



**FROST BRIDGE TO CAMPVILLE 115-kV PROJECT**

**DEVELOPMENT AND MANAGEMENT PLAN**

**APPROVALS, PERMITS, AND BEST MANAGEMENT  
PRACTICES FOR TRANSMISSION LINE AND  
SUBSTATION WORK**

**VOLUME 2**

**July 2016**

*Prepared by:*

The Connecticut Light and Power Company doing business as Eversource Energy

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**VOLUME 2**

**Approvals, Permits, and Best Management Practices for Substation and Transmission Line  
Work**

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**Attachment A:**

**The Council's Decision and Order and  
Opinion for the Project (Docket No. 466)**

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# STATE OF CONNECTICUT

## CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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April 18, 2016

Anthony M. Fitzgerald, Esq.  
Carmody Torrance Sandak & Hennessey LLP  
195 Church Street  
New Haven, CT 06509

RE: **DOCKET NO. 466** - The Connecticut Light & Power Company d/b/a Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the Frost Bridge to Campville 115-kilovolt (kV) electric transmission line project that traverses the municipalities of Watertown, Thomaston, Litchfield, and Harwinton, which consists of (a) construction, maintenance and operation of a new 115-kV overhead electric transmission line entirely within existing Eversource right-of-way and associated facilities extending approximately 10.4 miles between Eversource's existing Frost Bridge Substation in the Town of Watertown and existing Campville Substation in the Town of Harwinton; (b) related modifications to Frost Bridge Substation and Campville Substation; and (c) reconfiguration of a 0.4 mile segment of two existing 115-kV electric transmission lines across the Naugatuck River in the Towns of Litchfield and Harwinton within the same existing right-of-way as the new 115-kV electric transmission line.

Dear Attorney Fitzgerald:

By its Decision and Order dated April 14, 2016, the Connecticut Siting Council (Council) granted a Certificate of Environmental Compatibility and Public Need (Certificate) for the Frost Bridge to Campville 115-kilovolt (kV) electric transmission line project that traverses the municipalities of Watertown, Thomaston, Litchfield, and Harwinton, which consists of (a) construction, maintenance and operation of a new 115-kV overhead electric transmission line entirely within existing Eversource right-of-way and associated facilities extending approximately 10.4 miles between Eversource's existing Frost Bridge Substation in the Town of Watertown and existing Campville Substation in the Town of Harwinton; (b) related modifications to Frost Bridge Substation and Campville Substation; and (c) reconfiguration of a 0.4 mile segment of two existing 115-kV electric transmission lines across the Naugatuck River in the Towns of Litchfield and Harwinton within the same existing right-of-way as the new 115-kV electric transmission line.

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

Very truly yours,

Robert Stein  
Chairman

RS/RDM/cm

Enclosures (4)

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

STATE OF CONNECTICUT )

ss. New Britain, Connecticut :

April 18, 2016

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  
Acting Executive Director  
Connecticut Siting Council

I certify that a copy of the Findings of Fact, Opinion, and Decision and Order in Docket No. 466 has been forwarded by Certified First Class Return Receipt Requested mail, on April 18, 2016, to all parties and intervenors of record as listed on the attached service list, dated January 21, 2016.

ATTEST:



Carriann Mulcahy  
Secretary II  
Connecticut Siting Council



**LIST OF PARTIES AND INTERVENORS**  
**SERVICE LIST**

| Status Granted                             | Document Service                           | Status Holder<br>(name, address & phone number) | Representative<br>(name, address & phone number)  |
|--|--|---|---|
| <b>Applicant</b>                           | <input checked="" type="checkbox"/> E-Mail | Eversource Energy                               | <p>Kenneth P. Roberts<br/>Project Manager<br/>Eversource Energy<br/>56 Prospect Street<br/>Hartford, CT 06103<br/><a href="mailto:kenneth.roberts@eversource.com">kenneth.roberts@eversource.com</a></p> <p>John Morissette<br/>Project Manager-Transmission<br/>Siting-CT<br/>Eversource Energy<br/>56 Prospect Street<br/>Hartford, CT 06103<br/><a href="mailto:john.morissette@eversource.com">john.morissette@eversource.com</a></p> <p>Jeffery Cochran, Esq.<br/>Senior Counsel, Legal Department<br/>Eversource Energy<br/>107 Selden Street<br/>Berlin, CT 06037<br/><a href="mailto:jeffery.cochran@eversource.com">jeffery.cochran@eversource.com</a></p> <p>Anthony M. Fitzgerald<br/>Carmody Torrance Sandak &amp;<br/>Hennessey LLP<br/>195 Church Street<br/>New Haven, CT 06509<br/><a href="mailto:afitzgerald@carmodylaw.com">afitzgerald@carmodylaw.com</a></p> |
| <b>Party<br/>(Approved on<br/>1/21/16)</b> | <input checked="" type="checkbox"/> E-Mail | Office of Consumer Counsel                      | <p>Lauren Henault Bidra<br/>Staff Attorney<br/>Office of Consumer Counsel<br/>Ten Franklin Square<br/>New Britain, CT 06051<br/><a href="mailto:Lauren.bidra@ct.gov">Lauren.bidra@ct.gov</a></p> <p>Richard E. Sobolewski<br/>Supervisor of Technical Analysis<br/>Office of Consumer Counsel<br/>Ten Franklin Square<br/>New Britain, CT 06051<br/><a href="mailto:Richard.sobolewski@ct.gov">Richard.sobolewski@ct.gov</a></p>  |



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April 18, 2016

The Honorable Denise L. Nappier  
State Treasurer  
Office of the Treasurer  
55 Elm Street  
Hartford, Connecticut 06106

RE: **DOCKET NO. 466** - The Connecticut Light & Power Company d/b/a Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the Frost Bridge to Campville 115-kilovolt (kV) electric transmission line project that traverses the municipalities of Watertown, Thomaston, Litchfield, and Harwinton, which consists of (a) construction, maintenance and operation of a new 115-kV overhead electric transmission line entirely within existing Eversource right-of-way and associated facilities extending approximately 10.4 miles between Eversource's existing Frost Bridge Substation in the Town of Watertown and existing Campville Substation in the Town of Harwinton; (b) related modifications to Frost Bridge Substation and Campville Substation; and (c) reconfiguration of a 0.4 mile segment of two existing 115-kV electric transmission lines across the Naugatuck River in the Towns of Litchfield and Harwinton within the same existing right-of-way as the new 115-kV electric transmission line.

Dear Ms. Nappier:

Pursuant to Connecticut General Statutes § 16-50(bb), please be advised that on April 14, 2016 the Connecticut Siting Council (Council) rendered a final decision in the above referenced proceeding.

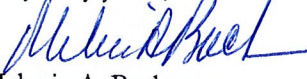
The Council did not receive any requests from the Town of Litchfield, Town of Harwinton, Town of Watertown, Town of Thomaston, Town of Plymouth, or the City of Waterbury to participate in this proceeding. Therefore, these municipalities are not eligible to request funds for reimbursement of expenses.

After May 13, 2016, unused portions of the Municipal Participation Fund Money for this docket should be returned to the applicant as stated below:

**Anthony M. Fitzgerald, Esq.**  
**Carmody Torrance Sandak & Hennessey LLP**  
**195 Church Street**  
**New Haven, CT 06509**

Thank you for your attention to this matter. If I may be of further service to you in this or any other matter, I hope you will not hesitate to call upon me.

Very truly yours,

  
Melanie A. Bachman  
Acting Executive Director

MAB/RDM/cm

c: Robert Stein, Chairman  
Parties and Intervenors

Chief Elected Officials: Town of Litchfield, Town of Harwinton, Town of Watertown, Town of Thomaston, Town of Plymouth, City of Waterbury

Lisa Fontaine, Fiscal Administrative Officer

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CONNECTICUT SITING COUNCIL

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April 18, 2016

TO: Classified/Legal Supervisor  
**466160418**  
Republican-American  
P.O. Box 2090  
Waterbury, CT 06722

FROM: Carriann Mulcahy, Secretary 

RE: **DOCKET NO. 466** - The Connecticut Light & Power Company d/b/a Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the Frost Bridge to Campville 115-kilovolt (kV) electric transmission line project that traverses the municipalities of Watertown, Thomaston, Litchfield, and Harwinton, which consists of (a) construction, maintenance and operation of a new 115-kV overhead electric transmission line entirely within existing Eversource right-of-way and associated facilities extending approximately 10.4 miles between Eversource's existing Frost Bridge Substation in the Town of Watertown and existing Campville Substation in the Town of Harwinton; (b) related modifications to Frost Bridge Substation and Campville Substation; and (c) reconfiguration of a 0.4 mile segment of two existing 115-kV electric transmission lines across the Naugatuck River in the Towns of Litchfield and Harwinton within the same existing right-of-way as the new 115-kV electric transmission line.

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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.

CM



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### NOTICE

Pursuant to General Statutes § 16-50p (a), the Connecticut Siting Council (Council) announces that, on April 14, 2016, the Council issued Findings of Fact, an Opinion, and a Decision and Order approving an application from The Connecticut Light & Power Company d/b/a Eversource Energy for a Certificate of Environmental Compatibility and Public Need for the Frost Bridge to Campville 115-kilovolt (kV) electric transmission line project that traverses the municipalities of Watertown, Thomaston, Litchfield, and Harwinton, which consists of (a) construction, maintenance and operation of a new 115-kV overhead electric transmission line entirely within existing Eversource right-of-way and associated facilities extending approximately 10.4 miles between Eversource's existing Frost Bridge Substation in the Town of Watertown and existing Campville Substation in the Town of Harwinton; (b) related modifications to Frost Bridge Substation and Campville Substation; and (c) reconfiguration of a 0.4 mile segment of two existing 115-kV electric transmission lines across the Naugatuck River in the Towns of Litchfield and Harwinton within the same existing right-of-way as the new 115-kV electric transmission line. This application record is available for public inspection in the Council's office, Ten Franklin Square, New Britain, Connecticut.



**DOCKET NO. 466** - The Connecticut Light & Power Company d/b/a } Connecticut  
 Eversource Energy application for a Certificate of Environmental }  
 Compatibility and Public Need for the Frost Bridge to Campville 115-kilovolt } Siting  
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 associated facilities extending approximately 10.4 miles between Eversource's } April 14, 2016  
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 Campville Substation in the Town of Harwinton; (b) related modifications to }  
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 Naugatuck River in the Towns of Litchfield and Harwinton within the same }  
 existing right-of-way as the new 115-kV electric transmission line.

## Findings of Fact

### Introduction

1. Pursuant to Connecticut General Statutes (C.G.S.) §16-50g et seq., on December 23, 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 for the Frost Bridge to Campville 115-kilovolt (kV) electric transmission line project that traverses the municipalities of Watertown, Thomaston, Litchfield, and Harwinton, which consists of (a) construction, maintenance and operation of a new 115-kV predominantly overhead electric transmission line entirely within existing Eversource right-of-way and associated facilities extending approximately 10.4 miles between Eversource's existing Frost Bridge Substation in the Town of Watertown and existing Campville Substation in the Town of Harwinton; (b) related modifications to Frost Bridge Substation and Campville Substation; and (c) reconfiguration of a 0.4 mile segment of two existing 115-kV electric transmission lines on common structures across the Naugatuck River in the Towns of Litchfield and Harwinton within the same existing right-of-way as the new 115-kV electric transmission line (Project). (Eversource 1, Vol. 1, p. ES-1)
2. The purpose of the Project is to bring the electric supply system in northwest Connecticut into compliance with applicable national and regional reliability standards and criteria by eliminating potential thermal overloads and voltage violations identified in studies conducted by the Independent System Operator in New England (ISO-NE). (Eversource 1, Vol. 1, p. ES-1)
3. The parties in this proceeding are Eversource and the Office of Consumer Counsel (OCC). (Transcript, February 23, 2016, 2:00 p.m. [Tr. 1], pp. 5-6, 21; Transcript, March 1, 2016, 3:30 p.m. [Tr. 2], pp. 26, 80)
4. Pursuant to C.G.S. §16-50(b), Eversource provided legal service and notice of the application. This included notice to municipalities traversed by the proposed Project; municipalities within 2,500 feet of the proposed Project; federal, state, local and regional agencies, elected officials, and abutters of both substations. Eversource published notice of the application filing in the Litchfield County Times on December 11 and 18, 2015, Waterbury Republican-American on December 15 and 17, 2015, and the Torrington Register Citizen on December 15 and 19, 2015. Eversource included a project information insert in one or more of its monthly bills to customers within Watertown, Thomaston, Litchfield and Harwinton within 60 days before submission of the application to the Council. (Eversource 1, Vol. 1,

pp. FR-8-10, Affidavit of Service of Application; Affidavit Regarding Publication of Legal Notice; Affidavit Regarding Notice Provided to Customers of CL&P d/b/a Eversource; Affidavit Regarding Notice to Community Groups; Affidavit of Service of Notice Upon Owners of Property Abutting Substations)

5. On or before December 18, 2016 Eversource notified property owners abutting both substations through certified mailings. Eversource received all certified mailing return receipts. (Eversource 2, R. 19)
6. In accordance with the Council's Application Guide for an Electric and Fuel Transmission Line Facility, Eversource provided notice to a number of community groups including applicable economic development commissions, land trusts, environmental groups, river protection organizations, historic preservation groups, and water companies with watersheds within the Project area. (Eversource 1, Vol. 1, pp. FR-8-10, Affidavit Regarding Notice to Community Groups)
7. Pursuant to C.G.S. §16-50/(b), Eversource served a copy of the application for the proposed Project on federal, state, regional and local officials listed therein. (Eversource 1, Vol. 1, pp. FR-18-19; Affidavit of Service of Application)

#### **Council Procedures**

8. On December 28, 2015, the Council sent a letter to the State Treasurer, with copies to the Chief Elected Officials of Litchfield, Harwinton, Watertown, Thomaston, Waterbury, and Plymouth, stating that \$25,000 was received from Eversource as payment to the Municipal Participation Fund (Fund) and deposited in the office of the State Treasurer's department account. The Fund is available for any or all of the municipalities to apply for as reimbursement to defray expenses incurred by the municipalities if they participated as a party in the proceeding, pursuant to C.G.S. §16-50bb. None of the subject municipalities applied for party status in the proceeding. (Record)
9. During a regular Council meeting on January 21, 2016, the application was deemed complete pursuant to Regulations of Connecticut State Agencies (R.C.S.A.) §16-50/1a and the public hearing schedule was approved by the Council. (Record)
10. Pursuant to C.G.S. §16-50m, the Council published legal notice of the date and time of the public hearing in the Waterbury Republican-American on January 26, 2016. (Record)
11. Pursuant to C.G.S. § 16-50m, on January 22, 2016, the Council sent a letter to the Towns of Harwinton, Litchfield, Plymouth, Thomaston, Waterbury, and Watertown to provide notification of the scheduled public hearing and to invite each municipality to participate in the proceeding. (Record)
12. On February 3, 2016, the Council held a pre-hearing conference on procedural matters 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 January 27, 2016)
13. In compliance with R.C.S.A. §16-50j-21, Eversource installed twelve signs throughout the Project area that presented the type of facility proposed, the public hearing date, and contact information for the Council. (Eversource 3, p. 38)

14. Pursuant to C.G.S. §16-50m, the Council, after giving due notice thereof, held a public evidentiary hearing session on February 23, 2016, beginning at 2:00 p.m. at the Council's office at 10 Franklin Square, New Britain, Connecticut. (Council Hearing Notice dated January 22, 2016; Tr. 1, p. 1)
15. The Council and its staff conducted a field review of the proposed Project on March 1, 2016 beginning at 1:00 p.m. Eversource provided bus transportation to both substations and various locations along the proposed electric transmission line route. (Council Hearing Notice dated January 22, 2016; Eversource 6)
16. On March 1, 2016, the Council continued the public evidentiary hearing session beginning at 3:30 p.m. and held a public comment hearing session beginning at 6:30 p.m. at the Northfield Volunteer Fire Department, 12 Knife Shop Road, Litchfield, Connecticut. (Tr. 2, p. 16; Transcript, March 1, 2016, 6:30 p.m. [Tr. 3], p. 81)

### **Municipal Consultation and Community Outreach**

17. Eversource began its outreach efforts to the Towns of Watertown, Harwinton, Thomaston and Litchfield in April 2015 by meeting with Town officials and providing a project overview presentation. (Eversource 1, Bulk File g)
18. Eversource presented materials to the Litchfield Board of Selectmen on May 19, 2015 and the Thomaston Board of Selectmen and the Harwinton Board of Selectmen on October 6, 2015. The Town of Watertown declined an offer to meet with Eversource. (Eversource Bulk File h; Eversource 3, p. 36)
19. Pursuant to C.G.S. §16-50(e), Eversource delivered a Municipal Consultation Filing (MCF) to the Towns of Watertown, Harwinton, Thomaston and Litchfield in early September 2015 to begin the 60-day municipal consultation process. Additionally, copies of the MCF were provided to the Town of Plymouth and the City of Waterbury as they are within 2,500 feet of the proposed Project. (Eversource 1, Vol. 1, p. ES-10; Eversource 3, pp. 35-36)
20. Eversource sponsored two Community Open House events held on September 29 and 30, 2015 at the Northfield Volunteer Fire Department building in Litchfield and the Thomaston Town Hall. Both of the open houses included project information displays as well as public comment kiosks. Notice of the open house events were provided in mailings to properties along the proposed route and by publication of notice in area newspapers. (Eversource 1, Bulk File i; Eversource 3, p. 37)
21. Eversource responded to written public comments received at the open house presentations and forwarded a copy of the written public comments to the respective Towns. (Eversource 1, Bulk File j)
22. The MCF was posted on Eversource's website and was made available in the respective Town libraries. (Eversource 1, Vol. 1, p. ES-11)
23. The Council did not receive any correspondence from any of the Project municipalities. (Record)

### **State Agency Comment**

24. Pursuant to C.G.S. § 16-50j (g), on January 22, 2016 and March 2, 2016, the following State agencies were solicited by the Council to submit written comments regarding the proposed facility: Department of Energy and Environmental Protection (DEEP); Department of Public Health (DPH); Council on Environmental Quality (CEQ); Public Utilities Regulatory Authority (PURA); Office of Policy and

Management (OPM); Department of Economic and Community Development (DECD); Department of Agriculture (DOAg); Department of Transportation (DOT); Connecticut Airport Authority (CAA); Department of Emergency Services and Public Protection (DESPP); and State Historic Preservation Office (SHPO). (Record)

25. The Council received a response from the DOT's Bureau of Engineering and Construction on February 22, 2016 indicating that a Highway Encroachment Permit would be required if any work, including project access, is conducted within a State right-of-way. (DOT Comment dated February 19, 2016)
26. The Council received a response from the DPH Drinking Water Section on January 15, 2016 indicating that the proposed Project does not appear to be located in a public water supply source water area. (DPH Comment dated January 15, 2016)
27. The Council received a response from DEEP on March 1, 2016 that contained a field description of the Project route, presented comment regarding the Project crossing of two DEEP properties (Mattatuck State Forest and Black Rock State Park) and applicable DEEP permit requirements. A revised Natural Diversity Database letter was attached to the DEEP comments approving the protection strategies for five State-listed species occurring along the Project route. (DEEP Comment received March 1, 2016)
28. The following agencies did not respond with comment on the application: CEQ, PURA, OPM, DECD, DOAg, CAA, DESPP, and SHPO. (Record)

#### **System Planning and Mandatory Reliability Standards**

29. The Federal Energy Policy Act of 2005 required the Federal Energy Regulatory Commission (FERC) to designate an Electric Reliability Organization (ERO) to develop and enforce a system of mandatory reliability standards for planning and operations of the bulk power electric system. Compliance with the standards is mandatory under federal law and violations are punished by fines. (Eversource 1, Vol. 1, p. 2-2)
30. FERC designated the North American Electric Reliability Corporation Inc. (NERC) to be ERO. As the ERO, NERC is charged with improving the reliability of the bulk-power electric system by developing mandatory reliability standards for planning and operations. (Eversource 1, Vol. 1, p. 2-2)
31. The Northeast Power Coordinating Council (NPCC) is a regional reliability council that was established to improve the reliability of the interconnected bulk power system in New York, the six New England states, and eastern Canadian provinces. The US systems of the NPCC formed two regional reliability councils to ensure the reliability of their portions of the interconnected bulk-power electric system - ISO-NE, and New York Independent System Operator (NYISO). (Eversource 1, Vol. 1, p 2-2)
32. ISO-NE is responsible for power system planning, as well as grid operation and market administration in the six New England States. ISO-NE uses a ten-year planning horizon. It has adopted planning standards, criteria and procedures consistent with the standards and criteria established by NERC and the NPCC, designed to ensure that New England's electric system will provide adequate and reliable electric power. (Eversource 1, Vol. 1, p. 2-2, Vol. 4, ISO-NE Transmission Planning Technical Guide)

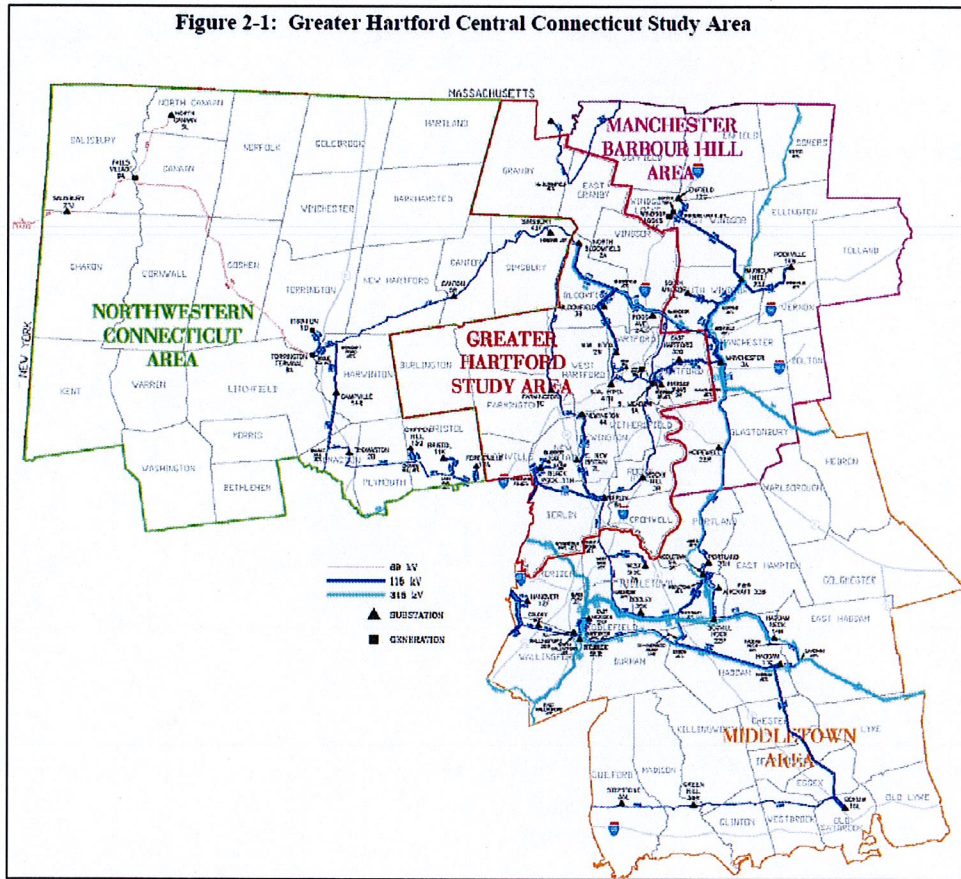


33. ISO-NE is responsible for the reliable and economical operation of New England's electric power system, which includes managing the comprehensive, long-term planning of the regional power system to identify the region's electricity needs and plans for meeting those needs. The planning process involves the preparation of an annual Regional System Plan (RSP) that provides forecasts of annual energy use and peak loads for a ten-year planning horizon; information about amounts, locations, and characteristics of market responses; and descriptions of transmission projects for the region that could meet the identified needs, as summarized in the RSP Project List. (Eversource Administrative Notice Item 3; Eversource Administrative Notice Item 4)
34. The RSP Project List is a summary of needed transmission projects for the region and includes the status of reliability transmission upgrades, market efficiency transmission upgrades, elective transmission upgrades and generator interconnection upgrades. The proposed project is identified on the RSP Project List as a planned reliability transmission upgrade that received Proposed Plan Application/I.3.9 Approval from ISO on April 16, 2015 with a projected in service date of December 2018. (Eversource Administrative Notice Item 4)
35. As a transmission owner in New England, Eversource must comply with the reliability standards and criteria adopted by NERC, NPCC, and ISO-NE. These standards and criteria establish a set of performance tests or contingency simulations under which Eversource's electric transmission system must perform without experiencing overloads or voltage problems. (Eversource 1, Vol. 1, pp. 2-2 to 2-5, 2-15)

