STATE OF NEW HAMPSHIRE

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February 1, 2017

Ms. Debra A. Howland
Executive Director
New Hampshire Public Utilities Commission
21 S. Fruit Street, Suite 10
Concord, NH 03301

Re: DG 16-441, Petition of PSNH dba Eversource Energy to Construct and Maintain Electric Lines, Neutral Wire and Fiber Optic Cable Over/Across the Public Waters of the Oyster River and Little Bay in the Town of Durham, Pickering Brook and Little Bay in the Town of Newington-Staff Recommendation-Randy Knepper

Dear Ms. Howland:

Please find attached the Commission Staff Recommendation from Randy Knepper, Director of Safety Division, filed in the above-captioned proceeding.

Sincerely,

Kerri-Lyn Gilpatric
Program Assistant II

cc: Service List

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 #: 16-441-1 Printed: January 27, 2017

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.**

STATE OF NEW HAMPSHIRE

Inter-Department Communication

DATE: February 1, 2017
AT (OFFICE): NHPUC

FROM: Randy Knepper
Director – Safety Division

SUBJECT: Docket No. DE 16-441 Public Service Company of New Hampshire d/b/a Eversource Energy –
Petition for Five Licenses for Public Waters Crossings in the Towns of Durham and Newington, NH
Staff Recommendation

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

cc: Robert Wyatt, Assistant Director, Safety Division

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

- Petition contents and history;
- Applicable State Statute;
- Existing crossing(s) already licensed by the PUC;
- Land ownership at existing facility locations;
- NESC code requirements as described in Puc 300;
- Public need and public impact, including applicability of other State regulations;
- Areas not reviewed by the Safety Division; and
- Conclusions and Recommendations.

A. Petition contents and history

The Seacoast Reliability Project

On April 12, 2016, Public Service Company of New Hampshire d/b/a Eversource Energy ("PSNH", "Eversource" or the "Company", filed a petition pursuant to RSA 371:17 for a license to construct and maintain electric lines, neutral wire and fiber optic cable over and across the public waters at three locations: The Oyster River in the Town of Durham,

Pickering Brook, in the Town of Newington; and Little Bay, in Durham and Newington. The public waters crossings are three small segments associated with the Company's proposed installation of a new 115 kV electric transmission line from the Madbury Substation in Madbury, NH to the Portsmouth Substation in Portsmouth, NH. This new 115 kV electric transmission line has been designated by PSNH as Line F107. The new 115 kV F107 line is needed to address reliability concerns in the New Hampshire Seacoast Region, which had previously been identified by the Independent System Operator – New England ("ISO-NE"). The new capacity will help the Company meet current demand requirements and future demand expectations in the seacoast region of New Hampshire.

In support of its petition, the Company provided the following information:

1. A general description of existing PSNH infrastructure along the proposed path of this project, currently operating 34.5kV circuit 380, between the Madbury Substation and the Packers Falls Substation in Durham, circuit 3162 between the Packers Falls Substation and the Little Bay shoreline in Durham, and circuit 3850 between and the Little Bay shoreline in Newington and the Portsmouth Substation. Between the terminus of circuit 3162 at the Little Bay shoreline in Durham, and the terminus of circuit 3850, on the opposite shoreline in Newington, the Company notes National Oceanic and Atmospheric Administration ("NOAA") navigation chart #13285, which identifies an existing underwater cable corridor across Little Bay, proximate to the rights of way for both circuits 3162 in Durham and 3850 in Newington.
2. A general description of the need for an addition 115kV of new transmission capacity to address reliability concerns, and to meet the reasonable requirements of service to the public, current demand requirements and future demand expectations in the seacoast region of New Hampshire. This new transmission capacity will be designated as Line F107, with a targeted in service date of sometime in the fourth quarter of 2018.
3. A general description of each public water crossing in which this petition seeks Licenses. Line F107, as proposed, will cross public water bodies at two locations in Durham, one over the Oyster River and one under Little Bay. The overhead Oyster River crossing will be double circuited with Line 380, which already crosses the Oyster River at this location. In Newington, Line 3850 crosses over Pickering Brook. The Company will rebuild the existing single circuit, Line 3850 Pickering Brook crossing, offset within the ROW to allow for Line F107 to cross, as a single circuit, parallel to Line 3850, on separate structures. The F107 crossing of Little Bay will be within the underwater cable corridor between Durham and Newington.
4. A general description of the optical ground wire ("OPGW") which will be installed on the new F107 structures, including those over the Oyster River and Pickering Brook crossings. The optic portion of the OPGW cable will be used by PSNH for it electric system communications up to the underground/underwater portion of F107, where two ADSS (All-Dielectric Self Supporting) fiber optic cables will be spliced onto the OPGW cables to carry the communications link

between the Durham and Newington points of the Little Bay crossing. The OPGW cable will also provide lightning protection above the F107 conductors in the F107 overhead configurations.

