

STATE OF NEW HAMPSHIRE

Inter-Department Communication

NHPUC 16JUN16PM3:24

DATE: June 16, 2016

AT (OFFICE): NHPUC

FROM: Randy Knepper /s/ *Randall S. Knepper*
Director – Safety Division

SUBJECT: Docket No. DE 15-284 New England Power Company d/b/a National Grid Petition for a License to Construct and Maintain Electric Lines Over State Lands and Public Waters, Windham, NH
Staff Recommendation

TO: Debra Howland, Executive Director
Thomas Frantz, Director, Electric Division
Leszek Stachow, Assistant Director, Electric Division
Rorie Patterson, Staff Attorney

The Safety Division's review of the above petition consisted of the following elements:

- Petition contents and history;
- Applicable State Statute;
- Review of the existing crossing(s) already licensed by the PUC;
- Review of land ownership of existing pole structures;
- Review of NESC code requirements as described in Puc 300;
- Review of public need and public impact, including applicability of other State regulations; and
- Conclusions and Recommendations.

1. Petition contents and history

The Merrimack Valley Reliability Project

On July 21, 2015, New England Power Company d/b/a National Grid (NEP), filed a petition pursuant to RSA 371:17 for a license to construct and maintain electric lines over and across public lands and public waters in the Town of Windham, New Hampshire. The proposed new crossings are two small segments associated with NEP's portion of a newly proposed installation of a 345 kV electric transmission line known as circuit 3124 that is part of the "Merrimack Valley Reliability Project". The project is jointly owned by PSNH d/b/a Eversource Energy (PSNH) and (NEP) and connects PSNH's Scobie Pond 345kV Substation in Londonderry with NEP's 22A Substation in Tewksbury, MA. The 345 kV Merrimack Valley Reliability Project is 17.9 miles from the Massachusetts border to the Scobie Pond Substation in Londonderry [traversing Pelham, Windham,

Hudson and Londonderry] and 6.5 miles in Massachusetts through Dracut, Andover and Tewksbury.¹

In addition NEP proposes to relocate an existing 115 kV circuit known as Y-151 which will cross public water, Beaver Brook, which serves as a town boundary between Hudson and Windham.

On February 26, 2016 NEP provided a memo to the Safety Division clarifying two issues the Safety Division had inquired about.

The Safety Division also referenced the original petition including the multiple appendices that was sent to the Site Evaluation Committee as listed in SEC docket 2015-05.

In summary NEP seeks 2 water crossings over Beaver Brook in Windham/Hudson, each for proposed 345kV Circuit 3124 and for a relocated 115kV Circuit Y-151. In addition NEP seeks a single land crossing of a State of NH DOT parcel in Windham for the 345kV Circuit 3124. NEP does not seek a license for the same parcel for the relocated 115kV Circuit Y-151 and believes it is not necessary.

The 3124 Line

The Hudson and Windham segments of the proposed electric Merrimack Valley Reliability Project 345 kV circuit (phase to phase), are identified as part of the “3124 line.” NEP proposes to locate the 3124 line within an existing 350-foot wide permanent easement that allows for multiple circuits to be placed including pole structures and conductors. The 3124 line will be built comprised of three pairs of 1590 kcmil ACSR (aluminum conductor steel reinforced) horizontally spaced single phase conductor wires of a 54/19 configuration. Each of the conductors will be approximately 1.545 inch diameter with a weight of 2.042 pound per foot. In addition there will be a single Overhead Power Ground Wire (OPGW) fiber optic cable that serves as both a ground wire for lightening protection and a communication carrier for the span. The OPGW is stated to have 48 fiber cables with 0.650 inch diameter and 0.407 pound per foot unit weight. Configured opposite the OPGW is a shield wire. The shield wire serves only as lightening protection. The shield wire will be composed of 0.360 inch diameter high strength steel and 0.273 pound per foot unit weight.

The two crossings that NEP is seeking licenses of the proposed 3124 line are
Crossing #1 –consists of an aerial crossing over the Beaver Brook
Crossing #2 – consist of an aerial crossing over land owned by NH DOT that is outside of the highway right of way for New Hampshire State Route 111 (Haverhill Rd)

The conductors transmitting electrical power at 345 kV will be 1590 ACSR “Falcon” cable with 54/19 stranding. The condition representing the least clearance to road or grade condition is when conductors will be sagged using 284 Degrees Fahrenheit thermal maximum operating condition. NEP stated the maximum tension amount applied will be 10,000 pounds. In its petition, NEP provides sufficient detail to show how all

¹ NH Site Evaluation Committee Application July 2015 Section C page 6. NEP will own 14.6 miles with 8.1 miles in Pelham, Windham, and Hudson and another 6.5 miles in Massachusetts communities of Dracut, Andover and Tewksbury. PSNH will own 9.8 miles in Londonderry and Hudson, NH

required clearances from phase wires to the surface of the water or land will be maintained.

The position, tensioning and type of the OPGW (static) wire is consistent with the NESC heavy loading rule 250B but does not factor into the clearances because it is located above the poles by approximately 12 and 21.5 additional feet respectively depending upon the type of support structure used. The same is true for the shield wire.

