DOCKET NO. 468 - The Connecticut Light & Power Company d/b/a Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the Southwest Connecticut Reliability Project that traverses the municipalities of Bethel, Danbury, and Brookfield, which consists of (a) construction, maintenance and operation of a new 115-kV overhead electric transmission line entirely within existing Eversource right-of-way and associated facilities extending approximately 3.4 miles between Eversource's existing Plumtree Substation in the Town of Bethel to its existing Brookfield Junction in the Town of Brookfield; (b) reconfiguration of two existing 115-kV double-circuit electric transmission lines at Eversource's existing Stony Hill Substation in the Town of Brookfield; and (c) related substation modifications.	}	Connecticut Siting Council November 10, 2016

Findings of Fact

Introduction

1. Pursuant to Connecticut General Statutes (C.G.S.) §16-50g et seq., on June 29, 2016, The Connecticut Light and Power Company doing business as Eversource Energy (Eversource), applied to the Connecticut Siting Council (Council) for a Certificate of Environmental Compatibility and Public Need for the Southwest Connecticut Reliability Project (Project). The Project consists of (a) construction, maintenance and operation of a new 115-kV overhead electric transmission line entirely within existing Eversource right-of-way and associated facilities extending approximately 3.4 miles between Eversource's existing Plumtree Substation in the Town of Bethel to its existing Brookfield Junction in the Town of Brookfield, traversing portions of the municipalities of Bethel, Danbury and Brookfield; (b) reconfiguration of two existing 115-kV double-circuit electric transmission lines at Eversource's existing Stony Hill Substation in the Town of Brookfield; and (c) related substation modifications. (Eversource 1, Vol. 1, p. ES-1)

2. The purpose of the Project is to bring the electric supply system in portions of southwest Connecticut into compliance with applicable national and regional reliability standards and criteria by eliminating potential thermal overloads and voltage violations identified in studies conducted by the Independent System Operator in New England (ISO-NE). (Eversource 1, Vol. 1, p. ES-1)

3. The only party in this proceeding is Eversource. (Transcript, September 22, 2016, 3:05 p.m. [Tr. 1], pp. 4-5; Transcript, September 22, 2016, 7:00 p.m. [Tr. 2], pp. 2, 5)

4. On September 29, 2016, after the close of the evidentiary record, the Town of Brookfield requested intervenor status to present concerns regarding a proposed access road at the Stony Hill Substation. The Stony Hill Substation access road is related to Council Petition 1230, a separate matter that was approved by the Council on June 23, 2016. The Council was unable to accommodate the Town's intervenor request as the evidentiary record for this docket closed on September 22, 2016. The Town's September 29, 2016 correspondence was entered into the Docket 468 record as municipal comments. (Town of Brookfield letter dated September 29, 2016; Council response letter dated October 4, 2016)

5. Pursuant to C.G.S. §16-50*l*(b), Eversource provided legal service and notice of the application. This included notice to municipalities traversed by the proposed Project; federal, state, local and regional agencies, elected officials, and abutters of both substations. Eversource published notice of the application filing in The News-Times on June 10, and June 16, 2016. Eversource included a Project information insert in one or more of its monthly bills to customers within Bethel, Brookfield and Danbury within 60 days before submission of the application to the Council. (Eversource 1, Vol. 1, pp. FR-11-12; Affidavit Regarding Publication of Legal Notice and Notice Provided to Customers of CL&P d/b/a Eversource; Affidavit of Service of Notice Upon Owners of Property Abutting Substations; Affidavit of Service of Application)

6. Eversource notified water companies servicing the areas traversed by the proposed Project. (Affidavit Regarding Notice to Water Companies)

7. On or before June 29, 2016, Eversource notified property owners abutting both substations through certified mailings. Four certified mailings were unclaimed. Eversource resent notice to these abutters by first class mail. (Eversource 1, Vol. 1, p. FR-12; Eversource 2, R. 1)

8. In accordance with the Council's Application Guide for an Electric and Fuel Transmission Line Facility, Eversource provided notice to a number of community groups including applicable economic development commissions, land trusts, environmental groups, river protection organizations, historic preservation groups, and water companies with watersheds within the Project area. (Eversource 1, Vol. 1, p. FR-11; Affidavit Regarding Notice to Community Groups)

9. Pursuant to C.G.S. §16-50*l*(b), Eversource served a copy of the application for the proposed Project to federal, state, regional and local officials listed therein. (Eversource 1, Vol. 1, p. FR-10; Affidavit of Service of Application)

Procedural Matters

10. On June 30, 2016, the Council sent a letter to the State Treasurer, with copies to the Chief Elected Officials of Bethel, Brookfield, and Danbury, stating that $25,000 was received from Eversource as payment to the Municipal Participation Fund (Fund) and deposited in the office of the State Treasurer's department account. The Fund is available for any or all of the municipalities to apply for as reimbursement to defray expenses incurred by the municipalities if they participated as a party in the proceeding, pursuant to C.G.S. §16-50bb. None of the subject municipalities are parties to the proceeding. (Record)

11. During a regular Council meeting on August 4, 2016, the application was deemed complete pursuant to Regulations of Connecticut State Agencies (R.C.S.A.) §16-50*l*-1a and the public hearing schedule was approved by the Council. (Record)

12. Pursuant to C.G.S. §16-50m, the Council published legal notice of the date and time of the public hearing in The News-Times on August 10, 2016. (Record)

13. Pursuant to C.G.S. §16-50m, on August 5, 2016, the Council sent a letter to the Towns of Bethel, and Brookfield and the City of Danbury to provide notification of the scheduled public hearing and to invite each municipality to participate in the proceeding. None of the municipalities responded to this solicitation. (Record)

14. On August 25, 2016, the Council held a pre-hearing conference on procedural matters to discuss the requirements for pre-filed testimony, exhibit lists, administrative notice lists, expected witness lists, filing of pre-hearing interrogatories and the logistics of the public inspection of the Project. (Council pre-hearing conference memoranda dated August 17, 2016)

15. In compliance with R.C.S.A. §16-50j-21, Eversource installed eight four-foot by six-foot signs along the Project route to describe the type of facility proposed, the public hearing date, and contact information for the Council. (Eversource 4, pp. 38-39)

16. The Council and its staff conducted a field review of the proposed Project on September 22, 2016 beginning at 1:30 p.m. Eversource provided bus transportation to various locations along the project route. (Council's Hearing Notice dated August 5, 2016; Eversource 7)

17. Pursuant to C.G.S. §16-50m, the Council, after giving due notice thereof, held a public hearing on September 22, 2016, beginning with the evidentiary portion of the hearing at 3:00 p.m. and continuing with the public comment session at 7:00 p.m. at the Bethel Municipal Center, 1 School Street, Bethel, Connecticut. (Council's Hearing Notice dated August 5, 2016; Council's Field Review Notice dated September 15, 2016; Tr. 1, p. 4; Tr. 2, p. 4)

Municipal Consultation and Community Outreach

18. Eversource began its outreach efforts to the municipalities of Bethel, Brookfield, and Danbury in March 2016 by briefing municipal officials on the Project. (Eversource 4, p. 36)

19. Pursuant to C.G.S. §16-50*l*(e), on April 14, 2016, Eversource provided a Project Municipal Consultation Filing (MCF) to the chief elected officials of Bethel, Brookfield and Danbury to begin the 60-day municipal consultation process. (Eversource 1, Vol. 1, p. 9-3)

20. Eversource sponsored a Public Open House event on May 4, 2016 at the Bethel Municipal Center in Bethel that was attended by approximately 30 people. Notification of the open house was provided by mailings to properties along the proposed route and by publication of notice in area newspapers. The open house included project information displays as well as public comment kiosks. Eversource representatives were available to respond to specific Project questions. (Eversource 1, Bulk File 2; Eversource 4, p. 38; Tr. 1, p. 66)

21. Eversource solicited written public comments at the open house and forwarded a copy of the written public comments to the respective municipalities and the Council. (Eversource 1, Vol. 1, p. 9-4, Bulk File 2)

22. The MCF was posted on Eversource's website and was made available in the respective municipal libraries. (Eversource 4, p. 38)

23. During the MCF process, the Town of Bethel requested that the new transmission line be constructed on the west/north side of the existing line, rather than the south/east side, where it traverses a predominately residential area. Eversource evaluated this option but did not pursue such a design as the existing right-of-way is not wide enough and additional easements would need to be obtained. More information is provided in FOF # 159. (Eversource 1, Vol. 1, pp. ES-11, ES-12, 11-32, 11-33)

24. The Bethel First Selectman, Matthew Knickerbocker, submitted written correspondence to the Council on September 22, 2016, that presented concerns regarding the amount of tree clearing along the right-of-way that could negatively affect adjacent residential properties. First Selectman Knickerbocker

acknowledged the need for reliable electric power in the area and requested that the powerline be placed on the east and west side of the right-of-way to minimize impacts to adjacent residents and businesses to the greatest extent possible. (Town of Bethel letter dated September 22, 2016)

25. The Council did not receive any correspondence from the City of Danbury. (Record)

State Agency Comment

26. Pursuant to C.G.S. § 16-50j (g), on August 5, 2016 and September 23, 2016, the following State agencies were solicited by the Council to submit written comments regarding the proposed facility: Department of Energy and Environmental Protection (DEEP); Department of Public Health (DPH); Council on Environmental Quality (CEQ); Public Utilities Regulatory Authority (PURA); Office of Policy and Management (OPM); Department of Economic and Community Development (DECD); Department of Agriculture (DOAg); Department of Transportation (DOT); Connecticut Airport Authority (CAA); Department of Emergency Services and Public Protection (DESPP); and State Historic Preservation Office (SHPO). (Record)

27. The Council received a response from the DOT's Bureau of Engineering and Construction on September 2, 2016 indicating that a Highway Encroachment Permit would be required if any work, including project access, is conducted within the State right-of-way for Interstate 84 and Route 6. (DOT comment dated August 29, 2016)

28. The Council received a response from DEEP on September 19, 2016 that contained a field description of the Project route, presented comment regarding the Project crossing of a DEEP property (East Swamp Wildlife Area) and a discussion of applicable DEEP permit requirements. (DEEP comments dated September 19, 2016)

29. The following agencies did not respond with comment on the application: CEQ, PURA, OPM, DECD, DOAg, DPH, CAA, DESPP, and SHPO. (Record)

System Planning and Mandatory Reliability Standards

30. The Northeast Power Coordinating Council (NPCC) is a regional reliability council that was established in 1966 to improve the reliability of the interconnected bulk power system in New York, the six New England states, and eastern Canadian provinces. The U.S. system of the NPCC formed two regional reliability councils to ensure the reliability of their portions of the interconnected bulk-power electric system - ISO-NE, and New York Independent System Operator (NYISO). (Eversource 1, Vol. 1, p. 2-3)

31. The Federal Energy Policy Act of 2005 required the Federal Energy Regulatory Commission (FERC) to designate an Electric Reliability Organization (ERO) to develop and enforce a system of mandatory reliability standards for planning and operations of the bulk power electric system. Compliance with the standards is mandatory under federal law and violations are subject to fines. (Eversource 1, Vol. 1, p. 2-4)

32. FERC designated the North American Electric Reliability Corporation Inc. (NERC) to be the ERO. As the ERO, NERC is charged with improving the reliability of the bulk-power electric system by developing mandatory reliability standards for planning and operations. (Eversource 1, Vol. 1, p. 2-4)

33. ISO-NE is responsible for power system planning, as well as grid operation and market administration in the six New England States. It has adopted planning standards, criteria and procedures consistent with the standards and criteria established by NERC and the NPCC, to ensure that New England's electric system will provide adequate and reliable electric power. For reliability studies, ISO-NE uses a ten-year planning horizon. (Eversource 1, Vol. 1, pp. 2-3, 2-4, Vol. 4, ISO-NE Transmission Planning Technical Guide)

