

**Appendix A: The Council's Decision and Order
and Opinion for the Project (Docket No. 461A)**

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STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

www.ct.gov/csc

November 14, 2017

Kathleen Shanley
Manager-Transmission Siting
Eversource Energy
56 Prospect Street
Hartford, CT 06103

RE: **DOCKET NO. 461A** - Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a 115-kilovolt (kV) bulk substation located at 290 Railroad Avenue, Greenwich, Connecticut, and two 115-kV transmission circuits extending approximately 2.3 miles between the proposed substation and the existing Cos Cob Substation, Greenwich, Connecticut, and related substation improvements. Reopening of this docket based on changed conditions pursuant to Connecticut General Statutes §4-181a(b).

Dear Ms. Shanley:

By its Decision and Order dated November 9, 2017, the Connecticut Siting Council (Council) granted a Certificate of Environmental Compatibility and Public Need (Certificate) for the construction, maintenance, and operation of a 115-kilovolt (kV) bulk substation located at 290 Railroad Avenue, Greenwich, Connecticut, and two 115-kV transmission circuits extending approximately 2.3 miles between the proposed substation and the existing Cos Cob Substation, Greenwich, Connecticut, and related substation improvements.

Enclosed are the Council's Certificate, Findings of Fact, Opinion, and Decision and Order.

Very truly yours,

James J. Murphy, Jr.
Vice Chairman

JJM/RDM/laf

Enclosures (4)

- c: Parties and Intervenors (without Certificate enclosure)
State Documents Librarian (without Certificate enclosure)

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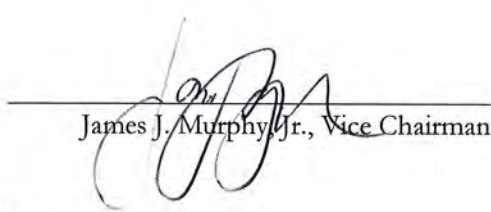
E-Mail: siting.council@ct.gov

www.ct.gov/csc

**CERTIFICATE
OF
ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED
DOCKET NO. 461A**

Pursuant to General Statutes §4-181a(b), as amended, the Connecticut Siting Council hereby issues a Certificate of Environmental Compatibility and Public Need to Eversource Energy for the construction, maintenance, and operation of a 115-kilovolt (kV) bulk substation located at 290 Railroad Avenue, Greenwich, Connecticut, and two 115-kV transmission circuits extending approximately 2.3 miles between the proposed substation and the existing Cos Cob Substation, Greenwich, Connecticut, and related substation improvements. This Certificate is issued in accordance with and subject to the terms and conditions set forth in the Decision and Order of the Council on November 9, 2017.

By order of the Council,


James J. Murphy Jr., Vice Chairman

November 9, 2017



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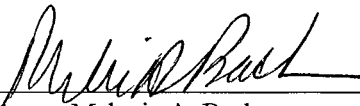
STATE OF CONNECTICUT)

: ss. New Britain, Connecticut November 14, 2017

COUNTY OF HARTFORD)

I hereby certify that the foregoing is a true and correct copy of the Findings of Fact, Opinion, and Decision and Order issued by the Connecticut Siting Council, State of Connecticut.


ATTEST:



Melanie A. Bachman
Executive Director
Connecticut Siting Council

I certify that a copy of the Findings of Fact, Opinion, and Decision and Order in Docket No. 461A has been forwarded by Certified First Class Return Receipt Requested mail, on November 14, 2017, to all parties and intervenors of record as listed on the attached service list, dated July 11, 2017.

ATTEST:



Lisa Fontaine
Fiscal Administrative Officer
Connecticut Siting Council

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LIST OF PARTIES AND INTERVENORS
SERVICE LIST

| Status Granted | Document Service | Status Holder (name, address & phone number) | Representative (name, address & phone number) |
|--|--|---|--|
| Applicant | <input checked="" type="checkbox"/> E-Mail | Eversource Energy | <p>Kathleen Shanley Manager-Transmission Siting Eversource Energy 56 Prospect Street Hartford, CT 06103 kathleen.shanley@eversource.com</p> <p>Raymond Gagnon Director – Transmission Projects Eversource Energy 56 Prospect Street Hartford, CT 06103 Raymond.gagnon@eversource.com</p> <p>Jeffery Cochran, Esq. Senior Counsel, Legal Department Eversource Energy 107 Selden Street Berlin, CT 06037 jeffery.cochran@eversource.com</p> <p>Marianne Barbino Dubuque Carmody Torrance Sandak & Hennessey LLP 50 Leavenworth Street Waterbury, CT 06702 mdubuque@carmodylaw.com</p> <p>Anthony M. Fitzgerald, Esq. Carmody Torrance Sandak & Hennessey LLP 195 Church Street New Haven, CT 06509 afitzgerald@carmodylaw.com</p> |
| Party Approved on July 23, 2015 | <input checked="" type="checkbox"/> E-Mail | Office of Consumer Counsel | <p>Lauren Henault Bidra, Esq. Staff Attorney Office of Consumer Counsel Ten Franklin Square New Britain, CT 06051 Lauren.bidra@ct.gov</p> |

| Status Granted | Document Service | Status Holder (name, address & phone number) | Representative (name, address & phone number) |
|---|--|--|--|
| Party Approved on July 23, 2015 | <input checked="" type="checkbox"/> E-Mail | Office of Consumer Counsel continued | Joseph A. Rosenthal, Esq. Principal Attorney Office of Consumer Counsel Ten Franklin Square New Britain, CT 06051 Joseph.rosenthal@ct.gov |
| Intervenor Approved on September 1, 2015 | <input checked="" type="checkbox"/> E-Mail | Parker Stacy 1 Kinsman Lane Greenwich, CT 06830 pstacy@optonline.net | |
| Intervenor Approved on September 1, 2015 | <input checked="" type="checkbox"/> E-Mail | Field Point Estate Townhouses, Inc. | Carissa Depetris Dwight Ueda Field Point Estate Townhouses 172 Field Point Road, #10 Greenwich, CT 06830 carissa.depetris@gmail.com d_ueda@yahoo.com |
| Intervenor Approved on September 1, 2015 | <input checked="" type="checkbox"/> E-Mail | Christine Edwards 111 Bible Street Cos Cob, CT 06807 SeeEdwards@aol.com | |
| Intervenor Approved on September 1, 2015 | <input checked="" type="checkbox"/> E-Mail | Richard Granoff, AIA, LEED AP Granoff Architects 30 West Putnam Avenue Greenwich, CT 06830 rg@granoffarchitects.com | |
| Grouped Intervenor Approved on September 1, 2015 | <input checked="" type="checkbox"/> E-Mail | Anthony Crudele Bella Nonna Restaurant & Pizzeria 280 Railroad Avenue Greenwich, CT 06830 bellanonnagreenwich@gmail.com | |
| Intervenor Approved on September 1, 2015 | <input checked="" type="checkbox"/> E-Mail | Cecilia H. Morgan 3 Kinsman Lane Greenwich, CT 06830 cecimorgan@aol.com | |

| Status Granted | Document Service | Status Holder (name, address & phone number) | Representative (name, address & phone number) |
|--|--|---|--|
| Grouped Intervenor Approved on September 17, 2015 | <input checked="" type="checkbox"/> E-Mail | Joel Paul Berger 4208 Bell Boulevard Flushing, NY 11361 communityrealty@msn.com | |
| Grouped Intervenor Approved on October 1, 2015 | <input checked="" type="checkbox"/> E-Mail | Meg Glass 9 Bolling Place Greenwich, CT 06830 glass50@hotmail.com | |
| Party Approved on January 12, 2016 | <input checked="" type="checkbox"/> E-Mail | The Honorable Peter J. Tesei First Selectman Town of Greenwich 101 Field Point Road Greenwich, CT 06830 ptesei@greenwichct.org | David A. Ball, Esq. David E. Dobin, Esq. Cohen and Wolf, P.C. P.O. Box 1821 Bridgeport, CT 06601 dball@cohenandwolf.com ddobin@cohenandwolf.com (203) 368-0211 (203) 394-9901 – fax |
| Intervenor Approved on May 25, 2017 | <input checked="" type="checkbox"/> E-Mail | Morningside Circle Association | P. Jude Collins, President Morningside Circle Association 67 Circle Drive Greenwich, CT 06830 (203) 918-1076 Mail@morningsidecircle.org |

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|--|---|------------------|
| DOCKET NO. 461A - Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a 115-kilovolt (kV) bulk substation located at 290 Railroad Avenue, Greenwich, Connecticut, and two 115-kV underground transmission circuits extending approximately 2.3 miles between the proposed substation and the existing Cos Cob Substation, Greenwich, Connecticut, and related substation improvements. Reopening of this docket based on changed conditions pursuant to Connecticut General Statutes §4-181a(b). | } | Connecticut |
| | } | Siting |
| | } | Council |
| | | November 9, 2017 |

Findings of Fact

Introduction

1. On June 26, 2015, 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, maintenance, and operation of a new 115-kilovolt (kV) bulk substation located at 290 Railroad Avenue, Greenwich, Connecticut, and two 115-kV underground transmission circuits extending approximately 2.3 miles between the proposed substation and the existing Cos Cob Substation including related substation improvements in Greenwich, Connecticut (Greenwich Substation and Line Project or GSLP). (Council Administrative Notice Item No. 43)
2. The parties in the original Docket 461 proceeding were Eversource, the Office of Consumer Counsel (OCC) and the Town of Greenwich (Town). The intervenors were Parker Stacy; Pet Pantry Super Discount Stores LLC; Field Point Estate Townhouses, Inc.; Christine Edwards; Richard Granoff; Bella Nonna Restaurant and Pizzeria; Cecilia Morgan; Greenwich Chiropractic & Nutrition; Joel Paul Berger; and Meg Glass. (Record)
3. During the original Docket 461 proceeding, the Council grouped the following intervenors with the same interests pursuant to Connecticut General Statutes (C.G.S.) §16-50n(c): Bella Nonna Restaurant and Pizzeria, Greenwich Chiropractic & Nutrition, Joel Paul Berger and Meg Glass (Grouped Intervenors). (Council Administrative Notice Item No. 43)
4. On May 12, 2016 the Council voted to deny without prejudice a Certificate to Eversource for the GSLP. (Council Administrative Notice Item No. 43)
5. On May 5, 2017 Eversource submitted a Petition for Reconsideration of the Denial of a Certificate of Environmental Compatibility and Public Need for the GSLP to the Council and the service list for the original Docket 461 proceeding based on changed conditions pursuant to C.G.S. §4-181a(b) (Motion to Reopen). The Motion to Reopen requested the Council to reconsider the denial without prejudice and provided additional direct testimony on the GSLP. (Eversource 1, Vol. 1, Motion to Reopen p. 1)
6. On May 5, 2017, the Council issued a memorandum to the service list for the original Docket 461 proceeding requesting comments or statements of position in writing with respect to whether the Motion to Reopen should be granted or denied by May 18, 2017. The Town, Meg Glass, Cecilia Morgan, Field Point Estate Townhouses, Inc., and Parker Stacy submitted comments in opposition to the Motion to Reopen. (Record)

7. At a meeting held on May 25, 2017, the Council voted to grant Eversource's Motion to Reopen. The reopening allows the Council to consider changed conditions, public need and alternate locations for the proposed electric substation and electric transmission circuits (Modified GSLP). (Council Memorandum re Docket 461A, dated May 26, 2017)
8. The Modified GSLP consists of the installation of a new 115-kV bulk power substation, referred to as the Greenwich Substation, a new 115-kV electric transmission line, and modifications to the existing Cos Cob and Prospect Substations. Two project variations were proposed for the Modified GSLP: the Proposed Modified Project (PMP) and Alternate Modified Project (AMP). (Eversource 1, Motion to Reopen, pp. 6-7)

Procedural Matters

9. During a regular Council meeting on May 25, 2017, the Council voted to approve the schedule for consideration of the reopened proceeding with a public field review of the Modified GSLP and public hearing in the Town of Greenwich on July 13, 2017. On May 26, 2017, all parties and intervenors to the original Docket 461 proceeding were notified of the reopening. (Record)
10. On May 25, 2017, the Council granted intervenor status to Morningside Circle Association. (Record)
11. On May 26, 2017, pursuant to C.G.S. §16-50m, the Council sent a letter to the Town to provide notification of the scheduled public hearing and to invite the Town to participate in the proceeding. (Record)
12. Pursuant to C.G.S. §16-50m, the Council published legal notice of the date and time of the public hearing in The Greenwich Time on May 31, 2017. (Record)
13. On June 14, 2017, the Council held a pre-hearing conference on procedural matters at the office of the Council, 10 Franklin Square, New Britain, Connecticut, for parties and intervenors to discuss the requirements for pre-filed testimony, exhibit lists, administrative notice lists, expected witness lists, filing of pre-hearing interrogatories and the logistics of the public inspection of the project. (Council Pre-Hearing Conference Memoranda, dated June 2, 2017 and June 16, 2017).
14. On June 15, 2017 Greenwich Chiropractic & Nutrition withdrew their Intervenor Status. (Record)
15. On July 11, 2017, Pet Pantry Super Discount Stores LLC withdrew their Intervenor Status. (Record)
16. Pursuant to R.C.S.A. §16-50j-21, Eversource installed eleven signs, measuring four feet by six feet at various locations along the project route and at the proposed substation locations, notifying the public of the type of facility proposed, the public hearing date and contact information for the Council. (Eversource 3)
17. The Council and its staff conducted a public inspection of portions of the Modified GSLP on July 13, 2017, beginning at 2:00 p.m. Eversource provided bus transportation along the AMP transmission line route and to the existing Cos Cob substation and proposed AMP and PMP substation locations. (Council Hearing Notice dated July 24, 2015; Council Field Review Notice Memoranda, dated June 28, 2017; Transcript, July 13, 2017, 6:30 p.m. [Tr. 1], pp. 4-5)
18. Pursuant to C.G.S. § 16-50m, the Council, after giving due notice thereof, held a public comment hearing session on July 13, 2017, beginning at 6:30 p.m., at the Greenwich Library, Cole Auditorium, 101 West Putnam Avenue, Greenwich, Connecticut. (Council Hearing Notice dated May 26, 2017; Tr. 1, pp. 1-5)

19. The Council continued the public hearing by holding evidentiary sessions on July 25, August 29, and September 5, 2017 at the office of the Council at 10 Franklin Square, New Britain, Connecticut. (Council Hearing Notice dated May 26, 2017; Council Continued Hearing Memoranda of July 25 and August 30, 2017; Transcript, July 25, 2017, 11:00 a.m. [Tr. 2], pp. 1-5; Transcript, August 29, 2017, 11:00 a.m. [Tr. 3] p. 1-5; Transcript, September 5, 2017, 1:00 p.m. [Tr. 4] pp. 1-4)
20. During the evidentiary hearing sessions, the Council, parties and intervenors were afforded opportunities to cross examine the applicant and other parties and intervenors. Also prior to and during the evidentiary hearing sessions, the applicant, parties and intervenors were afforded opportunities to submit pre-filed testimony and exhibits. (Tr. 2, pp. 180-190; Tr. 3, p. 120; Tr. 4 pp. 10-11, 48, 71, 81; Council Memoranda dated July 25, 2017; August 30, 2017)
21. The following parties and intervenors did not appear at any of the public hearings: Office of Consumer Counsel, Christine Edwards, Richard Granoff, Grouped Intervenors and Morningside Circle Association. (Tr. 2, pp. 180-190; Tr. 3, p. 120; Tr. 4 pp. 10-11, 48, 71, 81; Council Hearing Programs dated July 13, 2017; July 25, 2017; August 29, 2017; September 5, 2017)
22. The following intervenors did not submit any pre-filed testimony or exhibits, but availed themselves of opportunities to cross examine the applicant and other parties and intervenors during the evidentiary hearing sessions: Cecilia Morgan and Field Point Estate Townhouses, Inc. (Tr. 2, pp. 180-190; Tr. 3, p. 120; Tr. 4 pp. 10-11, 48, 71, 81; Council Hearing Programs dated July 13, 2017; July 25, 2017; August 29, 2017; September 5, 2017)
23. The following party and intervenor submitted pre-filed testimony and exhibits, and availed themselves of opportunities to cross examine the applicant and other parties and intervenors during the evidentiary hearing sessions: Town and Parker Stacy. (Tr. 2, pp. 180-190; Tr. 3, p. 120; Tr. 4 pp. 10-11, 48, 71, 81; Council Hearing Programs dated July 13, 2017; July 25, 2017; August 29, 2017; September 5, 2017)
24. The Connecticut Supreme Court acknowledges that constitutional principles permit an administrative agency to organize its hearing schedule so as to balance its interest in reasonable, orderly and non-repetitive proceedings against the risk of erroneous deprivation of a private interest. (*Concerned Citizens of Sterling v. Connecticut Siting Council*, 215 Conn. 474 (1990); *Pet v. Department of Public Health*, 228 Conn. 651 (1994); *FairwindCT, Inc. v. Connecticut Siting Council*, 313 Conn. 669 (2014))

Municipal Consultation and Community Outreach

25. Prior to submitting the Modified GSLP, Eversource, in consultation with the Town, reconsidered both distribution and transmission solutions that would meet the redefined need. Additionally, proposals for demand side measures to mitigate future load growth were discussed. (Eversource 1, Vol. 1, PFT p. 15)
26. Consultation with the Town began in late June 2016 and continued until April 21, 2017. Multiple meetings, conference calls and exchange of correspondence occurred during this time. (Eversource 1, Vol. 1, PFT p. 16)
27. During the consultation process, eight potential distribution alternatives, with variations, were discussed with various Town representatives and its consultant, Mr. Mitchell Mailman. Through its analysis, Eversource determined these potential distribution solutions were impractical, ineffective, or unreasonably expensive (refer to Attachment 3). (Eversource 1, Vol. 1, PFT p. 17)
28. Two transmission line routes were ultimately developed and submitted as part of the Modified GSLP; the PMP, preferred by Eversource, consisting of an overhead-underground transmission line route and a new air insulated substation at 290 Railroad Avenue, and the AMP, preferred by the Town, consisting of an all

underground transmission route extending from Cos Cob Substation to a new “indoor substation” at 281 Railroad Avenue. (Eversource 1, Vol. 1, PFT pp. 17-18)

29. Once details of the Modified GSLP were developed, Eversource notified property owners along the routes of both the PMP and the AMP and the abutters of the proposed and alternate locations of the new Greenwich Substation that the Petition would be filed. (Eversource 1, Vol. 1, PFT p. 22)
30. Eversource notified federal and state elected officials of the Modified GSLP during Project development. (Eversource 1, Vol. 1, PFT p. 22)

State Agency Comment

31. Pursuant to C.G.S. § 16-50j(g), on May 26, 2017, the following State agencies were solicited by the Council to submit written comments regarding the proposed facility: Department of Energy and Environmental Protection (DEEP); Department of Public Health (DPH); Council on Environmental Quality (CEQ); Public Utilities Regulatory Authority (PURA); Office of Policy and Management (OPM); Department of Economic and Community Development (DECED); Department of Agriculture (DOAg); Department of Transportation (DOT); Connecticut Airport Authority (CAA); Department of Emergency Services and Public Protection (DESPP); and State Historic Preservation Office (SHPO). (Council State Agency Memorandum, dated May 26, 2017)
32. On August 31, 2017, the DOT Bureau of Public Transportation submitted correspondence to Eversource indicating that the DOT will not grant Eversource a license to install the overhead transmission line portion of the PMP within the Metro-North Railroad (MNRR) right-of-way. This determination in effect makes the AMP transmission line route the only route for Council consideration. (Eversource 5)
33. On August 31, 2017, the DOT Bureau of Engineering and Construction submitted correspondence to Eversource indicating certain project design preferences and adherence to DOT approval and permit requirements. DOT's design preferences are presented in FOF # 230, 231, 237. (DOT comments of August 31, 2017)
34. No other state agencies commented on the Modified GSLP. (Record)

Changed Conditions

35. Eversource's Motion to Reopen identifies the following changed conditions since the Council's May 12, 2016 denial without prejudice decision:
 - a. Altered the design of the GSLP to account for current electric needs rather than to provide improvements with a 30 to 40 year planning horizon;
 - b. Designed a system to meet reliability needs based on 130.5 MVA of peak load on the Greenwich 27.6-kV system;
 - c. No longer use a ten year load growth forecasting that anticipated one percent load growth per year;
 - d. Two potential GSLP project routes and substation sites were developed for consideration; the PMP which was developed based on inquiries from the Council during the Docket 461 proceeding, and the AMP which was developed upon Eversource's consultation with the Town after the Council's Docket 461 decision;
 - e. Developed a transmission line route that avoids, to the extent possible, environmental impact to the Town-owned Bruce Park;
 - f. Reduced costs of both the PMP and AMP from than the original GSLP presented in Docket 461;

- g. Redesigned the GSLP substation that does not use costly Gas-insulated switchgear;
 - h. Use of Cross-linked Polyethylene (XLPE) cable instead of a High Pressure Fluid Filled cable design for all underground transmission line installations;
 - i. Consultations with the Town in an attempt to develop feasible alternatives as well as a feasible GSLP route; and
 - j. Consultations with the Town to develop demand side management programs to promote energy efficiency.
- (Eversource 1, Vol. 1 Motion to Reopen pp. 1-8, PFT p. 15; Vol. 1, Ex. B, p. C-12; Tr. 2, pp. 88-89; Tr. 3, pp. 15-22)