5. A general description of the structure configurations, above ground conductors and OPGW cable that will be used for the 115kV F107 and 34.5kV 380 and 3850 lines at the Oyster River and Pickering Brook crossings. The underground/ underwater segment associated with the Little Bay crossing will use specific underwater phase conductor cable for the F107 Line and fiber optic cable for the communications link along the F107.
6. Location maps, design and construction plan and profile drawings, and other engineering calculations for each crossing are provided in the petition appendices.
7. The Company acknowledges that technical information provided in the petition is based on the 2012 National Electric Safety Code (NESC) C2-2012 and the proposed crossings have been designed and will be constructed, maintained and operated by PSNH in accordance with the applicable requirements of NESC.
8. The Company acknowledges and provides details in the appendices that each of the crossings will be spanned using steel structures, with the exceptions of the easterly side of the Little Bay crossing, which will use a manhole structure, and the 34.5 kV Pickering Brook crossing, which will use wood pole structures.
9. The Company acknowledges its use of available FEMA flood water elevation information contained in flood insurance rate maps and that Table 232-1 of the NESC has a minimum clearance over a water body requirement that is based on a 10-year flood elevation.
10. The Company cites the NESC code requirements for minimum clearance to water surface during normal flood level (10-yr) for above-ground crossing circuits' phase, static and communications cables. Similarly, the Company cites the NESC code requirements for minimum clearance above roads subject to truck traffic and underground minimum depths, and for cable greater than 50 kV. Next, the NESC code requirements for high voltage submarine crossings are cited and finally, the NESC code reference and requirements for high voltage cable placement in an underground manhole vault are cited.
11. The Company cites the specific NESC code requirements for horizontal clearance at the supports for wires or conductors carried on the same supporting structure. For this project, PSNH provides horizontal clearance requirements between 115 kV and 34.5 kV conductors, between 115 kV and 0 kV neutral or static wires, and clearance requirements between 34.5 kV and 0 kV neutral or static wires. Similarly, horizontal clearance sag assumptions and vertical clearance requirements between each cable are also provided.
12. A description of the three phase wires and one OPGW cable that will span the overhead crossings for F107, the three phase wires and one neutral wire that span the overhead crossings for the 380 and 3850 lines. The designed sag maximum tensions and minimum clearances to the water surface for each overhead crossing are provided in the appendices
13. The Company acknowledges the entire project is being permitted with the NHDES and the USACE. All approvals will be obtained prior to construction.

14. The Company acknowledges PSNH ownership of easements for each of its lines and facilities on both sides of the public water crossing locations.
15. The Company submits that the licenses specific to this petition may be exercised without substantially affecting the rights of the public in the public waters identified in this petition.

Staff notes that the new F107 project, referred to as the Seacoast Reliability Project, adds electric transmission capacity from the Company's Madbury Substation to its Portsmouth Substation. This project will add an inner loop 115 kV circuit nearer to the load center, supplementing an existing 115 kV loop coming into the region from a different direction. The project requires Commission approval of separate licenses allowing the Company to construct, maintain and operate overhead transmission and distribution lines across public waters of the Oyster River, in Durham, and Pickering Brook, in Newington. The project also requires Commission approval of a license allowing the Company to construct, maintain and operate underwater and underground transmission lines beneath and across public water of Little Bay, from the shoreline in Durham to the opposite shoreline in Newington.

The Company asserts that the proposed new capacity from this project is necessary in order to continue to meet the reasonable requirements of service to the public[1]. PSNH submits that the licenses petitioned for may be exercised without substantially affecting the right of the public in the public waters listed in the petition and that minimum safe line clearances above and below all water surfaces and affected shorelines will be maintained at all times.[2]

The Company also indicates that each of the proposed overhead crossing locations uses permanent, 100-foot wide easements for its lines and facilities, on both sides of the water body.[3] The Company notes that on the westerly side of the Little Bay crossing, the riser pole will be located on fee-owned land which PSNH will acquire and own at the time of construction approval. The proposed crossing of Little Bay will occur in the existing charted utility corridor. On the easterly side of Little Bay, the crossing will come ashore and terminate in a manhole structure within a permanent 100-foot wide easement which PSNH will acquire and own at the time of construction approval.[4]

In its review of the filing, Staff breaks up the overall project into four sections. The first leg of the proposed path of this project will follow in existing PSNH 380 circuit ROW, a 34.5 kV distribution line beginning at the Madbury Substation, crossing over public waters of the Oyster River[5] in Durham, and continuing on to the Packers Falls Substation, also in Durham. The second leg of the proposed project will follow the existing PSNH 3162 circuit ROW, a 34.5 kV distribution line between the Packers Falls Substation and the Little Bay shoreline in Durham, adjacent to a charted utility corridor beneath a

[1] Re. PSNH Petition, paragraphs 1 and 2.
[2] Re. Petition, paragraph 15.
[3] Re. Petition, paragraph 14.
[4] Re. Petition, paragraph 14.
[5] In its Petition, PSNH is seeking an approval and license related to circuits 380 and F107, to cross over the public waters of the Oyster River in Durham.

portion of Little Bay, between Durham and Newington. The third leg of the proposed project will extend underwater and underground, using the charted utility corridor under and across Little Bay[6] to Newington. The final leg of this project will be above ground, following existing PSNH 3850 circuit ROW, a 34.5 kV distribution line, beginning at the terminus of the underground crossing of Little Bay in Newington, crossing over public waters of Pickering Brook[7] in Newington, and continuing on to the Portsmouth Substation.

The information provided by PSNH in its Petition and Appendices have been reviewed and are summarized by Staff as follows:

Oyster River Public Waters Crossing of the F107 and 380 Lines

PSNH Line F107, as proposed, will cross public waters of the Oyster River in the Town of Durham. The existing Oyster River public water crossing will be reconstructed to allow for the new F107 line to use the existing easements for the 380 line crossing. This overhead crossing will be double circuited with the new 115 kV PSNH F107 transmission circuit and the existing 34.5 kV PSNH 380 distribution circuit sharing the same structures. Eversource notes in its petition[8] that due to either an administrative oversight or for other undetermined reasons the existing 380 line public waters crossing of the Oyster River was never licensed. The Company, in its petition, is seeking to correct this oversight by licensing both the 115 kV F107 line and the 34.5 kV 380 line to cross above the public waters of the Oyster River at this location.

