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September 15, 2017

VIA ELECTRONIC MAIL AND HAND-DELIVERY

Melanie Bachman,
Executive Director/Staff Attorney
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

Re: ***Docket No. 474: The Connecticut Light & Power Company d/b/a Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the Greater Hartford-Central Connecticut Reliability Project that traverses the municipalities of Hartford, West Hartford, and Newington, which consists of (a) construction, maintenance and operation of a new 115-kilovolt (kV) electric transmission line within existing Eversource, Amtrak and public road rights-of-way and associated facilities extending overhead approximately 2.4 miles and underground approximately 1.3 miles between Eversource's existing Newington Substation in the Town of Newington and existing Southwest Hartford Substation in the City of Hartford; (b) modifications to a .01 mile section within existing Eversource right-of-way of the existing overhead 115-kV electric transmission line connection to the Newington Substation (Newington Tap); and (c) related modifications to Newington Substation and Southwest Hartford Substation***

Dear Ms. Bachman,

I enclose an original and fifteen copies of the Applicant's Proposed Findings of Fact and Post-Hearing Brief.

Very truly yours,

Anthony M. Fitzgerald

AMF/kas
Enclosure
cc (w/enc): Attached CSC Service List dated June 9, 2017

{W2929087}

LIST OF PARTIES AND INTERVENORS
SERVICE LIST

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STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

The Connecticut Light & Power Company d/b/a Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the Greater Hartford-Central Connecticut Reliability Project that traverses the municipalities of Hartford, West Hartford, and Newington, which consists of (a) construction, maintenance and operation of a new 115-kilovolt (kV) electric transmission line within existing Eversource, Amtrak and public road rights-of-way and associated facilities extending overhead approximately 2.4 miles and underground approximately 1.3 miles between Eversource's existing Newington Substation in the Town of Newington and existing Southwest Hartford Substation in the City of Hartford; (b) modifications to a .01 mile section within existing Eversource right-of-way of the existing overhead 115-kV electric transmission line connection to the Newington Substation (Newington Tap); and (c) related modifications to Newington Substation and Southwest Hartford Substation	**DOCKET NO. 474** **September 15, 2017**

Applicant's Proposed Findings of Fact

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I. INTRODUCTION

1. Pursuant to Connecticut General Statutes ("CGS") § 16-50g et seq., on June 7, 2017, 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 ("Certificate") for the construction and operation of the Greater Hartford-Central Connecticut Reliability Project, consisting of a new approximately 2.4 miles overhead and approximately 1.3 miles underground 115-kilovolt ("kV") electric transmission line between Newington Substation in the Town of Newington and Southwest Hartford Substation in the City of Hartford, related modifications to Newington Substation and Southwest Hartford Substation, and modification of a short section of an existing overhead 115-kV transmission line in Newington that connects to Newington Substation. These proposed improvements, which would be located almost entirely within existing Eversource, Amtrak and public road rights-of-way ("ROW") or on Eversource fee-owned property, are referred to collectively as the Greater Hartford-Central Connecticut Reliability Project ("Project"). (Eversource 1, Vol. 1, pp. FR-1, ES-1, 1-1)

2. The purpose of the Project is to bring the electric supply system in the Greater Hartford Sub-area into compliance with applicable national and regional electric reliability standards and criteria, and to improve the ability of the transmission system to move power across Connecticut when the system is under stress. This need was identified as a result of electric system planning studies and alternatives analyses performed by the Independent System Operation-New England ("ISO-NE"), the independent regional system planning authority in New England. (Eversource 1, Vol. 1, pp. FR-1, ES-3; Eversource 4, pp. 5-8)

3. The only party to these proceedings is Eversource (the Applicant). (Record)

4. In compliance with CGS § 16-50*l*(b), Eversource provided service and legal notice of the Application. This included notice to municipalities along the route of the proposed Project, federal, state, local and regional agencies, and elected officials. Eversource also published notice in the Hartford Courant on May 4, 2017 and May 11, 2017; and in the West Hartford News on May 4, 2017 and May 11, 2017. Eversource provided a separate "Notice of Proposed Construction of a High-Voltage Electric Transmission Line" that was included in one or more monthly bills to Eversource customers within the municipalities of Newington, West Hartford, and Hartford. (Eversource 1, Vol. 1, pp. FR-11 – FR-12; Eversource 4, p. 52; Affidavits of Notice)

5. Pursuant to CGS § 16-50*l*(b), Eversource provided notice to landowners abutting Newington Substation in Newington and Southwest Substation in Hartford. Community groups and water companies were also provided notice consistent with the Council's Application Guide for Electric and Fuel Transmission Line Facility ("Application Guide"). (Eversource 1, Vol. 1, pp. FR-11 – FR-12; Affidavits of Notice)

6. Eversource received return receipts from each landowner abutting Newington and Southwest Substations, except for owners of four abutting properties. Eversource sent an additional notice via first class mail on July 28, 2017 to the four abutters from whom Eversource did not receive return receipts. (Eversource 7, Q-CSC-001, Transcr. 1, p. 66)

II. COUNCIL PROCEDURES

7. On June 9, 2017, the Council sent a letter to the State Treasurer, with copies to the Chief Elected Officials of Hartford, Newington and West Hartford, stating that $25,000 was received from Eversource as payment to the Municipal Participation Account (the "Fund") and deposited with the State Treasurer's department account. Pursuant to CGS § 16-50bb, subsection (b), the Fund is available to any or all of the municipalities if they become a participant in this proceeding. No municipality has applied for party status in this proceeding. (Municipal Fund Letter, 6/9/17; Record)

8. On August 2, 2017, the Council held a pre-hearing teleconference on procedural matters for parties and intervenors to discuss the requirements for pre-filed testimony, exhibit lists, administrative notice lists, expected witness lists, and the filing of pre-hearing interrogatories. (Pre-Hearing Teleconference Memo dated 7/27/17)

9. In accordance with Section 16-50j-21 of the Regulations of the State of Connecticut ("RCSA") and Section IX of the Application Guide, on August 3 and 4, 2017, Eversource posted six 4-foot by 6-foot signs notifying the public of the Council's public hearing to be held in Newington on August 22, 2017. These signs were posted at various locations throughout Newington, West Hartford and Hartford. (Eversource 2; Eversource 4, p. 53)

10. The Council held a public evidentiary hearing on August 22, 2017 commencing at approximately 3:22 p.m., at the Newington Town Hall, 131 Cedar Street, Newington, Connecticut. (Transcr. 1, August 22, 2017, 3:22 p.m., p. 1)

11. Pursuant to CGS § 16-50m, the Council, after giving due notice thereof, held a public hearing for citizen comment on August 22, 2017, at the Newington Town Hall, 131 Cedar Street, Newington, Connecticut. The public comment session commenced at approximately 6:31 p.m. (Transcr. 2, August 22, 2017, 6:31 p.m., p. 71)

12. The Council and its staff conducted a public field review of the proposed Project route on August 22, 2017, prior to the public evidentiary hearing. (Council Hearing Notice)

III. MUNICIPAL CONSULTATION AND COMMUNITY OUTREACH

13. Eversource began its outreach efforts in March 2015 by providing project overviews to municipal officials in Newington, West Hartford and Hartford, and soliciting input concerning the scope of the work, especially the routing of the new transmission line. (Eversource 1, Vol. 1, pp. ES-17, 9-2)

14. Pursuant to CGS § 16-50*l*(e), in December 2015, Eversource provided a Municipal Consultation Filing ("MCF") to the Chief Elected Official of each of the municipalities (i.e., Newington, West Hartford and Hartford) that would be affected by the Project. No other municipalities are located within 2,500 feet of the Project's proposed boundaries. (Eversource 1, Vol. 1, pp. FR-10, ES-17)

15. During the 60-day MCF process, Eversource held an open house on January 20, 2016 in West Hartford. (Eversource 1, Vol. 1, pp. ES-18, 9-4; Eversource 4, p. 51; Eversource 7, Q-CSC-03)

16. With respect to the all-underground route discussed in the MCF, West Hartford and Newington officials expressed concerns about impacts to traffic, businesses, and residences, as well as excavation in recently-paved streets. They suggested route variations to mitigate some of these impacts, which Eversource was prepared to adopt. (Eversource 1, Vol. 1, p. ES-18, 9-4)

17. After completing its initial municipal consultations in early 2016 and coordinating further with Amtrak representatives, Eversource reconfigured the approximately 3.7-miletransmission line to the overhead/underground line proposed in the Application (the "Proposed Route"). In March 2017, Eversource representatives advised municipal representatives of these significant changes in the Proposed Route's design and routing. (Eversource 1, Vol. 1, pp. ES-18, 9-4)

18. Given the changes to the Project's design, Eversource held a second open house on April 27, 2017, in Newington. This forum allowed the public and municipal officials further opportunity to review and provide input concerning the proposed Project. (Eversource 1, Vol. 1, pp. ES-18, 9-4 – 9-5; Eversource 4, p. 51; Eversource 7, Q-CSC-03)

19. The Council did not receive written comments from any municipality or public official regarding this Project. (Record)

IV. STATE AGENCY COMMENTS

20. Pursuant to CGS § 16-50j(g), on July 21, 2017, the Council requested the following state agencies to submit written comments regarding the proposed Project: Department of Energy and Environmental Protection ("DEEP"); Department of Agriculture ("DOA"); 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 Transportation ("ConnDOT"); Connecticut Airport Authority ("CAA"); Department of Emergency Services and Public Protection ("DESPP"); and State Historic Preservation Office ("SHPO"). (Record)

21. ConnDOT submitted comments concerning Eversource's application on August 14, 2017. SHPO provided Eversource with comments concerning Eversource's application on August 17, 2017, which Eversource filed with the Council on August 21, 2017. DEEP submitted comments concerning Eversource's Application on August 21, 2017. (ConnDOT comments dated 8/14/17; SHPO comments dated 8/17/17; DEEP comments dated 8/18/17; Transcr. 1, pp. 9 – 10)

22. On August 18, 2017, Eversource filed a response to ConnDOT's August 14, 2017 letter , in which Eversource addressed ConnDOT's comments regarding coordination of its construction schedule with ConnDOT and Amtrak; routing and structure height in the area of the proposed rail station at Flatbush Avenue (the "West Hartford Rail Station"); proposed location of vaults within the underground segment of the Project; burial depth of the underground cable system within the state highway ROW; location of existing buried electric transmission facilities; protection of the signal system interconnect facility proximate to the Proposed Route; and an encroachment permit for work within the ConnDOT ROW. (Eversource 8; Transcr. 1, pp. 11 – 12)

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

V. SYSTEM PLANNING AND MANDATORY RELIABILITY STANDARDS

24. Improvements of the electric transmission system that are required to preserve its reliability are planned in a regional process pursuant to federal authority. Pursuant to the Energy Policy Act of 2005, the Federal Energy Regulatory Commission ("FERC") has designated the National Electric Reliability Corporation ("NERC") as a national Electric Reliability Organization ("ERO") to develop and enforce reliability standards for planning and operations. NERC's standards are subject to approval by FERC and compliance is mandatory under federal law. (Eversource 1, Vol. 1, pp. 2-2 - 2-3)

25. In addition, the Northeast Power Coordinating Council ("NPCC") promulgates reliability criteria that apply in New York, the six New England States, and parts of Canada; these criteria must be consistent with the NERC standards. The U.S. systems of the NPCC formed two new power pools, ISO-NE and the New York Independent System Operator ("NYISO"). (Eversource 1, Vol. 1, p. 2-2)

26. In New England, ISO-NE is an independent non-profit entity that has been vested by NERC with responsibility for planning and operating the New England transmission grid. ISO-NE issues its own reliability requirements and planning procedures, which must be consistent with (but may be more stringent than) those of NERC and NPCC. (Eversource 1, Vol. 1, p. 2-4)

27. In conducting planning studies and proposing improvements to the transmission system, all transmission owners in New England, including Eversource, are required to comply with NERC standards, NPCC criteria, and ISO-NE planning procedures. (Eversource 1, Vol. 1, p. 2-3; Eversource 1, Vol. 2, Exh. 2.D.2)

28. These standards, criteria, and procedures provide for the identification of the need for improvements to the transmission system by performing planning studies that consist of computer simulations of the performance of the system under existing and anticipated future conditions. (Eversource 1, Vol. 1, pp. 2-3 – 2-6)

VI. PROJECT NEED

29. The Greater Hartford Sub-area consists of the municipalities of Avon, Berlin, Bloomfield, Burlington, Cromwell, East Granby, East Hartford, Farmington, Granby, Hartford, New Britain, Newington, Plainville, Rocky Hill, West Hartford, Wethersfield and Windsor. (Eversource 1, Vol. 1, p. 2-1)

30. The proposed Project is the product of more than 10 years of planning studies. In 2005, ISO-NE identified potential future criteria violations on the 115-kV system in the Greater Hartford Sub-area in the course of early studies that ultimately resulted in the New England East-West Solution ("NEEWS") Plan, a comprehensive set of 345-kV improvements to the Southern New England transmission system. Potential solutions initially considered for the regional problems

addressed by NEEWS included improvements to the Greater Hartford 115-kV system, principally a new 115-kV line between Eversource's East Hartford and Manchester substations. (Eversource 1, Vol. 1, p. 2-7 – 2-8)

31. Further analyses showed that there were additional "load serving" issues in the Greater Hartford Sub-area that would not be resolved by a new 115-kV line. Therefore, in early 2010, ISO-NE removed the 115-kV system related issues from the scope of the NEEWS studies and initiated a separate study supplementary to the NEEWS studies that would take a comprehensive fresh look at the Greater Hartford area 115-kV system issues and seek a cost-effective solution for all of the identified problems in the area. This was known as the *Greater Hartford Area Reliability Study*. (Eversource 1, Vol. 1, p. 2-8)

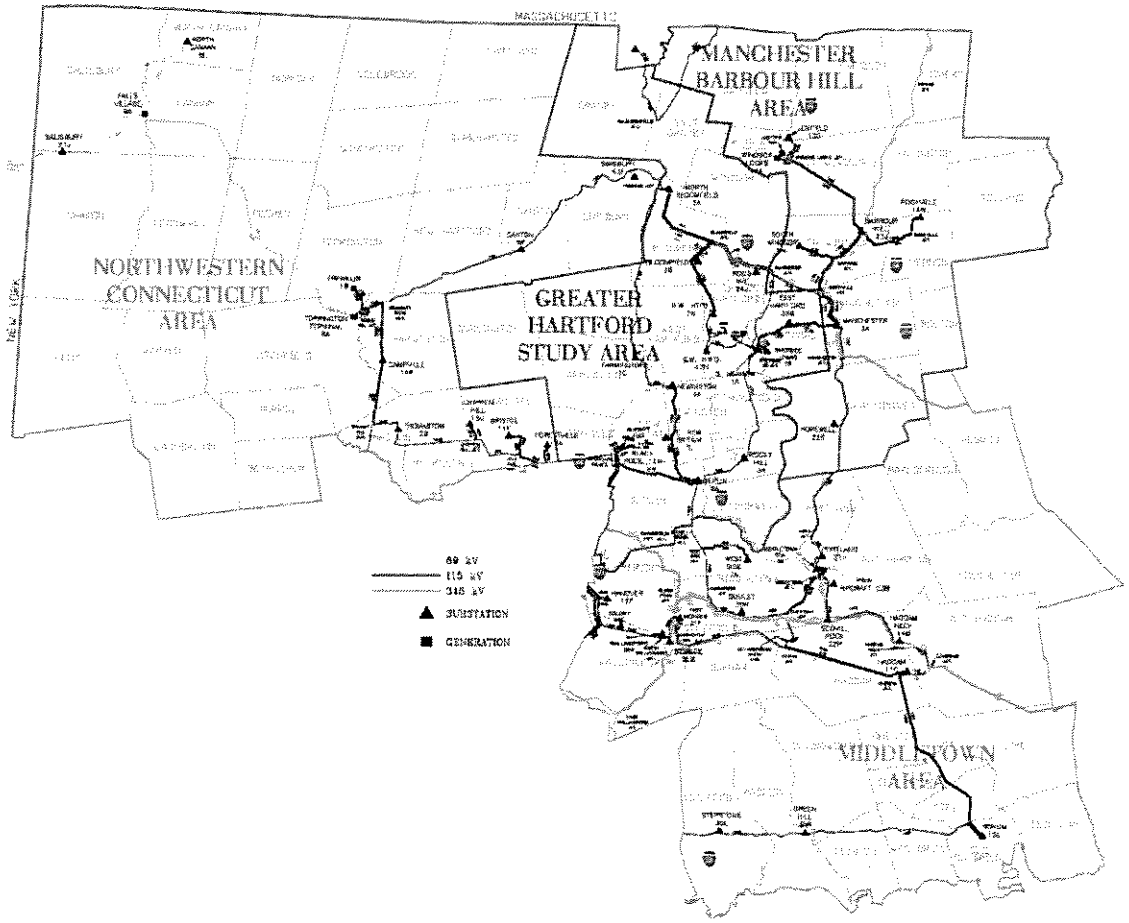
32. In early 2011, ISO-NE combined the *Greater Hartford Area Reliability Study*, along with other ongoing studies of reliability issues in sub-areas adjacent to Greater Hartford, into an assessment of load serving problems in four contiguous electrical sub-areas:

- Greater Hartford
- Manchester – Barbour Hill
- Middletown
- Northwestern Connecticut

The combined studies became known as the Greater Hartford/Central Connecticut ("GHCC") study. These were the same studies that determined the need for the Frost Bridge to Campville 115-kV line project that the Council approved last year in Docket 466, as well as several other projects that have been administratively noticed. (Eversource 1, Vol. 1, p. 2-8; Eversource 4, p. 8; Q-CSC-06)

33. The need for the Project was identified by a working group (the "Working Group") led by ISO-NE, which consisted of members from ISO-NE, Eversource, and The United Illuminating Company ("UI") through the GHCC suite of studies. (Eversource 1, Vol. 1, p. 2-8; Eversource 4, pp. 8 – 9)

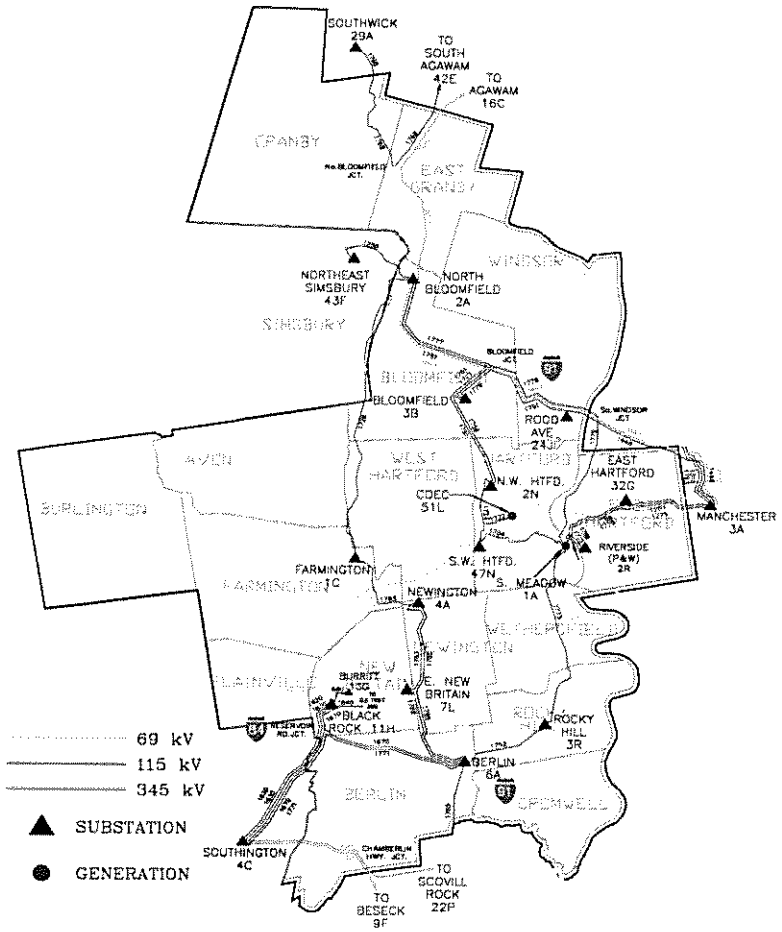
34. The figure below depicts the GHCC study area.



(Eversource 1, Vol. 1, p. 2-9)

35. An ongoing reassessment of the need for the Central Connecticut Reliability Project ("CCRP"), one of the four original NEEWS 345-kV projects, was folded into the GHCC study. At the time of the reassessment of the need for CCRP, that project was planned to consist primarily of a new 345-kV transmission line from North Bloomfield Substation in Bloomfield, Connecticut, to Frost Bridge Substation in Watertown, Connecticut, and was designed to greatly increase the capability of the transmission system to transfer power from east-to-west across the Western Connecticut (WCT) Import Interface. The preliminary results of the CCRP reassessment indicated that the need for such increased transfer capability had been substantially reduced by changes in system conditions and forecasted load, but not eliminated. Accordingly, the GHCC analysis was expanded to identify needs for both local reliability issues and western Connecticut import requirements, with the expectation that both sets of needs could be addressed by a single integrated 115-kV solution, which would both replace CCRP and meet local load serving needs. (Eversource 1 Vol. 1, pp. 2-9 – 2-10)

36. The following is a geographic map of the sub-area, illustrating the existing transmission lines, substations, generation resources and line terminations outside of the Greater Hartford Sub-area.