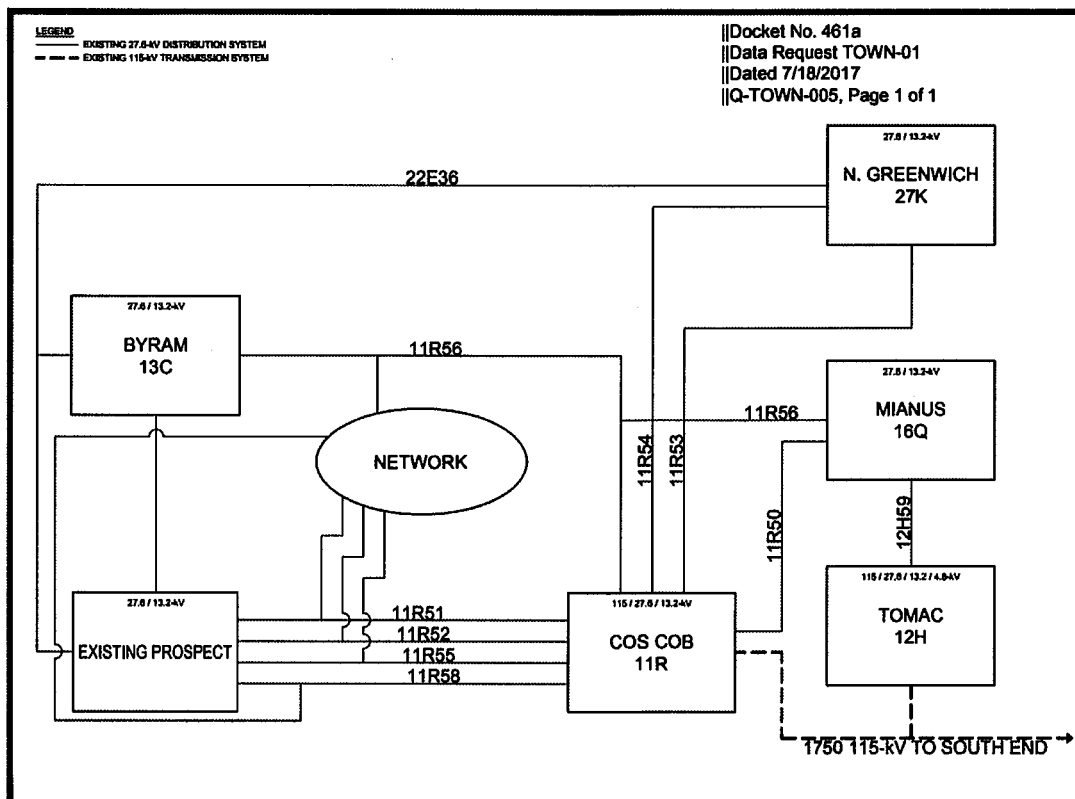
System Planning

- 36. The Independent System Operator of New England (ISO-NE), a regional reliability council, is responsible for the reliable and economical operation of New England's electric power system, which includes managing the comprehensive, long-term planning of the regional power system to identify the region's electricity needs and plans for meeting those needs. (Council Administrative Notice 43, FOF # 28)
- 37. ISO-NE would have to review and approve the Modified GSLP to ensure it has no impact on the bulk power system. ISO-NE approved the original Docket 461 design. The Modified GSLP is a smaller design so would have less of an impact on the bulk power system than the previous project. (Tr. 2, pp. 155-156)
- 38. No regional planning criteria apply to the distribution voltage elements of the GSLP or to the related distribution elements of the Greenwich distribution system. ISO-NE criteria does apply to the Cos Cob Substation as it is classified as a regional network transmission facility. The Modified GSLP 115 kV lines and the new Greenwich Substation are not part of the regional transmission system. (Eversource 2, response 4)
- 39. The Modified GSLP is identified in the ISO-NE Regional System Plan as project no. 1533. (Eversource 2, response 5)
- 40. ISO-NE would also determine the appropriate cost recovery allocation for the regional transmission portion of the Project. (Tr. 2, p. 156)
- 41. Connecticut's Comprehensive Energy Strategy proposes further investments in grid reliability and identifies three important components to grid reliability: resource adequacy, transmission security and distribution resiliency. (Council Administrative Notice 43, FOF #30)
- 42. Reliability can be looked at in three parts - assuring adequate supply; frequency of interruptions; and duration of outages. The existing electric system in the Town of Greenwich is unacceptable in all three aspects. (Council Administrative Notice 43, FOF #110)
- 43. The distribution network in Greenwich is under PURA regulatory authority. PURA periodically reviews electric system operations. If reliability concerns are not addressed, PURA could open a docket to determine if certain measures are necessary to ensure the distribution system is operated appropriately. The North American Electric Reliability Corporation has jurisdiction over the reliable operation of a transmission system. (Tr. 2, pp. 107-108)

Public Need

Greenwich Area Electric System

44. The electric distribution system in Greenwich was designed over 50 years ago to serve much lower load levels than those that exist today. (Council Administrative Notice 43, FOF #49)
45. Greenwich is at the farthest southwest extent of Eversource's electric network in Connecticut and is electrically isolated. There is no transmission tie to New York in the Greenwich area. (Council Administrative Notice 43, FOF # 50, #192)
46. Greenwich relies heavily on one bulk substation, the Cos Cob Substation, to provide power to three distribution substations in Greenwich; the Prospect, Byram and North Greenwich Substations. (Council Administrative Notice 43, FOF # 50)
47. A small portion of Greenwich load, in the southeast area of Town, is served by the Tomac Substation from a single 115-kV to 13.2-kV transformer. The Tomac Substation was added in the early 1990's to alleviate load at the Cos Cob Substation. It was designed as a temporary installation that did not incorporate a standard design. (Council Administrative Notice 43, FOF # 51; Tr. 3, p. 37)
48. A simplified line drawing of the existing Greenwich area electric system is presented below:



A diagram depicting the approximate service territory of each substation in Greenwich is provided in Attachment 1. (Eversource 9, response Town 5)

49. The diagram above does not depict the 1740 115-kV transmission line that also feeds the Cos Cob Substation from Stamford. Both the 1740 and 1750 lines are located on common structures. The loss of

both the 1740 and 1750 lines servicing the Cos Cob Substation would also result in the loss of electric service to almost all of Greenwich. An outage in 2012 interrupted service for both the 1740 and 1750 lines. (Council Administrative Notice 43, FOF #123; Tr. 3, pp. 11, 65-69)

Existing Cos Cob Substation

50. The Cos Cob Substation serves approximately 176 megavolt amperes (MVA) of load, and as such, is the most heavily loaded substation in Connecticut. It provides 130.5 MVA of peak load at 27.6-kV to the Prospect, North Greenwich and Byram Substations, 29.5 MVA of peak load to 13.2-kV distribution feeders and 16.4 MVA of peak load at 115-kV to an adjacent Metro North Railroad (MNR) substation. (Council Administrative Notice 43, FOF # 54, #55)
51. The Cos Cob Substation is one of two bulk substations in Eversource's service area that has three transformers serving 27.6-kV load. No bulk substation in Eversource's service area has four or more transformers serving 27.6-kV load. (Council Administrative Notice 43, FOF #56)
52. Typically, areas with large customer load have two or more bulk substations with multiple transmission supply lines to serve that load. Such a design allows for the transfer of load from one station to another if one of the transmission sources were interrupted. (Council Administrative Notice 43, FOF #61)
53. The Cos Cob Substation has three 115-kV to 27.6-kV transformers; 1X -50.4 MVA, 2X -46.7 MVA and 3X -46.7 MVA and two 115-kV to 13.2-kV transformers. (Eversource 1, Vol. 1, PFT p. 6; Eversource 2, response 19)

Existing Prospect Substation

54. The Prospect Substation is a non-bulk substation that was designed in 1954. It has 55 MVA of capacity, served by four 27.6-kV to 13.2-kV transformers: 1X -15 MVA, 2X -12.5 MVA, 3X -12.5 MVA, 4X -15 MVA. (Eversource 1, Vol. 1, PFT pp. 5-7)
55. The Prospect Substation is only served by Cos Cob Substation. In the event the Prospect Substation is lost from service, only one percent of the Prospect load can be supplied by other sources. (Council Administrative Notice 43; FOF #80; Tr. 2, p. 144)

Existing 27.6-kV Distribution Feeders

56. Four 27.6-kV distribution circuits from Cos Cob Substation provide power to the Prospect Substation; the 11R51, 11R52, 11R55, and 11R58 circuits. (Eversource 1, Vol. 1, PFT pp. 4-5)
57. In addition to the Prospect Substation, these four feeders are designed to also feed the Greenwich Network, certain large customers, and the Byram Substation. (Eversource 9, response Town 5, Town 21; Tr. 3, pp. 28, 36)
58. The current design of having distribution feeders to collectively serve substation load, network load, and large individual customer load is unique and not a good design. It was designed approximately 40 years ago to defer electric system investments. (Town 1, p. 17; Tr. 3. pp. 36-37)
59. The Greenwich Network generally consists of the downtown area of Greenwich with the feeders sharing a common bus and multiple transformers to create a grid distribution network. An additional feeder (11R-56) also serves the Greenwich Network but does not serve the Prospect Substation. (Eversource 9, response Town 1, Town 5; Tr. 2, pp. 20-21, 176)

60. If a common distribution feeder is de-energized to accommodate work at either the Prospect Substation or within the Greenwich Network, it affects both the substation and the network. The feeders cannot be isolated so that they can serve one or the other. (Eversource 9, response Town 2; Town 1, p. 17)
61. Eversource regularly schedules outages on the feeders typically once every 24 months to perform maintenance on the 22 transformers associated with the Greenwich network. (Eversource 9, response Town 2; Tr. 2, p. 25)
62. Certain sections of the four distribution feeders were installed in the 1950's to 1960's and are at the end of their useful life. Once the Project is operational, the feeders would continue to be repaired/replaced on an as needed basis. (Tr. 2, pp. 23-25)
63. In general, outages on feeders can be caused by age, loading, operational history, especially related to temperature, and weather events such as lightning. (Tr. 3, pp. 49-51)
64. An overload on a feeder results in a loss of service life of two percent per occurrence. (Tr. 4, p. 67)

GSLP Background

65. Eversource acquired the rights to the 290 Railroad Avenue location in 1971 in anticipation of a building a new substation. (Tr. 3, p. 37)
66. Eversource identified a need for a new substation in Greenwich in 1989. At that time, it was projected that the Cos Cob Substation would reach capacity in 1994. Many reliability and load demand measures subsequently were undertaken by Eversource to delay the need for a substation. In 2011 Eversource determined there were no more measures that could be undertaken to further delay the need for a new substation closer to the load in central Greenwich. (Council Administrative Notice 43, FOF # 63 – 68; Tr. 2, pp. 99-100)
67. Eversource publically announced its intent to construct a new substation west of Indian Harbor in 2011 in response to reliability concerns that were exposed by storm events in June 2011, before the Cos Cob Substation peak load of 130.5 MVA on the 27.6-kV system occurred in 2013. (Council Administrative Notice 43, FOF # 70; Tr. 2, pp. 13-15)
68. The June 2011 event interrupted service to over 5,000 customers due to multiple outages on the underground circuits emanating from Cos Cob Substation. (Council Administrative Notice 43, FOF # 71; Tr. 3, pp. 40-41)
69. This event demonstrated to Eversource an inadequate supply of power during contingency events, an unacceptable interruption of service (over 5,000 customers lost power) and cascading effects from the interruption in service, and the inability to recover from the interruption in a timely manner (75 minutes to 18 hours). (Council Administrative Notice 43, FOF #73; Tr. 3, pp. 40-41)
70. The GSLP was submitted to the Council on June 26, 2015 as a reliability project to provide immediate load relief and add transformer capacity to the electric distribution supply system in the Town of Greenwich by establishing a new bulk substation near the center of the customer electrical demand to avoid overloads on existing electric system equipment. The new substation at 290 Railroad Avenue would be connected to the Cos Cob Substation by installing two separate 115-kV transmission circuits that extended approximately 2.3 miles from Cos Cob Substation. (Council Administrative Notice 43, FOF #1, #2)

71. As part of Eversource's need analysis in Docket 461, Eversource used load forecasting that used one percent annual peak load growth on the Cos Cob 27.6-kV system beginning with the 2013 peak load of 130.5 MVA. Overloads were projected to occur in 2017 (135.7 MVA). The projected peak loading of 131.8 MVA in 2014, 133.1 in 2015, and 134.4 MVA in 2016 did not materialize. (Council Administrative Notice 43, FOF #97; Eversource 2, response 11; Town 1, p. 20; Tr. 3, pp. 15-18)

72. The peak load on the Cos Cob 27.6-kV system from 2004 to 2016 is presented in the table below :

| Cos Cob 27.6-kV System Peak - actual values | | | | | | | | | | | | |
|---|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| 96.8 | 117.9 | 125 | 116.1 | 112.1 | 107.7 | 119.7 | 121.8 | 128.2 | 130.5 | 107.7 | 114.8 | 115.6 |

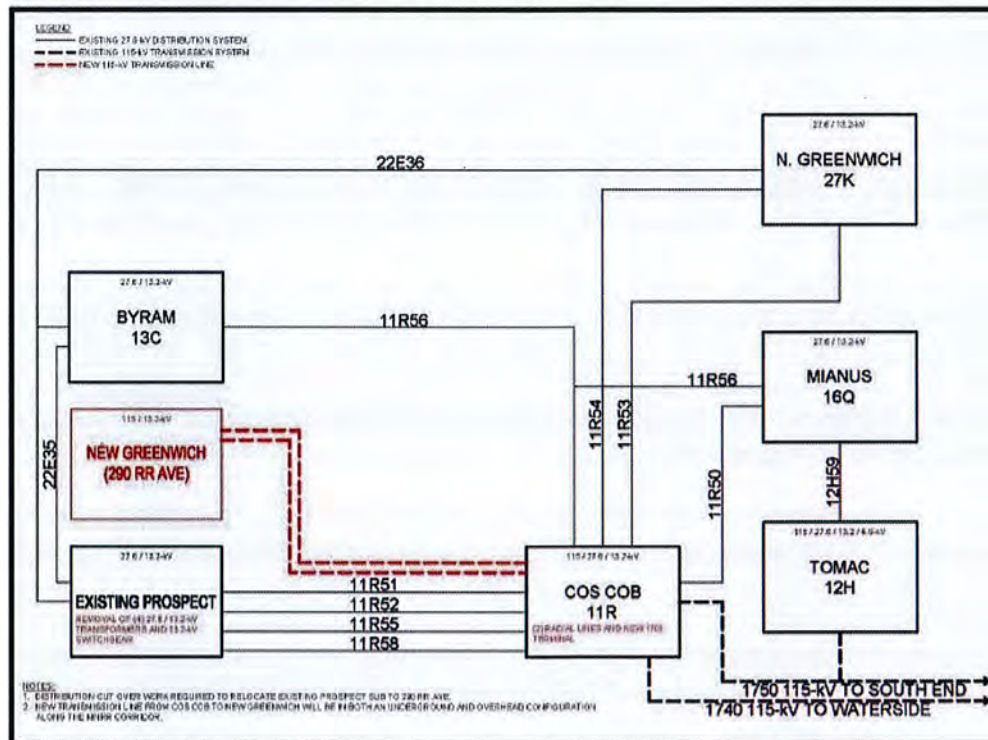
(Eversource 2, response 11)

73. The 2013 peak occurred over a sustained period of high temperatures combined with high humidity. Year 2012 also experienced several days of high heat and humidity resulting in a peak load of 128.2 MVA. Although 2016 was extremely hot, based on average temperature, there were no sustained days of high temperatures coupled with high humidity, to cause a similar spike in peak load. (Council Administrative Notice 43, FOF #84; Tr. 2, pp. 15-16, 19-20)
74. There was a short duration heat wave starting around July 19, 2017 throughout the State that caused a cable fault on a 27.6-kV feeder (11R56) to Byram Substation on July 20. It occurred early in the morning with a load below the cable's normal rating. The cable fault caused an overload on the Prospect 2X transformer causing a load to be shed that affected 477 customers for approximately 2 hours. For this weather event, Eversource experienced outages throughout the State, but Greenwich was the only location where customers could not be restored because the feeder capacity was not available. (Tr. 2, pp. 16-19; Tr. 3, pp. 46-47, 51)
75. Cable failures also occurred under other non-peak load conditions. Several recent distribution feeder failures not related to loading occurred as follows:
- a) The 11R52 feeder failed in July 5, 2015 at 25 MVA, below its normal rating of 33.5 MVA;
 - b) The 11R56 feeder failed on July 27, 2015 at a load of 7.5 MVA, below its cable rating of 15.9 MVA;
 - c) The 11R55 feeder failed on July 28, 2015 at a load of 14 MVA, below its normal rating of 32.5 MVA.
- A cable failure causes the other cables remaining in operation to carry more load. (Eversource 9, response Town 17; Tr. 3, pp. 52-57)

Modified GSLP Objectives

76. Unlike the original project, Eversource is no longer projecting load growth in this area and load growth is not part of the need for the Modified GSLP. (Eversource 1, Vol. 1, PFT, p. 15)
77. The Modified GSLP is designed to address the need for reliability improvements to the electric distribution system in Greenwich as previously identified by the Council in its Docket 461 decision. (Eversource 1, Vol. 1, PFT pp. 1-3)

78. The Modified GSLP would establish a new 115-kV to 13.2-kV substation west of Indian Harbor (Greenwich Substation), and a new 115-kV transmission line connection between the existing Cos Cob Substation and the new Greenwich Substation, as shown below:



(Eversource 10a, p. 10)

79. The Modified GSLP would function reliably with peak loads of approximately 195 MVA, representing a permissible load of 135 MVA at Cos Cob and a permissible load of 60 MVA at the new Greenwich Substation. (Eversource 1, Vol. 1, PFT pp. 8-9; Eversource 2, response 23)
80. The Modified GSLP would extend transmission level supply to the new Greenwich Substation, allowing Eversource to transfer load between the Cos Cob Substation and proposed Greenwich Substation and provide automatic electric supply backup to most of the customers in Greenwich in the event of an outage. There is no capability in the current electric system for this redundancy. This capability is consistent with Eversource's current electric system design in that if one power supply source is unavailable, the remaining bulk substation would be able to supply necessary power. (Council Administrative Notice 43, FOF # 118)
81. Two 60 MVA transformers would be installed at the new Greenwich Substation and both would operate and share the load at all times. The load at the new Greenwich Substation is expected to be approximately 51 MVA. (Eversource 9, response Town 13; Tr. 2, pp. 30-31)
82. The substation would be rated at 60 MVA, based on the loss of one transformer. (Tr. 2, pp. 30-31)
83. In the event of the loss of a single transformer (N-1) at Cos Cob Substation under 2013 peak conditions, load would be automatically transferred to the new Greenwich Substation, and the capacity of the remaining transformers at Cos Cob and the transformers at the new Greenwich Substation could serve 100 percent of the load. (Eversource 1, Vol. 1, PFT pp. 10-11)

84. In the event of a loss of one of the two transformers (N-1) at the new Greenwich Substation, the remaining transformer would be able to carry 100 percent of the load until the failed transformer was repaired/replaced. (Eversource 1, Vol. 1, PFT pp. 10-11)
85. In the event that two transformers were lost at either the Cos Cob or the new Greenwich Substation, approximately 80 percent of the load would automatically be transferred to other substations and the remaining 20 percent of the load could be restored quickly by operator adjustment. (Eversource 1, Vol. 1, PFT pp. 10-11)
86. The transmission level connection between the two substations is an improved design in that the new transmission line would provide a direct connection to the new Greenwich Substation, reducing the loading on the 27.6-kV feeder system. (Eversource 9, response Town 2)
87. This project is similar to other projects in the State to improve system reliability. In the last ten years, Eversource has constructed new substations and rebuilt others throughout the State, including in areas near the State boundary line. The new substations have been built in mostly rural areas and did not have the same physical property constraints as the two proposed locations. (Tr. 2, pp. 105-107, 114-115)
88. In most cases, the new substations are adjacent to existing transmission lines. The new Greenwich Substation is different in that a new transmission line would be extended to the new substation. (Tr. 2, pp. 106-107)
89. After the Modified GSLP is constructed, Eversource would still operate and maintain the 27.6-kV distribution feeders to serve 11 large customers out of the Prospect Substation, Byram Substation and the Greenwich Network. From 2011 to 2016, the average annual peak load from the 11 large customers is 18.4 MVA. (Eversource 9, response Town 20, response 21)
90. The Prospect Substation would be modified to a 27.6-kV switching station by removing the transformers and associated switchgear. (Eversource 1, Vol. 1, PFT, p. 9)
91. It is anticipated that by significantly offloading demand on the distribution feeders, the feeders would be able to operate with enough capacity to operate normally even under N-1 conditions, reducing the likelihood of outages that have historically occurred with this electric supply configuration. There would be enough capacity to operate in a N-2 condition. (Eversource 1, Vol. 1, PFT pp. 9-10; Council Administrative Notice 43, FOF #41, #76; Eversource 9, response Town 3, response 20; Tr. 2, p. 23; Tr. 3, p. 64, 97-98)
92. Eversource ultimately intends to serve load in Greenwich at the 13.2-kV level and retire other voltages. The Project serves as a foundation to accomplish this goal. For example the Byram Substation is not included within the Modified GSLP. Eversource would continue to examine load at both the new Greenwich Substation and the Byram Substation. If load is stable or declines due to energy efficiency measures, demand response and distributed generation initiatives, the Byram substation may be retired with the load served from the new Greenwich Substation. If load increases significantly, Eversource could recondition the substation to meet demand needs. (Tr. 2, pp. 26-27, 148-149)
93. The new Greenwich Substation would be connected through the Cos Cob Substation. The loss of both the 1740 and 1750 lines from Stamford would still cause the loss of service to most of Greenwich, including customers served by the new Greenwich Substation. (Tr. 3, pp. 67-69)
94. The GSLP would not extend existing circuits, add new circuits or provide any electrical connections or electrical supply to New York or any other area beside the Town of Greenwich. (Council Administrative Notice 43, FOF #192)

Eversource Reliability Planning

95. Eversource is not projecting load growth in this area. According to Eversource's recent evaluation and recent ISO-New England forecasts, current load growth is flat mainly due to energy efficiency, demand response and distributed generation. (Eversource 1, Vol. 1, PFT p. 15; Tr. 2, pp. 12, 88-90; Tr. 3, pp. 15-23)
96. Eversource used the 2013 peak load of 130.5 MVA on the 27.6-kV system served by the Cos Cob Substation as a baseline to conduct contingency planning studies to design the project since it was a recently recorded value that has the potential to reoccur. The 2013 peak load occurred over a sustained period of high temperatures combined with high humidity. (Council Administrative Notice 43, FOF #84; Eversource 1, Vol. 1, PFT p. 4)
97. Electric system elements of concern were studied first with all elements in service ("N-0" condition), and second, with each of the system elements out of service ("N-1" conditions). (Eversource 1, Vol. 1, PFT p. 5)
98. The results of those simulations confirmed the same reliability deficiencies in the existing electric system identified in the original Docket: potential transformer overloads at both the Cos Cob and Prospect Substations and potential overloads of the 27.6-kV distribution feeders supplying power to Prospect Substation. (Eversource 1, Vol. 1, PFT p. 5)
99. The Town concurs that utilities should plan for multiple contingencies. (Town 1, p. 15)
100. To measure reliability, Eversource predominately uses two metrics; the frequency of interruptions and the duration of interruptions. The analysis is based on circuits, not by Town. Based on these metrics, Town of Greenwich customers experience reliability far below the state average. The average customer in Connecticut has an interruption every 16 months with an average interruption time of approximately 80-85 minutes. Greenwich customers experience an interruption average below ten months with an average interruption time of approximately 110 minutes. (Tr. 2, pp. 102-104)
101. Approximately half of the outages in Greenwich are related to storm events affecting the overhead 13.2-kV distribution system. The 13.2-kV distribution system is regulated by PURA and is not the subject of the Modified GSLP. (Tr. 3, pp. 81-88, 98-99)