The rebuilt Oyster River crossing structures will use a double circuit configuration. The new crossing will span a distance of 495 feet[9] between two new steel, single-pole structures. The maps, engineering design and proposed construction specifics for this overhead crossing are detailed in Appendix A of the Petition.

- Structure F107-28, located on the north side of the Oyster River, will be a single-pole, directly embedded (16.5 feet embedded), 110 foot steel tangent suspension structure supporting the double circuit (F107 and 380) configuration.
    - 115 kV phase wires will have an approximate separation of 7-15 feet vertically and 0-13 feet horizontally in a delta configuration
    - The static wire is attached to a support bracket approximately 9 inches below the top of the structure.[10]

[6] In its Petition, PSNH is seeking an approval and license related to circuit F107, to cross beneath the public waters of Little Bay between Durham and Newington.
[7] In its Petition, PSNH is seeking an approval and license related to circuits 3850 and F107, to cross over the public waters of Pickering Brook in Newington.
[8] Re. Petition, paragraph 3, footnote 2.
[9] The actual span distance over the public waters, including the flood zone areas of the Oyster River is 314 feet. Re. Plan Profile drawing.
[10] Re. Petition Appendix A, Section 3.

- 34.5 kV phase wires will be arranged horizontally with an approximate separation of 15 feet below the lowest 115 kV conductor and an approximate separation at the structure of 0-5 feet vertically and 3-6 feet horizontally.
- The neutral wire will be attached to a support bracket approximately 7 feet below the 34.5 kV phase wires.

- Structure F107-29, will be a single-pole, 100 foot steel deadend strain on a concrete foundation, located on the south side of the Oyster River, supporting the double circuit (F107 and 380) configuration.
  - 115 kV phase wires will have an approximate separation of 7-15 feet vertically and 3-20 feet horizontally in a delta configuration.
  - The static wire is attached to a support bracket approximately 6 inches below the top of the structure.[11]
  - 34.5 kV phase wires will be arranged horizontally with an approximate separation of 16 feet below the lowest 115 kV conductor and an approximate separation at the structure of 0 feet vertically and 5 feet horizontally.
  - The neutral wire will be attached to a support bracket approximately 7 feet below the 34.5 kV phase wires.[12]
  - An optical ground wire, known as OPGW cable, will be installed 12 feet above the 115 kV phase conductors, for the entire length of the overhead portion of the F107 line, including the public waters crossing of the Oyster River. The OPGW line will provide two beneficial purposes for the PSNH electric system operations.
    - The fiber optic portion of the OPGW cable will improve and enhance the reliability and capacity of the communications system used by PSNH in its electric systems operations.
    - The OPGW will provide lightning protection over the conductors in the overhead configurations.
  - The vertical and horizontal design separations of all 115 kV phase wires, static wire, 34.5 kV phase wires and neutral carried on these structures exceed NESC clearance requirements at the structure, based on Table 235-1.
- Land along the shoreline adjacent to this crossing is not traversable by vehicles. Nonetheless, adequate NESC wire-to-ground clearances have been incorporated into the design.
  - The design calls for a clearance of 24 feet between the neutral wire and the closest ground point, exceeding the minimum NESC distances between neutral and ground by 8.5 feet.
  - All phase wires are above the neutral and meet or exceed minimum NESC required clearances.
  - The OPGW cable is attached nearest to the top of each structure in the overhead configuration of F107, above the 115 kV phase conductors, thus exceeding minimum NESC clearance requirements to the ground.

[11] Re. Plan Profile drawing of structure 29.
[12] Re. Petition Appendix A, Section 3.

- Flood water elevations are based on flood insurance rate maps provided by FEMA.[13] The 10-year flood elevation for this location of the Oyster approximately 33.3 feet.
    - At design conditions[14] the neutral wire[15] sag meets the 10-year flood elevation.
- PSNH analyzed various weather and loading scenarios in order to incorporate wire and cable sags and clearances necessary to meet or exceed NESC requirements above the water surface during a 10-year flood event for this crossing[16].
- The PSNH project design proposes 1590 kcmil ACSR 45/7 phase conductor cable will be used for the 115 kV F107 line overhead Oyster River crossing.
- The PSNH project design proposes 477 kcmil ACSR 18/1 phase conductor cable will be used for the 34.5 kV 380 line overhead Oyster River crossing.
    - This 380 line has also been designed to accommodate 795 ACSR 26/7 conductor, with no change in clearances, and which may be required based on anticipated future needs that may coincide with the timing of the project.
- PSNH is also in the permitting process with the New Hampshire Department of Environmental Services and the U.S. Army Corps of Engineers for wetlands permitting and shoreline protection permitting.[17]

See attached Water Crossing 1 of this Staff Recommendation for the Safety Division map and structure diagrams of the Oyster River crossing.