(Eversource 1, Vol. 1, p. 2-12)

37. The planning studies showed that the Greater Hartford Sub-area had four transmission elements with N-1 thermal violations and four 115-kV buses with N-1 low-voltage violations. Under N-1-1 conditions, there were 27 elements with thermal violations and ten 115-kV Pool Transmission Facilities ("PTF") buses with low voltage violations. Two 115-kV non-PTF buses also had low voltages. There were no N-0 violations. Violations occurred with all of one-unit-out and two-unit-out dispatches. A significant number of violations were dispatch-independent; the violation occurred with all dispatches. (Eversource 1, Vol. 1, p. 2-16; Eversource 1, Vol. 2, Exh. 2.D.3)

38. Although the year modelled in the *2012 Needs Assessment Report* was 2022, the study showed that the improvements required to meet the identified needs should be constructed as soon as possible. ISO-NE calculates a "year of need" for system improvements by estimating when the "critical load level" for which improvements are needed will be reached. The *2012 Needs Assessment Report* found that the year of need for the Greater Hartford improvements was 2013, because the Connecticut peak load forecast for 2013 was 7,776 MW, whereas thermal violations began to occur at 4,756 MW net load and low voltage violations began to occur at a 4,319 MW

net load. Moreover, the majority of the worse-case violations in the Greater Hartford Sub-area occurred at the 2013 net load level. (Eversource 1, Vol. 1, p. 2-16; Eversource 4, p. 9)

39. The actual 2013 summer peak was close to the ISO-NE 90/10 forecast. While subsequent peaks have been lower, they have consistently exceeded the critical load levels at which violations begin to occur. Accordingly, ISO-NE has not seen fit to reassess the need for the Project, and has continued to list it in its Regional System Plans. (Eversource 1, Vol. 1, p. 2-16; Eversource 4, pp. 9 – 10)

40. The GHCC studies reflect that Greater Hartford Sub-area net load for 2022 after demand resources were subtracted was estimated at approximately 1,227 MW. Generation in the sub-area totaled approximately 252 MW, consisting of three generators totaling about 103 MW that may be classified as regular units, and four generators totaling about 149 MW that are classified as fast-start units. The sub-area is a net importer of energy and relies on the surrounding areas to serve local load. (Eversource 1, Vol. 1, pp. 2-10 – 2-11)

41. The GHCC studies showed that there were criteria violations in two distinct "load pockets" within the Greater Hartford Sub-area. Load pockets are areas that have insufficient generation and/or transmission to serve their load. (Eversource 1, Vol. 1, p. 2-11)

42. The two distinct load pockets within the Greater Hartford Sub-area are the South Meadow – Berlin – Southington area and the North Bloomfield – Manchester area. The South Meadow – Berlin – Southington area has no generation located within it; the North Bloomfield – Manchester area has limited generation; and both areas have limited transmission capability. As a result, the transmission system in each load pocket is subject to overloads and low voltages when the system attempts to serve peak load under many contingent conditions. (Eversource 1, Vol. 1, p. 2-11)

43. The conceptual solution to resolve the criteria violations in the targeted load pockets was to connect them with a new transmission line so that the transmission system in each load pocket would be able to serve the other when needed. The Working Group identified two sets of logical terminal points for such a new line. One set consisted of the Newington and Southwest Hartford Substations, which are not currently interconnected and were ultimately selected as the terminal points of the preferred solution. The other set of terminal points considered was Farmington Substation in Farmington and North Bloomfield Substation in Bloomfield. These two substations are presently connected by an existing 11.7-mile Eversource 115-kV overhead transmission line. (Eversource 4, pp. 31 – 32)

44. In early 2015, ISO-NE published a report identifying preferred solutions for the needs of the entire GHCC study area, including the improvements in the Greater Hartford Sub-area proposed in this Project (the *GHCC Solutions Report*). After a positive recommendation by its Reliability Committee, on April 16, 2015, ISO-NE issued a technical approval of a set of preferred GHCC solutions, including a new 115-kV underground transmission circuit between Newington Substation and Southwest Substation, together with associated equipment additions to those substations. (Eversource 1, Vol. 1, p. 2-10)

45. The preferred new transmission circuit identified in the *GHCC Solutions Report* was an approximately 4-mile 115-kV underground cable between Newington and Southwest Hartford substations. Installation of this new circuit also would have required the installation of associated terminal equipment, including a 1.2% series reactor in series with the new cable. This all-underground solution was developed on the assumption that, because of the dense urban and suburban development in the area between Newington and Southwest Hartford substations and the lack of existing utility ROWs connecting these two substations, the installation of a new 115-kV line in an overhead configuration between these points would be impractical. (Eversource 1, Vol. 1, p. 2-17)

46. Subsequent to its MCF in December 2015, Eversource had further discussions with Amtrak, which resulted in the possibility of significantly reducing the cost of this Project by collocating the proposed 115-kV line overhead for a significant portion of its length within or adjacent to a section of the Amtrak/CT*fastrak* transportation corridor ("the Amtrak ROW") that extends through the eastern portion of the Project area. (Eversource 1, Vol. 1, p. 2-17; Eversource 4, p. 11 – 12)

47. After extensive technical studies and negotiations with Amtrak, Eversource reconfigured the proposed 115-kV line to an approximately 3.7-mile hybrid overhead/underground circuit, with approximately 1.3 miles of the circuit to be constructed underground and approximately 2.4 miles overhead along the Amtrak ROW. (Eversource 1, Vol. 1, p. 2-17)

48. As part of the Project, modifications to both Newington and Southwest Hartford substations would be required to connect the new 115-kV line to the transmission system. The new 115-kV line would enter both substations in an underground configuration. To accommodate the equipment for the new 115-kV line connection, Eversource proposes to expand each substation by approximately 0.3 acre, extending the existing fence at each facility. (Eversource 1, Vol. 1, p. ES-8)

49. The Project will meet the need identified by the Working Group because, upon completion of the Project, the transmission system in each of the load pockets in the Greater Hartford Sub-area would be able to serve the other when needed. In the event of contingencies in either area, there would be an additional high voltage transmission element to share the load that would be automatically redistributed from the failed system element; and each area would have a new high capacity path by which generation from outside both load pockets may reach the load within each. (Eversource 1, Vol. 1, p. 2-19)

50. The new 115-kV line and its associated improvements would also provide incremental transfer capability across the WCT Import Interface. As the 345-kV CCRP would have done, the proposed 115-kV line would add another transmission element to the interface; therefore, it would increase transfer capability across the interface. The increment in transfer capability provided by this improvement to the 115-kV system is less than would have been provided by the 345-kV CCRP solution; but the GHCC studies determined it to be adequate because less capability was needed under the modeled updated system conditions to eliminate criteria violations. (Eversource 1, Vol. 1, p. 2-20)

51. Eversource's 115-kV overhead 1783 Line extends from Farmington Substation to East New Britain Substation, passing adjacent to the Newington Substation. A 0.01-mile segment of the 1783 Line connects to Newington Substation. As part of the Project, this connection, referred to as the Newington Tap, would be relocated and rebuilt with larger conductors. These modifications would avoid overloads on the Newington Tap line under certain contingencies, such as when Newington Substation tries to simultaneously supply both East New Britain and Farmington substations. The modifications would also provide space within Newington Substation to accommodate the new 1346 Line termination. (Eversource 1, Vol. 1, p. ES-9; Eversource 4, pp. 21 – 22)

52. The *GHCC Solutions Report* specified a project with an all-underground transmission line and the I.3.9 technical approval that ISO-NE issued on April 16, 2015 was based on an analysis of a project that included an all underground transmission line. Accordingly, Eversource will need to seek a supplemental I.3.9 approval from ISO-NE before it can construct the Project. However, Eversource planners have determined that the electrical characteristics of the revised Project are sufficiently close to that for which the original I.3.9 was issued such that there should be no issue with the issuance of supplemental I.3.9 approval. (Eversource 4, pp. 13 – 14)

VII. PROJECT COST

53. The estimated capital cost for the Project is approximately $61.1 million; the transmission line accounts for approximately $44.4 million (including $1.2 million for the Newington Tap) and substation modifications account for approximately $16.7 million. (Eversource 1, Vol. 1, p. 3-25; Eversource 4, p. 22)

54. ISO-NE determines whether all costs of a project are regionalized in a Transmission Cost Allocation ("TCA") process. Unless costs are incurred to satisfy local requirements, Eversource expects that the costs of the Project would be regionalized. Assuming all costs are so regionalized, Connecticut's electricity customers (not just Eversource customers) would pay approximately 25% of the Project costs. (Eversource 4, pp. 22 – 23)

55. Applying the factors in the Council's 2012 *Life-Cycle Cost Studies for Overhead and Underground Transmission Lines*, the life-cycle cost for the transmission line is approximately $80.5 million. (Eversource 3)

56. Project construction is anticipated to begin in mid-2018, with a scheduled in-service date for the Project and facilities of the fourth quarter of 2019. Given that the year of need for the Project was 2013, Eversource hopes to achieve an earlier in-service date. (Eversource 1, Vol. 1, p. ES-17; Eversource 4, p. 23)

VIII. PROJECT ALTERNATIVES

No Action Alternative

57. The "no action" alternative (i.e., making no improvements to the electric supply system in the Greater Hartford Sub-area) was rejected by Eversource because it would not eliminate violations of national and regional liability standards and criteria, and would undermine the long-range plan of ISO-NE and Eversource for providing reliable transmission service throughout Connecticut. (Eversource 1, Vol. 1, p. 10-1; Eversource 4, p. 31)

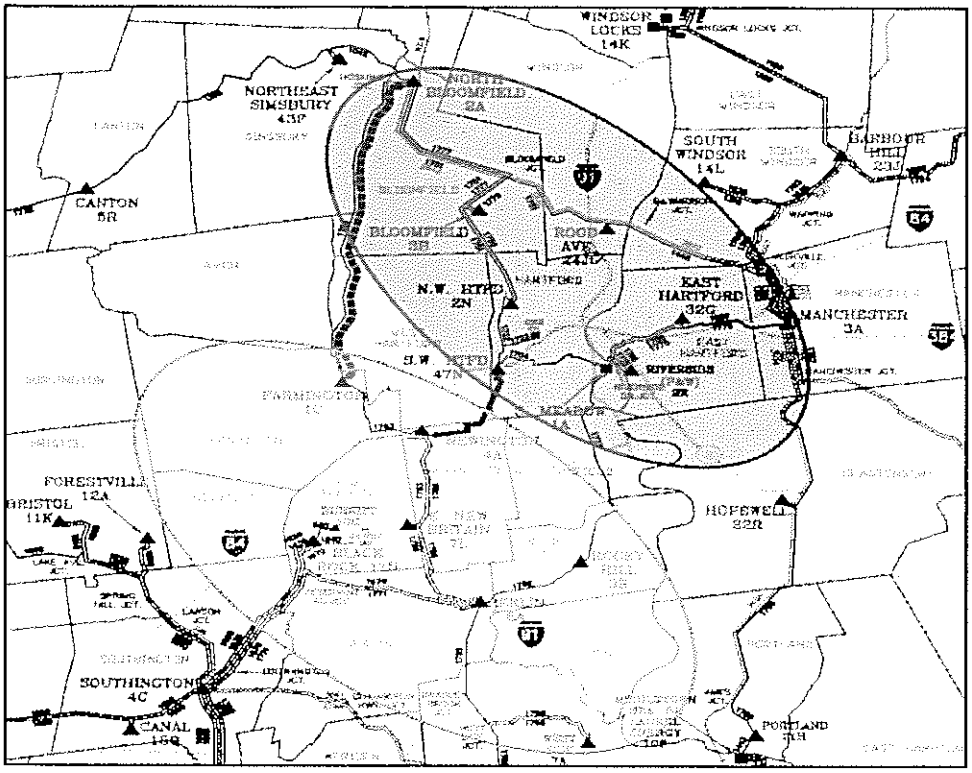
Transmission Alternatives

58. The Working Group evaluated two sets of logical terminal points for a new 115-kV transmission line connecting the South Meadow – Berlin – Southington and the North Bloomfield – Manchester load pockets. One set was Newington and Southwest Hartford Substations, which are not currently interconnected. The other set was Farmington Substation and North Bloomfield Substation, which are presently connected by an existing 11.7-mile Eversource 115-kV overhead transmission line; a second 115-kV line could be built within the same ROW in an overhead configuration adjacent to this existing 115-kV line. (Eversource 1, Vol. 1, pp. 10-2; Eversource 4, p. 32 – 33)

59. When the Working Group initially compared the two alternatives, a partially overhead transmission line route between Newington and Southwest Hartford Substations was believed to be impractical because of the dense urban and suburban development in this area. As a result, the two alternatives initially analyzed in detail by the Working Group were an all-underground cable route between Newington and Southwest Hartford substations, and an overhead line between Farmington and North Bloomfield substations. (Eversource 1, Vol. 1, p. 10-2; Eversource 4, p. 32)

60. Both alternatives would resolve all thermal and voltage criteria violations in the 10-year planning horizon; and both would require upgrades at each of the new transmission line's terminal substations. (Eversource 4, pp. 32 – 33)

61. The figure below illustrates the potential transmission connections for the two load pockets in the Greater Hartford Sub-area.



(Eversource 1, Vol. 1, p. 10-3)

62. A new overhead 115-kV transmission line along Eversource's existing ROW between Farmington and North Bloomfield substations would be aligned adjacent to an existing Eversource 115-kV line (the 1726 Line) and would extend for approximately 11.7 miles, traversing five towns in Hartford County. (Eversource 1, Vol. 1, p. 10-4; Eversource 4, p. 32)

63. The construction of a new overhead 115-kV transmission line along the Farmington – North Bloomfield ROW would require forested wetland vegetation clearing (an estimated 3.5 acres) and would potentially require permanent impacts to wetlands associated with the unavoidable placement of new structures in wetlands, as well as potential impacts to a large wetland complex near North Bloomfield Substation. New access roads (permanent or temporary) also would likely have to be installed through wetlands. Along most of the route, the entire 150-foot-wide ROW would have to be managed in low-growth vegetation consistent with overhead transmission line use. (Eversource 1, Vol. 1, p. 10-10)

64. The Working Group initially found the Newington to Southwest Hartford underground line to be preferable. Subsequently, after it became apparent that placement of an overhead segment of the Newington – Southwest Hartford line within the Amtrak ROW was feasible, Eversource compared that configuration to the Farmington – North Bloomfield alternative. That comparison made the choice of the Newington – Southwest Hartford alternative even clearer, given the

significant cost savings realized through the use of the hybrid route. (Eversource 1, Vol. 1, p. 10-11; Eversource 4, p. 32)

65. With the incorporation of an overhead configuration for approximately 65% (2.4 miles) of the 3.7-mile hybrid route, the estimated cost of the Project decreased to $61.1 million (a $30 million decrease), compared to $95.9 million for the overhead 115-kV line between Farmington and North Bloomfield substations. (Eversource 1, Vol. 1, pp. 10-11, 10-13, 10-17; Eversource 4, p. 33).

66. Compared to the overhead alternative between Farmington and North Bloomfield substations, the proposed 115-kV hybrid underground/overhead line between Newington and Southwest Hartford substations would provide the same system benefits at a far lower cost, would be shorter, and would result in fewer impacts to vegetation, wildlife, water resources, and scenic resources. (Eversource 1, Vol. 1, p. 10-16; Eversource 4, pp. 32 – 33)

Non-Transmission Alternatives

67. Eversource retained London Economics International, LLC ("LEI") to prepare a comprehensive analysis of non-transmission alternatives that could address the need served by the transmission solution. LEI concluded that a non-transmission alternative ("NTA") solution – consisting of a combination of demand response and new generation– would be far more costly than the Project and therefore economically impractical. (Eversource 1, Vol. 1, pp. 10-19 – 10-23; Eversource 1, Vol. 2, Exh. 2.D.1; Eversource 4, p. 33)

68. The ISO-NE analyses indicated that an NTA that would resolve the criteria violations in the Greater Hartford Sub-area would require injections in each of the two load pockets that would be joined by the proposed new GHCCRP circuit. In particular, an injection of 196 MW would be required at the Northwest Hartford Substation, which is inside the North Bloomfield – Manchester load pocket; and a 24 MW injection would be required at the Southington Substation, which could serve the South Meadow – Berlin – Southington load pocket. LEI considered the extent to which these injection requirements could be reduced by energy efficiency measures, and what actual supply-side resources would be capable of providing the injections required to satisfy the balance of the need. (Eversource 1, Vol. 1, p. 10-20)

69. LEI developed a hypothetical hybrid NTA consisting of a combination of demand response and new generation. This hypothetical hybrid NTA included the following elements:

- Construction of a 182 MW combined-cycle natural gas fueled turbine generator ("CCGT") at Northwest Hartford Substation and a 24 MW peaking plant of aeroderivative technology at Southington Substation; and
- Incremental demand response of 23 MW at Northwest Hartford Substation and 3 MW at Southington Substation.

(Eversource 1, Vol. 1, p. 10-21; Eversource 4, p. 34)

70. The net cost of LEI's hypothetical NTA was estimated to range from $26 million to $39 million a year, depending on the revenues that the generation components of the NTA would be able to earn. However, this cost was knowingly understated because there were several ancillary costs of the NTA that were not estimated or included. In comparison, the Greater Hartford solution set that included the all-underground Newington to Southwest Hartford line was estimated by LEI to cost approximately $4.6 million per year. When the analysis was adjusted to include the proposed Project in the Greater Hartford solution set instead of a project involving a new all-underground 115-kV line, the annual cost to Connecticut ratepayers dropped to $2.9 million, rendering the cost of the hypothetical NTA to be as much as 13 times greater than the proposed solution. (Eversource 1, Vol. 1, p. 10-21 – 10-23; Eversource 4, pp. 34 – 35)

71. No one has proposed to implement an NTA for the Greater Hartford Sub-area in the five years since ISO-NE identified potential Market Resource Alternatives ("MRAs") for the GHCC projects in 2012. (Eversource 1, Vol. 1, p. 10-22)

IX. TRANSMISSION LINE ROUTE AND CONFIGURATION ALTERNATIVES

72. The GHCCRP transmission line route and configuration evolved over a multi-year period and reflect Eversource's efforts to minimize Project cost, maximize the collocation of the new 115-kV line along existing linear corridors, and limit potential impacts to residential uses and environmental features. (Eversource 4, p. 10)

73. When the need for a new transmission link between Newington and Southwest Hartford substations was initially evaluated, the ISO-NE Working Group concluded that because of the dense urban and suburban development in the Greater Hartford area, the installation of a new 115-kV line in an overhead configuration between these points would be impractical. Eversource was aware of the Amtrak ROW in the Project area; however, the location of two rail lines and ConnDOT's recently developed CT*fastrak* busway within this ROW were anticipated to pose challenges for collocating the new line in the same corridor. Further, the Amtrak ROW does not provide a direct link between the Newington and Southwest Hartford substations. Consequently, initial studies assumed that the new 115-kV line would have to be installed entirely underground, along road ROWs; such an all-underground route was reflected in the December 2015 MCF for the Project. (Eversource 4, pp. 23 – 24, 10 – 11)

74. In the course of its municipal consultations, Eversource, as a result of continued discussions with Amtrak, initiated more detailed analyses of the potential for collocating a portion of the new 115-kV line, in an overhead configuration, along a segment of the Amtrak ROW. Recognizing both that an overhead line design could result in significant cost savings and that the use of the Amtrak ROW could align a majority of the new 115-kV line near commercial and industrial uses (rather than near residential areas), Eversource advised the affected municipalities that such a route was being evaluated and provided initial information about it in the MCF. (Eversource 1, Vol. 1, pp. ES-16, 11-1, 11-15 – 11-16; Eversource 4, pp. 11 – 12)

75. Between the time that the MCF was submitted in December 2015 and the Application was filed in June 2017, Eversource spent considerable time and effort working with Amtrak to determine

whether the collocation of the new 115-kV line, in an overhead configuration, within the Amtrak ROW would be feasible. Ultimately, Amtrak determined that such a collocation would be feasible, thereby allowing Eversource to proceed to work with Amtrak on a license agreement. (Eversource 1,Vol. 1, pp. 11-17 – 11-18; Eversource 4, pp. 12 – 13)

76. After working together to determine if collocation within the Amtrak ROW was feasible, Eversource and Amtrak have agreed to the terms of the license. Eversource has executed the Amtrak license agreement and is sending it to Amtrak for execution. (Eversource 4, p. 13; Transcr. 1, pp. 14 – 15)

77. After determining that the Amtrak ROW could be used for the central, 2.4-mile portion of the new 115-kV line (in an overhead configuration), Eversource evaluated routes and configurations for connecting the Amtrak ROW segment to both Newington and Southwest Hartford substations. Eversource applied standard routing criteria to identify and evaluate alignment options for these route segments. (Eversource 1, Vol. 1, pp. 11-5 – 11-10, 11-27; Eversource 4, pp. 23 – 24)