34. ISO-NE is responsible for the reliable and economical operation of New England's electric power system, which includes managing the comprehensive, long-term planning of the regional power system to identify the region's electricity needs and plans for meeting those needs. The planning process involves the preparation of an annual Regional System Plan (RSP) that provides forecasts of annual energy use and peak loads for a ten-year planning horizon; information about amounts, locations, and characteristics of market responses; and descriptions of transmission projects for the region that could meet the identified needs, as summarized in the RSP Project List. (Council Administrative Notice Item No. 13; Council Administrative Notice Item No. 14)

35. The RSP Project List is a summary of needed transmission projects for the region and includes the status of reliability transmission upgrades, market efficiency transmission upgrades, elective transmission upgrades and generator interconnection upgrades. The proposed Project is identified on the RSP Project List as a planned reliability transmission upgrade that would ensure electrical reliability through 2022. (Eversource Vol. 1, p. 2-10; Council Administrative Notice Item No. 14; Eversource 4, p. 16)

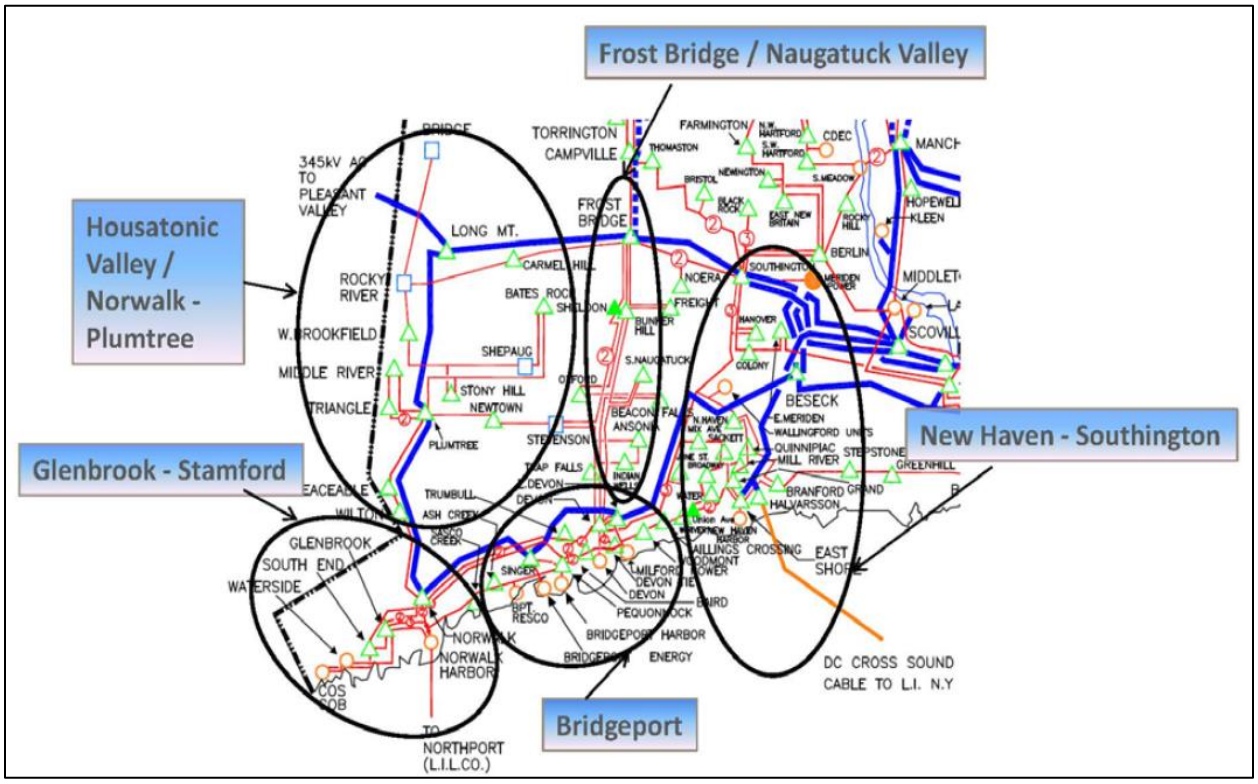
36. As a transmission owner in New England, Eversource must comply with the reliability standards and criteria adopted by NERC, NPCC, and ISO-NE. These standards and criteria establish a set of performance tests or contingency simulations under which Eversource's electric transmission system must perform without experiencing overloads or voltage problems. (Eversource 1, Vol. 1, pp. 2-3, 2-6, 2-20)

Project Need

37. The electric transmission needs addressed by the Project were identified by numerous ISO-NE planning studies that began in 2001 that were initially focused on potential future criteria violations on the 115-kV electric transmission system in the SWCT area, resulting in three major projects – Docket 217, Bethel-Norwalk 345-kV line, Docket 272, Middletown-Norwalk 345-kV line and Docket 292,- Glenbrook-Norwalk 115-kV cable project - that created a 345-kV loop to better serve the SWCT area as well as resolve numerous transmission reliability issues. Despite the construction of these projects, the initial studies noted that additional reliability issues would remain. (Eversource 1, Vol. 1, p. 2-8)

38. In its 2005 final decision in Docket 272, the Council found that more than 20 thermal overloads would remain after completion of that 345-kV loop and that these remaining overloads would be addressed locally through substation or transmission line upgrades to be constructed in the future. (Eversource 1, Vol. 1, p. 2-8; Eversource Administrative Notice Item No. 22; Tr. 1, pp. 63-65)

39. In 2012, ISO-NE formed a working group of transmission planners from ISO-NE, Eversource, and the United Illuminating Company to perform a SWCT needs assessment and solutions study, projected out to year 2022, to resolve the remaining reliability issues. The SWCT area was divided into five sub-areas, as shown in the figure below:

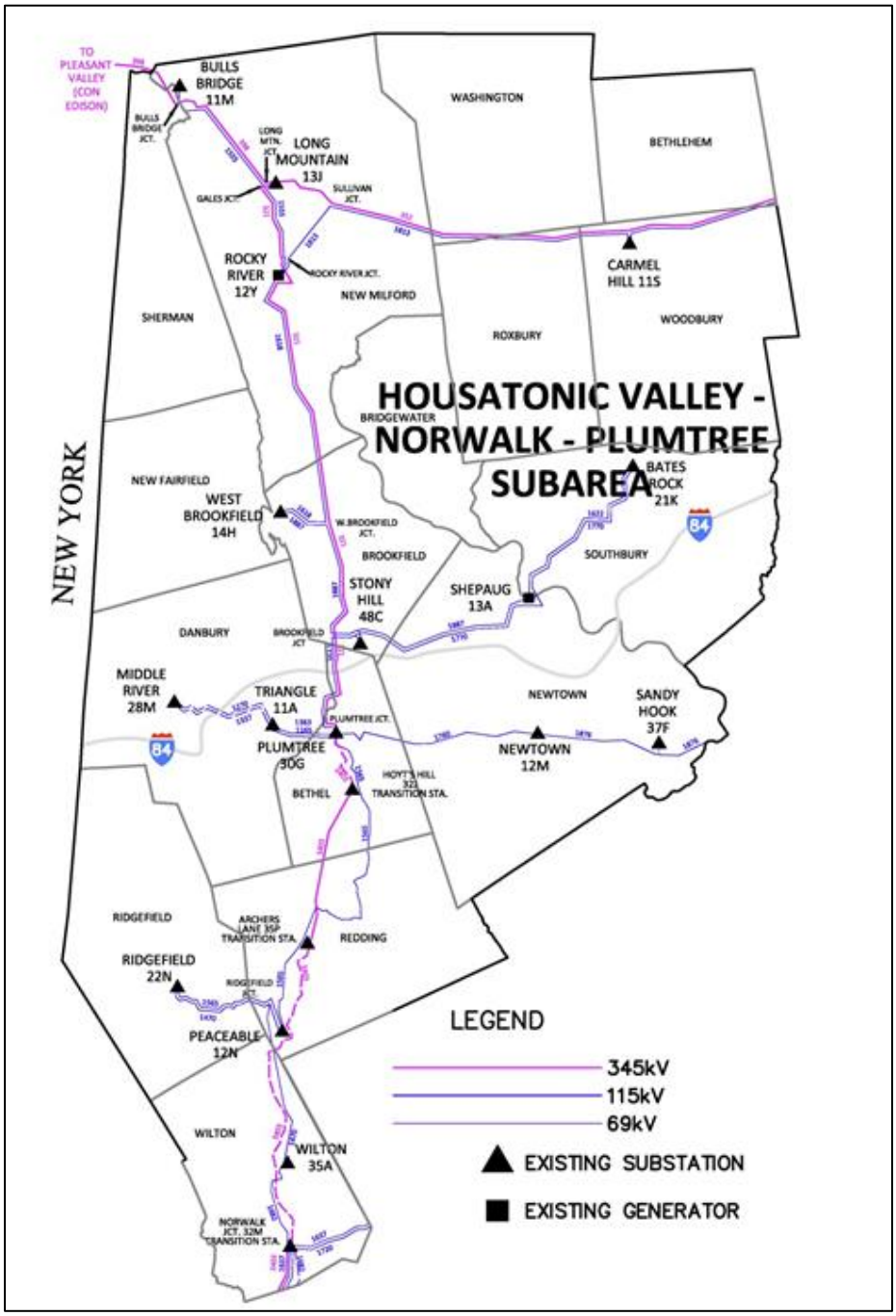


(Council Administrative Notice Item No. 42, p. F-12)

40. The five sub-areas were studied both individually (local) and with one or more sub-area groupings (global) to assure that identified needs and solutions were sufficiently examined in a cost efficient and coordinated manner. For a global solution, the study combined the HV sub-area with the adjacent Frost Bridge-Naugatuck Valley sub-area. Ultimately, the study determined local solutions in both sub-areas were preferred over a global solution. (Eversource 1, Vol. 1, pp. 2-9, 2-10)

