

**THE STATE OF NEW HAMPSHIRE
BEFORE THE
PUBLIC UTILITIES COMMISSION**

PETITION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE FOR A LICENSE TO CONSTRUCT AND MAINTAIN ELECTRIC LINES, STATIC WIRE AND FIBER OPTIC CABLE OVER AND ACROSS GREAT COHAS BROOK IN THE CITY OF MANCHESTER, NEW HAMPSHIRE.

TO THE PUBLIC UTILITIES COMMISSION:

Public Service Company of New Hampshire ("PSNH"), a public utility engaged in the generation, transmission, distribution and sale of electricity in the State of New Hampshire, hereby petitions the Public Utilities Commission ("Commission"), pursuant to RSA 371:17, for a license to construct and maintain electric lines, static wire, and fiber optic cable at one location over and across the public waters of Great Cohas Brook in the City of Manchester, New Hampshire and in support of its petition states as follows:

1. In order to meet the reasonable requirements of service to the public, PSNH is proposing to construct a new 115 kV transmission line, designated as the W144 Line. The proposed W144 line will connect the PSNH Scobie Pond Substation in Londonderry, New Hampshire to the PSNH Huse Road Substation in Manchester, New Hampshire. The proposed W144 line will be located in the same right of way (ROW) as PSNH's Line I158, which was re-built in 2006 as a 115 kV line connecting the Scobie Pond Substation to the Huse Road Substation. The W144 line is proposed for overhead crossing of Great Cohas Brook in Manchester, New Hampshire,

2. The new W144 line between the Scobie Pond and Huse Road Substations is needed in order to increase service and transmission to the southern part of the State, as determined by ISO New England and PSNH. The W144 line is proposed to be built in the existing ROW connecting the Scobie Pond Substation and the Huse Road Substation, where the I158 line already exists. The project will include installing a 115 kV transmission line for approximately 6.27 miles between the two Substations. The structures that occur within the 10-year flood zone will be structures 70 through 76. The structures that occur at the proposed Great Cohas Brook crossing will be structure 73 (123 feet south of Great Cohas Brook) and structure 74 (367 feet north of Great Cohas Brook). The total distance between the two structures is 528 feet ($123' + 367' + 38'$ (brook crossing) = 528'). The W144 line will contain three 1272 ACSS 45/7 conductors. For the majority of the line (approximately 4.6 miles) the line will be constructed using steel single pole structures with a single OPGW fiber optic cable. At the location of the crossing, the structures will be steel H-frame type construction for approximately 1.0 miles. At this location, the single OPGW fiber optic cable will continue, and an additional 19#10 alumoweld static wire will be added to increase the lightning protection of the H-frame structures. Installation of the W144 line is currently planned to commence in February, 2015, and be completed in June, 2015.

3. In order to improve and enhance the reliability and capacity of the communications system used in its electrical system operations, and thereby meet the reasonable requirements of service to the public, PSNH will also install and maintain an optical ground wire, known as OPGW cable, on the W144 line structures. The OPGW will cross Great Cohas Brook at the same location as part of the W144 line crossing. In addition to improving communications, the OPGW will provide lightning protection over the conductors. The fiber optic cable will be installed at a height that is always greater than the height of the conductors, and the sag of the fiber optic cable will never be below the sag of the conductors.

4. The general location of the W144 line Great Cohas Brook crossing is shown on the U.S. Geological Survey location plan attached hereto and marked as Exhibit 1. The design and construction of the crossing is shown on the attached Public Service of New Hampshire Transmission Business plan and profile drawing entitled "115 kV Transmission Line W144 Cohas Brook Crossing" attached hereto and marked Exhibit 2.

5. The required technical information provided in this petition is based on the 2012 National Electrical Safety Code (NESC) C2-2012, which meets and/or exceeds the 2002 NESC.

6. Building the W144 line will require construction of new overhead wire over Great Cohas Brook in a horizontal single circuit configuration. The required clearance calculations for the new line crossing are attached to this petition as Appendix A.

7. The Great Cohas Brook will be spanned using direct embedded 3 phase steel H-frame tangent structures. Structures within the 10-year flood zone associated with the Great Cohas Brook span will contain both direct embedded 3 phase steel H-frame tangent structures and 3 phase steel H-frame dead-end structures. Detail design specifications for the structure type is attached to Appendix A of this petition as Figure 1 and Figure 2. As shown on Figure 1, the phase wires have an approximate separation at the structure of 0 feet vertically and approximately 14 feet horizontally. The static wire cables located in the static wire positions are carried on the structure by a support bracket approximately 9 inches down from the top of the structure.