78. Eversource's analyses identified a preferred underground line configuration and route to connect the new 115-kV line from Southwest Hartford Substation to the Amtrak ROW. This short, approximately 0.17-mile segment extends underground from the proposed transition structure on Amtrak property (west of the Amtrak ROW), across private property and then along New Park Avenue to the substation. (Eversource 1, Vol. 1, pp. 3-3, 11-27 – 11-29; Eversource 4, p. 24)

79. For the approximately 1.16-mile segment of the new 115-kV transmission line between Newington Substation and the Amtrak ROW, Eversource initially identified various route and design configurations, and ultimately conducted more detailed evaluations of 10 route variations. These variations were assessed based on length; constructability; the avoidance or minimization of impacts to land uses, environmental resources, cultural resources, community facilities, transportation, and infrastructure; cost; and input received from municipal and state officials, including the SHPO. (Eversource 1, Vol. 1, pp. 11-28, 11-30 – 11-38; Eversource 4, p. 24)

80. Eversource's analyses determined that a 0.8-mile segment of the new 115-kV line could be aligned entirely within its existing distribution line ROW between Newington Substation and Willard Avenue (State Route 173). The use of this ROW would avoid underground cable construction along various residential streets in Newington and West Hartford, as would be required for two of the route variations considered (Route Variations 1 and 2). Route Variations 1 and 2 were determined to be less preferable because of their comparatively longer lengths and higher cost, as well as public input regarding concerns about increased impacts to traffic and residents. (Eversource 1, Vol. 1, pp. 11-33 – 11-36)

81. The remaining eight route variations between Newington Substation and the Amtrak ROW, all located entirely in the Town of Newington, involved alignment of the new 115-kV line within the 0.8-mile Eversource ROW (using all-underground or hybrid underground-overhead configurations), from Newington Substation to Willard Avenue. From the intersection of the ROW with Willard Avenue, these route variations would extend east to the Amtrak ROW either by (1) traversing first north along Willard Avenue and then proceeding east along Shepard Drive;

or (2) crossing Willard Avenue and then following Spring Street, a narrow, privately-owned road that extends generally due east from Willard Avenue. (Eversource 1, Vol. 1, pp. 11-34 – 11-39)

82. After evaluation, Eversource selected as part of the Proposed Route the alignment along Willard Avenue and Shepard Drive, and including a short segment on private industrial property (Shepard Steel). These roads are sufficiently wide to accommodate cable construction, and would not pose construction challenges. (Eversource 1, Vol. 1, pp. 11-39 – 11-43; Eversource 4, pp. 26 – 28)

83. In comparison to the Proposed Route, the use of Spring Street would represent a slightly shorter route (by 0.17 mile) to reach the Amtrak ROW, but would pose constructability issues because the private road is very narrow (about 20 feet wide) and various utilities (including four underground Eversource distribution circuits) are buried within it. Because cable construction typically requires a 30-foot-wide work space within roads, the new 115-kV line could not be buried within the paved Spring Street surface and easements from adjacent landowners would be required. In addition, Spring Street would have to be closed completely to all traffic to install the 115-kV cable system, likely requiring a temporary construction access road from Shepard Drive to Spring Street and posing inconveniences to the residents and businesses on the street. Further, excavation for the cable system would be required very close to homes listed in the Newington Junction North National Register of Historic Places District. Easements also would have to be acquired from private landowners, including the unknown owner(s) of Spring Street itself. (Eversource 1, Vol. 1, pp. 11-39 – 11-43; Eversource 4, pp. 26 – 28)

84. The final alignment of the underground 115-kV cable and overhead transition Structure 11B on the privately-owned Shepard Steel property (Line List # 12114.03) will be determined as specified in Eversource's easement agreement with the landowner, and will likely be slightly south of the alignment shown on the maps in the Application. The final alignment will be provided in the Project's Development and Management ("D&M") Plan. (Eversource 1, Vol. 3, Ex. C, Mapsheet 4, E.3; DEEP Comments dated 8/18/17, pp. 2 – 3; Transcr. 1, pp. 10 – 11)

85. Within its 0.8-mile ROW, Eversource selected an all-underground configuration for the new 115-kV line. Compared to a hybrid configuration for this section involving an approximately 0.52-mile segment of overhead line (11 split phase monopole structures, each approximately 75 feet tall, as well as two transition structures), the all-underground line design would be slightly less costly (principally because it would require less relocation of the existing 23-kV distribution line circuits located within the ROW) and would minimize visual impacts to nearby residents and impacts to environmental resources. (Eversource 1, Vol. 1, pp. 11-44 – 11-48, Appendix 11A; Eversource 4, pp. 28 – 30; Transcr. 1, pp. 59 – 60)

86. Eversource evaluated, but did not select as preferred, an all-underground route for the new 115-kV line. This all-underground route alternative, which was presented in the MCF and summarized in the Application, would be 3.8 miles in length and would be aligned principally along local and state road ROWs in Newington, West Hartford, and Hartford. Approximately 0.7 mile of the route alternative would be in Newington, while 2.6 miles would be in West Hartford and 0.5 mile would be in Hartford. An estimated 0.71 mile of this route alternative would be along state roads (State Routes 173 and 529). However, compared to the proposed

hybrid 115-kV line, this all-underground route would be significantly more costly ($75 million vs. $43.2 million [excluding the cost of the Newington Tap and substation work]) and would extend through substantially more residential areas. (Eversource 1, Vol. 1. pp. 11-49 – 11-52).

87. Compared to any other route/design variations, the proposed 115-kV line would maximize the use of existing ROWs and would result in substantial cost savings to customers, without causing any significant impacts to environmental resources, land uses, or cultural resources. (Eversource 1, Vol. 1, pp. 11-53 – 11-55)

X. PROJECT DESCRIPTION

88. The Project would consist of a new, approximately 3.7-mile 115-kV combined overhead and underground electric transmission line along the Proposed Route between Newington Substation and Southwest Hartford Substation. Eversource also proposes to make modifications to its existing Newington and Southwest Hartford substations, and to modify its existing 1783 Line connection into Newington Substation ("Newington Tap"). Approximately 92% of the Proposed Route would be aligned within existing Eversource, Amtrak, or public road ROWs. (Eversource 1, Vol. 1, pp. 3-1, 3-3)

115-kV Transmission Line

89. The underground segments of the new line would be aligned within existing ROWs, including an approximately 0.8-mile, Eversource distribution line ROW in Newington, as well as local and state public road ROWs in Newington and Hartford. (Eversource 1, Vol. 1, p. 1-4; Eversource 4, p. 15)

90. The overhead portion of the proposed transmission line would be situated along the eastern side of Amtrak's New Haven-Hartford-Springfield railroad ROW, the western portion of which contains ConnDOT's CT*fastrak* busway. (Eversource 1, Vol. 1, p. 1-4; Eversource 4, p. 15)

91. A transition structure, which is required to switch the 115-kV line from an underground cable to overhead line and vice versa, would be required at each end of the overhead line segment. Both transition structures would be located west of the Amtrak/CT*fastrak* corridor, one on privately-owned land in Newington and the other within the Amtrak ROW in Hartford. (Eversource 1, Vol. 1, p. 1-4; Eversource 4, pp. 15 – 16)

92. Eversource would obtain easements from property owners for the location of the transition structure in Newington, for one new 115-kV line structure in West Hartford that cannot be located within the Amtrak ROW, and for short sections of the underground cable (where the Proposed Route must cross private parking areas or may otherwise have to be located outside of road ROWs). (Eversource 1, Vol. 1, pp. 1-4 – 1-5; Eversource 4, pp. 18 – 19)

93. The following table depicts the Proposed Route mileage, by line configuration and municipality:

Proposed 115-kV Line Configuration	Municipality (Approximate Miles)			Total
	Newington	West Hartford	Hartford	
Underground	1.16	0	0.17	1.33
Overhead	0.17	1.64	0.56	2.37
Total	**1.33**	**1.64**	**0.73**	**3.70**

(Eversource1, Vol. 1, p. 1-8)

Underground Cable

94. The new 115-kV line would include two underground cross-linked polyethylene ("XLPE") cable segments, totaling approximately 1.3 miles, along the southern and northern portions of the Proposed Route. (Eversource 1, Vol. 1, p. 1-5; Eversource 4, p. 14)

95. The underground cables would be installed in polyvinyl chloride ("PVC") ducts encased in concrete duct banks, which will also house three fiber optic cables. Two of these fiber optic cables would be used for remote protection and control of the cable system, and the third would be used for monitoring the operating temperature of the cables. (Eversource 1, Vol. 1, pp. 1-6, 3-4; Eversource 4, p. 15)

96. The underground segment in Newington would extend approximately 1.1 miles from Newington Substation east/northeast to the Amtrak ROW. The underground cable would be located for approximately 0.8 mile on Eversource's property and within Eversource's existing distribution line ROW between Newington Substation and State Route 173 (Willard Avenue). From the intersection of the Eversource ROW and State Route 173, the cable route would be aligned north along State Route 173 for approximately 0.14 mile, and then east for approximately 0.13 mile along Shepard Drive and across a privately-owned paved parking area to a transition structure to located west of and adjacent to the Amtrak ROW. Along this underground segment, three splice vaults would be required; all three splice vaults would be located in upland areas, two on Eversource property and one along Shepard Drive. (Eversource 1, Vol. 1, pp. 1-6, 3-4, Eversource 4, p. 15)

97. The underground segment in Hartford would extend for approximately 0.17 mile, traversing from a transition structure located within the Amtrak ROW at the north end of the overhead line segment into Southwest Hartford Substation. From the transition structure, the underground cable would extend west for approximately 0.1 mile across the northern portion of the paved parking lot for the Bow-Tie Cinemas, which is situated directly south of Interstate 84, and then would turn north along New Park Avenue, crossing beneath Interstate 84 to Southwest Hartford Substation (located adjacent to and west of New Park Avenue). (Eversource 1, Vol. 1, pp. 1-6, 3-4; Eversource 4, p. 16)

98. The exact location of the cable and splice vaults would be determined based on final engineering design, taking into consideration the constraints posed by existing buried utilities, the location of other physical features, and the requirements and preferences of the entity that owns each road or property (municipality, state or private). The final alignment would be depicted in the Project's D&M Plan. (Eversource 1, Vol. 1, p. 3-5)

99. The underground cable would extend for approximately 0.8 mile within Eversource's existing ROW, which is presently occupied by five distribution line circuits (two double-circuit overhead lines and an underground line). Approximately 80% of this segment of "ROW" is located on Eversource fee-owned property. As to the remainder of the ROW, Eversource has underground cable installation rights. (Eversource 4, p. 18)

Overhead Line

100. From the transition structure located at the end of the underground cable segment in Newington, the overhead portion of the line would span the CT*fastrak* and Amtrak's two existing rail lines and then would extend north for approximately 2.4 miles along the east side of the Amtrak ROW in West Hartford and Hartford. South of Interstate 84, the overhead line would turn west, again spanning the Amtrak property west of the CT*fastrak* to another transition structure. (Eversource 1, Vol. 1, pp. 1-8, 3-3 – 3-4; Eversource 4, pp. 15 – 16)

101. Along the overhead line segment of the Proposed Route, the Amtrak ROW, which Amtrak owns, varies in width from 86 feet to 155 feet, but typically is 93 to 115 feet wide. (Eversource 1, Vol. 1, p. 3-7; Eversource 4, p. 16)

102. Along the Amtrak ROW, the proposed 115-kV line would typically consist of galvanized steel monopoles, approximately 95 to 110 feet in height above ground level, in a vertical configuration. Each of the two transition structures would be a steel monopole, approximately 95 to 105 feet in height above ground level. In total, 51 overhead transmission line structures – including the transition structures – would be installed. (Eversource 1, pp. 1-8, 3-5)

103. In its August 14, 2017 comments regarding the Project, ConnDOT raised a concern as to whether Structures 47 and 48, which are proposed for location in the vicinity of ConnDOT's planned West Hartford Rail Station, would pose any safety issues or would conflict with the design of the proposed station. In response, Eversource proposed two options for the construction of Structures 47 and 48:

- Structures 47 and 48 could be constructed to maintain the required clearances to the proposed West Hartford Rail Station by increasing their height from the currently proposed height of 107 feet. Until Eversource receives and reviews ConnDOT's 30% design plans for the railroad station, it cannot determine the precise height of Structures 47 and 48 needed to achieve required clearances over the station, but it expects the "worst case scenario" would be that the two structures would be approximately 140 feet, based upon the design information provided to date by ConnDOT. However, depending upon the final design of the West Hartford Rail Station, Structures 47 and 48 may only need to be between 125-130 feet.

- Eversource could design and build the structures in the vicinity of the West Hartford Station with the expectation that the height of Structures 47 and 48 may need to be increased at a later date, once it is certain that the proposed station will be built, and in a manner similar to the currently available conceptual design. Under this option, Structures 46 and 49 would be built as dead-end structures with drilled shaft foundations, and Structures 47 and 48 would be designed with flange points that would allow the height of these structures to be raised if the proposed railroad station is built.

The first option would have an incremental cost of $170,000 over the cost of the proposed design of 107-foot structures. For the second option, there would be two sets of costs for including this "design flexibility" in the Project: one would be the certain incremental cost to erect the structures as part of the Project ($160,000); and the second, contingent, future set of costs would be for modification of the structures, if required ($285,000).

Eversource recommends the first option because: (1) it would be initially only slightly more costly (by $10,000) than the certain of incremental costs for the second option and would avoid the likely additional $285,000 future cost of raising the structures later; and (2)ConnDOT has indicated that constructing the West Hartford Rail Station is a high priority (and therefore Eversource believes it will likely be built).

(ConnDOT comments dated 8/14/17, p. 2; Eversource 8; Transcr. 1, pp. 12 – 13, 39, 57)

104. Structure locations along the Amtrak ROW have been, and would continue to be, reviewed and approved by Amtrak. (Eversource 1, Vol. 1, p. 3-4)

105. Structure foundations for the overhead portion of the Proposed Route are expected to be direct embedded for tangent structures and drilled shaft (concrete) for strain and dead-end structures. Braced-post suspension and I-string suspension insulator assemblies are expected to be used for tangent structures, while strain dead-end insulator assemblies are expected to be used for strain and dead-end structures. (Eversource 1, Vol. 1, p. 3-4)

106. In determining the line design along the Amtrak railroad ROW, Eversource recognized that standard overhead configurations, as used for structures placed on wider transmission line ROWs, could not be applied to the constrained work space within the Amtrak ROW. In addition, Eversource's transmission line design had to avoid impacts to the adjacent Amtrak railroad lines by locating structures as close to the eastern edge of the ROW as possible and by confining potential wire blowout, to the extent possible, to avoid crossing the edge of the ROW. (Eversource 1, Vol. 1, p. 3-6; Eversource 4, p. 16)

107. Amtrak requested that Eversource's design account for the following:

- A future electrification catenary structure line to the west of the proposed overhead 115-kV transmission line and east of the existing two railroad tracks.

- A future planned regional train station east of and adjacent to the tracks, just south of Flatbush Avenue in West Hartford.
- Where possible, provide room for a 10-foot-wide access road along the eastern portion of the ROW for Amtrak's use.
- Where possible, maintain 18 feet from the center of the easternmost railroad track to the face of each proposed transmission structure.

(Eversource 1, Vol. 1, pp. 3-6 – 3-7; Eversource 4, pp. 16 – 17; Eversource 7, Q-CSC-012)

108. In order to accommodate Amtrak's design requirements (as outlined above), the proposed 115-kV structures along the Amtrak ROW must be taller and more closely spaced than would be the case along a typical transmission line ROW. For example, most spans between the proposed structures along the Amtrak ROW would be approximately 250 to 300 feet. In comparison, along an existing, wider ROW, new 115-kV transmission structures would typically be shorter and spaced at 600- to 800- foot intervals. (Eversource 1, Vol. 1, p. 3-7; Eversource 4, p. 17)

109. Structure locations may be modified as the Project design process proceeds and coordination with Amtrak continues. Future changes could occur based on information obtained from more detailed field studies, as well as input from municipalities, the Council, and other regulatory agencies. Final detailed line engineering would be performed to determine the exact locations of the new structures; however, typically, the final structure locations are expected to be within 20 feet (longitudinally along the line) of the proposed structure locations as depicted in Eversource's Application. (Eversource 1, Vol. 1, p. 3-7; Eversource 4, pp. 17 – 18)

Substation Modifications

Newington Substation and Newington Tap

110. Newington Substation is located in the northwestern portion of the Town of Newington and occupies approximately 1.7 acres of an 11.4-acre property owned by Eversource. The property is bordered by single-family residential properties on all sides, along Cherry Hill Drive to the north, Avery Road to the east, Barnard Drive to the southeast, Reservoir Road to the south, Thornton Drive to the southwest, and Quincy Lane to the west. The substation property is currently accessible via Cherry Hill Drive. (Eversource 1, Vol. 1, p. 1-9; Eversource 4, p. 19)

111. Newington Substation has been in operation for about 60 years. It is a 115- to 23-kV substation with three 115- to 23-kV transformers. The existing 1785 Line and the 1783 Line each connect to separate circuit breakers within the substation. A transformer connects to these two circuit breakers. Each of the existing 115-kV lines leaves the substation overhead. Existing distribution lines extend from the substation to the north, east and west. (Eversource 1, Vol. 1, pp. 1-9 – 1-10, 3-18; Eversource 4, pp. 19 – 20)

112. As part of the Project, the existing 1783 Line position would be relocated to accommodate the connection of the new 115-kV underground line (the 1346 Line) to the existing 1783 Line position. The final configuration for each terminal position would include one lightning arrestor,

one disconnect switch, and one Capacitance Coupling Voltage Transformer ("CCVT") per phase. (Eversource 1, Vol. 1, p. 1-10; Eversource 4, p. 20)

113. The existing substation 115-kV yard would be reconfigured into a ring bus, with two new circuit breakers in an open air double-breaker assembly. One overhead line terminal position would be relocated and one underground line terminal position would be new. One disconnect switch (per phase) would be installed on either side of the double-breaker assembly for operation and maintenance, and one additional disconnect switch would be installed in the ring bus for future maintenance. (Eversource 1, Vol. 1, pp. 1-10, 3-20)

114. In order to relocate the 1783 Line interconnection in the substation, a new steel dead end structure would be installed within the substation. This structure would be approximately 70 feet high, and the transmission line phase conductors would be attached approximately 40 feet above the ground. The substation take-off structure would include a three-phase motor-operated disconnect switch and a wave trap located on one phase. (Eversource 1, Vol., 1, pp. 1-11, 3-20; Eversource 4, p. 20)

115. The new underground 1346 Line would be transitioned to a rigid substation bus, using one pothead per phase. The height of this terminal would be 16.5 feet, which is the approximate height of the existing bus. The line terminal position would include the installation of a new motor-operated disconnect switch. This three-phase disconnect switch would have a control and indication cable routed underground to the existing control enclosure. A new duct bank would be constructed within the substation for these control and indications cables, in addition to the duct bank that currently exists within the substation. (Eversource 1, Vol. 1, pp. 1-10, 3-20)

116. A new control enclosure (approximately 32 feet by 14 feet) would be constructed to house new protection and control equipment, primarily DC battery components. (Eversource 1, Vol. 1, pp. 1-10, 3-20; Eversource 4, p. 20)

117. To accommodate the modifications required to interconnect the new 115-kV transmission line, Eversource proposes to expand the substation by approximately 30 feet to the south. In addition, a 160-foot section of the substation's western fenced area would be expanded by approximately 20 feet to the west to provide space for the construction of a new battery enclosure. In total, the developed portion of the substation would be expanded by approximately 0.3 acre. A cast-in-place concrete retaining wall would be built on the south and west sides of the substation fence line to maintain the grade for that expanded portion of the substation. (Eversource 1, Vol. 1, p. 3-18; Eversource 4, pp. 2, 20)

118. As part of the Project, Eversource proposes to relocate and reconductor the Newington Tap, the 0.01 mile interconnection to the existing 115-kV 1783 Line into Newington Substation. In particular, the 1783 Line entry to the substation would be relocated from the current bay position to the west side of Newington Substation to a new bay position on the south side of the substation. (Eversource 1, Vol. 1, p. 3-21; Eversource 4, pp. 21 – 22)

119. Structure modifications to the Newington Tap would include relocating guys and anchors, as well as replacing cross arms and cable support hardware. Structure 16072, a three-pole structure located south of the substation, would be removed and replaced with a new monopole structure

in generally the same location. The new structure would be approximately 30 feet taller than the existing structure to accommodate the line taps required to connect to the new bay position. (Eversource 1, Vol. 1, p. 3-21)

120. The modifications to the Newington Tap would entail work both within the Newington Substation yard and within Eversource's existing transmission line ROWs located immediately adjacent to the substation. (Eversource 1, Vol. 1, p. 3-21)

Southwest Hartford Substation

121. Eversource's Southwest Hartford Substation is located in the southwestern portion of the City of Hartford and currently occupies approximately 2.1 acres of a 7.1-acre Eversource property. The property was acquired for utility use in 1968. Currently, two 115-kV underground high-pressure fluid filled ("HPFF") cables (the 1722 Line and the 1704 Line), and nine 23-kV distribution lines connect to the substation. (Eversource 1, Vol. 1, p. 1-11; Eversource 4, pp. 20 – 21)