#### **Project Need**

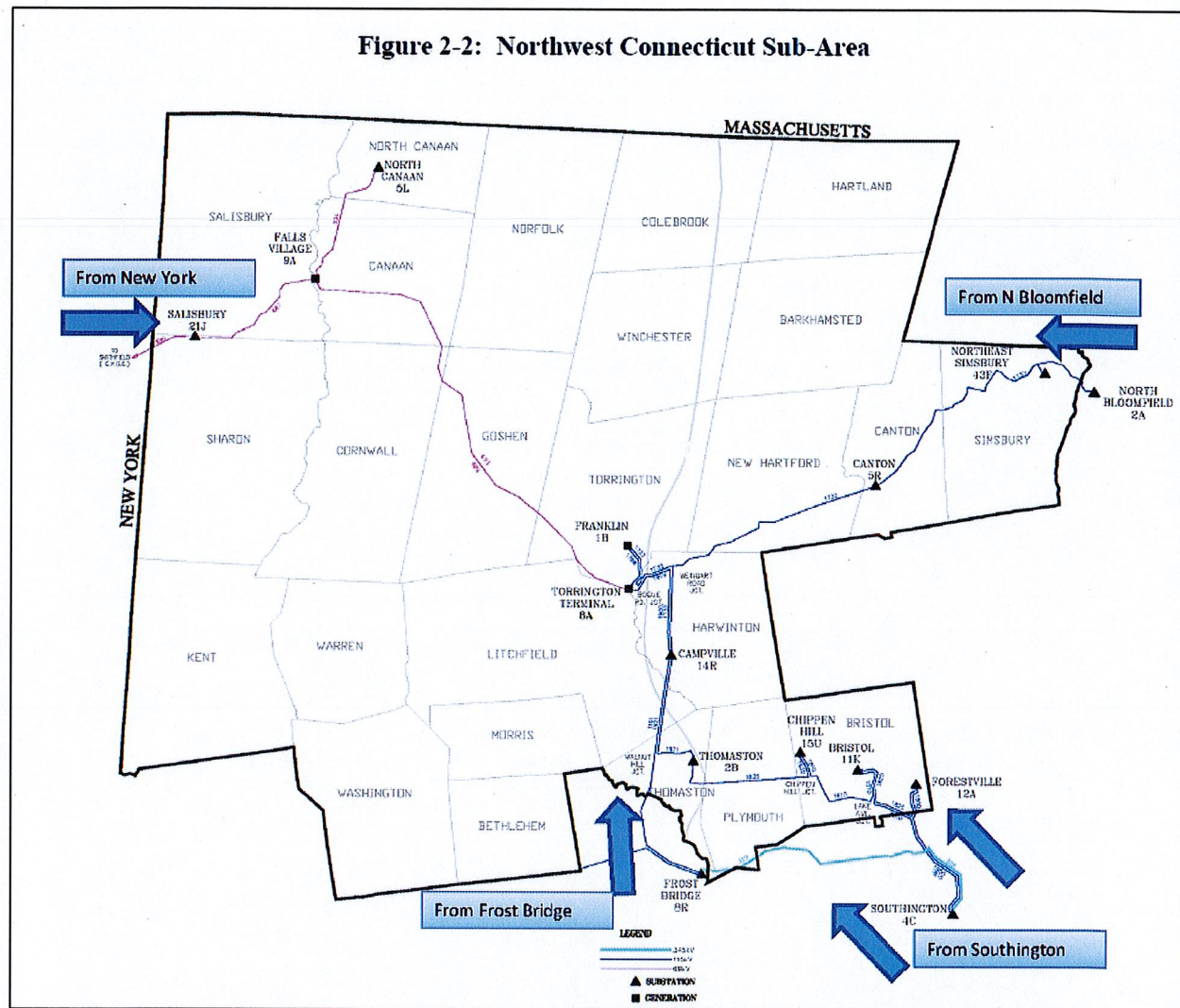
36. The electric transmission needs addressed by the Project were identified by numerous ISO-NE planning studies that began in 2005 initially focused on potential future criteria violations on the 115-kV electric transmission system in the Greater Hartford area, ultimately resulting in the New England East-West Solution Plan (NEEWS), a comprehensive set of 345-kV transmission line improvements in CT, RI, and MA, including the Central Connecticut Reliability Project (CCRP). (Eversource 1, Vol. 1, p. 2-6)
37. In 2011, ISO-NE reconfigured the geographical scope of the Greater Hartford study by separating the area into four sub-areas: the Greater Hartford, Manchester – Barbour Hill, Middletown, and Northwestern Connecticut (NWCT) sub-areas. The study was re-named the Greater Hartford and Central Connecticut (GHCC) study area that consists of about 35 percent of CT electric load. The sub areas are shown below. (Eversource 1, Vol. 1, p. 2-6, 2-7, Vol. 4, ISO-NE GHCC Needs and Solutions Studies; Eversource Administrative Notice Item 4, p. 104)

(continued next page)



(Eversource 1 Vol. 1, p. 2-7)

38. To study the four sub-areas within the GHCC, ISO-NE formed a working group of transmission planners from ISO-NE, Eversource, and the United Illuminating Company. (Eversource 1, Vol. 1, p. 2-7)
39. The grouping of the sub-area needs into a single study was to assure that identified needs and solutions were sufficiently examined in a cost efficient and coordinated manner. (Eversource 1, Vol. 1, p. 2-14)
40. The GHCC studies considered potential interdependencies in the load serving needs and potential solutions for the four sub-areas. ISO-NE published the results of the needs assessment study in May 2014 (GHCC Needs Report), which considered electric system needs in each sub-area in study year 2022 consistent with ISO-NE's ten year planning horizon. (Eversource 1, Vol. 1, p. 2-8, Vol. 4 Needs Study)
41. The GHCC Needs Report determined that the solutions for the sub-areas could be analyzed independently because the needs in each sub-area were largely driven by criteria violations following the loss of critical 115-kV sources into each sub-area. (Eversource 1, Vol. 4 Needs Study)
42. The GHCC needs report identified the NWCT sub-area as a load pocket which is an area that has insufficient generation and/or transmission to serve its electric load. The NWCT sub-area is a net importer of electricity as it relies on the surrounding areas to serve its local electric load, as shown in the figure below. (Eversource 1, Vol. 1, p. 2-9, Vol. 4 Needs Study)



The above diagram shows transmission connections to the NWCT sub-area load pocket (blue arrows). Three 115-KV connections occur from the south and east (blue lines). One 69-kV connection is from New York, west of the area (pink line). (Eversource 1, Vol. 1, p. 2-10)

43. The GHCC studies revealed criteria violations in the NWCT sub-area load pocket. ISO-NE calculates a year of need for system improvements by estimating when the critical load level, the level at which criteria violations begin to occur, will be reached. The projected year 2022 NWCT sub-area net load without demand sources is approximately 509 MW. (Eversource 1, Vol. 1, p. 2-9 to p. 2-12)
44. The GHCC Needs Report determined the existing electric system is insufficient to reliably serve peak load customer demands in the NWCT load pocket under contingency events. The study identified failures in reliability for various transmission elements and facilities, leading to thermal overloads and voltages falling below acceptable limits. The worst-case condition was identified as the loss of two or more electric import paths into the NWCT sub-area. (Eversource 1, Vol. 1, p. 2-12)
45. In early 2015, ISO-NE published the GHCC Solutions Report to address the electric system deficiencies identified in the GHCC Needs Report that are largely driven by load-serving issues following the loss of critical 115-kV sources into each sub-area. (Eversource 1, Vol. 1, pp. 2-8, 2-14, 10-2; Eversource 3, p. 17)

46. The proposed Project would implement an important component of long-range plans for the expansion of Connecticut's electric power grid in the GHCC study area as the proposed Project is an outgrowth of the NEEWS studies that began in 2006 and of the Greater Hartford area study that began in 2010. The need for the Central Connecticut Reliability Project of NEEWS and the load serving needs of the Greater Hartford, Manchester-Barbour Hill, Middletown and NWCT sub-areas were examined together in the GHCC Needs Analysis. Furthermore, ISO-NE has been examining transmission needs in Southwest Connecticut (SWCT) and has coordinated the GHCC and SWCT studies to avoid redundant solutions. Together, these studies provide solutions for Connecticut's transmission system that will comply with reliability requirements through 2022 and that form a part of the ISO RSP. (Eversource 1, p. 2-14)
47. The GHCC Solutions Study identified the addition of a 115-kV line between Frost Bridge and Campville substations, the separation of the 115-kV lines between Frost Bridge and Campville and from Campville to Thomaston and the addition of a 115-kV breaker at Campville Substation as preferred solutions for the NWCT subarea. (Eversource Administrative Notice Item 4, p. 104)
48. For the NWCT sub-area, a new 115-kV transmission source into the area was identified as the preferred solution to address the worst case thermal and voltage violations that resulted from the loss of two transmission sources into the sub-area. (Eversource 1, Vol. 1, pp. 2-13, 10-2)
49. The proposed Project would bring a new source of power from a substation outside of the load pocket (Frost Bridge Substation) to a substation within the load pocket (Campville Substation). This additional import source would allow for the re-distribution and supply of power into the sub-area if other electrical system elements fail. (Eversource 1, Vol. 1, p. 2-13; Eversource 3, pp. 15-16)
50. The proposed Project would also eliminate a potential single contingency from the loss of two existing transmission lines that share a common structure (double circuit tower line) where they cross the Naugatuck River at the town boundary of Litchfield and Harwinton. The river crossing would be reconfigured by installing new poles so that each line is supported by its own set of structures. (Eversource 1, Vol. 1, pp. 2-13 to p. 2-15)
51. The Project would address identified violations of reliability criteria and assist in maintaining the reliability of the Connecticut bulk electric transmission system in accordance with mandatory federal and regional standards and criteria. (Eversource 1, Vol. 1, p. 2-15)
52. After a review of the Solutions Report by the Reliability Committee, on April 16, 2015, ISO-NE issued a technical approval of the preferred solutions contained within the report including transmission improvements to the NWCT sub-area. (Eversource 1, Vol. 1, p. 2-8)
53. The proposed Project was listed in Eversource's *2015 Forecast of Loads and Resources for the Period 2015-2024* as a proposed 115-kV transmission line from Frost Bridge Substation to Campville Substation. (Eversource Administrative Notice Items 40 -43 – Eversource Forecast Reports)
54. The proposed Project was listed in the Council's *2014/2015 Review of the Ten Year Forecast of Connecticut Electric Loads and Resources* as a proposed 10.4 mile 115-kV transmission line from Frost Bridge substation to Campville substation with an in service date of 2017. (Council Administrative Notice Item 30, Appendix B)
55. The Project is consistent with the *Conservation and Development Policies Plan for Connecticut 2013-2018*. It will serve a public need for a reliable source of electricity to support development in Connecticut's

Regional Centers. Torrington and Bristol are Regional Centers within the Northwest Connecticut Sub-Area. (Council Administrative Notice Item 48; Eversource 1, Vol. 1, p. 5-35)

56. Two regional planning agencies, the Naugatuck Valley Council of Governments and the Northwest Hills Council of Governments, have member municipalities served by the Project. The Project is consistent with the goals of these agencies by providing a reliable electric system to the region. (Eversource 1, Vol. 1, p. 5-35)
57. Connecticut's Comprehensive Energy Strategy (CES) proposes further investments in grid reliability and identifies three important components to grid reliability: resource adequacy, transmission security and distribution resiliency. (Council Administrative Notice Item 40, pp. 71, 97)

#### **Project Cost**

58. The estimated capital cost of the Project is \$51 million, with the transmission line accounting for \$46 million and the substation modifications \$5 million. (Eversource 1, Vol. 1, p. 3-23)
59. The cost of the Project is anticipated to be regionalized with Connecticut ratepayers paying approximately 25 percent of the Project cost. Any additional cost incurred for local requirements would be expected to be paid by Connecticut ratepayers. (Eversource 3, p. 17)
60. The life-cycle cost for the transmission line portion of the Project would be \$76.4 million. This total would include annual carrying charges of the capital cost, annual operation and maintenance costs, cost of energy losses, and cost of capacity. (Eversource 1, Vol. 1, p. 3-23)
61. Project construction is anticipated to begin in the second quarter of 2017. The tentative in-service date is June 2018. (Eversource 3, p. 17)

#### **Project Alternatives**

62. A "no-action" alternative would not improve the reliability of the electric system in the NWCT sub-area, subjecting the area to continued risk of electric outages as well as undermining ISO-NE long range reliable transmission planning for Connecticut and New England. Eversource could be fined by FERC for failure to correct the identified criteria violations. (Eversource 1, Vol. 1, p. 10-1)
63. In addition to the proposed Project, two other alternative 115-kV overhead solutions were studied to bring power into the NWCT sub-area: North Bloomfield to Campville and North Bloomfield to Canton. (Eversource 1, Vol. 1, p. 10-2)
64. The North Bloomfield Substation to Campville Substation alternative was rejected early in the alternative route analysis due to its 25 mile length which would be more costly and cause more environmental impact than the proposed Project. (Eversource 1, Vol. 1, p. 10-4)
65. The North Bloomfield Substation to Canton Substation alternative was examined in more detail due its relatively similar length to the proposed Project route, 12.8 miles to 10.4 miles, respectively. Ultimately, this alternative was rejected given its cost, estimated to be \$23 million higher than the proposed Project. The higher cost was due to its longer length and the greater number of environmental resources that would be impacted when compared to the proposed route. Additionally, more costly substation improvements would be required to improve voltage conditions. (Eversource 1, Vol. 1, pp. 10-4 to 10-6)

66. An 11.2 mile underground 115-kV transmission cable system alternative route that followed existing roadways between the Frost Bridge and Campville Substations was examined and rejected due to an estimated project cost of \$328 million. In addition, the estimated life-cycle cost for the underground line is \$432 million whereas the estimated life-cycle cost of proposed Project is \$76.4 million. (Eversource 1, Vol. 1, p. 3-23; Eversource 3, pp. 19-20)
67. A hybrid 7.8 mile underground/2.0 mile overhead alternative route using roadways and existing transmission right-of-way between the Frost Bridge and Campville Substations was examined and rejected due to an estimated project cost of \$264 million. (Eversource 3, pp. 19-20)
68. Non-transmission alternatives were examined including the addition of gas-fired turbines within the load pocket, energy storage, fuel cells and energy efficiency measures. The best non-transmission alternative solution to meet the identified need within the load pocket is the construction of a 180 MW combined-cycle natural gas fueled turbine generator at Campville Substation and the installation of 54 MW of peaking generation units at Torrington Substation. This potential solution was rejected due to its high cost to Connecticut ratepayers, estimated to be at least eight times greater than the cost of the proposed Project. (Eversource 1, Vol. 1, pp. 10-8 to 10-9; Eversource 3, p. 23)

### **Project Description**

69. The proposed Project entails the installation of a new 115-kV electric transmission line, designated as Line 1304, and related improvements as listed below:
  - a) modifications of the Frost Bridge Substation in Watertown;
  - b) installation of a 0.1 mile 115-kV underground transmission cable exit at the Frost Bridge Substation;
  - c) installation of a 10.3 mile long 115-kV overhead transmission line within existing Eversource right-of-way in Watertown, Thomaston, Harwinton and Litchfield to the Campville Substation in Harwinton and reconfiguration of existing electric transmission line support structures that span the Naugatuck River at the Litchfield and Harwinton town line; and
  - d) modifications to the Campville Substation;Detail of each portion of the Project is described in the following subsections. (Eversource 1, Vol. 1, p. 3-1)

#### *Frost Bridge Substation Modifications*

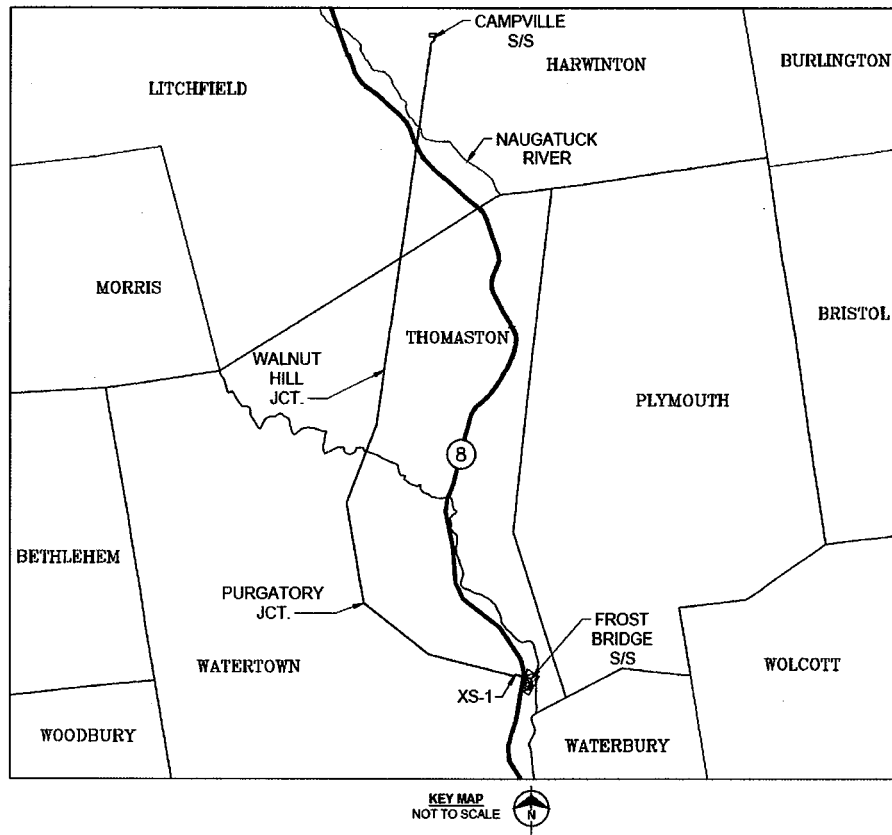
70. The existing Frost Bridge Substation is located on a 128-acre parcel owned by Eversource in eastern Watertown. The existing developed substation area is 5.7 acres. (Eversource 1, Vol. 1, p. 3-17)
71. Eversource proposes to modify the substation by expanding the existing one-position 115-kV bay to a two-position 115-kV bay, install a new 115-kV circuit breaker, two switches, three lightning arrestors, three capacitor voltage transformers and one wave trap. New equipment would also be installed within the existing control house. These modifications would be performed within the existing fenced area of the substation. (Eversource 1, Vol. 1, p. 3-17)
72. A 76-foot tall steel 115-kV transition structure would be installed adjacent to the east and outside of the substation fence to connect the new transmission line to an existing terminal structure. (Eversource 1, Vol. 1, p. 3-17; Eversource 1, Vol. 5, Appendix 4B)
73. A second steel terminal structure, 106 feet tall, would be installed outside of the west substation fence to carry the new transmission line over Frost Bridge Road and Route 8 to the existing right-of-way. (Eversource 1, Vol. 1, p. 3-17; Eversource 1 Vol. 5, Appendix 4B)

*Proposed 115-kV Underground Transmission Cable*

74. The proposed single-circuit underground 115-kV transmission system would consist of three cables (phases). Each phase would consist of one 5000-kcmil copper conductor cable surrounded by cross-linked polyethylene (XLPE) insulation. (Eversource 1, Vol. 1, p. 3-3)
75. The cables would be installed within polyvinyl chloride (PVC) ducts encased in concrete. A fourth duct would be installed to allow for future use by a replacement cable if the need arises. (Eversource 1, Vol. 1, p. 3-4)
76. Three fiber optic cables would be installed within the duct bank for transmission cable protection, control and monitoring. (Eversource 1, Vol. 1, p. 3-2, 3-4)
77. The line would be installed in two sections and joined at an underground splice vault. The underground splice vault would be installed on Eversource property and would allow the cable to be joined together and allow cable segments to be pulled through the conduit. (Eversource 1, Vol. 1, pp. 3-4 to 3-5)
78. The underground transmission line would extend from the proposed transition structure adjacent to the east side of the substation, traverse the southern portion of the substation compound, then extend along the western edge of the substation to the west transition structure (refer to Attachment 1). (Eversource 1, Vol. 5, Appendix 2B)

*Proposed Overhead 115-kV Transmission Line*

79. The proposed 115-kV overhead transmission line would consist of three sets of 1,590-kcmil phase conductors installed on weathering steel monopoles. The monopoles would typically be embedded into the ground. (Eversource 1, Vol. 1, p. 3-3, p. 3-6)
80. Most of the new monopoles would support conductors arranged in a delta configuration. Some areas would use a vertical configuration depending on existing right-of-way characteristics (refer to Attachment 2). (Eversource 1, Vol. 1, p. 3-6)
81. In general, the new monopoles would be 90 feet in height for the delta configuration and 105 feet in height for the vertical configuration. Local topography and area land use would account for variation in the final pole height. (Eversource 1, Vol. 1, p. 3-6; Eversource 1, Vol. 5 Appendix 4B)
82. The new monopoles generally would be installed in line with other existing Eversource structures in the right-of-way. The final location of the new poles would be determined by in-field conditions such as work area access, subsurface conditions or the presence of sensitive environmental features. (Eversource 1, Vol. 1, p. 3-6, 3-8)
83. The proposed transmission line would be located within existing Eversource right-of-way through the Towns of Watertown (4.5 miles), Thomaston (2.6 miles), Litchfield (1.8 miles), and Harwinton (1.3 miles). (Eversource 3, p. 7)
84. Sections of the right-of-way include Frost Bridge Road to Purgatory Junction in Watertown, Purgatory Junction to Walnut Hill Junction in Thomaston, and Walnut Hill Junction to Campville Substation in Harwinton, as shown below. (Eversource 1, Vol. 1, pp. 3-2, 3-5)



Frost Bridge Substation to Purgatory Junction

85. The existing right-of-way from Frost Bridge Road to Purgatory Junction is 400 feet wide and entirely cleared. This section of right-of-way extends for approximately 2.5 miles through Watertown. (Eversource 1, Vol. 1, p. 3-13; Eversource 1, Vol. 5, Appendix 1B)
86. The right-of-way contains three separate Eversource transmission lines, Line 352, a 345-kV transmission line attached to H-frame structures running along the north side of the right-of-way; Line 1191, a 115-kV transmission line mounted on H-frame structures installed near the center of the right-of-way, and Line 1238, a 115-kV transmission line mounted on steel monopoles running along the south side of the right-of-way. (Eversource 1, Vol. 1, p. 3-15; Eversource 1, Vol. 5, Appendix 1B)
87. In this section, Eversource proposes to install the new transmission line on 22 new vertical monopole structures located between Line 352 and Line 1191. (Eversource 1, Vol. 1, p. 3-15; Eversource 1, Vol. 5, Appendix 1B)
88. The new structures would range in height from 75 feet to 125 feet with a typical height of 105 feet. (refer to Attachment 3). (Eversource 1, Vol. 1, p. 3-15)
89. No clearing of mature forest areas would be required to install the new transmission line in this segment. (Eversource 1, Vol. 5, Appendix 1B)
90. Land use adjacent to the right-of-way includes commercial and industrial areas, agricultural land, a town park, and some residential development. The right-of-way traverses Route 8, Route 6, and various local roads. (Eversource 1, Vol. 1, p. 5-31)



Purgatory Junction to Walnut Hill Junction

91. The existing right-of-way from Purgatory Junction to Walnut Hill Junction is 250 feet wide and is cleared to a width of 90 feet. This section of right-of-way is 3.8 miles in length and extends through Watertown and Thomaston. (Eversource 1, Vol. 1, p. 3-15; Eversource 1, Vol. 5, Appendix 1B)
92. The right-of-way contains Line 1191 mounted on H-frame structures along the west side of the right-of-way. (Eversource 1, Vol. 1, p. 3-15; Eversource 1, Vol. 5, Appendix 1B)
93. The existing H-frame structures have a typical height of 50 feet. (Eversource 1, Vol. 5, Appendix 1B)
94. In this section, Eversource proposes to install the new transmission line on 39 new monopole structures south of Line 1191. The new line would typically be arranged in a delta configuration. (Eversource 1, Vol. 5, Appendix 1B)
95. The structures would range in height from 45 feet to 125 feet with a typical height of 90 feet. (refer to Attachment 4). (Eversource 1, Vol. 1, p. 3-15; Eversource 3, p. 3, Attachment 1)
96. To accommodate the new line, the width of the cleared area of the right-of-way would be expanded by 45 feet. (Eversource 1, Vol. 5, Appendix 1B)
97. Land use adjacent to the right-of-way includes single family residences, undeveloped woodland, Mattatuck State Forest, Black Rock State Park, Thomaston Fish and Game Club, and the Crest Brook Country Club. The right-of-way crosses Route 109 and local roads. (Eversource 1, Vol. 1, p. 5-32; Eversource 1, Vol. 5, Appendix 1B)