Contingency Modeling - Cos Cob Substation

102. Contingency modeling indicates if one of the three Cos Cob transformers is lost from service (N-1), the remaining two transformers would have to operate at their emergency ratings to carry the substation load. With the loss of the largest transformer (50.4 MVA), the substation would have a nameplate rating of 94 MVA. (Eversource 1, Vol. 1, PFT p. 6; Tr. 3, p. 17)
103. Electric power at 27.6-kV cannot be transferred to another substation to reduce power demand on the transformers; however, 6 MVA of load can be transferred to the 115-kV to 13.2-kV transformers within the substation. This small amount of load transfer is currently sufficient to relieve overloads on the two remaining transformers to enable them to operate within their normal ratings. This small reliability margin could be reduced or entirely disappear with load growth on the 13.2-kV system served directly from the Cos Cob Substation. (Eversource 1, Vol. 1, PFT pp. 7, 8)

104. In the event of a transformer outage requiring a prolonged repair, only a 30 MVA (maximum) mobile transformer can be temporarily installed within the substation, which is insufficient to support the 2013 peak loading on either the 2X or 3X transformers. Under this circumstance, the substation would have to be manually reconfigured to redistribute loading. (Eversource 1, Vol. 1, PFT pp. 7, 8)
105. The permissible load rating at Cos Cob is 135 MVA for the 27.6-kV system based on a 2-hour emergency rating. It is based on the loss of the largest transformer (50.4 MVA) where the remaining two transformers would have to operate 145 percent above their nameplate rating in order to maintain electric service. After two hours, the load on the remaining two transformers must be reduced to a 22 hour rating. Although Eversource is willing to operate equipment above nameplate ratings for short intervals, it cannot operate its equipment in their emergency ratings for extended periods of time without permanent damage to equipment. (Council Administrative Notice 43, FOF #88, #89; Tr. 3, p. 18)

Contingency Modeling - Prospect Substation

106. Prospect Substation would experience overloaded transformers at the 2013 peak load levels under N-0 conditions. One transformer (4X) would exceed its current rating at this load level. Additionally, since one transformer (3X) is not connected to any other transformer, its loss would result in service interruption (N-1 condition). If one of the other three transformers is lost (1X, 2X, 4X), the remaining two would have to operate above their ratings (N-1 condition). One of the three connected transformers (2X) is prone to failure during overload conditions. (Eversource 1, Vol. 1, PFT pp. 5-7)
107. The Modified GSLP would be able to provide 100 percent of the load in the event the Prospect Substation was lost from service. (Tr. 2, p. 144)

Contingency Modeling – 27.6-kV Feeder System

108. When the loss of one of Cos Cob to Prospect feeders (N-1) was modeled at the peak load of 130.5 MVA, the remaining cables would be overloaded, as shown below:

| Load relative to Normal cable ratings | | | |
|---------------------------------------|--------|--------|--------|
| O.O.S. | 151% | 140% | 122% |
| 117% | O.O.S. | 109% | 95% |
| 114% | 117% | O.O.S. | 97% |
| 73% | 73% | 69% | O.O.S. |

Normal ratings are based on a 75 percent load factor. Contingency modeling does not account for load redistribution to other circuits in the Greenwich electric system that can occur to protect system elements. (Eversource 1, Vol. 1, PFT p. 5; Tr. 3, p. 32; Tr. 4, pp. 61-62)

109. The length and impedance differences of the parallel feeders limit the capability of each feeder to accept flow from another feeder that is out of service. (Eversource 1, Vol. 1, PFT p. 5)
110. Overloads on one or more of the feeders occur on loads as low as approximately 82 MVA. (Eversource 1, Vol. 1, PFT p. 5; Eversource 2, response 16)
111. If two of the circuits are out, load would have to be shed to protect system components. (Council Administrative Notice 43, FOF #79)

112. In 2015, the Cos Cob peak demand reached 114.8 MVA and a cable fault occurred on the 11R52 feeder. Under contingency modeling the loads on the remaining three feeders would have been as follows:
- 11R51 - overloaded by 36 percent.
 - 11R55 - overloaded by 4 percent.
 - 11R58 - loading at 65 percent of cable rating.

In actual conditions with the loss of the 11R52 feeder, the load was redistributed to the three remaining feeders as well as to the 11R53 and the 11R54 feeders serving North Greenwich Substation. Eversource accepted overloads on the 11R53 and 11R54 feeders to minimize overloads on the 11R51 and 11R55 feeders. Even though the load was re-distributed in this fashion, the 11R51 feeder was overloaded by approximately 17 percent. No customers lost service during this fault event. (Eversource 2, response 1, Eversource 15; Tr. 4, pp. 54-62)

Project Alternatives

113. Project Alternatives were examined in detail during the original Docket 461 proceeding and included transmission, distribution, interconnection, generation, demand side management alternatives as well as energy efficiency measures. (Council Administrative Notice 43, FOF #s 132- 210)
114. In OCC's Docket 461 Post-Hearing brief of April 11, 2016, the OCC mentioned two potential alternatives they believed were not addressed sufficiently during the original proceeding: replacing the existing transformers at Cos Cob Substation with larger transformers, and retrofit the Prospect Substation in conjunction with switching some load to other substations. These potential alternatives were rejected as described below:
- a. Eversource examined the feasibility of replacing the existing Cos Cob 46.7 MVA and 50.4 MVA transformers with two 80 MVA transformers but after contacting four different manufacturers, determined there is not enough space within the substation to accommodate the physically larger replacement transformers.
 - b. There is not enough room within the Prospect Substation to install an additional transformer and associated bus connection. Any load transfer to another distribution substation supplied from Cos Cob would not reduce the load on the Cos Cob 115-27.6 kV transformers. Transfer of load to Byram is not practical since it does not relieve load on the 27.6 kV circuits from Cos Cob. Transfer of load to North Greenwich is not practical since it would add load to the North Greenwich 13.2 kV feeders which would reduce the ability to accept load during contingencies. In addition, additional feeders would need to be installed to transfer load to the substation due to existing feeder constraints.
- (Eversource 2, response 27; Council Administrative Notice 43 – OCC brief)
115. After the Council's final May 2016 decision, Eversource consulted with the Town to examine potential projects to improve reliability in Greenwich. Eversource determined the eight distribution alternatives examined were inferior to the Proposed Project due to cost concerns, inferior reliability, or engineering difficulties. These rejected distribution alternatives are provided in Attachment 3. (Eversource 1, Vol. 1, PFT p. 17; Eversource 2, response 26)
116. Rebuilding the existing 27.6-kV system in Greenwich, as examined in the eight distribution alternatives, would cost more, and offer less electric system flexibility when compared to the Project, and is incompatible with Eversource's plan to convert 27.6- kV system to a multi-grounded system at 23-kV or 13-kV across its service territory in Connecticut. (Eversource 9 response Town 12)

Energy Efficiency Measures

117. Discussions with the Town also included energy efficiency initiatives for both Town owned facilities and private investments to mitigate the electrical demand and usage within the Town. The types of investments presented included energy storage, as well as distributed generation and demand response programs. A variety of incentives are available within federal and state programs for these types of investment. (Eversource 9, response Stacy 1)
118. Load demand has been offset in the Greenwich area through energy efficiency and distributed generation projects. Continued use of these measures as well as incorporation of demand response projects could lead to further decline in load demand. Future demand is expected to be flat or negative with utilization of energy efficiency, distributed generation and demand response programs. (Tr. 2, p. 12; Tr. 3, pp. 24-25)
119. Some energy efficiency results from the replacement of older residential structures with new structures that are built with improved or new building codes that can lead to energy savings when compared to older homes built to older codes. (Tr. 3, p. 199)
120. Despite energy efficiency for new residential construction, new and upgraded residential electrical service requests are for electric service that is similar to what would be considered a medium sized commercial building in other areas of the State. (Council Administrative Notice 43, FOF #47)
121. In Eversource's service territory, Greenwich residential customers use more than two times the electricity of the average Connecticut residential customer. (Council Administrative Notice 43, FOF #46)
122. The Town has undertaken some of its own measures to improve energy efficiency including five recent projects that reduced load from Town facilities by 2.3 percent. (Tr. 2, p. 163)
123. In 2016, 36 businesses participated in Eversource sponsored energy efficiency programs and through June 2017, 33 businesses participated. (Tr. 2, pp. 165-166)
124. Eversource has been sponsoring a residential weatherization/efficiency program that averaged about 150 residences per year up to 2014. In 2014, Eversource created a new program, the Clean Energy Communities Pledge that increased participation to 225 customers in 2015, and 255 customers in 2016. For year to date (July 2017) 164 customers participated. (Tr. 2, p. 166)
125. Energy efficiency for businesses in Greenwich is mostly through LED lighting upgrades. Eversource currently has six projects underway with industrial and commercial users that would result in 108 kW of demand savings. (Tr. 2, p. 167)
126. Energy efficiency measures alone cannot solve electric system reliability issues and does not eliminate the need for the Project. These measures would extend the life of the Project so that additional projects necessary to accommodate future load growth would be delayed. (Eversource 9, response Stacy 1, slide 2; Tr. 2, pp. 93-94)
127. Eversource has met with the Town five times to discuss energy efficiency within the Town and at Town facilities. (Tr. 2, pp. 90-91)
128. Measures undertaken so far include mailings to Town residences, identification of Town facilities that could be candidates for energy efficiency measures, and working with the Chamber of Commerce to establish a business outreach program. (Tr. 2, pp. 91-92)

129. Two light bulb swaps were conducted in Greenwich, one on October 25, 2016 and one on April 22, 2017. From the two events, 2,785 light bulbs were distributed and a total of 66 customers enrolled in the Home Energy Solutions program for energy efficiency services. (Eversource 12, response 62; Tr. 2, p. 112; Town 4, Schedule B, p. 3)
130. The Town of Greenwich has improved energy efficiency and reduced demand via the following:
- 1,958-kW of renewable energy capacity has been installed between 2014 and 2016.
 - The Town is a "Clean Energy Community" and it has committed to a 20 percent reduction in energy use by 2018.
 - Since 2008, the Town has participated in the CT Clean Energy Community, including the Solarize CT and C-PACE programs.
 - The Town participated in the Sunshot Grant program aimed at streamlining the process and lowering the cost for solar PV installation and local permitting.
 - The Town is working to identify distributed generation projects that produce clean energy and reduce loads and peak loads on the grid.
 - Since October 2016, the Town has been partnering with Eversource and Energize Connecticut to launch the Home Energy Solutions (HES) program and the Town is encouraging Town residents to take advantage of the services. By the end of April 2017 approximately 200 audits of residences were conducted.
 - Light bulb exchange program.
- (Town 1, pp. 20-21; Town 3, pp. 2-6; Town 4, Schedule B, p. 3)
131. The Town has reduced municipal building energy consumption as follows:
- Over 17 percent reduction in usage at the Grass Island Wastewater Treatment Plant for years 2011 to 2016.
 - Installation of solar energy at two schools, including Greenwich High School, which experienced a usage reduction of eight percent in only one year from 2014 to 2015.
 - Eversource recently conducted an energy audit of the Greenwich Town Hall and expects to achieve a ten to 25 percent reduction in usage at Town Hall in the coming year.
- (Town 4, Schedule, A and Schedule B)
132. Greenwich ranks 40th of 169 municipalities in the State of Connecticut and ranks 3rd of 23 municipalities in Fairfield County for installed renewable energy capacity. (Town 4, Schedule B, p. 3)

Demand Response – Distributed Generation

133. Non-transmission alternatives must be able to provide reliable power. For this project, non-transmission alternatives do not provide a viable alternative to improve the reliability issues that currently exist. (Eversource 13, response Stacy 3)
134. For distributed generation (DG), 15 customers representing approximately 0.12 MW of DG connected to Eversource's electric network from January through June 2016. There are 24 pending customer requests representing a total of 0.282 MW. (Eversource 9 - response Stacy 1, slide 14)
135. In 2015, the Council approved a 525-kW fuel cell installation at the Greenwich Hyatt Hotel. Fuel cells of this size are beneficial in reducing electric demand on a certain area since they operate as a base load unit. In comparison, a solar installation is too variable to rely on for base load reduction. (Tr. 2, pp. 131-133; Council Petition No. 1190)

136. Eversource did offer to facilitate the installation of a 10 to 15 MW fuel cell facility within the Town but the Town was not interested at this point in time. (Tr. 2, p. 133)
137. Eversource is advocating for legislation that would allow electric utilities to own and operate fuel cells. (Tr. 2, p 132)
138. Mr. Stacy requested that Eversource examine battery storage systems to provide for electrical capacity in Greenwich. Through legislative action in 2015, DEEP opened a docket requesting information on energy storage systems. As part of that docket, in 2016 Eversource requested information, including costs, from 19 manufactures of battery storage systems. Tesla was solicited for information but Eversource did not receive a response. Based on the information received, battery storage units would not be cost effective in meeting the needs of the Project. (Stacy 1; Eversource 13, response Stacy 1, response Stacy 2; Tr. 4, pp. 13-14, 16)
139. Based on the DEEP docket, Eversource, along with United Illuminating, submitted proposals for energy storage projects in the State but the proposals were rejected for being too costly. (Tr. 4, pp. 30-31)
140. Eversource had a general discussion with the Town regarding battery systems on how to potentially use a better system in conjunction with industrial sized solar installations. No specific location or user was discussed. (Tr. 2, pp. 129-130)

Modified GSLP Description

141. The Modified GSLP consists of the installation of a new 115-kV bulk power substation, referred to as the Greenwich Substation, a new 115-kV double-circuit electric transmission line, and modifications to the existing Cos Cob, and Prospect Substations. (Eversource 1, Motion to Reopen pp. 6-7)
142. The Modified GSLP proposes two new project designs for consideration; the PMP and the AMP. (Eversource 1, Motion to Reopen pp. 6-7)
143. The Modified GSLP does not include improvements to the Byram Substation. Although the equipment is obsolete, and was scheduled for removal in the original project with load transferred to the new Greenwich Substation, Eversource intends to replace aging equipment through future distribution projects not subject to Council jurisdiction. (Eversource 1, Motion to Reopen p. 6; Eversource 9, response Town 27)
144. The Modified GSLP does not include any improvements to the existing Tomac Substation nor is the substation the subject of the Modified GSLP. Tomac Substation is a single transformer bulk substation that serves a limited area of southeastern Greenwich. Tomac is served by a 115-kV transmission line (#1750) and not from Cos Cob Substation. It was designed to be supplied from a single transmission source, therefore, it cannot supply load if this single source was lost. (Eversource 9, response Town 9, response Town 11, response Town 29; Tr. 3, pp. 71-72)
145. Although not part of the Modified GSLP, Eversource intends to upgrade the transmission line feed into Tomac by replacing the existing three terminal line with two, two terminal lines. Eversource, in accordance with a system priority list, would most likely undertake this project within 10 years. (Tr. 4, pp. 38-39)
146. In addition to loads at 13.2-kV, Tomac serves approximately 1,100 customers in the Old Greenwich area at 4.8 kV with the ability for a backup of about half of the customers at peak load if the 4.8-kV transformer was lost. A project is currently proposed for 2018-2019, separate from the Modified GSLP, to improve distribution reliability by converting the 4.8-kV system to 13.2-kV, creating automatic and

manual backup for customers. (Eversource 9, response Town 17, response Town 29; Town 1, pp. 14-15; Tr. 3, pp. 72-76)

Proposed Modified Project

147. The PMP consists of an overhead-underground transmission line route and a new air insulated substation at 290 Railroad Avenue. (Eversource 1, Vol. 1, Ex. A, pp. A-5, A-11)
148. The PMP transmission line route consist of an overhead segment extending from Cos Cob Substation along the north side of the MNRR ROW to Indian Field Road, cross the MNRR and follows the south side of the MNRR to Steamboat Road. From Steamboat Road, the transmission line extends underground within Railroad Avenue to the new Greenwich Substation. (Eversource 1, Vol. 1, Ex. A, Fig. A-1)
149. Eversource developed the PMP based on direction from the Council in Docket 461 where the Council requested Eversource to examine in detail the feasibility of constructing an overhead route along portions of the MNRR. At the time of the Council's decision, this potential route was not engineered to a point where enough detail was available for full consideration by the Council. (Eversource 1, Vol. 1, Motion to Reopen p. 3)
150. The PMP design is consistent with the Federal Energy Regulatory Commission Guidelines for the Protection of Natural, Historic, Scenic and Recreational Values in the Design and Location of Rights-of-Way and Transmission Facilities (FERC Guidelines) as this proposed, alternate route jointly utilizes existing rights-of-way that are occupied by different kinds of utility services. (Council Administrative Notice 9)
151. Eversource consulted with the DOT during initial development of an overhead route along the MNRR ROW, referred to as the Hybrid Alternative, during the Docket 461 proceeding. At the time of the consultation, this potential route seemed feasible. (Eversource 4, p. 2)
152. After the Council's denial of Docket 461 without prejudice, Eversource held a series of meetings with DOT representatives from October 2016 through April 2017. On April 27, 2017, Eversource and DOT came to an agreement regarding co-location issues and it appeared a DOT license for Eversource's to use the MNRR ROW would be issued. (Eversource 4, p. 2)
153. After the filing of the Motion to Reopen, Eversource was contacted by DOT Rails informing Eversource that DOT opposes installation of the PMP transmission line within the MNRR ROW. (Eversource 4, p. 3)
154. On June 14, 2017, Eversource met with a senior official at DOT Rails who indicated that the DOT would not grant Eversource a license for use of the MNRR in that such a license is inconsistent with DOT's needs and policies. (Eversource 4, Ex. A; Tr. 2, pp. 100-101)
155. On July 5, 2017 the DOT's Assistant Rail Administrator provided written correspondence to Eversource confirming the DOT's new position. The correspondence indicated the DOT is specifically opposed to 1) rail outages that will impact rail service, 2) lack of manpower to support outages and transmission line construction, 3) lack of space on exiting catenaries to support new lines, and 4) the congested nature of the existing rail corridor where the placement of a non-rail related transmission line would encumber the future expansion of rail service. (Eversource 4, Ex. A)

156. Due to the DOT's July 5, 2017 correspondence, Eversource notified the Council on July 10, 2017 that it is withdrawing the PMP transmission line route from consideration, but would continue to offer the AMP as a viable candidate for the Modified GSLP. (Eversource 5)
157. If the PMP was a viable option, its cost would have been approximately \$78 million. (Eversource 1, Vol. 1, PFT p. 11)
158. The Council acknowledged withdrawal of the PMP transmission line route at the July 13, 2017 public hearing session. (Tr. 1, pp. 4-5)

Alternate Modified Project

159. The AMP consists of a 2.3 mile underground transmission route extending from Cos Cob Substation to a new "indoor substation" at 281 Railroad Avenue. A portion of the underground route extends through Town-owned Bruce Park. (Eversource 1, Ex. B, Fig A-1)
160. The AMP design is inconsistent with the FERC Guidelines as the use of park and recreation lands for ROWs are to be avoided, where practical, but if ROWs must be routed through parks and recreation lands, they should be placed in a manner so as to be least visible from public view. (Council Administrative Notice 9)
161. On July 17, 2017, Eversource submitted correspondence to the Council indicating that the AMP would now be referred to as the Proposed Project and that both the 290 Railroad Avenue and 281 Railroad Avenue parcels are viable locations for the Project substation. Details of each portion of the proposed Project are described in the following sections. (Eversource 8)

(continued next page)

Proposed Project - Description

New Greenwich Substation – 290 Railroad Avenue

162. The proposed Greenwich Substation is located on a 0.81-acre parcel within a General Business Zone at 290 Railroad Avenue in Greenwich. (Council Administrative Notice Item 43, FOF #212)
163. The parcel is located on the corner of Railroad Avenue (to the north) and Field Point Road (to the west.), The site location and general substation layout is shown below:



(Eversource 2, response 55)

164. The parcel is approximately 40 feet above mean sea level and is generally flat. (Council Admin. Notice Item 43, FOF #214)
165. The parcel is almost entirely developed with a commercial building and associated parking lot. Developed commercial properties are located across both roads and abut the parcel directly to the east and south. (Council Admin. Notice Item 43, FOF #215)
166. The area in the vicinity of the site is heavily developed consisting of a mix of industrial, commercial and residential land uses. The MNRR and Interstate 95 are to the south. (Council Admin. Notice Item 43, FOF #216)

167. The proposed 290 Railroad Avenue substation would be of an open-air insulated design. It would contain two 60 MVA 115-kV/13.2-kV transformers, one 115-kV circuit breaker, two 115-kV termination structures, four circuit switches, two disconnect switches, two terminal structures, a switchgear enclosure, a control enclosure, one lightning mast and other associated equipment. (Eversource 1, Vol. 1, p. A-6, Vol. 2, App. 4)
168. The underground transmission lines would enter the substation along Railroad Avenue to the 115-kV termination structures. (Eversource 1, Vol. 1, p. A-6, Vol. 2, App. 4)
169. The distribution switchgear enclosure is located to the south of the two transformers and measures 24 feet wide by 85 feet long by 11.3 feet high. (Eversource 1, Vol. 1, p. A-6, Vol. 2, App. 4)
170. The control enclosure measures 14 feet wide by 42 feet long by 12 feet high and would be located at the southwest end of the substation. (Eversource 1, Vol. 1, p. A-6, Vol. 2, App. 4)
171. Each transformer, approximately 21.5 feet in height, would be enclosed by 22.5-foot tall firewalls on three sides. The north side of each transformer would remain open for buswork connections to each transformer. The outer firewall at each transformer would be removable to allow for maintenance access. (Eversource 1, Vol. 2, App. 4)
172. The proposed lightning mast would be 65 feet in height and would be located in the northern end of the substation, between two circuit switchers. (Eversource 1, Vol. 1, p. A-6, Vol. 2, App. 4)
173. The substation would be enclosed by a 15-foot tall brick veneer wall. The wall would be decorative in that it would utilize columns and a sill to create horizontal separation between upper and lower sections as shown in the photo-simulation below.