Pickering Brook Public Waters Crossing of the F107 and 3850 Lines

PSNH Line F107, as proposed, will cross public waters of Pickering Brook in the Town of Newington. The existing Pickering Brook public water crossing will be reconstructed to allow for the new F107 line to use the existing easements for the 3850 line crossing. This overhead crossings will be single circuit designs with the new 115 kV PSNH F107 transmission circuit and the relocated 34.5 kV PSNH 3850 distribution circuit on separate, newly constructed structures sharing the same ROW. Eversource notes in its petition[18] that due to either an administrative oversight or for other undetermined reasons the existing 3850 line public waters crossing of the Pickering Brook was never licensed. The Company, in its petition, is seeking to correct this oversight by licensing both the 115 kV F107 line and the 34.5 kV 3850 line to cross above the public waters of Pickering Brook at this location.

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[13] Re. FEMA Firm Map 33017C0314D Panel 314 or 405, dated May 17, 2005 and FEMA FIS Study 33015CV001A, also dated May 17, 2005.
[14] Re. Petition Appendix A, Exhibit1, drawing number F10740901-3.
[15] The neutral wire is the lowest wire above land and water surfaces.
[16] Re. Petition, Appendix A, section 5 for specific details.
[17] Re. Petition, paragraph 13.
[18] Re. Petition, paragraph 3, footnote 2.

The proposed new F107 circuit and reconstructed 3850 circuit crossing structures over Pickering Brook will use separate single circuit configurations. The new F107 line crossing will span a distance of 472 feet[19] between two new steel, single-pole structures, and the reconstructed 3850 line crossing will span a distance of 495 feet[20] between two between new wooden, single-pole structures.

- Structure F107-120, located on the eastern side of Pickering Brook, will be a single-pole, directly embedded (16 feet embedded), 100 foot steel tangent suspension structure supporting the single F107 circuit.
    - 115 kV phase conductors will have an approximate separation of 8-15 feet vertically and 0-13 feet horizontally (6.5 foot post insulators) in a delta configuration
    - The static wire is attached to a support bracket approximately 9 inches below the top of the structure.[21]
- Structure F107-119, will be a single-pole, 75 foot steel deadend strain on a concrete foundation, located on the western side of the Pickering Brook, supporting the single F107 circuit.
    - 115 kV phase wires will have an approximate separation of 7-15 feet vertically and 2.5-20 feet horizontally in a delta configuration.
    - The optical ground wire, known as OPGW cable, will be installed approximately 13.5 feet above the 115 kV phase conductors, for the public waters crossing of Pickering Brook.
    - The OPGW line will provide two beneficial purposes for the PSNH electric system operations.
        - The fiber optic portion of the OPGW cable will improve and enhance the reliability and capacity of the communications system used by PSNH in its electric systems operations.
        - The OPGW will provide lightning protection over the conductors in the overhead configurations.
    - The vertical and horizontal design separations of all 115 kV phase wires, and static wire (OPGW) carried on these structures exceed NESC clearance requirements at each structure, based on Table 235-1.
- Land along the Pickering Brook shoreline adjacent to the F107 line crossing is not traversable by vehicles. Nonetheless, adequate NESC wire-to-ground clearance is achieved in the design with the closest phase wire to ground being 26.2 feet.
    - The design of F107 calls for a clearance of 20.1 feet between the nearest wire and the closest ground point, exceeding the minimum NESC distances between neutral and ground by 6.1 feet.
    - The other F107 phase wires are above the reference phase wire and therefore exceed minimum NESC required clearances.
    - The OPGW cable is attached nearest to the top of each structure in the overhead configuration of F107, above the 115 kV phase conductors, thus exceeding minimum NESC clearance requirements to the ground.

[19] The actual span distance over the public waters of Pickering Brook is 92 feet. Re. Plan Profile drawing.
[20] The actual span distance over the public waters of Pickering Brook is 92 feet. Re. Plan Profile drawing.
[21] Re. Petition Appendix B, Section 3.

- Structure 3850-5, located on the western side of Pickering Brook, will be a single-pole, directly embedded (8 feet embedded), 60 foot wooden deadend structure supporting the single 3850 circuit.
    - 34.5 kV phase wires will be arranged in a horizontal configuration with an approximate separation of 5 feet vertically and 0-9 feet horizontally.
    - the neutral wire will be attached to a support bracket approximately 5 feet below the 34.5 kV phase wires
- Structure 3850-6, located on the eastern side of Pickering Brook, will be a single-pole, directly embedded (8 feet embedded), 60 foot wooden tangent structure supporting the single 3850 circuit.
    - 34.5 kV phase wires will be arranged horizontally with an approximate separation of 4 feet eight inches horizontally.
    - The neutral wire will be attached to a support bracket approximately 5 feet below the 34.5 kV phase wires.[22]
    - The vertical and horizontal design separations of the 34.5 kV phase wires, and neutral carried on these structures exceed NESC clearance requirements at the structure, based on Table 235-1.
- Land along the Pickering Brook shoreline adjacent to the 3850 line crossing is not traversable by vehicles. Nonetheless, adequate NESC wire-to-ground clearance is achieved in the design with the neutral wire to ground being 21 feet.
    - The design of 3850 calls for a clearance of 15.5 feet between the nearest wire and the closest ground point, exceeding the minimum NESC distances between neutral and ground by 6.1 feet.
    - The 3850 phase conductors are above the reference neutral wire and therefore exceed minimum NESC required clearances.