Walnut Hill Junction to Campville Substation

98. The existing right-of-way from Walnut Hill Junction to Campville is 250 feet wide and is cleared to a width of 140 feet with the exception of the Naugatuck River crossing where the cleared width is 115 feet. This section of right-of-way is 3.9 miles in length and extends through Thomaston, Litchfield, and Harwinton. (Eversource 1, Vol. 1, p. 3-15; Eversource 1, Vol. 5, Appendix 1B)
99. The right-of-way contains Line 1191 mounted on H-frames structures and Line 1921, a 115-kV transmission line mounted on delta monopole structures that joins the right-of-way at Walnut Hill Junction. (Eversource 1, Vol. 1, pp. 2-10, 3-15; Eversource 1, Vol. 5, Appendix 1B)
100. The existing H-frame structures and the delta monopole structures have a typical height of 55 feet and 75 feet, respectively. (Eversource 1, Vol. 5, Appendix 1B)
101. In this section, Eversource proposes to install the new transmission line on 32 new delta configuration monopole structures located south of Line 1921. (Eversource 1, Vol. 5, Appendix 1B)
102. The structures would range in height from 70 feet to 120 feet with a typical height of 90 feet (refer to Attachment 5). (Eversource 3, p. 3)
103. To accommodate the new transmission line, the width of the cleared area of the right-of-way would be expanded by 40 feet. (Eversource 1, Vol. 5, Appendix 1B)

104. At the Naugatuck River, two existing 155-foot lattice structures, one on each side of the river, would be removed. The structures support Line 1191 and Line 1921. To accommodate removal of the structures and the installation of new 155-foot monopole structures to support each line independently, the cleared area of the right-of-way the would be expanded by 70 feet (refer to Attachment 6). (Eversource 1, Vol. 1, p. 2-13, XS-5)
105. Land use adjacent to the right-of-way includes single family residences, flood control property, undeveloped woodland and agricultural land. The right-of-way crosses Route 8, Route 254, local roads, and a railroad right-of-way along the Naugatuck River used for seasonal scenic train excursions. (Eversource 1, Vol. 1, p. 5-32, p. 5-33; Eversource 1, Vol. 5, Appendix 1B; DEEP comments received March 1, 2016)

#### *Campville Substation Modifications*

106. The existing Campville Substation is located on a 42.3-acre parcel owned by Eversource in the southwest section of Harwinton. The existing developed substation area is 1.7 acres and is accessed off Wildcat Hill Road. (Eversource 1, Vol. 1, p. 3-18)
107. Eversource proposes to modify the substation by expanding the substation fenceline by 90 feet to the east, increasing the fenced substation area by approximately 0.4 acre. The existing topography in the expansion areas ranges by five feet and grading of the area would be required to create a level surface for new equipment (refer to Attachment 7). (Eversource 2, R. 14; Tr. 2. pp. 34-35)
108. Major Project related work at the substation involves the following:
- Expansion and modification of the ring bus to accommodate five new 115-kV breakers and one new transmission line terminal position.
  - Installation of a new 68-foot high terminal structure to connect the proposed Line 1304 to the line position.
  - Installation of a motor operated disconnect switch, one ground switch, three lightning arrestors, three capacitor voltage transformers, cabling and one wave trap.
  - Installation of four 115-kV disconnect switches, aluminum tube conductor, six 115-kV breakers, two 60-foot tall lightning masts.
  - Installation of expansion area fencing, stormwater management controls, steel support structures and foundations
  - Installation of a new substation enclosure for batteries and equipment boards.
- (Eversource 3, p. 13; R. 14; Tr. 2. pp. 31-32)

#### **General Project Construction Procedures**

109. The following subsections describe the general construction procedures for each portion of the project. If the Project was approved, Eversource intends to submit two Development and Management Plans for the Project; one that details the construction of both the underground and overhead sections of the transmission line and one for the modifications to both substations. (Eversource 1, Vol. 1, p. 3-3)

*Frost Bridge Substation and Campville Substation Modifications*

110. Eversource would install material staging areas on Eversource property and establish temporary access as necessary for heavy vehicles. (Eversource 1, Vol. 1, p. 4-35)
111. Prior to construction, Eversource would install soil erosion and sedimentation controls, as necessary, and would maintain these areas for the duration of the Project. (Eversource 1, Vol. 1, p. 4-35)
112. Vegetation within the expansion area at the Campville Substation would be removed and the site graded. (Eversource 1, Vol. 1, p. 4-35)
113. Excavated soils would be characterized for reuse or disposal. (Eversource 1, Vol. 1, p. 4-35)
114. Once constructed, new equipment would be tested prior to commencement of operation. (Eversource 1, Vol. 1, p. 4-36)

*Proposed 115-kV Underground Transmission Cable*

115. Eversource would conduct pre-construction surveys to identify any existing underground facilities along the cable route. (Eversource 1, Vol. 1, p. 4-23)
116. Eversource would install material staging areas on Eversource property and establish work zones and temporary access as necessary for heavy vehicles. (Eversource 1, Vol. 1, p. 4-23)
117. Prior to construction, Eversource would install soil and sedimentation controls, as necessary, and would maintain these controls until soil stabilization and re-vegetation. (Eversource 1, Vol. 1, p. 4-23)
118. Eversource would excavate a trench approximately 6 to 10 feet deep and five feet wide to install the duct bank. (Eversource 1, Vol. 1, p. 4-23)
119. The duct bank would consist of eight-inch PVC pipe for the XLPE conduits, two-inch PVC conduits for the ground continuity conductors and sensing fiber, and three-inch PVC conduits for fiber optic and sensing fiber. The PVC conduits would be installed in 10 to 20 foot sections. (Eversource 1, Vol. 1, p. 4-24)
120. Any open portions of trench would be covered with plywood or steel plates after work hours to prevent fall hazards. (Eversource 1, Vol. 1, p. 4-24)
121. The splice vault would be approximately 24 feet long by eight feet wide by eight feet high. The vault would be approximately 30-inches below grade and once constructed, would be accessible via two access manholes. (Eversource 1, Vol. 1, pp. 3-5, 4-25)
122. After conduits have been installed, they would be tested with a mandrelling procedure, in which a “pig” (a cylindrical object slightly smaller in diameter than the conduit) is pulled through the conduit to verify that the conduit has not been crushed, damaged, or installed improperly. (Eversource 1, Vol. 1, p. 4-25)
123. When conduits have been successfully installed and tested, cable would be pulled through them using truck-mounted winches and cable handling equipment. (Eversource 1, Vol. 1, p. 4-25)

124. Completed portions of the trench and concrete casing would be backfilled with appropriate materials, and the surface cover would consist of gravel or seeded, depending on the location. (Eversource 1, Vol. 1, p. 4-24)
125. Any groundwater that is encountered would be dewatered as necessary in accordance with applicable regulations. (Eversource 1, Vol. 1, p. 4-26)
126. Any subsurface rock would be removed by mechanical methods; blasting is not anticipated. (Eversource 1, Vol. 1, p. 4-24)

*Proposed Overhead 115-kV Transmission Line*

127. Eversource would conduct pre-construction surveys to demarcate right-of-way boundaries, sensitive environmental features, vegetation clearing limits and proposed structure locations. (Eversource 1, Vol. 1, p. 4-2)
128. Eversource would establish temporary storage and staging areas for construction support. If Eversource-owned property is not available or suitable for storage or staging areas, Eversource would investigate the use of suitable private property as close to the Project area as possible. (Eversource 1, Vol. 1, p. 4-5)
129. Temporary storage areas require approximately two to five acres and are used to temporarily store construction materials, equipment, supplies, mobile construction offices, parking of personal vehicles of construction crew members, parking construction vehicles and equipment, and performing minor maintenance on construction equipment. (Eversource 1, Vol. 1, p. 4-5)
130. Staging areas typically require less than two acres and are used for temporarily stockpiling materials for transmission line construction, such as erosion and sedimentation control materials, and for temporarily stockpiling materials removed during construction. Staging areas could be within or off the right-of-way. As construction progresses, staging areas would be relocated to be near construction work. (Eversource 1, Vol. 1, p. 4-6)
131. Once a storage/staging area is no longer needed, it would be restored pursuant to the land use agreement with the underlying landowner. (Eversource 1, Vol. 1, p. 4-5)
132. Access to the right-of-way would utilize existing access roads to the greatest extent possible. (Eversource 1, Vol. 1, p. 4-13)
133. A large network of access roads already exists along a majority of the entire right-of-way. Most of the existing access roads would have to be improved, widened, or modified to accommodate construction equipment. To ensure safe vehicle access, access road grades cannot exceed ten percent. (Eversource 1, Vol. 1, p. 4-14)
134. Existing access roads would be restored with gravel and widened to a travel surface of 16-20 feet. (Eversource 1, Vol. 1, p. 4-14)
135. In areas where terrain and the presence of environmental features make linear use or construction of an on-right-of-way access road difficult, off-right-of-way access roads would be constructed to bypass these areas. Off-right-of-way access roads would typically originate from public roads or from existing access roads on private property. (Eversource 1, Vol. 1, p. 4-13)

136. Culverts and timber mats would be used where the access roads traverse wetlands and watercourses to minimize permanent impacts to these features. (Eversource 1, Vol. 1, p. 4-14)
137. Vegetative clearing would occur in designated areas both in the right-of-way areas and along access roads to the right-of-way. Equipment for clearing would include flatbed trucks, brush hogs, skidders, bucket trucks, log trucks and wood chippers. (Eversource 1, Vol. 1, p. 4-8, p. 4-9)
138. Generally, tall tree species would be removed from the right-of-way expansion area. Smaller tree species and shrubs would be retained in areas outside of the conductor zones (an area 15 feet from the conductors). (Eversource 1, Vol. 1, p. 4-11)
139. Stumps would only be removed from the cleared areas to facilitate construction or rehabilitation of access roads and the installation of work pads. Stumps that are removed would be hauled off-site or chipped for use as ground cover in the right-of-way, where appropriate. (Eversource 2, R. 7)
140. Clearing in sensitive areas, such as wetland areas or along stream banks, would be minimized to the extent practical. (Eversource 1, Vol. 1, p. 4-11, p. 4-12)
141. Eversource would coordinate with respective property owners regarding disposition of logged trees along the right-of-way. Eversource would leave timber portions of the trees on the landowner's property if requested, stacked in upland areas. If the landowner does not want the timber, the timber would become property of the land clearing contractor and removed from the property. (Eversource 1, Vol. 1, p. 4-11)
142. If a "hazard" tree (one that is weak, broken, decaying) is found on or off-right-of-way that could threaten the integrity of the transmission lines it would be removed or pruned as necessary. Eversource's ability to remove these trees in off-right-of-way areas is predicated on the language in the right-of-way easement agreement. If the language does not give Eversource permission to remove hazard trees from outside of the easement area, the company would seek permission from the property owner. (Eversource 1, Vol. 1, p. 4-12)
143. Temporary erosion and sedimentation (E&S) controls would be installed as practicable prior to and/or during vegetation clearing in compliance with the *2002 Connecticut Guidelines for Soil Erosion and Sedimentation Control* and Eversource's *Best Management Practices Manual: Construction and Maintenance Environmental Requirements for Connecticut*. Temporary controls include silt fence, hay/straw bales, and filter socks to be used during any construction that involves soil disturbance. (Eversource 1, Vol. 1, p. 4-7)
144. Additional E&S controls may be used after vegetation removal to demarcate limits of work within environmentally sensitive areas. (Eversource 1, Vol. 1, p. 4-7)
145. Work pads would be established at each proposed transmission structure location to provide a level work area for construction equipment used to erect the transmission structure. Typical work pads would consist of gravel and measure 100 feet by 100 feet for a tangent structure and 200 feet by 100 feet for a dead-end structure. (Eversource 1, Vol. 1, p. 4-15, p. 4-16)
146. Work pad construction includes the removal of vegetation, grading to create a level area, removal of topsoil and layering of a filter fabric and rock base. A roller is typically used to flatten and compact the pad. In wetland areas, removable timber mats may be used to allow water to flow beneath the pad. As an alternative to timber mats, a large rock base may be used to allow water flow with smaller rock layered on top and a layer of gravel intermixed with soil on top of that. (Eversource 1, Vol. 1, p. 4-16)

147. Transmission structures would be delivered to the work pad in sections, then assembled and installed with a crane. (Eversource 1, Vol. 1, p. 4-17)
148. Tangent structures would be directly embedded into the ground. Dead-end angle structures would have a drilled shaft foundation. Excavations for foundations would be accomplished by mechanical means. If blasting is required based on soil borings at each structure location, a certified blasting contractor would develop a controlled drilling and blasting plan in compliance with state and local regulations, including notification to adjacent residents. (Eversource 1, Vol. 1, p. 4-17)
149. Excess concrete used of any foundation work would be disposed of in upland areas, away from any delineated wetlands. (Tr. 2, pp. 60-61)
150. Overhead conductors would be installed using pulling and tensioning equipment placed at one to three mile intervals along the route. Gravel pull pads measuring 100 feet wide by 100 to 300 feet long would be constructed for the staging and operation of the pulling equipment. Helicopters may also be used for installation of the pulling lines. Once the conductors are pulled into place, linemen in bucket trucks would complete the conductor installation at each structure location. (Eversource 1, Vol. 1, p. 4-19)
151. Gravel pads would be installed adjacent to roads to provide locations for temporary guard structures used to provide line clearance over roadways during pulling. (Eversource 1, Vol. 1, p. 4-17)
152. The existing lattice structures (#3171 and #3174) that carry Line 1191 and Line 1921 over the Naugatuck River would be dismantled using a crane. The associated foundations would be removed to below grade, then covered with soil and seeded. (Eversource 1, Vol. 1, p. 4-18; Tr. 2, p. 68)
153. Based on initial review, private structures that would need to be removed from the right-of-way include a portion of fencing in Litchfield and an abandoned shed in Thomaston. Several greenhouses in the right-of-way in Watertown can remain in place as they are far enough from the proposed work area. (Eversource 2, R. 6; Tr. 2 p. 33)
154. Traffic impacts during construction are expected to be minimal as most of the Project area is sparsely populated. Eversource would consult with the affected Towns and the DOT to minimize traffic congestion and resolve potential Project access issues during construction. (Eversource 1, Vol. 1, p. 4-22)
155. Upon completion of the transmission line installation, work pads would remain in place unless directed by the landowner or if the work pad is located within a sensitive environmental area. Access roads in upland areas would remain in place to facilitate future maintenance activities. Pull pads and guard pads would be removed. (Eversource 1, Vol. 1, p. 4-16, p. 4-17)
156. Following construction of the proposed project, construction debris and temporary access roads would be removed, final grading of areas affected by construction would occur, if applicable, and the disturbed areas stabilized through re-vegetation, installation of water bars, and/or other measures. (Eversource 1, Vol. 1, p. 4-20)
157. Post-construction right-of-way vegetation management includes the removal of targeted species such as tall growing trees and State-listed invasives, encouraging the growth of native shrub and small tree species. (Eversource 1, Vol. 1, p. 4-36)

158. Vegetation management within the right-of-way is typically performed every four years, while side-trimming of vegetation encroaching on the edge of the managed portion of the right-of-way occurs every ten years. (Eversource 1, Vol. 1, p. 4-36)
159. Vegetation management would be conducted in accordance with Eversource's *Specifications for Rights-of-Way Vegetation Management* document. (Eversource 1, Vol. 1, p. 4-36)
160. Eversource anticipates developing a Wetland Invasives Species Control Plan for right-of-way management upon consultation with various state and federal entities. (Eversource 1, Vol. 1, p. 4-36)

### **Environmental Resources**

161. The proposed Project is located within the Northwest Hills physiographic region of Connecticut, generally characterized by hilly, glacial influenced terrain with shallow till on bedrock. Some locations in the Project area have extensive deep till and glacial outwash deposits. (Eversource 1, Vol. 1, pp. 5-2 to 5-4)
162. Elevations along the right-of-way range from 300 feet above mean sea level in Watertown to 800 feet above mean sea level in Litchfield. (Eversource 1, Vol. 1, p. 5-2)

#### *Watercourses*

163. The proposed Project is located within the Naugatuck River regional drainage basin. (Eversource 1, Vol. 1, p. 5-5)
164. The proposed Project crosses a total of 58 watercourses/waterbodies. Of these, 14 are perennial streams or rivers, 6 are ponds and 38 are intermittent watercourses. (Eversource 1, Vol. 1, p. 5-6)
165. Three of the perennial streams are greater than 20 feet wide, including Branch Brook, Northfield Brook and the Naugatuck River. (Eversource 1, Vol. 1, p. 5-6)
166. The proposed route extends across 100-year flood zones associated with Branch Brook, Northfield Brook and the Naugatuck River. No existing or proposed structures would be within the designated flood zones. (Eversource 1, Vol. 1, p. 5-12)
167. None of the rivers or streams along the route are designated as or considered for designation as a National Wild and Scenic River. (Eversource 1, Vol. 1, p. 5-6)
168. All of the watercourses and waterbodies along the Project route are already spanned by transmission lines. (Eversource 1, Vol. 1, p. 5-6, p. 5-7)
169. DEEP noted that watercourse D-5, located on the Thomaston Fish and Game Club (TFGC) property, is a high quality stream and the stream bottom should be preserved through proper engineering methods such as an oversized culvert or bridging. (DEEP comments received March 1, 2016)
170. The Naugatuck River is designated by DEEP as a Trout Management and Salmon Broodstock area. The proposed transmission line crossing in this location would be well above the river and would not affect the riparian forest immediately adjacent to the river. (Eversource 1, Vol. 1, p. 5-16)
171. The proposed Project would not impact any fisheries. (Eversource 1, Vol. 1, p. 6-20)

*Wetlands*

172. A total of 91 wetland areas were delineated within the existing right-of-way using State and Federal criteria. In addition, four wetlands were delineated adjacent to proposed Project access roads in off-right-of-way areas. (Eversource 1, Vol. 1, p. 5-7)
173. Clearing in the right-of-way may affect 48 of 95 delineated wetlands. (Eversource 1, Vol. 1, p. 5-7)
174. A majority of the wetlands along the Project route are classified as scrub-shrub and emergent wetlands. Most are maintained as such through ongoing right-of-way maintenance activities. Most of these wetlands extend into non-maintained areas, transitioning into forested wetlands. (Eversource 1, Vol. 1, p. 5-10)
175. Development of the Project would convert approximately 6.7 acres of forested wetlands to scrub-shrub or emergent marsh wetlands by clearing the right-of-way for the new transmission line. (Eversource 1, Vol. 1, p. 6-10)
176. Portions of two wetlands on the east side of the Naugatuck River would be permanently filled for access roads, as follows; approximately 1505 square feet in designated wetland W-F11 and approximately 232 square feet in designated wetland W-F12. (Eversource 2, R. 11; Eversource 1, Vol. 5, Appendix 2B, Sheet 32)
177. A new transmission structure (no. 95) would be installed in wetland W-F15 in Harwinton. Approximately 28 square feet of this wetland would be permanently filled. Due to the extensive wetlands in this area of the Project route, wetland impact cannot be avoided. (Eversource 1, Vol. 1, p. 6-10; Eversource 2, R. 11; DEEP comments received March 1, 2016)
178. The Project would temporarily affect 27 wetlands through the development, widening, restoration and use of access roads and work pads within wetlands to construct the transmission structures and clear the affected areas of right-of-way. Approximately 117,500 square feet of wetlands would be temporarily disturbed primarily through the use of construction matting or gravel placed on top of geotextile fabric. (Eversource 1, Vol. 1, p. 6-9, p. 6-10; Eversource 2, R. 11)
179. Compensatory wetland mitigation may be required depending on permit requirements from DEEP and the USACE and could include wetland restoration and/or enhancement, wetland preservation payment, and/or conservation restrictions. (Eversource 1, Vol. 1, p. 6-13)
180. Approximately 21 vernal pools are located along the Project route. Fifteen of the pools were considered high value and three were considered decoy pools formed from impoundment through existing access road use. (Eversource 1, Vol. 1, p. 6-21, p. 6-22)
181. To avoid impacts to vernal pools, Eversource would locate new structures, access roads and work areas outside of vernal pools to the extent practical. One vernal pool, located adjacent to proposed Structure 39, would be partially filled to create a work pad. Eversource would attempt to relocate the work pad out of the vernal pool during the D&M phase of the project. (Eversource 1, Vol. 1, p. 6-22; Eversource 3, Table 2)
182. Eversource removed the potential pull pad adjacent to vernal pool D4-1, between structures 53 and 54 in Thomaston, from the design of its project to reduce the potential for disturbance to that vernal pool. A potential pull pad located between structures 52 and 53 would be used instead. (Eversource 2, R. 12)



183. Generally, vernal pool protective measures would include retaining as much of the low growing vegetation in and around each pool as possible, leaving tree stumps in place to minimize disturbance, minimize the use of gravel within 100 feet of vernal pools, and the use of appropriate erosion and sedimentation controls to prevent sediment from accumulating in the pools as well as maintaining access ways and migratory pathways for vernal pools species to use adjacent upland areas. (Eversource 1, Vol. 1, p. 6-22)
184. For Project activities adjacent to vernal pools (within 100 feet) that occur during amphibian migration periods, site specific measures would be undertaken such as elevated construction matting to provide unencumbered amphibian access to and from vernal pools. (Eversource 1, p. 6-22)
185. The Project route does not traverse any aquifer protection areas. The nearest aquifer protection area is approximately 0.5 mile east the proposed transmission line route where it crosses Route 109 in Thomaston. (Eversource 1, Vol. 1, p. 5-12)
186. The Project is not near any public water supply watershed areas. The nearest public water supply watershed is approximately one mile west of the proposed transmission line route where it crosses Black Rock State Park in Thomaston. (Eversource 1, Vol. 1, p. 5-11)
187. If groundwater is encountered during any Project excavations, dewatering would be performed in accordance with authorizations from applicable regulatory agencies. (Eversource 1, Vol. 1, p. 4-34)

#### *Wildlife*

188. The expansion of the Campville Substation would require the removal of 0.4 acre of woodland. (Eversource 1, Vol. 1, p. 6-44; DEEP comments received March 1, 2016)
189. Development of the new transmission line would require the clearing of 42.2 acres of forested upland in the existing right-of-way. An estimated 7,000 trees with a diameter six inches or greater at breast height would be removed. (Eversource 1, Vol. 1, p. 6-15)
190. Some of the clearing would occur along the edge of two core forest blocks in the Black Rock State Park and Mattatuck State Forest area of Watertown. However, the clearing would not reduce the size of either core forest block below 250 acres, the minimum size required to maintain habitat for interior forest birds. (Eversource 3, Exhibit 2, p. 5-2, p. 5-3, Figure 1)
191. Once the Project is complete, cleared areas would revert to scrub-shrub habitat benefiting many species that depend on this type of habitat, including species that are in decline in New England such as the prairie warbler and the blue-wing warbler. (Eversource 1, Vol. 1, pp. 6-16, 6-25)
192. Shrubland and edge habitats support a high biodiversity, especially among birds, reptiles and invertebrates. Due to land use patterns, shrubland and old field areas are in rapid decline and managed right-of-way is now an important source of this habitat. (Eversource 1, Vol. 1, p. 6-20, 6-25)
193. Based on review of Natural Diversity Database for state endangered, threatened or special concern species and ongoing consultations with DEEP, five state listed species were identified as potentially occurring in the Project area: wood turtle, smooth green snake, spotted turtle, northern spring salamander, and the frosted elfin butterfly. (Eversource 4, p. 18; DEEP comments received March 1, 2016)

194. Upon consultation with DEEP, Eversource has developed DEEP-approved protection strategies for each of these species. These strategies would be implemented as part of the D&M Plan for the Project. (Eversource 3, p. 18; DEEP comments received March 1, 2016)
195. Although the Project area may contain suitable forest habitat for the northern long-ear bat, a Federally-listed threatened species, Eversource and DEEP concluded there in no nearby bat hibernacula to support bat populations in the area. Eversource is consulting with the USFWS for a final Project impact determination regarding this species. (Eversource 2, R. 9)