3124 Crossing #1, Beaver Brook Crossing:

- The location of this crossing is over the Beaver Brook located between Haverhill Rd, Windham also known as NH State Route 111 in Windham and Bockes Rd, Hudson, NH. Appendix A Figure 1 shows the area being crossed.

The total span of this segment of the 3124 line, between the supporting structures #144 and #145, is 919 feet. Beaver Brook width itself is approximately 87 feet at this location.

- Beaver Brook serves as the town boundary between Windham and Hudson.
 - NEP is not seeking a license to cross the New Hampshire State Route 111 (Haverhill Rd); this will be done separately through an Occupancy and Use Agreement with the NH DOT.
 - This brook crossing will only have 3 pairs of energized conductors; twin bundled per phase and a single Overhead Power Ground Wire (OPGW), fiber optic cable and a single wire. The OPGW serves as both a ground wire and a communication carrier. The shield wire serves only as lightening protection. The 3124 line will be built comprised of three pairs of 1590 Kcmil ACSR (aluminum conductor steel reinforced) horizontally spaced single phase conductor wires in a 54/19 configuration. Each of the conductors will be approximately 1.545 inch diameter with a weight of 2.042 pound per foot. The OPGW is stated to have 48 fiber cables with 0.650 inch diameter and 0.407 pound per foot unit weight. The shield wire will be composed of 0.360 inch diameter high strength steel and 0.273 pound per foot unit weight.
 - Structure #144 will support the conductors on the southerly side of Beaver Brook in the interior position within the right of way. At approximately 175 ft from the edge of the right of way. The Structure will be 75 ft above ground level and will consist of weathered tubular steel pole configured in an H Frame dead end configuration. The height of the Structure is 75 ft and will not be embedded.

- Structure #145 will support the conductors on the northerly side of Beaver Brook in the interior position within the right of way. At approximately 175 ft from the edge of the right of way. The Structure will be 70 ft above ground level and will consist of weathered tubular steel pole configured in an H Frame suspension configuration with cross bracing. The height of the Structure is 70 ft and will not be embedded.

3124 Crossing #2, NH DOT parcel Crossing:

- The location of this crossing is the same span that is described in Crossing #1. NEP seeks a license for a small, approximately 85 feet segment over a parcel of land in Windham located northerly of Haverhill Rd (New Hampshire Route 111) and owned by the NH DOT but outside of the Highway Right of Way. The parcel is south of Beaver Brook Crossing.
- The parcel of land is identified on item 14 and Attachment 4 of the petition as NH DOT owned parcel Lot 14-A-300A described as a 0.33 acre vacant parcel. The Town of Windham also identifies the parcel as lot 14-A-300A but lists it 0.36 acre. Appendix A, Figure 2 shows the parcel of state land being crossed as represented by the Town of Windham's online GIS.
 - The length of the aerial crossing (approximately 85') is a portion of a larger span (919)' as listed in Crossing #1.
 - The location of the crossing for 3124 is in the same location as the current location of as 115 kV circuit Y-151.
 - Circuit Y-151 will be moved and rebuilt to a western location approximately 28.5 feet from the western edge of the 350 foot ROW.
 - NEP is not seeking a license to cross Route 111; this will be done separately through an Occupancy and Use Agreement with the NH DOT.
 - The minimum clearance per the NESC is 24.8 ft above ground level and NEP has designed the minimum to be 30 ft easily meeting the requirement.
- This parcel crossing will only have 3 pairs of energized conductors; twin bundled per phase and a single Overhead Power Ground Wire (OPGW), fiber optic cable and a single wire. The OPGW serves as both a ground wire and a communication carrier. The shield wire serves only as lightening protection. The 3124 line will be built comprised of three pairs of 1590 Kcmil ACSR (aluminum conductor steel reinforced) horizontally spaced single phase

conductor wires in a 54/19 configuration. Each of the conductors will be approximately 1.545 inch diameter with a weight of 2.042 pound per foot. The OPGW is stated to have 48 fiber cables with 0.650 inch diameter and 0.407 pound per foot unit weight. The shield wire will be composed of 0.360 inch diameter high strength steel and 0.273 pound per foot unit weight.

The Y151 Line

The Hudson and Windham segments of the proposed electric Merrimack Valley Reliability Project 345 kV circuit (phase to phase), are identified as part of the “3124 line.” NEP proposes to locate the 3124 line at the center line within an existing 350-foot wide permanent easement that allows for multiple circuits to be placed including pole structures and conductors. To facilitate the building of the proposed 3124 circuit the existing Y-151 115kV circuit is required to be relocated thus necessitating a new license to be granted. The amount of relocation is approximately 7.6 miles but only a single segment requires a license over Beaver Brook. NEP did not include any mention of a previous license for Y-151 over Beaver Brook and staff research of PUC files did not find one.

The relocated Y-151 circuit will be rebuilt with three pairs of 795 kcmil ACSSHS285 (aluminum conductor steel supported - high strength) horizontally spaced single phase conductor wires of a 26/7 configuration. Each of the conductors will be approximately 1.108 inch diameter with a weight of 1.093 pound per foot. In addition there will be a single Overhead Power Ground Wire (OPGW) fiber optic cable that serves as both a ground wire for lightening protection and a communication carrier for the span. The OPGW does not identify how many cables are included in its petition. Within the SEC application the OPGW is stated to have 144 count with 0.630 inch diameter and 0.407 pound per foot unit weight². There is no shield wire opposite the OPGW.