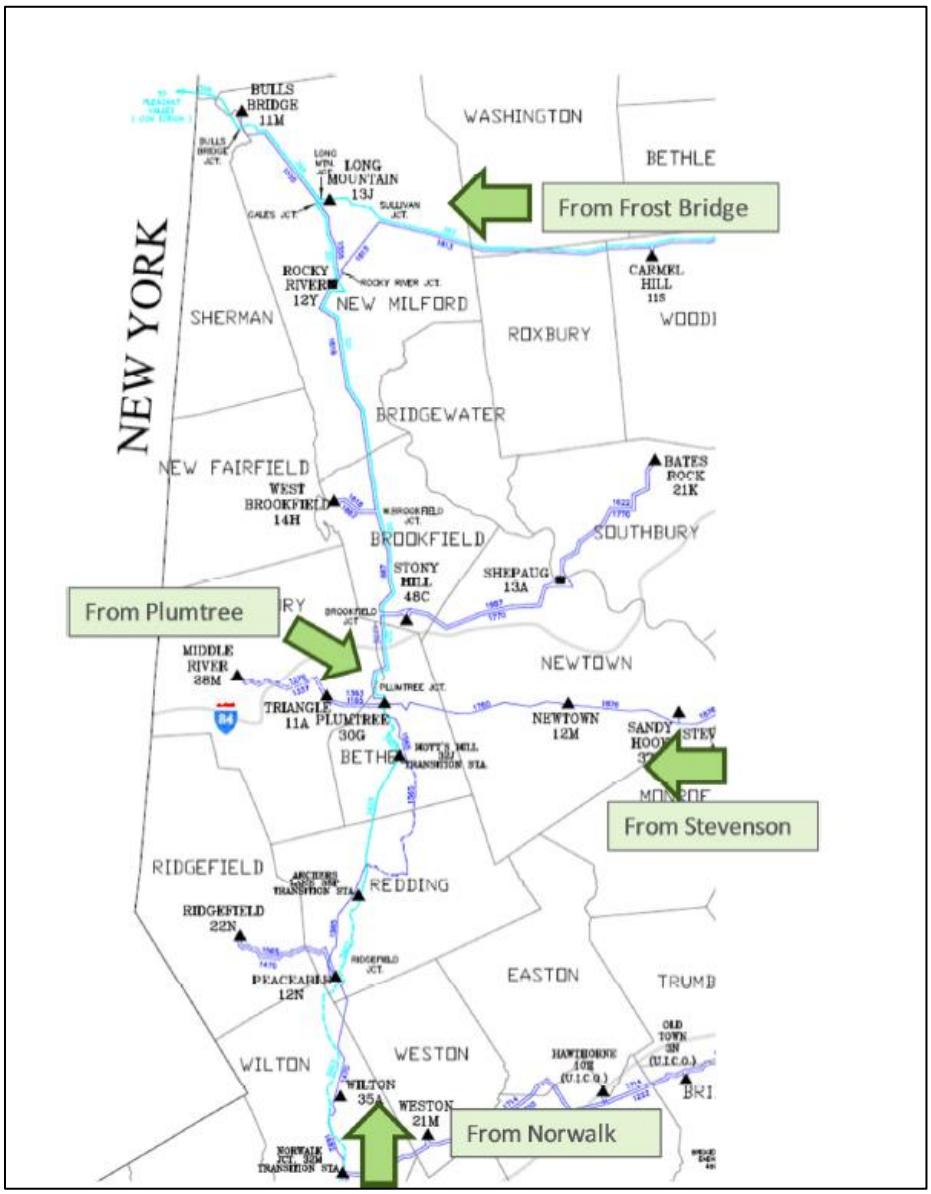
41. ISO-NE published the results of the SWCT Needs Assessment study in June 2014 (SWCT Needs Report), which considered electric system needs in each sub-area in study year 2022, consistent with ISO-NE's ten year planning horizon. (Eversource 1, Vol. 1, p. 2-10, Vol. 4, SWCT Transmission Needs Assessment)

42. The SWCT Needs Report determined the existing electric system within the HV sub-area is insufficient to reliably serve peak load customer demands under contingency events. When one or more electric import paths into the HV sub-area were removed, the remaining electric connections and local generation capacity was unable to meet electric demand, thus failures in reliability for various transmission elements and facilities would occur, leading to thermal overloads and voltages falling below acceptable limits. The Figure below shows the existing electric system within the HV sub-area:



(Eversource 1, Vol. 1, pp. 2-11, 2-12)

43. The SWCT Needs Report identified the HV sub-area as a load pocket which is an area that has insufficient generation and/or transmission to serve its electric load. The HV sub-area is a net importer of electricity as it relies on the surrounding areas to serve its local electric load, as shown in the figure below.



The above diagram shows transmission connections to the HV sub-area load pocket (green arrows). 115-kV connections are shown in violet, 345-kV connections are shown in blue. (Eversource 1, Vol. 1, p. 2-12, Vol. 4, Fig. 5-2)

44. The SWCT studies revealed criteria violations in the HV sub-area load pocket. ISO-NE calculated an immediate need for the project as the critical load level, the level at which criteria violations begin to occur, is 4,163 MW of net load for thermal violations and 5,218 MW of net load for low voltage violations, both exceeded by the actual 2013 Connecticut net load of 7,128 MW. The projected year 2022 HV sub-area net load without demand resources is approximately 860 MW. (Eversource 1, Vol. 1, pp. 2-13, 2-15)

45. In early 2015, ISO-NE published the SWCT Solutions Report to address the electric system deficiencies identified in the SWCT Needs Report, including solutions for the HV sub-area. Solutions include the proposed Project as well as other upgrades independent of the objectives of the proposed Project, and as such, are being implemented separately. (Eversource 1, Vol. 1, pp. 2-10, 2-15, 2-16)

46. The proposed Project would implement an important component of long-range plans for the expansion of Connecticut's electric power grid, including the Greater Springfield Reliability Project (Docket 370) and the Interstate Reliability Project (Docket 424). Furthermore, ISO-NE has examined transmission needs and solutions for the Greater Hartford area and has coordinated the Greater Hartford and SWCT studies to avoid redundant solutions. Together, these studies provide solutions for Connecticut's transmission system that will comply with reliability requirements through 2022 and that form a part of the ISO Regional System Plan. (Eversource 1, Vol. 1, p. 2-21)

47. The SWCT Solutions Study identified the addition of a 115-kV line between Plumtree Substation and Brookfield Junction, as well as other improvements, as the preferred reliability solution for the HV sub-area. (Council Administrative Notice Item No. 14, p. 102)

48. For the HV sub-area, a new 115-kV transmission source into the area, reconfiguration of two existing lines (1887 Line and 1770 Line) and related system upgrades were identified as the preferred solution to address the worst case thermal and voltage violations that occur in the sub-area under contingent conditions and are in accordance with mandatory federal and regional standards and criteria. (Eversource 1, Vol. 1, pp. 2-15, 2-16)

49. The proposed Project would bring a new source of power into the load pocket and, together with the line reconfiguration, would provide an additional resource to share load that can be automatically redistributed among three substations that serve the load pocket; the Plumtree Substation, West Brookfield Substation and Shepaug Substation. This additional import source would allow for the re-distribution and supply of power into the sub-area if other electrical system elements fail. (Eversource 1, Vol. 1, pp. 2-16 - 2-19)

50. On April 16, 2015, ISO-NE, after a review of the Solutions Report by the Reliability Committee, issued a technical approval of the preferred solutions contained within the SWCT Solutions Study, including transmission improvements to the HV sub-area. (Eversource 1, Vol. 1, p. 2-10)

51. The Project was included in the DEEP 2014 Integrated Resource Plan (IRP) as a planned new transmission project with related substation improvements with an in-service date of 2017. (Council Administrative Notice Item No. 42, App. F)

52. The proposed Project was listed in Eversource's *2015 Forecast of Loads and Resources for the Period 2015-2024* and in Eversource's *2016 Forecast of Loads and Resources for the Period 2016-2025* as a proposed 115-kV transmission line from Plumtree Substation to Brookfield Junction. (Eversource Administrative Notice Items No. 53, No. 54 – Eversource Forecast Report, Table 4-1)

53. The proposed Project was listed in the Council's *2014/2015 Review of the Ten Year Forecast of Connecticut Electric Loads and Resources* as a proposed 3.4 mile 115-kV transmission line from Plumtree Substation to Brookfield Junction. (Council Administrative Notice Item No. 18, Appendix B)

54. The Project is consistent with the *Conservation and Development Policies Plan for Connecticut 2013-2018*. It will serve a public need for a reliable source of electricity to support development in Connecticut. (Council Administrative Notice Item No. 52; Eversource 1, Vol. 1, pp. 6-26, 6-27)

55. Connecticut's Comprehensive Energy Strategy proposes further investments in grid reliability and identifies three important components to grid reliability: resource adequacy, transmission security and distribution resiliency. (Council Administrative Notice Item No. 41, pp. 70-71, 97)

Project Cost

56. The estimated capital cost of the Project is $24.4 million, with the transmission line accounting for $18.9 million and the substation modifications accounting for $5.5 million. (Eversource 1, Vol. 1, p. 3-17)

57. The cost of the Project is anticipated to be regionalized with Connecticut ratepayers paying approximately 25 percent of the total project cost. Any additional cost incurred for local requirements would be expected to be paid by Connecticut ratepayers. (Eversource 4, p. 17)

58. The life-cycle cost for the transmission line portion of the Project would be $32.3 million, or $9.7 million per mile. This total would include annual carrying charges of the capital cost, annual operation and maintenance costs, cost of energy losses, and cost of capacity. (Eversource 1, Vol. 1, p. 3-17)

59. Project construction is anticipated to begin in the first quarter of 2018. The tentative in-service date is December 2018. (Eversource 4, p. 17)

Project Alternatives

60. A "no-action" alternative would not improve the reliability of the electric system in the HV sub-area, subjecting the area to continued risk of electric outages as well as undermining ISO-NE long range reliable transmission planning for Connecticut and New England. Eversource could be fined by FERC for failure to correct the identified criteria violations. (Eversource 1, Vol. 1, p. 10-1)

61. On June 6, 2014, the state statutory requirement under C.G.S. §16a-7c for initiation by the Connecticut Energy Advisory Board of a reactive request for proposal process to seek non-transmission alternatives to the need addressed by an application for a proposed facility that is submitted to the Council was repealed. (State of Connecticut Public Act 14-94)

62. In the 2014 IRP, DEEP outlines criteria used for illustrating reliability projects that may be viable candidates for the consideration of non-transmission alternatives - Category A consists of new substations; Category B consists of infrastructure upgrades; and Category C consists of new transmission lines and new infrastructure considered in reliability studies. Categories A and B are identified as unlikely to have viable non-transmission alternatives. The Project was identified as a Category C project where alternatives could be studied. (Council Administrative Notice Item No. 42, App. F)

63. In addition to the proposed Project, referred to as Local 2 in the SWCT studies, three other alternative 115-kV overhead solutions were studied to bring power into the SWCT sub-area: two entailed a connection between the HV sub-area and the Frost Bridge-Naugatuck Valley sub-area, referred to as "global solutions" as they attempted to resolve reliability issues in both sub areas, and one other local solution, referred to as Local 1, that would also resolve reliability issues only in the HV sub-area. (Eversource 1, Vol. 1, pp. 10-2, 10-3)

64. The two global solutions, examined to resolve reliability issues in the HV sub-area and the Frost Bridge-Naugatuck Valley sub-area, were ultimately rejected due to high cost and societal and environmental issues related to the necessity of acquiring a new right-of-way for a 10.7 mile long 115-kV transmission line between the Bates Rock Substation in Southbury and the Bunker Hill Substation in Waterbury. (Eversource 1, Vol. 1, pp. 10-2 - 10-8)

65. The Local 1 alternative was rejected as it would be approximately $21 million in additional cost for unique elements, specifically the addition of two synchronous condensers at the Stony Hill Substation, instead of one condenser required for the proposed Project. (Eversource 1, Vol. 1, pp. 10-2 - 10-8)

66. Non-transmission alternatives were examined including the addition of gas-fired turbines within the load pocket, energy storage, fuel cells and energy efficiency measures. The least-costly non-transmission alternative solution to meet the identified need within the load pocket is the construction of four natural-gas fired fueled turbine peaking generators to supply 291 MW. Another alternative examined was a combination of 255 MW supplied by peaking generators and 31 MW of energy efficiency measures. Both of these solutions were rejected due to high costs to Connecticut ratepayers ($53 to $82 million per year compared to $2.1 million per year). (Eversource 1, Vol. 1, pp. 10-8 - 10-12; Eversource 5, pp. 5-7)

67. Once the Local 2 solution was selected for the Project, Eversource examined ten potential route alternatives including overhead, underground, and hybrid overhead/underground solutions. Eversource ultimately selected the proposed Project route as the most cost effective and technically feasible as it followed existing right-of-way through a developed portion of the region. Five of the rejected routes would have required new easements to create new right-of-way for overhead lines. Three other rejected routes were hybrid overhead/underground routes but were considered cost prohibitive. An all underground route was rejected as not cost effective as the cost per mile is five to ten times greater than an overhead line, depending on local conditions. (Eversource 1, Vol. 1, Section 11; Tr. 1, pp. 62-63)