*Scenic, Historic and Recreation Areas*

196. The Project would not affect any previously identified historic sites, archeological sites, or properties listed on the National Register of Historic Places. Eversource would conduct further subsurface archeological field investigations during final project design. If significant archeological deposits are found, Eversource would relocate temporary and permanent Project infrastructure to the greatest extent possible. (Eversource 1, Vol. 1, p. 6-39, p. 6-45)
197. The portion of the Project that crosses through the TFGC property is near several old stone walls and stone dams. The landowner and DEEP requested that these features be preserved to the greatest extent possible. (Eversource Bulk File comments from Thomaston Fish and Game Club; DEEP Comments received March 1, 2016)

*Visibility*

198. The Project is not located within or near any State designated heritage areas. (Eversource 1, Vol. 3, Visual Resource Analysis, p. 4)
199. The Project would not be visible from DOT designated Scenic Land Strips. (Eversource 1, Vol. 3, Visual Resource Analysis, p. 4)
200. The Project right-of-way traverses two DEEP properties, Mattatuck State Forest and Black Rock State Park. In Mattatuck State Forest, the new transmission line would be constructed between two existing transmission lines in a cleared right-of-way, with construction temporarily affecting one hiking trail. The section in Black Rock State Park would require clearing in the existing right-of-way, temporarily affecting two hiking trails in a remote section of the park. (Eversource 1, p. 6-34, p. 6-35; DEEP comments received March 1, 2016)
201. The Project right-of-way traverses Northfield Brook Lake, a USACE flood control property developed with a recreational trail. Construction along the right-of-way would temporarily affect access to this trail. (Eversource 1, Vol. 1, p. 6-34)
202. Eversource would coordinate with DEEP and the USACE regarding temporary trail closures and other aspects of the Project in these areas. (Eversource 1, Vol. 1, p. 6-35)
203. The Project is adjacent to Veterans Memorial Park in Watertown but no impact on park recreational facilities are expected. (Eversource 1, Vol. 1, p. 6-34)
204. The visual impact of the Project on State, Federal and Town public recreation facilities and properties would be minimal given the presence of the existing managed right-of-way adjacent to and within these areas. Most visibility from recreational resources would be where hiking trails intersect with the

existing right-of-way. The Project would also be visible from the top of the Black Rock Dam, a USACE facility. (Eversource 1, Vol. 1, Volume 3, pp. 11-15, Exhibit 5)

205. The Project would not be visible from the Black Rock viewpoint in Black Rock State Park. (Council Administrative Notice Item 69; Eversource 1, Vol. 3, pp. 11-15; Vol. 5 Appendix 1B, Sheet 4)
206. In general, the visibility impact of the new transmission line would be incremental as it is being installed within an existing right-of-way that already contains transmission line structures. To minimize the visual effect of new transmission structures, Eversource would install the structures in line with existing structures to the greatest extent practical. (Eversource 1, Vol. 1, pp. 3-8, p. 11-7)
207. During the MCF process, the Town of Thomaston and the TFGC requested that shorter transmission line structures be used between proposed Structures 50 to 60 to reduce visual impacts in this area. This section of the right-of-way is approximately one mile in length and traverses property primarily owned by TFGC. (Eversource 1, Vol. 1, p. 12-9)
208. The existing right-of-way in this area has a managed width of 90 feet and contains H-frame structures ranging in height from 50 to 80 feet that support Line 1191. (Eversource 1, Vol. 1, p. 12-9; Eversource 1, Vol. 5, Appendix 1B)
209. Eversource proposes to install steel delta structures in this area that range in height from 66 to 108 feet, eight to 24 feet higher than the existing H-frame structures, and widen the cleared area of the right-of-way by 40 feet. (Eversource 1, Vol. 1, p. 12-10)
210. Eversource examined the possibility of using H-frame structures along this one-mile segment. If H-frames were used, they would range in height from 52-90 feet. Five of the H-frame structures would be below the existing tree line. (Eversource 1, Vol. 1, p. 12-10)
211. The use of H-frames structures would require the clearing of an additional 10 feet of forest along the east side of the right-of-way in order to maintain adequate vegetative clearance. The additional clearing, totaling approximately one-acre, would occur in four wetland areas, along two forested streams, and within a high quality vernal pool that supports the only known population of marbled salamander in Thomaston. (Eversource 1, Vol. 1, p. 12-10, p. 12-11; Eversource 3, p. 6-1; Tr. 2, p. 30)
212. The estimated cost of using H-frame structures in this area is an additional \$700,000. (Eversource 1, Vol. 1, p. 12-11)

#### *Noise*

213. Eversource expects only short-term and highly localized construction-related noise effects from the Project. Most construction related noise would occur during normal work hours of 7 AM to 7 PM Monday through Saturday. Construction may occur beyond these times to accommodate electric outages or the installation of certain facilities. (Eversource 1, Vol. 1, pp. 6-40, 6-41, 6-46)
214. During the development of access roads or the installation of some of the proposed steel monopole structures, rock may be encountered. Whereas mechanical methods are the preferred method for removing rock, in some areas, controlled blasting may be required. If blasting is required, Eversource would develop a Blasting Control Plan in compliance with state, industry, and Eversource standards. Potential impacts from rock removal may include dust, vibration, and noise. (Eversource 1, Vol. 1, p. 6-40; Eversource 4, p. 33)

215. Once completed, operation of the Project facilities would result in a minimal change in the existing ambient noise environment and would meet applicable state regulations. (Eversource 1, Vol. 1, p. 6-46)

### **Electric and Magnetic Fields**

216. Electric fields (EF) and magnetic fields (MF) are two forms of energy that surround an electrical device. Transmission lines are a source of both EF and MF. In North America, electric utilities provide power at 60 hertz (oscillates 60 times per second). (Eversource 1, Vol. 1, p. 7-1)
217. 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 29; Eversource 1, Vol. 1, p. 7-1)
218. Magnetic fields are produced by the flow of electric currents. The level of a magnetic field is commonly expressed as magnetic flux density in units called gauss (G), or in milliGauss (mG). The magnetic field level at any point depends on characteristics of the source, which can include the arrangement of conductors, the amount of current flow through the source, and its distance from the point of measurement. MF levels decrease rapidly with distance from the source but are not easily interrupted as they pass through most materials. (Council Administrative Notice Item 29; Eversource 1, Vol. 1, p. 7-1)
219. 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 29; Eversource 1, Vol. 1, p. 7-17)
220. In accordance to the Council's *Electric and Magnetic Fields Best Management Practices for the Construction of Electric Transmission Lines in Connecticut* guidelines (EMF BMP), Eversource is required to provide an analysis of recent scientific literature regarding MF exposure, an analysis of pre and post construction MF levels, and investigate "no cost" and "low cost" transmission line design alternatives to reduce MF levels at the edge of a right-of-way and in areas of particular interest, as long as such designs do not compromise system reliability or worker safety, or environmental and aesthetic project goals. (Council Administrative Notice Item 29)
221. As required by the Council's EMF BMP's, Eversource provided an analysis of recent scientific literature regarding MF exposure and determined there were no relevant changes in current research conclusions or the recommended exposure standards established by ICES and ICNIRP. (Eversource 3, pp. 27-28)
222. As required by the Council's EMF BMP, Eversource examined the project route to determine the location of any schools, daycare facilities, playgrounds, hospitals, and residential areas, as defined under C.G.S. § 16-50p(a)(3)(D), for specific MF analysis. Eversource located three areas, referred to as

Focus Areas, as follows; the ball field in Veterans Memorial Park in Watertown, a residential area on Walnut Hill Road in Thomaston with 12 residences and a residential area on Campville Road in Litchfield with 19 residences. (Eversource 3, pp. 28-29)

223. Field measurements of existing, preconstruction MF and EF were taken at each Focus Area, as follows:

**Measured Electric and Magnetic Fields**

| Location                           | Magnetic Field (mG) | Electric Field (kV/m) |
|------------------------------------|---------------------|-----------------------|
| Veteran's Memorial Park, Watertown | 1.00                | 0.00                  |
| Walnut Hill Road, Thomaston        | 12.33-15.95         | 0.075-0.332           |
| Campville Road, Litchfield         | 5.11-30.11          | 0.096-0.932           |

These field measurements represent only the MF and EF levels at the time of measurement. MF levels vary constantly depending on the amount of power flowing through the line whereas EF remains somewhat constant over time. (Eversource 3, p. 30)

224. Eversource conducted an analysis of pre and post construction MF levels at the edge of the right-of-way under average transmission line load conditions. As shown in the table below, generally, MF levels would decrease except for an increase along the right edge of the right-of-way from Walnut Hill Junction to the Campville Substation.

**Table 7-3: Summary of Magnetic Field Calculations**

| Magnetic Field Calculation Summary (Average Annual Loads, field in mG) |                  |      |                   |      |
|--|------------------|------|-------------------|------|
| Section  | Left Edge of ROW |      | Right Edge of ROW |      |
|  | Pre              | Post | Pre               | Post |
| Frost Bridge S/S to Purgatory Junction                                 | 23.9             | 23.5 | 41.3              | 40.9 |
| Purgatory Junction to Walnut Hill Junction                             | 7.3              | 4.2  | 6.1               | 3.9  |
| Walnut Hill Junction to Campville S/S                                  | 20.5             | 12.8 | 0.6               | 1.4  |

\*Left and right edges of ROW are defined by looking from Frost Bridge Substation to Campville Substation

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

225. The EMF BMP directs an Applicant to initially develop a baseline Field Management Design Plan that incorporates “no-cost” MF mitigation design features. The Applicant shall then study potential design alternatives by adding “low-cost” MF mitigation design features specifically where portions of the project are adjacent to residential areas, public or private schools, licensed child day-care facilities, licensed youth camps, or public playgrounds. The overall cost of “low-cost” design features are to be calculated at four percent of the initial Field Management Design Plan. The four percent guideline for “low-cost” mitigation should aim at a magnetic field reduction of 15 percent or more at the edge of the utility’s ROW. This 15 percent reduction should relate specifically to those portions of the project where the expenditures would be made. (Council Administrative Notice Item 29)
226. Eversource’s base Field Management Design Plan incorporates “no cost” magnetic field reduction measures, consistent with the Council’s EMF BMP, through the use of delta structure design where possible and arranging the conductor phases to achieve optimum MF cancellation from other MF

sources in the existing transmission line right-of-way. This “no cost” design was used to develop the pre and post project MF calculations. (Eversource 1, Vol. 1, Appendix 7B)

227. Although the post construction MF levels at the edge of the right-of-way are small compared with the guidelines from ICNIRP and ICES, Eversource examined “low cost” methodologies to reduce MF along the sections the right-of-way abutting the identified Focus Areas. (Eversource 1, Vol. 1, Appendix 7B; Eversource 3, p. 32)
228. As part of the “low cost” modification to the Field Management Design Plan, Eversource examined the feasibility of installing the transmission line underground near the Focus Areas to reduce MF but determined this method would not decrease the MF levels at all three Focus Areas by the recommended 15 percent. Additionally, the cost of underground transmission line installation would exceed the recommend four percent cost allocation to achieve MF reduction. (Eversource 1, Vol. 1, Appendix 7B)
229. In addition to the new transmission line, the transformers and other equipment within the Frost Bridge and Campville Substations are other potential EMF sources. These sources, however, would be expected to cause little or no exposure to the general public because the strength of fields from typical substation equipment decreases rapidly with distance and reaches very low levels at relatively short distances beyond the substation perimeter fence. (Eversource 3, p. 28)

#### **Public Safety**

230. The proposed Project would be constructed in full compliance with the National Electric Safety Code, standards of the Institute of Electrical and Electronic Engineers, and the American National Standards Institute, good utility practice and applicable PURA regulations regarding the methods and manner of transmission line construction. (Eversource 1, Vol. 1, p. 4-37)
231. Protective relaying equipment would be incorporated into the new transmission line and substation designs to automatically detect abnormal operational conditions. Circuit breakers would automatically be triggered to isolate the faulted section of the transmission system. (Eversource 1, Vol. 1, pp. 4-37 to p. 4-39)
232. Protective relay mechanisms include redundant primary and back up equipment to ensure continuous operational monitoring if some of the monitoring equipment was out of service. (Eversource 1, Vol. 1, p. 4-38)
233. The new transmission line design includes fiber optic strands installed within the lightning shield wires above the new overhead transmission line to allow for protective relay system communication. (Eversource 1, Vol. 1, p. 4-37)
234. The substations would be remotely controlled and monitored by the Connecticut Valley Electric Exchange System Operator using digital metering systems and a Supervisory Control and Data Acquisition system. (Eversource 1, Vol. 1, p 4-38)
235. Fire and smoke detection systems would be installed within the new Campville Substation control house. These systems already exist at the Frost Bridge Substation control house. If triggered, these detection systems would automatically activate an alarm at the Connecticut Valley Electric Exchange System, a central monitoring installation, where further appropriate action would be taken such as dispatch of personnel to the substation. (Eversource 1, Vol. 1, p. 4-37 to p. 4-39)

236. To deter unauthorized entry to the substations, the existing substations are enclosed by a seven-foot high chain link fence topped with barbed wire. The new fence around the expansion area at the Campville Substation would match existing fencing. Access to the substation compound is through a locked gate. Appropriate signage is in place around each substation indicating the presence of high-voltage equipment. (Eversource 1, Vol. 1, p. 4-39)
237. Physical security at both the Frost Bridge and Campville Substations is consistent with the Council's *White Paper on the Security of Siting Energy Facilities*. The white paper guidelines focused on security issues related to intentional physical destruction of substation equipment. (Council Administrative Notice Item 31; Eversource 1, Vol. 1, p. 4-39)
238. Lighting is installed in and around each substation for safety and security concerns. Additional lighting is present to facilitate emergency night work. (Eversource 1, Vol. 1, p. 4-39)
239. Unauthorized access onto the transmission line right-of-way by third-party off road vehicles is discouraged to the greatest extent practical. Typically, Eversource would install a gate where a right-of-way access road intersects with a public roadway to deter access. Additional gates, berms, and fences would be installed upon consummation with the underlying landowner. (Eversource 1, Vol. 1, p. 6-37; Tr. 2, p. 70)
240. Signs are installed in the right-of-way warning the public of the presence of high-voltage transmission lines. (Eversource 1, Vol. 1, p. 6-37)

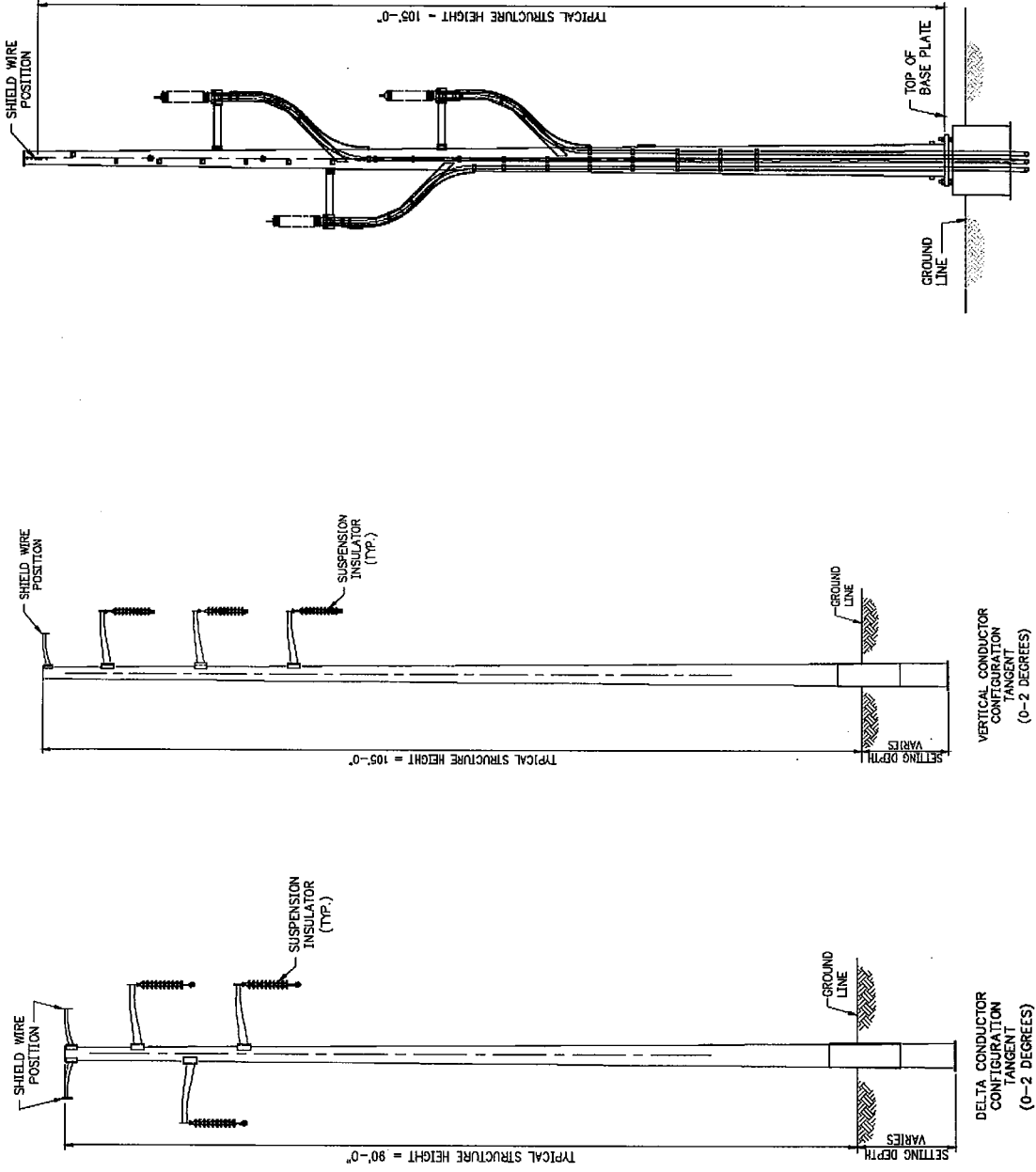
Attachment 1- Aerial Photograph of Frost Bridge Substation (Eversource 1, Vol. 1, p. 3-19)



- Proposed Structure
- Structure to be Removed
- Existing Structure
- Existing Distribution Pole
- Existing Transmission Line (Centerline)
- Proposed 115-kV Line (Centerline)
- Proposed UG 115-kV line (Centerline)
- Existing Transmission Line to be Removed



Attachment 2 – Types of Transmission Structures Proposed for the Project (Eversource 1, Vol. 1, App. 3B)

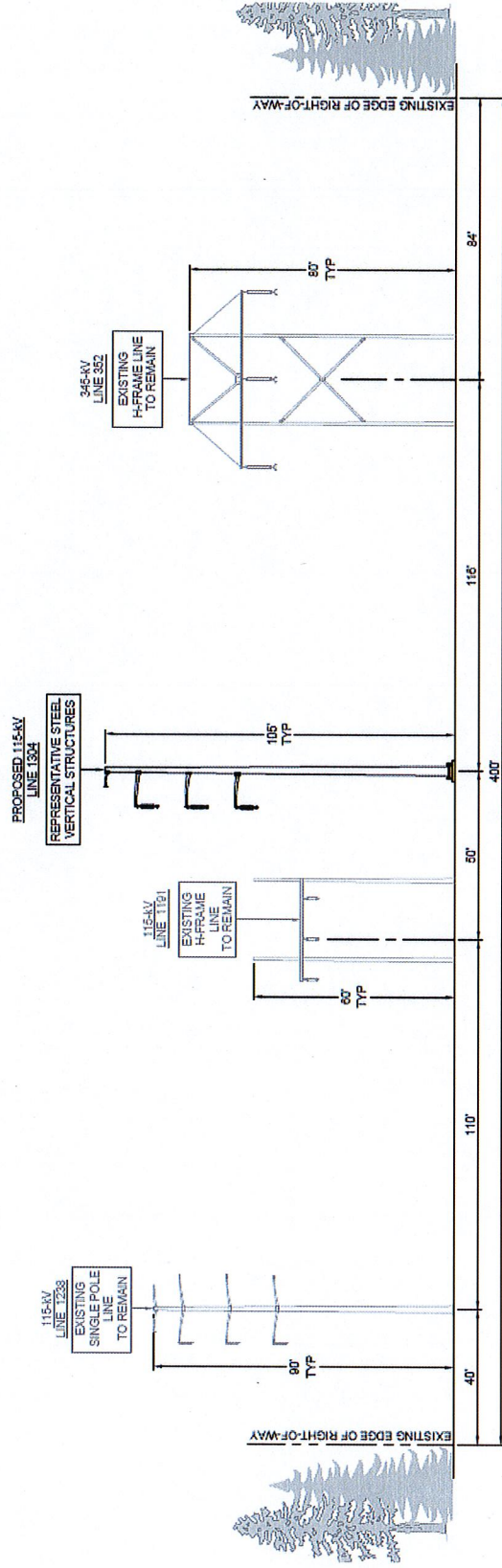


VERTICAL CONDUCTOR  
 CONFIGURATION  
 DEADEND

VERTICAL CONDUCTOR  
 CONFIGURATION  
 TANGENT  
 (0-2 DEGREES)

DELTA CONDUCTOR  
 CONFIGURATION  
 TANGENT  
 (0-2 DEGREES)

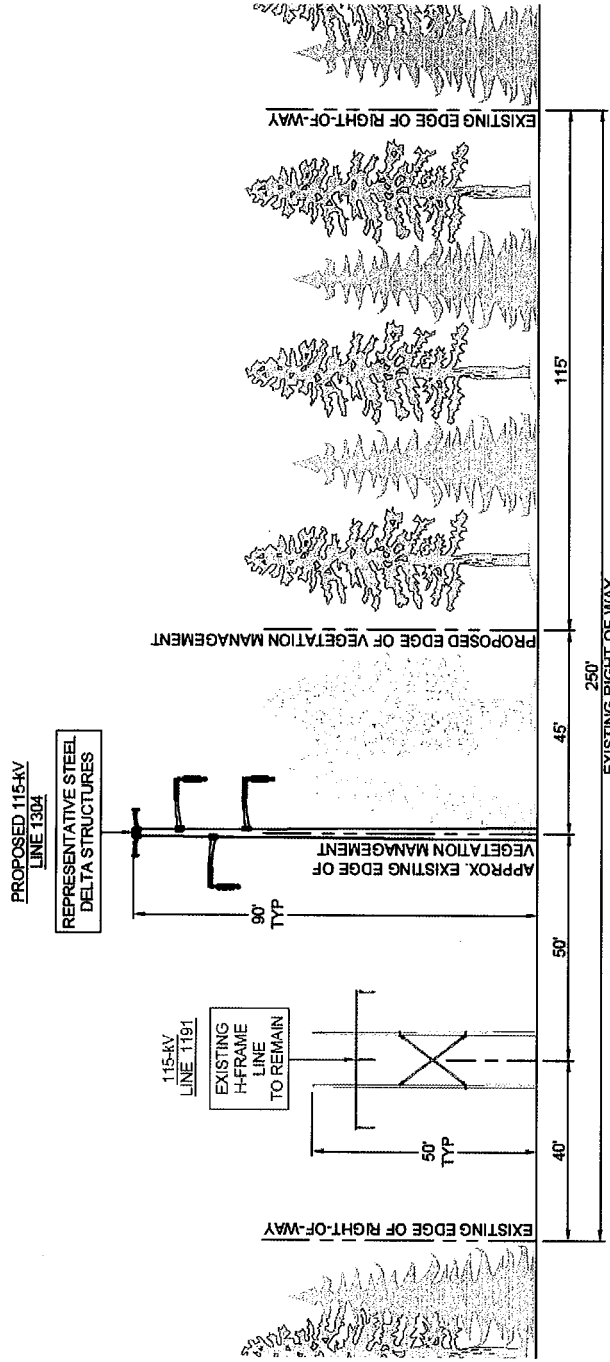
Attachment 3 – Frost Bridge to Purgatory Junction Cross Section (Eversource 1, Vol. 1, XS-2)