The crossing that NEP is seeking licenses of the proposed Y-151 line is Crossing #3 –consists of an aerial crossing over the Beaver Brook.

The conductors transmitting electrical power at 115 kV will be 795 kcmil ACSS “Drake” cable with 24/7 stranding. The condition representing the least clearance to road or grade condition is when conductors will be sagged using 392 Degrees Fahrenheit thermal maximum operating condition. NEP stated the maximum tension amount applied will be 8,000 pounds. In its petition, NEP provides sufficient detail to show how all required clearances from phase wires to the surface of the water or land will be maintained.

The position, tensioning and type of the OPGW (static) wire is consistent with the NESC heavy loading rule 250B but does not factor into the clearances because it is located above the poles by approximately 12 and 21.5 additional feet respectively depending upon the type of support structure used.

² SEC 2015-05, Initial Application p.47 Table 6.

Y-151 Crossing #3, Beaver Brook Crossing:

- The location of this crossing is over the Beaver Brook located between Haverhill Rd, Windham also known as NH State Route 111 in Windham and Bockes Rd, Hudson, NH. Appendix A Figure 1 shows the area being crossed.

The total span of this segment of the Y-151 line, between the supporting structures #82 and #83, is 703 feet. Beaver Brook width itself is approximately 55 feet at this location.

- Beaver Brook serves as the town boundary between Windham and Hudson.
 - NEP is not seeking a license to cross the New Hampshire State Route 111 (Haverhill Rd); this will be done separately through an Occupancy and Use Agreement with the NH DOT.
 - This brook crossing will only have 3 pairs of energized conductors; twin bundled per phase and a single Overhead Power Ground Wire (OPGW), fiber optic cable and a single wire. The OPGW serves as both a ground wire and a communication carrier. The relocated Y-151 line will be built comprised of three pairs of 795 Kcmil ACSSHS285 (aluminum conductor steel supported, high strength type) horizontally spaced single phase conductor wires in a 26/7 configuration. The high strength conductor is able to be strung tighter allowing for less sag. The ultra high strength inner cable is able to withstand greater tensioning before breaking. Each of the conductors will be approximately 1.108 inch diameter with a weight of 1.093 pound per foot.
 - The OPGW is stated to have 144 count with 0.630 inch diameter and 0.462 pound per foot unit weight.
 - Structure #82 will support the conductors on the southerly side of Beaver Brook at the western most position within the right of way, at approximately 28.5 ft from the western edge of the right of way. The Structure will be 85 ft above ground level and will consist of weathered tubular steel mono pole davit arm type dead ended (double insulated string. The height of the Structure is 85 ft and will not be embedded.
 - Structure #83 will support the conductors on the northerly side of Beaver Brook at the western most position within the right of way, at approximately 28.5 ft from the western edge of the right of way. The Structure will be 72.5 ft above ground level and will consist of

weathered tubular steel monopole davit arm suspension type (double insulated string). The height of the Structure is 72.5 ft and will not be embedded.

Considered Y-151 Crossing #4 – This consists of a potential aerial crossing over land owned by NH DOT that is outside of the highway right of way for New Hampshire State Route 111 (Haverhill Rd)

- This potential parcel crossing is the same parcel as listed in Crossing #2 (see this parcel as highlighted in Appendix A, Figure 2) and the span would be the same span as listed in Crossing #3 (see location of span Y-151 in Appendix A, Figure 1).
- NEP does not seek a license for the land crossing because it does not believe the land is owned by the state of New Hampshire. The Safety Division in reviewing NH DOT Crossing Permit Drawing 400298-C-L-10, as provided in the petition attachment, noted the NH DOT parcel as depicted did not seem to align with the Tax Map Parcel as depicted on the Town of Windham’s online GIS. See Appendix A, Figure 3.
- The Safety Division imposed the Tax Map Parcel from the Town of Windham’s online GIS and created its own drawing as provided in Appendix A, Figure 4. A discrepancy appeared between the depiction of the NEP drawing of the parcel shape and location when compared to the above referenced drawing created by the Safety Division. A further inquiry was made of NEP to confirm (see next bullet point).
- In its February 26, 2016 response NEP stated that “ National Grid’s Surveying Department has confirmed that the shape of the NH DOT Parcel noted on the north side of Route 111 is accurate and consistent with their field review. There could be inaccuracies with the Town of Windham’s Assessors maps, which is not uncommon.”
- The Safety Division did not complete a field survey and thus relies on NEP’s statement. Since NEP has not requested a license then the Safety Division believes the petition should be considered as presented.

2. New Hampshire statute referenced in petition

371:17 Licenses for New Poles. – Whenever it is necessary, in order to meet the reasonable requirements of service to the public, that any public

utility should construct a pipeline, cable, or conduit, or a line of poles or towers and wires and fixtures thereon, over, under or across any of the public waters of this state, or over, under or across any of the land owned by this state, it shall petition the commission for a license to construct and maintain the same. For the purposes of this section, "public waters" are defined to be all ponds of more than 10 acres, tidewater bodies, and such streams or portions thereof as the commission may prescribe. Every corporation and individual desiring to cross any public water or land for any purpose herein defined shall petition the commission for a license in the same manner prescribed for a public utility.