122. As part of the Project, Eversource proposes to reconfigure the existing 115-kV yard into a ring bus, with two new 115-kV circuit breakers. One line terminal position would be added, and one disconnect switch (per phase) would be installed on either side of each circuit breaker for operation and maintenance. (Eversource 1, Vol. 1, p. 3-23; Eversource 4, p. 21)

123. The relocated 1704 Line and the new 1346 Line would both enter the Southwest Hartford Substation underground. Each line would have one series reactor per phase (three per line position), as well as a circuit switcher, disconnect switch, arrestor, CCVT, and pothead per phase. Although the lines would enter the substation underground, a bypass is necessary for the operation of the reactors. This would require two new approximately 70-foot dead end structures per line within the substation. The bypass would require strain bus that would be tensioned between the two dead-end structures. These dead-end structures would accommodate all the equipment except the circuit switchers and reactors, which would be installed on their own structures with foundations. (Eversource 1, Vol. 1, p. 3-23; Eversource 4, p. 21)

124. Eversource would extend the existing substation ground grid as required, to address the expanded substation footprint. All structures and equipment casing would be tied to this grid using appropriate ground conductor. Foundations, conduits and the substation fence would be grounded. (Eversource 1, Vol. 1, p. 3-21; Eversource 4, p. 21)

125. To accommodate the new equipment, Eversource proposes to expand the existing fenced area by approximately 65 feet to the east and relocate the existing access road and gates off New Park Avenue. Grading and drainage improvements would be performed, as required. (Eversource 1, Vol. 1, p. 3-21; Eversource 4, p. 21)

XI. GENERAL PROJECT CONSTRUCTION PROCEDURES

126. The proposed Project would be constructed, operated, and maintained in accordance with established industry practices, as well as pursuant to Eversource's specifications. Construction, operation, and maintenance activities also would conform to any conditions identified in the Council's Decision and Order and in federal and state permits obtained for the Project. (Eversource 1, Vol. 1, p. 4-1)

Overhead Transmission Line

127. Eversource's license agreement with Amtrak may specify certain non-standard construction methods and schedules, including the performance of Project activities during select night-time hours to avoid or minimize conflicts with rail operations. (Eversource 1, Vol. 1, p. 4-3; Eversource 4, p. 35)

128. Eversource would prepare material staging sites (e.g., storage, staging, and laydown areas) to support the construction effort. Limited work space is available within the Amtrak ROW next to the active rail lines. Eversource anticipates that small staging areas may be established along the east side of the Amtrak ROW to provide additional temporary work space as needed to support the overhead transmission line construction. (Eversource 1, Vol. 1, p. 4-2; Eversource 4, p. 35)

129. ROW preparation is one of the first steps in the transmission line construction process. ROW preparation activities typically involve vegetation removal and the associated deployment of erosion and sedimentation ("E&S") controls. However, vegetation removal is expected to be minimal as the entire Amtrak ROW is already cleared of tall-growing vegetation. In addition, exclusion fencing or other types of boundary markings are typically installed to demarcate areas of restricted construction access or environmental sensitivity. (Eversource 1, Vol. 1, pp. 4-5, 4-6)

130. Access to each transmission structure site would be required during construction. The existing Amtrak access road that is aligned east of and parallel to the railroad tracks would be used for construction to the extent practical, as would other existing access presently used for rail line maintenance. Where no access road is available to a specific structure location within the Amtrak ROW, Eversource would identify appropriate access to work sites from public road crossings or from properties adjoining the railroad corridor. Eversource would negotiate appropriate easements for access across private properties. (Eversource 1, Vol. 1, p. 4-6; Eversource 4, p. 36)

131. Grading may be required to develop or to improve access roads. Access road improvements typically would include widening roads as needed to provide a minimal travel surface approximately 16 feet wide with 2-foot-wide shoulders on either side (additional width would be needed at turning or passing locations). Access roads would be graveled. (Eversource 1, Vol. 1, p. 4-7)

132. Work pads would be used to provide a safe, level work base for construction equipment to install structure foundations and erect the structures; in addition, work pads would be used to stage structure components for final on-site assembly. (Eversource 1, Vol. 1, p. 4-7; Eversource 4, p. 36)

133. The specific locations and configurations of work pads would be determined during final Project design and coordinated with Amtrak. In general, work pads for the line construction along the Amtrak ROW are expected to range from 3,000 to 5,000 square feet for tangent structures, and 10,000 to 20,000 square feet for angle and deadend structures. Work pads would be sized to accommodate the equipment required to excavate the structure foundations, install the transmission line structures, and string conductor. (Eversource 1, Vol. 1, p. 4-8)

134. Pulling pads, which would be required in certain locations along the Amtrak ROW for conductor and optical ground wire ("OPGW") installation, would be designed in accordance with Eversource requirements, factoring in the constraints posed by the width of the Amtrak ROW. The exact locations and configurations of pulling pads would be determined during final Project design. (Eversource 1, Vol. 1, p. 4-8)

135. The tangent structures would typically be direct embedded; angle, dead-end, and transition structures would typically have a drilled shaft foundation. Excavations for line-structure foundations would typically be accomplished using mechanical excavators (drill rigs) and pneumatic hammers. (Eversource 1, Vol. 1, p. 4-8)

136. Structures would be delivered to installation locations in sections, then assembled and installed with a crane. (Eversource 1, Vol. 1, p. 4-9)

137. Various pulling sites would be established along the transmission line route. The selection of these sites would be based on a variety of factors, including: accessibility, angles within the line sections where the conductors would be pulled, the location of dead-end structures, the length of conductors and OPGW to be pulled, puller capacity, and snub structure loads. Conductor pulling sites would also be determined based upon the design load of the structures and the avoidance or minimization of environmental effects. Specific conductor pulling sites would be identified by the Project construction contractor, in consultation with Eversource. (Eversource 1, Vol. 1, pp. 4-9 – 4-10)

138. Cleanup and restoration activities would include the removal of construction debris, signs, flagging, and fencing, as well as the removal of temporary access roads and work pads. Areas affected by construction would be re-graded as practical and re-stabilized using gravel, paving or seeding. Temporary E&S controls would remain in place, where needed, until site stabilization is achieved. (Eversource 1, Vol. 1, p. 4-10; Eversource 4, pp. 36 – 37)

Underground Transmission Cable

139. The first steps in the underground cable construction process would be to remove vegetation where required (particularly within the Eversource ROW); establish access roads, where required; and deploy appropriate E&S controls at locations where pavement or soils would be

disturbed. Construction would conform to Eversource's Best Management Practices Manual for Massachusetts and Connecticut (Construction & Maintenance Environmental Requirements) September 2016 ("BMP Manual") and any Project specific siting and regulatory conditions. (Eversource 1, Vol. 1, p. 4-16; Eversource 4, p. 37; Eversource 5, p. 19)

140. Along the Eversource ROW, access roads would need to be established to provide ingress and egress to work sites from public roads. Through wetland areas along the ROW, access roads would be temporary and would be constructed using timber mats. In upland areas, access roads would typically be graveled and – on Eversource properties – may be constructed to provide permanent access to the underground line segment. (Eversource 1, Vol. 1, p. 4-17; Eversource 4, p. 37)

141. The underground cable system would consist of an XLPE cable with splice vaults at intervals as required. In uplands and roads, an XLPE cable trench typically requires an excavation of 6-10 feet deep and about 5 feet wide. In wetlands, the cable trench would typically be 8-10 feet deep and less than 10 feet wide. (Eversource 1, Vol. 1, pp. 4-12, 6-7; Eversource 4, p. 2; Eversource 5, pp. 20-21)

142. For cable trench excavation in wetlands, excavated material would be placed into dump trucks and transported to either a suitable disposal site or temporary storage site. If groundwater is encountered, dewatering would be performed in accordance with authorizations from applicable regulatory agencies and may involve discharge to catch basins, temporary settling basins, wetland filter bags, temporary holding tanks, or vacuum trucks. (Eversource 1, Vol. 1, p. 4-17; Eversource 7, Q-CSC-026)

143. At three upland locations along the underground cable segment in Newington, pre-cast concrete splice vaults would be installed below ground. Each vault would have two entry points, via manholes, to the surface. After the area is backfilled and restored, only the manhole covers would be visible; these covers would be flush with the ground or road surface. (Eversource 1, Vol. 1, p. 4-19; Vol. 3)

144. The outside dimensions of the pre-cast splice vaults for 115-kV XLPE cables are approximately 8 feet wide by 8 feet high and 24 feet long. The installation of each splice vault typically requires an excavation area approximately 12 feet wide, 12 feet deep, and 28 feet long. The actual burial depth of each vault would vary, based on site-specific topographic conditions and on the depth of the adjacent cable sections that must be interconnected within the vault. (Eversource 1, Vol. 1, p. 4-12)

145. The cable duct bank system would be installed between splice vaults, or between splice vaults and cable termination points. The conduit would be installed in sections, each of which would be about 10 to 20 feet long, with a bell and spigot connection. (Eversource 1, Vol. 1, p. 4-19)

146. After installation in the trench, the conduits would be placed into spacers that hold the conduit in the desired configuration and then encased in high strength concrete. The trench would be backfilled with approved material with sufficient thermal characteristics to help dissipate the heat generated by the cables. (Eversource 1, Vol. 1, p. 4-19)

147. The exact location of the duct bank and the splice vaults would be determined based on final engineering design, taking into account the constraints posed by existing buried utilities and the location of other physical features. (Eversource 1, Vol. 1, p. 4-13)

148. During non-work hours, steel plates would be installed over the open trench within paved roads to maintain traffic flow. Similar plates may be installed over open trench areas in paved parking areas, or temporary fencing may be erected around such locations if traffic flow does not need to be maintained. (Eversource 1, Vol. 1, p. 4-19)

149. After successful testing of the conduits, the transmission cables and ground continuity conductors would be installed and spliced. Cable reels would be delivered to each splice vault location, where the cable would be pulled in to the conduit using a truck-mounted winch and special cable handling equipment. (Eversource 1, Vol. 1, p. 4-20; Eversource 4, p. 38)

150. After the transmission cables and ground continuity conductors are pulled into their conduits, the ends would be spliced together in the vaults. Splicing XLPE cables involves a complex procedure that requires a "clean room" atmosphere, which would be provided by an enclosure or vehicle that must be located over the manhole access points during the splicing process. It would take approximately five to seven days to complete the splices in each splice vault. (Eversource 1, Vol. 1, pp. 4-20 – 4-21)

151. The fiber optic cables would be spliced and pulled into a pre-cast hand hole located near each splice vault location. (Eversource 1, Vol. 1, p. 4-20)

152. At Newington and Southwest Hartford substations, terminations would be connected to the ends of the cables. The terminations would link the underground cables to switches and bus work within the substations. (Eversource 1, Vol. 1, p. 4-21)

153. Any rock encountered during excavation would typically be removed using mechanical methods, which might be supplemented by controlled drilling. Geotechnical investigation would be performed to confirm the presence/absence of rock and to determine the technological choice of the type of drill head, earth removal method, and operation procedure. (Eversource 1, Vol. 1, p. 4-21)

154. After installation of the duct bank and splice vaults, restoration would be performed as appropriate. Temporary E&S controls would remain in place, as needed, until stabilization is achieved. Along the cable route within roads and parking lots, the areas affected by construction would be repaved. (Eversource 1, Vol. 1, p. 4-23; Eversource 4, p. 38)

Substation and Newington Tap Modifications

155. Site preparation work would include vegetation removal within the substation expansion areas, followed by grading and filling as necessary to create a level area for the new substation facilities. (Eversource 1, Vol. 1, pp. 4-32; Eversource 4, p. 38)

156. At Newington Substation, a retaining wall would be installed along the south and west sides of the substation expansion area. (Eversource 1, Vol. 1, pp. 4-32)

157. Temporary E&S controls would be installed prior to the filling and grading work, and maintained as necessary throughout construction. Such controls would conform with BMPs, including those provided in the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control* and Eversource's BMP Manual. (Eversource 1, Vol. 1, pp. 4-32, 4-35)

158. Foundations would be required for the battery enclosure (approximately 41 feet by 14 feet) at Newington Substation, and for all steel structures that support electrical equipment at both substations. The foundation installation process would involve excavation, form work, steel reinforcement, and concrete placement. (Eversource 1, Vol. 1, pp. 4-32, 4-35)

159. After the foundation is installed, steel support structures for electrical equipment would be erected. Protection and control conduits, as well as ground-grid conductors, would be installed beneath the substation grade. (Eversource 1, Vol. 1, pp. 4-32 – 4-33, 4-35)

160. At Newington Substation, an enclosure to house the primary and backup battery system for the protection and control equipment would be installed. (Eversource 1, Vol. 1, pp. 4-32 – 4-33)

161. New structures and associated conductors would be installed to connect the new transmission line terminals at both substations to the new 115-kV transmission facilities. All of the new equipment would be tested prior to final connection to the transmission grid. (Eversource 1, Vol. 1, p. 4-33)

162. For modifications to the Newington Tap, construction access road and work pad areas would be installed for the installation of the new structures and the removal of the existing Tap structures. Grading may be required to create a stable base for drilling and other structure installation and removal equipment. Vegetation clearing/trimming within the boundaries for the Tap modifications would be performed. (Eversource 1, Vol. 1, p. 4-34)

163. For the Newington Tap modifications, existing structures being replaced would be demolished and removed from the property, as well as the existing shield wires, conductors, and other line materials on the spans being removed. (Eversource 1, Vol. 1, p. 4-34)

164. Areas of disturbed soils within the substation fence would be surfaced and stabilized with trap rock or gravel. Areas of disturbed soils located outside the substation fence typically would be seeded, mulched and allowed to re-vegetate in low-growing shrub or grass species. (Eversource 1, Vol. 1, p. 4-33)

165. After the completion of construction, any remaining construction debris would be removed from the substation sites. Temporary erosion controls would be maintained until the disturbed areas are satisfactorily stabilized. (Eversource 1, Vol. 1, p. 4-33)

166. After certification of the Project, Eversource would prepare and submit a D&M Plan for Council approval that would detail the procedures to be used to construct the proposed transmission

facilities. The D&M Plan would incorporate the conditions of the Council's Certificate for the Project, as well as conditions of the permits received from other regulatory agencies, as appropriate. Eversource would monitor conformance of construction activities with the D&M Plan, the Council's Certificate, other regulatory requirements, and Company standards. (Eversource 1, Vol. 1, p. 4-35; Eversource 5, pp. 27 - 31)

XII. ENVIRONMENTAL RESOURCES, EFFECTS, AND MITIGATION MEASURES

Geology, Topography, and Soils

167. The Project area is situated within Connecticut's Central Valley (or Newark Terrane), which is within the Connecticut River Valley. Elevations along the Proposed Route range from 50 to 200 feet above mean sea level, and are 150 feet and 50 feet above mean sea level at Newington Substation and Southwest Hartford Substation, respectively. (Eversource 1, Vol. 1, pp. 5-2, 5-50, 5-56)

168. The Project area does not encompass any trap rock or amphibolite ridge areas as identified in CGS Section 8-1aa (1). (Eversource 1, Vol. 1, p. 5-3)

169. The soils in the Project area have been extensively disturbed by urban/suburban uses and infrastructure developments and consist primarily of Udorthents and Urban Land. Three soil types identified as prime farmland and one soil type identified as farmland of statewide importance are located along portions of the Project Area in Newington; however, none of these soils are presently used for agricultural purposes. (Eversource 1, Vol. 1, pp. 5-4 – 5-5)

170. The Project would have minimal and highly localized effects on topography and soils. Minimal to no grading would be required to install the 115-kV cable underground within Eversource's ROW, road ROWs, or other paved surfaces. The installation of the overhead transmission line segment within the Amtrak ROW is not anticipated to result in grade changes. Localized impacts to soils would occur as a result of activities such as excavating the cable trench and splice vaults, as well as overhead structure foundations. (Eversource 1, Vol. 1, p. 6-2; Eversource 5, p. 18)

171. If soil, subsoil, or rock excavated from the cable system must be temporarily stored on-site, measures would be implemented to avoid or minimize the potential for sedimentation outside of approved work spaces into water resources and/or into catch basins. Along the overhead transmission segment within the Amtrak ROW, spoils excavated during structure foundation work would either be temporarily stockpiled in approved work spaces or live-loaded to dump trucks for off-site disposal in accordance with applicable regulations. (Eversource 1, Vol. 1, p. 6-3)

172. After the installation of the cable system duct bank and splice vaults, any disturbed areas would be restored to grade (as required) and repaved or otherwise stabilized. Work areas along the Amtrak ROW affected by the overhead transmission structure installation would be similarly restored and stabilized. (Eversource 1, Vol. 1, p. 6-2; Eversource 5, p. 18)

173. At Newington Substation, an approximately 0.3-acre upland area located immediately south and west of the existing station fence would be graded and filled to create a level surface for the new substation facilities, and a retaining wall would be installed. No grading or filling would be done within wetlands; appropriate erosion and sedimentation controls would be installed to minimize the potential for erosion into nearby wetlands. (Eversource 1, Vol. 1, pp. 6-25 – 6-26; Eversource 5, p. 19)

174. The modifications to Southwest Hartford Substation would involve a 0.3-acre expansion of the substation fence in an upland area, as well as realignment of the substation access road from New Park Avenue. These modifications would require minor grading and soil disturbance. (Eversource 1, Vol. 1, p. 6-33; Eversource 5, p. 19)

175. Except for the installation of the new overhead Tap monopole structure in an upland area, the Newington Tap modifications would not require permanent fill; temporary work pads would be used to stage the construction activities needed to remove four existing 115-kV poles and to install the new overhead Tap structure. (Eversource 1, Vol. 1, p. 6-26, Eversource 5, p. 18).

176. All Project activities involving soil disturbance (e.g., vegetation clearing, grading, filling, excavation) would be performed in accordance with Eversource and state requirements including Eversource's BMP Manual and the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control (revised 2007),* as well as DEEP's *General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities.* Eversource would prepare a Project-specific *Stormwater Pollution Control Plan* that would incorporate these requirements, including specifications for the deployment and maintenance of temporary erosion and sedimentation control measures during construction. (Eversource 1, Vol. 1, pp. 6-3 – 6-4, 6-26 – 6-27, 6-33; Eversource 5, pp. 19 – 20)

Watercourses

177. The Project area is located within the Connecticut River Major Drainage Basin and the Park River Regional Drainage Basin. (Eversource 1, Vol. 1, p. 5-6)

178. The proposed Project facilities are located near five watercourses, all of which are assigned a Class A water quality classification by DEEP. These watercourses include three un-named tributaries to Piper Brook (two intermittent and one perennial), Trout Brook, and an un-named tributary to the South Branch of the Park River. (Eversource 1, Vol. 1, pp. 5-10 – 5-11, Vol. 3, Ex. B and C; Eversource 7, Q-CSC-029)

179. None of the watercourses in the Project area are designated as a National Wild and Scenic River or as Connecticut protected rivers. (Eversource 1, Vol. 1, p. 5-9)

180. Eversource has planned the Project to avoid impacts to all but two of the five watercourses. The Project would span Trout Brook along the Amtrak ROW and would avoid one of the intermittent tributaries to Piper Brook and the un-named tributary to the South Branch of the Park River. The remaining two small un-named tributaries to Piper Brook, both located along the 115-kV line underground segment in Newington, would be temporarily affected by the installation of the

cable duct bank using an open cut method. (Eversource 1, Vol. 1, pp. 6-5 – 6-6, 6-20 – 6-21, 6-27, 6-34; Vol. 3, Ex. B and C; Eversource 5, pp. 11 – 12, Eversource 7, Q-CSC-029)

181. The un-named perennial tributary to Piper Brook (referred to as PS-1) is culverted beneath Shepard Drive in Newington. The underground cable could be aligned across stream PS-1 either north or south of the culverted road crossing. The exact alignment of the cable across this stream would be determined during final Project design and would be included in the D&M Plan. (Eversource 1, Vol. 1, pp. 4-26, 6-6)

182. The use of an open cut method to install the cable beneath the two watercourses in Newington would minimize construction activities in and near the streams and would result in approximately 0.03 acre of temporary impacts to stream substrates. (Eversource 1, pp. 6-5 – 6-6; Eversource 5, p. 20; Eversource 7, Q-CSC-029)

183. Eversource would perform the watercourse crossings in accordance with Eversource's BMP Manual and in accordance with the conditions of Project-specific water resource permits from the U.S. Army Corps of Engineers (USACE) and DEEP. (Eversource 1, Vol. 1, pp. 4-23 – 4-24, 6-5)

184. No Project facilities would be located in any Federal Emergency Management Agency (FEMA) designated 100-year floodplains or floodways. Temporary access roads may be situated within a FEMA-designated 500-year floodplain, which is located near proposed Structures 29 to 34 along the Amtrak ROW in the Town of West Hartford. (Eversource 5, pp. 13 – 14)

Wetlands

185. Wetlands in the Project area were identified and delineated by soil and wetland scientists using procedures established by the USACE and in accordance with the Connecticut Inland Wetlands and Watercourses Act. (Eversource 1, Vol. 2, Exhibit 2A, p. 3-1; Eversource 5, p. 5)

186. Seven wetlands, each of which meets federal and state jurisdictional criteria, were delineated along the Proposed Route of the 115-kV line or at the substations. Four of these wetlands are located along the underground segment in Newington; wetlands N-2, N-3, and N-4 are located along the Eversource ROW, while wetland N-5 is situated along the un-named tributary to Piper Brook adjacent to Shepard Drive. Two wetlands (designated N-1 and N-1A are located south and west of Newington Substation and will be affected temporarily by Project activities. The last wetland, designated as H-1, is situated on the northern portion of the Southwest Hartford Substation property and will not be affected by the Project. (Eversource 1, Vol. 1, pp. 5-11 – 5-12, 5-51, 5-56; Vol 2, Exhibit 2A; Vol. 3, Ex. B and C; Eversource 5, pp. 11 – 12)

187. The wetlands along Eversource's ROW consist of palustrine emergent marsh and palustrine scrub-shrub habitats within the managed portions of the ROW and typically palustrine forested habitat within the unmanaged portions of the ROW. Wetlands at Newington Substation are primarily palustrine scrub-shrub habitat. The invasive species, common reed (*Phragmites australis*), was a dominant species in wetlands N-1, N-1A, N-2, and N-3. (Eversource 1, Vol. 1 pp. 5-11 – 5-12, 5-51; Vol. 2, Exhibit 2A)

188. No vernal pools were identified along the Proposed Route or at the substations. Vernal pool surveys were conducted in the spring of 2017. (Eversource 1, Vol. 2, Ex. 2A; Eversource 5, pp. 5 – 6).