PROPOSED CONFIGURATION  
VERTICAL DESIGN

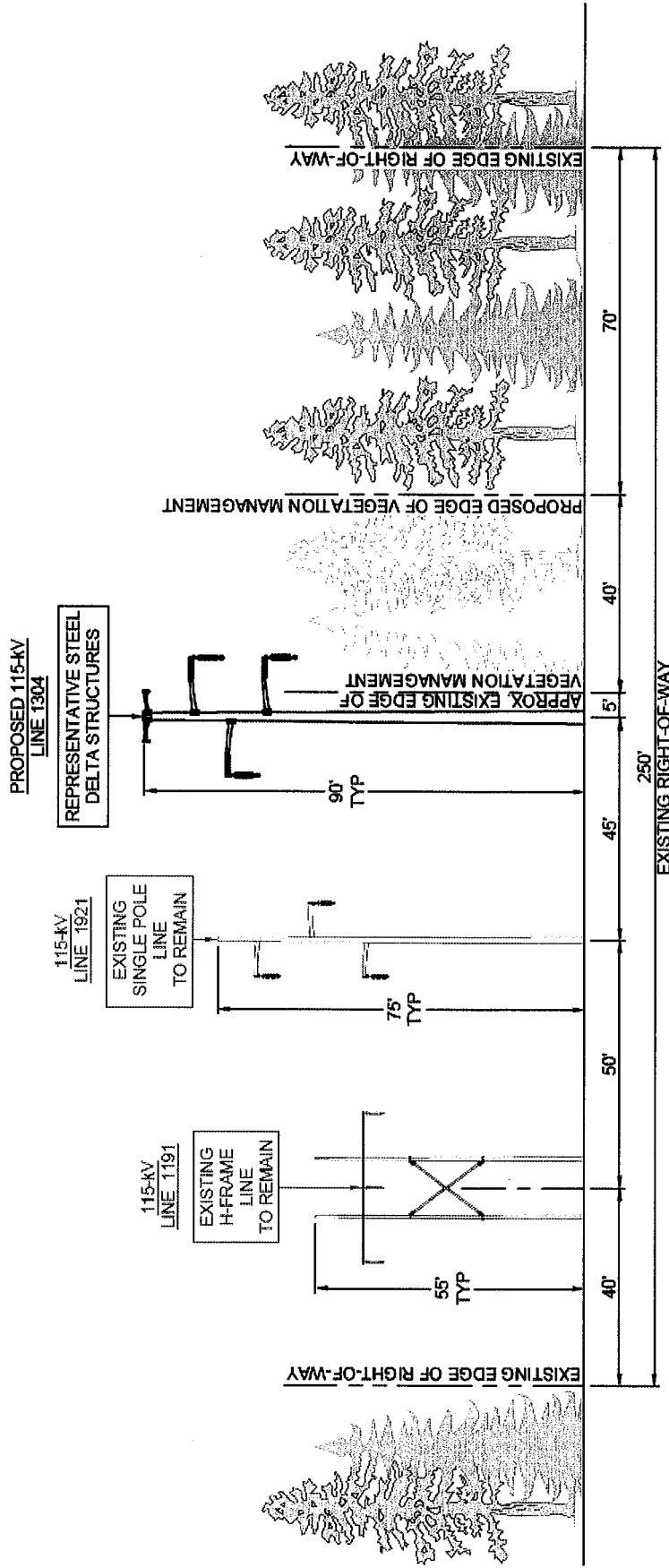
FROST BRIDGE SUBSTATION LINE EXIT  
TO  
PURGATORY JUNCTION  
IN THE TOWN OF  
WATERTOWN  
LOOKING  
WEST  
(2.5 MILES)

Attachment 4 – Purgatory Junction to Walnut Hill Junction Cross Section (Eversource 1, Vol. 1, XS-3)



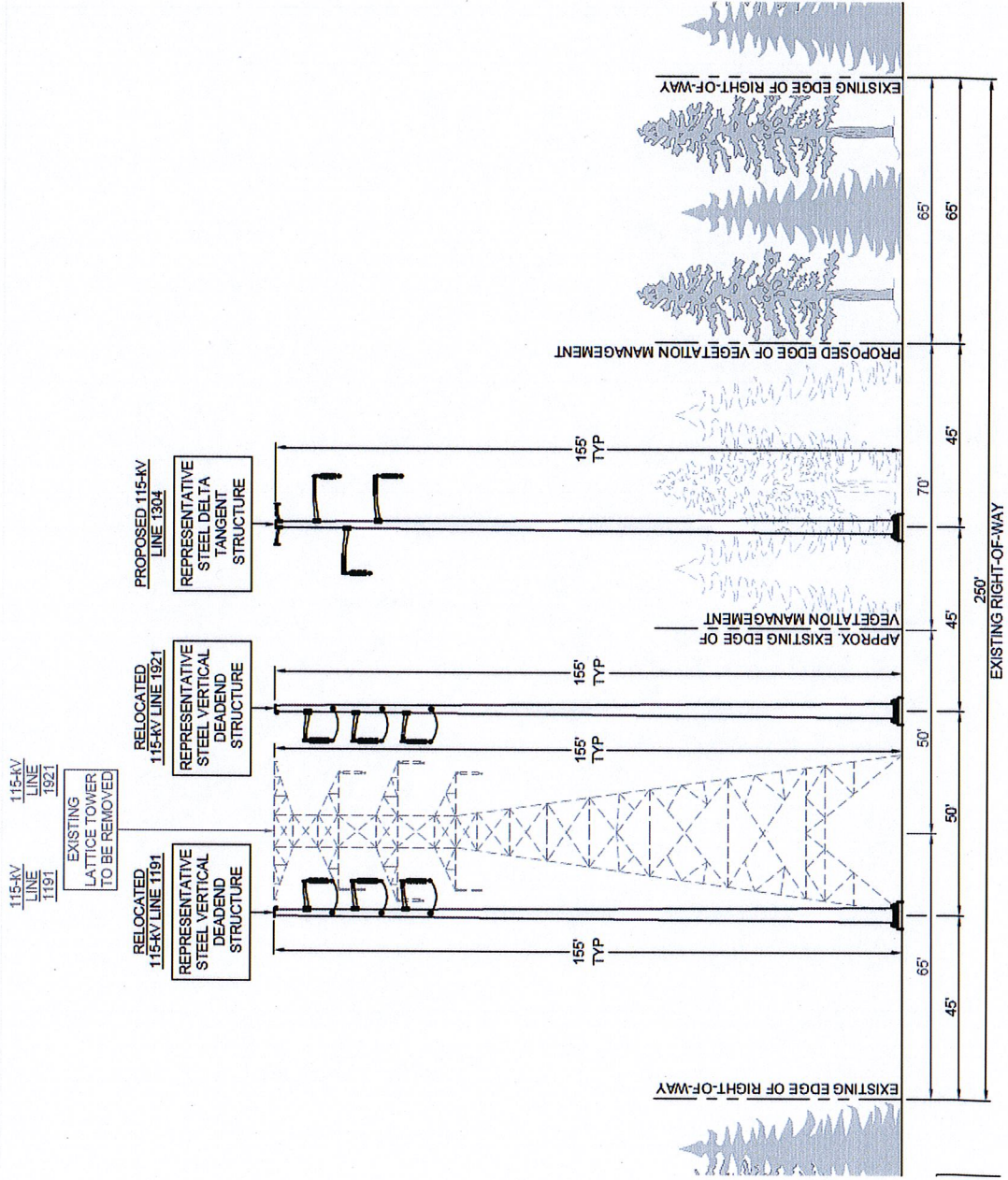
PROPOSED CONFIGURATION  
DELTA DESIGN  
PURGATORY JUNCTION  
TO  
WALNUT HILL JUNCTION  
IN THE TOWNS OF  
WATERTOWN & THOMASTON  
LOOKING  
NORTH  
(3.8 MILES)

Attachment 5 – Walnut Hill Junction to Campville Substation Cross Section (Eversource 1, Vol. 1, XS-4)



PROPOSED CONFIGURATION  
DELTA DESIGN

Attachment 6 – Nagatuck River Crossing Cross Section (Eversource 1, Vol. 1, XS-5)



Attachment 7 - Aerial Photograph of Campville Substation (Eversource 1, Vol. 1, p. 3-21)



|   |   |
|---|---|
| <p><b>DOCKET NO. 466</b> - The Connecticut Light &amp; Power Company d/b/a Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the Frost Bridge to Campville 115-kilovolt (kV) electric transmission line project that traverses the municipalities of Watertown, Thomaston, Litchfield, and Harwinton, which consists of (a) construction, maintenance and operation of a new 115-kV overhead electric transmission line entirely within existing Eversource right-of-way and associated facilities extending approximately 10.4 miles between Eversource's existing Frost Bridge Substation in the Town of Watertown and existing Campville Substation in the Town of Harwinton; (b) related modifications to Frost Bridge Substation and Campville Substation; and (c) reconfiguration of a 0.4 mile segment of two existing 115-kV electric transmission lines across the Naugatuck River in the Towns of Litchfield and Harwinton within the same existing right-of-way as the new 115-kV electric transmission line.</p> | <p>} Connecticut<br/>         } Siting<br/>         } Council<br/>         April 14, 2016</p> |
|---|---|

**Opinion**

**Introduction**

On December 23, 2015, The Connecticut Light and Power Company d/b/a Eversource Energy (Eversource) applied to the Connecticut Siting Council (Council) for a Certificate of Environmental Compatibility and Public Need (Certificate) for the Frost Bridge to Campville 115-kilovolt (kV) electric transmission line project that traverses the municipalities of Watertown, Thomaston, Litchfield, and Harwinton. The project consists of (a) construction, maintenance and operation of a new 115-kV predominantly overhead electric transmission line entirely within existing Eversource right-of-way and associated facilities extending approximately 10.4 miles between Eversource's existing Frost Bridge Substation in the Town of Watertown and existing Campville Substation in the Town of Harwinton; (b) related modifications to Frost Bridge Substation and Campville Substation; and (c) reconfiguration of a 0.4 mile segment of two existing 115-kV electric transmission lines on common structures across the Naugatuck River in the Towns of Litchfield and Harwinton within the same existing right-of-way as the new 115-kV electric transmission line (Project).

**Public Need**

The purpose of the Project is to bring the electric supply system in northwest Connecticut into compliance with applicable national and regional reliability standards and criteria by eliminating potential thermal overloads and voltage violations identified in studies conducted by the Independent System Operator in New England (ISO-NE). ISO-NE is responsible for the reliable and economical operation of New England's electric power system, which includes managing the comprehensive, long-term planning of the regional power system to identify the region's electricity needs and plans for meeting those needs.

As part of a Working Group formed by ISO-NE in 2011 to study grid reliability in the Greater Hartford and Central Connecticut (GHCC) area, analyses of transmission load capability within and between four Connecticut sub-areas, one of which was the Northwest Connecticut sub-area, were conducted. In May 2014, ISO-NE published the results of the needs assessment study, identifying the NWCT sub-area as an area that has insufficient generation and/or transmission to serve its electric load. The GHCC studies revealed criteria violations in the NWCT sub-area load pocket, determining the existing electric system is insufficient to reliably serve peak load customer demands under contingency events. The study identified failures in reliability for various transmission elements and facilities, leading to thermal overloads and voltages falling below acceptable limits. The worst-case condition was identified as the loss of two or more electric import paths into the NWCT sub-area.

In response to the identified weaknesses in the existing electric transmission system in Northwest Connecticut, in 2015, ISO-NE published the GHCC Solutions Report to address these issues. To eliminate the potential electric transmission system contingencies, the report identified the addition of a 115-kV line between Frost Bridge and Campville substations, the separation of the 115-kV lines between Frost Bridge and Campville and from Campville to Thomaston and the addition of a 115-kV breaker at Campville Substation as preferred solutions for the NWCT sub-area.

On April 16, 2015, after review of the solutions report by the ISO-NE Reliability Committee, ISO-NE issued a technical approval of the preferred solutions of the report including transmission improvements to the NWCT sub-area. The proposed Project would bring a new source of power from the Frost Bridge Substation, outside of the load pocket, to the Campville Substation, within the load pocket. This additional import source would allow for the re-distribution and supply of power into the NWCT sub-area if other electrical system elements fail.

During the Working Group's planning for a solution to the GHCC insufficiencies, Eversource considered and rejected a "no action" alternate on the grounds that doing nothing to eliminate existing and potential violations of national and regional reliability standards would be inconsistent with its obligation to provide reliable electric service. Eversource also considered several non-transmission alternatives to the proposed Project, namely: central generation, energy efficiency and energy storage. However, none of the non-transmission alternatives were cost effective or able to provide enough power to resolve the identified reliability criteria violations.

### **Project Alternatives**

In planning the specific route of its proposed 115-kV transmission circuit, Eversource wanted to find the shortest feasible route with the fewest potential environmental and social impacts. In addition to the proposed Project, Eversource reviewed two other alternative 115-kV overhead solutions as well as underground variations for the proposed Project. The alternatives and variations were found not to be cost effective and had a greater environmental and community impact than the proposed Project.

### **Project Description**

The proposed Project entails the installation of a new 115-kV electric transmission line, designated as Line No. 1304, and related improvements as listed below:

- a) modifications of the Frost Bridge Substation in Watertown;
- b) installation of a 0.1 mile 115-kV underground transmission cable exit at the Frost Bridge Substation;
- c) installation of a 10.3 mile long 115-kV overhead transmission line within existing Eversource right-of-way in Watertown, Thomaston, Harwinton and Litchfield to the Campville Substation in Harwinton and reconfiguration of existing electric transmission line support structures that span the Naugatuck River at the Litchfield and Harwinton town line; and
- d) modifications to the Campville Substation.

### ***Substations***

Modifications to both the existing Frost Bridge Substation and the existing Campville Substation would occur on property owned by Eversource. Modifications at the Frost Bridge Substation would include new equipment and structures within the existing fenceline as well as new transmission structures adjacent to the substation fence. An underground transmission circuit would be installed at the Frost Bridge Substation property to connect the new overhead 115-kV line to the substation. Overhead takeoffs directly from Frost Bridge Substation were not feasible without costly modifications to the substation. Modification at the Campville Substation consists of an expansion of the substation by 0.4 acres to the east to accommodate new



equipment that will support the new 115-kV overhead transmission line. Consistent with the Council's concern regarding physical security, the Council recommends installation of a fence with less than two-inch mesh.

### ***Transmission Line***

The proposed 10.3 mile overhead transmission line would be constructed in existing Eversource right-of-way, portions of which are already cleared to support existing electric transmission infrastructure. The 2.5 mile section of right-of-way from Frost Bridge Road to Purgatory Junction (just west of Route 6), is entirely cleared and the new transmission line would be located on new monopole transmission structures located in between existing transmission lines/structures. For areas north of the Purgatory Junction, the width of the existing cleared area of the right-of-way varies as there are one or two existing transmission lines present, depending on location. Eversource would widen the cleared area of the existing right-of-way, typically 40-45 feet, to accommodate the new transmission line on monopole structures with a delta conductor configuration.

In addition to installing the new transmission line within existing Eversource right-of-way, Eversource would improve the existing transmission system by eliminating a common lattice support structure shared by two separate existing transmission lines where they cross the Naugatuck River at the Litchfield-Harwinton town line. New monopole transmission structures, one for each line on each side of the river crossing would be installed to eliminate the potential loss of both transmission lines if one of the existing lattice structures failed. The existing right-of-way in this area would be widened by 70 feet to accommodate the new structures for both the existing and proposed transmission lines.

### **Environmental**

The Project area is mainly rural in character, with scattered residential areas, an industrial area, parks, agricultural fields, extensive forested areas, and numerous water resources, including wetlands. The existing substations, right-of-way and overhead transmission lines have been a familiar part of this landscape for decades.

Work at the Frost Bridge Substation and the expansion of the Campville Substation would have little environmental effect. Some wooded areas would be cleared and graded to accommodate the new electric facilities, but both substations are well established, with the developed areas mostly surrounded by undeveloped portions of adjacent Eversource property. Although the Frost Bridge Substation is not near any sensitive visual receptors, the area where it abuts Frost Bridge Road has overgrown landscaping and areas of unhealthy trees and shrubs. The Council will require Eversource to consider landscaping at Frost Bridge Substation in the D&M Plan.

### ***Vegetation***

Transmission-line construction and maintenance requirements are established by international, federal, and regional power authorities so as to assure reliability. In general, such requirements dictate the removal of all tall-growing tree species from the ROW that could be a hazard to the transmission lines, while low-growing tree species and taller shrub species may remain in the areas outside of the conductor zones, which is the area directly below the lines to 15 feet from the most outward conductors.

Clearing of mature vegetation for the new transmission line would mostly occur north from Purgatory Junction in Watertown, through Thomaston and Litchfield, to the Campville Substation in Harwinton. Approximately 42.2 acres of forested upland and 6.7 acres of forested wetlands would be cleared within this section of the right-of-way. The remainder of the right-of-way, Frost Bridge Road to Purgatory Junction,

would include the clearing of shrub vegetation to accommodate construction work pads and related access areas. Following construction and restoration activities, the right-of-way would be monitored and controlled on a four-year vegetation management cycle. Invasive species would be discouraged from establishing in the new right-of-way area through repeated cutting or targeted removal.

The Council recognizes the proposed additional clearing in the right-of-way would alter established vegetation and associated wildlife habitats, but considers that these effects would be small, localized expansions of existing cleared areas. Conversion of more land area within the right-of-way from woodland to shrubland habitat would benefit certain wildlife species that are declining in the State and region. Old field and shrubland habitats are declining because former post-agricultural lands are either being developed or allowed to revert to second-growth woodland.

### ***Wetlands and Watercourses***

The Project route crosses 58 watercourses/waterbodies and would affect 48 wetlands and 21 vernal pools. Although Eversource intends to minimize the disturbance to these resources to the greatest extent practical, there would be impacts from construction including the restoration and widening of existing access roads traversing the right-of-way, installation of work pads, and clearing of forest within wetlands or along watercourses. The Project would temporarily affect 27 wetlands and 21 vernal pools. Three of the identified vernal pools are decoy pools that were formed from impoundment through existing access road use. Construction impacts in these areas would be minimized through the use of temporary construction matting or gravel on geotextile fabric. In some instances, permanent wetland impacts would occur where it is not possible to relocate an existing access road, or a transmission structure. The preliminary design for the project includes the partial filling in three different wetlands and the partial filling of one vernal pool. The Council is aware decoy pools may result in harm to amphibian fauna because they may not hold water long enough to allow amphibians to develop. The Council will order Eversource to include a measure to allow the natural removal of decoy pools by providing appropriate road drainage features.

### ***Wildlife***

Based on review of the Natural Diversity Database for state endangered, threatened or special concern species and ongoing consultations with DEEP, five state listed species were identified as potentially occurring in the Project area: wood turtle, smooth green snake, spotted turtle, northern spring salamander, and the frosted elfin butterfly. During construction, Eversource would implement DEEP-approved protection strategies for each of these species.

### ***Historic and Cultural Resources***

The Project would not affect any previously identified historic sites, archeological sites, or properties listed on the National Register of Historic Places. Eversource would conduct further subsurface archeological field investigations during final project design. If significant archeological deposits are found, Eversource would relocate temporary and permanent Project infrastructure to the greatest extent possible.

The Project would traverse several hiking and multiuse trails. Eversource would coordinate with DEEP and other managers of the affected trails to ensure public notification of construction activities and temporary closure of trails.

### ***Visibility***

The visual impact of the Project on State, Federal and Town public recreation facilities and properties would be minimal given the presence of the existing managed right-of-way adjacent to and within these areas. Most

visibility from recreational resources would be where hiking trails intersect with the existing right-of-way. Additionally, the visibility impact of the new transmission line from adjacent areas would be incremental as it is being installed within an existing right-of-way that already contains transmission line structures. To minimize the visual effect of new transmission structures and in compliance with the *FERC Guidelines for the Protection of Natural, Historic, Scenic and Recreational Values in the Design and Location of Rights-of-Way and Transmission Facilities*, Eversource would install the structures in line with existing structures to the greatest extent practical. The Council recognizes Eversource's effort to minimize visibility and encourages Eversource to investigate decreasing the height of the proposed transmission line structures to the greatest extent possible as part of the D&M Plan for the Project.

One property owner, the Thomaston Fish and Game Club, requested that Eversource utilize H-frame structures for 11 structures located on or near their property to minimize the visual impact. However, since H-frames are slightly lower (14 to 18 feet) than the proposed monopole design, the lower height would require more clearing to provide adequate conductor clearance from adjacent vegetation. This clearing would widen the visual profile of the right-of-way and require clearing in a sensitive forested vernal pool that has the only known marbled salamander population in Thomaston. Given these substantial effects for a modest structure height reduction and the additional cost of \$700,000 for the H-frame installation, the Council finds the proposed monopole design with a delta conductor configuration preferable.

### **Electric and Magnetic Fields**

Included in the review of the Project's environmental impact was a review of electric and magnetic fields (EMF). The Project route traverses a corridor already occupied by transmission lines that emit EMF. In accordance with the Council's *Electric and Magnetic Fields Best Management Practices for the Construction of Electric Transmission Lines in Connecticut*, Eversource reviewed current literature to determine if there were new developments or guidelines related to EMF exposure. No changes were identified. Additionally, Eversource developed a Field Management Design Plan to investigate cost effective ways to minimize EMF levels resulting from the new transmission line. Eversource ultimately selected a monopole design from Frost Bridge Road to Purgatory Junction and monopoles with a delta conductor configuration from Purgatory Junction to Campville Substation. The delta conductor configuration in particular arranges the conductors so that EMF is mitigated through cancellation from other sources, in this case the other transmission line in the right-of-way. Upon review of the EMF data provided in the Application, the Council finds the EMF levels associated with the project to be well below recommended EMF exposure standards from research groups.

### **Conclusion**

The Council finds that there is a public need for the proposed Project as it is necessary for the reliability of the electric power supply of the state and 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.

The Council has examined the policies of the state concerning the natural environment, ecological balance, public health and safety, air and water purity, and fish, aquaculture and wildlife, together with all other environmental concerns, including EMF, and balanced the interests in accordance with Conn. Gen. Stat. § 16-50p(a)(3)(B) and Conn. Gen. Stat. § 16-50p(a)(3)(C). The environmental effects that are the subject of Conn. Gen. Stat. § 16-50p (a)(3)(B) can be sufficiently mitigated and do not overcome the public need for the facility. Furthermore, the Council finds 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 Conn. Gen. Stat. § 16-50p (a)(3)(E).

include, among other items, 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, species protection plan upon consultation with DEEP, 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; provisions for re-vegetation and maintenance of the right-of-way, provisions for inspection and monitoring of the proposed right-of-way and substation construction, and pre-construction and post-construction measurements of EMF. In order to verify consistency with the Council's Decision and Order, the Council will require the Certificate Holder to document compliance with environmental requirements and prepare periodic status reports.

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 transmission circuit between the Frost Bridge Substation in Watertown and Campville Substation in Harwinton and related substation and line improvements.

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| <p><b>DOCKET NO. 466</b> - The Connecticut Light &amp; Power Company d/b/a Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the Frost Bridge to Campville 115-kilovolt (kV) electric transmission line project that traverses the municipalities of Watertown, Thomaston, Litchfield, and Harwinton, which consists of (a) construction, maintenance and operation of a new 115-kV overhead electric transmission line entirely within existing Eversource right-of-way and associated facilities extending approximately 10.4 miles between Eversource's existing Frost Bridge Substation in the Town of Watertown and existing Campville Substation in the Town of Harwinton; (b) related modifications to Frost Bridge Substation and Campville Substation; and (c) reconfiguration of a 0.4 mile segment of two existing 115-kV electric transmission lines across the Naugatuck River in the Towns of Litchfield and Harwinton within the same existing right-of-way as the new 115-kV electric transmission line.</p> | <p>} Connecticut<br/>} Siting<br/>} Council<br/>} April 14, 2016</p> |
|---|--|

**Decision and Order**

Pursuant to Connecticut General Statutes Section 16-50p and the foregoing Findings of Fact and Opinion for the Frost Bridge to Campville 115-kilovolt (kV) electric transmission line project, 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-kV overhead electric transmission line, associated facilities and related improvements to the Frost Bridge Substation in Watertown and the Campville Substation in Harwinton (Project), including effects on the natural environment; ecological integrity and balance; forests and parks; 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 Connecticut General Statutes §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 electric transmission line overhead along the proposed route 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.
2. The Certificate Holder shall prepare two D&M Plans for this Project; one specific to the proposed substation improvements and one specific to the proposed construction of the new transmission line and improvements to the existing transmission lines. 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 Towns of Watertown, Thomaston, Litchfield, Harwinton, and Plymouth and the City of Waterbury 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. Detailed site plans showing the placement of the access roads, structure foundations, equipment and material staging area for the overhead route;
  - b. A site plan that includes fencing detail for the replacement fence at Campville Substation with the recommendation of less than 2-inch mesh fencing;

- c. Identification of areas for staging and equipment lay down, field office trailers, sanitary facilities and parking;
  - d. A site plan including landscaping at Frost Bridge Substation;
  - e. An erosion and sediment control plan, consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended;
  - f. Identification of wetland and watercourse resources, related temporary and permanent construction impacts and methods to reduce such impacts including a measure to allow the natural removal of decoy pools by providing appropriate road drainage features;
  - g. Details of ground disturbance;
  - h. Vegetative clearing plan;
  - i. Wetland restoration plan;
  - j. A spill prevention and countermeasures plan;
  - k. Invasive species control plan;
  - l. Provisions to manage the discovery of undocumented Native American Archaeological resources;
  - m. A schedule of construction hours;
  - n. A blasting plan, if necessary;
  - o. Plans and strategies to prevent post-construction use of the right-of-way by all-terrain vehicles;
  - p. Provisions for site specific measures to reduce impacts to State listed endangered, threatened, and special concern species as well as vernal pools and associated fauna; and
  - q. EMF Monitoring Plan.
3. The Certificate Holder shall comply with the Department of Energy and Environmental Protection recommendations, or coordinate with the Department of Energy and Environmental Protection, for construction of the route in the area of endangered, threatened, or special concern species identified along the Project route.
  4. The Certificate Holder shall hire an independent environmental inspector, subject to Council approval, to monitor and provide a bi-weekly report to the Council regarding environmental compliance with the approved D&M Plan.
  5. The Certificate Holder shall obtain necessary permits from the United States Army Corps of Engineers and the Connecticut Department of Energy and Environmental Protection prior to the commencement of construction, in areas where said permits are required.
  6. The Certificate Holder shall conform to the Council's Best Management Practices for Electric and Magnetic Fields.
  7. 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.
  8. 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.
  9. This Decision and Order shall be void if all construction authorized herein is not completed within four years of the effective date of the Decision and Order, or within four years after all appeals to this Decision and Order have been resolved.