View from corner of Railroad Ave. and Field Point Rd.
(Eversource 1, Vol. 2, App. 4, App. 5)

174. Eversource could move the wall fronting Railroad Avenue approximately 10 feet south to create more space between the wall and existing sidewalk. (Eversource 12, response 68)
175. Eversource would be willing to install simulated windows along the brick wall. The additional cost of incorporating simulated windows is minimal. (Tr. 2, p. 77)
176. Two substation access gates are proposed; one located in the northeast corner of the substation, exiting to Railroad Avenue; and the other in the western portion of the substation, exiting to Field Point Road. (Eversource 1, Vol. 2, App. 4)

177. The southwest portion of the substation yard would have space to accommodate a mobile transformer for use during emergency situations. The use of a mobile transformer is highly unlikely in that the new Greenwich Substation is being designed to handle the load with one transformer out. A mobile unit would only be used if both transformers were inoperable. (Eversource 1, Vol. 1, p. A-6; Tr. 2, pp. 75-76, 151)
178. An "indoor substation" could be constructed at the 290 Railroad Avenue site. It would be similar in design to the alternate substation location proposed at 281 Railroad Avenue. (Eversource 1, Vol. 1, Ex. App. F-1, F-2)
179. The indoor substation is not designed for a mobile transformer. A temporary transformer could be set up on the parcel, outside of the indoor substation. Cables would have to be installed through or over the wall to connect the transformer to substation components. Temporary fencing would need to be installed to enclose the mobile transformer. (Tr. 2, pp. 81-82)

New Greenwich Substation – 281 Railroad Avenue

180. The 281 Railroad Avenue Substation site is located on a 0.75-acre parcel owned by Eversource and used to store utility infrastructure equipment. (Eversource 1, Vol. 1, Ex. B, pp. A-5, A-7, A-8)
181. Residential and mixed use development abut the site on the east and west sides. Three residential properties are located north of the site, across Woodland Avenue. A commercial plaza is located south of the site, across Railroad Avenue. The site location and general substation layout is shown below:



(Eversource 1, Vol. 1, Ex. B, pp. A-6 - A-8; Eversource 2, response 53)

182. Eversource proposes to construct an indoor substation on the parcel, measuring approximately 92 feet wide by 112.5 feet long. It would resemble a multiple unit residential building and feature a sloping, standing seam metal roof, with a maximum height of 20 feet above grade. (Eversource 1, Vol. 1 PFT, p. 15; Vol. 2, App. 9; Eversource 2, response 44)
183. Two 60 MVA 115-kV/13.2-kV transformers would be installed in the central portion of the structure and would not be covered by a roof. The roof opening above the transformers would measure approximately 80 feet by 40 feet. (Eversource 1, Vol. 2, App. 9)
184. A plug and switch system (PASS M0) would be used instead of a traditional air insulated circuit breaker. The PASS M0 design is a hybrid between a gas insulated and air insulated equipment and has a reduced footprint when compared to traditional open-air components of similar function. It contains internal current transformers, disconnect switches, and the circuit breaker. (Eversource 2, response 45)
185. The PASS M0, switchgear and control equipment would be installed within the roofed portion of the structure. (Eversource 1, Vol. 2, App. 9; Eversource 2, response 45)
186. The underground transmission lines would enter the substation from Railroad Avenue to the 115-kV termination points. (Eversource 1, Vol. 1, Ex. B, p. A-6; Vol. 2, App. 9)
187. Each transformer would be enclosed by 23.5 foot tall concrete firewalls on three sides, leaving the south side open to allow for transformer connection to the circuit breaker. The firewalls would have removable panels to facilitate transformer access, when necessary. (Eversource 1, Vol. 2, App. 9)
188. The open area above the transformers would be sufficient for air cooling. No fan units are necessary to provide additional transformer cooling during normal operations. (Tr. 2, p. 49)
189. Access to interior portions of the substation would be by six exterior doors and four roll-up doors. (Eversource 1, Vol. 2, App. 9)
190. The exterior of the substation would be designed to appear as a multistory condominium-style building with gabled roof lines, faux windows and doors and a nonflammable siding. The siding is pre-colored and may require periodic cleaning for maintenance. A photo-simulation of a potential exterior design is shown below:



View north from Railroad Avenue.

(Eversource 1, Vol. 2, App. 11; Eversource 2, response 44; Tr. 2, p. 48)

191. No perimeter fence around the substation building is proposed. All access doors would be secured from public entry. (Eversource 1, Vol. 2, App. 9; Tr. 2, pp. 51-52)

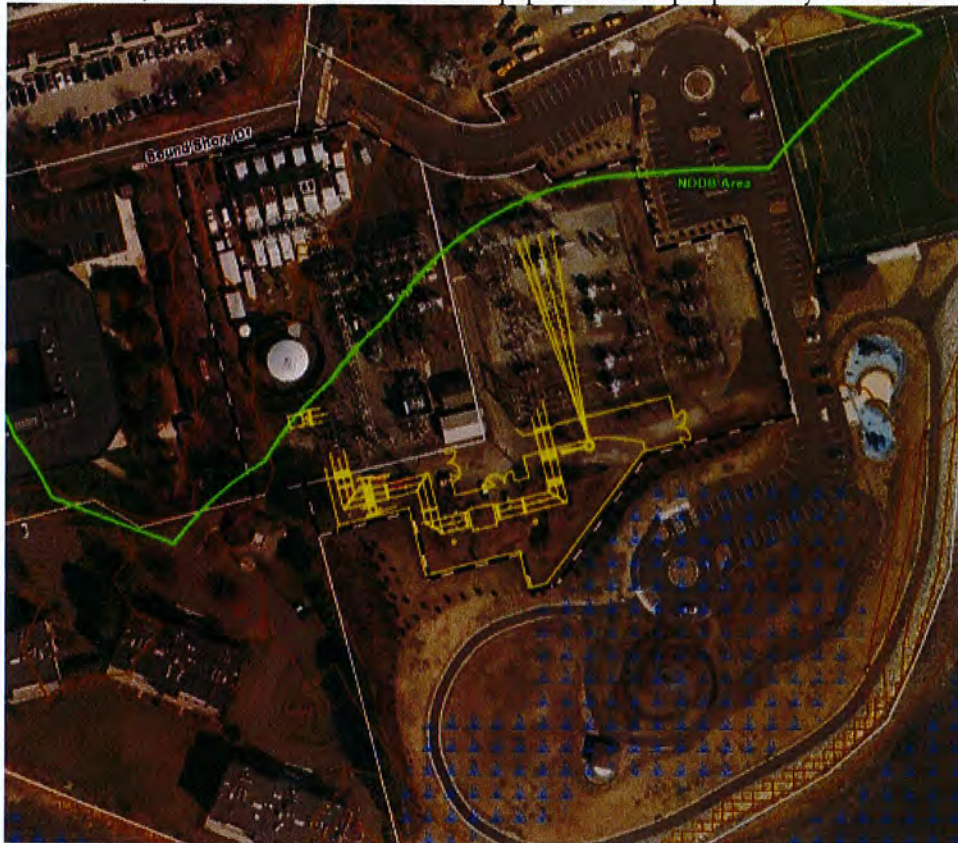
192. Lightning protection would be provided by 10-foot high air terminals around the perimeter of the roof. (Eversource 2, response 45)
193. Access to the substation would be from two paved driveways extending from Railroad Avenue to serve the east and west sides of the building. A third asphalt driveway would extend from Woodland Drive to serve the north side of the building. (Eversource 1, Vol. 2, App. 9)
194. A fully-enclosed indoor substation would have less visual impact than an open-air substation. (Eversource 14, response Town 82)
195. A mobile transformer may be able to fit on the parcel adjacent to the indoor substation. If there is limited space, Eversource would have to obtain temporary easements on adjacent property to create enough space for the transformer, cabling, and temporary fencing. (Tr. 2, pp. 81-83, 85-86)
196. An all open-air insulated substation could be constructed at the 281 Railroad Avenue site. The site is approximately 3,000 square feet smaller than the 290 Railroad Avenue site. (Eversource 1, Vol. 1, Ex. A, p. F-1, p. F-2; Tr. 2, p. 61)
197. The new Greenwich Substation is a distribution asset, and as such, the cost would have to be borne 100 percent by Connecticut ratepayers. The indoor substation design would cost approximately \$1.2 million more than an open-air design with a perimeter brick wall. (Eversource 14, response 64, response 69; Tr. 2, pp. 116-117)

Cos Cob Substation Modifications

198. Cos Cob Substation is located off Sound Shore Drive and abuts Cos Cob Park to the east and south, a shared access driveway that serves the substation and park to the north, and a developed commercial property to the west. (Eversource 1, Vol. 2, App. 8)
199. Modifications to the Cos Cob Substation would require the substation to be expanded by 0.8-acre to the south. (Eversource 1, Vol. 1, p. A-7, Vol. 2, App. 4)

(continued next page)

200. Modifications include, but are not limited to, the addition of the following: expansion of the ring bus to install a new underground termination position, one new monopole line structure (90 feet tall), one new A-frame line structure (58 feet tall), reconstruction of the mobile transformer position, underground conduits and duct banks, control and communication equipment. The proposed layout is shown below:



(Eversource 1, Vol. 1, Ex. A, pp. A-8, B-4; Eversource 1, Vol. 2, App. 4)

201. Existing equipment that would be removed includes, but is not limited to, the following: two steel A-frames, one wood H-frame, one line trap, strain overhead bus sections, one disconnect switch, one wood pole, and one lattice structure. (Eversource 1, Vol. 1, Ex. A, p. A-8)
202. A new 7-foot tall perimeter chain link fence would be installed to enclose the expansion area. The fence would be located 6 feet from the existing Town park fence. (Eversource 2, response 30)
203. Access to the expanded portion of the substation would be from four new gates installed within the existing substation perimeter fence. (Eversource 1, Vol. 2, App. 4, App. 6)

Prospect Substation Modifications

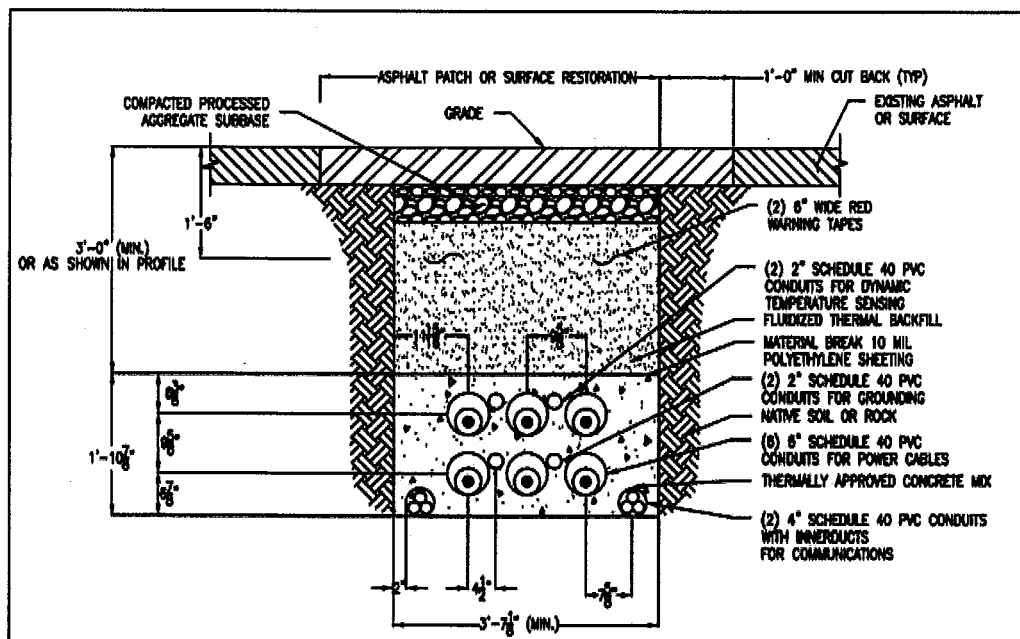
204. Modifications at the Prospect Substation include the removal of four 27.6 kV to 13.2-kV transformers and associated 13.2-kV switchgear. The ties to the 27.6-kV feeders serving certain large customers would remain. (Eversource 1, PFT p. 9; Tr. 2, pp. 135-136)
205. The remaining equipment would not be damaged if flooding occurred. (Tr. 2, p. 147)

206. The project would require reconfiguration of the 13.2-kV feeder network in the area of the new Greenwich Substation and Prospect Substation so that the new substation connects to the existing feeders presently served from the Prospect Substation. (Eversource 9, response Town 28)
207. Seven existing 13.2-kV underground feeders serving the Prospect Substation would be relocated to the proposed Greenwich Substation. (Eversource 1, p. 9; Eversource 9, response Town 64)

115-kV Underground Transmission Line

208. The new substation would be supplied by a new underground 115-kV double circuit transmission line extending approximately 2.3 miles from the Cos Cob Substation. (Eversource 1, Vol. 1, Ex. B, p. A-8)
209. The underground route would extend from the north side of the Cos Cob Substation, head west on Sound Shore Drive, head south on Indian Field Road, crossing Interstate 95 either above ground or below ground, then head west on Bruce Park Drive, Woods Road, Davis Avenue and across Indian Harbor, then continuing west on Indian Harbor Drive, Museum Drive, Arch Street and Railroad Avenue to the new Greenwich Substation (refer to Attachment 2). (Eversource 1, Vol. 1, Ex. B, pp. A-3, A-10, A-11)
210. The underground transmission line would consist of two cross-linked polyethylene (XLPE) cable circuits, each composed of three phases. (Eversource 1, Vol. 1, Ex. B, p. A-8)
211. Each phase would consist of one 3500-kcmil copper conductor cable insulated with 0.75 inches of insulation. Each cable is approximately 4.5 to 4.6 inches in diameter. (Eversource 1, Vol. 1, Ex. B, p. A-8; Eversource 9, response Town 56)
212. The 115-kV transmission line would provide 192 megavolt amperes (MVA) of summer normal line capacity. (Eversource 1, Vol. 1, Ex. B, p. A-10)
213. The capacity of the transmission line (192 MVA) is being sized for the potential future installation of two 80 MVA transformers at the Greenwich Substation if the need arises. If two 80 MVA transformers were eventually installed, they could serve 120 percent of their normal rating (192 MVA) for up to two hours in the event of a contingency at the Cos Cob Substation. (Eversource 9, response Town 58)
214. The size of the conductors would enable Eversource to eventually loop feed the Cos Cob Substation and the Tomac Substation. A smaller cable could be used (3,000 kcmil) to supply only the needs of the new Substation, but would not allow for a future loop feed. This proactive installation at a nominal cost (approx. \$120,000) is consistent with other Eversource projects, such as Docket 474, to reduce the potential for more costly upgrades in the future. (Tr. 3, pp. 93-95)
215. For the underground installation, each cable would be installed in 6 inch diameter PVC ducts that are encased in a concrete duct bank, measuring approximately 3.6 feet wide by 4.9 feet deep. The concrete duct bank would enclose both circuits for most of the transmission line length, except near each substation where the circuits diverge from each other to reach different terminal points. (Eversource 1, Vol. 1, Ex. B, p. A-8; Eversource 9, response Town 59a, response Town 59c)
216. Smaller conduits would also be installed within the duct banks for communication, temperature monitoring and grounding. (Eversource 1, Vol. 1, p. A-8)
217. Installation of the transmission line would require a five foot deep trench that is approximately 3.6 feet wide for the double circuit duct bank, and two feet wide for the single circuit duct bank. (Eversource 1, Vol. 1, Ex. B, p. A-13; Eversource 9, response Town 59c; Tr. 2, p. 138)

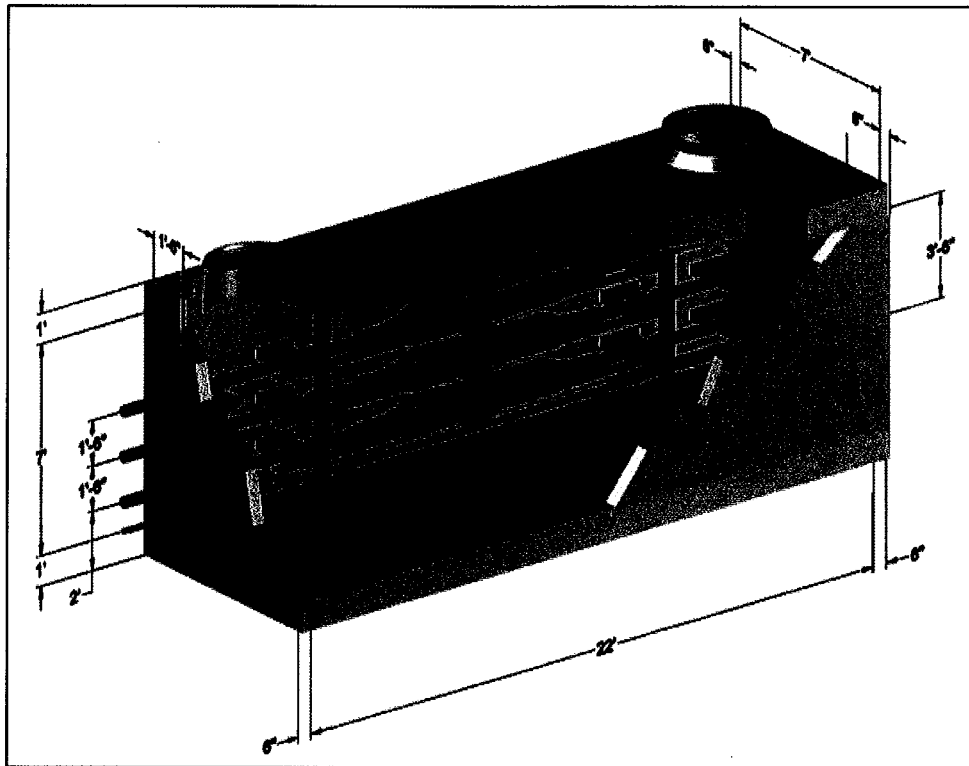
218. A schematic of the duct bank with approximate dimensions is shown below:



(Eversource 1, Vol. 1, Ex. B, Figure A-3)

219. Open trenches would be covered by steel plates during non-work hours. (Tr. 2, p. 139)
220. The length of trenching and duct bank that could be installed per day would vary depending on specific subsurface conditions. Conditions could include the presence of existing subsurface infrastructure and utilities, rock and groundwater. Traffic management, material delivery and spoil removal are other site specific factors. In some areas, crews could install 50 to 75 linear feet per day but in other areas it would be significantly less. (Eversource 2, response 47)
221. Construction within Davis Avenue would require the closure of a 200 to 300-foot segment of the road each workday. There is not enough space to accommodate both traffic and construction equipment. (Tr. 2, pp. 74, 139)
222. If work was conducted through Bruce Park in the winter, Woods Road could be closed entirely during construction to facilitate the trench installation as well as for use as a staging area. (Tr. 2, pp. 140-141)
223. The underground transmission line would require approximately six splice vault locations along the 2.3 mile route to connect segments of the transmission line. Additionally, there are two "pull through" vaults where splicing is not required but are used to facilitate connection to each substation. (Eversource 1, Vol. 2, App. 11; Eversource 9, response Town 25)
224. The average cable pull length between splice vaults is 1,800 feet (excluding "pull through" vaults). (Eversource 9, response Town 25)
225. Cable splicing would begin after the duct banks and splice vaults have been installed. One or two phases could be pulled through to each vault location per day. Cable splicing is expected to take up to two weeks at each vault location. (Eversource 2, response 47)

226. Each splice vault location consists of two separate vaults, once for each circuit, with each vault measuring approximately 23 feet long, by 8 feet wide by 9 feet high. A schematic showing the approximate dimensions of a splice vault is shown below:



(Eversource 1, Vol. 1, pp. A-9, A-10)

227. Tentative locations for splice vaults include the following; Cos Cob Substation property; off-road location on Sound Shore Drive, Indian Field Road south of I-95 Exit 4 (in-road), Woods Road (in-road), Davis Avenue west of Indian Harbor (in-road), Museum Drive near the Indian Harbor Drive intersection (in-road), Arch Street(in-parking lot), Railroad Avenue near new Greenwich Substation (in-road). (Eversource 1, Vol. 2, App. 11; Tr. 2, pp. 149-150)
228. The splice vaults would be located within road rights-of-way or on private property adjacent to road rights-of-way. Excavation for the vaults would reach about nine feet. (Eversource 1, Vol. 1, p. A-9; Tr. 2, p. 138)
229. With the exception of the Davis Avenue location, the DOT recommends installing all splice vaults outside of traveling roadways. (DOT comments of August 31, 2017)
230. The DOT recommends installing the splice vaults at Sound Shore Drive as close to the road as possible, thus maximizing the distance between the splice vaults and I-95. The splice vaults in this location are on DOT property and a DOT encroachments agreement would be required. (DOT comments of August 31, 2017; Tr. 2, p. 33)
231. The Town considers Bruce Park Drive, Woods Road, Davis Avenue, Indian Harbor Drive and Museum Drive as part of Bruce Park. The Town requests the installation of splice vaults within park roadways and not on adjacent lawn areas to avoid having permanent manhole covers within lawn areas and to avoid potential impacts to tree roots. (Tr. 3, pp. 228-231)

232. Eversource would coordinate road closures with the Town and any affected residents. (Tr. 2, pp. 75, 140)
233. The Town requests the complete repaving of all roads within Bruce Park that are disturbed during trench installation. Utility cuts within paved roads shorten their service life and reduce the investment made by the Town in paving the roads prior to the project. The roadways in Bruce Park were most likely paved five years ago and are currently in very good condition. (Tr. 3, pp. 244, 246-247)