68. Cost recovery for any underground route would most likely not be eligible for regionalized cost-recovery if it is determined by ISO-NE that more cost effective solutions exist. (Eversource 1, Vol. 1, p. 11-25)

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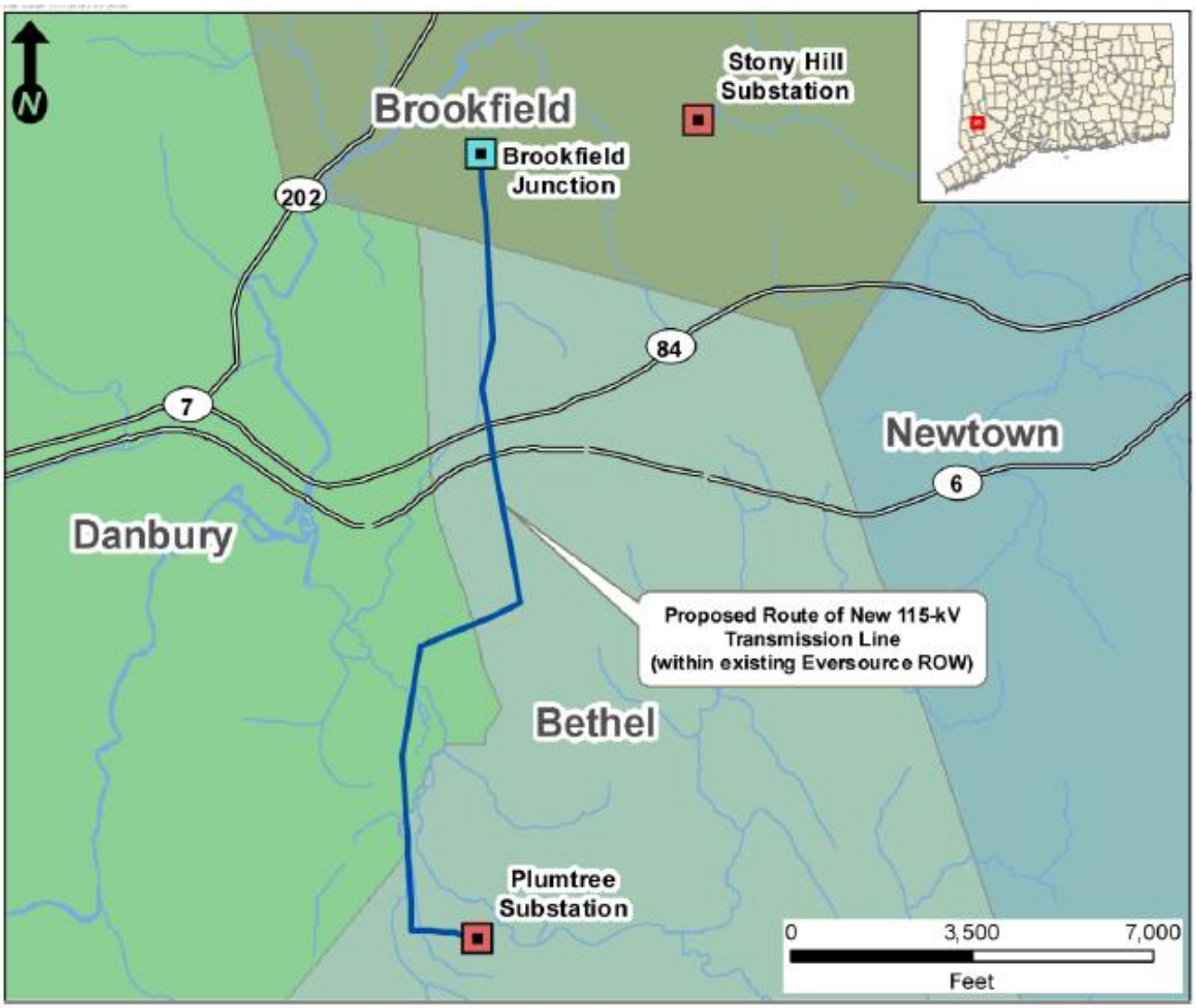
Project Description

69. The proposed Project entails the installation of a new 115-kV electric transmission line that would extend the existing 115-kV 1887 Line from Brookfield Junction in Brookfield to the Plumtree Substation in Bethel. Related improvements include:
    a) minor modifications to the Plumtree Substation;
    b) modifications at the Stony Hill Substation;
    c) reconfiguration of the existing 1770 Line; and
    d) reconfiguration of the existing 1887 Line.



(Eversource 1, Vol. 1, p. ES-4)

Proposed Overhead 115-kV Transmission Line

70. The proposed 115-kV overhead transmission line would extend for 3.4 miles and would be installed within existing Eversource right-of-way. The new line would be installed adjacent to other existing 115-kV and/or 345-kV lines (Lines 321, 1770, 1363, 1165). (Eversource 1, Vol. 1, pp. 3-1 - 3-3)

71. Characteristics of the Project within the existing right-of-way are as follows:

Municipality	ROW length	ROW width
Bethel	2.2 miles	175-225 feet
Danbury	0.9 miles	175 feet
Brookfield	0.3 miles	175 feet

(Eversource 1, Vol. 1, p. 1-6)

72. Land use within and adjacent to the right-of-way includes the following:
    a. Bethel, southern portion (Plumtree Substation to East Swamp Brook) – wetlands, floodplain, State property, land trust property, Town of Bethel property, Eversource property, and a condominium complex;
    b. Danbury (East Swamp Brook to Payne Road) - Wetland, forestland, a closed landfill and developed industrial/commercial land;
    c. Bethel northern portion (Payne Road to Research Drive terminus) – residential areas along Payne Road, Hearthstone Drive, Chimney Drive, and Sky Edge Lane, commercial property at Route 6, Interstate-84, and an industrial/corporate park north of Interstate-84; and
    d. Brookfield (Research Drive terminus to Brookfield Junction – developed and undeveloped industrial/commercial land.

    (Eversource 1, Vol. 1, pp. 5-30 - 5-32; Eversource 5, Appendix 2B)

73. The new transmission line would consist of three sets of 1,590-kcmil Aluminum Conductor Steel Supported phase conductors installed mostly on weathering steel monopoles in a vertical configuration. West of Plumtree Substation, four three-pole weathering steel structures with conductors arranged in a horizontal configuration would be installed to accommodate conductor angles and to cross existing transmission lines. (Eversource 1, Vol. 1, pp. 1-6, 3-3)

74. The new line would be protected by one overhead lightning shield wire. Communication fiber would be installed within the shield wire. (Eversource 1, Vol. 1, p. 3-2)

75. In general, the new vertical configuration monopoles would range in height from 95 feet to 135 feet above ground level (agl) and the horizontal structures ranging in height from 30 to 40 feet agl. Local topography and area land use would account for variation in the final structure height. (Eversource 1, Vol. 1, p. 1-6)

76. The new structures would typically be shorter than the existing approximately 150-foot tall double-circuit monopoles that support the existing 1770 Line (115-kV) and 321 Line (345-kV) within the entire Project right-of-way. Line 1165 and Line 1363, both 115-kV lines, are located on separate 85-foot tall steel monopoles for 0.25 miles of right-of-way west of the Plumtree Substation. (Eversource 1, Vol. 1, pp. 1-6, 3-3)

77. Most of the proposed structures would be installed in line with other existing Eversource structures in the right-of-way. The final location of the new structures would be determined by in-field conditions such as work area access, subsurface conditions or the presence of sensitive environmental features, but it is anticipated the final location would be within 100 feet of the initial proposed location. (Eversource 1, Vol. 1, pp. 3-4, 3-5)

78. To accommodate the new transmission line, Eversource would clear an additional 25 feet of right-of-way on the south and east side. (Eversource 1, Vol. 1, p. 6-16)

Plumtree Substation Modifications

79. Eversource proposes to modify the Plumtree Substation by connecting the new transmission line to an existing steel A-frame terminal structure and upgrading the existing terminal equipment, including a line disconnect switch and wave trap, to meet current line capacity requirements. (Eversource 1, Vol. 1, p. 1-7)

80. All work would be performed within the existing 4.6-acre substation yard. The substation is located on a 13.8-acre Eversource-owned property (refer to Figure 4). (Eversource 1, Vol. 1, pp. 1-7, 12-1)

Stony Hill Substation and Related Modifications

81. The Stony Hill Substation currently connects to the 1770 Line and 1887 Line. Modifications to the substation and reconfiguration of adjacent transmission line structures would eliminate the 1887 Line connection to the substation and result in the 1770 Line being re-designated as two lines, the 1268 Line extending from Stony Hill Substation to Plumtree Substation, and the 1485 Line extending from Stony Hill Substation to Bates Rock Substation. (Eversource 1, Vol. 1, pp. ES-4, 1-8)

82. The 1.7-acre substation is located on an 18.8-acre parcel owned by Eversource. (Eversource 1, Vol. 1, p. 12-1)

83. The specific components of the line reconfiguration are as follows:
    a. The existing 1770 Line would be looped into the substation, thereby creating two terminal lines (referred to as the 1268 and 1485 lines);
    b. The existing 1887 Line tap into the east side of the substation would be eliminated such that the line will no longer connect to the substation; and
    c. Three existing wood transmission line structures that presently connect the 1770 and 1887 lines to the substation would be removed. Two new steel monopole structures would be installed adjacent to the substation. One structure would be direct buried while the other would be installed on a concrete foundation.

    (Eversource 1, Vol. 1, p. 3-12)

84. Within the substation, the existing 37.8 mega volt ampere reactive capacitor bank 22K connection would be moved from Bus A1 to Bus A3. This work would include the following:
    a. Remove rigid bus, bus support structure, and associated foundations between capacitor banks 48C-21K & 48C-22K to separate capacitor bank 22K from the 115-kV Bus A1;
    b. Install new rigid bus, three-phase high bus support structure, 115-kV underground pothead structure and associated foundations to the south of capacitor bank 22K;
    c. Install 115-kV underground duct bank, 115-kV underground pothead structure, manually-operated vertical break disconnect switch, switch structure, three-phase high and low bus support structures, rigid bus and associated foundations to connect capacitor bank 22K to 115-kV Bus A3; and

d. Install three lightning arrestors on each pothead structure.
(Eversource 1, Vol. 1, p. 3-11)

85. No expansion of the substation is required for the proposed Project. An expansion of the substation to the east and a new driveway to access the east end was approved by the Council on June 23, 2016 in Petition 1230 (refer to Figure 5). (Council Administrative Notice Item No. 34; Eversource 1, Vol. 5, App. B, p. 14)

General Project Construction Procedures

86. Eversource would conduct pre-construction surveys to demarcate right-of-way boundaries, sensitive environmental features, vegetation clearing limits and proposed transmission structure locations. (Eversource 1, Vol. 1, p. 4-2)

87. Eversource would establish temporary storage and staging areas for construction support. If Eversource-owned property is not available or suitable for storage or staging areas, Eversource would investigate the use of suitable private property as close to the Project area as possible. (Eversource 1, Vol. 1, p. 4-5; Tr. 1, p. 62)

88. Temporary storage areas require approximately two to five acres and are used to temporarily store construction materials, equipment, supplies, mobile construction offices, parking of personal vehicles of construction crew members, parking construction vehicles and equipment, and performing minor maintenance on construction equipment. (Eversource 1, Vol. 1, p. 4-5)

89. Staging areas typically require less than two acres and are used for temporarily stockpiling materials for transmission line construction, such as erosion and sedimentation control materials, and for temporarily stockpiling materials removed during construction. Staging areas could be within or off the right-of-way. As construction progresses, staging areas would be relocated to be near construction work. (Eversource 1, Vol. 1, pp. 4-5, 4-6)