- Flood water elevations are based on flood insurance rate maps provided by FEMA.[23] Although the design for this location uses the 10-year flood elevation, for this location PSNH notes that the 100-year flood elevation for this portion of Pickering Brook, located in the Zone X section of the map, is only at approximately 1 foot.
    - At design conditions,[24]for line F107, the closest wire[25] sag meets the 10-year flood elevation.
    - At design conditions,[26]for line 3850 the neutral wire[27] sag meets the 10-year flood elevation.
- PSNH analyzed various weather and loading scenarios in order to incorporate wire and cable sags and clearances necessary to meet or exceed NESC

[22] Re. Petition Appendix B, Section 4.
[23] Re. FEMA Map 33015C0255E, dated May 17, 2005.
[24] Re. Petition Appendix B, Exhibit 3, drawing number F10740903.
[25] One of the phase conductor wires is the lowest F107 wire above land and water surfaces.
[26] Re. Petition Appendix B, Exhibit 5, drawing number F10740901-2.
[27] The neutral wire is the lowest 3850 wire above land and water surfaces.

requirements above the water surface during a 10-year flood event for these crossings[28].

- The PSNH project design proposes 1590 kcmil ACSR 45/7 phase conductor cable will be used for the 115 kV F107 line overhead Oyster River crossing[29].
- The PSNH project design proposes 477 kcmil ACSR 18/1 phase conductor cable will be used for the 34.5 kV 380 line overhead Oyster River crossing[30].
    - This 3850 line has also been designed to accommodate 795 ACSR 26/7 conductor, with no change in clearances, and which may be required based on anticipated future needs that may coincide with the timing of the project[31].
- PSNH is also in the permitting process with the New Hampshire Department of Environmental.[32]

See attached Water Crossing 2 of this Staff Recommendation for the Safety Division map and structure diagrams of the Pickering Brook crossing.

Little Bay Crossing Public Waters Crossing of the F107 Lines

The proposed new PSNH F107 line will cross public waters of Little Bay between the Towns of Durham and Newington. There are old underwater de-energized sub-transmission power lines in the charted utility cable corridor that crosses under Little Bay between Durham and Newington.[33] The Company will remove and dispose of the old underwater power cables that currently occupy space that is needed for placement of the three new underwater phase conductor cables and two underwater fiber optic communications cables related to the F107 project. Unlike the previously described Oyster River and Pickering Brook crossings, only one circuit will be licensed for this crossing, the proposed new 115 kV PSNH F107 transmission circuit.

The Company notes that on the westerly, Durham side of the Little Bay crossing, the riser pole will be located on fee-owned land which PSNH will acquire and own at the time of construction approval. From the riser pole, the three submarine phase conductor cables and two fiber optic communication cables will follow the 3 to 5 foot wide, 42 inch deep landing trench. The submarine cable will run down the riser pole at Structure F107-101 into the landing trench, and then extend in the trench out into the shallow waters of Little Bay. The landing trench will continue underwater maintaining the 42 inch depth along the bay floor, extending out approximately 367 feet from the riser pole into Little Bay. From this point the cable depth will increase to 8 feet in the main channel, for a distance of 2,431 feet. Each cable is connected to the jet-plow, which moves seaward cutting a

[28] Re. Petition, Appendix B, Section 5 for specific details.
[29] Re. Petition, paragraph 5.
[30] Re. Petition, paragraph 5.
[31] Re. Petition, paragraph 5.
[32] Re. Petition, paragraph 13.
[33] Re. Site Evaluation Committee Docket No. 2015-04, April 12 Pre-Filed Direct Testimony of Anthony Troy Godfrey, Director of Marine Engineering, Caldwell Marine International, LLC, page 3, lines 18-30 and page 4, lines 1-2.

trench to the 8 foot depth along the bottom, following the designated path, dropping each cable into a separate trench. This submarine cable installation task will be completed in three separate runs[34] through the existing charted utility corridor.[35] On the easterly side of Little Bay, the crossing will transition from the main channel into a similar 42-inch deep landing trench for an additional distance of approximately 770 feet through shallow waters and ashore, continuing underground and terminating in a manhole structure. The underground trench and manhole splice vault structure will be located within a permanent 100-foot wide easement which PSNH will acquire and own at the time of construction approval.[36]

- The PSNH project design proposes 1400 mm cross link polyethylene (XLPE), lead sheath, armored submarine cables, one cable for each phase conductor.
- The PSNH project design proposes to splice two ADSS fiber optic cables to the OPGW cable for the underwater crossing.
- PSNH is also in the permitting process with the New Hampshire Department of Environmental Services and the U.S. Army Corps of Engineers for wetlands permitting and shoreline protection permitting.[37]

See attached Water Crossing 3 of this Staff Recommendation for the Safety Division map and structure diagrams of the Little Bay crossing.

B. 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.

[34] Cable installation runs 1 and 2 will include one power cable and one externally strapped fiber optic cable bundled in the same trench. The third cable installation run will include the third power cable.
[35] Re. Petition, Paragraph 1, National Oceanic and Atmospheric Administration (NOAA) Chart #13285.
[36] Re. Petition, paragraph 14.
[37] Re. Petition, paragraph 13.

C. Existing license(s) and permissions previously granted by the PUC for these locations

Staff was not able to confirm the existence of any previously granted crossing licenses for the two overhead crossing locations. PSNH notes that neither of the two existing overhead crossings, the 380 line over the Oyster River, nor the 3850 line over Pickering Brook, was previously licensed. Each of these crossings will be reconstructed as part of this Seacoast Reliability Project and the Company is seeking public waters licenses for both. There are de-energized electric transmission lines within the underwater cable corridor beneath Little Bay, but no research was done to confirm whether those submarine crossings were ever licensed, since they are not part of the petition.

PSNH asserts in the petition that the proposed construction of these crossings will be exercised without affecting the rights of the public to use the public waters of the State.[38] Minimum safe line clearances of overhead crossings above water surfaces 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.