10. This Certificate may be surrendered by the Certificate Holder upon written notification to the Council.
11. 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.
12. 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.
13. 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 January 21, 2016, and notice of issuance published in the Waterbury Republican-American.

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.



# STATE OF CONNECTICUT

## CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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

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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. 466** - The Connecticut Light & Power Company d/b/a Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the Frost Bridge to Campville 115-kilovolt (kV) electric transmission line project that traverses the municipalities of Watertown, Thomaston, Litchfield, and Harwinton, which consists of (a) construction, maintenance and operation of a new 115-kV overhead electric transmission line entirely within existing Eversource right-of-way and associated facilities extending approximately 10.4 miles between Eversource's existing Frost Bridge Substation in the Town of Watertown and existing Campville Substation in the Town of Harwinton; (b) related modifications to Frost Bridge Substation and Campville Substation; and (c) reconfiguration of a 0.4 mile segment of two existing 115-kV electric transmission lines across the Naugatuck River in the Towns of Litchfield and Harwinton within the same existing right-of-way as the new 115-kV electric transmission line., and voted as follows to approve the proposed project:

#### Council Members

#### Vote Cast

Robert Stein, Chairman

Yes

James J. Murphy, Jr., Vice Chairman

Yes

Chairman Arthur House  
Designee: Larry Levesque

Yes

Commissioner Robert Klee  
Designee: Robert Hannon

Yes

Philip T. Ashton

Yes

Daniel P. Lynch, Jr.

Yes

Dr. Michael W. Klemens

Yes

Dated at New Britain, Connecticut, April 14, 2016.



# **Attachment B:**

# **Spill Prevention and Control Plan**

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**ATTACHMENTS**

B.1 Spill Report Form

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## 1. INTRODUCTION

This Spill Prevention and Control Plan (SPCP or Plan) describes measures to minimize the potential for a spill of petroleum products or a hazardous or toxic substance and, in the event that a spill does occur, to contain and control the release to minimize the effects. Eversource Energy (Eversource) will require all construction contractors to adhere to the procedures presented in this Plan during the construction of the Frost Bridge to Campville 115-kV Project (Project). Accordingly, this Plan describes:

- The identification of petroleum products and materials classified as hazardous or toxic that are likely to be used during Project construction;
- Training, equipment inspection and maintenance, and other procedures designed to minimize the potential for a spill;
- The transport, storage, and disposal procedures for these substances; and
- The procedures to be followed in the event of a release of a petroleum or hazardous / toxic substance to the environment, including a spill reporting protocol. Attachment B.1 includes a copy of the Spill Report Form that construction contractors must complete and submit to Eversource.

This SPCP conforms to the requirements of the Project's regulatory approval from the Connecticut Siting Council (Council), as well as commitments made in Project permit applications to the U.S. Army Corps of Engineers (USACE) and the Connecticut Department of Energy and Environmental Protection (CT DEEP)<sup>1</sup>. The Plan applies to all elements of the construction of the Project, including not only Project sites (e.g., the transmission line right-of-way [ROW], off-site access roads and substations), but also contractor yards and staging areas managed for Project support purposes.

*Note: Eversource does not anticipate on-site bulk storage of petroleum or other regulated substances during Project construction. However, if a construction contractor elects to maintain large quantities of petroleum products at a Project staging area, then requirements in addition to this SPCP may apply. Specifically, pursuant to Title 40, Section 112 of the Code of Federal Regulations (CFR), a Spill Prevention, Control, and Countermeasure (SPCC) Plan must be prepared if the construction site will have 1,320 gallons of aggregate above-ground storage capacity or more in 55-gallon (or larger) containers, or 42,000 gallons in underground storage not regulated by underground storage tank (UST) rules. Any temporary tanks or fueling trucks parked on site and used to "store" petroleum are subject to the SPCC Plan requirements. If, at any time, a Project construction contractor's cumulative storage capacity exceeds 1,320 gallons on-site, the contractor must prepare a SPCC Plan, signed by a registered professional engineer, in accordance with 40 CFR 112. Copies of the SPCC Plan do not need to be filed with any regulatory agencies, but must be maintained at the contractor's Project office and also be provided to Eversource's Project Manager, Burns and McDonnell (BMcD).*

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<sup>1</sup> Condition No. 2(j) of the Council's approval of the Project (Decision and Order, Docket No. 466, April 14, 2016) requires that a SPCP be prepared as part of the D & M Plan for the Project. In its applications to the Council, USACE, and CT DEEP, Eversource committed to conform to its 2011 *BMP Manual: Construction and Maintenance Environmental Requirements for Connecticut*.

## **2. IDENTIFICATION OF PETROLEUM PRODUCTS AND OTHER HAZARDOUS / TOXIC SUBSTANCES USED DURING CONSTRUCTION, AND DESIGNATION OF CLEANUP CONTRACTOR**

### **2.1 Materials Subject to this SPCP**

The principal materials used during Project construction that are addressed in this SPCP are petroleum products, such as fuels, lubricants, fluids, and related materials used for the operation of construction vehicles and equipment. Also included are other substances classified as hazardous or toxic that may be used during construction.

Each construction contractor will compile and maintain a list of the petroleum products and hazardous / toxic substances used in the performance of Project work, along with a Material Safety Data Sheet (MSDS) for each such material. The MSDSs will be kept on-site (e.g., at the construction contractors' offices in Project construction yards or staging areas) for the duration of construction. The contractor(s) will make the list of products and associated MSDSs available for audit by Eversource or its Project Manager upon request.

Due to the different types of petroleum products and other regulated materials typically used during construction, different handling and storage procedures may be required. Eversource will require its construction contractors to adhere to all directions and warnings for products used on the Project.

### **2.2 Designation of Connecticut-Licensed Spill Response and Cleanup Contractor**

Prior to the start of construction, each construction contractor must identify a licensed spill response contractor who can respond promptly, if required, during construction as detailed in Section 4.4 of this plan.

### 3. TRAINING AND MANAGEMENT PRACTICES

Key measures to avoid spills during construction include proper training of construction personnel in spill prevention and control techniques, properly maintaining construction equipment, and proper management regarding the storage and use of petroleum and hazardous/toxic substances used during construction. In the event that a spill does occur, construction personnel will be trained in the techniques to promptly and properly contain, clean up, and report the spill.

#### 3.1 Training

Prior to the start of a contractor's work on the Project, Eversource (or its Project Manager) will provide initial training for the contractor with respect to safety, environmental compliance, and public outreach. As part of this initial contractor training, construction personnel will be briefed on the requirements of this SPCP; will be made aware of sensitive resources along and in the vicinity of Project work sites (e.g., ROW, off-ROW access roads, substations); and will be informed of the key pollution control laws, rules, and regulations applicable to their work.

Contractors will be required to implement procedures aimed at minimizing the potential for spills and for promptly responding to and reporting spills, should they occur. Examples of such procedures are:

- Inspect, operate, and maintain equipment to minimize the potential for the accidental discharge or release of fuel, oil, or lubricants to the environment.
- Implement employee training / awareness regarding the handling of fuels and, as applicable, hazardous or toxic materials.
- Perform refueling to minimize the potential for a release to the environment.
- Maintain adequate supplies of spill response equipment, materials, and supplies in accessible locations for cleanup of a release.
- Conform to regulatory requirements and Project specifications regarding equipment operation, refueling, and the use of petroleum products near water resources.
- In the event of a spill, promptly respond and follow required reporting procedures.

#### 3.2 Equipment Inspection and Maintenance

To minimize the potential for a spill due to equipment failure, the construction contractors will be responsible for:

- Routinely inspecting and maintaining construction equipment, including hydraulic lines, valves, and other hoses;
- Promptly repairing any equipment leaks or faulty equipment components;
- Routinely inspecting and maintaining in good condition all containers, valves, pipes, hoses, and other components of storage areas for fuels and lubricants;

- Providing appropriately-sized and provisioned spill containment kits to construction crews and replenishing such supplies as needed; and
- Maintaining stockpiles of spill cleanup materials at easily accessible locations, including at both substations sites and staging areas.

In addition, the construction contractors will be responsible for providing portable toilets at construction sites. The construction contractor will be responsible for properly locating portable toilets in upland areas, away from any water resources, sensitive environmental resources, or other restricted areas, and for arranging for routine cleaning and maintenance of these facilities.

### **3.3 Fuel and Material Storage**

Eversource's construction contractors will be required to implement the following procedures when storing fuels and hazardous / toxic substances. These procedures are intended to limit the potential for spills and to minimize the impact of releases that may accidentally occur:

- No bulk quantities of hazardous substances, toxic materials, or petroleum products will be stored, unless approved by Eversource, within 25 feet of any waterbody, wetland, water supply well, spring, or other water resource. Such materials typically will be stored in upland areas;
- At Project staging and support sites, contractors will make efforts to store only enough products required to complete the job;
- Materials will be stored in a neat, orderly manner, in appropriate containers, and, if possible, under a roof or enclosure;
- Chemical and/or petroleum products will be kept in original containers with the original manufacturer's label. Fuels that need to be kept in portable containers will be stored in tightly sealed containers designed to hold such fuels and will be clearly labeled. Preferably, the containers will be stored in a covered truck or trailer that provides secondary containment for the products;
- Substances will not be mixed unless approved by the manufacturer;
- Whenever possible, all of a product will be used before disposing of the container;
- Manufacturer's recommendations for proper use and disposal of a product will be followed; and
- If surplus product must be disposed, the manufacturer's or state-recommended methods for proper disposal will be followed.

Any containment area for the storage of petroleum products will have a minimum capacity of 110% (1.1 times) the combined maximum volume of all containers within the containment area. (The containment must have sufficient freeboard to accommodate the maximum precipitation from a 25-year 24-hour storm event.) Storage areas will not have drains unless such drains lead to a containment area or vessel of sufficient size to contain and recover a full release of all stored products. A berm, or



other suitable containment device, will be installed around any storage shed housing materials that are potentially hazardous to the environment. Bulk storage tanks having a capacity of more than 55 gallons will be provided with secondary containment consisting of a temporary earthen berm or other means.

After each rainfall, the contractor will inspect all containment areas for excess water. If no sheen is visible, the contractor can pump the collected water to the ground in a manner that does not cause scouring. If present, any sheen must be cleaned up prior to discharging the water. Otherwise, the contaminated water must be transported and disposed of off-site in accordance with local, state, and federal requirements.

### **3.4 Equipment Refueling and Parking**

Contractors will implement the following measures when refueling equipment and when parking equipment on Project sites:

- Generally, fuel will be stored at contractor yards and certain construction equipment will be refueled there (other equipment, such as cranes, drilling equipment, will be refueled in uplands on the ROW or at the substation sites).
- Refueling equipment will be manned throughout the refueling operation.
- Spill kits will be on hand during all refueling operations.
- Equipment refueling will not be performed within 25 feet of any waterbody or wetland, with the following potential exceptions:
  - Areas with rugged terrain or steep slopes where movement of equipment outside of such 25-foot buffers would cause excessive disturbance to the work area;
  - Areas where removing equipment from or near a wetland and/or watercourse for servicing or refueling would increase adverse impacts to the water resource;
  - Locations where the water body or wetland is located adjacent to a road crossing (from which the equipment can be fueled): and
  - Refueling of equipment that is not readily mobile or must remain on-site for prolonged periods to safely complete a construction task (e.g., drilling rigs, cranes for structure installation).
- During refueling, all necessary precautions will be taken to avoid or minimize the potential for an accidental spill. Appropriate spill kits / absorbent materials will be available at all refueling sites. If refueling must occur within a wetland or within 25 feet of a water resource, temporary containment will be provided as appropriate.
- Except for equipment that cannot be practically moved (e.g., cranes, drill rigs), construction equipment and vehicles will not be serviced or parked overnight on access roads or work pads within wetlands.

## 4. SPILL EQUIPMENT, RESPONSE, CONTROL, AND CLEANUP

### 4.1 Spill Containment and Cleanup Equipment

Prior to the start of construction, contractors will prepare, for approval by Eversource, a list of the type, quantity, and storage location of spill containment and cleanup equipment that will be available for use during construction. Table 4-1 provides a general list of the basic types of spill containment and cleanup materials to be kept on-hand during construction activities in uplands, near water resources, and at refueling and product storage sites. In response to a spill, the contractor will use equipment and control/cleanup measures appropriate to contain and clean up the spilled material, taking into consideration the environmental characteristics of the area affected by the release.

### 4.2 Spill Response and Control

If a spill occurs, containment and control of the release are the immediate priorities. Eversource's construction contractor(s) will take immediate action to minimize the impact of the spill (containment) and to implement appropriate cleanup action. Cleanup procedures will begin immediately after a release is contained. In the event of a spill, the contractor will typically take the following actions:

- The spill will be immediately stopped at the source;
- If the spill impacts a water resource, the spill will be contained through the use of appropriately deployed containment materials (e.g., sorbent booms, absorbent pads, constructing dikes) and then will be collected with sorbent materials, skimmed off water surfaces with booms, and/or the contaminated soil will be excavated;
- If the spill occurs in uplands, the contaminated soil will be excavated;
- The waste materials will be properly disposed at a Eversource-approved disposal site; and
- The affected areas will be restored as closely as possible to previous condition.

### 4.3 Spill Notifications

#### 4.3.1 Notifications to Federal, State, and Local Agencies

In Connecticut, a spill, as defined in CGS Section 22a-450, means the discharge, spillage, uncontrolled loss, seepage, or filtrations of oil or petroleum or chemical liquids or solid, liquid or gaseous products or hazardous waste that poses a potential threat to human health or the environment. All such spills are reportable.

Eversource requires that **ANY release of these materials, in any amount, must be reported to the CT DEEP.** Project construction contractor(s) are responsible for providing immediate notification of spills to the CT DEEP and other entities, as required. When notifying CT DEEP, obtain the CT DEEP representative's badge number and record the Spill Identification Number assigned to the incident by CT DEEP.

**Table 4-1**

**Typical Spill Containment and Cleanup Equipment and Supplies**

**For General Construction in Upland Areas (Transmission Line, Substations):**

- Sorbents (e.g., pillows, socks, and wipe sheets) for containment and pick-up of spilled liquids;
- Pre-packaged, self-contained spill kits containing a variety of sorbents for small to large releases; (e.g., kits that can be stored on equipment with the capacity of absorbing up to 5 gallons);
- Structures such as gutters, culverts, and dikes for immediate spill containment;
- Shovels, backhoes, etc., for excavating contaminated materials;
- Sumps and collection system; and
- Drums, barrels, and temporary storage bags to clean up and transport contaminated materials.

**For General Construction in or Near Water Resource Areas:**

- All of the above (for upland sites) and the following:
- Oil containment booms and the related equipment needed for rapid deployment; and
- Equipment to remove petroleum-based products from water.

*(This equipment will be located near wetlands and water bodies to reduce response time in the event of a release.)*

**For Storage of Products and Equipment Refueling:**

- Sorbent pads and/or mats, containment equipment, or equivalent protective measures (e.g., kiddie pools or basins to be placed on the ground beneath equipment before refueling or maintenance activities). (The quantity and capabilities of the mats will be sufficient to capture the largest foreseeable spill given workspace characteristics, crankcase size, and other fuel vessel capacities.)
- Dedicated sorbent / spill response kits or functional equivalent to be kept on major pieces of construction equipment (e.g., pumps, cranes, drill rigs, hydraulic lifts) that must be routinely refueled or maintained on Project sites (because movement of such equipment to designated refueling or maintenance yards is impractical or inefficient).

**It is the Project construction contractors' responsibility to report spills of any amount to CT DEEP. Spills must be reported immediately (24/7) to:**

**CT DEEP Emergency Response and Spill Prevention Division  
860-424-3338 or toll free at 866-337-7745 (866-DEPSIL)**

**If the above numbers are unavailable for any reason, call 860-424-3333**

In the event of any spill, the Project construction contractor shall immediately report the following facts to CT DEEP, pursuant to Section 22a-450<sup>2</sup>:

- Location of spill;
- Quantity and type of substance, material, or waste released;
- Date and cause of the incident;
- Name and address of the owner;
- Name and address of the person making the report, and their relationship to the owner.

In addition to the notification to CT DEEP, some spills may be reportable to the Federal government. An oil spill must be reported to the Federal government if the spill is to navigable waters<sup>3</sup> or the adjoining shoreline; water quality standards could be violated; the spill causes a sheen or discoloration; or the spill causes a sludge or emulsion. Spills of hazardous chemicals must also be reported to the Federal government, depending on the quantity of the material spilled and if the release could threaten human health. The Federal reportable spill quantities for hazardous materials are listed in 40 CFR, Part 302.4 (refer to the table entitled "List of Hazardous Substances and Reportable Quantities")<sup>4</sup>. Incidents that are required to be reported under the Federal Emergency Planning and Community Right-to-Know Act or other prevailing/applicable Federal law are reportable to:

- The State Emergency Response Commission (CT DEEP at 860-424-3338);
- The National Response Center at 800-424-8802;
- The local community emergency coordinator.

A report by the Project construction contractor to the local fire department is also recommended (911 throughout Connecticut).

<sup>2</sup> Note: Unless specifically requested for a particular incident, CT DEEP does not require a written submission when reporting a spill.

<sup>3</sup> No waters along the Frost Bridge to Campville ROW or near the substations are navigable.

<sup>4</sup> Available online at: <http://www.gpo.gov/fdsys/pkg/CFR-2010-title40-vol27/pdf/CFR-2010-title40-vol27-sec302-4.pdf>

#### 4.3.2 Notification and Reporting to Eversource

In addition to notifying the CT DEEP, the construction contractor or other Project personnel who first observe a spill will provide immediate verbal notification to the designated Eversource or BMcD Project representative<sup>5</sup>. Within 24 hours of a spill, the construction contractor will prepare and submit to BMcD or Eversource a *Spill Report Form* (refer to Attachment B.1). This form must include the following information regarding the spill, along with any relevant supporting information (such as maps) and representative photographs:

- Date, time, and location of the spill, including name and address (town) of the owner of the property where the spill occurred and the nearest transmission line structure number (if on the ROW);
- The quantity and type of the substance, material, or waste spilled;
- Circumstances that caused the spill;
- List of water resources affected or potentially affected by the release (if applicable);
- Statement verifying whether a sheen is present;
- Size of the affected area;
- Estimate of the depth that the material has reached in water or in soil;
- Determination of whether the release has or will migrate off Project work areas (e.g., Eversource property, ROWs, staging areas, off-ROW access roads);
- Determination of whether the release is under control;
- Status of the cleanup effort and a description of the methods used (or to be used) to clean up the release;
- Name(s), company affiliation(s), and address(es) of the personnel who identified the release;
- List of any soil and water samples taken;
- Names of contacts made to federal, state, and local agencies, as applicable, and time of report (include, at minimum, CT DEEP representative's badge number and the CT DEEP-assigned spill identification number); and
- Name, address, and company affiliation of the person who completed the *Spill Report Form*.

The designated BMcD or Eversource Project representative will verify that the construction contractor's *Spill Report Form* is complete and will submit it to Eversource Environmental Affairs.

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<sup>5</sup> Contact information for Eversource and BMcD Project personnel will be provided to construction contractors in conjunction with the initial Project training.

#### **4.4 Spill Cleanup**

Eversource's construction contractors will clean up all spills promptly using appropriate containment and cleanup measures. Spill containment equipment will not be used for storing wastes resulting from cleanup efforts or other contaminated material.

Small spills may be contained and cleaned up by Project construction crews using the on-site spill containment and cleanup materials. In such cases, all contaminated materials will be properly handled, contained, and transported in secure containment to a staging area for pick-up and ultimate disposal by the construction contractor's designated and pre-approved spill response firm. **In no case will spills or contaminated materials (including waste oils) be buried or otherwise disposed of on Project sites.**

If the Project construction contractor determines that a release cannot be adequately excavated and disposed of by its construction crews alone, the construction contractor will contact the designated spill response firm. Any cleanup must be performed by a licensed spill response contractor, as required by CGS Section 22a-454. The Project construction contractor will work with the spill response contractor(s) and will verify that all excavated wastes are transported to a licensed disposal facility approved by Eversource.

#### **4.5 Penalties for Non-Reporting**

Any person who fails to report incidents as required by CGS Section 22a-450 may be fined by CT DEEP not more than \$5,000 and the employer of such person not more than \$10,000. Failure to report incidents, as required by the Project, can result in removal from the Project or termination.

**ATTACHMENT B.1**  
**SPILL REPORT FORM**

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# SPILL REPORT FORM

**Date:** \_\_\_\_\_ **Time of Spill Occurrence:** \_\_\_\_\_

**Name/Title of the first observer:** \_\_\_\_\_

**Regulatory Agencies Notified / Time & Date of Notification** (use reverse side if needed; include CT DEEP representative badge number and CT DEEP-assigned spill identification number): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Location of Spill:** **Parcel No.** \_\_\_\_\_ **Town** \_\_\_\_\_ **County** \_\_\_\_\_

Nearest Public Road: \_\_\_\_\_ Nearest Structure No. (if on-ROW): \_\_\_\_\_

Nearest Street Address or landmark (if off-ROW): \_\_\_\_\_

Attachments (circle all that apply):      map      photographs      other \_\_\_\_\_

**Type of material spilled:** \_\_\_\_\_

Quantity spilled (circle one):      10 gals. or less      10 - 1,000 gals.      Over 1,000 gals.

Specify approximate amount spilled: \_\_\_\_\_

**Circumstances causing spill:** \_\_\_\_\_

Size of area affected by spill: \_\_\_\_\_ Estimate depth of spilled material on water or soil: \_\_\_\_\_

If spill is into water, is a sheen present? (circle one):      YES      NO

Has spill left Company property or ROW? (circle one):      YES      NO

Is spill under control? (circle one):      YES      NO\*

    \*If not, is there a potential for the spill to leave the  
    ROW or staging area? (circle one):      YES      NO

Has spill cleanup begun? (circle one):      YES\*\*      NO

    \*\*If so, what methods are being or will be used?: \_\_\_\_\_

\_\_\_\_\_

Have soil and/or water samples been taken? (circle one)      YES\*\*\*      NO

    \*\*\*If yes, list sample types: \_\_\_\_\_

**Signature of Contractor Representative/Date:**

\_\_\_\_\_

Print Name/Title: \_\_\_\_\_

**Signature of Designated Project Representative/Date:**

\_\_\_\_\_

Print Name/Title: \_\_\_\_\_

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# **Attachment C:**

## **Snow Removal and De-Icing Procedures**

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## ATTACHMENTS

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| C.1 | CT DEEP Best Management Practices For Disposal of Snow Accumulations from Roadways and Parking Lots |  |
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# 1. INTRODUCTION

## 1.1 Applicability

The Connecticut Light and Power Company doing business as Eversource Energy (Eversource) anticipates that the primary construction of the Frost Bridge to Campville 115-kV Project (Project), including the installation of approximately 10.4 miles of new 115-kV transmission line, the 115-kV double-circuit separation at the Naugatuck River crossing, and modifications to the Frost Bridge and Campville substations, will occur over an 18-month period and thus will require work during the winter, when periods of ice and snow can be expected.

The removal of ice and snow from work sites, including from on- and off- right-of-way (ROW) access roads, work pads, staging areas, contractor yards, and substations, will be critical to allow construction to proceed safely. However, snow removal and de-icing must be performed to protect the environment, in accordance with the Project's regulatory requirements.