189. As a result of the use of temporary timber mats to create site access and work pads, the construction of the Project would result in approximately 1.55 acres of temporary impacts to wetlands along the 115-kV transmission line route and 0.51 acre of temporary impacts to wetlands during the modifications to Newington Tap. (Eversource 1, Vol. 1, pp. 6-7 – 6-8; 6-28; Eversource 5, p. 20)

190. Approximately 0.24 acre of tree clearing would be required in forested wetlands along the Proposed Route. These forested wetlands would be permanently converted to scrub-shrub or emergent wetlands, representing a long-term cover type change to wetland habitat, but not a net loss of wetlands. In forested wetlands, stumps would be left in place where practical. (Eversource 1, Vol. 1, pp. 6-7 – 6-8; Eversource 5, p. 20; Eversource 7, Q-CSC-028)

191. Eversource would implement wetland invasive species control BMPs during construction, as required per USACE permit requirements. Such measures would be incorporated into the Project D&M Plan. (Eversource 7, Q-CSC-027)

192. To minimize or avoid potential impacts to wetlands, Eversource would require construction activities to conform to the Council's certificate and federal and state permits pertaining to wetlands and to the various mitigation measures identified by the Company. These measures, including procedures for wetland restoration, would be incorporated into the Project D&M Plan or similar Project documents. (Eversource 1, Vol. 1, pp. 4-24 – 4-25, 6-8 – 6-9; Eversource 7, Q-CSC-026)

193. Compensatory wetland mitigation, if required by USACE and DEEP permits, would depend on the final Project design and would likely consist of in-lieu fee payment. (Eversource 1, Vol. 1, p. 6-9)

Groundwater

194. The Project does not cross and would not affect any DEEP-designated Aquifer Protection Areas. Further, no public wells or private groundwater supplies would be affected by the Project. (Eversource 1, Vol. 1, pp. 5-14, 6-9)

195. For the construction of the Project, Eversource would prepare a Stormwater Pollution Control Plan and a Spill Prevention and Control Plan that would include best management practices for protecting against the leakage of fluids from construction vehicles and/or spills. (Eversource 7, Q-CSC-024, Q-CSC-030)

196. Where groundwater is encountered in Project excavations, dewatering would be performed in accordance with best management practices and authorizations from applicable agencies. (Eversource 1, Vol. 1, p. 6-9)

Vegetation

197. The Project is within a densely-developed urban/suburban area where most vegetation consists of lawns, ornamental landscaping, and species common to residential, commercial, and industrial areas in the northeastern U.S. Exceptions are the 0.8-mile segment of the Eversource ROW in Newington, the Eversource property and ROW at the Newington Substation/Newington Tap, and Southwest Hartford Substation. In these areas, vegetation consists of a mix of scrub-shrub species compatible with utility line use, as well as upland and forested wetlands. (Eversource 1, Vol. 1, pp. 5-15 – 5-17, 5-53, 5-58)

198. Construction of the Project facilities will require approximately 1.9 acres of forested vegetation removal (including 0.24 acre of forested wetlands) along the Eversource distribution line ROW in Newington, as well as 0.3 acre of vegetation removal at Newington Substation, 0.3 acre of vegetation removal at Southwest Hartford Substation. For the Newington Tap modification, vegetation removal will typically be limited to the construction work space within Eversource's managed 1783 Line ROW; however, some trees along the edge of this ROW would have to be removed or trimmed to achieve required clearances from the relocated overhead line. In addition, for the construction and operation of the overhead segment of the new 115-kV line, some trees may have to be trimmed or removed along the Amtrak ROW. (Eversource 5, pp. 21 – 22)

199. The conversion of the 1.9 acres of presently forested areas to shrubland would have a long-term positive effect on the species that depend on such habitat, since shrubland habitat is otherwise declining in New England. (Eversource 1, Vol. 1, pp. 6-12 – 6-13; Eversource 5, p. 23)

200. As part of the restoration phase of construction, within the 0.8-mile Eversource ROW, Eversource would typically seed areas disturbed by work activities. Vegetative species compatible with the use of the ROW for transmission and distribution line purposes are expected to regenerate naturally over time. If lawn and ornamental vegetation is affected by construction, Eversource would implement site-specific revegetation as part of the restoration phase of Project construction. (Eversource 1, Vol. 1, pp. 4-16, 6-11 – 6-12)

Wildlife and Fisheries

201. The wildlife species expected to occur in the Project area are those common to urban lands, shrubland, and small, isolated forested tracts. (Eversource 1, Vol. 1, pp. 5-17 – 5-18)

202. The Project would not significantly affect wildlife resources and would have a long-term beneficial effect on certain wildlife species, including birds that use shrubland habitat. (Eversource 1, Vol. 1, pp. 6-12 – 6-13, 6-14 – 6-16; Eversource 5, p. 23; Eversource 7, Q-CSC-031)

203. The Project would not affect fishery resources. (Eversource 1, Vol. 1, pp. 6-13 – 6-14)

Threatened, Endangered, or Special Concern Species

204. Although Eversource's 2015 – 2017 review of the DEEP's publicly-available Natural Diversity Data Base did not identify the presence of any state-listed species in the Project area, a subsequent NDDB review of the Project area revealed potential habitat for two state special concern species in Newington. (Eversource 7, Q-CSC-033; DEEP comments dated 8/18/17)

205. Eversource will consult further with DEEP regarding the measures to be taken to protect these two state special concern species during construction of the Project. (Eversource 7, Q-CSC-033; Transcr. 1, pp. 47 - 48)

206. In accordance with correspondence received on July 31, 2017 from the U.S. Fish and Wildlife Service ("USFWS"), Eversource will consult further with the USACE and the USFWS to assess protection measures for a federally-listed threatened species. In consultation with DEEP, Eversource would identify measures to protect or otherwise to minimize potential effects on the state-listed species. (Eversource 5, pp. 9 – 10; Eversource 7, Q-CSC-031, Attachment Q-CSC-031)

Land Use, Recreation, and Cultural Resources

207. The Project does not traverse any designated wild and scenic or protected rivers, Connecticut Heritage Areas, national scenic trails, ConnDOT scenic land strips, federal or state park or forest lands, or state- or federally-designated scenic roads. (Eversource 1, Vol. 1, pp. 5-27, 6-17)

208. The new approximately 3.7-mile 115-kV transmission line would be aligned almost entirely within existing utility, public road, or railroad ROWs, including about 0.8 mile within the Eversource ROW, 0.14 mile within State Route 173, 0.2 mile within local road ROWs (e.g., Shepard Drive, New Park Avenue), and 2.4 miles along the Amtrak ROW. For the few parcels of land where the new transmission line would be aligned on private property, Eversource would coordinate with and obtain easements from such landowners. (Eversource 1, Vol. 1, pp. 1-6 – 1-7, 3-3; Vol. 3, Ex. B and C; Eversource 4, pp. 18-19)

209. The Project would be consistent with existing and future municipal and state land use plans, as well as with federal guidelines for collocating new transmission lines on existing ROWs. (Eversource 1, Vol. 1, pp. 5-33 – 5-35, 6-17; Eversource 5, p. 24)

210. Eversource commissioned cultural resource studies concerning the Project, including analyses of the potential indirect effects of the overhead transmission line structures on National Register of Historic Places districts in Newington and Hartford. These studies were performed in 2015 – 2016; a report was submitted to the SHPO in April 2017. (Eversource 1, Vol. 1, pp. 5-35 – 5-40; Vol. 2, Ex. 2.B; Eversource 5, pp. 6 – 7, 14 – 15)

211. In correspondence dated August 17, 2017, based on a review of the cultural resource studies, the SHPO determined that the Project would have no adverse effect on historic resources. (SHPO comments dated 8/17/17)

Transportation, Access, and Utility Crossings

212. The urban/suburban Project area is characterized by a well-developed transportation network, consisting of roads, railroads, and the CT*fastrak* busway. (Eversource 1, Vol., 1, pp. 5-44 – 5-47, Vol. 3, Ex. B and C)

213. Construction of the proposed Project facilities would cause minor, short-term, and localized effects on transportation patterns as a result of additional construction traffic on roads in the Project vicinity. (Eversource 1, Vol. 1, pp. 6-22 – 6-24; Eversource 5, pp. 25 – 26)

214. Eversource would employ personnel to direct traffic at construction work sites along public roads, as needed, and would erect appropriate traffic signs to indicate the presence of construction work zones. Eversource would consult with state and local transportation officials to define appropriate mitigation and protection measures, and also would inform affected landowners and businesses of the construction schedule. For work along the Amtrak ROW, Eversource would coordinate with Amtrak and ConnDOT to define work schedules and construction sequencing. (Eversource 1, Vol. 1, pp. 6-23 – 6-24; Eversource 5, pp. 25 – 26)

215. Eversource would seek appropriate permits from ConnDOT for the installation of the 0.14-mile segment of underground cable within State Route 173, as well as for the overhead crossings of the CT*fastrak* and State Route 529, as needed. (Eversource 5, p. 26)

Noise

216. Construction of the Project would cause short-term, and highly localized increases in ambient noise levels near work sites. To minimize excessive construction noise to the extent possible, engine-powered equipment would be properly muffled and maintained. The operation of the new Project facilities would not affect the noise environment. (Eversource 1, Vol. 1, pp. 6-20 – 6-22; Eversource 5, p. 27)

217. Construction work hours will be scheduled to minimize impacts to residents and businesses to the extent possible. In the general vicinity of residential areas, construction hours would typically be 7:00 AM to 7:00 PM, Monday through Saturday. Along the underground cable segments in the vicinity of commercial/industrial areas, work may be either performed during these standard hours or during the night-time to minimize both potential inconvenience to businesses and traffic disruption. The schedule for the installation of the new 115-kV line along the Amtrak ROW will be coordinated with Amtrak and ConnDOT, and will be designed to minimize impacts to passenger and freight traffic; based on consultations conducted to date, night-time work is anticipated. (Eversource 1, Vol. 1, pp. 6-21 – 6-22; Eversource 5, p. 27; Eversource 8, p. 2)

218. Construction work hours will be defined in the Project's D&M Plan, which must be submitted to and approved by the Council. (Eversource 1, Vol. 1, p. 6-22; Eversource 5, pp. 28 – 29)

Air Quality

219. Air-quality effects associated with the construction of the Project would be short-term, minor, and highly localized. No long-term effects on air quality would result from the operation of the Project. (Eversource 1, Vol. 1, pp. 6-19, 6-31 – 6-32, 6-36)

220. To minimize the dust generated by construction activities, water would typically be used when saw cutting pavement for cable system installation. In addition, the construction access road along the Eversource ROW would be watered, if necessary, to minimize fugitive dust, and crushed stone aprons would be installed at access road entrances to public roads to minimize tracking of dirt onto roads. (Eversource 1, Vol. 1, p. 6-19 – 6-20)

221. To minimize emissions from construction vehicles, Eversource's contractors would be required to properly maintain construction equipment and vehicles, and to conform to Connecticut's vehicular anti-idling regulations (RCSA § 22a-174-18). (Eversource 1, Vol. 1, p. 6-19)

D&M Plan

222. If the Council certifies the Project, Eversource would prepare a D&M Plan for the Project, consistent with the Council's requirements. Eversource may prepare separate D&M Plans for the new 115-kV transmission line and for the substations/Newington Tap modifications. The D&M Plan would include details regarding environmental mitigation measures, and would reflect the incorporation of conditions of the Council's approval of the Project. Each D&M Plan would be submitted to the Council for review and approval. (Eversource 5, pp. 28 – 29)

223. Eversource would continue to coordinate with federal and state agencies such as the USACE, ConnDOT, and DEEP to obtain required permits or regulatory authorizations for the Project. Eversource representatives would monitor the conformance of Project construction activities to the D&M Plan and to other federal and state regulatory requirements. ((Eversource 1, Vol. 1, pp. 9-1 - 9-3; Eversource 5, p. 29)

224. If directed by the Council, Eversource would hire an independent environmental inspector to conduct periodic inspections of environmental aspects of Project construction, as detailed in the D&M Plan. (Eversource 5, p. 30)

XIII. ELECTRIC AND MAGNETIC FIELDS

225. Transmission lines are common sources of electric and magnetic fields ("EMF"), as are other components of electric power infrastructure. There are no state or federal laws or regulations concerning transmission line EMF. (Eversource 1, Vol. 1, p. 7-5)

226. In February 2014, the Council revised its *Electric and Magnetic Fields Best Management Practices for the Construction of Electric Transmission Lines in Connecticut* ("EMF BMP"), originally issued in 1993. The Council's EMF BMP addresses concerns regarding potential health risks from exposure to EMF. (Eversource 1, Vol. 1, p. 7-4; Eversource 1, Vol. 2, Exh. 2.C.1)

227. 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. (Eversource 1, Vol. 1, pp. 7-1, 7-5)

228. EF are the result of voltages applied to electrical conductors and equipment. EF are measured in units of volts per meter or kilovolts per meter. (Eversource 1, Vol. 1, pp. 7-1; Eversource 4, p. 39)

229. MF are produced by the flow of electric currents. The MF at any point depends on the characteristics of the source, including the arrangement of conductors, the amount of current flow through the source, and the distance between the source and the point of measurement. MF are typically measured in units of milliGauss ("mG"). (Eversource 1, Vol. 1, p. 7-1; Eversource 4, p. 39)

230. Levels of both, EF and MF, fall off quickly as the distance from the conductor is increased. Objects such as trees or building walls weaken or block EF, but MF are not affected by most materials. Health concerns regarding EMF focus on MF rather than EF. (Eversource 1, Vol. 1, pp. 7-3, 7-5; Eversource 4, p. 39)

231. Although there are no binding regulations limiting EMF exposures, guidelines have been developed by the international scientific community; in particular, the International Committee on Electromagnetic Safety ("ICES"), a committee of the Institute of Electrical and Electronics Engineers, and the International Council on Non-Ionizing Radiation Protection ("ICNIRP"), a specially chartered independent scientific organization. ICNIRP established a level of 2,000 mG as an acceptable exposure level for the general public. ICES calculated a guideline of 9,040 mG for exposure to workers and the general public. (Eversource 1, Vol. 1, pp. 7-18 – 7-19, Table 7-5)

232. "Research on Extremely Low Frequency Electric and Magnetic Fields and Health", a report by Exponent, Inc., systematically evaluates peer-reviewed research and reviews by scientific panels published from August 1, 2012 to August 31, 2016 to determine if there are any new developments that might alter the current scientific consensus as articulated in the Council's 2014 EMF BMP. The review concluded that no recent studies provide evidence to alter the conclusion that the scientific evidence suggests EMF exposure is not the cause of cancer or any other disease process, at the levels we encounter in our everyday environment. (Eversource 1, Vol. 1, p. 7-18; Eversource 1, Vol. 2, Exh. 2.C.2, p. 58; Eversource 4, p. 41)

233. The Council requires transmission-line planners to provide a baseline design (the Field Management Design Plan or "FMDP") – with cost estimates – against which effective mitigations can be measured. Further, the EMF BMP requires transmission line applicants to adopt "no cost" line designs for lowering magnetic fields from new or reconstructed lines, and to identify "low cost" opportunities for making further reductions. The EMF BMP establish a "benchmark" for "low cost" field reduction measures of 4% of the project cost, including substation costs. "Low cost" measures for reducing MF are required to achieve at least a 15% reduction in the fields that would be associated with the base line construction. (Eversource 1, Vol. 1, p. 7-16; Eversource 4, p. 40; Council Administrative Notice Item 25, p. 4)

234. Eversource prepared initial calculations of the existing and predicted MF from the transmission lines along the ROW for the Proposed Route. The calculations of MF predicted assume a projected average annual loading, peak-day average load, and annual peak conditions in the year 2024. Consistent with the measured values, these calculations also apply at 1 meter above grade. (Eversource 1, Vol. 1, p. 7-11; Eversource 1, Vol. 2, Exh. 2.C.3; Eversource 4, p. 43)

235. EF calculations were only performed for the proposed overhead segment of the transmission line along the Amtrak ROW; along the underground segments of the Proposed Route, the sheath of the cable grounds out the EF outside of the cable assembly. (Eversource 1, Vol. 1, p. 7-11)

236. Calculations for the MF in the vicinity of the underground transmission line segments assume that the depth below grade of the uppermost cable is 3.5 feet. (Eversource 1, Vol. 1, p. 7-11)

237. The table below reflects the calculated MF near the underground transmission line under average annual load conditions:

Calculated Magnetic Field (mG)		
Left Edge of ROW	Max in ROW	Right Edge of ROW
0.3	63.0	3.3

(Eversource 1, Vol. 1, p. 7-11; Eversource 4, p. 44)

238. The calculations show that the MF is highest directly above the line and would drop to below 3.0 mG within 32 feet on either side of the transmission line. No homes or statutory facilities would be within 32 feet of the underground section of the transmission line. (Eversource 1, Vol. 1, p. 7-11)

239. Near each of the three required splice vaults, the conductors would change to a vertical position for entry into the vault. The phases spacing increases to 18 inches. Two of the splice vaults in Newington would be located on Eversource properties, and the third would be along Shepard Drive. (Eversource 1, Vol. 1, p. 7-13)

240. The table below reflects the calculated MF near the splice vaults under average annual load conditions:

Calculated Magnetic Field (mG)		
Left Edge of ROW	Max in ROW	Right Edge of ROW
2.6	433.0	2.6

(Eversource 1, Vol. 1, p. 7-13)

241. Because of the increased phase spacing, the fields directly above the trench at each splice vault reach a field level of 433 mG; however, the fields drop to below 3 mG within 50 feet of the vault. No homes or statutory facilities are located within 75 feet of splice vault locations. (Eversource 1, Vol. 1, p. 7-13)

242. Along the Amtrak ROW, the transmission line would be vertically-configured with 12-foot phase spacing. Because the transmission line must be designed to accommodate future electrification of the railroad, the bottom conductor would be 55 feet above grade, which is higher than Eversource's typical design. As a result, MF 1 meter above ground are lower than typical in and adjacent to an overhead ROW. (Eversource 1, Vol. 1, p. 7-14; Eversource 4, p. 44)

243. The table below summarizes the calculated fields for the overhead transmission line under average annual load conditions:

Calculated Fields near OH Line			
Field	Left Edge of ROW	Max in ROW	Right Edge of ROW
Magnetic Field (mG)	3.7	13.6	12.8
Electric Field (kV/m)	0.03	0.44	0.38

(Eversource 1, Vol. 1, p. 7-14; Eversource 4, p. 45)

244. At Newington and Southwest Hartford Substations, EF would be unchanged as a result of the proposed Project modifications, and MF would be unchanged except for those associated with the new underground transmission line entries in to the switchyards. The reconfiguration of the Newington Tap would not cause a measurable change of the EMF beyond the substation property. (Eversource 1, Vol. 1, p. 7-16; Eversource 4, p. 45)

245. In accordance with EMF BMP guidelines, the proposed new 115-kV line has been designed so that it will have very little effect on MF levels within and along the Proposed Route. The Project's base design for the overhead portion along the Amtrak ROW incorporates the use of taller structures in light of Amtrak's plans for future electrification. By increasing the distance between the conductors and the ground, the use of taller structures reduces projected MF levels at ground level. (Eversource 1, Vol. 1, p. 7-16; Eversource 4, pp. 45 – 46)

246. The EMF BMP direct the investigation into additional "low cost" mitigation measures to reduce fields associated with overhead transmission lines where portions of the Project are adjacent to residential areas, public or private schools, licensed day-care facilities, licensed youth camps or public playgrounds. There are no such areas or facilities adjacent to the overhead segment of the proposed 115-kV line. Moreover, the MF associated with the overhead lines drop off sharply to background levels. Therefore, no further mitigation measures are recommended for the overhead segment of the transmission line. (Eversource 1, Vol. 1, p. 7-16; Eversource 4, p. 46)

247. With respect to underground lines, the EMF BMP recommend further EMF mitigation beyond the base design only in "special circumstances". Eversource considers that no such special circumstances are present in this case because the underground segments will not provide sources of persistent exposure of fields above background to people or inhabited structures. (Eversource 1, Vol. 1, p. 7-16; Eversource 4, p. 46)

248. Typical low-cost MF mitigation measures for underground transmission lines are not appropriate for these circumstances. The use of cancellation loops, for example, may have the effect of reducing MF above the splice vaults, but fields would be higher at nearby residences. The implementation of metallic plates to cancel or shield the fields would not be possible at splice

vaults because of the need for a manhole access point negating the effectiveness of the plates. (Eversource 1, Vol. 1, p. 7-16; Eversource 4, pp. 46 – 47)

249. Under all projected operating conditions after the proposed line is placed in service, the calculated electric and magnetic fields would be a small fraction of the ICNIRP and ICES guidelines. (Eversource 1, Vol. 1, p. 7-18)

Compliance With Statutory and BMP Requirements

250. Eversource has complied with the statutory and the EMF BMP requirements regarding EMF, as follows:

a. Eversource has provided an update of scientific research and authoritative positions concerning potential adverse health effects of MF;
b. Eversource has provided measurements and calculations that were developed in accordance with the EMF BMP; and
c. Eversource has prepared a Field Management Design Plan with a base design that incorporates standard utility practice with no-cost MF mitigation design features as applicable.