D. Land ownership at existing facility locations

As noted in its petition, at paragraph 14, PSNH is using existing power line rights of way. For each of its overhead crossings PSNH owns permanent, minimum 100 foot wide easements for its lines and facilities on both sides of the public water body at the proposed crossing locations. Each of the crossings will be constructed within the limits of those easements.

On the westerly side of the Little Bay crossing, the riser pole structure will be located on PSNH fee-owned land which PSNH will acquire and own at the time of construction approval. The proposed crossing location will be within the 1,000 foot wide utility cable corridor, defined on NOAA Chart #13285. On the easterly side of Little Bay, the crossing will come ashore, continuing underground to a manhole structure, within a 100 foot wide easement which PSNH will acquire and own at the time of construction approval.

E. 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;

[38] Re, RSA 371:20 Rights in Public Waters and Lands.

(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....

The Company explicitly states that the required technical information provided in its petition is based on the 2012 National Electric Safety Code (NESC) C2-2012. The Company continues by stating the proposed crossings have been designed and will be constructed, maintained and operated by PSNH in accordance with the applicable requirements of the NESC.[39]

Safety Division Staff reviewed the specifications related to the maps, design and proposed construction plan and profile drawings of the crossing projects as provided in the Petition, Appendices A, B and C and supporting Exhibits, as filed on April 12, 2016, and found each to be in conformance with the applicable sections of NESC code C2-2012 and Puc 300.

F. Public need and public impact, including applicability of other State regulations

In order to meet the reasonable requirements of electric service to the public, PSNH has previously constructed, and currently operates and maintains, other three-phase 115 kV transmission lines on its system. The Company has also previously constructed, and currently operates and maintains 34.5 kV electric distribution system circuits within the same easements in the Towns of Durham and Newington, New Hampshire. The proposed new F107 Line will be an integral part of the PSNH system, as well as the regional ISO-NE Grid. Alternative transmission routes were evaluated but were ultimately not selected by PSNH and ISO-NE. The proposed new F107 Line will use existing distribution system easements and cross the same public waters at the two overhead crossing locations. The underwater crossing location will use the existing charted utility corridor beneath Little Bay.

PSNH asserts in the petition that the construction, maintenance and operation of these crossings will be exercised without affecting the rights of the public of the public waters at all three crossing locations. Minimum safe line clearances above public water and ground surfaces will be maintained at all times. The use and enjoyment of the public

[39] Re. Petition, paragraph 7.

waters at the Oyster River, Little Bay and Pickering Brook locations 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 distribution lines within the existing rights of way are necessary to allow for the addition of the proposed new F107 line, a 115 kV transmission line, designed to serve the growing demand requirements of the Seacoast Region of New Hampshire. NHPUC Safety Division Staff concludes the impact to the public in terms of safety will be *de minimis* and not measurable in terms of meeting minimum NESC clearance requirements over the public water surfaces of the Oyster River and Pickering Brook crossing locations. The same is true for meeting minimum NESC clearances below the public water surface of the Little Bay crossing, within the charted utility corridor.

G. Areas not reviewed by the Safety Division

The scope of the Safety Division review was limited to analysis of the functional use and safety at the proposed crossings.

The scope of this review excluded environmental and aesthetic impacts as those areas are reviewed by New Hampshire Department of Environmental Services and the New Hampshire Site Evaluation Committee.

H. Safety Division Staff Recommendations:

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

1) Find that the public waters licenses PSNH requests in this docket may be exercised without substantially affecting the public rights in the public waters which are the subject of the petition;

2) Grant PSNH five licenses to construct and maintain electric transmission and distribution lines, including communication wires, across the public waters, and identified as follows:

    a. One double-circuited overhead crossing (two licensed crossings) above the Oyster River, within existing PSNH 100 foot ROW on permanent easements in Durham, NH, of

        i. PSNH 34.5 kV distribution circuit 380 between double-circuited, single-pole structures F107-28 and F107-29; and

ii. PSNH 115 kV transmission circuit F107 with optical ground wire communications cable (OPGW) between double-circuited, single-pole structures F107-28 and F107-29;

b. Two single circuit overhead crossings (two licensed crossings) above Pickering Brook, within existing PSNH 100 foot ROW on permanent easements in Newington, NH, of

i. PSNH 34.5 kV distribution circuit 3850, between structures 3850-5 and 3850-6; and

ii. PSNH 115 kV transmission circuit F107 with optical ground wire communications cable (OPGW), between structures F107-119 and F107-120;

c. Single-circuit submarine crossing (one licensed crossing) below the floor of Little Bay, within existing PSNH 100-foot ROW on permanent onshore easements in Durham, NH, and Newington, NH, and within the charted underwater utility cable corridor across Little Bay,