90. Once a storage/staging area is no longer needed, it would be restored pursuant to the land use agreement with the underlying landowner. (Eversource 1, Vol. 1, p. 4-6)

91. Access to the Plumtree Substation already exists and no other access is required. Access to the Stony Hill Substation and adjacent right of way is by an existing access road that extends to the northwest end of the substation and from a new access road that would extend to the southeast end of the substation, as approved by the Council in Petition 1230. (Council Administrative Notice No. 34; Eversource 1, Vol. 5, Appendix 2B, p. 1A, p. 14)

92. A large network of gravel-based access roads already exists along a majority of the entire right-of-way. Most of the existing access roads would have to be improved, widened, or modified to accommodate construction equipment. To ensure safe vehicle access, access road grades cannot exceed ten percent. (Eversource 1, Vol. 1, p. 4-13)

93. Existing access roads would be resurfaced and widened to a vehicle travel surface of 16-20 feet. Wider sections would be constructed as necessary for turning and passing locations. (Eversource 1, Vol. 1, p. 4-13)

94. The 16-20-foot wide travel surface is an Eversource standard design to prevent cumbersome requests for access road enlargements necessitated by in-field conditions during construction. (Tr. 1, pp. 68-69)

95. In areas where terrain and the presence of environmental features make linear use or construction of an on-right-of-way access road difficult, off-right-of-way access roads would be constructed to bypass these areas. Off-right-of-way access roads would typically originate from public roads or from existing access roads on private property. (Eversource 1, Vol. 1, p. 4-14)

96. Culverts and timber mats would be used where the access roads traverse wetlands and watercourses to minimize permanent impacts to these features. (Eversource 1, Vol. 1, p. 4-13)

97. Eversource would use existing roads along the edge of the Danbury Landfill property to access the edge of the right-of-way. From this access, Eversource would construct new roads to access three structures located within and adjacent to wetland areas. The existing roads are sufficient to support construction vehicles and the landfill cap would not be impacted. (Eversource 1, Vol. 5, App. 2B, pp. 4, 5; Tr. 1, pp. 20-21)

98. Vegetative clearing would occur in designated areas both in the right-of-way areas and along access roads to the right-of-way. Equipment for clearing would include flatbed trucks, brush hogs, skidders, bucket trucks, log trucks and wood chippers. (Eversource 1, Vol. 1, p. 4-2)

99. Generally, tall tree species would be removed from the right-of-way expansion area. Smaller tree species and shrubs would be retained in areas outside of the conductor zones (an area 15 feet from the conductors). (Eversource 1, Vol. 1, pp. 4-9, 4-10)

100. Stumps would only be removed from the cleared areas to facilitate construction or rehabilitation of access roads and the installation of work pads. Stumps that are removed would be hauled off-site or chipped for use as ground cover in the right-of-way, where appropriate. (Eversource 1, Vol. 1, pp. 4-11, 4-12)

101. Clearing in sensitive areas, such as wetland areas or along stream banks, would be minimized to the extent practical. (Eversource 1, Vol. 1, p. 4-11)

102. Eversource would coordinate with respective property owners regarding disposition of logged trees along the right-of-way. Eversource would leave timber portions of the trees on the landowner's property if requested, stacked in upland areas. If the landowner does not want the timber, the timber would become property of the land clearing contractor and removed from the property. (Eversource 1, Vol. 1, p. 4-10)

103. DEEP has indicated that it does not want the forest products harvested from the East Swamp Wildlife Management Area. (DEEP comments of September 19, 2016)

104. Temporary erosion and sedimentation (E&S) controls would be installed as practicable prior to and/or during vegetation clearing in compliance with the *2002 Connecticut Guidelines for Soil Erosion and Sedimentation Control* and Eversource's *Best Management Practices Manual: Construction and Maintenance Environmental Requirements for Connecticut*. Temporary controls include silt fence, hay/straw bales, and filter socks to be used during any construction that involves soil disturbance. (Eversource 1, Vol. 1, pp. 4-6, 4-7)

105. Additional E&S controls may be used after vegetation removal to demarcate limits of work within environmentally sensitive areas. (Eversource 1, Vol. 1, p. 4-7)

106. Work pads would be established at each proposed transmission structure location to provide a level work area for construction equipment used to erect the transmission structure. Typical work pads would consist of gravel and measure 100 feet by 100 feet for a tangent structure and 200 feet by 100 feet for a dead-end structure. (Eversource 1, Vol. 1, pp. 4-15, 4-16)

107. Work pad construction includes the removal of vegetation and topsoil, grading, and the installation of a rock base overlain with a rock fines and soil mixture (typical). A roller is typically used to flatten and compact the pad. In wetland areas, temporary timber mats would be used to create work pads. The temporary mats would minimize disturbance to wetland soils and would allow water to flow beneath the mats. (Eversource 1, Vol. 1, pp. 4-15, 4-16)

108. Transmission structures would be delivered to the work pad in sections, then assembled and installed with a crane. (Eversource 1, Vol. 1, p. 4-17)

109. Tangent structures would be directly embedded into the ground. Dead-end and angle structures would have a drilled shaft foundation. Excavations for foundations would be accomplished by mechanical means. If blasting is required based on soil borings at each structure location, a certified blasting contractor would develop a controlled drilling and blasting plan in compliance with state and local regulations, including notification to adjacent residents. (Eversource 1, Vol. 1, pp. 4-16, 4-17)

110. Overhead conductors would be installed using pulling and tensioning equipment placed at one to three mile intervals along the route. Gravel pull pads measuring 100 feet wide by 100 to 300 feet long would be constructed for the staging and operation of the pulling equipment. Helicopters may also be used for installation of the pulling lines. Once the conductors are pulled into place, linemen in bucket trucks would complete the conductor installation at each structure location. (Eversource 1, Vol. 1, pp. 4-17, 4-18)

111. Gravel "guard" pads would be installed adjacent to roads to provide locations for temporary guard structures used to provide line clearance over roadways. (Eversource 1, Vol. 1, p. 4-16)

112. Traffic impacts during construction are expected to be temporary and localized. Eversource would consult with the affected municipalities and the DOT to minimize traffic disruptions and to resolve potential Project access issues during construction. (Eversource 1, Vol. 1, pp. 4-20, 4-21)

113. Based on initial review, the only private structures/materials that would need to be removed from the right-of-way to accommodate construction are several large dumpsters near Structure 1019 in the Town of Bethel. (Eversource 2, R. 2)

114. Three existing wood pole structures adjacent to the Stony Hill Substation would be removed using standard construction methods. Hardware would be recycled or disposed of accordingly. (Eversource 1, Vol. 1, pp. ES-8, 4-29)

115. Upon completion of the transmission line installation, gravel work pads located in upland areas would remain in place "as is" unless directed by the landowner or if the work pad is located within a sensitive environmental area. Access roads in upland areas would remain in place to facilitate future maintenance activities. Although work pads and access roads would remain in place where permitted, Eversource would not regularly clear vegetation from these areas. (Eversource 1, Vol. 1, p. 4-16; Tr. 1, pp. 67-68)

116. Following construction of the proposed project, construction debris, pull pads, guard pads and temporary access roads would be removed. Final grading of areas affected by construction would occur, if applicable, and the disturbed areas stabilized through re-vegetation, installation of water bars, and/or other measures. (Eversource 1, Vol. 1, pp. 4-16, 4-18, 4-19)

117. Post-construction right-of-way vegetation management includes the removal of targeted species such as tall growing trees and State-listed invasives, encouraging the growth of native shrub and small tree species. (Eversource 1, Vol. 1, p. 4-19)

118. Vegetation management within the right-of-way is typically performed every four years, while side-trimming of vegetation encroaching on the edge of the managed portion of the right-of-way occurs every ten years. (Eversource 1, Vol. 1, p. 4-30)

119. Vegetation management would be conducted in accordance with Eversource's *Specifications for Rights-of-Way Vegetation Management* document. (Eversource 1, Vol. 1, p. 4-30)

120. Eversource anticipates developing a Wetland Invasives Species Control Plan for right-of-way management upon consultation with various state and federal entities. (Eversource 1, Vol. 1, p. 4-30)

121. No landscaping is proposed for either substation as both are set back from local roads and blocked from view by intervening vegetation. (Eversource 1, Vol. 1, p. 4-30, Vol. 5, Appendix 2B, p. 1A, p. 14)

Environmental Resources

122. The proposed Project is mostly located within the Southern Marble Valley physiographic region of Connecticut, generally characterized by metamorphosed limestone and marble overlain by glacial drift. (Eversource 1, Vol. 1, p. 5-2)

123. Elevations along the right-of-way range from 300 feet above mean sea level near Plumtree Substation to 520 feet above mean sea level along the midpoint of the transmission route in Bethel. (Eversource 1, Vol. 1, p. 5-3)

124. The project is consistent with the FERC Guidelines for the Protection of Natural, Historic, Scenic and Recreational Values in the Design and Location of Rights-of-Way and Transmission Facilities as the proposed route utilizes existing rights-of-way that are occupied by existing transmission structures different kinds of utility services. (Council Administrative Notice Item No. 7)

Watercourses

125. The proposed Project is located within the Housatonic River regional drainage basin. (Eversource 1, Vol. 1, p. 5-8)

126. The proposed Project crosses a total of seven watercourses and one pond. Of these, four are perennial streams, two are intermittent watercourses, one is a drainage channel, and one is pond. (Eversource 1, Vol. 1, p. 5-9)

127. Two of the perennial watercourses, East Swamp Brook and Limekiln Brook, are associated with a large wetland complex located along the southern portion of the Project route. (Eversource 1, Vol. 1, p. 5-10)

128. All of the watercourses and waterbodies along the Project route are already spanned by transmission lines. (Eversource 1, Vol. 1, p. 5-11)

129. The proposed route extends across a Federal Emergency Management Agency (FEMA) designated 100-year flood zone and floodway associated with East Swamp Brook and Limekiln Brook. A floodway is the channel of the watercourse and adjacent land that discharges the base flood, and thus, it has the highest flood velocities. (Eversource 1, Vol. 1, p. 5-17)

130. Eversource would install 12 new structures within the flood zone and, of these; five would be in the floodway. Given the extensive flood zone and floodway along the existing transmission right-of-way, Eversource cannot locate the new structures out of the flood zone or floodway. Elimination of a structure by increasing the conductor span would not be a feasible option due to span swing clearance requirements necessary to avoid interference with the adjacent existing transmission line. (Eversource 1, Vol. 1, p. 4-25; Eversource 2, R. 5)

131. Eversource would obtain all necessary permits from the U.S. Army Corps of Engineers (USACE) and the DEEP for construction work within the floodway. DEEP noted in its comments that the USACE would mostly likely require hydraulic modeling of floodplain flows to determine if the new structures would adversely affect flood flows. Eversource calculated that the new structures would increase the flood elevation by 0.0002 feet. (Eversource 1, Vol. 1, p. 4-25; Eversource 2, R. 5; DEEP comments dated September 19, 2016)

132. The Project does not cross any rivers designated as a National Wild and Scenic River or any State designated river corridors. (Eversource 1, Vol. 1, p. 5-11)

133. The Project would not adversely affect any fisheries. None of the watercourses traversed by the Project are DEEP designated Trout Management Areas. (Eversource 1, Vol. 1, pp. 5-20, 5-21)

Wetlands

134. Wetlands in the Project area were delineated by a soil scientist using guidelines established by the USACE, United States Department of Agriculture Central-Northeast, and the State of Connecticut. Due to differences between State and Federal wetland delineation criteria and methodology, the boundaries of state and federal wetlands may not always correspond. (Eversource 1, Vol. 1, pp. 5-11, 5-12)