(Eversource 1, Vol. 1, p. 7-18; Eversource 4, p. 47)

XIV. PUBLIC SAFETY AND SECURITY

251. The proposed Project would be constructed in full compliance with the National Electrical Safety Code, standards of the Institute of Electrical and Electronic Engineers, and the American National Standards Institute, good utility practice, and the PURA regulations covering the method and manner of construction. (Eversource 1, Vol. 1, p. 4-1)

252. The design of the Project incorporates high-speed protective relaying equipment to automatically detect abnormal system conditions and send a protective trip signal to the associated circuit breaker(s) at each end of a line to isolate the faulted section of the transmission system. (Eversource 1, Vol. 1, p. 4-37; Eversource 4, p. 48)

253. Protection would also be provided by a Supervisory Control and Data Acquisition system ("SCADA"). The SCADA system allows for remote control and equipment monitoring by the Connecticut Valley Electric Exchange ("CONVEX") system operator. (Eversource 1, Vol. 1, pp. 4-37 – 4-38; Eversource 4, p. 48)

254. Smoke detection equipment is already in place at both Newington and Southwest Hartford substations. These systems would automatically activate an alarm at CONVEX and the system operators would then take appropriate action. The relay/control enclosures at each substation are equipped with fire extinguishers. (Eversource 1, Vol. 1, pp. 4-37 – 4-38; Eversource 4, p. 48)

255. Existing access driveways to Newington and Southwest Hartford substations are presently gated and the perimeter of each substation is enclosed with a 7-foot-high chain link fence topped with

3 strands of barbed wire to discourage unauthorized entry and vandalism. Access is limited through locked gates and only authorized personnel are permitted to enter. (Eversource 1, Vol. 1, pp. 4-38, 4-41)

256. Lighting is installed within the substation yards to facilitate work at night under emergency conditions and during inclement weather. The substations also have low-level lighting for safety and security purposes. (Eversource 1, Vol. 1, p. 4-38)

257. During Project construction, access to both substations would be controlled, with the substation gates kept closed and locked as needed. All substation gates would be padlocked at the end of each workday during the construction phase, and at all times after the Project is completed. (Eversource 1, Vol. 1, p. 4-39)

258. The physical security of Newington and Southwest Hartford substations is consistent with the Council's "White Paper on the Security of Siting Energy Facilities," as amended. (Eversource 1, Vol. 1, p. 4-38; Eversource 4, p. 49)

259. The construction of the proposed line, the modifications to Newington and Southwest Hartford substations, and modifications to the Newington Tap would not pose a safety threat or create any undue hazard to the general public, including persons or property. All work would be designed and constructed in accordance with all applicable national, electric utility industry, state and, to the extent practical, local codes. (Eversource 4, p. 48)

Respectfully submitted,

THE CONNECTICUT LIGHT AND POWER COMPANY
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CERTIFICATION

I hereby certify that a copy of the foregoing Applicant's Proposed Findings of Fact has been electronically mailed on this 15th day of September, 2017 upon all parties as referenced in the Connecticut Siting Council's Service List dated June 9, 2017.

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STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

DOCKET NO. 474 - The Connecticut Light & Power Company d/b/a Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the Greater Hartford-Central Connecticut Reliability Project that traverses the municipalities of Hartford, West Hartford, and Newington, which consists of (a) construction, maintenance and operation of a new 115-kilovolt (kV) electric transmission line within existing Eversource, Amtrak and public road rights-of-way and associated facilities extending overhead approximately 2.4 miles and underground approximately 1.3 miles between Eversource's existing Newington Substation in the Town of Newington and existing Southwest Hartford Substation in the City of Hartford; (b) modifications to a .01 mile section within existing Eversource right-of-way of the existing overhead 115-kV electric transmission line connection to the Newington Substation (Newington Tap); and (c) related modifications to Newington Substation and Southwest Hartford Substation.	**DOCKET NO. 474** September 15, 2017

POST-HEARING BRIEF OF EVERSOURCE ENERGY

The Connecticut Light and Power Company
d/b/a Eversource Energy

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INTRODUCTION AND SUMMARY

The Greater Hartford - Central Connecticut Reliability Project (the "Project") consists of an approximately 3.7-mile 115-kilovolt ("kV") electric transmission line between Newington Substation in the Town of Newington and Southwest Hartford Substation in the City of Hartford, related modifications to Newington Substation and Southwest Hartford Substation, and modification of a short section of an existing overhead 115-kV transmission line in Newington that connects to Newington Substation.

The Project is the product of extensive planning studies conducted by a Working Group led by the Independent System Operator, New England ("ISO-NE"). These planning studies examined load-serving deficiencies within the Greater Hartford Sub-area and identified violations of regional and national planning standards. The principal purpose of the Project is to construct a new 115-kV transmission line connecting two "load pockets" within the Greater Hartford Sub-area. "Load pockets" are areas with insufficient generation and/or transmission to serve customer load when the electric system is placed under stress. The new 115-kV transmission line would link these two load pockets so that generation resources and transmission capacity in either of them would be available to serve the other when needed. The Project will bring the electric supply system in the Greater Hartford Sub-area into compliance with applicable regional and national reliability standards and criteria by eliminating the potential thermal overloads and voltage violations identified in the planning studies.

No one has questioned the need for this Project, the Proposed Route, or the reasonableness of the estimated cost; in fact, there were no parties or intervenors in this proceeding other than The Connecticut Light and Power Company doing business as Eversource Energy ("Eversource" or the "Applicant"). Moreover, there is no practical

and feasible alternative that would address the reliability problems that this Project resolves, and extensive analysis has shown that the proposed Project is the most cost-effective solution for the need identified by ISO-NE.

The new 115-kV line would be would be aligned almost entirely along existing linear corridors, including for approximately 0.8 mile on Eversource property or within an Eversource distribution line ROW, for approximately 2.4 miles along the Amtrak Railroad ROW ("Amtrak ROW"), and along state and local road ROWs. The Project would minimize adverse environmental effects by collocating the proposed new 115-kV transmission line within or along existing utility, road, and railroad ROWs, and by developing the proposed substation modifications at Newington Substation and Southwest Hartford Substation and the Newington Tap reconfiguration on property that is already designated for utility use. The Project would not result in any significant adverse effects on environmental resources, cultural resources, land uses, or recreational resources. No new substations will be required, and all of the necessary line terminal improvements would be made at existing substations. Eversource has taken and would continue to take care to minimize effects on the identified water resources along the route. Clearing and vegetation maintenance along the ROW for the underground segment of the new line would increase scrub/shrub "open field" habitat, which has been diminishing in the region, with significant beneficial effects for wildlife diversity.

The magnetic fields associated with the proposed transmission line drop off sharply to background levels as the distance from the centerline of the conductor and cable increases because Eversource has taken full advantage of available "no-cost" EMF reduction strategies. Moreover, the overhead portion of the route along the Amtrak ROW extends through commercial and industrial areas, and there are no residential areas,

public or private schools, licensed day-care facilities, licensed youth camps or public playgrounds adjacent to this overhead segment.

The proposed hybrid 115-kV line is the most cost-effective, environmentally compatible configuration, and is consistent with all of the standards that the Connecticut Siting Council ("Council") must apply in ruling on transmission line applications.

The following sections of this brief discuss the foregoing points in more detail.

STATEMENT OF THIS PROCEEDING

Eversource has applied to the Council for a Certificate of Environmental Compatibility and Public Need for the Project. As proposed, the Project would consist of a new approximately 3.7-mile 115-kilovolt (kV) transmission line from its existing Newington Substation in the Town of Newington, through the eastern portion of the Town of West Hartford, to its Southwest Hartford Substation in the City of Hartford. Eversource also proposes to construct associated upgrades to the Newington and Southwest Hartford substations and to expand each substation by approximately 0.3 acre, and to modify a 0.01-mile section of an existing overhead 115-kV transmission line connection to the Newington Substation. (This connection of the 1783 Line is referred to as the Newington Tap.)

The new 115-kV transmission line between Newington and Southwest Hartford substations would consist of two underground cable segments in Newington and Hartford (totaling 1.3 miles) and a 2.4-mile overhead segment, which would be located along an Amtrak railroad right-of-way ("Amtrak ROW") in Newington, West Hartford, and Hartford (collectively, the "Proposed Route"). The underground segments of the proposed transmission line would be aligned within an Eversource distribution line ROW and along local and state road ROWs. The overhead portion of the transmission line

route would be situated within the eastern side of the Amtrak ROW, which includes two railroad tracks and the Connecticut Department of Transportation's (ConnDOT's) CT*fastrak* busway.

Use of existing linear corridors where linear utility uses are already established such as Eversource's existing ROWs, fee-owned properties and the Amtrak ROW, as well as use of state and local road ROWs, is consistent with the Federal Energy Regulatory Commission's ("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 required by Conn. Gen. Stat. § 16-50p(a)(3)(D). *(Council Admin. Notice Item 9)*

DISCUSSION

This portion of the Brief summarizes the evidence showing that:

- The Project is needed (Section I);
- The environmental effects of the Project are acceptable (Section II); and
- Construction of the new 115-kV transmission line from Newington Substation to Southwest Hartford Substation is consistent with the Council's EMF Best Management Practices and with statutory requirements (Section III).

Appendix A to this Brief lists conclusory findings that the Council is directed to make by its enabling legislation in order to issue a certificate, and provides citations to the relevant paragraphs of Eversource's Proposed Findings of Fact that support those findings.

I. THERE IS A PUBLIC NEED FOR THE PROJECT FOR REGIONAL RELIABILITY

A. The Project Is Needed To Ensure Reliable Electric Service To The Greater Hartford Sub-area (Conn. Gen. Stat. § 16-50p(a)(3)(A))

1. An ISO-NE Working Group Determined That The Electric System for the Greater Hartford Sub-area Is in Violation of Mandatory Reliability Standards, and the Project Would Address These Criteria Violations

The Greater Hartford electric sub-area consists of the municipalities of Avon, Berlin, Bloomfield, Burlington, Cromwell, East Granby, East Hartford, Farmington, Granby, Hartford, New Britain, Newington, Plainville, Rocky Hill, West Hartford, Wethersfield and Windsor. This Project is the product of extensive studies over more than a decade that examined reliability issues in the Greater Hartford sub-area, as well as adjoining portions of central Connecticut. *(Eversource 1, Vol. 1, p. 2-1; PFOF ¶ 29-30)*

In 2005, ISO-NE identified potential future criteria violations on the 115-kV system in the Greater Hartford Sub-area in the course of early studies that ultimately resulted in the New England East-West Solution ("NEEWS") Plan, a comprehensive set of 345-kV improvements to the Southern New England transmission system. However, these 115-kV issues identified in the early NEEWS studies were removed from the NEEWS scope and earmarked for separate consideration. In 2010, ISO-NE initiated the *Greater Hartford Area Reliability Study* to take a comprehensive fresh look at the Greater Hartford area 115-kV system issues, which was subsequently combined in 2011 with other ongoing studies of reliability issues in sub-areas adjacent to Greater Hartford, into an assessment of load serving problems in four contiguous electrical sub-areas:

- Greater Hartford
- Manchester – Barbour Hill
- Middletown
- Northwestern Connecticut

The combined studies became known as the Greater Hartford/Central Connecticut ("GHCC") Study. These were the same studies that determined the need for the Frost Bridge to Campville 115-kV line project that the Council approved last year in Docket 466, as well as several other projects that have been administratively noticed. *(Eversource 1, Vol. 1, pp. 2-7, 2-8; Eversource 4, p. 8; Q-CSC-06; PFOF ¶¶ 30-33)*

The GHCC studies showed that there were criteria violations in two distinct "load pockets" within the Greater Hartford Sub-area. Load pockets are areas that have insufficient generation and/or transmission to serve their load. The two distinct load pockets within the Greater Hartford Sub-area are the South Meadow – Berlin – Southington area and the North Bloomfield – Manchester area. The South Meadow – Berlin – Southington area has no generation located within it; the North Bloomfield – Manchester area has limited generation; and both areas have limited transmission capability. As a result, the transmission system in each load pocket is subject to overloads and low voltages when the system attempts to serve peak load in either load pocket under many contingent conditions. *(Eversource 1, Vol. 1, p. 2-11; PFOF ¶¶ 41-42)*

The GHCC planning studies showed that the Greater Hartford Sub-area had four transmission elements with N-1 thermal violations and four 115-kV buses with N-1 low-voltage violations. Under N-1-1 conditions, there were 27 elements with thermal violations and ten 115-kV Pool Transmission Facilities ("PTF") buses with low voltage violations. Two 115-kV non-PTF buses also had low voltages. Violations occurred with all of the "one-unit-out" and "two-unit-out" dispatches. A significant number of violations were dispatch-independent; the violation occurred with all dispatches. *(Eversource 1, Vol. 1, p. 2-16; Eversource 1, Vol. 2, Exh. 2.D.3; PFOF ¶ 37)*

Although the year modelled in the *2012 Needs Assessment Report* was 2022, the study showed that the improvements required to meet the identified needs should be constructed as soon as possible. ISO-NE calculates a "year of need" for system improvements by estimating when the "critical load level" for which improvements are needed will be reached. The *2012 Needs Assessment Report* found that the year of need for the Greater Hartford improvements was 2013, because the Connecticut peak load forecast for 2013 was 7,776 MW, whereas thermal violations began to occur at 4,756 MW net load and low voltage violations began to occur at a 4,319 MW net load. Moreover, the majority of the worst-case violations in the Greater Hartford Sub-area occurred at the 2013 net load level. *(Eversource 1, Vol. 1, p. 2-16; Eversource 4, p. 9; PFOF ¶ 38)*

The actual 2013 summer peak was close to the ISO-NE 90/10 forecast. While subsequent peaks have been lower, they have consistently exceeded the critical load levels at which violations begin to occur. Accordingly, ISO-NE determined that there was no reason to reassess the need for the Project in light of the actual loads being lower than those forecast; and ISO-NE has continued to list the Project in its Regional System Plans. *(Eversource 1, Vol. 1, p. 2-16; Eversource 4, pp. 9-10; PFOF ¶ 39)*

In early 2015, ISO-NE published a report identifying preferred solutions for the needs of the entire GHCC study area, including the improvements in the Greater Hartford Sub-area proposed in this Project (the *GHCC Solutions Report*). After a positive recommendation by the NEPPOOL[1] Reliability Committee, on April 16, 2015, ISO-NE issued a technical approval of a set of preferred GHCC solutions, including a new 115-kV underground transmission circuit between Newington Substation and Southwest

[1] The New England Power Pool (NEPOOL) is a predecessor organization of ISO-NE, which continues to serve in an advisory capacity to ISO-NE.

Substation, together with associated equipment additions to those substations. Eversource subsequently determined that placement of an overhead segment of the Newington – Southwest Hartford line within the Amtrak ROW was feasible (and far less expensive) and is therefore proposing a hybrid underground/overhead configuration in this Application. *(Eversource 1, Vol. 1, p. 2-10, 2-17; PFOF ¶¶ 44, 46)*

As part of the Project, the 1783 Line connection to Newington Substation (i.e., the Newington Tap) would be relocated and rebuilt with larger conductors in order to avoid overloads on the Tap line under certain contingencies, such as when Newington Substation tries to simultaneously supply both East New Britain and Farmington, Substations. *(Eversource 1, Vol. 1, p. ES-9; Eversource 4, pp. 21-22; PFOF ¶ 51)*

The Project will meet the need identified by the Working Group because, upon completion of the Project, the transmission system in each of the load pockets in the Greater Hartford Sub-area would be able to serve the other when needed. In the event of contingencies in either area, there would be an additional high-voltage transmission element to share the load that would be automatically redistributed from the failed system element; and each area would have a new high capacity path by which generation from outside both load pockets may reach the load within each. The new 115-kV line and its associated improvements would also provide incremental transfer capability across the Western Connecticut Import Interface. *(Eversource 1, Vol. 1, p. 2-19, 2-20; PFOF ¶¶ 49-50)*

2. There Has Been No Opposition to the Need for This Project

There are no other parties or intervenors in this proceeding, and there is simply no challenge to the demonstrated need for the Project. (*Record*)

3. *There Are No Practical System Alternatives That Would Properly Resolve the Reliability Problems Addressed By The Project*

a. No Action

Taking no action would fail to eliminate violations of national and regional liability standards and criteria, and would be inconsistent with Eversource's obligation to provide reliable electric service. *(Eversource 1, Vol. 1, p. 10-1; Eversource 4, p. 3; PFOF ¶ 57)*

b. Transmission Alternatives

The Working Group evaluated two sets of logical terminal points for a new 115-kV transmission line connecting the South Meadow – Berlin – Southington and North Bloomfield – Manchester load pockets. One such set was the Newington and Southwest Hartford Substations, which are not currently interconnected. The other set was Farmington Substation and North Bloomfield Substation, which are presently connected by an existing 11.7-mile Eversource 115-kV overhead transmission line. A second 115-kV line could be built within the same ROW in an overhead configuration adjacent to this existing 115-kV line. Both alternatives would resolve all thermal and voltage criteria violations in the 10-year planning horizon; and both would require upgrades at each of the new transmission line's terminal substations. *(Eversource 1, Vol. 1, pp. 10-2; Eversource 4, p. 32-33; PFOF ¶¶ 58, 60)*

The Working Group initially found the Newington to Southwest Hartford all-underground line under consideration at the time to be preferable to the Farmington – North Bloomfield alternative. Subsequently, after it became apparent that placement of an overhead segment of the Newington – Southwest Hartford line within the Amtrak ROW was feasible, Eversource compared that configuration to the Farmington – North

Bloomfield alternative. That comparison made the choice of the Newington – Southwest Hartford alternative even clearer, given the significant cost savings available through the use of the hybrid route. Compared to the overhead alternative between Farmington and North Bloomfield Substations, the proposed 115-kV hybrid underground/overhead line between Newington and Southwest Hartford Substations would provide the same system benefits at a far lower cost, would be shorter, and would result in fewer impacts to vegetation, wildlife, water resources, and scenic resources. *(Eversource 1, Vol. 1, p. 10-11, 10-16; Eversource 4, pp. 32-33; PFOF ¶¶ 64-66)*

c. Non-Transmission System Alternatives

There are no practical non-transmission alternatives to the Project. In some cases, electric reliability needs can be met by means other than improvements to the transmission system. For instance, where the reliability problem is simply a lack of sufficient generation resources to reliably serve the load in a defined area, it may be possible to meet the reliability need through building new generation in the area, reducing demand in the area, or through some combination of these strategies.

In other cases, the only practical means of resolving transmission reliability criteria violations is through improvements to those transmission systems. This is such a case, as established by an expert report prepared by Julia Frayer of London Economics International, LLC (LEI).

LEI's detailed analysis, presented in its August 2015 report *(See Eversource 1, Vol. 2, Ex. 2.D.1)* strongly supports the conclusion that there is no practical and cost-effective non-transmission alternative to the Project. LEI carefully evaluated supply-side solutions, load reductions and combinations of the two, but was unable to find a technically feasible, economically practical non-transmission alternative that solved the thermal and voltage

violations identified by ISO-NE in the Greater Hartford sub-area. Although LEI was able to identify a potential technically feasible non-transmission alternative, the cost for implementing the alternative would be as much as thirteen times greater than the Project. Challenges regarding implementation of the non-transmission alternative were also identified in the report, including the costs of constructing pipeline laterals and any necessary transmission upgrades. These challenges are not present with the transmission solution that the Project would provide. Moreover, no one has proposed to implement an NTA for the Greater Hartford Sub-area in the five years since ISO-NE identified potential Market Resource Alternatives ("MRAs") for the GHCC projects in 2012. *(Eversource 1, Vol. 2, Ex. 2.D.1; Eversource 1, Vol. 1, p. 10-22; PFOF ¶¶ 67-71)*

In summary, there are no non-transmission alternatives, either singularly or in the aggregate, that would meet the identified needs at a reasonable cost.

