrimack Valley Reliability Project Report found in Appendix AJ, which discusses the economic impacts in New Hampshire. The greatest impact on employment is in the construction industry, which will account for 231 job years or 37% of the total. However, a wide range of other industries also benefit from Project spending. For example, the professional services industry, which tends to be higher paying, accounts for 98 job years or 16% of the total. This includes engineering, management, planning, design, legal and other professional services. There is also a significant impact to the local manufacturing industry where about 8% of the total job years are expected. Finally, retail trade and other services, which include health, education, government and recreation accounts for 150 jobs years or 24% of the jobs created. This reflects the induced economic impacts of the project spending. In total each $1.0 million in annual spending on the Project is expected to generate 7.6 job years in New Hampshire.

(k) PRE-FILED TESTIMONY AND EXHIBITS SUPPORTING THE APPLICATION

Pre-filed Testimony of the following persons in support of this application is submitted by the following individuals:

1. John Martin, addressing: Impact on system stability and reliability
2. Bradley Bentley, addressing: Impact on system stability and reliability
3. Brian McNeill, addressing: Financial capability of NEP to construct and operate the Project
4. Michael Ausere, addressing: Financial capabilities of PSNH to construct and operate the Project
5. Bryan Hudock, addressing: Technical and Managerial capabilities of NEP
6. David Plante, addressing: Technical and Managerial capabilities of PSNH
7. Jessica Farrell, addressing: Technical and Managerial capabilities of NEP related to Project design, the Applicants' preferred route and other alternatives the Applicants considers available for the site and configuration of the facility
8. Garrett Luszczki, addressing: Technical and Managerial capabilities of PSNH related to Project design, the Applicants' preferred route and other alternatives the Applicants consider available for the site and configuration of the facility
9. Mark Suennen, addressing: Technical and Managerial capabilities of NEP and PSNH related to traffic management
10. John Hecklau, addressing: The Project's visual impacts (i.e. aesthetics)
11. Sherrie Trefry, addressing: The Project's impacts on the natural environment (water resources / water quality and air quality)
12. Darrell Oakley, addressing: The Project's impacts on the natural environment (wildlife habitat, plant communities, and rare, threatened, and endangered species)
13. Steve Olausen, addressing: Above-ground historic resources
14. Dianna Doucette, addressing: Archaeological resources
15. William Bailey, addressing: Public health and safety (EMF)

16. Gary Johnson, addressing: Public health and safety (sound)

17. Robert Varney, addressing: Orderly regional development, local land use, and tourism

18. Alfred Morrissey, addressing: Local economics and local employment for the Project and local property tax revenues for the NEP-owned Segment of the Project

19. Lisa Shapiro, addressing: Local property tax revenues for the PSNH-owned Segments of the Project

20. James Chalmers, addressing: Local property values

(l) COPY OF TRANSCRIPT FROM PUBLIC INFORMATION SESSION HELD 30 DAYS PRIOR TO THE FILING OF THE APPLICATION

A copy of the transcript from the public information session held on May 6, 2015 in Londonderry, New Hampshire for Rockingham County is provided in Appendix AL. A copy of the transcript from the public information session held on May 7, 2015 in Hudson, New Hampshire for Hillsborough County is provided in Appendix AL.