Source. 1921, 82:1. PL 244:8. RL 294:16. 1951, 203:48 par. 17. 1953, 52:1, eff. March 30, 1953. 2013, 82:1, eff. June 19, 2013.

3. Review of existing license(s) and permissions previously granted by the PUC for this location of the along the DOT owned parcels.

The crossing is new and has not had a need to have been previously licensed by the Commission as the 3124 line. There are two other 230kV circuits and one 115 kV circuits within the right of way but no research was done to confirm those licenses were granted since they are not part of the petition.

NEP asserts in the petition that the proposed construction of this crossing will be exercised without affecting the rights of the public to use the waters of the property of the State. Minimum safe line clearances above grounds surface will be maintained at all times. The use of the parcels by the public will not be diminished in any material respect as a result of the overhead line crossing. The New Hampshire DOT has the right to require relocation of structures if the ROW is negatively affected. *reference RSA 231:161 (c)*

4. Review of land ownership of proposed pole structures

In its petition, NEP specifies that the construction of this crossing will span the affected parcels at the same location as other existing crossings within the same NEP easement. New Structure 144 and 145 will be located within existing property owned by NEP. New Structure 82 will be located in a parcel outside of the Highway ROW. NEP PSNH also states the next Structure 83 will be located within existing property owned by NEP.

Electronic copies of both easements referenced above were provided to the SEC 15-05 filing in Appendix P.

5. Review of NESC code requirements as described in Puc 300

N.H. Code of Administrative Rules Puc 306 requires:

(a) each utility shall construct, install, operate and maintain its plant, structures and equipment and lines, as follows:

- (1) In accordance with good utility practice;
- (2) After weighing all factors, including potential delay, cost and safety issues, in such a manner to best accommodate the public; and
- (3) To prevent interference with other underground and above ground facilities, including facilities furnishing communications, gas, water, sewer or steam service.

(b) For purposes of this section, “good utility practice” means in accordance with the standards established by:

- (1) The National Electrical Safety Code C2-2012....

NEP does not explicitly state that it used the 2012 National Electrical Safety Code C2-2012 compliance. It does reference the standard conditions found in the NESC in its drawing attachments.

Safety Division Staff reviewed the specifications related to the design and construction of this crossing project as provided in the petition, attachment pages 1-4, supplemental drawings provided to Staff on February 26, 2016, all supplemental support documents, and found them to be in conformance with the applicable sections of NESC code C2-2012 and Puc 300.

6. Review of public need and public impact.

In order to meet the reasonable requirements of electric service to the public, NEP has previously constructed, and currently operates and maintains, other three-phase 230 kV and 115 kV transmission lines within the same easement in the Towns of Hudson and Windham, New Hampshire. The proposed 3124 Line will be an integral part of the regional ISO New England Grid. Alternative transmission routes were evaluated but were ultimately not selected by ISO New England. The proposed 3124 Line will use the same easements and cross the same public lands as other existing electric lines.

NEP asserts in the petition that the proposed construction of this crossing will be exercised without affecting the rights of the public of the public lands and waters at all the crossings. Minimum safe line clearances above the road and ground surfaces will be maintained at all times. The use and enjoyment of the vacant DOT parcel and Beaver Brook by the public will not be diminished in any material respect as a result of the overhead line crossings.

The Safety Division notes the reconfiguration of the transmission lines within the existing ROW is necessary as the ROW is becoming more crowded and the existing

easement is becoming a major corridor for power transmission. Safety Division Staff concludes the impact to the public in terms of safety will be *de minimis* and not measurable in terms of heights above surfaces of the Beaver Brook and the NH DOT parcel. The proposed crossing does not appear to materially affect the rights of the public at each of the three locations because minimum safe line clearances above the road and ground surfaces will be easily be far above the amounts required by the NESC.

Safety Division Staff Recommendations:

Based on the results of its review of the petition, attachment pages, and all other supporting documents available, the Safety Division Staff recommends that the Commission:

- 1) Find that the license(s) NEP requests in this docket may be exercised without substantially affecting the public rights in the public lands which are the subject of the petition;
- 3) Grant NEP a license to construct and maintain electric lines, including communication wires across the public lands in Windham identified as NH DOT –owned parcel Lot 14-A-300A and public water known as Beaver Brook in the Towns of Hudson and Windham
- 4) Issue an Order Nisi and orders for its publication; and
- 5) Require NEP to forward the Order after 30 days of publication notice to Site Evaluation Committee for consideration in SEC proceeding 15-05.