Interstate 95 Crossing

234. Two options to cross I-95 at Field Point Road were initially presented; an above ground crossing where the transmission line is attached to the underside of the I-95 overpass bridge or a pipe jacking crossing where the transmission line would be installed under the highway. The pipe jacking method would cost \$1.5 million more than the pipe attachment method. (Eversource 1, Vol. 1, Ex. B, pp. A-11, A-12; Eversource 14, response 69)
235. After the Modified GSLP was submitted, the DOT submitted correspondence on August 31, 2017 stating that it is opposed to any attachment of the transmission line to the Indian Field Road bridge. (DOT comments of August 31, 2017)
236. DOT also commented on the pipe jacking installation, stating that it requests an in-depth review of the transmission line crossing and associated jacking pit locations to ensure such installations are as far away from the I-95 travel way as possible. (DOT comments of August 31, 2017)
237. The pipe jacking installation would require 0.5-acre staging areas on each side of I-95, between the Exit 4 on and off-ramps. Vertical shafts, approximately 15 feet wide, 50 feet long, and up to 15 feet deep, would be excavated to accommodate a boring machine within the shaft pit. A 42-inch diameter bore would be made under the highway between the trench pits. A 42-inch diameter casing pipe would then be installed between the bore pits and the cable ducts pulled into the casing pipe. The remaining voids in the casing would be filled with thermal concrete. (Eversource 1, Vol. 1, Ex. B, p. A-12)
238. The pipe jacking installation is anticipated to take 30 days. No highway shutdowns are anticipated as the bore pit locations would be located as far from paved roadways as possible. (Tr. 2, p. 46)
239. To avoid the Exit 4 area of I-95, Eversource examined the feasibility of extending the transmission line along the south side of I-95. Due to limited space, an overhead route would not conform to DOT specifications. An underground route in this area would be challenging and costly to construct due to steep embankments. The existing tree buffer between the highway and abutting residences would have to be removed. (Eversource 12, response 66)
240. An option to cross under I-95 from Sound Shore Drive to Cobb Island Drive was examined and determined to be unfeasible given terrain challenges and the necessary acquisition of easements for the crossing of private property as well as along privately owned Cobb Island Drive. (Eversource 12, response 66)
241. An overhead highway crossing option was examined using tall transmission structures located in the grassed areas between the exit ramps and highway. Eversource did not pursue this option because DOT was not initially receptive and no cost savings would be gained given the structures required and highway-related construction constraints. (Tr. 2, pp. 35-36)

Indian Harbor Crossing

242. Two options were presented to cross Indian Harbor within Bruce Park, a trench crossing utilizing a cofferdam, or an above ground crossing utilizing a new transmission line/pedestrian bridge. Either crossing would be located to the north of the existing Davis Avenue bridge over Indian Harbor. The exact location of either crossing would be determined upon consultation with the Town. (Eversource 1, Vol. 1, p. A-11; Tr. 2, p. 63)
243. The existing Davis Avenue bridge has a concrete sidewalk on both sides of the road. (Tr. 3, pp. 245-246)
244. The Town requested the transmission line/pedestrian bridge crossing to avoid disturbance to Indian Harbor. The bridge would be composed of steel and concrete and would require on-site assembly. The bridge itself would have a lifespan of 50 years. The wood pedestrian decking would be approximately eight feet wide and would have a lifespan of 10 years. (Eversource 1, Vol. 1, p. A-11; Eversource 1, Vol. 2, App. 11; Eversource 2, response 48; Tr. 2, pp. 67, 69, 87)
245. The trench installation through Indian Harbor would also be located to the north of the Davis Avenue bridge. Construction through the harbor would require a cofferdam to facilitate excavation of harbor sediments and installation of the duct bank. (Eversource 2, response 49)
246. Under the FERC Guidelines, when necessary, cofferdam techniques to lay pipe or cable across streams or bodies of water should be used and banks should be stabilized to prevent erosion. (Council Administrative Notice 9)
247. The Town is not opposed to a cofferdam installation as long as it can be accomplished without the use of large cranes placed along the shoreline. (Town 1, p. 34; Tr. 3, p. 242)
248. The Indian Harbor transmission line crossing is considered a non-Pool Transmission facility, and as such, approximately 60 percent of the cost would be borne by Connecticut ratepayers. The pedestrian bridge crossing would cost approximately \$1.8 million more than the trench/cofferdam crossing. (Eversource 14, response 64, response 69; Tr. 2, pp. 116-117)

Environmental Considerations

Soil and Earthwork

249. Eversource would deploy erosion and sedimentation controls in accordance with the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control* at the limits of work, adjacent to sensitive areas, and around adjacent catch basins. Erosion controls would be maintained until construction is completed and exposed soils in the work area have stabilized. (Eversource 1, Vol. 1, Ex. B, p. C-3)
250. Minimal grading would be required at the proposed substation locations. (Eversource 1, Vol. 1, Ex. A, p. B-7, Ex. B, p. C-5)
251. Trench construction in roads would be similar to other types of construction projects that occur in roads such as water main replacements or natural gas line installations. (Council Administrative Notice 43, FOF #384)

252. Trench and splice vault excavation would have minimal environmental effect as construction activities would be temporary and limited to the area in and adjacent to the trench. Suitable erosion and sedimentation controls for road excavation would be deployed, if necessary. (Eversource 1, Vol. 1, Ex. B, p. C-3)
253. Trench backfill would be compacted to avoid subsidence. In road areas, backfilling and compaction would have to meet DOT standards. In non-paved areas, 12 to 18-inches of topsoil would be included to allow for enough soil for re-vegetation. (Council Administrative Notice 43, FOF #389)
254. Excess excavated materials and materials not suitable for trench backfill would be disposed of in accordance with applicable regulations. (Eversource 1, Vol. 1, Ex. B, p. C-3)
255. Rock may be encountered during trench construction in off-roadway areas. Rock removal, if required, would be accomplished by mechanical methods such as rock chipping. (Tr. 2, p. 73)

Flood Zones

256. Both the 281 Railroad Avenue and 290 Railroad Avenue sites are not within the 100-year or 500-year flood zones. (Eversource 1, Vol. 1, Ex. A, p. B-8, Ex. B, p. B-2)
257. Both the 281 Railroad Avenue and 290 Railroad Avenue Substations are not within a Hurricane Surge Inundation Area as demarcated by the National Hurricane Center. (Eversource 1, Vol. 1, Ex. A, pp. B-8, B-9, Ex. B, p. B-8)
258. The Cos Cob Substation expansion area is not within a 100-year or 500-year flood zone or within a Hurricane Surge Inundation Area. (Eversource 1, Vol. 1, Ex. A, p. B-8)
259. The Project underground route would cross the 100 year flood zone in two different areas; generally along a substantial portion of Arch Street, between Steamboat Avenue and Railroad Avenue, and along Davis Avenue east and west of Indian Harbor. (Eversource 1, Vol. 2, App. 11)
260. Two splice vaults would be located within the flood zone areas. Vault components would be designed to be able to withstand flooding and saltwater intrusion. (Eversource 1, Vol. 2, App. 11; Tr. 2, pp. 153-153)
261. The underground transmission line route would extend approximately 780 feet through the 100-year flood zone and approximately 6,655 feet through Hurricane Surge Inundation Areas. The transmission lines and associated equipment would be designed to be protected from inundation. (Eversource 1, Vol. 1, Ex. B, p. C-6)

Freshwater Wetlands and Watercourses

262. Both the 281 Railroad Avenue and 290 Railroad Avenue Substation locations are used for commercial purposes and do not contain freshwater wetlands or watercourses. (Eversource 1, Vol. 1, Ex. A, p. A-26, B-9, Ex. B, p. B-2, C-4)
263. The expansion of the Cos Cob Substation would not affect any freshwater wetlands or watercourses. (Eversource 1, Vol. 1, Ex. A, Fig. B-2)
264. The Project underground route would not directly affect any freshwater wetlands. (Eversource 1, Vol. 1, Ex. B, p. C-4)

Coastal Area Resources

265. The Project is located within the coastal resource boundary, as defined by the Connecticut Coastal Management Act (CCMA). The goals and policies of the act are to “ensure that the development, preservation or use of the land and water resources of the coastal area proceeds in a manner consistent with the rights of private property owners and the capability of the land and water resources to support development, preservation or use without significantly disrupting either the natural environment or sound economic growth”. (Eversource 1, Vol. 1, Ex. B, p. B-9)
266. None of the coastal resources identified by the CCMA would be adversely affected by construction or operation of the Project. (Eversource 1, Vol. 1, Ex. A, pp. C-5, C-6, Ex. B, pp. C-6 – C-8)
267. The Project transmission line route would cross Indian Harbor, a coastal resource within Bruce Park, either by a new transmission line/pedestrian bridge installation that spans the harbor or by a trench installation through the harbor. Both proposed installations would cross to the north of the Davis Avenue bridge crossing. (Eversource 1, Vol. 1, Ex. B, pp. A-11, C-4)
268. The existing Davis Avenue bridge provides some protection of areas north of the bridge from storm surge due to the presence of several culverts that restrict incoming flows. (Tr. 2, p. 64)
269. The banks of the harbor consist of stone armoring, maintained lawn, and bedrock outcrops. All disturbed areas along the banks of Indian Harbor would be protected from erosion and restored once construction is completed. (Eversource 1, Vol. 1, Ex. B, Fig. B-2, pp. B-9, C-3)
270. Construction of the transmission line/pedestrian bridge may require the installation of sheet piles of cofferdams on both banks of the harbor crossing to facilitate the installation of bridge abutment foundations. The bridge would be approximately 165 feet long. (Eversource 1, Vol. 1, Ex. B, pp. A-5, C-4)
271. The trench crossing would require cofferdams to allow for the excavation of approximately seven feet of harbor sediment to reach bedrock. The sediment displaced by the conduit/duct bank would be trucked off-site, temporarily stockpiled, and characterized prior to disposal. (Eversource 1, Vol. 1, Ex. B, p. C-4; Tr. 2, p. 72)
272. The trench installation would have no effect on submarine topography or the current defined shoreline. Some leveling of the bedrock may be necessary to create a suitable surface for the duct bank. (Eversource 1, Vol. 1, Ex. B, p. C-8; Tr. 2, p. 72)
273. The trench would be installed in two parts, using two different cofferdams that extend from each shore so that the harbor would only be partially blocked at any given time, allowing for unimpeded tidal fluctuations. (Eversource 2, response 49; Tr. 2, pp. 65-66)
274. Floating work platforms may be used to install the cofferdams. (Tr. 2, pp. 67-68)
275. The proposed transmission line/ pedestrian bridge would be designed to match the existing park environment. (Eversource 1, Vol. 1, Ex. B, p. C-14)
276. Trench work within the tidal ponds would require a permit from DEEP Office of Long Island Sound Programs. The permit would detail the effects on benthic habitats and typically requires a three to one mitigation ratio for restoration activities. (Council Administrative Notice 43, FOF #415)

Groundwater

277. Groundwater in the Project area is classified as GA or GB. GA groundwater - fit for human consumption without treatment - is located primarily within the central portion of the transmission line route. GB groundwater - not fit for human consumption without treatment - is located in the western and eastern portions of the Project area. (Eversource 1, Vol. 1, Ex. B, p. B-8)
278. The Project route and facilities are not within a designated Aquifer Protection area or near any known water supply wells. (Eversource 1, Vol. 1, Ex. A, B-8, Ex. B, p. B-8)
279. Due to the highly urbanized nature of the Greenwich area, construction of the Project may encounter contaminated soils and/or contaminated groundwater. (Council Administrative Notice 43, FOF #390)
280. Groundwater may be encountered during installation of the transmission line, pipe jacking pits, or substation equipment foundations. If groundwater is encountered, appropriate sampling and dewatering would be performed in accordance with applicable regulatory agencies. Depending on the water characterization, groundwater may be discharged to catch basins, or pumped to temporary storage tanks for disposal off-site. (Eversource 1, Vol. 1, Ex. B, p. C-5)
281. Groundwater recharge would not be significantly altered by the construction of the Project. The two proposed substation sites currently consist of impervious and highly compacted surfaces. These surfaces would be replaced with trap rock in the substation yard, improving existing on-site drainage. The construction of the transmission line route would not substantially change existing drainage patterns or alter groundwater flow and recharge. (Eversource 1, Vol. 1, Ex. B, pp. C-7, C-8)

Fish, Wildlife and Habitat

282. Both the 281 Railroad Avenue and 290 Railroad Avenue Substation locations are used for commercial purposes and do not contain sensitive environmental features such as wildlife habitat, wetlands, watercourses or woodlands. (Eversource 1, Vol. 1, Ex. A, p. B-1, B-14, Ex. B, p. B-2, C-9)
283. The Cos Cob Substation area provides minimal wildlife habitat, although ospreys and other birds may use the taller structures to perch or nest. (Eversource 1, Vol. 1, Ex. A, p. B-14)
284. No State listed endangered, threatened or special concern species would be impacted by construction of the Project. (Eversource 1, Vol. 1, Ex. B, p. B-9, Vol. 2, App. 3)
285. Two federally-listed threatened species occur within the general area of the Project; the northern long-eared bat (NLEB) and the red knot, a shorebird. There are no known NLEB hibernacula or known maternity roost trees in close proximity to the Project area and adverse impacts to the NLEB are not anticipated. The red knot is found along the coastline, mostly in the intertidal zone where it forages for food or on barrier islands. Neither habitat type would be affected by the Project. (Eversource 1, Vol. 1, Ex. B, p. B-10, C-9)
286. The proposed Project would not impact any DEEP designated critical habitats. (Eversource 1, Vol. 1, Ex. A, p. B-14, Ex. B, p. B-9)
287. The proposed Project would not affect any DEEP Fisheries Management Areas. The nearest designated fishery area is associated with the Mianus River, approximately 1.2 miles northeast of the Cos Cob Substation. (Eversource 1, Vol. 1, Ex. A, p. B-16, Ex. B, pp. B-10, C-10)

288. The Project underground transmission line route would follow existing roadways adjacent to developed commercial, residential, transportation, and parkland uses. (Eversource 1, Vol. 1, Ex. A, p. B-3, Fig. B-3, Ex. B, p. C-9)
289. Use of the roadways within the park would lessen the impact on species that inhabit park grounds. (Tr. 2, p. 186)

Historic and Archeological Resources

290. No historic resources would be affected by construction of the Project. Due to previous impacts to subsurface areas, the Project would have a low probability of affecting subsurface archeological deposits. (Eversource 1, Vol. 1, Ex. A, p. C-10, Ex. B, pp. B-11, C-10, C-11)

Vegetation Management

291. Construction of the transmission line route within Bruce Park roadways is not expected to require the removal of any trees. Tree trimming, when necessary, would be conducted in consultation with the Town arborist. (Tr. 3, pp. 238-239)
292. Under the FERC Guidelines, clearing of natural vegetation should be limited to that which poses a hazard to the transmission line and determination of a hazard in critical areas, such as a park, should be a joint endeavor of the utility company and the land manager consistent with the National Electric Safety Code and other electric safety and reliability requirements. (Council Administrative Notice 9)

Parks and Recreational Resources

293. The original Project route through Bruce Park would have disturbed recreational park areas and used fluid filled piping beneath water resources. The Modified GSLP follows the existing roadways through the park to the extent practical, lessening disturbance on park lawn and recreational areas. The cable is solid, not containing any fluids that could leak if the cable was compromised. (Tr. 2, pp. 154-155)
294. The Town requests that the Project be constructed within Bruce Park in a way that is safe for the public and not detrimental to the aesthetics or use of the park. (Tr. 3, pp. 140-142)
295. Eversource has worked with the Town to lessen the impact on Bruce Park and would continue to develop the logistics of the Project with the Town prior to and during construction. (Tr. 2, pp. 184-188)
296. The Cos Cob Substation expansion area would remain on Eversource and State of Connecticut property and would not affect recreational facilities in Cos Cob Park. (Eversource 1, Vol. 1, Ex. A, p. B-3)
297. Temporary effects to park areas may include the disruption of land/recreation use proximate to construction activities. (Eversource 1, Vol. 1, Ex. A, p. C-12, Ex. B, pp. C-13, C-14)

Statutory Facilities

298. The Project area contains numerous statutory facilities that are defined under C.G.S. § 16-50p(a)(3)(D) to include residential areas, private or public schools, licensed child day care facilities, licensed youth camps or public playgrounds adjacent to 345-kV transmission lines. (Eversource 1, Vol. 1, Ex. A, p. B-17, Ex. B, p. B-12, Vol. 2, Ex. 11)

299. The 290 Railroad Avenue Substation site is approximately 560 feet north of the Boys & Girls Club of Greenwich at 4 Horseneck Lane. The substation site predominately abuts commercial uses with the exception of a residential/commercial building located on the north side of Railroad Avenue, across from the site. (Eversource 1, Vol. 1, Ex. A, pp. B-17, C-12)
300. The 281 Railroad Avenue Substation is approximately 480 feet north of the Boys & Girls Club of Greenwich at 4 Horseneck Lane. The site abuts developed residential areas to the east and west. (Eversource 1, Vol. 2, Ex. 11)
301. The Project transmission line route would be installed within existing roadways adjacent to residential areas and through Bruce Park. It would be approximately 375 feet north of The Boys & Girls Club of Greenwich where it extends along Railroad Avenue and 225 feet west of a child daycare within the Putnam Indian Field School at 101 Indian Field Road. (Eversource 1, Vol. 1, Ex. B p. B-12, Vol. 2, App. 11)
302. Construction and operation of the Project would have no long term permanent effects on adjacent statutory facilities. (Eversource 1, Vol. 1, p. C-12)

Air Quality

303. Construction of the Project would have short-term, localized effect on air quality, mostly from dust and equipment emissions. In order to minimize dust, Eversource would limit the extent of exposed/disturbed areas and install temporary gravel tracking pads wherever necessary to prevent dirt from being tracked onto public roadways. Water may be used to control dust emissions, as needed. (Eversource 1, Vol. 1, Ex. A, p. C-12)
304. Construction vehicle emissions would be limited by requiring contractors to properly maintain construction equipment and vehicles, and by minimizing the idling time of diesel construction equipment in accordance with DEEP regulatory standards. (Eversource 1, Vol. 1, Ex. B, p. C-13)

Noise

305. The existing noise environment along the Project route is dominated by urban noise related to local and highway traffic, the MNRR rail corridor and residential and commercial land uses. (Eversource 1, Vol. 1, Ex. B, p. B-11)
306. Pursuant to R.C.S.A. §22a-69-1.8(h), noise created from construction activities is exempt from the State Noise Control Regulations. (Eversource 1, Vol. 1, Ex. B, p. C-11)
307. Post-construction noise from the new substations would be predominately from the new transformers. Additional noise would originate from infrequent switching and circuit breaker operations. (Eversource 1, Vol. 1, Ex. A, p. C-11, Ex. B, p. C-12)
308. The Town of Greenwich Noise Ordinance sets noise limits based on zoning districts. The 290 Railroad Avenue site is in a General Business (GB) zone and abuts property zoned GB. The permitted Greenwich noise level for a GB emitter to GB receptor is 62 dBA. (Eversource 2, response 54)
309. The 281 Railroad Avenue site is partially within a GB zone and a Residential zone (R-6). The site abuts both a GB zone, generally abutting Railroad Avenue, and a R-6 zone generally abutting Woodland Drive. The permitted Greenwich noise level for a GB emitter to a R-6 receptor is 55 dBA day/45 dBA at night. (Eversource 1, Vol. 1, p. B-1, C-12; Eversource 2, response 54)

310. Post-construction noise levels adjacent to the 290 Railroad Avenue open-air substation would not exceed the Town's regulatory level at the abutting GB-zoned properties (61 dBA). The projected noise levels would be less than 45 dBA, the most restrictive State and Town regulatory level. (Eversource 1, Vol. 1, Ex. A, p. C-11; Eversource 2, response 54)
311. Post-construction noise levels adjacent to the 281 Railroad Avenue "indoor substation" would not exceed 45 dBA, the most restrictive State and Town regulatory level. The transformer firewalls and a sound attenuation baffle installed along the north edge of the roof opening above the transformers would mitigate sound levels at adjacent residential properties. (Eversource 1, Vol. 1, Ex. B, p. C-12; Eversource 1, Vol. 2, App. 9; Eversource 2, response 54)
312. A fully-enclosed indoor substation would be significantly more effective at reducing sound levels from substation equipment than an open-air substation surrounded by a brick wall. (Eversource 14, response Town 82; Town 1, p. 28; Tr. 2, pp. 84-85)
313. An emergency generator would operate during emergencies such as "black out" conditions. The emergency generator would also operate occasionally for maintenance and testing purposes during normal business hours. According to R.C.S.A. §22a-69-1.8, noise created as a result of, or relating to, an emergency, such as an emergency backup generator, is exempt from the State Noise Control Regulations. (Eversource 1, Vol. 1, Ex. B, p. C-12)
314. Post-construction noise at the Cos Cob Substation would not increase current steady state noise emissions. (Eversource 1, Vol. 1, Ex. A, p. C-12)

Public Safety

315. The proposed 290 Railroad Avenue open-air substation would be enclosed by a 15-foot tall perimeter brick wall. The wall would serve as both a security fence and as a fire barrier. (Eversource 1, PFT, p. 9; Tr. 4, p. 45)
316. The proposed 281 Railroad Avenue "indoor substation" would have outer doors and roll up gates, preventing access. The exterior siding of the substation would be fireproof. (Eversource 1, Vol. 2, App. 9; Eversource 2, response 44)
317. A fully-enclosed indoor substation would have a higher level of security than an open-air substation. (Eversource 14, response Town 82)
318. The transformers at both substations would be enclosed by firewalls that extend slightly above the top of the transformers. (Eversource 1, Vol. 2, App. 4, App. 9)
319. The indoor substation would be designed in accordance with applicable safety codes. Additional training for Town emergency responders would be necessary to ensure safe entry into the indoor substation and for proper response to certain emergencies. (Tr. 2, pp. 49-50)
320. The indoor substation would feature heat detectors and water and chemical fire suppression systems. The type of system would depend on the components being protected as well as the on-site drainage system's ability to contain released water. (Tr. 2, pp. 50-51)