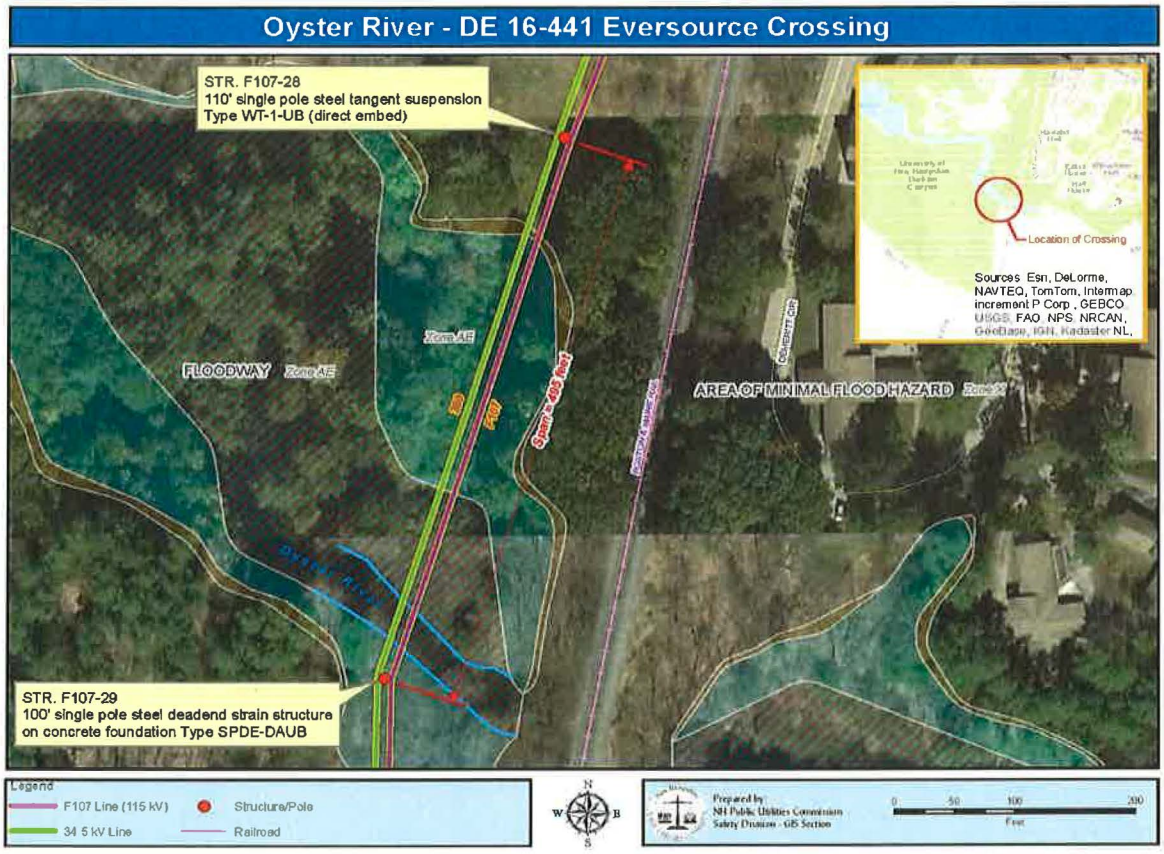
i. PSNH 115 kV transmission circuit F107, consisting of three submarine phase conductor cables, two of which include attached fiber optic communication cables, installed in three underground/underwater trenches between riser-pole structure F107-101 on the western shore and F107 underground splice vault structure on eastern shore in Newington;

4) Issue an Order Nisi and orders for its publication; and

5) Require PSNH to forward the Order after 30 days of publication notice to Site Evaluation Committee for consideration in SEC proceeding 15-04.

Attachments

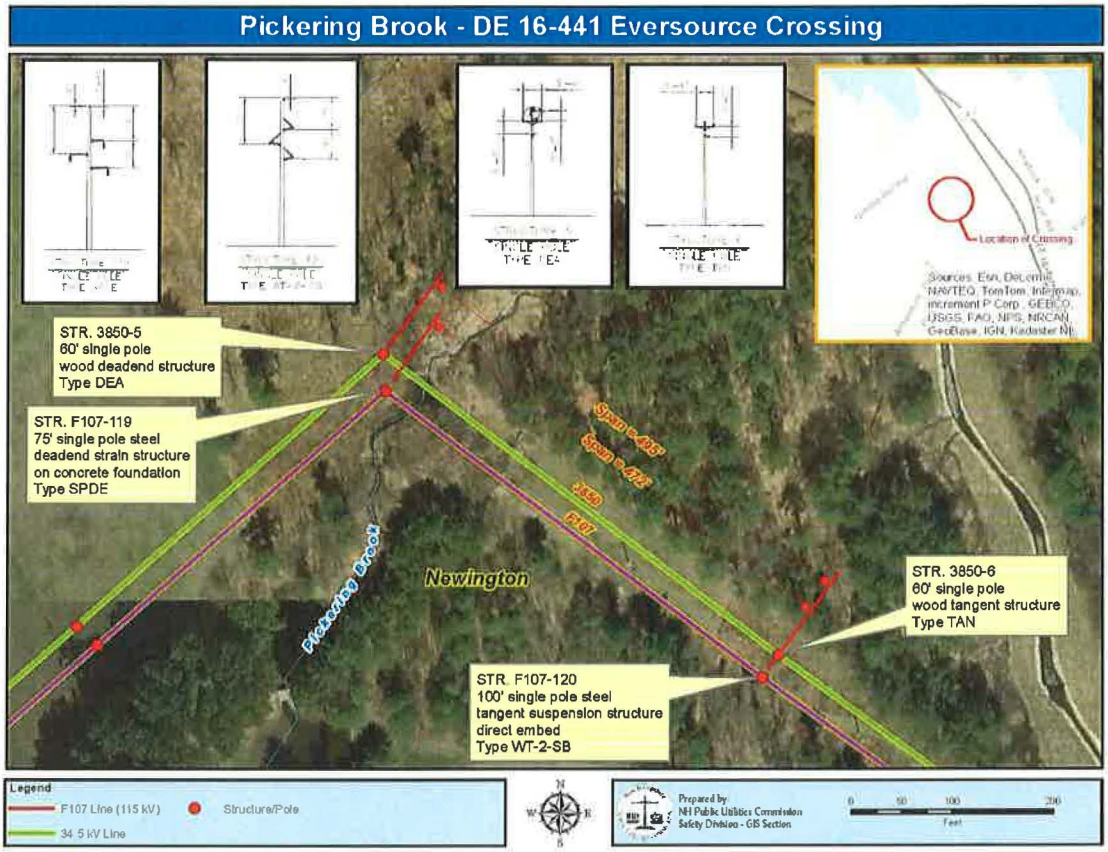
Water Crossing 1



Water Crossing 1:
Licenses 1 + 2:

This is the PSNH proposed public waters crossing of the Oyster River in Durham, NH. Existing PSNH 34.5 kV distribution circuit 380 will be reconstructed into a double-circuit configuration with the proposed new PSNH 115 kV transmission circuit F107. The double-circuit configuration will be single-pole structures designed to support both the proposed new F107 line and the existing 380 line within the existing 380 line ROW and PSNH permanent easements. The crossing will be between new structures F107-28 and F107-29.

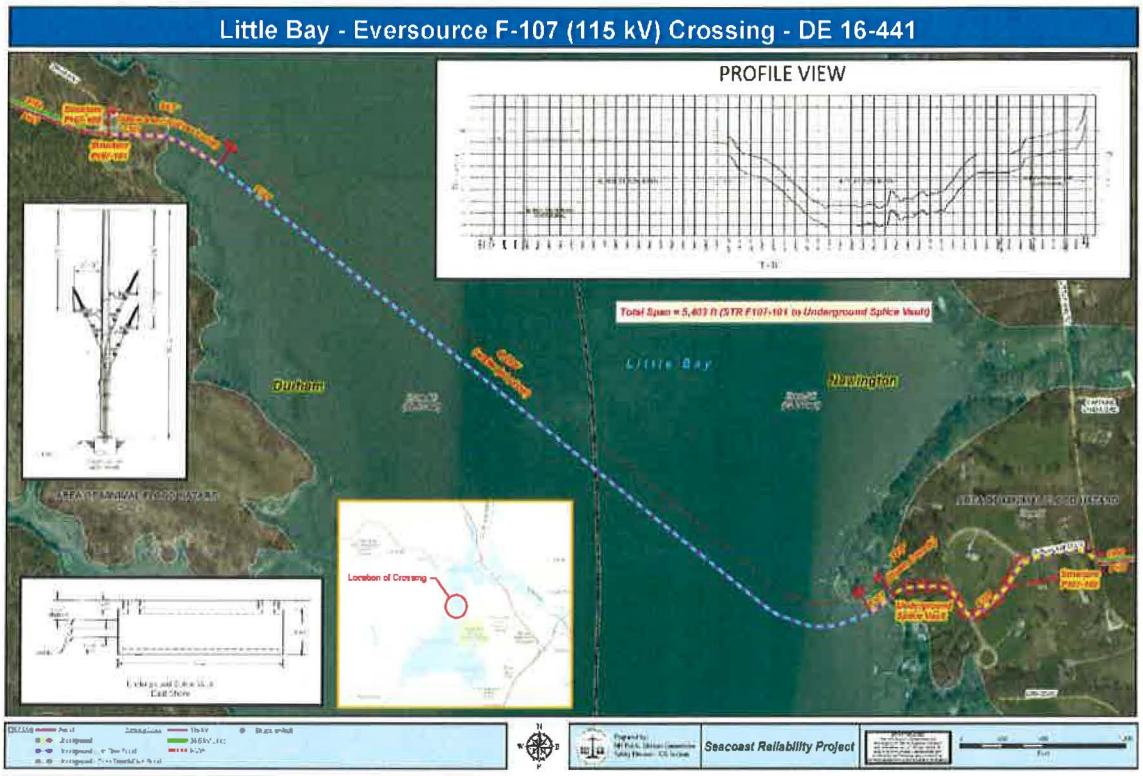
Water Crossing 2



Water Crossing 2:
Licenses 3 + 4:

This is the PSNH proposed public waters crossing of Pickering Brook in Newington, NH. Existing PSNH 34.5 kV distribution circuit 3850 will be relocated/reconstructed using the existing 3850 line ROW, freeing up space for the proposed new F107 circuit. The F107 and 3850 lines will each be of single-circuit configurations with separate support structures. The existing PSNH 3850 line overhead crossing will be supported on each side of Pickering Brook by relocated wood single pole structures 3850-5 and 3850-6. The proposed new PSNH F107 line overhead crossing of Pickering Brook will be supported by structures F107-119 and F107-120.

Water Crossing 3



Water Crossing 3:
License 5:

This is the PSNH proposed new public waters crossing of Little Bay between Durham and Newington, NH. The single-circuit submarine crossing below the floor of Little Bay, within existing PSNH 100-foot ROW on permanent onshore easements in Durham, NH, and Newington, NH. In between these two points, the F107 crosses below Little Bay, within the charted underwater utility cable corridor. The proposed PSNH 115 kV transmission circuit F107 submarine crossing will consist of three trenches, one for each XLPE submarine phase conductor cable. The two ADSS fiber optic communication cables will be strapped to two separate phase conductor cables (one to each cable), and installed in three underground/underwater trenches between riser-pole structure F107-101 on the western shore and F107 underground splice vault structure on eastern shore in Newington.