Attachment

Appendix A

FIGURE 1:

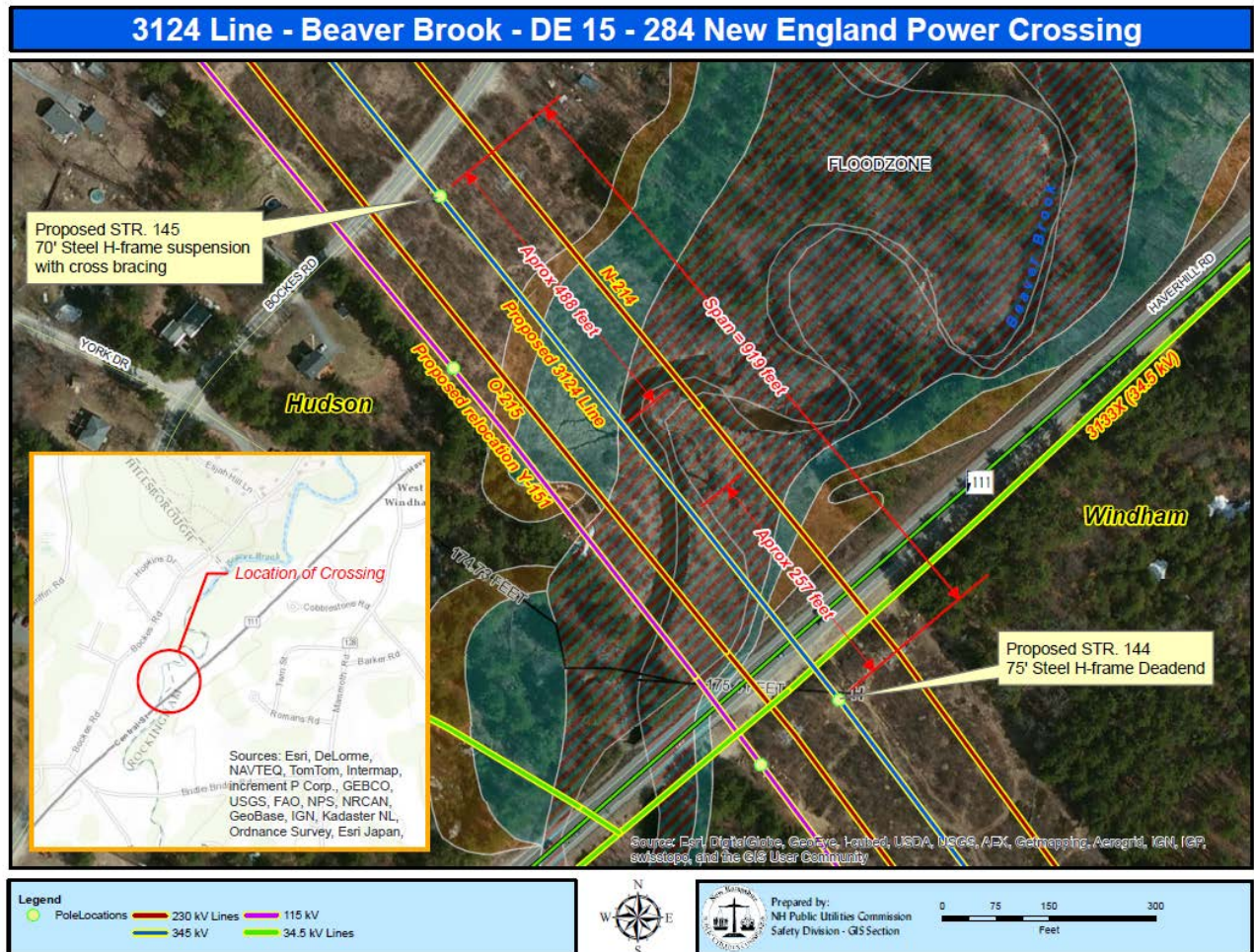


Figure 1: This is the proposed 3124 line shown in the center of the 350 foot ROW. The span of 919 feet crosses both the Beaver Brook and a parcel of the NH DOT. The respective Support structures are 485 feet and 275 feet to the banks of the Beaver Brook. Note also Route 111 is crossed but not subject of this petition. Existing 230 kv lines N214 and O215 are shown as reference. Proposed relocation of Y-151 115 kV is also depicted.

Appendix A

FIGURE 2:

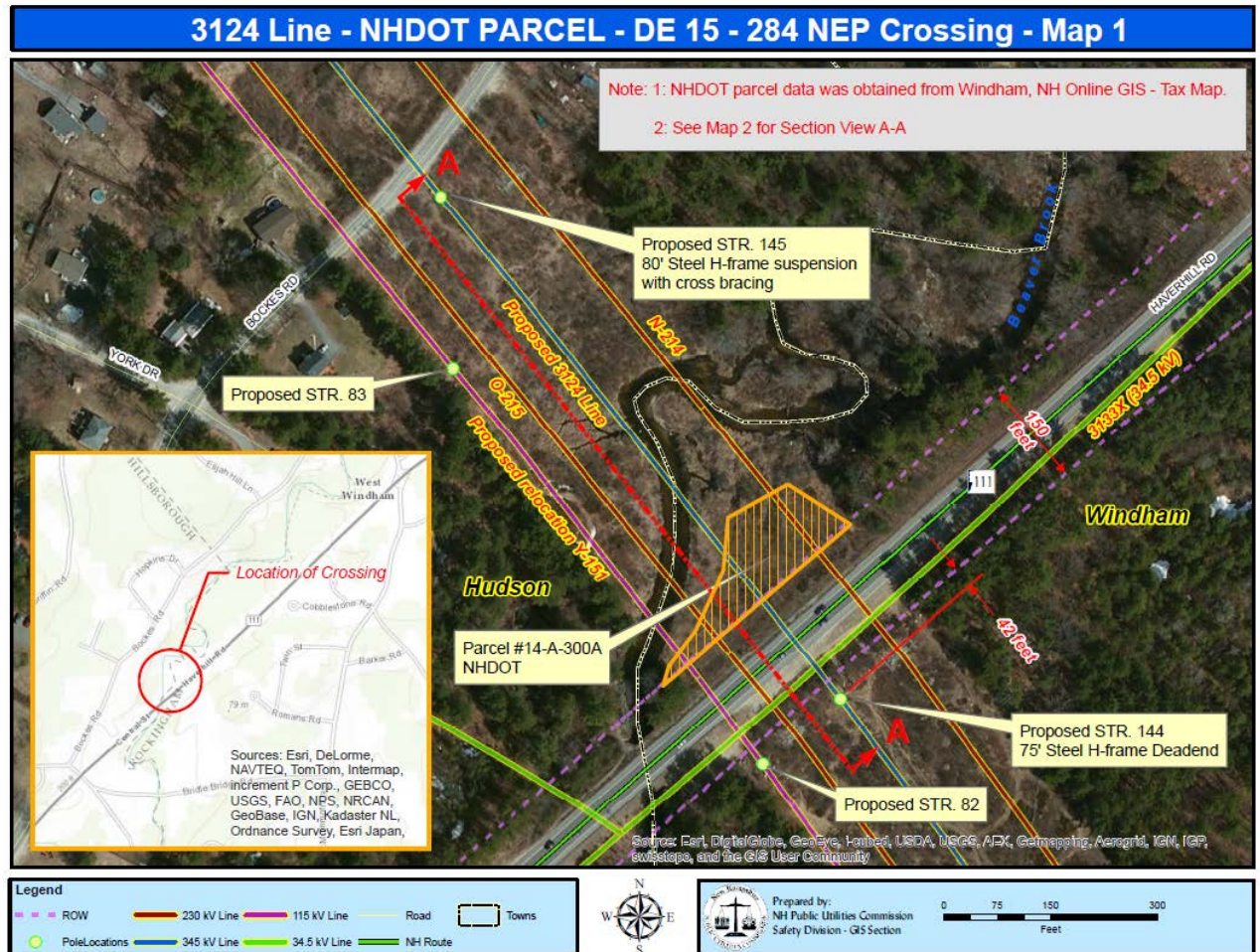


Figure 2: 345kV, designated as the 3124 Line, a span of approximately 919 feet in Windham and Hudson, NH. The yellow highlighted parcel is the public land owned by NH DOT that the petition seeks to cross. This is outside of the Highway ROW thus RSA 231:161 does not apply. RSA 371:17 does apply. Note this crossing is referenced as Crossing #2 in this Staff Memorandum. Cross Section A-A is shown on Appendix A – Figure 3

Appendix A

FIGURE 3:

NHDOT - DE 15 - 284 (3124, 345kV) NEP Crossing - Map 2

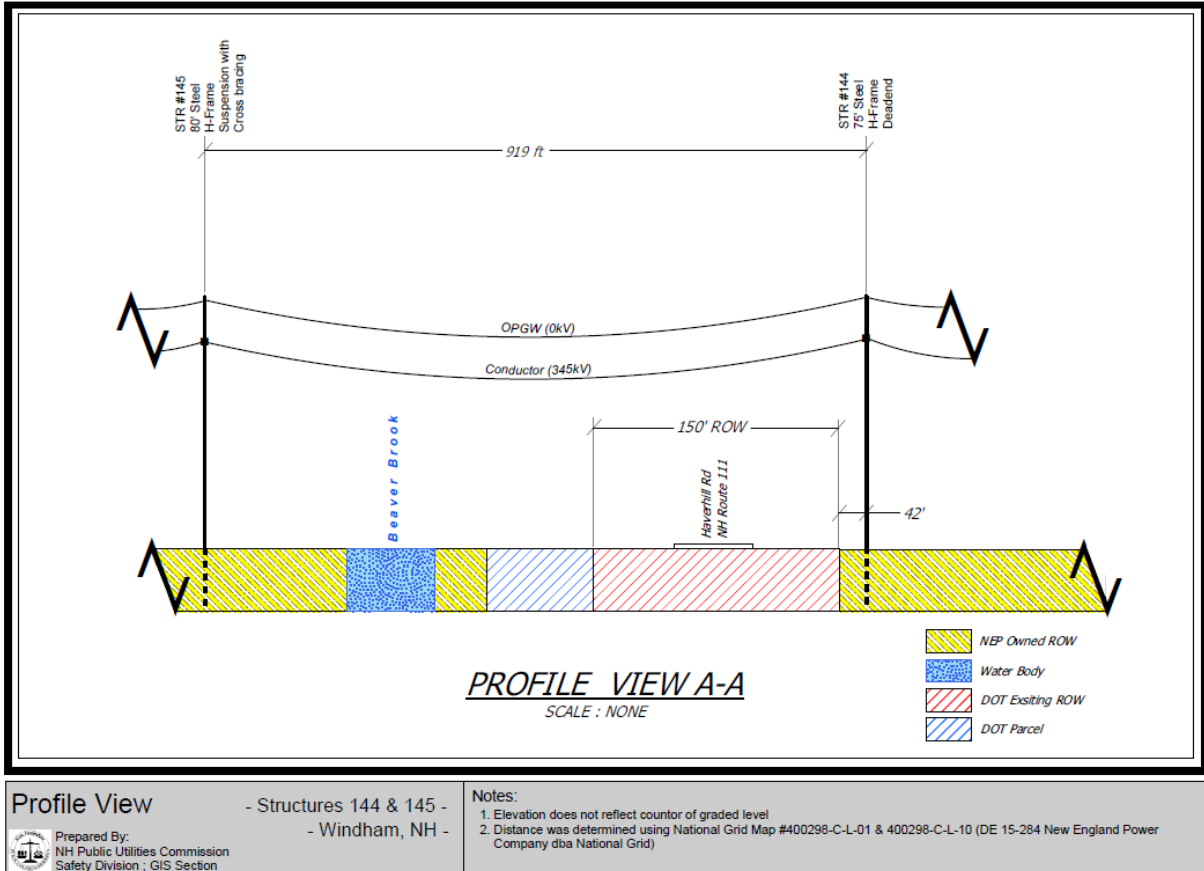
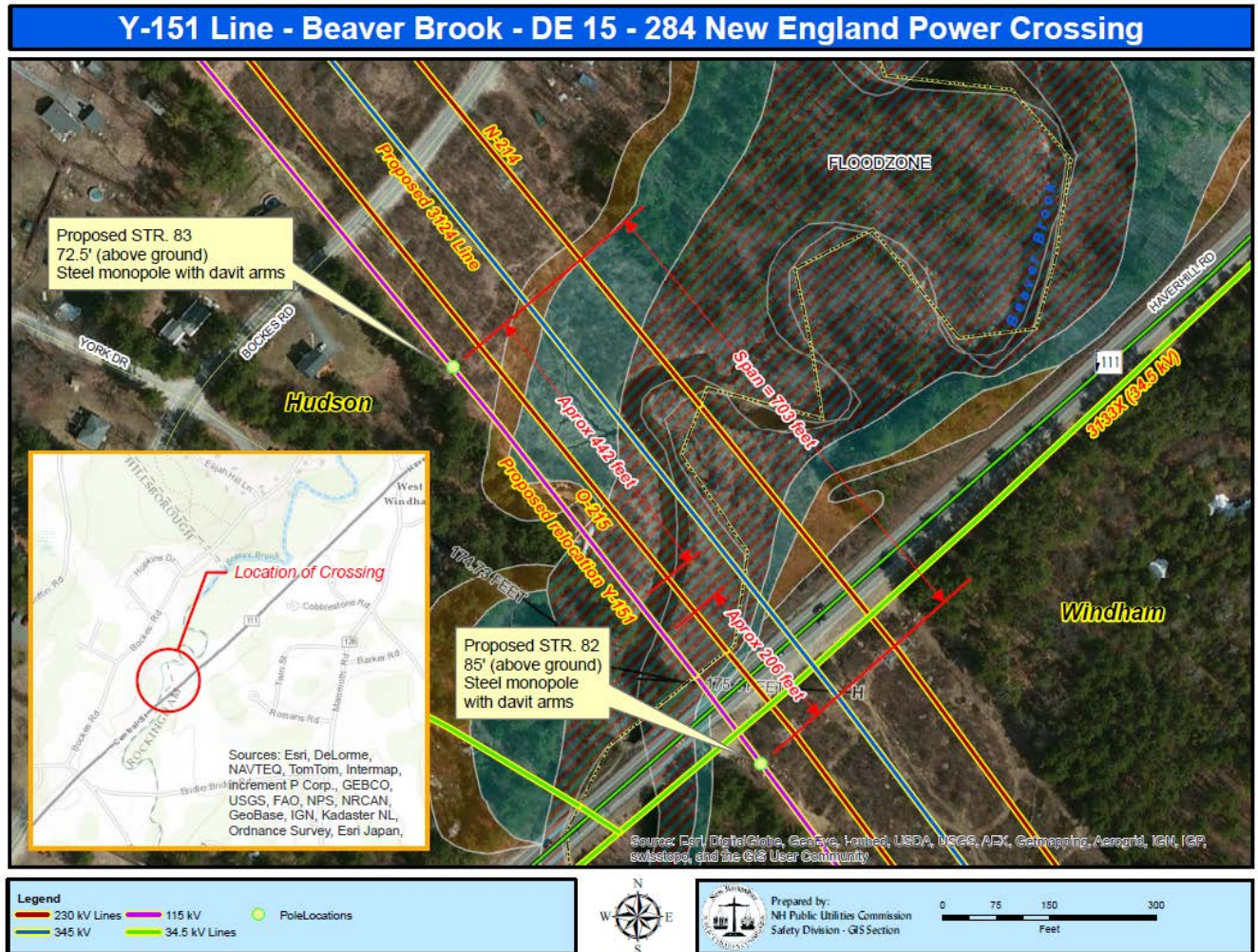


Figure 3: MAP 2 Cross Section of 3124 line 345 kV. Note the structures and orientation of DOT Parcel and Beaver Brook.