321. A pole-mounted transformer caught fire in June 2015 at the Cos Cob Substation. The fire was localized to the pole-mounted transformer. Protective systems de-energized the transformer and adjacent bus. The fire did not affect operation of Eversource's large bulk power transformers, DOT's MNRR transformers or equipment within an adjacent NRG substation. (Eversource 2, response 56; Tr. 2, pp. 52-53)
322. Emergency response to a substation requires an Eversource representative to be on-site to properly de-energize system components to ensure safety of the local emergency responders. Eversource's response time to the Cos Cob substation for the June 2015 pole-mounted transformer fire was over an hour. Since that time, Eversource has modified personnel dispatch times and has altered worker shifts to ensure there is more timely response to emergency calls at substations. (Tr. 2, pp. 53-55)
323. There are no standards or safety codes that would prevent an open-air substation from being constructed at 290 Railroad Avenue, adjacent to the AIRGAS commercial property. (Tr. 2, pp. 58-61, 126; Tr. 3, pp. 244-245)
324. Trees that overhang the perimeter substation fence would be trimmed as necessary. Trees that are deemed a hazard to the substation would be removed. (Eversource 12, response 67)
325. In December 2009, President Obama proclaimed power grids as critical infrastructure vital to the United States. The Department of Homeland Security, in collaboration with other federal stakeholders, state, local, and tribal governments, and private sector partners, has developed the National Infrastructure Protection Plan to establish a framework for securing our resources and maintaining their resilience from all hazards during an event or emergency. (Council Administrative Notice 3)
326. On February 12, 2013, President Obama signed Executive Order 13636 on Improving Cyber Security for Critical Infrastructure, along with an accompanying Presidential Policy Directive on Critical Infrastructure Security and Resilience. The order established the U.S. policy to "enhance the security and resilience of the nation's critical infrastructure." The Secretary of Homeland Security has been given the overall responsibility for critical infrastructure protection, and identifies the Department of Energy as the sector-specific agency responsible for the energy sector. The Department of Energy may draw upon the North American Electric Reliability Corporation's (NERC) expertise. (Council Administrative Notice 4; Council Administrative Notice 58)
327. NERC developed Physical Security Reliability Standard CIP-014-1 to address threats and vulnerabilities to the physical security of critical infrastructure on the bulk power system. CIP-014-1 consists of standards and requirements related to security of electronic perimeters, protection of critical cyber assets including personnel, training, security management and disaster recovery planning. CIP-014-1 requires transmission owners to deploy systems for monitoring security events and to have comprehensive contingency plans for cyberattacks, natural disasters and other unplanned events. (Council Administrative Notice 8; Council Administrative Notice 58, p. 9)

Electric and Magnetic Fields

328. Electric fields (EF) and magnetic fields (MF) are two forms of energy that surround an electrical device. Transmission lines are a source of both EF and MF. In North America, electric utilities provide power at 60 hertz (oscillates 60 times per second). (Council Administrative Notice Item 27; Eversource 1, Vol. 1, Ex. A, p. D-1)

329. Electric fields result from voltages applied to electrical conductors and equipment. Appliances within homes and the workplace are the major sources of electric fields indoors, and power lines are the major sources of electric fields outdoors. EF levels decrease rapidly with distance from the source, diminishing even faster when interrupted by conductive materials, such as buildings and vegetation. The scientific community does not regard EF levels to be a concern to the general public and thus studies of health effects from electrical transmission lines and equipment has focused on MF. (Council Administrative Notice Item 27; Eversource 1, Vol. 1, Ex. A, p. D-1)
330. Magnetic fields are produced by the flow of electric currents. The level of a magnetic field is commonly expressed as magnetic flux density in units called gauss, or in milliGauss (mG). The magnetic field level at any point depends on characteristics of the source, which can include the arrangement of conductors, the amount of current flow through the source, and its distance from the point of measurement. MF levels decrease rapidly with distance from the source but are not easily interrupted as they pass through most materials. ((Council Administrative Notice Item 27; Eversource 1, Vol. 1, Ex. A, p. D-1)
331. In the United States, no state or federal exposure standards for 60-hertz MF based on demonstrated health effects have been established. Nor are there any such standards established world-wide. However, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) has established a level of 2,000 mG, based on extrapolation from scientific experimentation, and the International Committee on Electromagnetic Safety (ICES) has calculated a guideline of 9,040 mG for exposure to workers and the general public. (Council Administrative Notice Item 27; Eversource 1, Vol. 1, Ex. A, p. D-1)
332. The Council has developed its *"Electric and Magnetic Field Best Management Practices for the Construction of Electric Transmission Lines in Connecticut"* (EMF BMPs) to address concerns regarding potential health risks from exposure to EMF from transmission lines. The document presents scientific knowledge about health risks, outlines the Council's policy of prudent avoidance, and describes a wide range of best-practice MF management designs. (Council Administrative Notice Item 27; Eversource 1, Vol. 1, Ex. A, p. D-1)
333. In accordance with the Council's EMF BMPs, Eversource is required to provide an analysis of recent scientific literature regarding MF exposure, an analysis of pre and post construction MF levels, and develop a Field Management Design Plan and associated MF reduction strategies in areas of particular interest, as long as such designs do not compromise system reliability or worker safety, or environmental and aesthetic project goals. (Council Administrative Notice Item 27)
334. Eversource has complied with the Council's EMF BMP by reviewing recent scientific literature and exposure standards related to MF in Docket 461, provided pre- construction measurement and post construction calculations, and reviewed the need for a Field Management Design Plan with MF reduction strategies. (Council Administrative Notice Item 27; Eversource 1, Vol. 1, Ex. A, p. D-19)
335. The existing distribution lines are the major source of MF in the project area. For example, measurements of existing MF collected near 281 Railroad Avenue range from 3.7 to 9.3 mG. Another source is the MNRR where measurements collected at the Indian Field Road overpass range from 1.5 to 23.1 mG. (Eversource 1, Vol. 1, Ex. A, pp. D-4, D-5, Ex. B, p. D-1)
336. MF from the Project underground transmission line during average annual load would be a maximum of 6.7 mG directly above the duct bank within the road, decreasing to 0.6 mG along the edge of the road. For splice vault locations, the MF would be a maximum of 28.7 mG above the vault decreasing to 8.1 mG along the edge of the road. (Eversource 1, Vol. 1, Ex. B, p. D-1)

337. MF for the transmission line installed within the optional pedestrian bridge over Indian Harbor would be 49.4 mG directly above the bridge travel surface during average annual load conditions. (Eversource 10a, pp. D-4)
338. Transformers and other equipment at the Cos Cob Substation and proposed Greenwich Substation are potential EMF sources. These sources, however, would be expected to cause little or no exposure to the general public because the strength of fields from typical substation equipment decreases rapidly with distance and reaches very low levels at relatively short distances beyond the substation perimeter. The exception to the normally low levels of EMF associated with substations is where transmission and distribution lines enter the substation. (Council Administrative Notice 43, FOF #456)

Project Cost and Cost Allocation

339. The estimated costs of the Proposed Project with certain variations are summarized below:

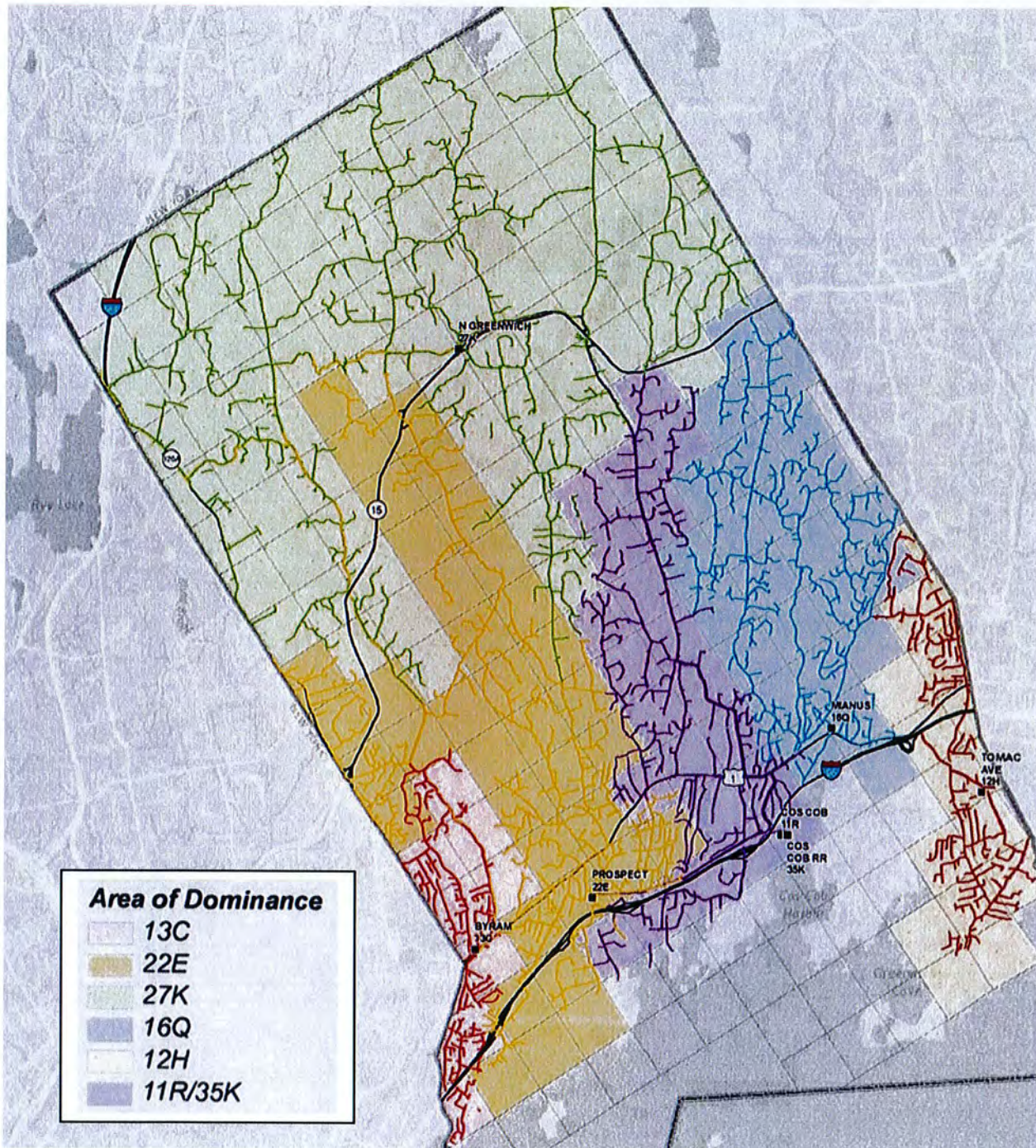
| | 281 Railroad Avenue | 290 Railroad Avenue |
|--|---------------------|---------------------|
| Transmission line with trench/cofferdam crossing at Indian Harbor and jack piping under I-95 | \$52,215,678 | \$53,115,678 |
| Cos Cob and Prospect Substation work and distribution feeder modifications | \$18,208,282 | \$16,512,750 |
| Open-air Substation w/brick wall | \$27,792,801 | \$28,136,179 |
| Total | \$98,216,761 | \$97,764,607 |
| <i>Optional Additional Costs</i> | | |
| Indoor Substation design | + \$1,200,000 | +\$1,400,000 |
| Pedestrian/transmission line bridge over Indian Harbor | +\$1,800,000 | +\$1,800,000 |

Detailed cost tables are provided in Attachment 4. (Eversource 14, response 69)

340. Costs of the Project would be recovered through regionalized and localized cost allocation. Project costs are regionalized among the ISO-NE states if the project will improve reliability and provide a benefit throughout the New England region. A State's share of the regionalized costs is proportionate to its electricity demand. Project costs, or portions of project costs, are localized if they do not provide a regional reliability benefit and are typically recovered through local transmission and distribution rates of the transmission owner. (Eversource 2, response 58, response 59)
341. The Cos Cob Substation modifications are considered to be ISO-NE Pool Transmission Facilities (PTF) and as such, costs would be regionalized with Connecticut ratepayers responsible for approximately 20 percent of the costs. (Eversource 2, response 4, response 59)
342. The 115-kV transmission lines are non-PTF and costs would be recovered through Eversource's Local Network Service rates with Connecticut ratepayers responsible for approximately 60 percent of the cost. (Eversource 2, response 4, Tr. 2, pp. 115-117)

343. Distribution costs - bulk power transformers and switchgear at the new Greenwich Substation and the 13.2-kV interconnection - would be recovered 100 percent from Connecticut ratepayers. (Eversource 2, response 4; Tr. 2, pp. 115-117, 157-158)
344. Distribution costs for the 281 Railroad Avenue site are slightly higher than the 290 Railroad Avenue site (approx. \$1.7 million) since the feeder connection is longer (approx. 750 feet) and two additional manholes would be required. (Eversource 9, response 70; Tr. 2, pp. 125, 178-179)

Attachment 1 – Approximate Substation Service Territories



13C = Bryam

27K = North Greenwich

12H = Tomac

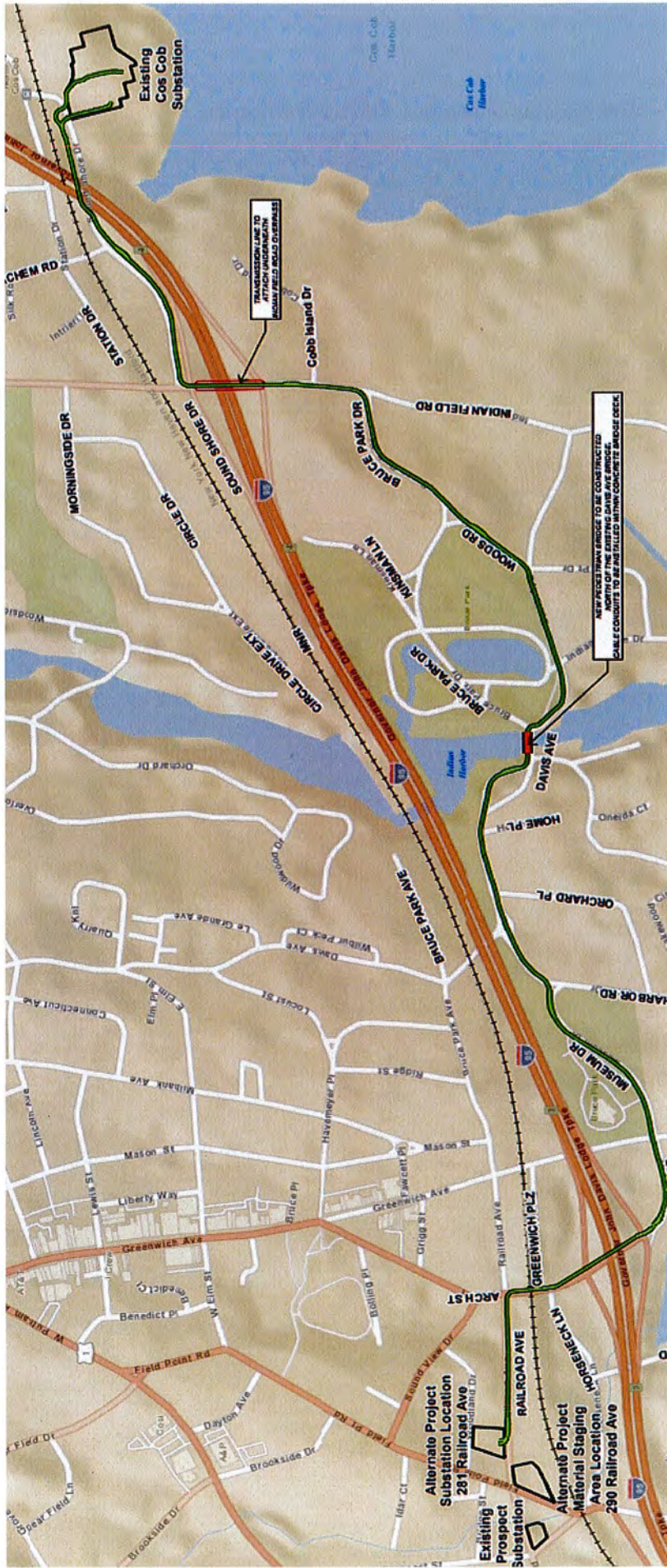
22E = Prospect

16Q = Mianus

11R/35K = Cos Cob

(Eversource 14, response 79)

Attachment 2: Project Route



(Eversource 1, Vol. 1, App. B, Fig. A-1)

Attachment 3

| Distribution Alternatives Analyzed | | | |
|---|---|--|-------------------|
| Distribution Alternatives | Scope | Explanation for Dismissal | Cost ¹ |
| Distribution Option 1: Reconductoring of existing feeders from Cos Cob to Existing Prospect SS | <ul style="list-style-type: none"> *Reconductor four (4) existing underground feeders from Cos Cob to Existing Prospect SS *Feeders would be reconducted from 500 kcmil Cu to 750 kcmil Cu | <ul style="list-style-type: none"> *Due to the length and impedance differences of the parallel feeders, the upgraded feeders continue to be overloaded. To avoid overload in contingency, the normal load on the feeders must be reduced. Because of this fatal flaw, no cost estimate for this option was developed | N/A |
| Distribution Option 2: Addition of fifth feeder from Cos Cob to Existing Prospect SS | <ul style="list-style-type: none"> *Addition of fifth feeder from Cos Cob to Existing Prospect SS in an underground configuration utilizing 1000 kcmil Cu conductor *Install (2) 27.6-kV feeders from Cos Cob Substation to Byram Substation in an underground/overhead configuration. The overhead portion would utilize 750 AL aerial insulated cable for 3.5 miles, while the underground portion would utilize 1000 kcmil Cu conductor for 0.7 miles *Add 27.6-kV switchgear at Cos Cob Substation to accommodate new feeders. *Reconfigure existing feeders *Build new 27.6/13.2-kV Substation on Railroad Ave; Install two 80 MVA 27.6/13.2-kV transformers *Remove existing Prospect Substation *Upgrade two transformers at Byram Substation from 12.5 MVA to 25 MVA. | <ul style="list-style-type: none"> *Addition of a fifth feeder did not alleviate overloads on other feeders due to the length and impedance differences of the parallel feeders. Because of this fatal flaw, no cost estimate for this option was developed | N/A |
| Distribution Option 3: Two Feeders from Cos Cob to Byram & New Prospect S/S | <ul style="list-style-type: none"> *Install (4) 27.6-kV feeders from Cos Cob SS to New Prospect SS in an underground configuration utilizing 1000 kcmil Cu Conductor for approximately 3 miles *Build new 27.6/13.2-kV indoor substation on Railroad Ave with two 80 MVA transformers *Reconfigure existing 2-27.6-kV feeders and 7-13.2-kV feeders from Prospect to the new substation *Reconfigure and up-grade the existing 13.2-kV feeders that currently initiate at Byram SS and existing Prospect SS to initiate at the new Prospect SS *Re-route and up-grade existing 11R58 27.6-kV feeder to new Prospect SS *Remove existing Prospect *Remove existing Byram *Install (2) 27.6-kV feeders from Cos Cob to Substation to Byram Substation and install (1) 27.6-kV feeder from Cos Cob Substation to New Prospect Substation in an underground configuration utilizing 1000 kcmil Cu conductor for 4.6 miles. All feeders would utilize the same ductbank *Add 27.6-kV switchgear at Cos Cob Substation to accommodate new feeders. *Reconfigure existing feeders *Build a new 27.6/13.2-kV Substation on Railroad Ave; Install two 80 MVA 27.6/13.2-kV transformers *Remove existing Prospect *Upgrade two transformers at Byram Substation from 12.5 MVA to 25 MVA. *Install (3) 27.6-kV feeders from Waterside Substation to New Prospect Substation in an underground configuration utilizing 1000 kcmil Cu conductor for 6.2 miles *Waterside Substation Modifications; expand 115-kV ring bus and add two 115/27.6-kV transformers and switchgear *Build a new 27.6/13.2-kV Substation on Railroad Ave; Install three 25 MVA 27.6/13.2-kV transformers *Remove four 27.6/13.2-kV transformers and 13.2-kV switchgear at Existing Prospect *Upgrade two transformers at Byram Substation from 12.5 MVA to 25 MVA. | <ul style="list-style-type: none"> *This configuration does not avoid loss of load in the event of loss of two or more transformers at Cos Cob. The loss of load in that event could be up to 92% of the Cos Cob 27.6 kV system *In addition, in order to reconfigure the 27.6 kV design at Cos Cob, a new bulk substation is needed | \$102M |
| Distribution Option 4: Four feeders from Cos Cob SS to Prospect SS | <ul style="list-style-type: none"> *Install (4) 27.6-kV feeders from Cos Cob SS to New Prospect SS in an underground configuration utilizing 1000 kcmil Cu Conductor for approximately 3 miles *Build new 27.6/13.2-kV indoor substation on Railroad Ave with two 80 MVA transformers *Reconfigure existing 2-27.6-kV feeders and 7-13.2-kV feeders from Prospect to the new substation *Reconfigure and up-grade the existing 13.2-kV feeders that currently initiate at Byram SS and existing Prospect SS to initiate at the new Prospect SS *Re-route and up-grade existing 11R58 27.6-kV feeder to new Prospect SS *Remove existing Prospect *Remove existing Byram *Install (2) 27.6-kV feeders from Cos Cob to Substation to Byram Substation and install (1) 27.6-kV feeder from Cos Cob Substation to New Prospect Substation in an underground configuration utilizing 1000 kcmil Cu conductor for 4.6 miles. All feeders would utilize the same ductbank *Add 27.6-kV switchgear at Cos Cob Substation to accommodate new feeders. *Reconfigure existing feeders *Build a new 27.6/13.2-kV Substation on Railroad Ave; Install two 80 MVA 27.6/13.2-kV transformers *Remove existing Prospect *Upgrade two transformers at Byram Substation from 12.5 MVA to 25 MVA. *Install (3) 27.6-kV feeders from Waterside Substation to New Prospect Substation in an underground configuration utilizing 1000 kcmil Cu conductor for 6.2 miles *Waterside Substation Modifications; expand 115-kV ring bus and add two 115/27.6-kV transformers and switchgear *Build a new 27.6/13.2-kV Substation on Railroad Ave; Install three 25 MVA 27.6/13.2-kV transformers *Remove four 27.6/13.2-kV transformers and 13.2-kV switchgear at Existing Prospect *Upgrade two transformers at Byram Substation from 12.5 MVA to 25 MVA. | <ul style="list-style-type: none"> *This configuration does not avoid loss of load in the event of loss of two or more transformers at Cos Cob. The loss of load in that event could be up to 92% of the Cos Cob 27.6 kV system *In addition, in order to reconfigure the 27.6 kV design at Cos Cob, a new bulk substation is needed | \$122M |
| Distribution Option 5: Two Feeders from Cos Cob to Byram, One Feeder from Cos Cob to New Prospect S/S | <ul style="list-style-type: none"> *Install (4) 27.6-kV feeders from Cos Cob SS to New Prospect SS in an underground configuration utilizing 1000 kcmil Cu Conductor for approximately 3 miles *Build new 27.6/13.2-kV indoor substation on Railroad Ave with two 80 MVA transformers *Reconfigure existing 2-27.6-kV feeders and 7-13.2-kV feeders from Prospect to the new substation *Reconfigure and up-grade the existing 13.2-kV feeders that currently initiate at Byram SS and existing Prospect SS to initiate at the new Prospect SS *Re-route and up-grade existing 11R58 27.6-kV feeder to new Prospect SS *Remove existing Prospect *Remove existing Byram *Install (2) 27.6-kV feeders from Cos Cob to Substation to Byram Substation and install (1) 27.6-kV feeder from Cos Cob Substation to New Prospect Substation in an underground configuration utilizing 1000 kcmil Cu conductor for 4.6 miles. All feeders would utilize the same ductbank *Add 27.6-kV switchgear at Cos Cob Substation to accommodate new feeders. *Reconfigure existing feeders *Build a new 27.6/13.2-kV Substation on Railroad Ave; Install two 80 MVA 27.6/13.2-kV transformers *Remove existing Prospect *Upgrade two transformers at Byram Substation from 12.5 MVA to 25 MVA. *Install (3) 27.6-kV feeders from Waterside Substation to New Prospect Substation in an underground configuration utilizing 1000 kcmil Cu conductor for 6.2 miles *Waterside Substation Modifications; expand 115-kV ring bus and add two 115/27.6-kV transformers and switchgear *Build a new 27.6/13.2-kV Substation on Railroad Ave; Install three 25 MVA 27.6/13.2-kV transformers *Remove four 27.6/13.2-kV transformers and 13.2-kV switchgear at Existing Prospect *Upgrade two transformers at Byram Substation from 12.5 MVA to 25 MVA. | <ul style="list-style-type: none"> *This configuration does not avoid loss of load in the event of loss of two or more transformers at Cos Cob. The loss of load in that event could be up to 92% of the Cos Cob 27.6 kV system *In addition, in order to reconfigure the 27.6 kV design at Cos Cob, a new bulk substation is needed | \$109M |
| Distribution Option 6: Three Feeders from Waterside to New Prospect S/S | <ul style="list-style-type: none"> *Install (4) 27.6-kV feeders from Cos Cob SS to New Prospect SS in an underground configuration utilizing 1000 kcmil Cu Conductor for approximately 3 miles *Build new 27.6/13.2-kV indoor substation on Railroad Ave with two 80 MVA transformers *Reconfigure existing 2-27.6-kV feeders and 7-13.2-kV feeders from Prospect to the new substation *Reconfigure and up-grade the existing 13.2-kV feeders that currently initiate at Byram SS and existing Prospect SS to initiate at the new Prospect SS *Re-route and up-grade existing 11R58 27.6-kV feeder to new Prospect SS *Remove existing Prospect *Remove existing Byram *Install (2) 27.6-kV feeders from Cos Cob to Substation to Byram Substation and install (1) 27.6-kV feeder from Cos Cob Substation to New Prospect Substation in an underground configuration utilizing 1000 kcmil Cu conductor for 4.6 miles. All feeders would utilize the same ductbank *Add 27.6-kV switchgear at Cos Cob Substation to accommodate new feeders. *Reconfigure existing feeders *Build a new 27.6/13.2-kV Substation on Railroad Ave; Install two 80 MVA 27.6/13.2-kV transformers *Remove existing Prospect *Upgrade two transformers at Byram Substation from 12.5 MVA to 25 MVA. *Install (3) 27.6-kV feeders from Waterside Substation to New Prospect Substation in an underground configuration utilizing 1000 kcmil Cu conductor for 6.2 miles *Waterside Substation Modifications; expand 115-kV ring bus and add two 115/27.6-kV transformers and switchgear *Build a new 27.6/13.2-kV Substation on Railroad Ave; Install three 25 MVA 27.6/13.2-kV transformers *Remove four 27.6/13.2-kV transformers and 13.2-kV switchgear at Existing Prospect *Upgrade two transformers at Byram Substation from 12.5 MVA to 25 MVA. | <ul style="list-style-type: none"> *This option was dismissed for the following reasons: <ul style="list-style-type: none"> **Significantly higher cost compared to other alternatives **This configuration does not avoid loss of load in the event of loss of two or more transformers at Cos Cob. The loss of load in that event could be up to 39% of the Cos Cob 27.6 kV system | \$163M |