135. Six wetlands were delineated within the existing right-of-way using State and Federal criteria. One of these wetlands is a permanently flooded open water pond. Two additional wetlands were delineated adjacent to the Stony Hill Substation. (Eversource 1, Vol. 1, pp. 5-13, 5-14, 5-47)

136. A majority of the wetlands along the Project route are classified as scrub-shrub and emergent wetlands dominated by the common reed *(Phragmites australis)*. Most are maintained as such through ongoing right-of-way maintenance activities. Most of these wetlands extend into non-maintained areas, transitioning into forested wetlands. (Eversource 1, Vol. 1, pp. 5-13, 5-14; Tr. 1, p. 56)

137. The largest wetland, referred to as Wetland 1, is associated with East Swamp Brook and Limekiln Brook and extends 1.3 miles along the right-of-way between the Plumtree Substation and Brookfield Junction. Eversource would permanently fill 0.03-acre of this wetland to install 11 of the new transmission structures. Due to the extensive wetlands in this area of the Project route, wetland impact cannot be avoided. (Eversource 1, Vol. 1, p. 6-9)

138. Expansion of the cleared area within the right-of-way would occur within four wetland areas, resulting in 2.6-acres of forested wetland being permanently converted to a scrub-shrub wetland. Eversource can use low-ground-pressure track vehicles to remove vegetation in wetland areas. (Eversource 1, Vol. 1, pp. 4-2, 6-9 - 6-11; Tr. 1, pp. 48-49)

139. Project construction would temporarily affect a total of 4.5-acres of wetlands through the use of construction timber mats or other temporary installations for site access and/or work pads. (Eversource 1, Vol. 1, pp. 6-11, 6-12)

140. Compensatory wetland mitigation may be required depending on permit requirements from DEEP and the USACE and could include wetland restoration and/or enhancement, wetland preservation payment, and/or conservation restrictions. (Eversource 1, Vol. 1, p. 6-13)

141. No vernal pools were identified along the Project route. Vernal pool surveys were conducted in the Spring of 2015 and extended 100 feet to 200 feet beyond the edge of the right-of-way. (Eversource 1, Vol. 1, p. 5-21)

142. The Project route does not traverse any DEEP designated aquifer protection areas. The nearest aquifer protection area is approximately 0.8 mile east of the existing transmission structure 10257 in Bethel. (Eversource 1, Vol. 1, p. 5-16)

143. The Project would not affect groundwater resources, private groundwater wells or public water supplies. Eversource would require its contractors to adhere to its best management practices to prevent and contain spills of potentially hazardous materials. (Eversource 1, Vol. 1, pp. 6-13, 6-14)

144. If groundwater is encountered during any Project excavations, dewatering would be performed in accordance with authorizations from applicable regulatory agencies. (Eversource 1, Vol. 1, p. 4-27)

Vegetative Clearing

145. Eversource currently maintains a 95-foot to 140-foot wide area of the existing right-of-way for low-growth vegetation. (Eversource 1, Vol. 1, p. 6-16)

146. Construction and operation of the new transmission line would require clearing of forest for an additional 25 feet to the east/south of the existing 321/1770 lines. This additional 25 feet coincides with the right-of-way boundary for most of the route. (Eversource 1, Vol. 1, pp. 3A-3, 3A-5, 6-16; Tr. 1, pp. 31-34)

147. The additional forest clearing would total 8.4 acres. (Eversource 1, Vol. 1, pp. 6-16, 6-17)

148. In its May 31, 2012 Report on Transmission Facility Outages During the Northeast Snowstorm of October 29-30, 2011, the FERC determined that the vast majority of transmission line outages (80 percent) were caused when healthy trees contacted the transmission lines within the "full right of way," the portion of land for which a utility has documented legal rights to build and maintain transmission facilities, but outside of the "maintained right of way," the area in which the utility performs vegetation management. All of the trees that fell into the lines were located within the utility's "full right of way." Although managing a narrower "maintained right of way" has been a relatively common industry practice, FERC specifies that this is not a best practice. Therefore, in its Report, FERC concluded that utilities should work toward reclaiming the "full right of way" width where feasible. (Council Administrative Notice Item No. 8)

149. Eversource would inspect areas adjacent to the right-of-way for "hazard" trees – trees that are weak, broken, decaying, or very tall - that could threaten the integrity of the transmission system and remove or prune them accordingly. For hazard trees located beyond the right-of-way, Eversource would obtain approval from the underlying property owner prior to conducting any tree work. (Eversource 1, Vol. 1, p. 4-12; Tr. 1, pp. 72-73)

150. Eversource would remove low-growing tree species and shrubs from the construction footprint. (Eversource 1, Vol. 1, p. 6-15)

151. Scrub-shrub vegetation would be retained to the greatest extent possible, typically outside of construction areas and outside of the conductor zone. (Eversource 1, Vol. 1, p. 6-19)

152. Once construction is complete, cleared areas would be seeded with appropriate seed mixes, eventually reverting to scrub-shrub habitat. (Eversource 1, Vol. 1, pp. 6-17, 6-18)

153. Shrubland and edge habitats support high biodiversity, offering foraging, nesting, and cover habitat for various species. Due to land use patterns, shrubland and old field habitats are in decline. Managed right-of-ways are a valuable surrogate for this declining habitat type. (Eversource 1, Vol. 1, pp. 5-19, 6-17, 6-21)

154. In accordance with C.G.S. §16-50h(h), the maintained scrub-shrub habitat would be a benefit to pollinators such as moths, butterflies and bees. (Eversource 1, Vol. 1, p. 6-17)

155. Soil designated as Prime Farmland and Farmlands of Statewide Importance are located along the route. However, no land along or adjacent to the Project right-of-way is presently used for agriculture. (Eversource 1, Vol. 1, p. 5-5)

Federal and State-listed Species

156. Based on review of the Natural Diversity Database for state endangered, threatened or special concern species, ongoing consultations with DEEP, and field surveys, four state-listed species were identified as potentially occurring in the Project area: a reptile, a plant, and two bird species. (Eversource 1 Vol. 1, pp. 6-24, 6-25; DEEP comments dated September 19, 2016; Tr. 1, p. 27)

157. Upon consultation with DEEP, Eversource would develop DEEP-approved protection strategies for the reptile species and plant species. These strategies would be implemented as part of the Development and Management Plan for the Project. (Eversource 1, Vol. 1, p. 6-25; DEEP comments dated September 19, 2016: Tr. 1, pp. 9-10. 21-22, 57-58)

158. In addition to the identified reptile species, the southern portion of the project area contains habitat for the spotted turtle, a State Species of Special Concern. Although the spotted turtle was not specifically identified as occurring in the area, Eversource would be willing to incorporate DEEP-specified spotted turtle protection measures into the D&M Plan. (Tr. 1, pp. 57-58)

159. Project construction would temporarily disturb the listed bird species as both rely on shrub habitats. Post-construction, the right-of-way would offer additional shrub habitat for these species. (Eversource 1, Vol. 1, p. 6-25)

160. Although it is recommended to avoid tree/shrub clearing during bird nesting season, April to mid – August, Eversource would only adhere to this recommendation if the Project schedule allows. (Eversource Vol. 3, Breeding Bird Assessment, p. 6-1; Tr. 1, pp. 27-28)

161. Two federally-listed Threatened Species and State-listed Endangered Species, have been documented to occur in the vicinity of the proposed site: northern long-eared bat and bog turtle. Further consultation with DEEP as well as field investigations indicated that no suitable habitat for either species exists along the Project route. (Eversource 1, Vol. 1, p. 6-24; Eversource 6, p. 20; DEEP comments of September 19, 2016; Tr. 1, pp. 55-56)

Historic, Scenic and Recreational Resources

162. The Project would not affect any previously identified historic sites, archeological sites, or properties listed on the National Register of Historic Places or disturb any important cultural or archeological resources of the Wampanoag, Mashantucket Pequot or Mohegan Tribes. (Eversource 1, Vol. 1, pp. 5-42, 6-32, 6-33; Eversource 6, p. 23)

163. The existing right-of-way traverses portions of designated open space, Meckauer Park, a recreational park in Bethel, and the East Swamp Wildlife Management Area, a DEEP property used primarily for small game and deer hunting. Impacts to these recreational resources would be minimal and temporary. There would be no impact to developed recreational resources in Meckauer Park as the right-of-way passes through a wooded area. (Eversource 1, Vo. 1, pp. 6-27, 6-28; Eversource 1, Vol. 3, Visual Resource Analysis, p. 3-3; DEEP comments of September 19, 2016)

164. The Project may affect a recreational trail located in Bethel, the Enchanted Trail, which traverses open space and Eversource property around the Plumtree Substation. The trail extends across the access road and along the south fenceline of the Plumtree Substation on Eversource property. Eversource would coordinate with the Bethel Land Trust regarding temporary trail closures related to Project construction. (Eversource 6, p. 31)

165. The Project is not located within or near any State designated heritage areas. (Eversource 1, Vol. 3, Visual Resource Analysis, p. 3-3)

166. The Project would not be visible from DOT designated Scenic Land Strips. (Eversource 1, Vol. 3, Visual Resource Analysis, p. 3-3)

167. The Project crosses Stony Hill Road (Route 6) in Bethel. This section of Route 6 is designated the Washington-Rochambeau National Historic Trail. The Project would have no visual effect on the trail given the dense commercial and industrial development in this area. (Eversource 1, Vol. 3, Visual Resource Analysis, p. 3-1)

168. In general, the visibility impact of the new transmission line would be incremental as the new towers are shorter than the existing structures. Furthermore, the new structures are in-line with existing structures to the greatest extent practical. The existing cleared area of the right-of-way would be expanded towards residential homes in some areas. Eversource has conducted and would conduct further outreach to adjacent property owners affected by clearing activities. (Eversource 1, Vol. 1, p. 6-28; Vol. 3, p. 4-4; Tr. 1, pp. 25-26, 71-72)

169. The DEEP comments of September 19, 2016 recommended that the Norway maple in front of 12 Chimney Drive be retained, if possible, as this tree provides the only vegetative screening of the transmission line from the residence. Eversource would need to remove the tree as it would create a clearance issue with the new conductors that span this portion of the right-of-way. Vegetation within the right-of-way should not exceed ten feet to maintain appropriate conductor clearance. The residence was built in 1977 and is beyond the edge of the right-of-way which was established across this lot in 1975. (DEEP comments of September 19, 2016; Tr. 1, pp. 23, 33, 50-51)

170. During the MCF process, the Town of Bethel and several landowners requested that Eversource consider installing the new transmission line on the west/north side of the right-of-way instead of the east/south side. Eversource examined this configuration for a 0.7 mile segment of line in the Payne Road/Sky Edge Drive area of Bethel but decided to not pursue this design option for the following reasons:
    a. the existing right-of-way does not have sufficient space on the west/north sides to accommodate the new transmission line. Eversource would be required to obtain easements from private landowners for an additional 25 feet of right-of-way space;
    b. two single family homes would encroach on the acquired right-of-way;
    c. the transmission line would require a re-design to accommodate cross overs of the existing 321/1770 Lines. Four additional three pole structures would be required; and
    d. the total Project cost would increase by $7.5 million. (Eversource 1, Vol. 1, pp. 11-32, 11-33)

Noise

171. Eversource expects only short-term and highly localized construction-related noise effects from the Project. Most construction related noise would occur during normal work hours of 7 AM to 7 PM Monday through Saturday. Construction may occur beyond these times to accommodate electric outages or the installation of certain facilities. (Eversource 1, Vol. 1, p. 6-34)