This document presents the procedures that will apply during construction when accumulated snow or ice must be removed from Project work sites. The procedures are designed to:

1. Define responsibility for snow removal and disposal;
2. Identify acceptable snow disposal (i.e., stockpile or mounding) areas;
3. Describe the requirements for snow disposal areas; and
4. Establish methods for removing snow and ice from work sites safely and in conformance with Project environmental requirements, as contained in Development and Management (D&M) Plans and other state and federal permits.

In addition to these Project-specific procedures, snow removal and disposal activities must be in accordance with Eversource's *Best Management Practices (BMPs) Manual: Connecticut* (December 2011) and the applicable provisions of the Connecticut Department of Energy and Environmental Protection's (CT DEEP's) BMPs for such activities. Attachment E to this D&M Plan includes the Eversource BMPs, which are also available on the Eversource website at:

[http://www.transmission-nu.com/contractors/pdf/CT\\_BMP.pdf](http://www.transmission-nu.com/contractors/pdf/CT_BMP.pdf) The CT DEEP BMPs are reproduced in Attachment D.1 of this document and can also be found on the CT DEEP website at: [http://www.ct.gov/dep/cwp/view.asp?a=2721&q=325692&depNav\\_GID=1654](http://www.ct.gov/dep/cwp/view.asp?a=2721&q=325692&depNav_GID=1654).

## 1.2 Responsibility

The Project contractor(s) will be responsible for implementing these snow removal and de-icing procedures. The contractor must review the locations of snow disposal areas with Eversource or Eversource's Project manager (Burns and McDonnell [BMCD]), prior to use, to verify conformance to this plan. Any proposed deviations from these procedures must be justified by the contractor and will require approved in advance by Eversource or BMCD; Eversource or BMCD will determine whether any modifications to this plan also may require regulatory approval.

## 2. SNOW DISPOSAL AREAS

### 2.1 General

Snow will typically be plowed from access roads, pads, and other work sites pursuant to the procedures described in Section 3. However, depending on snowfall amounts, snow also may need to be mounded or stockpiled in areas along the ROW or at contractor yards and staging sites. Such snow disposal areas may be located in uplands within the Project ROW, at substations, or within identified Project staging and support sites, except as noted below.

**No snow disposal stockpiles or mounds** will be located in the following areas:

1. Any water resources (e.g., wetlands, vernal pools, ponds, lakes, watercourses, or swales).
2. Within public wellhead protection areas associated with a public water supply well or within 100 feet of a private well.
3. On top of stormwater catch basins or in stormwater drainage swales or ditches.
4. Within environmentally sensitive areas, as defined on the D&M Plan maps (including, but not limited to, threatened and endangered species habitat and vernal pools).
5. On private property (including privately-owned portions of the ROW) immediately adjacent to residential areas without the prior approval of the landowner.

Snow disposal stockpiles or mounds placed on pervious surfaces must be located to allow snow melt water to infiltrate into the soil, without causing sedimentation into water resources, and leaving behind any access road / work pad materials (e.g., gravel) or other debris that may be mixed with the snow. Such materials must be collected and removed from the Project areas when possible in the springtime.

Snow stored on asphalt or concrete must not be piled on top of manholes or catch basins.

At substations, snow disposal locations may be situated anywhere within the fenced portion of the substation or on upland portions of the surrounding Eversource property / nearby ROW. To the extent practicable, snow disposal areas will be at least 25 feet from any water resources or catch basin, and protected with appropriate erosion and sedimentation controls if necessary.

### 2.2 Disposal Site Ownership

Snow disposal stockpile / mound sites typically will be located on the ROW, at least 25 feet from water resources, in non-environmentally sensitive areas, and/or in Project-approved designated staging areas.

If snow must be disposed of in off-ROW locations (e.g., municipally-approved stockpile sites), the contractor must obtain and provide documentation to Eversource or BMcD of all applicable approvals and any conditions relating to the use of the disposal site.



### 3. SNOW AND ICE REMOVAL FROM WORK SITES

The following procedures will apply for the removal of snow and ice, when necessary, from Project work sites:

1. Snow may be removed by plowing (blading) and windrowing, or snow blowing, depending on the amount and type of snow, the area that must be cleared, and the site location.
2. Snow may be bladed level (rather than removed) along access roads to improve driving conditions. If appropriate, this technique also may be used at work pads and staging areas.
3. When removing or blading snow from access roads or work pads, contractors shall attempt to avoid plowing up topsoil, subsoil, or gravel.
4. Any erosion and sedimentation controls damaged during the snow removal and/or stockpiling processes will be repaired as soon as practical, taking into consideration snow depth and frozen ground. (Note: Winter weather conditions may preclude the re-establishment of damaged erosion and sedimentation controls until a thaw occurs or until spring).
5. Sand, salt, sand/salt mix, or Calcium Magnesium Acetate (CMA) may be applied for traction and de-icing along all access roads, work pads, staging areas, and substation sites.
  - a. Where timber mats are located along access roads or as part of work pads in wetlands, Eversource's contractor will use the minimum amount of sand, salt, sand/salt mix, or CMA necessary to maintain safe working conditions when frozen precipitation represents a safety hazard for construction activities.
  - b. To clear snow from timber mats placed in wetlands, for any event that results in greater than 4 inches of snow, Eversource's contractor will push or blow clean snow off the timber mats, down to 3 inches. This clean snow will be windrowed along either side of the timber mat access road. The bottom 3 inches of snow will be carefully removed from the timber mats and transported to an upland area.
  - c. For any event resulting in 4 inches of snow or less, all snow will be scraped off the timber mats and moved to upland areas.
  - d. CMA will be applied according to product specifications.

During extreme weather events, this protocol may be amended as needed to address immediate worker safety issues or to prevent significant damage to property.

#### **4. SNOW DISPOSAL WHEN APPROVED AREAS ARE FULLY UTILIZED**

Depending on snowfall accumulations, it is possible that all available snow disposal areas within the Project ROW and/or at Project substations could be fully utilized and that additional disposal sites or other snow disposal options will need to be considered. Under such circumstances, contractors must coordinate with Eversource and/or BMcD to identify snow disposal options.

New snow disposal sites must be pre-approved by Eversource and BMcD and may require notice to or approval by local, state, and/or federal regulatory agencies.

**ATTACHMENT C.1**

**CONNECTICUT DEPARTMENT OF ENERGY AND  
ENVIRONMENTAL PROTECTION**

**BEST MANAGEMENT PRACTICES  
FOR DISPOSAL OF SNOW ACCUMULATIONS  
FROM ROADWAYS AND PARKING LOTS**

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# Connecticut Department of Energy & Environmental Protection

## Best Management Practices for Disposal of Snow Accumulations from Roadways and Parking Lots

**Purpose:** These guidelines have been developed to clarify DEEP recommendations to state and municipal officials, and others regarding the removal and disposal of snow accumulations from roadways and parking lots. For purposes of this guidance snow accumulations refers to snow banks and snow piles that are removed by front-end loader or by loading on trucks for disposal. This guidance does not apply to normal snow plowing operations that must, inevitably, discharge some snow into wetlands and watercourses.

**Implementation:** While following these guidelines does not constitute a permit or authorization, the Department recognizes there is a considerable need for flexibility in implementation of this policy, particularly in emergency situations. There is no intent to interfere with snow plowing operations. Where trucking and snow dumping operations are undertaken the Department recommends these guidelines be followed.

**Problem:** Current road maintenance activities include removal of snow accumulations from bridges, roads and parking areas for the purpose of providing more space for subsequent snow storms and for ease of travel and parking. Sometimes this snow is moved by truck or with a front-end loader and deposited directly into surface waters of the state including streams, wetlands and Long Island Sound. This practice is not recommended due to the presence of dirt, salt, litter and other debris, which are routinely mixed in the accumulated snow.

Under normal conditions of snowmelt, the majority of these contaminants remains on or next to the paved surface or may be captured in stormwater catch basins. These contaminants can then be swept from streets and bridges or vacuumed from catch basin sumps. However, when accumulated snow is collected and dumped into surface waters, this mixture of snow, sand and debris may smother aquatic life in the bottom of streams and rivers and degrade the aesthetics of the surface water with silt plumes and litter. Large quantities of snow (and the sand and debris) may also cause blockage of storm drainage systems, resulting in increased chance for localized flooding.

**Recommended Management Practice:** Snow accumulations removed from roadways, bridges, and parking lots should be placed in upland areas only, where sand and other debris will remain after snowmelt for later removal. Care must be exercised not to deposit snow in the following areas:

1. freshwater or tidal wetlands or in areas immediately adjacent to such areas where sand and debris may be flushed during rainstorms;
2. on top of storm drain catch basins;
3. in storm drainage swales;
4. on stream or river banks which slope toward the water, where sand and debris can get into the watercourse; and
5. in areas immediately adjacent (within at least 100 feet) of private or public drinking water well supplies (due to the possible presence of road salt).

**For Governmental Entities:** In normal winter conditions, governmental entities should follow the recommended management practices outlined above. In extraordinary winter conditions, the commissioner may, upon public notification, offer governmental entities the flexibility of limited in-water disposal. When such flexibility is offered, governmental entities who have determined that extraordinary circumstances exist where all upland, land-based disposal options have been fully exhausted (i.e., disposal capacity is not available) and snow needs to be removed to meet public safety demands (i.e., clear access ways for police, emergency medical and fire responders), may use certain waterways for snow disposal in accordance with the following conditions:

1. Upland storage and disposal of snow (i.e., athletic fields, parks and other flat, open-field sites) and other snow management methods (i.e., snow melting equipment) must be the first alternatives explored and exhausted. Environmentally sensitive areas must be avoided;
2. This guidance applies only to snow and ice which is not visibly contaminated with material other than salt and sand from road clearing activities;
3. For coastal communities, preference should be given to snow disposal in salt water where available;
4. Disposal in rivers or streams must be limited to those water bodies that have adequate flow and mixing and are not prone to ice jams;
5. The disposal must occur only in open water in areas that will not interfere with navigation;
6. Disposal must be conducted in a manner so as to prevent ice dam formation or damage to bridges, docks or other structures;
7. Disposal in ponds and lakes is discouraged;
8. There shall be no disposal in coastal or freshwater wetlands, eelgrass beds, vegetated shallows, vernal pools, shellfish beds mudflats, public water supply reservoirs and their tributaries, or others areas designated as being environmentally sensitive;
9. The activity must comply with local laws and requirements;
10. Precautions must be taken to avoid shoreline or stream bank damage or erosion from truck/equipment activity; and
11. Governmental entities must notify the Department by email (address email to [kevin.sowa@ct.gov](mailto:kevin.sowa@ct.gov)) prior to disposing of snow and ice in waterways or, if advance notification is not possible, then the Department must be contacted as soon as possible after snow disposal has begun.

**Notification:** Notification can be made by addressing an email to Kevin Sowa at: [kevin.sowa@ct.gov](mailto:kevin.sowa@ct.gov). The notification must include the following: (1) the name of the governmental entity making the notification; (2) contact information for the governmental entity including name, email address and phone number; (3) the street address where the snow disposal activity will occur; (4) the name of the waterbody where the snow will be disposed; (5) the estimated quantity of snow to be disposed; (6) the dates during which the disposal activity will occur; and (7) a statement that the governmental entity has exhausted all disposal alternatives and snow management methods and will make best efforts to adhere to these snow disposal guidelines.

**Information:** For further information please call the Water Permitting and Enforcement Division Engineer of the Day at 860-424-3018.

DEP-PED-GUID-002 Revised 02/04/11

**Attachment D:**  
**Eversource's BMP Manual: Construction and  
Maintenance Environmental Requirements for  
Connecticut**

Available in hard-copy upon request or at the following link:  
[http://www.transmission-nu.com/contractors/pdf/CT\\_BMP.pdf](http://www.transmission-nu.com/contractors/pdf/CT_BMP.pdf)

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**Attachment E:**  
**Connecticut Department of Energy and  
Environmental Protection (CT DEEP) General Permit  
for the Discharge of Stormwater and Dewatering  
Wastewaters Associated with Construction Activities**  
(Available Upon Request)

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# **Attachment F: Vegetation Clearing Plan**

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| 2 | Eversource <i>Vegetation Clearing Procedures and Practices for Transmission Line Sections</i> (OTRM 230)  |  |
| 3 | Eversource brochure regarding procedures for landowners to request timber cleared from the ROW on their property (“Making Requests for Wood” <a href="http://www.Eversourcerightsofway.com">www.Eversourcerightsofway.com</a> ) |  |

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## 1. INTRODUCTION

The Frost Bridge to Campville 115-kV Project (Project) includes the installation of approximately 10.4 miles of new 115-kilovolt (kV) transmission line in the towns of Watertown, Thomaston, Litchfield and Harwinton (Litchfield County, Connecticut), as well as the 115-kV double-circuit reconfiguration (structure removal and replacement) adjacent to the Naugatuck River crossing (towns of Litchfield and Harwinton). The new 115-kV transmission line and the double-circuit separation will be located adjacent to one or more existing overhead transmission lines, which are situated within an existing Eversource Energy (Eversource) right-of-way (ROW) that varies in width from approximately 250 to 400 feet.

Beneath and in the vicinity of the existing transmission lines that occupy this ROW, Eversource routinely manages vegetation pursuant to requirements for the reliable operation of the overhead transmission line. Since April 7, 2006, Eversource's ROW vegetation management practices have been required to comply with mandatory standards adopted by the North American Electric Reliability Corporation following the August 14, 2003 Northeast blackout.<sup>1</sup> These vegetation management practices are designed to allow the reliable operation of the transmission facilities by preventing the growth of trees or invasive vegetation that will otherwise interfere with the transmission facilities or hinder access along the ROWs.

As a result, the vegetation within the managed portions of the Project ROW typically consists of shrubs and small trees (generally maturing at less than 20 feet in height) and herbaceous species. The vegetation outside the currently managed portions of the ROW consists predominantly of mixed deciduous forest of various ages and sizes<sup>2</sup>, but also includes areas of farmlands, open fields, and similar low-growing vegetative communities.

Low growing, herbaceous, scrub/shrub and forest vegetation along the ROW will be removed where necessary to construct the new 115-kV line, to provide and maintain access to transmission line structures, and to provide safe distances between the conductors and woody vegetation at all times. However, the amount of and type of vegetation clearing required will vary, depending on factors such as the existing width of the managed ROW, vegetation communities present (e.g., forested, herbaceous, scrub-shrub, open field, lawn), the type of the new 115-kV transmission line structures, configuration of the transmission line conductors, transmission line span lengths, and terrain.

This *Vegetation Clearing Plan (Plan)* describes the vegetation clearing that will be performed as part of Project construction, including the limits of clearing for construction and the vegetation disturbance (primarily removal of tall-growing tree species) along each ROW segment, as required to meet the

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<sup>1</sup> Transmission line outages triggered by conductors sagging into overgrown vegetation in Ohio were substantial factors in causing the blackout.

<sup>2</sup> A "tree" is defined as a woody plant maturing at 20 feet or more in height, usually with a single trunk, unbranched for several feet about the ground, with a definite crown. (Refer to Attachments 1 and 2 to this *Plan*)

established minimum vegetation clearances when operating the new transmission line. These vegetation removal limits are illustrated on the Volume 3 maps.

It also is likely that as part of vegetation removal during construction or after the conductors have been installed, additional trees, located outside of the initially cleared area, may need to be selectively removed or pruned to maintain the required clearances. Vegetation (trees and herbaceous or low growing scrub/shrub) removal outside of the vegetation clearing limits shown on the Volume 3 maps will also be required, particularly along off-ROW access roads and on-ROW access roads that extend beyond these clearing limits.

The *Plan* also addresses the typical methods to be used for forested and low growing herbaceous and scrub/shrub vegetation removal, along with measures for salvaging merchantable timber.

Vegetation clearing methods will be in accordance with Eversource specifications (refer to Attachments 1, 2, and 3 to this *Plan*), the conditions of Project regulatory approvals received from the Connecticut Siting Council (Council), U.S. Army Corps of Engineers (USACE), and Connecticut Department of Energy and Environmental Protection (CT DEEP). In addition, Eversource's Best Management Practices (BMPs) will be implemented, as appropriate to the clearing activities (refer to Volume 2, Attachment D).



## 2. LIMITS OF CLEARING

Along the Project ROW, the width of the vegetation that Eversource currently manages differs, depending on the number and configuration of the existing transmission lines that occupy the ROW (refer to the cross-sections in Volume 3). As a result, the amount of new vegetation clearing for the Project, particularly additional forest removal, will vary by ROW segment. Table 2-1 summarizes the widths of the Project ROW segments, the typical widths of the presently managed portions of the ROW, and the anticipated additional widths of vegetation removal for the Project.

**Table 2-1: Summary of Project ROW Widths, by ROW Segment and Existing and Planned Vegetation Management**

| Town                   | Existing Eversource ROW or Property       |                        |   |   |
|------------------------|---|------------------------|---|---|
|                        | Cross-Section Reference (refer to Vol. 3) | Total ROW Width (feet) | Width of Current Vegetation Management Area along ROW (feet, typical) | Estimated Width of New Vegetation Clearing* Required for Proposed 115-kV Transmission Line (feet) |
| Watertown              | XS-1                                      | Fee-owned              | N/A Substation  | N/A Substation  |
| Watertown              | XS-2                                      | 400                    | 400   | 0   |
| Watertown / Thomaston  | XS-3                                      | 250                    | 90  | 45  |
| Thomaston / Litchfield | XS-4                                      | 250                    | 140   | 40  |
| Litchfield / Harwinton | XS-5                                      | 250                    | 115   | 70  |
| Harwinton              | XS-6                                      | 250                    | 140   | 40  |

\*Note: The estimated width of new vegetation clearing refers to the additional areas of the ROW, outside of the portions of the ROW that Eversource presently manages, where vegetation (typically forest) would have to be removed for the new 115-kV transmission line. To accommodate the construction of the new transmission line, vegetation (mostly shrub-scrub) would also have to be removed along portions of the existing managed ROW.

The Volume 3 maps illustrate the edge of new vegetation removal that is required to meet the established minimum vegetation clearances for operating the new transmission line and – within the presently managed portions of the ROW - the general limits of vegetation clearing that will be required to construct the new line.

For example, along the 2.5 miles from the vicinity of Frost Bridge Substation to Purgatory Junction (refer to XS-2), the 400-foot-wide ROW currently includes one 345-kV circuit and two 115-kV circuits. The new 115-kV line is proposed for location near the middle of the ROW, between the 345-kV and one of the existing 115-kV circuits. Because Eversource already manages most of this ROW segment for low- growth vegetative communities, clearing for the construction of the new 115-kV line along this ROW segment would predominantly involve the removal of scrub-shrub type

vegetation. However, some areas of taller- growing vegetation are predominant within the limits of clearing for the new 115-kV transmission line and thus would have to be removed. To support the installation or improvement of access roads, some of this clearing will occur outside of the limits of vegetation removal shown on the Volume 3 maps.

Along a majority of the remaining Project route, the new 115-kV transmission line will be located adjacent to and east of one or two existing 115-kV lines, within a typical 250-foot-wide ROW. Along these ROW segments, Eversource presently manages (on average) a 95-to-140-foot-wide area beneath and adjacent to the existing lines. The development of the new 115-kV line, supported on delta monopole structures, will require (typically) an additional 40-to-45 feet of new vegetation removal for construction and subsequent management within the ROW. An exception will be along the ROW segment at the Naugatuck River, where the reconfiguration of the double circuit 1191/1921 lines and the construction of the new 115-kV line will require 70 feet of additional vegetation clearing within the ROW.

Outside of the limits of vegetation removal shown on the Volume 3 maps, most of the vegetation within the remaining width of the ROW will not be affected by construction activities. However, some additional vegetation removal will be required to establish on- or off-ROW access roads and certain work pads that must be located beyond the standard vegetation removal limits.

Also, as part of vegetation removal during construction or after the conductors have been installed, additional trees, located outside of the initially cleared areas, may need to be selectively removed or pruned to maintain the required clearances.

### 3. VEGETATION CLEARING METHODS

#### 3.1 General Approach

Vegetation clearing for the new 115-kV transmission line will be performed in accordance with Eversource's *Right-of-way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines* (OTRM 030.001) and *Vegetation Clearing Procedures and Practices for Transmission Line Sections* (OTRM 230). (Refer to Attachments 1 and 2, respectively, to this *Plan*).

Vegetation will be removed along those portions of the ROW to be used for the construction of the new transmission line, as well as in areas that contain undesirable, tall-growing, woody species that could grow to interfere with the operation of the proposed transmission line should they not be removed. For example, as part of construction, all tall growing vegetation will be removed within the identified "vegetation clearing limits for construction" shown on the Volume 3 maps.

Vegetation (all types) also will be cleared, as required, at work pads, as well as along existing or new access roads. In addition, vegetation will be removed, as necessary, along existing or new access roads that may be on the ROW (but outside the designated vegetation removal limits) or off the ROW (but required to reach the ROW). In addition, danger or hazard trees outside the limits of clearing (on or off the ROW) will be removed as necessary to protect the integrity of the new transmission line.

Clearing will typically be accomplished using mechanical methods, although manual methods (e.g., chain saws) may be used in wetlands and near residential areas. Vegetation removal activities typically require flatbed trucks, brush hogs or other types of mowing equipment, skidders, forwarders, bucket trucks for canopy trimming, feller bunchers for mechanical tree cutting, wood chippers, log trucks, and chip vans.

#### 3.2 Access for Vegetation Clearing

Clearing crews must be able to access areas where vegetation removal is required for construction and within the clearance zones of the new 115-kV conductors, as well as to reach on-ROW or off-ROW danger and hazard trees (refer to Section 3.4). Thus, vegetation clearing crews will use both on- and off-ROW access roads, which also will be used for general Project construction, as well as on-ROW "access routes" that will be required only to reach areas where vegetation must be removed.

Access roads are illustrated on the Volume 3 maps. However, temporary clearing crew "access routes" will be identified in the field at the time of construction, based on site-specific conditions. Such "access routes" will be restored to pre-construction conditions, as clearing activities proceed along the ROW.<sup>3</sup>

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<sup>3</sup> Clearing access routes also will be used to reach danger and hazard trees, located either on-or off the ROW that, in the opinion of Eversource foresters, must be removed to protect the integrity of the transmission line. Such danger and hazard trees cannot be identified until the construction phase.

During vegetation removal, timber mats, timber corduroy road, or equivalent may be used to provide a stable base for clearing equipment across watercourses or within wetlands. Such temporary support will minimize rutting in wetlands and will be removed after the clearing activities are completed. Within wetlands and across streams, vegetation clearing crew “access routes” will be in accordance with all Project regulatory requirements, including permits from the CT DEEP and the USACE.

### **3.3 Vegetation Removal: Low-Impact Tree Clearing**

Eversource will implement various measures to minimize the environmental effects of vegetation removal. For example, Eversource will incorporate into the vegetation clearing contract relevant specifications for access, wetland/stream crossings, vegetation removal methods, vernal pool protection, state-listed species protection, and maintenance of site quality.

In addition, Eversource will require the vegetation clearing contractor to use low-impact tree clearing means and methods to remove forested vegetation. Low-impact tree clearing incorporates a variety of approaches, techniques, and equipment to minimize site disturbance and to protect wetlands, watercourses, soils, threatened and endangered species and their habitats, and cultural resources. Eversource will require the clearing contractor to use some or all of the following low-impact tree clearing methods, depending on site-specific considerations:

- Consider soil and weather conditions when scheduling vegetation removal activities.
- Maximize the use of uplands for clearing access routes.
- Fell trees directionally (parallel to and within the ROW) to minimize impacts to residual vegetation, where practical.
- Adhere to BMPs, as described in the *Best Management Practices for Water Quality while Harvesting Forest Products*, 2007 Connecticut Field Guide (also referenced in the Eversource BMPs, Volume 2, Attachment D)  
([http://www.ct.gov/deep/cwp/view.asp?a=2697&q=379248&deepNav\\_GID=1631](http://www.ct.gov/deep/cwp/view.asp?a=2697&q=379248&deepNav_GID=1631))
- Use a variety of tree clearing equipment, as appropriate to minimize impacts to the extent practicable.
- Cut trees close to the ground, leaving root systems and stumps, where practical, to provide additional soil stability
- Stockpile cut timber and brush only in uplands.

Where removal of woody vegetation is required, vegetation will be cut so that stumps are generally 6 inches or less above the ground surface.

Desirable species will be preserved to the extent practical. For example, certain desirable, low-growing trees may be kept on the ROW in specific locations, pursuant to Eversource’s *Right-of-Way Vegetation Initial Clearance Standard for 115-kV and 345-kV Transmission Lines* (refer to Attachment 1 of this *Plan*). Generally, all tall-growing tree species will be removed from the managed portion of the ROW

and low-growing tree species and taller shrub species will be retained in the areas outside of the conductor zones. The conductor zone is the area directly beneath the conductors extending outward a distance of 15 feet from the outermost conductors.