Attachment 3 (cont.)

| | | | |
|--|---|---|--------|
| Distribution Option 7: Fifth Feeder from Cos Cob to New Prospect S/S & Three Feeders from Cedar Heights to North Greenwich | <ul style="list-style-type: none"> *Add a fifth 27.6-kV feeder from Cos Cob Substation to New Prospect Substation in an underground configuration utilizing 1000 kcmil Cu conductor for 3.1 miles *Install (3) 27.6-kV feeders from Cedar Heights Substation to North Greenwich Substation in an underground configuration utilizing 1000 kcmil Cu conductor for 10.3 miles *Install one 115/27.6-kV transformer and switchgear at Cedar Heights Substation *Build new 27.6/13.2-kV Substation on Railroad Ave; Install three 25 MVA 27.6/13.2-kV transformers *Remove existing Prospect Substation *Upgrade two transformers at Byram Substation from 12.5 MVA to 25 MVA *Rebuild two 115-kV circuits from Cedar Heights Substation to Glenbrook Substation in an underground configuration utilizing 1000 kcmil Cu conductor for 4.9 miles | <ul style="list-style-type: none"> *This option was dismissed for the following reasons: <ul style="list-style-type: none"> **Significantly higher cost compared to other alternatives **This configuration does not avoid loss of load in the event of loss of two or more transformers at Cos Cob. The loss of load in that event could be up to 38% of the Cos Cob 27.6 kV system ** Community impact, which includes acquiring multiple easements, expansion of Cedar Heights Substation | \$303M |
| Distribution Option 7A Variation: Fifth Feeder from Cos Cob to New Prospect S/S & Three Aerial Feeders from Cedar Heights to North Greenwich | <ul style="list-style-type: none"> *Addition of a fifth 27.6-kV feeder from Cos Cob Substation to New Prospect Substation in an underground configuration utilizing 1000 kcmil Cu for 3.1 miles *Install (3) 27.6-kV feeders from Cedar Heights Substation to North Greenwich Substation in an underground/overhead configuration. The underground portion would utilize 1000 kcmil Cu conductor for 3.1 miles, while the overhead portion would utilize 750 AL aerial insulated cable for 7.2 miles *Rebuild two 115-kV circuits from Cedar Heights Substation to Glenbrook Substation in an underground configuration utilizing 1000 kcmil Cu conductor for 4.9 miles *Expand Cedar Heights Substation, install two 115KV-27.6KV transformers and add two (2) 13.2-kV Feeder Positions *Build new 27.6/13.2-kV Substation on Railroad Ave; Install three 25 MVA 27.6/13.2-kV transformers *Upgrade two transformers at Byram Substation from 12.5 MVA to 25 MVA *Remove existing Prospect Substation | <ul style="list-style-type: none"> *This option was dismissed for the following reasons: <ul style="list-style-type: none"> **Significantly higher cost compared to other alternatives **This configuration does not avoid loss of load in the event of loss of two or more transformers at Cos Cob. The loss of load in that event could be up to 38% of the Cos Cob 27.6 kV system ** Community impact, which includes acquiring multiple easements, expansion of Cedar Heights Substation | \$253M |
| Notes | | | |
| 1 | The above estimated costs were rough "order of magnitude" costs developed in the fall of 2016 for use in comparing the various conceptual distribution solutions against one another and against the estimated transmission costs. Since these comparisons were made, the estimated costs for the PMP and AMP have been refined | | |

(Eversource 2, response 26)

Attachment 4

The Table below presents a breakdown of the Modified GSLP with variations. Please note the “XLPE AMP Route” cost includes attachment to the Indian Field Road overpass (DOT is opposed) and the pedestrian bridge over Indian Harbor:

| Component | Currently Proposed GSLP (XLPE AMP Route) - Term at 281 RR Ave (Pole Yard) | Currently Proposed GSLP (XLPE AMP Route)- Term at 290 RR Ave (Pet Pantry) |
|---|---|---|
| Transmission Line | \$52,515,678 | \$53,415,678 |
| Cos Cob Modifications / Distribution upgrades (incl Prospect) | \$18,208,282 | \$16,512,750 |
| New Greenwich S/S | \$28,992,801 | \$28,136,749 |
| Total | \$99,716,761 | \$98,065,177 |
| Project Component | Additional Cost to GSLP | Additional Cost to GSLP |
| Pipejacking Underneath I-95 (Vol 1, Ex. B, sec. A.5.1.1) | \$1.5M | \$1.5M |
| Architectural Building to replace wall enclosure | \$0 (incl) | \$1.4M |
| Project Component | Reduced Cost to GSLP | Reduced Cost to GSLP |
| Cofferdam Variation (Vol 1, Ex. B, sec. A.4) | \$1.8M | \$1.8M |
| Wall Enclosure only - no architectural building | \$1.2M | \$0 (incl) |

(Eversource 14, response 69)

A breakdown of the approximate cost allocation for the AMP (Indoor Substation at 281 Railroad Ave, Field Point Rd. Bridge Attachment, pedestrian bridge crossing over Indian Harbor), is summarized in the chart below:

| Project Estimates | | GSLP Cost Component Allocation | | |
|--|-------------------------|--------------------------------|---|--------------|
| Project Component | Currently Proposed GSLP | Transmission PTF (regional) | Transmission non-PTF (Network Service) | Distribution |
| Transmission Line | \$52,515,678 | | \$52,515,678 | |
| Greenwich Substation | \$28,992,801 | | | |
| Transmission Component | \$12,291,549 | | \$12,291,549 | |
| Distribution Component | \$16,701,252 | | | \$16,701,252 |
| Cos Cob Substation | \$12,669,170 | \$12,669,170 | | |
| Prospect Substation Modifications | \$952,837 | | | \$952,837 |
| Distribution Feeder Relocation | \$4,586,275 | | | \$4,586,275 |
| Project Total | \$99,716,760 | \$12,669,170 | \$64,807,227 | \$22,240,364 |
| Project Estimates | | Rate Impact | | |
| Percent of Project | 100.00% | 12.71% | 64.99% | 22.30% |
| CL&P Customer - % of Load | | 19.42% | 60.44% | 100.00% |
| Estimated Annual Retail Cost to CL&P Customers | 9,849,000 | \$ 418,000 | \$ 5,719,000 | \$ 3,712,000 |
| Average CL&P Retail Rate (\$/kWh) | \$ 0.000441 | \$ 0.000019 | \$ 0.000256 | \$ 0.000166 |
| Estimated Average Monthly Impact to 700 kWh CL&P Retail Customer | \$ 0.309 | \$ 0.013 | \$ 0.179 | \$ 0.116 |

(Eversource 14, response 63)

| | | |
|--|---|------------------|
| DOCKET NO. 461A - Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a 115-kilovolt (kV) bulk substation located at 290 Railroad Avenue, Greenwich, Connecticut, and two 115-kV underground transmission circuits extending approximately 2.3 miles between the proposed substation and the existing Cos Cob Substation, Greenwich, Connecticut, and related substation improvements. Reopening of this docket based on changed conditions pursuant to Connecticut General Statutes §4-181a(b). | } | Connecticut |
| | } | Siting |
| | } | Council |
| | | November 9, 2017 |

Opinion

Introduction

On June 26, 2015, 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, maintenance, and operation of a new 115-kilovolt (kV) bulk substation located at 290 Railroad Avenue, Greenwich, Connecticut, and two 115-kV underground transmission circuits extending approximately 2.3 miles between the proposed substation and the existing Cos Cob Substation including related substation improvements in Greenwich, Connecticut (Greenwich Substation and Line Project or GSLP).

In addition to the applicant, 12 parties and intervenors participated in the original Docket 461 proceeding, which consisted of 6 evidentiary hearings and a public comment session. Common concerns shared and expressed by the parties, intervenors and other interested persons included, but were not limited to, impacts to the community, impacts to Bruce Park, lack of effective communication with the Town of Greenwich (Town), lack of demonstration of the public need for the GSLP, lack of exploration of potential alternatives and exorbitantly high project costs.

On May 12, 2016 the Council voted to deny without prejudice a Certificate to Eversource for the GSLP based on the following issues:

- The cost of the GSLP, as presented, was exceedingly high;
- The design and associated cost of the GIS substation, including a position for a third transmission line, was not warranted;
- The proposed GSLP route through Bruce Park would have an adverse environmental effect and did not conform to the Federal Energy Regulatory Commission Guidelines for the Protection of Natural, Historic, Scenic and Recreational Values in the Design and Location of Rights-of-Way and Transmission Facilities (FERC Guidelines);
- An alternative transmission line route along the Metro-North Railroad (MNRR), referred to as the Hybrid Alternative, was not thoroughly developed for Council consideration. The Hybrid Alternative may be less costly and would be consistent with the FERC Guidelines;
- No immediate need for the GSLP was found as the projected load at the Cos Cob Substation and Prospect Substation in years 2014 and 2015 did not occur; and
- A lack of communication with the Town to develop a mutually suitable solution to meet the Town's electric needs.

Jurisdiction

The Council does not have jurisdiction over electric distribution facilities. The Council's jurisdiction under Connecticut General Statutes (C.G.S) §16-50i(a) extends over electric transmission line facilities with a design capacity of 69-kV or more and electric substation facilities designed to regulate the voltage of electricity at 69-kV or more. Under the Public Utility Environmental Standards Act (PUESA), the Council's charge is to balance the need for adequate and reliable public utility services at the lowest reasonable cost to consumers with the need to protect the environment and ecology of the state. A public need exists when a facility is necessary for the reliability of the electric power supply of the state. Although the Council's jurisdiction is limited to transmission level supply, in this case, electric distribution and electric transmission components are intertwined.

Under C.G.S §16-50p, the Council shall not grant a Certificate, either as proposed or modified by the Council, unless it shall find and determine the nature of the probable environmental impact of the facility alone and cumulatively with other existing facilities, including a specification of every significant adverse effect relative to electric and magnetic fields, 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, agriculture, forests and parks, air and water purity and fish, aquaculture and wildlife, and why the adverse effects are not sufficient reason to deny the application.

In the case of an electric transmission line, the Council shall also find and determine an appropriate design of the facility including what portion of the facility shall be located overhead; 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 and will serve the interests of electric system economy and reliability; that the facility design is cost effective and the most appropriate alternative based on a life-cycle cost analysis of the facility and are consistent with the purposes of the PUESA, the Council's Electric and Magnetic Fields Best Management Practices (EMF BMP) and FERC Guidelines.

Changed Conditions

On May 5, 2017 Eversource submitted a Petition for Reconsideration of the Denial of a Certificate of Environmental Compatibility and Public Need for the Greenwich Substation and Line Project to the Council and the original Docket 461 service list based on changed conditions pursuant to C.G.S. §4-181a(b) (Motion to Reopen).

In its Motion to Reopen, Eversource identified changed conditions to the Project's capacity, design and cost since the Council's May 12, 2016 denial without prejudice, including, but not limited to:

- a. Altered the design of the GSLP to account for current electric needs rather than to provide improvements with a 30 to 40 year planning horizon;
- b. Designed a system to meet reliability needs based on 130.5 MVA of peak load on the Greenwich 27.6-kV system;
- c. No longer use a ten year load growth forecasting that anticipated one percent load growth per year;
- d. Two potential GSLP project routes and substation sites were developed for consideration upon Eversource's consultation with the Town after the Council's Docket 461 decision; the Proposed Modified Project (PMP) and the Alternate Modified Project (AMP);
- e. Developed a transmission line route that avoids, to the extent possible, environmental impact to the Town-owned Bruce Park, consistent with the FERC Guidelines;
- f. Reduced costs of both the PMP and AMP from than the original GSLP presented in Docket 461;

- g. Redesigned the new Greenwich Substation that does not use costly gas-insulated switchgear;
- h. Use of Cross-linked Polyethylene (XLPE) cable instead of a High Pressure Fluid Filled (HPFF) cable design for all underground transmission line installations;
- i. Consultations with the Town in an attempt to develop feasible alternatives as well as a feasible GSLP route; and
- j. Consultations with the Town to develop demand side management programs to promote energy efficiency.

At a meeting held on May 25, 2017, after considering all comments submitted by parties and intervenors to the original proceeding regarding the Motion to Reopen, the Council voted to grant Eversource's Motion to Reopen. The reopening allowed the Council to consider changed conditions, public need and alternate locations for the proposed electric substation and electric transmission circuits (Modified GSLP).

The Council held one public comment hearing session in Greenwich and three public evidentiary hearing sessions at the Council's office in New Britain. All parties and intervenors had the opportunity to meaningfully participate in the re-opened proceedings.

Public Need

As stated in the Council's Docket 461 decision, *"the proposed GSLP, or some variation thereof, is necessary for the reliability of the electric power supply of the Town of Greenwich"*. The Council's position has not changed in this regard. Greenwich is at the farthest southwest extent of Eversource's electric network in Connecticut and is electrically isolated from other areas of the State. The geographic isolation resulted in a unique and unreliable electric system that was designed in the 1950's, where most of Greenwich is serviced by a single bulk power substation, the Cos Cob Substation. The Cos Cob Substation distributes power to three distribution substations in Greenwich; the Prospect, Byram and North Greenwich Substations through a system of 27.6-kV distribution feeders. The current system was designed to serve much lower load demands than exist today. The area of Greenwich with the highest load demand is west of Indian Harbor, in the vicinity of the existing Prospect Substation.

To examine the resiliency of an electric system, the loss of various electric system elements are modeled to determine electric system weaknesses and vulnerabilities. Good electric system planning attempts to resolve an identified contingency weakness or even multiple contingency events occurring at once.

Part of the reliability concerns for the Modified GSLP include a system of four 27.6-kV distribution feeders that emanate from the Cos Cob Substation and simultaneously serve the Prospect Substation, certain large customers, and the Greenwich Network, a distribution system that serves the downtown area of Greenwich. Certain contingency events can cause one or more of the feeders to operate above service limits or, during multiple contingency events, result in load shedding and the loss of power to customers. Operation of the feeders beyond their current design thresholds can shorten their operational life. These four feeders also have a history of not operating to design standards even under normal load conditions and as such, Eversource has made repeated repairs to the feeder network in an attempt to maintain system reliability.

Reliability concerns are also an issue at the Cos Cob Substation where contingency modeling for the loss of a 115-kV to 27.6-kV transformer could result in the remaining transformers serving the Greenwich 27.6-kV loads to operate beyond their nameplate ratings, shortening the operational life of the equipment. Finally, the existing Prospect Substation is currently at the end of its lifespan and, in its current design, would not be able to serve load within nameplate ratings during certain contingency events. Under a worst case contingency scenario of the loss of the entire Prospect Substation, 99 percent of the substation load cannot be served by other electric supply sources.

In the original Docket 461, in addition to reliability concerns associated with the current design of the Greenwich electric system, Eversource used load growth forecasting that anticipated one percent of peak load growth per year at both the Cos Cob Substation and Prospect Substation as part of the need for the GSLP. The projected peak loads did not materialize, but rather decreased significantly in Years 2014 and 2015. Part of the peak load demand has been offset in the Greenwich area through energy efficiency and distributed generation projects. Continued use of these measures, as well as incorporation of demand response projects, could lead to further decline in peak load demand. The other factor in the decrease in peak load demand was the absence of weather conditions that cause a dramatic increase in load over the past few years. Years 2012 and 2013 had some sustained periods of high heat and humidity which increases peak demand. Last year, although very hot, did not have sustained periods of high heat and humidity.

Eversource is proposing the Modified GSLP to address current distribution reliability concerns, as well as to address reliability issues identified through electric system contingency planning. Unlike the original Docket 461 project, Eversource is no longer projecting load growth in this area and load growth is not part of the need for the Modified GSLP.

Based on contingency modeling and the current operational design of the Cos Cob Substation power supply and feeder network, the Council finds, and the Town acknowledges, the current distribution feeder system is antiquated and subject to repeated failures during normal operation, as well as during contingency events. The Modified GSLP would alleviate loads on the existing feeder system by directly transferring the Prospect Substation load to a 115-kV transmission source rather than rely on a 27.6-kV distribution feeder source. The 27.6-kV distribution feeders would remain in place to serve the Greenwich Network, certain large customers, and the Byram Substation, creating less operational stress on the feeders under both normal and contingent conditions.

The Modified GSLP would allow Eversource to have the capability to transfer load between the Cos Cob Substation and the proposed Greenwich Substation at the transmission level and provide automatic electric supply backup to most of the customers in Greenwich in the event of an outage on one of the transformers at the Cos Cob Substation or at the new Greenwich Substation. There is no capability in the current electric system for this redundancy. This capability is consistent with Eversource's current electric system design in that if one power supply source is unavailable, the remaining bulk substation would be able to supply necessary power. This project is similar to other projects in the State where a new substation is constructed or an existing substation expanded to improve electric system reliability.

Eversource has anticipated a need for an additional substation in Greenwich since 1971 when it acquired the 290 Railroad Avenue property. Since that time, Eversource has undertaken multiple measures to defer the expense of a new substation. In 2011, Eversource announced plans for a new substation for the purpose of serving load west of Indian Harbor. The Town, in its 2011-2012, 2013-2014, 2014-2015, 2015-2016 Annual Reports, recognized the need for reliable energy as well as a new substation.

The Town has expressed concern regarding the reliability of the two 115-kV transmission circuits that feed the Cos Cob Substation, the 1740 and 1750 lines. Both circuits are located on common structures and are the only source of power to the Cos Cob Substation and as such, if both circuits were out of service, almost all of Greenwich would lose power. Contingency events associated with the 1740 and 1750 lines are not the subject of the Proposed Project. Additionally, the Town has not proposed any modifications to the 1740 and 1750 lines in its proposed reliability solutions and further, acknowledges separation of the lines to improve reliability would be very costly.