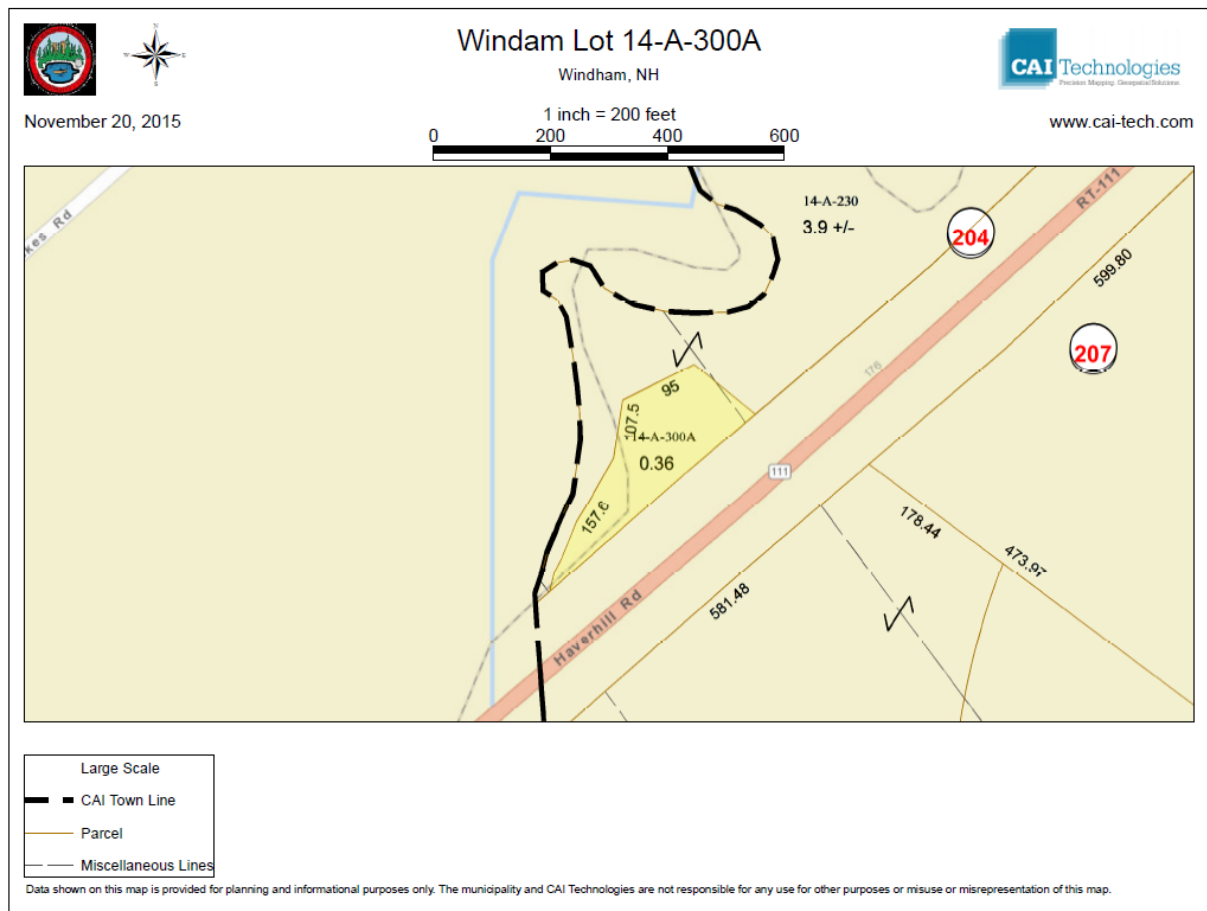
Appendix A

FIGURE 4:



Appendix A

FIGURE 5:



Appendix A

FIGURE 6:



SERVICE LIST - EMAIL ADDRESSES - DOCKET RELATED

Pursuant to N.H. Admin Rule Puc 203.11 (a) (1): Serve an electronic copy on each person identified on the service list.

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Docket #: 15-284-1 Printed: June 16, 2016

FILING INSTRUCTIONS:

- a) Pursuant to N.H. Admin Rule Puc 203.02 (a), with the exception of Discovery, file 7 copies, as well as an electronic copy, of all documents including cover letter with:**

DEBRA A HOWLAND
EXECUTIVE DIRECTOR
NHPUC
21 S. FRUIT ST, SUITE 10
CONCORD NH 03301-2429

- b) Serve an electronic copy with each person identified on the Commission's service list and with the Office of Consumer Advocate.**
- c) Serve a written copy on each person on the service list not able to receive electronic mail.**

PURSUANT TO N.H. ADMIN RULE PUC 203.09 (d), FILE DISCOVERY

DIRECTLY WITH THE FOLLOWING STAFF

RATHER THAN WITH THE EXECUTIVE DIRECTOR

BULK MATERIALS:

Upon request, Staff may waive receipt of some of its multiple copies of bulk materials filed as data responses. Staff cannot waive other parties' right to receive bulk materials.

✓ DISCOVERY

NHPUC

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✓ LEGAL DEPARTMENT

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- c) Serve a written copy on each person on the service list not able to receive electronic mail.

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