B. The Project Conforms To a Long-Range Plan for Expansion Of The Electric Power Grid of the Electric Systems Serving the State and Interconnected Utility Systems (Conn. Gen. Stat. § 16-50p(a)(3)(D))

In order to grant a certificate for an electric transmission line, the Council must find that "the facility conforms to a long-range plan for expansion of the electric power grid of the electric systems serving the state and interconnected utility systems". (*Conn. Gen. Stats. § 16-50p(a)(3)(D)*) It is clear that the Project satisfies this requirement.

This Project is a key component of a set of transmission improvements in Connecticut coordinated by ISO-NE and is included in its Regional System Plan. The proposed Project is an outgrowth of the New England East-West Solution ("NEEWS") Plan, which is a comprehensive set of 345-kV improvements to the Southern New England transmission system, and of a series of ISO-NE planning studies of the Greater Hartford and Central Connecticut sub-areas. Ultimately, the load serving needs of the

Greater Hartford, Manchester-Barbour Hill, Middletown, and Northwest Connecticut sub-areas were examined together in a single study to ensure that coordinated and cost efficient solutions to the identified needs would be developed. At the same time, ISO-NE was examining transmission needs in Southwest Connecticut ("SWCT") for 2022. The GHCC and SWCT studies were coordinated in an effort to avoid redundant solutions, and together the studies identified solutions for Connecticut's transmission system that will comply with applicable reliability requirements through 2022. (*Eversource 1, Vol. 1, pp. 2-7 – 2-22; PFOF ¶¶ 29-52*)

C. The Project Will Serve the Public Need for Economic Service And Serve The Interests Of System Economy (Conn. Gen. Stat. § 16-50p(a)(3)(D))

1. The Overhead Portions of the Project Are Cost-Effective And the Most Appropriate Alternative Based on a Life-Cycle Cost Analysis of the Facility and Underground Alternatives

Section 16-50p(a)(3)(D) of the General Statutes requires that when the Council grants a certificate, it specify "what part, if any, of the facility shall be located overhead… and… that the overhead portions, if any, of the facility are cost-effective and the most appropriate alternative based on a life-cycle cost analysis of the facility and underground alternatives to such facility…." Accordingly, a transmission line applicant and the Council must assess the practicality and life-cycle cost of an all-underground alternative to a proposed overhead transmission line. The evolution of the Project during its development provides clear and convincing evidence that the proposed hybrid underground/overhead 115-kV line is a far more cost-effective and preferable solution to an all-underground alternative.

The preferred new transmission circuit identified by the ISO-NE Working Group in the *GHCC Solutions Report* was an approximately 4-mile long 115-kV underground

cable between Newington and Southwest Hartford Substations. This all-underground solution was developed on the assumption that, because of the dense urban and suburban development in the area between Newington and Southwest Hartford Substations and the lack of existing utility ROWs connecting these two substations, the installation of a new 115-kV line in an overhead configuration between these points would be impractical. However, when Eversource was preparing the municipal consultation filing ("MCF") for this Project in Autumn 2015, the hearings on the Greenwich Substation and Line Project were underway. At the Council's direction, Eversource was investigating the potential for collocating a portion of the Greenwich transmission line with the Metro-North Railroad ROW, a possibility that it had dismissed during the early routing studies for the Greenwich project. That experience prompted Eversource to revisit the potential for collocating a portion of this project's transmission line, in an overhead configuration, along the Amtrak ROW. In doing so, Eversource recognized that an overhead line design could result in significant savings on the cost of the line (compared to an all-underground configuration) and also that the use of the Amtrak ROW could route a majority of the new line near commercial and industrial areas, rather than near residential uses. Accordingly, Eversource commenced further consultations with ConnDOT and Amtrak. Eversource was pursuing that investigation at the time it filed the MCF, in December 2015. Ultimately, Eversource concluded that collocation of the 2.4-mile overhead segment along the Amtrak ROW was feasible and significantly more cost-effective than the all-underground route. *(Eversource 1, Vol. 1, p. 2-17; Eversource 4, pp. 11-12; PFOF ¶¶ 72-76)*

Once it was determined that a portion of the new 115-kV line could be aligned along the Amtrak ROW, Eversource then conducted further studies to identify viable

routes and line designs to connect the overhead portion of the new line along the Amtrak ROW to both Newington and Southwest Hartford Substations. Because of suburban development in Newington and commercial/transportation uses (including Interstate 84) in Hartford, the results of those analyses led to the selection of an underground line design for the connection of the Amtrak ROW segment to both of the substations. *(Eversource 1, Vol. 1, p. 2-17; Eversource 4, pp. 11-12; PFOF ¶¶ 77-82)*

The proposed Project is substantially less expensive than the all-underground alternative that was included in the *GHCC Solutions Report*. With the incorporation of an overhead configuration for approximately 65% (2.4 miles) of the 3.7-mile hybrid route, the estimated cost of the Project (not including the cost of reconductoring the Newington Tap) declined by approximately $30 million from the initial $91 million initial estimate. For the all-underground alternative, the capital cost of the 115-kV underground line (excluding substation modifications and the Newington Tap, which are common to the Project and the all-underground alternative) would be $75 million, as compared to $43.2 million for the proposed hybrid line. *(Eversource 1, Vol. 1, pp. 10-11, 10-13, 10-17, 11-52; PFOF ¶¶ 53, 65, 86)*

The differences in life-cycle costs are even greater. The life-cycle cost for the proposed hybrid 115-kV line is approximately $80.5 million. *(Eversource 3; PFOF ¶ 55)* The life cycle cost for the all-underground, four-mile 115-kV alternative is approximately $121 million[2]. These vast cost differences preclude a finding that a predominantly all-underground line would be more cost-effective, on a life-cycle cost basis, than the proposed hybrid overhead line.

[2] This estimate is based on the life cycle cost/mile figure for 115-kV XLPE presented in Table 9-3 of the Council's 2012 *Investigation into the Life-Cycle Costs of Electric Transmission Lines. (Council Admin. Notice 28, p. 9-6)*

2. *The Project Will Provide the Needed Reliability Improvements at the Lowest Reasonable Cost*

The total estimated capital cost of the Project is approximately $61.1 million ($44.4 million for transmission line costs, including 1.2 million for the Newington Tap) and $16.7 million for substation modifications). (Eversource 1, Vol. 1, p. 3-25; *PFOF ¶ 53*) This cost is substantially less than the $95.9 million cost of the overhead 115-kV line between Farmington and North Bloomfield Substations, or the cost of the all-underground alternative discussed in section 1 above. *(Eversource 1, Vol. 1, pp. 10-13, 10-17; Eversource 4, p. 33; PFOF ¶¶ 65, 75)*

The hybrid underground/overhead 115-kV transmission line ultimately proposed by Eversource in the Application is clearly the most cost-effective, least environmentally damaging practical alternative. *(See generally, Eversource 1, Vol. 1)* In fact, the evolution of this Project from the all-underground line discussed in the ISO-NE *GHCC Solutions Report* to the hybrid underground/overhead line proposed in the Application is a case study in the manner in which Eversource – heeding direction from the Council - searches for the most cost effective solution to reliability issues throughout the development of a transmission project.

Because the Project has been designed cost effectively in accordance with good engineering practice, and will yield regional benefit, it is expected that the costs of the Project will be regionalized. Assuming all costs are so regionalized, Connecticut's electricity customers would pay approximately 25% of the Project's costs. *(Eversource 1, Vol. 1, p. 3-25; Eversource 4, pp. 22-23; PFOF ¶¶ 54)*

II. THE PROJECT WILL NOT CAUSE SIGNIFICANT ADVERSE ENVIRONMENTAL EFFECTS (Conn. Gen. Stat. § 16-50p(a)(3)(B) & (C)

CGS Section 16-50p(a)(3)(B) requires the Council to find, when it issues a certificate, "[t]he nature of the probable environmental impact of the facility alone and cumulatively with other existing facilities, including a specification of every significant adverse effect, including, but not limited to, electromagnetic fields that, whether alone or cumulatively with other effects, impact on, and conflict with the policies of the state concerning the natural environment, ecological balance, public health and safety, scenic, historic and recreational values, forests and parks, air and water purity and fish, aquaculture and wildlife;" and § 16-50p(a)(3)(C) requires the Council to find why these effects do not provide "sufficient reason to deny the application." The Project's potential electric and magnetic field effects are discussed in a subsequent section of this Brief.

With respect to the other listed environmental concerns, Eversource has provided extensive evidence to demonstrate that: (1) the Project has been designed to avoid or minimize adverse effects; (2) the impacts that will occur will be, for the most part, short-term and localized; (3) Eversource will exercise great care to mitigate those effects; and (4) overall, the Project would have no significant long-term adverse environmental effects. This evidence is summarized in detail in Eversource's *PFOF* ¶¶ *167-224,* and is summarized at a high level in this section. Consequently, there is no basis to support a denial of Eversource's Application for a Certificate by the Council.

A. Construction and Operation of the New 3.7-Mile 115-kV Transmission Line, Consisting of Approximately 1.3 Miles of Underground Cable and 2.4 Miles of Overhead Line along the Amtrak ROW, Will Have No Significant Environmental Effects

The new 115-kV transmission line would extend for a distance of approximately 3.7 miles from Eversource's Newington Substation in the Town of Newington, through

the Town of West Hartford, to the Southwest Hartford Substation, located in the City of Hartford, linking these two substations that are not presently connected. Through this heavily urbanized area, the new line would be aligned almost entirely along existing linear corridors, including for approximately 0.8 mile on Eversource property or within an Eversource distribution line ROW, for approximately 2.4 miles along eastern side of the Amtrak ROW, and along state and local road ROWs. *(Eversource 4, p. 4; PFOF ¶¶ 89 - 93)*

Eversource has designed the Project to avoid, minimize, or mitigate adverse effects to environmental, cultural, and visual resources by using a hybrid underground/overhead configuration for the new 115-kV transmission line, aligning the line underground within Eversource's existing electric distribution line ROW and along public road ROWs through residential and densely developed commercial areas, and locating the line overhead within the long-established Amtrak ROW adjacent to industrial/commercial areas. In addition, Eversource would minimize impacts to public transportation (including rail service, CT*fastrak* busway operations, and vehicular movements on state/local roads) by continuing to coordinate with Amtrak, ConnDOT, and municipal transportation authorities. As a result, most impacts would be short-term, lasting only during construction and would be mitigated to the extent practical. *(Eversource 1, Vol. 1, pp. 6-1, 6-2; Eversource 5, pp. 16-17)*

The new 115-kV transmission line would have negligible effects on topography and geology. Minimal to no grading would be required to install the 115-kV cable underground within the Eversource's ROW, road ROWs, other paved surfaces, or within the Amtrak ROW. Localized impacts to soils would occur as a result of activities such as excavating the cable trench and splice vault sites, and excavating for the overhead

structure foundations. However, these impacts would be short-term and limited to the construction phase. To minimize the potential impacts, all activities involving soil disturbance would be performed in accordance with the Eversource and state requirements, including Eversource's *Best Management Practices Manual for Massachusetts and Connecticut (Construction & Maintenance Environmental Requirements) September 2016* ("BMP Manual"), and the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control (revised 2007),* as well as the DEEP's *General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities*. Eversource will prepare a Project-specific *Stormwater Pollution Control Plan* that would incorporate these requirements, including specifications for the deployment and maintenance of temporary erosion and sedimentation control measures during construction and for long-term stabilization of the areas affected by construction. *(Eversource 1, Vol. 1, pp. 6-2 – 6-4; Eversource 5, pp. 18 – 20; PFOF ¶¶ 170, 176)*

The construction and operation of the new 115-kV transmission line would have minimal effects on water resources. Eversource has planned the Project to avoid impacts to all but two of the five watercourses located in the Project area. The new 115-kV line would span Trout Brook along the Amtrak ROW and would avoid two other watercourses (i.e., an intermittent tributary to Piper Brook and an un-named tributary to the South Branch of the Park River). The remaining two small watercourses – both un-named tributaries to Piper Brook and both located along the 115-kV line underground segment in Newington - would be temporarily affected by the installation of the cable duct bank. The use of an open cut method to install the cable beneath these two small streams would minimize construction activities and would result in approximately 0.03 acre of temporary impacts to stream substrates. The watercourse crossings would be

performed in accordance with Eversource's BMP Manual and the conditions of Project-specific water resource permits from the U.S. Army Corps of Engineers (USACE) and DEEP. *(Eversource 1, Vol. 1, pp. 6-5 – 6-6; Eversource 5, pp. 11-12, Eversource 7, Q-CSC-029; PFOF ¶¶ 180, 182, 183)*

No Project facilities would be located in any Federal Emergency Management Agency ("FEMA") designated 100-year floodplains or floodways. Temporary access roads for the 115-kV line construction may be situated within a FEMA-designated 500-year floodplain, which is located near proposed Structures 29 to 34 along the Amtrak ROW in the Town of West Hartford. *(Eversource 5, pp. 13 – 14; PFOF ¶ 184)*

Four wetlands are located along the 115-kV transmission line route, all along the underground cable segment in Newington. As a result of the use of temporary timber mats to create site access and work pads, the construction of the 115-kV line would result in approximately 1.55 acres of temporary impacts to wetlands. In addition, approximately 0.24 acre of tree clearing in forested wetlands would be required; these areas would be converted permanently to scrub-shrub or emergent wetlands, representing a long-term cover type change to wetland habitat, but not a net loss of wetlands. *(Eversource 1, pp. 6-7 – 6-8; Eversource 5, p. 20, PFOF ¶¶ 189, 190)*

To minimize potential impacts to wetlands, Eversource would require construction activities to conform to the Council's Certificate and federal and state permits, as well as to the various mitigation measures identified by the Company. Such measures would include invasive species control BMPs, which would be implemented during construction. Compensatory wetland mitigation, if required by USACE and DEEP permits, would depend on the final Project design and likely would consist of an

in-lieu fee payment. *(Eversource 1, Vol. 1, pp. 4-24 – 4-25, 6-8 – 6-9; Eversource 5, p. 21; PFOF ¶¶ 191 – 193)*

The 115-kV line would have only minor, localized effects on vegetation and wildlife habitat, which in the urban/suburban Project area consists predominantly of lawns, ornamental landscaping, and species common to residential, commercial, and industrial uses. Construction of the line would require approximately 1.9 acres of forested vegetation removal (including the 0.24 acre of forested wetland vegetation) along the Eversource distribution line ROW, and the revegetation of such areas with species compatible with the use of the ROW for transmission line purposes, including scrub and shrub species. The conversion of forested areas to shrubland would have a long-term positive effect on the species that depend on such habitat. For the construction and operation of the overhead segment of the new line, some trees along the Amtrak ROW also may have to be trimmed or removed. *(Eversource 1, Vol. 1, pp. 6-12 – 6-13; Eversource 5, p. 23; PFOF ¶¶ 197 – 200)*

No vernal pools were identified in the Project area; thus, none would be affected by the transmission line construction or operation. *(Eversource 5, pp. 5-6; PFOF ¶ 188)*

Based on DEEP's comments concerning the potential for habitat for two state special concern species to occur in the vicinity of a portion of the Project area in Newington, Eversource will consult further with DEEP regarding the measures to be taken to protect these species during construction. Similarly, Eversource will consult further with the USACE and U.S. Fish and Wildlife Service to define measures to protect a federally-listed species that could potentially occur in the Project vicinity. *(Eversource 7; Q-CSC-031, -033;; DEEP comments dated 8/18/17; PFOF ¶¶ 204 – 206)*

The new 115-kV transmission line would be collocated along existing linear corridors that are already dedicated to utility or transportation uses. As a result, the transmission line would result in generally limited and temporary impacts on land uses, and would have no adverse effect on historic resources. *(Eversource 1, Vol. 1, pp. 6-16 – 6-18; SHPO comments dated 8/17/17; PFOF ¶ 211)*

Eversource carefully considered various configurations and alignments for the new 115-kV line before determining that the hybrid configuration, including the 0.8-mile underground segment along its existing distribution line ROW in Newington, would best minimize cost while avoiding or limiting adverse effects to ecological resources, cultural resources, land uses, and visual resources. *(Eversource 1, Vol. 1, pp. 11-1 – 11-55; PFOF ¶¶ 72, 77 – 83; 85)* The use of an underground transmission cable alignment within an existing Eversource ROW is unusual; however, factors particular to the 0.8-mile distribution line ROW segment in Newington make an underground configuration preferable to an overhead alignment in this instance. Such factors include the relatively flat terrain, availability of Eversource ROW or fee-owned land within which the line could be located, and ability to install the underground transmission cable with only temporary (rather than permanent) relocation of the existing overhead distribution lines, all of which make the cost of the underground cable configuration slightly lower than an overhead alignment. Moreover, compared to an overhead alignment, the underground alignment along the Eversource distribution line ROW would minimize wetland impacts and forested vegetation clearing, and would avoid long-term visual impacts to nearby residences. *(Eversource 1, Volume 1, pp. 11-44, 11-47 – 11-48; Transcript pp. 32, 59 – 61; PFOF ¶ 85)*

B. The Proposed Modifications to Newington Substation, Southwest Hartford Substation, and Newington Tap Will Be Within Eversource Property and ROWs Already Dedicated to Utility Use and Will Not Result in any Significant Adverse Environmental Effects

The proposed modifications to Newington Substation and Southwest Hartford Substations, as required to connect the new 115-kV transmission line, would be accomplished entirely within Eversource's property and, at each substation, would require only an approximately 0.3-acre expansion of the existing fenced area. The substation expansions will be located entirely in uplands, and would result in minor and localized grading, filling, and vegetation removal impacts only on Eversource property, and thus, would have no significant adverse effects on environmental resources or scenic, historic, or recreational values. *(Eversource 1, Vol. 1, pp. 6-25, 6-26, 6-33; Eversource 5, pp. 18-19; PFOF ¶¶ 173 - 174, 198)* Similarly, the modifications to Newington Tap would be performed either within the Newington Substation yard or along Eversource's existing 1783/1785 Line ROW, which is situated directly adjacent to the substation. To construct the Newington Tap and Newington Substation modifications, timber mats would be placed temporarily in Wetlands N-1 and N-1A, affecting a total of approximately 0.51 acre of these wetlands. The timber mats would provide temporary work space during construction and would be removed after the Project modifications are completed; the affected wetlands would be restored. The Newington Tap modifications would not affect land uses, cultural resources, or recreational resources and, with the exception of some trees that would have to be trimmed or removed along a short segment of the 1783 Line ROW to achieve required clearance from the reconfigured line, would not affect vegetation. *(Eversource 1, Vol. 1, pp. 6-25 – 6-36; Eversource 5, pp. 18 – 20, 22; PFOF ¶¶ 186, 187, 189)*

C. The Proposed Project Will Result in Minor Adverse Environmental Effects that Will Be Outweighed by Project Benefits

Overall, by maximizing the use of existing Eversource properties and ROWs, as well as road and railroad corridors, the Project would be consistent with policies advocating the colocation of linear facilities. Further, the hybrid design of the new 115-kV transmission line would minimize or avoid adverse effects not only to environmental and cultural resources, but also to residents and businesses. *(Eversource 5, p. 30; PFOF ¶¶ 208, 209)*

The Project would not result in any impacts to vernal pools, floodplains, floodways, recreational/open space areas, or cultural resources. Impacts to water resources have been avoided or minimized to the extent possible. Similarly, forest vegetation removal has been minimized. During Project construction, Eversource would minimize impacts to environmental resources by adherence to its BMP Manual and the conditions of approvals from the Council and other regulatory agencies. Potential impacts to residential, commercial, and industrial uses and to transportation would be mitigated by adhering to the work hours and conditions specified by Amtrak, ConnDOT, and the Council and by coordinating with the affected municipalities and property owners. (*Eversource 5, pp. 30 – 31; see generally PFOF ¶¶ 167-224*)

The environmental effects of the Project do not conflict with the State of Connecticut's environmental policies or land-use plans. Furthermore, the Project is consistent with FERC's *Guidelines for the Protection of Natural Historic Scenic and Recreational Values in the Design and Location of Rights-of-way and Transmission Facilities*. The adverse environmental effects of the Project would be for the most part minor, localized, and short-term. Given the importance to society of maintaining reliable

electric service, such impacts as the Project may have provide no reason to deny a Certificate. *(Council Admin. Notice 9*; Eversource 5, p. 24)

If the Council issues a certificate for the Project, Eversource would prepare a Development and Management (D&M) Plan that would incorporate detailed construction plans, as well as environmental mitigation measures. The D&M Plan would be submitted to the Council for approval. Eversource representatives would monitor the conformance of construction activities to the D&M Plans, the Council's certificate, other regulatory requirements, and Eversource standards. *(Eversource 1, Vol. 1, pp. 4-36, 6-2; Eversource 5, pp. 28 - 29; PFOF ¶¶ 222 – 224)*

III. CONSTRUCTION OF THE HYBRID UNDERGROUND/OVERHEAD 115-kV TRANSMISSION LINE WOULD BE CONSISTENT WITH THE COUNCIL'S EMF BEST MANAGEMENT PRACTICES AND STATUTORY REQUIREMENTS

A. The Statutory and Regulatory Framework for Analyzing Overhead and Underground Construction of 115-kV Electric Transmission Lines (Conn. Gen. Stat. § 16-50p(a)(3)(D)(i), (ii); § 16-50p(a)(3)(E); § 16-50t(c); Best Management Practices)

In December 2007, pursuant to Conn. Gen. Stat. § 16-50t(c) the Council adopted revised EMF Best Management Practices ("EMF BMP"), following a two-year proceeding in which it considered, among other things, a comprehensive review of the scientific consensus concerning the potential health effects of transmission line electric and magnetic fields. The EMF BMP was further revised in February 2014. *(Council Admin. Notice Item 25, Electric and Magnetic Fields Best Management Practices for the Construction of Electric Transmission Lines in Connecticut, December 14, 2007, revised February 20, 2014. Website Link: http://www.ct.gov/csc/emf-bmp)* The revised EMF BMP, like its predecessor, applies to all transmission lines that require a certificate from the Council.