The Town has expressed concern regarding the reliability of the Tomac Substation, a 115-kV to 13.2-kV substation in the southeast area of town that serves a small portion of Greenwich load. It was built in the early 1990's to relieve load off of the Cos Cob Substation and is served by a single transmission source. Although the Proposed Project is not designed to address issues at Tomac, the Council notes Eversource has a project planned in the short term to improve distribution service out of Tomac by converting a 4.8-kV distribution system that serves about a thousand customers to a 13.2-kV distribution system¹, an upgrade that will provide backup power to these customers, and a project planned in the long term, in accordance with an electric system priority list, to provide two sources of transmission level service to Tomac instead of one.

The original Docket 461 application included the retirement of the obsolete Byram Substation, rated at 25 MVA of peak load, with load from the substation to be served by the new Greenwich Substation. The Proposed Project no longer includes the retirement of the Byram Substation. Eversource would continue to monitor the condition of the equipment at the substation and replace equipment, as necessary. Eversource may be able to retire the substation if load demand decreases, with load transferred to the new Greenwich Substation.

Project Alternatives

During the original Docket 461 proceeding, various alternatives to the GSLP were examined, including transmission, distribution, interconnection, generation, demand side management alternatives as well as energy efficiency measures. Prior to the submission of the Modified GSLP, Eversource met with the Town to discuss project alternatives, including potential distribution solutions, and energy efficiency measures within the Town. Due to the localized nature of the reliability issue, Eversource, with the Town's consultant, examined eight distribution alternatives prior to submission of the Modified GSLP to the Council. In addition, other distribution scenarios were explored during the re-opened proceeding. None of these potential distribution designs were deemed viable due to design flaws, reduced reliability, or excessive cost when compared to the Modified GSLP.

A simple rebuild of the Prospect Substation would be an expenditure to support the 27.6-kV system, a voltage Eversource intends to phase out over time, and would not resolve the current reliability issues associated with the current feeder design, or provide a reliable source of power during transformer contingency events at Cos Cob Substation, or prevent service interruption to customers resulting from the loss of the Prospect Substation itself.

Discussions with the Town also included energy efficiency initiatives for both Town-owned facilities and private investments to mitigate the electrical demand and usage within the Town. The Town has undertaken energy efficiency projects at Town-owned facilities, hosted community light-bulb swaps and is working with the Chamber of Commerce to establish a business outreach program. Larger projects, such as demand side energy sources, are not currently proposed. Another technology, battery storage systems, is currently being examined by DEEP but there are no projects currently being developed in Connecticut. Energy efficiency and demand side energy sources can be effective in reducing peak loads, but would not serve to eliminate the reliability issues associated with the current design of the Cos Cob to Prospect 27.6-kV distribution feeder system, the objective of the Modified GSLP.

¹ The Public Utilities Regulatory Authority has exclusive jurisdiction over electric distribution in the state.

Proposed Project

Two alternatives for the Modified GSLP were initially presented to the Council, the PMP and the AMP. The PMP consisted of an overhead-underground transmission line route and a new open-air insulated substation at 290 Railroad Avenue. It was developed in response to the Council's Docket 461 decision regarding the feasibility of constructing a less expensive overhead route along portions of the MNRR right-of-way that is consistent with the FERC Guidelines as it would utilize an existing right-of-way occupied by the MNRR and other utility services. The PMP route, initially referred to as the "Hybrid Alternative" during the original Docket 461 proceeding, would be north of Bruce Park, thus avoiding impacts on the sensitive environmental and recreational resources of the park. Upon initial consultation with Connecticut Department of Transportation (DOT) representatives, the PMP was deemed viable and the transmission line route was fully developed with details for overhead and underground transmission line segments and a new substation. The PMP estimated cost was \$78 million.

After the filing of the Motion to Reopen, Eversource was contacted by DOT Rails informing Eversource that senior DOT officials oppose the installation of the PMP transmission line within the MNRR right-of-way. Written correspondence from DOT Rails was submitted to Eversource on July 14, 2017 indicating the DOT would not issue a license to Eversource for use of the MNRR right-of-way and stating there would be too many outages to existing rail service, manpower is not available to Eversource for necessary construction support, and the installation of the overhead transmission towers would exacerbate the already congested nature of the existing rail corridor, encumbering future expansion of the railroad.

On July 17, 2017, Eversource submitted correspondence to the Council indicating that it must withdraw the PMP from consideration and that the AMP would now be referred to as the Proposed Project. For the Proposed Project, both the 290 Railroad Avenue and 281 Railroad Avenue sites are viable locations for the Project substation, either as an open-air design or indoor design.

The AMP consists of an all underground transmission line route installed within roadways or adjacent road rights-of-way and includes a new substation at 281 Railroad Avenue. It was developed upon consultation with the Town prior to the filing of the Modified GSLP. Although the Town objected to the original GSLP route through Bruce Park and initially supported the concept of the Hybrid Alternative, Eversource designed the AMP to address Town concerns regarding visual impacts of the PMP on Bruce Park, as well as to avoid the Town's sewer main located adjacent to the PMP route within the MNRR.

Environmental Considerations

The Council finds there is no substantial adverse environmental impact associated with the Proposed Project transmission line route. Construction would be confined to paved roadways, parking lots or lawn areas immediately adjacent to roadways.

Although the Proposed Project route through Bruce Park is inconsistent with the FERC Guidelines, as the use of park and recreation lands for right-of-ways are to be avoided where practical, no other alternative currently exists. The Council's and Town's concerns regarding the original Bruce Park route included the use of a HPFF cable design and utilizing Horizontal Directional Drilling (HDD) for the installation of the transmission line through the park or in the park area. The HDD installation would have disrupted park recreational and scenic resources for months.

The Proposed Project uses an alternate design to address these concerns. Specifically, the transmission line would be composed of XLPE cable circuits. The transmission line would be installed underground, within park roadways, thus using previously disturbed areas and rendering the transmission line not visible from park areas. The Town has stated that it is amenable to these design changes. Construction of the project would disrupt park roads, except at Indian Harbor, and would be similar to other road construction projects.

The transmission line would cross Indian Harbor, a north-south oriented tidal waterbody in Bruce Park. Two crossing methods are proposed in the area north of the Davis Avenue bridge; an eight-foot wide pedestrian bridge, where the transmission line would be enclosed within the bottom of the bridge, or a trench installation within the harbor facilitated by cofferdams. After examining the environmental effects as well as the cost of both methods, the Council finds the trench installation preferable. The trench would have minimal environmental effect as it would temporarily disturb harbor sediment and would be installed using cofferdams that would not restrict tidal fluctuations. The trench installation would be approximately \$1.8 million less than the pedestrian bridge installation and would not pose an ongoing maintenance issue. The Council appreciates the Town's willingness to accept a trench/cofferdam crossing in lieu of a more costly bridge installation, and is cognizant that the Town prefers a floating platform for construction purposes to minimize disturbance to adjacent shore and lawn areas to the extent possible.

In the area of Indian Field Road, two transmission line crossings of I-95 were initially proposed; an above ground crossing where the transmission line is attached to the underside of the I-95 overpass bridge or a pipe jacking crossing where the transmission line would be installed under the highway. Upon further review by the DOT, the DOT stated that it would only allow the pipe jacking transmission line crossing. The pipe jack locations would be within previously disturbed areas, adjacent to highway ramps, and no substantial adverse environmental effect is anticipated.

Development of a substation at either 290 Railroad Avenue or 281 Railroad Avenue would have no adverse environmental effect since both sites are already used for commercial purposes and are located in a heavily developed urban area. At either site, an open-air substation or an indoor substation could be developed. An indoor substation would cost approximately \$1.2 to \$1.4 million more than an open-air substation enclosed by a perimeter brick wall.

The 281 Railroad Avenue site, favored by the Town, is partially zoned General Business (GB) and Residential, and abuts predominately residential areas. Given its location and surrounding land use, the Town favors an indoor substation design so that it would appear as a condominium building to mitigate aesthetic and noise concerns. The 290 Railroad Avenue site is entirely zoned GB and abuts other commercial properties. An existing brick building on the parcel would be demolished.

After reviewing both substation locations, the Council finds the 290 Railroad Avenue location preferable as it is entirely zoned GB and is surrounded by established commercial uses, some of which are brick buildings. It is a larger parcel, by approximately 3,000 square feet, than the 281 Railroad Avenue parcel, and thus offers more flexibility in site layout, potential equipment additions, and an easier connection for an emergency mobile transformer. As for the substation design, the Council finds an open-air substation with a perimeter brick wall appropriate for a GB zone. Furthermore, the brick wall and fire walls surrounding the transformers within the substation would provide protection to adjacent properties. An indoor substation design at this location is not warranted given the higher threshold of noise for the surrounding GB zone, predominate commercial nature of the immediate area, and the additional cost that would be borne by Connecticut ratepayers. To increase the setback of the brick wall fronting Railroad Avenue, the Council will order that Eversource increase the setback distance by approximately ten feet.

The Council is satisfied that the Project's electric and magnetic fields have been demonstrated to be well below recommended exposure standards established by the International Commission on Non-Ionizing Radiation Protection and the International Committee on Electromagnetic Safety and are not of a concern.

Cost

The cost of the Proposed Project, with the Indian Harbor trench/coffer dam crossing, pipe jacking under I-95, and an open air-substation at 290 Railroad Avenue, is approximately \$97.8 million. After the withdrawal of the PMP from consideration, with its estimated cost of \$78 million, the Council examined the limited options available before it, and sought to reduce the Project cost to the greatest extent possible, as well as find the most equitable regional cost allocation. Since only one transmission route remained viable, overall Project cost savings were obtained by selecting the trench/cofferdam crossing of Indian Harbor instead of the pedestrian bridge installation (\$1.8 million savings), and by selecting the 290 Railroad Avenue Substation with an open-air design rather than an indoor substation design (\$1.4 million savings). Additionally, the 290 Railroad Avenue site would provide a modest savings on the distribution cost recovery component of the Project (recovered 100 percent by Connecticut ratepayers), as it is closer to the distribution feeder tie in points than the 281 Railroad Avenue location.

Conclusion

The Council finds the Proposed Project is necessary for the reliability of the electric power supply of the state, serving the interests of electric system economy and reliability, and as such, conforms to a long-range plan for expansion of the electric system serving the state and related interconnected utility systems². The Project is consistent with the Connecticut's Comprehensive Energy Strategy which proposes further investments in grid reliability, and identifies three important components to grid reliability: resource adequacy, transmission security and distribution resiliency.

Although the Proposed Project is seemingly a localized issue, Eversource met with the Town to discuss Project alternatives beyond those initially discussed in the original proceeding. Multiple distribution alternatives were discussed in an attempt to find a local solution, and energy efficiency, demand response and battery storage measures were explored, but unfortunately, none of these alternatives and measures were deemed viable from a cost, reliability, or practicality perspective to solve the identified reliability issues. Quite simply, there are no localized solutions to resolve the identified reliability problems.

Based on the record of this proceeding, the Council finds that conditions have changed since the denial without prejudice of a Certificate in the original Docket 461 proceeding. The Council finds and determines that there is a public need for the facility. The Council also finds and determines that the Proposed Project is not in conflict with 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, including EMF, and balanced the interests in accordance with C.G.S. §16-50p(a)(3)(B) and C.G.S. §16-50p(a)(3)(C). The environmental effects that are the subject of C.G.S. §16-50p(a)(3)(B) can be sufficiently mitigated and do not overcome the public need for the facility. Furthermore, the Council finds and determines that the location of the new transmission line will not pose an undue hazard to persons or property along the area traversed by the transmission line pursuant to C.G.S. §16-50p(a)(3)(E).

² The Proposed Project does not establish a new transmission tie to New York.

The Council will require Eversource to submit a D&M Plan for the Proposed Project to include, but not be limited to, provisions for municipal comment and review; detailed site plans identifying structure and equipment locations as well as temporary and permanent facilities and roadways; wetland mitigation methods for temporary and permanent effects, an erosion and sediment control plan consistent with the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control*; a Spill Prevention, Control, and Countermeasures Plan; identification of vegetative removal/trimming areas, provisions for post-construction restoration, provisions for inspection and appropriate monitoring of Project construction, and pre-construction and post-construction measurements of EMF.

With the conditions listed above, the Council will issue a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a new 115-kV bulk open-air substation located at 290 Railroad Avenue, Greenwich, Connecticut, and two 115-kV underground transmission circuits extending approximately 2.3 miles between the proposed substation and the existing Cos Cob Substation, including related substation improvements in Greenwich, Connecticut.

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| DOCKET NO. 461A - Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a 115-kilovolt (kV) bulk substation located at 290 Railroad Avenue, Greenwich, Connecticut, and two 115-kV underground transmission circuits extending approximately 2.3 miles between the proposed substation and the existing Cos Cob Substation, Greenwich, Connecticut, and related substation improvements. Reopening of this docket based on changed conditions pursuant to Connecticut General Statutes §4-181a(b). | } } } } } | Connecticut Siting Council November 9, 2017 |
|--|-----------------------|--|

Decision and Order

Pursuant to Connecticut General Statutes (C.G.S) §4-181a(b) and §16-50p, and the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that there is a public need for the proposed facility and the effects associated with the construction of a new 115-kilovolt (kV) bulk substation located at 290 Railroad Avenue, Greenwich, Connecticut, and two 115-kV underground transmission circuits extending approximately 2.3 miles between the proposed substation and the existing Cos Cob Substation, Greenwich, Connecticut, and related substation improvements (Project), including effects on the natural environment; ecological integrity and balance; forests and parks; agriculture; scenic, historic, and recreational values; air and water purity; fish and wildlife; and public health and safety are not disproportionate either alone or cumulatively with other effects compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application. Therefore, the Council directs that a Certificate of Environmental Compatibility and Public Need, as provided by C.G.S §16-50k, be issued to Eversource Energy (hereinafter referred to as the Certificate Holder) for the construction, maintenance and operation of the Project.

Unless otherwise approved by the Council, the Project shall be constructed, operated, and maintained substantially as specified in the Council's record in this matter, and subject to the following conditions:

1. The Certificate Holder shall construct the proposed substation at 290 Railroad Avenue, enclosed by a perimeter brick wall. The brick wall shall be relocated south by approximately 10 feet to increase the setback distance between the brick wall and Railroad Avenue.
2. The Certificate Holder shall construct the proposed underground electric transmission line along the proposed route using a pipe jack crossing of Interstate 95 and a trench/cofferdam crossing of Indian Harbor, and perform related Project improvements, as proposed, subject to modifications during final site design and approval of the Development and Management (D&M) Plan for the project.
3. The Certificate Holder shall prepare two D&M Plans for this Project; one specific to the proposed substation and other substation improvements, and one specific to the proposed construction of the new transmission line. Both D&M Plans shall be in compliance with Sections 16-50j-60 through 16-50j-62 of the Regulations of Connecticut State Agencies. The D&M Plans shall be served on the Town of Greenwich for comment, and all parties and intervenors as listed in the service list, and submitted to and approved by the Council prior to the commencement of facility construction. The D&M Plans shall include:
 - a. A detailed site plan showing the placement of all substation equipment, structures, and buildings within the substation perimeter, access, provisions for storm water management and transformer oil containment and fencing;

- b. A detailed site plan showing the underground transmission line route, splice vaults, traffic management plan, identification of pipe jacking sites, provisions for underground cable protection, substation improvements, and equipment and material staging areas;
 - c. An erosion and sediment control plan that includes provision for any areas for the temporary storage of fill materials and is consistent with the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control*, as amended;
 - d. A spill prevention and countermeasures plan;
 - e. Identification of areas for staging and equipment lay down, field office trailers, sanitary facilities and parking;
 - f. Details for the Indian Harbor crossing including related temporary and permanent construction impacts and methods to reduce such impacts;
 - g. A vegetative clearing/trimming plan;
 - h. Restoration plan for disturbed areas and roads;
 - i. A construction schedule, including construction hours;
 - j. A blasting plan, if necessary;
 - k. EMF Monitoring Plan; and
 - l. Submission of monthly construction progress reports.
4. The Certificate Holder shall obtain necessary permits from the Connecticut Department of Energy and Environmental Protection, Department of Transportation and other entities, as necessary, prior to the commencement of construction.
5. The Certificate Holder shall comply with all future electric and magnetic field standards promulgated by State or federal regulatory agencies. Upon the establishment of any new standards, the facilities granted in this Decision and Order shall be brought into compliance with such standards.
6. The Certificate Holder shall provide to the Council an operating report within three months after the conclusion of the first year of operation of all facilities herein, and annually thereafter for a period of three years, with information relevant to the overall condition, safety, reliability, and operation of the new transmission line.
7. Unless otherwise approved by the Council, this Decision and Order shall be void if all construction authorized herein is not completed within five years of the effective date of the Decision and Order, or within five years after all appeals to this Decision and Order have been resolved. Authority to monitor and modify this schedule, as necessary, is delegated to the Executive Director. The Certificate Holder shall provide written notice to the Executive Director of any schedule changes as soon as is practicable.
8. Any request for extension of the time period referred to in Condition 7 shall be filed with the Council not later than 60 days prior to the expiration date of this Certificate and shall be served on all parties and intervenors, as listed in the service list, and the Town of Greenwich.
9. This Certificate may be surrendered by the Certificate Holder upon written notification to the Council.
10. In accordance with Section 16-50j-62 of the Regulations of Connecticut State Agencies, the Certificate Holder shall provide the Council with written notice two weeks prior to the commencement of site construction activities. In addition, the Certificate Holder shall provide the Council with written notice of the completion of site construction, and the commencement of site operation.

11. The Certificate Holder shall remit timely payments associated with annual assessments and invoices submitted by the Council for expenses attributable to the facility under Conn. Gen. Stat. §16-50v.
12. This Certificate may be transferred in accordance with Conn. Gen. Stat. §16-50k(b), provided both the Certificate Holder/transferor and the transferee are current with payments to the Council for their respective annual assessments and invoices under Conn. Gen. Stat. §16-50v. In addition, both the Certificate Holder/transferor and the transferee shall provide the Council a written agreement as to the entity responsible for any quarterly assessment charges under Conn. Gen. Stat. §16-50v(b)(2) that may be associated with this facility.

We hereby direct that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed in the Service List, dated July 11, 2017, and notice of issuance published in The Greenwich Time.

By this Decision and Order, the Council disposes of the legal rights, duties, and privileges of each party named or admitted to the proceeding in accordance with Section 16-50j-17 of the Regulations of Connecticut State Agencies.

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CERTIFICATION

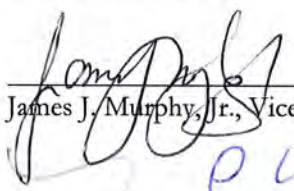
The undersigned members of the Connecticut Siting Council (Council) hereby certify that they have heard this case, or read the record thereof, in **DOCKET NO. 461A** - Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a 115-kilovolt (kV) bulk substation located at 290 Railroad Avenue, Greenwich, Connecticut, and two 115-kV transmission circuits extending approximately 2.3 miles between the proposed substation and the existing Cos Cob Substation, Greenwich, Connecticut, and related substation improvements based on changed conditions pursuant to Connecticut General Statutes §4-181a(b), and voted as follows to approve the proposed facility:

Council Members

Vote Cast

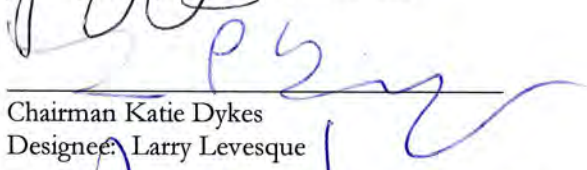
Robert Stein, Chairman

Absent



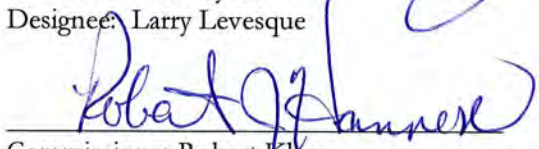
James J. Murphy, Jr., Vice Chairman

Yes



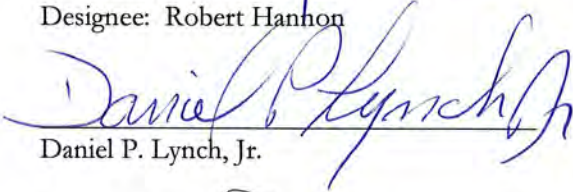
Chairman Katie Dykes
Designee: Larry Levesque

Yes



Commissioner Robert Klee
Designee: Robert Hannon

Yes



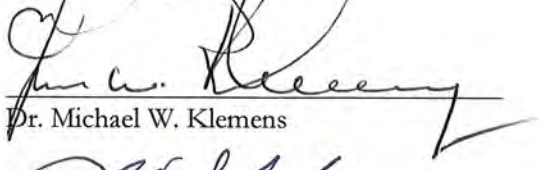
Daniel P. Lynch, Jr.

Yes



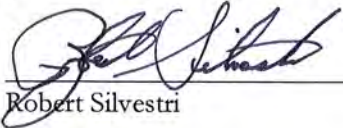
Michael Harder

Absent



Dr. Michael W. Klemens

Yes



Robert Silvestri

Yes

Dated at New Britain, Connecticut, November 9, 2017.

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STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051


Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

www.ct.gov/csc

VIA ELECTRONIC MAIL

November 14, 2017

TO: Classified/Legal Supervisor
461A170713
The Greenwich Time
Southern Connecticut Newspapers
20 East Elm Street
Greenwich, CT 06830 

FROM: Lisa Fontaine, Fiscal Administrative Officer

RE: **DOCKET NO. 461A** - Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a 115-kilovolt (kV) bulk substation located at 290 Railroad Avenue, Greenwich, Connecticut, and two 115-kV transmission circuits extending approximately 2.3 miles between the proposed substation and the existing Cos Cob Substation, Greenwich, Connecticut, and related substation improvements. Reopening of this docket based on changed conditions pursuant to Connecticut General Statutes §4-181a(b).

Please publish the attached notice as soon as possible, but not on Saturday, Sunday, or a holiday.

Please send an affidavit of publication and invoice to my attention.

Thank you.

laf

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STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

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NOTICE

Pursuant to General Statutes §4-181a(b), the Connecticut Siting Council (Council) announces that, on November 9, 2017, the Council issued Findings of Fact, an Opinion, and a Decision and Order approving the Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a 115-kilovolt (kV) bulk substation located at 290 Railroad Avenue, Greenwich, Connecticut, and two 115-kV transmission circuits extending approximately 2.3 miles between the proposed substation and the existing Cos Cob Substation, Greenwich, Connecticut, and related substation improvements. This application record is available for public inspection in the Council's office, Ten Franklin Square, New Britain, Connecticut.

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