8. Flood water elevations for these crossings were based on information contained in the FEMA Hillsborough County Flood Insurance Study, Vol. 3, panel number 93 to 94. Clearance is required to the 10-yr flood elevation in accordance with note 18 Section 232 of the NESC Code. Clearances will be above this level. All elevations are based on NAVD 88 datum.

9. Based on Table 232-1.7 of the NESC, for open supply conductors 750 V to 22 kV to ground, the minimum clearance to the water surface during normal level for water bodies not suitable for sail boating is 17.0'. Minimum clearances to water bodies suitable for sail boating is 20.5' (for waters less than 20 acres), and 28.5' (for waters 20 to 200 acres). NESC Rule 232.C.1.a states that the minimum clearance increases by 0.4 inches for every kilovolt in excess of 22 kV. It also specifies that at voltages above 50 kV the minimum clearance is based on phase to ground voltage of the line. Based on this rule, an additional clearance of 37.2" or 3.1 feet $((115 \text{ kV} - 22 \text{ kV}) * 0.4" = 37.2")$ is needed for 115 kV, which brings the total required minimum clearance to 20.1' (for water bodies deemed not sailable), 23.6' (for sailable waters less than 20 acres), and 31.6' (for sailable waters 20 to 200 acres). For overhead shield/surge protections wires and OPGW cables that meet NESC Rule 230.E.1, the minimum clearance to the water surface at the normal level is 20.1'. As the static wire and fiber optic cable are located above the phase wires, this NESC minimum clearance requirement will always be met. NESC minimum distances to road for truck traffic, based on Table 232-1.2 of the NESC for open supply conductors for 750V to 22 kV to ground is 18.5'. With the additional 3.1' of clearance required for 115 kV, the total required clearance is 21.6'.

10. The W144 line will span Great Cohas Brook using 1272 ACSS Bittern 45/7. The crossing locations detailed in this petition have a total of 3 phase wires and one shield wires and one fiber optic OPGW cable spanning the water body. All 3 (OPGW, 19#10 AW and 1272 ACSS) will be sagged using the NESC Heavy Loading (0 degrees F., 4 pounds per square foot wind loading, ½ -inch radial ice) sag charts upon original installation in the field. The 1272 ACSS conductors will be sagged using a maximum tension of 7,000 at NESC Heavy Load conditions. The 19#10 AW static wire will be sagged using a maximum tension 4,000 pounds respectively at NESC Heavy Load conditions. The OPGW will

be sagged using a maximum tension of 4,000 pounds at NESC heavy loading conditions. The sag and clearance to the water surface for the proposed crossing is provided in the attached Appendix A.

11. All structures being placed within the 10-year flood elevation associated with Great Cohas Brook, including the tangent structures from the crossing will be set inside of jurisdictional wetlands. All work and structures to be set in jurisdictional wetlands will require a Standard Dredge and Fill Permit issued by the New Hampshire Department of Environmental Services (NHDES) and the US. Army Corps of Engineers (USACE). These permits have now been approved and issued to PSNH.

12. Any Army Corps permit is not required for the crossing as Great Cohas Brook is not federally designated as navigable waters.

13. The proposed crossing will be maintained and operated by PSNH in accordance with the applicable requirements of the NESC.

14. PSNH owns permanent easements, not less than 265' in width, for its lines and facilities on the north and south side of Great Cohas Brook in Manchester. The proposed crossing will be constructed and maintained within the limits of the easements.

15. PSNH submits that the license petitioned for herein may be exercised without substantially affecting the rights of the public in the public waters of Great Cohas Brook. Minimum safe line clearances above all water surfaces and affected shorelines will be maintained at all times. The use and enjoyment by the public of Great Cohas Brook will not be diminished in any material respect as a result of the overhead line and cable crossings.

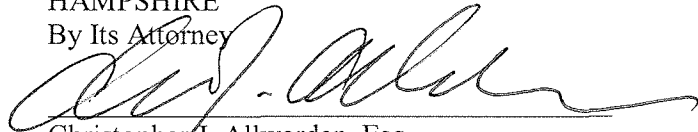
WHEREFORE, PSNH respectfully requests that the Commission:

- a. Find that the license petitioned for herein may be exercised without substantially affecting the public rights in the public waters which are the subject of this Petition;
- b. Grant PSNH a license to construct and maintain electric lines, state wire and fiber optic cable over and across the public waters as specified in the Petition; and
- c. Issue an Order Nisi and orders for its publication.

Dated at Manchester this 13th day of January, 2015

Respectfully submitted,

PUBLIC SERVICE COMPANY OF NEW
HAMPSHIRE
By Its Attorney



Christopher J. Allwarden, Esq.
Senior Counsel, Legal Department
PSNH Energy Park
780 North Commercial Street
Manchester, NH 03101
(603) 634-2459