The Council requires an applicant proposing to build an overhead electric transmission line to develop and present a Field Management Design Plan ("FMDP") that identifies design features to mitigate magnetic fields ("MF") that would otherwise occur along an electric transmission ROW. Further, the EMF BMP requires transmission line applicants to adopt "no cost" line designs for lowering magnetic fields from new or reconstructed lines, and to identify "low cost" opportunities for making further reductions. Four percent of Project cost is the benchmark for "low cost" mitigation measures; and such measures should aim to achieve at least a 15% reduction at the edge of the utility ROW. However, the four percent guideline is not "absolute" but may be varied as appropriate to the circumstances of particular applications particularly where, as in this case, "no cost" field reduction strategies are shown to be effective. The Council's EMF BMP also prescribes areas of focus for mitigation efforts in an applicant's FMDP for any areas where a proposed overhead transmission line is adjacent to "residential areas, public or private schools, licensed child day-care facilities, licensed youth camps or public playgrounds". *(EMF BMP, Eversource 1, Vol. 2, Exhibit 2.C.1, p. 4)* With regard to underground transmission lines, a Field Management Design Plan is not required absent "special circumstances." *(EMF BMP, Eversource 1, Vol. 2, Exhibit 2.C.1, p.5)*

In addition, pursuant to Conn. Gen. Stat. 16-50p(a)(3)(D)(iii), the Council, as part of its opinion, must find and determine that any overhead portions of a transmission line "are to be contained within an area that provides a buffer zone that protects the public health and safety, as determined by the council."

1. Eversource's EMF calculations along the Proposed Route show that additional mitigation measures beyond the "no-cost" measures incorporated in the baseline design are not required.

Eversource has submitted a FMDP for the Project, which reflects that the proposed new transmission line between Newington Substation and Southwest Hartford Substation has been designed so that electric and magnetic fields associated with the new transmission line would drop quickly to background levels as the distance from the centerline of the conductor and cables increases. Moreover, the proposed Project changes to the existing Newington and Southwest Hartford substations and to the Newington Tap would not cause changes in magnetic fields beyond the Eversource property lines, other than those related to the new underground line. *(Eversource 1, Vol. 1, p. ES-14; PFOF ¶¶ 237-247)*

For the overhead portion of the route along the Amtrak ROW, the proposed 115-kV overhead line would be the major source of EMF. If Amtrak eventually proceeds with its plans for future electrification of this rail corridor, the lines serving the railroad would be another source of EMF along this corridor. The Project's base design for the overhead portion along the Amtrak ROW incorporates the use of taller structures in light of Amtrak's plans for future electrification. By increasing the distance between the conductors and the ground, the use of taller structures reduces projected MF levels at ground level. *(Eversource 1, Vol. 1, p. 7-16; Eversource 4, pp. 41-42, 45 – 46; PFOF 242-243, 245, 246)*

The table below summarizes the calculated fields for the overhead transmission line under average annual load conditions:

Calculated Fields near OH Line			
Field	Left Edge of ROW	Max in ROW	Right Edge of ROW
Magnetic Field (mG)	3.7	13.6	12.8
Electric Field (kV/m)	0.03	0.44	0.38

(Eversource 1, Vol. 1, p. 7-14; Eversource 4, p. 45; PFOF ¶ 243)

The EMF BMP direct the investigation into additional "low cost" mitigation measures to reduce fields associated with overhead transmission lines where portions of those lines are adjacent to residential areas, public or private schools, licensed day-care facilities, licensed youth camps or public playgrounds. There are no such areas or facilities adjacent to the overhead segment of the proposed 115-kV line. Moreover, the MF associated with the overhead lines drop off sharply to background levels. Therefore, no further mitigation measures are recommended for the overhead segment of the proposed transmission line. *(Eversource 1, Vol. 1, p. 7-16; Eversource 4, p. 46; PFOF ¶ 246)*

For the underground segments of the route along the Eversource ROW in Newington, and in roads, the major sources of MF once the Project is completed would be the existing distribution lines and the proposed 115-kV underground line. There would be no above ground *electric* fields associated with the installation of the underground portion of the new 115-kV line because the sheath of the cable grounds out the electric field outside of the cable assembly. *(Eversource 1, Vol. 1, p. 7-11; Eversource 4, p. 41; PFOF ¶ 235)*

The table below reflects the calculated MF near the underground transmission line under average annual load conditions:

Calculated Magnetic Field (mG)		
Left Edge of ROW	Max in ROW	Right Edge of ROW
0.3	63.0	3.3

(Eversource 1, Vol. 1, p. 7-11; Eversource 4, p. 44; PFOF ¶ 237)

The MF associated with the underground line is highest directly above the line and would drop to below 3.0 mG within 32 feet on either side of the transmission line. No homes or statutory facilities would be within 32 feet of the underground section of the transmission line.[3] *(Eversource 1, Vol. 1, p. 7-11; PFOF ¶ 238)*

For underground transmission lines, the EMF BMP recommend further EMF mitigation beyond the base design only in "special circumstances". *(EMF BMP, Eversource 1, Vol. 2, Exhibit 2.C.1, p.5)* Eversource submits that no "special circumstances" warranting mitigation beyond the base design are present in this case because the underground segments will not provide sources of persistent exposure of fields above background to people or inhabited structures. *(Eversource 1, Vol. 1, p. 7-16; Eversource 4, p. 46; PFOF ¶ 247)*

Moreover, typical low-cost MF mitigation measures for underground transmission lines are not appropriate for these circumstances. The use of cancellation loops, for example, may have the effect of reducing MF above the splice vaults, but fields would be higher at nearby residences. The implementation of metallic plates to cancel or shield the fields would not be possible at splice vaults because of the need for a manhole access

[3] The underground segment of the Project will also include three splice vaults, two on Eversource property and one along Shepard Drive. Similar to the underground duct bank, the MF at each splice vault reach their highest level directly above the trench (a field level of 433 mG), but the MF drop to below 3 mG within 50 feet of the vault and are 2.6 mG at both edges of the ROW. No homes or statutory facilities are located within 75 feet of splice vault locations. (Eversource 1, Vol. 1, p. 7-13)

point negating the effectiveness of the plates. *(Eversource 1, Vol. 1, p. 7-16; Eversource 4, pp. 46 – 47; PFOF ¶ 248)*

At Newington and Southwest Hartford Substations, EF would be unchanged as a result of the proposed Project modifications, and MF would be unchanged except for those associated with the new underground transmission line entries in to the switchyards. Both Newington and Southwest Hartford Substations are situated on larger parcels of Eversource property, and thus are not directly near public use areas. Similarly, the reconfiguration of the Newington Tap would not cause a measurable change of the EMF beyond the substation property. *(Eversource 1, Vol. 1, p. 7-16; Eversource 4, p. 45; PFOF ¶ 244)*

For all the reasons outlined above, Eversource submits that no additional mitigation measures other than the "no cost" measures incorporated in the baseline design (i.e., the higher overhead structures designed to account for Amtrak's plan for future electrification of its railroad lines) are warranted for the Project. *(Eversource 1, Vol. 1, pp. 7-16 – 7-17; PFOF ¶¶ 246-248)*

2. *The Amtrak ROW Will Provide an Adequate Buffer Zone for the New Overhead 115-kV Lines (§ 16-50p(a)(3)(D)(iii))*

The overhead portion of the Proposed Route runs along the Amtrak ROW, which varies in width from 86 feet to 155 feet, but typically is 93 to 115 feet wide. *(Eversource 1, Vol. 1, p. 3-7; Eversource 4, p. 16; PFOF ¶ 101)* From the transition structure located at the end of the underground cable segment in Newington, the overhead portion of the line would span the CT*fastrak* and Amtrak's two existing rail lines and then would extend north for approximately 2.4 miles along the east side of the Amtrak ROW in West Hartford and Hartford. South of Interstate 84, the overhead line would turn west, again

spanning the Amtrak property west of the CT*fastrak* to another transition structure. (Eversource 1, Vol. 1, pp. 1-8, 3-3 – 3-4; Eversource 4, pp. 15 – 16; *PFOF ¶ 100*)

In accordance with the EMF BMP guidelines, the proposed new 115-kV line has been designed so that it will have very little effect on magnetic fields levels within and along the Proposed Route. Along the Amtrak ROW, the transmission line would be vertically-configured with 12-foot phase spacing. Because the transmission line must be designed to accommodate future electrification of the railroad, the bottom conductor would be 55 feet above grade, which is higher than Eversource's typical design. Consequently, MF 1 meter above ground are lower than typical in and adjacent to an overhead ROW. Moreover, the overhead portion of the proposed Route extends through commercial and industrial areas, and there are no adjacent residential areas, public or private schools, licensed day-care facilities, licensed youth camps or public playgrounds. *(Eversource 1, Vol. 1, pp. 7-14, 7-16; Eversource 4, pp. 44-45; PFOF ¶¶ 74, 246)*

The overhead line will be constructed in full compliance with the National Electrical Safety Code, published by the Institute of Electrical and Electronic Engineers. (Eversource 1, Vol. 1, p. 4-1) With respect to magnetic field levels, in evaluating whether an existing ROW provides an adequate buffer, the Council will consider, in addition to its own BMP, guidelines or benchmarks used by other states, such as the 85 mG Massachusetts benchmark for comparing different design alternatives. *(EMF BMP, Eversource 1, Vol. 2, Exhibit 2.C.1, p. 7)* The edge-of-ROW magnetic field levels along the Amtrak ROW will be comfortably within these guidelines. *(See Eversource 1, Vol. 1, pp. 7-14, Vol. 2, Ex. 2.C.3)* Moreover, under all projected operating conditions after the proposed line is placed in service, the calculated electric and magnetic fields would be a

small fraction of the guidelines issued by the International Committee for Electromagnetic Safety ("ICES"), a committee of the Institute of Electrical and Electronics Engineers, and the International Commission on Non-Ionizing Radiation Protection ("ICNIRP"), a specially chartered independent scientific organization. *(Eversource 1, Vol. 1, pp. 7-18, 7-19; PFOF ¶ 249)*

Accordingly, the Council has a clear basis for a finding that the overhead portion of the new line will be contained within a "buffer zone that protects the public health and safety," consisting of the existing Amtrak ROW, which will provide an adequate buffer zone between the new transmission line and any adjacent residential areas, public or private schools, licensed child day care facilities, licensed youth camps or public playgrounds (of which there are none for this Project). *(Conn. Gen. Stat. § 16-50p(a)(3)(D)(iii); Council Admin. Notice Item 25)*

IV. DISCUSSION OF CERTAIN ISSUES RAISED DURING THE HEARING & RELATED MATTERS

A. ConnDOT Comments Regarding the Proposed West Hartford Rail Station

In its August 14, 2017 comments regarding the Project, ConnDOT raised a concern as to whether Structures 47 and 48, which are located in the vicinity of the proposed West Hartford Rail Station that ConnDOT plans to build, would pose any safety issues or would conflict with the design of the proposed station. In response, Eversource proposed two options for constructing Structures 47 and 48:

- These structures could be constructed to maintain the required clearances to the proposed West Hartford Rail Station by increasing their height from the currently proposed height of 107 feet. Eversource expects the structures may possibly be as high as approximately 140 feet, based upon the limited design information provided to date by ConnDOT. However, depending upon the final design of the West Hartford Rail Structure, Structures 47 and 48 may only need to be between 125-130 feet. This option would have an incremental cost of $170,000 over the cost of the proposed design of 107-foot structures.

- Eversource could design and build the structures in the vicinity of the West Hartford Station with the expectation that the height of Structures 47 and 48 may need to be increased at a later date, once it became certain that the proposed station will be built, and in a manner similar to the currently available conceptual design. Structures 46 and 49 would be built as dead-end structures with drilled shaft foundations, and Structures 47 and 48 would be designed with flange points that would allow the height of these structures to be raised if the proposed railroad station is built. There would be two sets of cost for this "design flexibility" in the Project: one would be the incremental cost to install the "design flexibility" structures today ($160,000); and the second set of costs would be for modification of the structures in the future if the station is built ($285,000).

(ConnDOT comments dated 8/14/17, p. 2; Eversource 8; Transcr. 1, pp. 12 – 13, 39, 57; PFOF ¶ 103)

Eversource recommends that the Council select the first option because: (1) it would initially be only slightly more costly than the second option (and would avoid the additional $285,000 future cost of raising the structures later when the station is built); and (2) ConnDOT has indicated that constructing this station is a high priority, and therefore Eversource believes it will likely be built. (Transcr. 1, pp. 12 – 13, 39, 57)

B. DEEP Letter

In its August 18, 2017 comment letter concerning the Project, the Department of Energy and Environmental Protection noted that Eversource had selected a "low impact route" *(Ex. E-3, p.1)*, which includes a slightly different alignment of the underground line and associated transition structure on property of Shepard Steel in Newington than shown in the application. The final alignment agreed with the landowner will be shown in the proposed Development & Management Plan to be submitted to the Council. *(Ex. E-3, pp. 2,3; Transcript, pp. 10, 11; PFOF ¶ 84).*

C. Start of Construction Condition in Decision and Order

The Council's Decision and Orders approving new transmission lines typically include a condition that the Certificate Holder obtain necessary permits from the United

States Army Corps of Engineers ("USACE") and CT DEEP. In Docket No. 370A, The Greater Springfield Reliability Project, the relevant condition provided that these permits be obtained "prior to the commencement of construction." (Docket No. 370A, *Decision and Order, Cond. 7*). In order to meet in-service requirements, the Certificate Holder was required to petition the Council for relief from that condition, to allow construction to begin in areas for which approvals from CT DEEP and the USACE were not required. (*See, Id.,* Notice of Permission to Start Work, d. June 3. 2011). To avoid a recurrence of this necessity, in several recent dockets, specifically Docket No. 424 (the Interstate Reliability Project), Docket No. 466 (the Frost Bridge to Campville Project), and Docket No. 468 (the Southwest Connecticut Project) the Council carefully tailored this condition to provide:

> The Certificate Holder shall obtain necessary permits from the United States Army Corps of Engineers and the Connecticut Department of Energy and Environmental Protection prior to the commencement of construction *in areas where said permits are required.* (emphasis added)

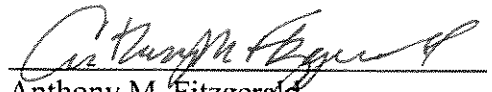
By allowing construction to start in upland areas where permits from the USACE and CT DEEP were not required, this condition avoided unnecessary constraints on construction. The Applicant respectfully requests that the permitting condition in this Docket follow the same format as that in Docket Nos. 424, 466, and 468.

CONCLUSION

Based upon the information set forth in its application, the Proposed Findings of Fact, and this brief, Eversource respectfully requests that the Council issue a certificate of environmental compatibility and public need for the Project. Eversource further asks the Council to include in its Opinion the statutory findings that the Council is directed to make in order to support the issuance of the certificate. These conclusory findings are listed in Appendix A to this brief.

Respectfully submitted,

THE CONNECTICUT LIGHT AND POWER COMPANY d/b/a EVERSOURCE ENERGY,

By: 

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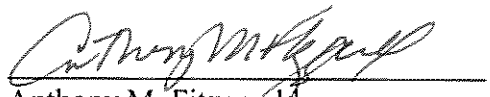
CERTIFICATION

I hereby certify that a copy of the foregoing Applicant's Proposed Findings of Fact has been electronically mailed on this 15th day of September, 2017 upon all parties as referenced in the Connecticut Siting Council's Service List dated June 9, 2017.



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APPENDIX A

Statutory Findings

There is a public need for the Greater Hartford - Central Connecticut Reliability Project. (See Eversource's Proposed Findings of Fact [PFOF] ¶¶ 29-52, and provisions of the Record cited by those Findings) Conn. Gen. Stat. § 16-50p(a)(3)(A)

The nature of the probable environmental impact, including EMF, of the facility alone and cumulatively with other existing facilities has been reviewed by this Council in approving this facility. (See PFOF ¶¶ 167-250, and provisions of the Record cited by those Findings) Conn. Gen. Stat. § 16-50p(a)(3)(B)

The Council has examined the policies of the State concerning the natural environment, ecological balance, public health and safety, air and water purity, and fish, aquaculture and wildlife, together with all other environmental concerns, and balanced the interests in accordance with Conn. Gen. Stat. § 16-50p(a)(3)(B) and Conn. Gen. Stat. § 16-50p(a)(3)(C). (See PFOF ¶¶ 167-224, and provisions of the Record cited by those Findings)

The environmental effects that are the subject of Conn. Gen. Stat. § 16-50p(a)(3)(B) can be sufficiently mitigated and do not overcome the public need for the facility approved by the Council in its Opinion, Decision and Order. (See PFOF ¶¶ 167-224, and provisions of the Record cited by those Findings)

Conn. Gen. Stat. § 16-50p(a)(3)(D)(i) requires that the Council specify what part, if any, of the facility approved shall be located overhead. That is designated in the Opinion, Decision and Order.

The facility approved by the Council in the Opinion, Decision and Order conforms to a long-range plan for expansion of the electric power grid of the electric systems serving the State of Connecticut and its people and interconnected utility systems and will serve the interests of electric system economy and reliability. (See PFOF ¶¶ 29-52 and provisions of the Record cited by those Findings) Conn. Gen. Stat. § 16-50p(a)(3)(D)(ii)

The overhead portions of the facility approved by this Council in its Opinion, Decision and Order are cost effective and the most appropriate based on a life-cycle cost analysis of the facility and underground alternatives to the facility and comply with the provisions of Conn. Gen. Stat. § 16-50p. (See PFOF ¶¶ 53-56, 64-66, 86 and provisions of the Record cited by those Findings) Conn. Gen. Stat. § 16-50p(a)(3)(D)(iii)

The overhead portions of the facility approved by this Council in its Opinion, Decision and Order are consistent with the purposes of Chapter 227a of the General Statutes of Connecticut, and with Council regulations and standards adopted pursuant to Conn. Gen. Stat. §16-50t, including the Council's BMPs and with the Federal Energy Regulatory Commission's "Guidelines for the Protection of Natural Historic Scenic and Recreational

Values in the Design and Location of Rights-of-Way and Transmission Facilities." (See PFOF ¶¶ 64-66, 72-87, 100-109, and provisions of the Record cited by those Findings) Conn. Gen. Stat. § 16-50p(a)(3)(D)(iii)

The overhead portions of the facility approved by this Council are contained within a buffer zone, no less in area than the existing Amtrak Railroad right-of-way, that protects the public health and safety. In establishing this buffer zone, the Council took into consideration, among other things, residential areas, private or public schools, licensed child day care facilities, licensed youth camps or public playgrounds adjacent to the proposed route of the overhead portions [and the fact there are no such facilities adjacent to the proposed overhead route] and the level of voltage of the overhead portions and any existing overhead transmission lines on the approved routes. (See PFOF ¶¶ 225-250, and provisions of the Record cited by those Findings; Eversource 1, Vol. 1, Section 7) Conn. Gen. Stat. § 16-50p(a)(3)(D)(iii)

Eversource has designed the Project in compliance with the Council's BMPs. (See PFOF ¶¶ 225-250, and provisions of the Record cited by those Findings; Eversource 1, Vol. 1, Section 7) Conn. Gen. Stat. § 16-50p(a)(3)(D)(iii)

In compliance with the BMPs, Eversource furnished a Field Management Design Plan for the Project. (PFOF ¶¶ 225-250; Council Admin. Notice Item 25, pp. 4-5; Eversource 1, Vol. 1, Section 7.5)

The location of the facility approved by this Council in its Opinion, Decision and Order will not pose an undue hazard to persons or property along the area traversed by those lines. (See PFOF ¶¶ 225-259, and provisions of the Record cited by those Findings) Conn. Gen. Stat. § 16-50p(a)(3)(E)