172. During the development of access roads or the installation of some of the proposed steel monopole structures, rock may be encountered. Whereas mechanical methods are the preferred method for removing rock, in some areas, controlled blasting may be required. If blasting is required, Eversource would develop a Blasting Control Plan in compliance with state, industry, and Eversource standards. Potential impacts from rock removal may include dust, vibration, and noise. (Eversource 1, Vol. 1, p. 6-5)

173. Once completed, operation of the Project facilities would result in a minimal change in the existing ambient noise environment and would meet applicable state regulations. (Eversource 1, Vol. 1, pp. 6-34, 6-39)

Electric and Magnetic Fields

174. Electric fields (EF) and magnetic fields (MF) are two forms of energy that surround an electrical device. Transmission lines are a source of both EF and MF. In North America, electric utilities provide power at 60 hertz (oscillates 60 times per second). (Eversource 1, Vol. 1, p. 7-1)

175. Electric fields result from voltages applied to electrical conductors and equipment. Appliances within homes and the workplace are the major sources of electric fields indoors, and power lines are the major sources of electric fields outdoors. EF levels decrease rapidly with distance from the source, diminishing even faster when interrupted by conductive materials, such as buildings and vegetation. The scientific community does not regard EF levels to be a concern to the general public and thus

studies of health effects from electrical transmission lines and equipment has focused on MF. (Council Administrative Notice Item No. 17; Eversource 1, Vol. 1, p. 7-1)

176. Magnetic fields are produced by the flow of electric currents. The level of a magnetic field is commonly expressed as magnetic flux density in units called gauss (G), or in milliGauss (mG). The magnetic field level at any point depends on characteristics of the source, which can include the arrangement of conductors, the amount of current flow through the source, and its distance from the point of measurement. MF levels decrease rapidly with distance from the source but are not easily interrupted as they pass through most materials. (Council Administrative Notice Item No. 17; Eversource 1, Vol. 1, p. 7-1)

177. In the United States, no state or federal exposure standards for 60-hertz MF based on demonstrated health effects have been established. Nor are there any such standards established world-wide. However, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) has established a guideline exposure level of 2,000 mG, based on extrapolation from scientific experimentation, and the International Committee on Electromagnetic Safety (ICES) has calculated a guideline of 9,040 mG for exposure to workers and the general public. (Council Administrative Notice Item No. 17; Eversource 1, Vol. 1, p. 7-13)

178. In accordance to the Council's *Electric and Magnetic Fields Best Management Practices for the Construction of Electric Transmission Lines in Connecticut* guidelines (EMF BMP), Eversource is required to provide an analysis of recent scientific literature regarding MF exposure, an analysis of pre and post construction MF levels, and investigate 'no cost" and "low cost" transmission line design alternatives to reduce MF levels at the edge of a right-of-way and in areas of particular interest, as long as such designs do not compromise system reliability or worker safety, or environmental and aesthetic project goals. (Council Administrative Notice Item No. 17)

179. As required by the Council's EMF BMP's, Eversource provided an analysis of recent scientific literature regarding MF exposure and determined there were no relevant changes in current research conclusions or the recommended exposure standards established by ICES and ICNIRP. (Eversource 1, Vol. 1, p. 7-14)

180. Eversource conducted an analysis of pre- and post-construction MF levels at the edge of the right-of-way under average transmission line load conditions. As shown in the table below, generally, MF levels would increase by 2-3 mG along the edges of right edge from Plumtree Substation to Brookfield Junction.

Magnetic Field Calculation Summary (Average Annual Loads, field in mG)	Left Edge of ROW		Right Edge of ROW	
	Pre	Post	Pre	Post
	9.85	12.91	12.24	14.02

*Left and right edges of ROW are defined by looking from Plumtree Substation to Brookfield Junction

All pre and post-construction values are a fraction of the ICNIRP and ICES recommended exposure guidelines. (Eversource 1, Vol. 1, pp. 7-10, 7-13)

181. In addition to the new transmission line, the transformers and other equipment within the Plumtree and Stony Hill Substations are other potential EMF sources. These sources, however, would be expected to cause little or no exposure to the general public because the strength of fields from typical substation equipment decreases rapidly with distance and reaches very low levels at relatively short distances beyond the substation perimeter fence. (Eversource 4, p. 29)

182. The EMF BMP directs an Applicant to initially develop a baseline Field Management Design Plan that incorporates "no-cost" MF mitigation design features. The Applicant shall then study potential design alternatives by adding "low-cost" MF mitigation design features specifically where portions of the project are adjacent to residential areas, public or private schools, licensed child day-care facilities, licensed youth camps, or public playground. The overall cost of "low-cost" design features are to be calculated at four percent of the initial Field Management Design Plan. The four percent guideline for "low-cost" mitigation should aim at a magnetic field reduction of 15 percent or more at the edge of the utility's ROW. This 15 percent reduction should relate specifically to those portions of the project where the expenditures would be made. (Council Administrative Notice Item No. 17)

183. Eversource's base Field Management Design Plan incorporates "no cost" magnetic field reduction measures, consistent with the Council's EMF BMP by arranging the conductor phases to achieve optimum MF cancellation from other MF sources in the existing transmission line right-of-way. This "no cost" design was used to develop the pre and post-project MF calculations. (Eversource 1, Vol. 1, p. 7B-4, Eversource 4, pp. 32-33)

184. As required by the Council's EMF BMP, Eversource examined the project route to determine the location of any schools, daycare facilities, youth camps, playgrounds, and residential areas, as defined under C.G.S. § 16-50p(a)(3)(D), for specific MF analysis. Eversource did not identify any schools, licensed day-care facilities, youth camps or public playgrounds within 300 feet of the proposed transmission line route. Eversource identified two residential areas, referred to as Focus Areas, for additional MF analysis; as follows, the Chimney Drive/Hearthstone Drive area in Bethel and the Lexington Meadows Condominium complex in Danbury/Bethel. (Eversource 1, Vol. 1, pp. 7B-7, 7B-8)

185. Although the post-construction MF levels at the edge of the right-of-way are small compared with the guidelines from ICNIRP and ICES when using a "no cost" design, Eversource examined "low cost" methodologies to reduce MF along the sections the right-of-way abutting the identified Focus Areas. (Eversource 1, Vol. 1, Appendix 7B; Eversource 4, pp. 32-33)

186. As part of the "low cost" modification to the Field Management Design Plan, Eversource examined the feasibility of installing the transmission line underground as well as other overhead design options. After examining various options, Eversource concluded a split-phase overhead design in the Focus Areas would achieve a reduction of at least 15 percent along the west/north side of the right-of-way. (Eversource 1, Vol. 1, pp. 7B-4, 7B-5)

187. Construction of the split-phase design in the Chimney Drive/Hearthstone Drive area and the Lexington Meadows Condominium complex would add $3.92 million and $3.22 million to the Project cost, respectively. Using a split-phase design in either area would significantly exceed the recommended four percent "low cost" design criteria. (Eversource 1, Vol. 1, pp. 7B-7 - 7B-10; Eversource 4, p. 33)

Public Safety

188. The proposed Project would be constructed in full compliance with the National Electric Safety Code, standards of the Institute of Electrical and Electronic Engineers, and the American National Standards Institute, good utility practice and applicable PURA regulations regarding the methods and manner of transmission line construction. (Eversource 1, Vol. 1, p. 4-31)

189. Protective relaying equipment would be incorporated into the new transmission line and substation designs to automatically detect abnormal operational conditions. Circuit breakers would automatically be triggered to isolate the faulted section of the transmission system. (Eversource 1, Vol. 1, p. 4-31)

190. Protective relay mechanisms include redundant primary and back up equipment to ensure continuous operational monitoring if some of the monitoring equipment was out of service. (Eversource 1, Vol. 1, p. 4-31)

191. The new transmission line design includes fiber optic strands installed within the lightning shield wires above the new overhead transmission line to allow for protective relay system communication. (Eversource 1, Vol. 1, p. 4-31)

192. The substations would be remotely controlled and monitored by the Connecticut Valley Electric Exchange System Operator using digital metering systems and a Supervisory Control and Data Acquisition system. (Eversource 4, p. 4-35)

193. Smoke detection systems located at the substations would automatically activate an alarm at the Connecticut Valley Electric Exchange System, a central monitoring installation, where further appropriate action would be taken such as dispatch of personnel to the substation. (Eversource 4, p. 35)

194. The existing substations are enclosed by a seven-foot high chain link fence topped with barbed wire to deter unauthorized entry. Access to the substations is through a locked gate. Appropriate signage is in place around each substation indicating the presence of high-voltage equipment. (Eversource 1, Vol. 1, p. 4-32)

195. Low-level lighting is installed in and around both substations for safety and security concerns. Additional lighting is present to facilitate emergency night work. (Eversource 1, Vol. 1, p. 4-32)

196. Physical security at both the Plumtree and Stony Hill Substations is consistent with the Council's *White Paper on the Security of Siting Energy Facilities*. The white paper guidelines focused on security issues related to intentional physical destruction of substation equipment. Both substations are classified as "low risk" per the NERC Physical Security Standard. (Council Administrative Notice Item No. 19; Eversource 1, Vol. 1, pp. 4-32, 4-33)

197. Unauthorized access onto the transmission line right-of-way by third-party off road vehicles is discouraged to the greatest extent practical. Typically, Eversource would install a gate where a right-of-way access road intersects with a public roadway to deter access. Additional gates, berms, and fences would be installed upon consultation with the underlying landowner. (Eversource 1, Vol. 1, p. 6-30; Tr. 1, pp. 64-65)

198. Signs are installed in the right-of-way warning the public of the presence of high-voltage transmission lines. (Eversource 1, Vol. 1, p. 6-30)

Figure 1: Cross section of the existing right-of-way with the new transmission line, typical of the Project route. (Eversource 1, Vol. 5, App. 4B)

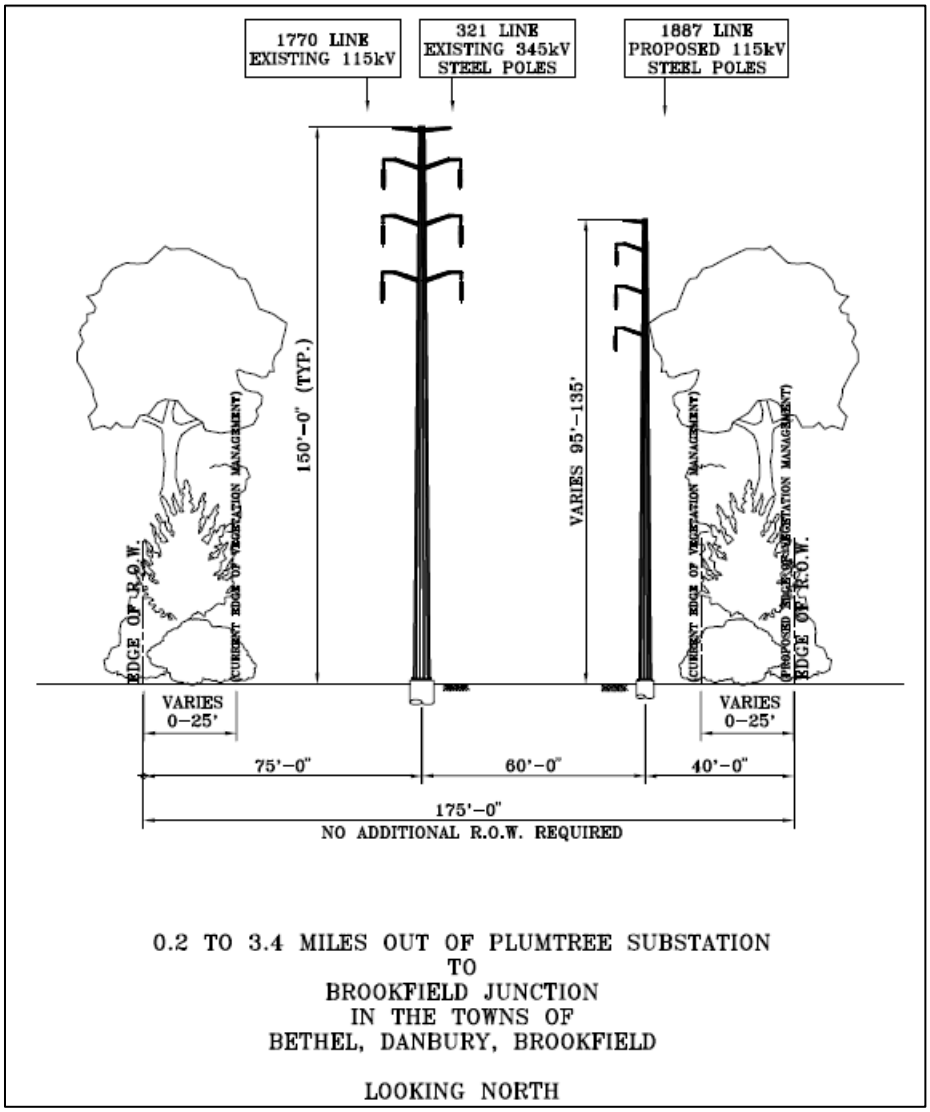


Figure 2: Cross section of the existing right-of-way with the new transmission line, adjacent to Plumtree Substation.
(Eversource 1, Vol. 5, App. 4B)

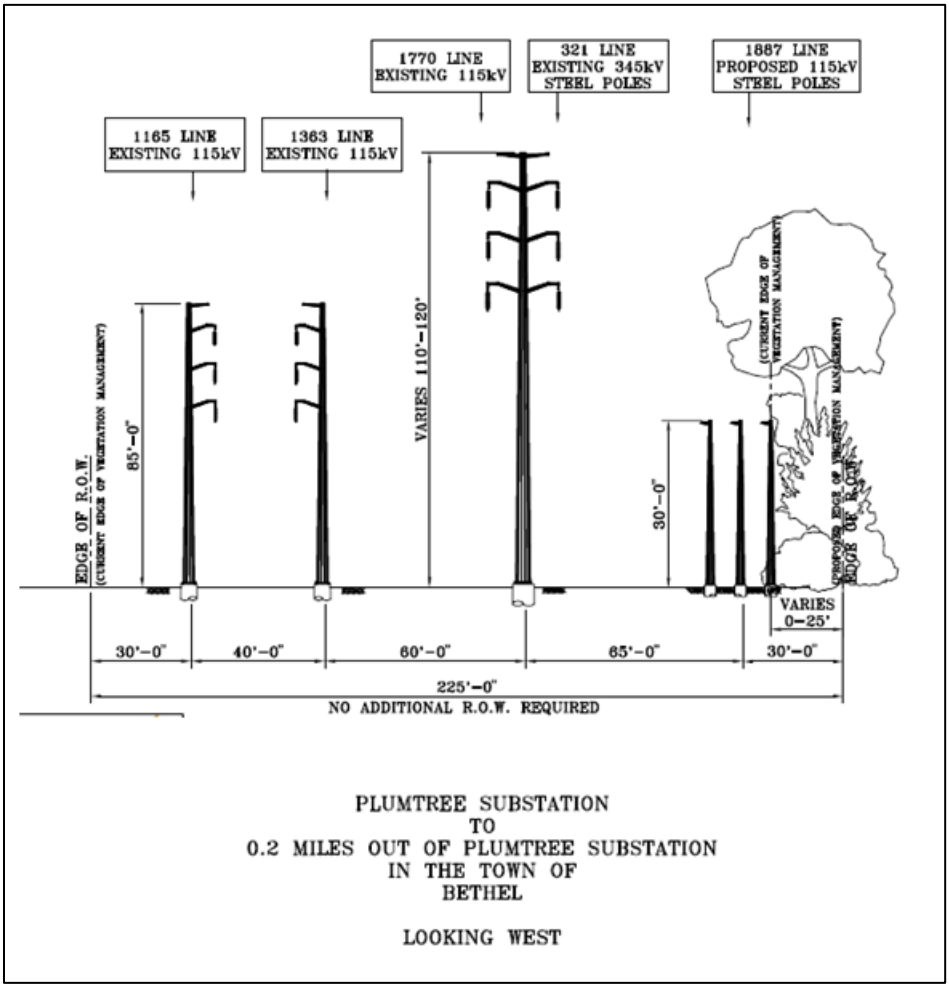


Figure 3: Cross section of the existing right-of-way with the new transmission line at Brookfield Junction.
(Eversource 1, Vol. 5, App. 4B)

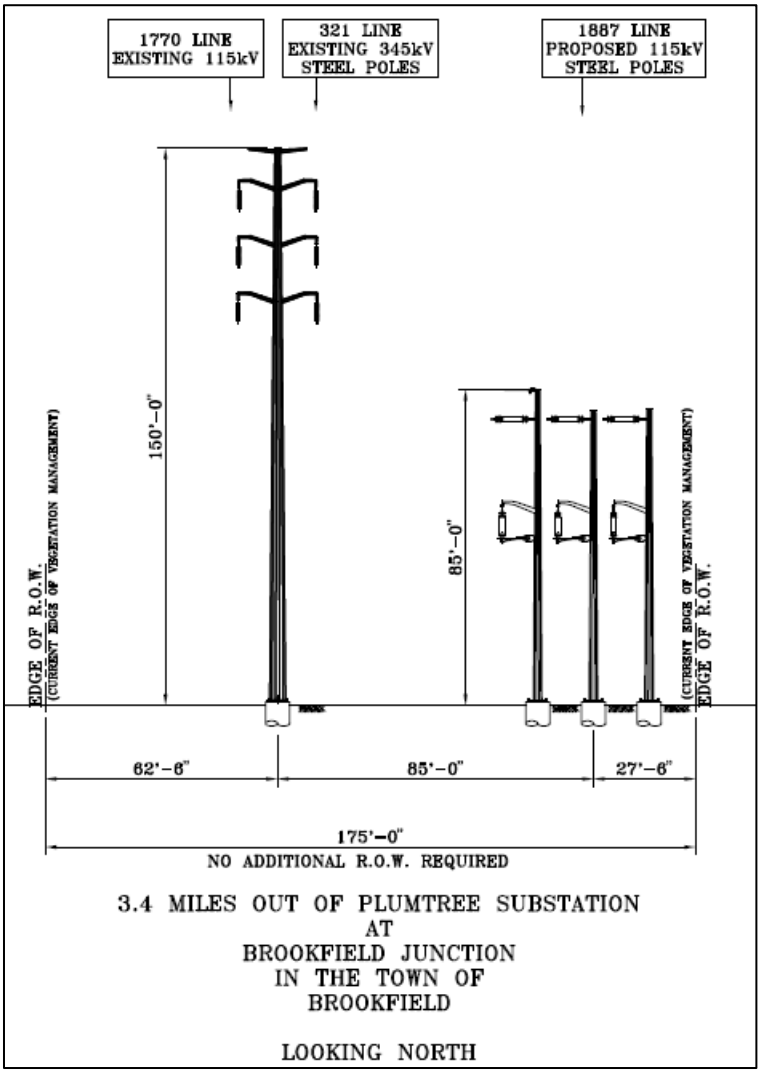


Figure 4 - Aerial Photograph of Plumtree Substation and Improvements (Eversource 1, Vol. 5, App. 2B, p.1)

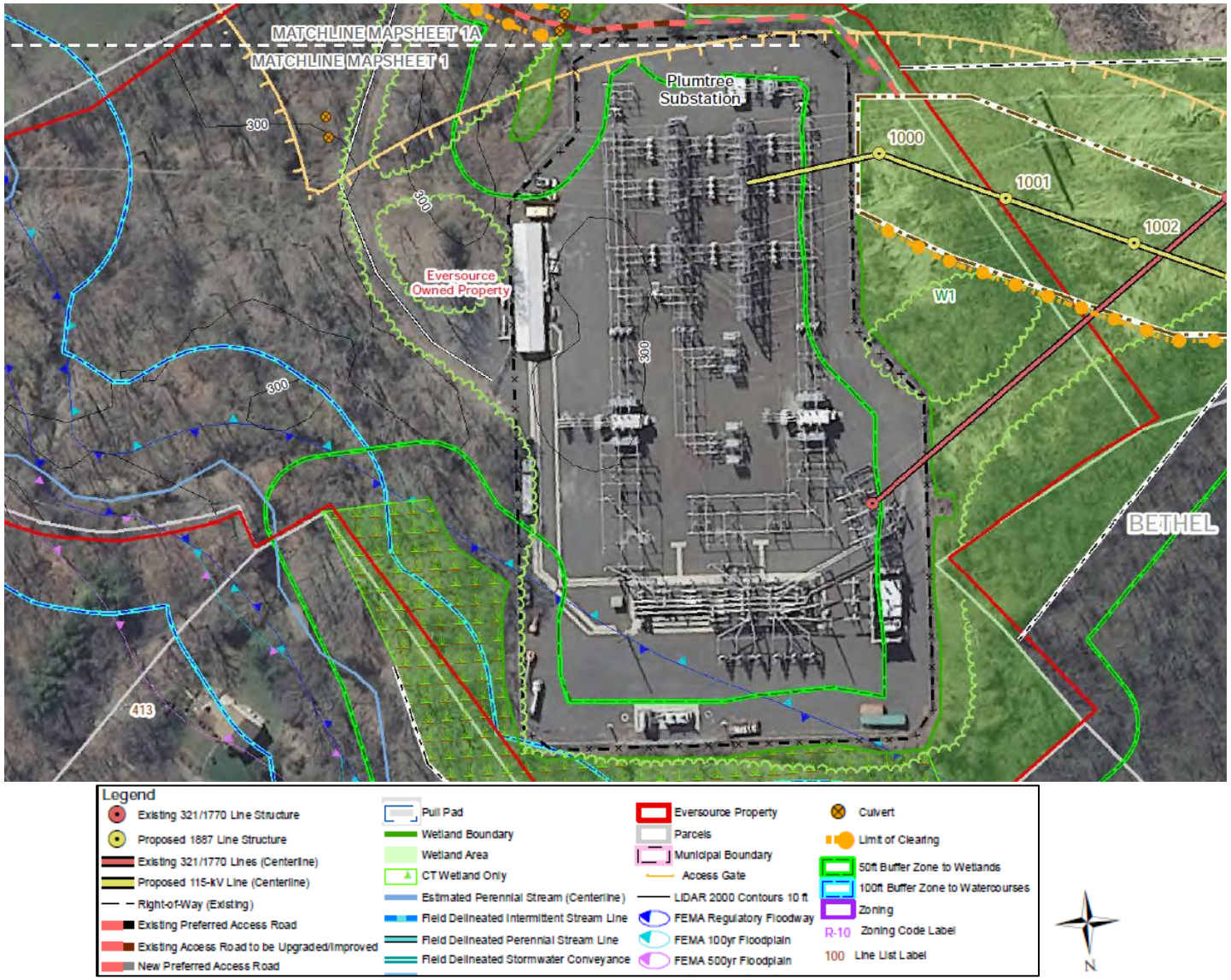


Figure 5- Aerial Photograph of Stony Hill Substation and Improvements (Eversource 1, Vol. 5, App. 2B, p.14)