### **3.4 Vegetation Removal: Environmentally Sensitive and Other Special Areas**

In environmentally sensitive and other special use areas, Eversource will conduct vegetation removal activities in accordance with applicable federal and state permit requirements, and site-specific conditions that may apply to special land uses (e.g., public recreational areas).

**Wetlands and Waterbodies.** Along stream banks and within wetlands, Eversource will attempt to retain low-growing vegetation to the extent practicable. For example, vegetation removal near streams will be performed selectively, preserving desirable streamside vegetation within a 25-foot-wide riparian zone adjacent to either side of the stream bank in order to maintain habitat, shading, and bank stability and to minimize the potential for sedimentation.

In wetlands, vegetation clearing will be conducted to minimize rutting; in addition, stumps will not be removed from forested wetlands unless it is determined that intact stumps will pose a safety concern for the construction personnel during the establishment/use of access roads and work areas, or installation of transmission line structures. (For additional information regarding vegetation removal in and near water resources, refer to the *Wetlands and Waterbodies Impact Avoidance and Minimization Measures* included on a Detail Sheet in Volume 3).

**Vernal Pools.** Vegetation removal in and around vernal pool habitats will be necessary, but will be limited to the extent practicable. Equipment access for vegetation removal near vernal pools will be avoided when practicable. Where access near (i.e., within 100 feet of) vernal pools is unavoidable, lower impact clearing techniques and/or temporary timber mats, corduroy roads, or equivalent may be used to support vehicles and equipment. To the extent that circuit outage and other construction timing constraints allow, Eversource will attempt to schedule these activities so as not to interfere with amphibian breeding and migration seasons. Work during frozen ground conditions also will be considered, if construction and/or transmission line outage schedules allow. (For additional details, refer to the *Avoidance and Minimization Measures for Vernal Pools* included as a Detail Sheet in Volume 3).

**Other.** Eversource may alter vegetation removal activities in the following areas, provided that the vegetation clearing is consistent with the requirements for construction and for the operation of the facilities pursuant to national transmission line vegetation management standards:

- a. Steep slopes and valleys spanned by transmission line (e.g., Branch Brook, Northfield Brook, Naugatuck River), where the conductors will be significantly higher than normal and where the vegetation at full mature height would not violate conductor clearances and would not cause construction or access problems.
- b. Agricultural lands (where vegetation removal is required, such as within hedgerows). ***Wilted cherry leaves are poisonous to livestock; therefore, if areas along the ROW are frequented***

*by livestock, any cherry cuttings will be removed and disposed of outside of livestock use areas.*

- c. Near homes where owner-maintained ornamental vegetation does not interfere with the construction, maintenance, or operation of the transmission line.
- d. In areas documented to provide state-listed species habitat or to contain host plant species that support state-listed invertebrate species, Eversource will minimize mowing and ground disturbance outside of the areas required to safely complete the necessary vegetation clearing for construction activities.

### **3.5 Timber and Brush Disposition**

As part of the Project planning, Eversource commissioned a survey of the vegetation along the transmission line ROW, including the size and quality of trees within the currently un-managed portions of the easement. This survey determined that most of the forest vegetation that will be removed for the Project (approximately 48.9 acres<sup>4</sup>) consists of trees with an average diameter at breast height (dbh<sup>5</sup>) of 6 inches or greater.

The clearing contractor will be responsible for using or properly disposing of any vegetative materials cut along the ROW that are not otherwise planned for use by the landowner (e.g., as firewood) per easement agreements (refer to Section 5 and Attachment 3 of this *Plan*). Other than when wood is to be left for the landowner, Eversource will not dictate to the clearing contractor the means and methods for wood disposition.

The value of timber resources removed from the ROW for such uses as lumber, firewood, mulch, or biomass chips is a function of the species, location, size, and quality, as well as the market for such products. Typically, a clearing contractor can be expected to reduce waste, minimize clean-up costs, and maximize the value of the wood resources. The following methods may be used for timber disposition:

1. **Wood Requested by Landowners.** For landowners who request to retain timber wood that is cleared from an easement area on their property, tree tops will be cut, chipped and removed or spread in upland areas, but the timber/firewood will be piled on the edge of the ROW (on the landowner's property), outside of any environmentally sensitive areas and away from construction activities.
2. **Drop and Lop.** This method involves cutting a tree, lopping off the branches (as appropriate), and then leaving the wood materials where felled. The "drop and lop" method is typically used in areas that are inaccessible to clearing equipment; when cutting sapling-size trees (generally less than 2 inches dbh) on the managed portions of the ROWs; or when impacts to nearby compatible vegetation need to be avoided.

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<sup>4</sup> Includes approximately 42.2 acres of forested upland and 6.7 acres of forested wetland.

<sup>5</sup> Dbh is defined as outside bark diameter at breast height. Breast height is defined as 4.5 feet above the forest floor on the uphill side of the tree. For the purposes of determining breast height, the forest floor includes the duff layer that may be present, but does not include unincorporated woody debris that may rise above the ground line.

3. **Chipped on ROW.** Brush, tree tops, limbs, and other non-marketable timber and marginally marketable trees typically will be disposed of by chipping. Chips must not be left in piles, but may be spread on the ROW at a depth not to exceed 3 inches.
4. **Used for Log Riprap.** Some timber may be requested by the construction contractor involved in access road construction for use when developing temporary access roads (corduroy) across wetlands. The use of corduroy must be in accordance with regulatory requirements.
5. **Removed for Forest Product Use.** The harvested trees or other wood materials (e.g., wood chips) are transported off-site for productive use. Market demand, transportation costs, and quality of the wood materials will factor into the viability of this option.

### **3.6 Danger and Hazard Trees**

A danger tree is a tree that, due to its location and height, could cause a flashover or damage to the structures or conductors, or violate the conductor zones, if it were to fall toward the transmission line. A hazard tree is a tree that exhibits some type of defect or damage (e.g., weakness, broken limbs, decay, infestation) that increases the risk of it falling into the transmission line.

During and after the 115-kV transmission line construction, on- and off-ROW danger and hazard trees that threaten the transmission line will be identified. Such trees will be removed or pruned as necessary. To the extent that un-managed portions of the existing Eversource ROW border the new 115-kV line, there is a lower potential for the occurrence of off-ROW danger or hazard trees. However, on-ROW danger or hazard trees, located in un-managed areas outside the limits of the Project clearing, may be identified and then would be removed.

Prior to the removal of any off-ROW danger or hazard trees, Eversource will inform and seek permission from the affected landowner.

#### 4. VEGETATION MANAGEMENT AND PRESERVATION GOALS AND METHODS

The objective of Eversource's well-established vegetation management program is to maintain safe access to its transmission facilities and promote the growth of vegetative communities along its ROWs that are compatible with transmission line operation and in accordance with federal and state standards. The vegetation along the new transmission line will be managed in accordance with these standards.

Eversource's vegetation management practices are designed to allow the reliable operation of transmission line by preventing the establishment and growth of trees or invasive vegetation that could interfere with the transmission facilities or access along the ROWs. As a result, the vegetation within the managed portions of Eversource's ROWs typically consists of shrubs, herbaceous species, and other low-growing species. Unused or un-managed portions of Eversource's ROWs not proximate to the existing line may be characterized by forest vegetation, which is allowable as long as it does not conflict with the operation of overhead transmission line.

Undesirable tall-growing woody species within the ROWs and proximate to the new 115-kV transmission line will be removed during construction. These species will be cut to ensure adequate clearance from wires and structures, pursuant to Eversource's *Right-of-Way Vegetation Initial Clearance Standard for 115-kV and 345-kV Transmission Lines* (refer to Attachment 1 to this *Plan*). Desirable species will be preserved to the extent practicable. In selected locations, certain desirable low-growing trees or tall growing shrubs, due to their growth characteristics and locations relative to the new line, may be allowed to remain on the ROWs.

Vegetative species compatible with the use of the ROW for transmission line purposes are also expected to regenerate naturally over time. Eversource will promote the re-growth of desirable species by implementing ROW vegetative management practices to control tall-growing trees and promote native plant colonization.

Vegetation preserved during Project construction activities may be removed in the future in accordance with Eversource's *Vegetation Clearing Procedures and Practices for Transmission Lines, OTRM 230* (refer to Attachment 2 to this *Plan*).



## 5. LANDOWNER OUTREACH AND BENEFICIAL USE OF FOREST PRODUCTS

The timber and firewood resources along the 115-kV transmission line route belong to the landowners across whose properties the ROW is aligned. Eversource's policy is to proactively coordinate with landowners regarding the disposition and use of the trees to be removed along the ROWs.<sup>6</sup>

If requested by the landowner, the firewood and timber portions of the trees will be left on the landowner's property, in upland areas that are not otherwise designated as environmentally sensitive, on the edge of the managed portion of the ROW. After limbs are removed, the boles of the trees would be piled in tree-length logs for landowners to cut and remove at their convenience.

Timber and firewood removed along the ROWs on Eversource-owned properties or on parcels where the landowners are not interested in retaining the wood will become the property of the Project's land clearing contractor.

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<sup>6</sup> Information for landowners regarding vegetation clearing and timber also is described in Eversource's brochure "Making Requests for Wood", which can be found at [www.Eversourcerightsofway.com](http://www.Eversourcerightsofway.com). A copy of this brochure is included in Attachment 3 of this *Plan*.

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## **ATTACHMENT 1**

### ***Right-of-way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines (OTRM 030.001)***

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# Northeast Utilities Overhead Transmission Line Standards

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## 1. Scope

This standard describes the vegetation clearing along rights-of-way (ROW) of the NU operating companies in Connecticut and Massachusetts where overhead transmission lines are to be constructed. The practices described here apply to the construction requirements for all 115kV and 345kV <sup>1</sup> electric transmission lines, and are consistent with the North American Electric Reliability Council (NERC) Vegetation Management Standard FAC-003-1 dated 2/16/2006, The New England Independent System Operator's (ISO-NE) vegetation clearing standard OP-3 dated 2/1/2005, and the National Electrical Safety Code (NESC) Rule 218 as adopted by the Connecticut Department of Public Utility Control (Regulation Sec. 16-11-134).

This standard applies to new construction clearing requirements and practices and not to on-going future vegetation maintenance of the ROW's. The initial clearance requirements outlined in this standard are intended to provide adequate clearances for a period of four (4) years at which time scheduled maintenance will be performed to reestablish or preserve the initial clearances. The maintenance of the vegetation following construction is addressed under the Northeast Utilities Specification for Rights-of-Way Vegetation Management. Low-maturing trees, which are allowed to remain after completion of vegetation clearing, are still subject to future trimming and removals, depending upon their growth and health, as well as the future needs of NU to operate, maintain, and add or replace electric facilities on the ROW.

NU operating companies typically obtain permanent easement rights for the placement of overhead transmission lines, including the right to clear vegetation within the fully defined limits of a ROW. In most locations the right to remove any tree or portion of tree outside the easement limits of the ROW ("danger tree") that by falling could endanger the transmission line facilities is also obtained. These rights are necessary to provide for the safe and reliable operation and maintenance of any overhead transmission line that is built on a ROW.

Notwithstanding these rights, the standard practice of the NU operation companies is to minimize tree and other vegetation removal that is required for new transmission line construction by:

- A. Designing new lines to keep the positions of new conductors as much as possible within any existing cleared ROW corridor, thus minimizing additional clearing
- B. Remove non-compatible vegetation (trees and tall growing shrub species) within the conductor clearance zone (area directly under the conductors extending 15 feet horizontally outward from the outermost line conductors)

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<sup>1</sup> Except for possible modifications to existing 69kV lines, it is unlikely that NU will construct any new 69kV lines. Therefore, this standard covers 115 and 345kV lines only, and 115kV line clearances would apply to any new 69kV lines.

|  |                               |                               |                                    |
|--|-------------------------------|-------------------------------|------------------------------------|
| <b>Right-of-Way Vegetation Initial Clearance Standard<br/>for 115- and 345-kV Transmission Lines</b> |                               |                               |                                    |
| <b>Northeast Utilities</b><br>Approved by: DEH, PJA  | <b>Design and Application</b> | <b>OTRM</b><br><b>030.001</b> | <b>Rev. 1</b><br><b>05/16/2008</b> |

# Northeast Utilities Overhead Transmission Line Standards

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- C. Allowing low-maturing tree species such as dogwoods to remain within the side zones (area outside of the conductor clearance zone extending to the edge of the ROW clearing limits) where these low-maturing species exist
- D. Re-establishing pre-existing access roads for construction vehicles to minimize the clearing of low growth within the existing corridor for access
- E. Locating new line structures close to old structures and overlapping the work areas of old structures to reduce to the amount of clearing for the new structure work areas
- F. Where feasible, using existing conductors to pull in new conductors, thus reducing damage to low growth vegetation along the cleared corridor
- G. Engaging an arborist to determine individual “danger trees” for removal considering
  - 1) Species
  - 2) Soil conditions
    - a) including wetland vs. upland
    - b) susceptibility to flooding
    - c) depth to rock (and adaptability of the species to those conditions)
  - 3) Health of the tree
  - 4) Inclination of trunk
  - 5) shape of crown

Refer to figures V-1 through V-6 for diagrams of the conductor clearance zone and side zones associated with various line structure types.

## 2. Clearance between Conductors and Woody Vegetation

Transmission lines within the Northeast Utilities System present a variety of woody vegetation control situations. Regulatory authorities may require “buffers” or “screening” at visually sensitive highway and local road crossings or other locations, and such locations require special attention to achieve and maintain the necessary clearances. At all other locations, standard ROW vegetation clearing practices for new line construction are as follows:

- A. Within the ROW limits, as depicted on Figures A, B, and C, cut all tall-maturing tree species of any height while retaining existing compatible woody shrub species (see Appendix 1).
- B. Clear-cut construction areas at structure locations and access roads as depicted on Figure C.
- C. At road crossings, within side zones and other sensitive areas, as specified by ROW development and management plans, retain existing low-maturing tree species such as Flowering Dogwood (see Appendix 2) to the extent that these trees will not conflict with operation of the transmission line prior to the next scheduled vegetation maintenance.
- D. At ravines, river crossings, and similar locations: retain tree species on the ROW where the conductors will be significantly higher than normal and where the

|  |                               |                               |                                    |
|--|-------------------------------|-------------------------------|------------------------------------|
| <b>Right-of-Way Vegetation Initial Clearance Standard<br/>for 115- and 345-kV Transmission Lines</b> |                               |                               |                                    |
| <b>Northeast Utilities</b><br>Approved by: DEH, PJA  | <b>Design and Application</b> | <b>OTRM</b><br><b>030.002</b> | <b>Rev. 1</b><br><b>05/16/2008</b> |

# Northeast Utilities Overhead Transmission Line Standards

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vegetation at full mature height would not violate Figure A clearances and will not cause construction or access problems.

The minimum clearances established in Figures A, B, and C between conductors and woody vegetation includes allowances for re-growth over the periodic maintenance cycle of four (4) years for vegetation within the cleared limits of the ROW, and ten (10) years for vegetation beyond the cleared limits of the ROW. The defined clearances cover all vegetation including natural growth, screens or buffers, orchards, ornamental plantings, nursery stock, and danger trees.

The minimum clearances applicable to woody vegetation are shown in the included figures.

- 1) Figure A; Minimum Conductor Clearances
- 2) Figure B; Danger Tree Clearance
- 3) Figure C; Conductor Clearance Zone, Side Zones and Structure Clearing Areas for New Construction

Where Orchards, ornamental plantings, or nursery stock is permitted by easement or license to exist, the maximum tree heights allowed within the conductor and side zones are shown in Figure A. Agreements with individual property owners may define site-specific maximum allowable tree heights and should be checked prior to scheduled maintenance activities.

Where rights exist beyond the edge of the ROW, any tree designated as a “danger tree,” i.e. a tree that can fall within the dimensions noted in Figure B that is determined to be an imminent hazard will be removed at the discretion of the arborist. In sensitive areas adjacent to or within the ROW or where rights or other permission to remove danger trees cannot be obtained, arborists will direct the removal of those portions of the tree canopy projecting into the ROW, and those portions of a tree which, if they become detached, may fall within the minimum clearance distances as shown on Figure B. On side-hill ROW’s, danger trees can be found significantly further from the conductors on the uphill side of the ROW.

### 3. Clearing for New Construction

This clearing consists of clear cutting four distinct areas of the ROW as defined by Figure C. These clearing areas are:

- A. Basic clearing of the ROW width, which consists of a conductor clearance zone and side zones. Low-maturing woody shrub species are typically not removed from the side zones, and low maturing tree species such as Flowering Dogwood will be preserved where they do not conflict with construction needs.
- B. Clearing at each structure location as required for construction equipment
- C. Clearing the full length of all access road and spurs to structure sites for a cleared width of fifteen (15) feet
- D. Removal of danger trees that pose an imminent risk to the new line along the new or existing clearing edge

|  |                               |                               |                                    |
|--|-------------------------------|-------------------------------|------------------------------------|
| <b>Right-of-Way Vegetation Initial Clearance Standard<br/>for 115- and 345-kV Transmission Lines</b> |                               |                               |                                    |
| <b>Northeast Utilities</b><br>Approved by: DEH, PJA  | <b>Design and Application</b> | <b>OTRM</b><br><b>030.003</b> | <b>Rev. 1</b><br><b>05/16/2008</b> |

# Northeast Utilities Overhead Transmission Line Standards

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For new line construction, in addition to the cleared area around each structure, a lay-down and assembly area may be required that is considerably larger. The size of this area depends upon topography, the type of structure to be assembled, and the type of foundation required at the site. Also at selected locations spaced several miles apart, setup sites for conductor-pulling equipment are required within the conductor zone and may require some removal of shrub growth.

The process to accomplish the clearing for new construction involves:

- A. Field survey and stake the edge of the clearing limits and conductor zone
- B. The NU "Owner's Representative" further reviews the survey staking before clearing begins
- C. Where specified in an existing agreement with individual landowners, the Owner's Representative or his designee marks acceptable low growing trees they will attempt to retain within a side zone
- D. The Owner's Representative contacts landowners before the clearing begins if they wish to discuss the clearing as marked out, and to ask if the property owner wishes to take ownership of the cut wood
- E. Where the landowner will take the cut wood, an agreement will specify the contractor's placement of cut wood outside the ROW, or the landowner's schedule for removal if at a location within the ROW
- F. Carry out the clearing operation
- G. Cut using chain saws within wetland areas, and minimize the use of mechanized equipment for removal (note: mechanized equipment may be used to remove the logs and tree tops from a wetland by positioning equipment outside wetlands to drag out logs and tops using cables)
- H. During or shortly after the initial clearing operation, an arborist will evaluate trees beyond the edge of the clearing limits to identify and mark danger trees that pose an imminent risk to the new line
- I. The landowner will then be given an opportunity to discuss the danger trees marked for removal with the Owner's Representative who will then give instructions to the contractor

Contracts for clearing will be structured to effectively implement the above process and this standard. Despite efforts to minimize tree and other vegetation removal, there may still be locations where the transmission facility requirements and/or the existing vegetation conditions are such that no substantial vegetation may remain within the ROW limits.

#### 4. Clearing for Structure Maintenance or the Replacement of an Existing Line

Clearing for structure maintenance or replacement of an existing line is similar to that for new line construction with the following exceptions:

|  |                               |                               |                                    |
|--|-------------------------------|-------------------------------|------------------------------------|
| <b>Right-of-Way Vegetation Initial Clearance Standard<br/>for 115- and 345-kV Transmission Lines</b> |                               |                               |                                    |
| <b>Northeast Utilities</b><br>Approved by: DEH, PJA  | <b>Design and Application</b> | <b>OTRM</b><br><b>030.004</b> | <b>Rev. 1</b><br><b>05/16/2008</b> |



# Northeast Utilities Overhead Transmission Line Standards

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- A. Clearing needs depend on the relative location of the rebuilt line with respect to the existing maintained area of the ROW and the proposed construction method for installation of conductors and shield wires. These factors may reduce the needed clearing.
- B. Structure site and access road clearing will still be required but may also be significantly reduced.
- C. When structures from the old line are removed, the cleared area at these sites and the access spurs to them will be allowed to naturally re-vegetate with native plant species, which may include native grasses, forbs or shrubs.

5. Decision Responsibility for Retention of Non-standard Woody Vegetation

The transmission line Construction Manager and Contractor Arborist will be responsible for obtaining approval from the Transmission Supervisor, Vegetation Management before allowing vegetation to remain which conflicts with the clearances shown in Figures A, B, and C.

6. Approving Managers and SME

Dorian Hill  
Manager Transmission Line and Civil Engineering  
Northeast Utilities

Peter Avery  
Manager Transmission Line Construction and MTCE  
Northeast Utilities

SME

Anthony Johnson III  
Supervisor Transmission Vegetation Management  
Northeast Utilities

7. Deviations

This standard sets forth the current NU 'best practices' for most applications of this subject matter. Therefore, deviation from this standard is generally not permitted. However, in unique instances a user may submit a written deviation request including justification to the listed Subject Matter Expert (SME). The SME must approve or deny the request in writing prior to the user commencing any non-standard activities. The SME may consult with his/her supervisor, co-SME if any and co-SME supervisor, and subsequently must copy any approval to them.

Revision History  
Rev.0 – original issue  
Rev. 1 – Clarified conductor zone and side zone definitions, and clearing practices to address NERC reliability requirements through strict conformance to the ISO-NE OP-3.

|  |                               |                               |                                    |
|--|-------------------------------|-------------------------------|------------------------------------|
| <b>Right-of-Way Vegetation Initial Clearance Standard<br/>for 115- and 345-kV Transmission Lines</b> |                               |                               |                                    |
| <b>Northeast Utilities</b><br>Approved by: DEH, PJA  | <b>Design and Application</b> | <b>OTRM</b><br><b>030.005</b> | <b>Rev. 1</b><br><b>05/16/2008</b> |

# Northeast Utilities Overhead Transmission Line Standards

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## APPENDIX 1

SHRUB SPECIES ALLOWED TO REMAIN: (PARTIAL LIST)

| <u>COMMON NAME</u>          | <u>GENUS/SPECIES</u>                                 |
|-----------------------------|--|
| Arrowwood Viburnum          | <i>Viburnum dentatum</i>                             |
| Bayberry                    | <i>Myrica pennsylvanica</i>                          |
| Blueberry - Highbush        | <i>Vaccinium corymbosum</i>                          |
| Blueberry - Lowbush         | <i>Vaccinium angustifolium</i> & <i>V. vacillans</i> |
| Brambles                    | <i>Rubus</i> spp.                                    |
| Buttonbush                  | <i>Cephalanthus occidentalis</i>                     |
| Dogwood - Gray              | <i>Cornus racemosa</i>                               |
| Dogwood - Redosier          | <i>Cornus stolonifera</i>                            |
| Dogwood - Silky             | <i>Cornus amomum</i>                                 |
| Elderberry                  | <i>Sambucus</i> spp.                                 |
| Hazelnut                    | <i>Corylus americana</i> & <i>C. cornuta</i>         |
| Honeysuckle - Bush          | <i>Diervilla lonicera</i>                            |
| Honeysuckle - Fly           | <i>Lonicera canadensis</i>                           |
| Honeysuckle - Tartarian     | <i>Lonicera tatarica</i>                             |
| Huckleberry                 | <i>Gaylussacia</i> spp.                              |
| Maple-leaf Viburnum         | <i>Viburnum acerifolium</i>                          |
| Meadowsweet - Broad-leaved  | <i>Spirea latifolia</i>                              |
| Meadowsweet - Narrow-leaved | <i>Spirea alba</i>                                   |
| Mountain Laurel             | <i>Kalmia</i> spp.                                   |
| Oblong Fruited Juneberry    | <i>Amelanchier bartramiana</i>                       |
| Oldfield Common Juniper     | <i>Juniperus depressa</i>                            |
| Pasture Juniper             | <i>Juniperis communis</i>                            |
| Running Shadbush            | <i>Amelanchier stolonifera</i>                       |
| Sheeplaurel                 | <i>Kalamia augustifolia</i>                          |
| Spicebush                   | <i>Lindera benzoin</i>                               |
| Steeplebush                 | <i>Spirea tomentosa</i>                              |
| Sumac - Smooth              | <i>Rhus glabra</i>                                   |
| Sweetfern                   | <i>Comptonia peregrina</i>                           |
| Sweetpepperbush             | <i>Clethra alnifolia</i>                             |
| Winterberry                 | <i>Ilex verticillata</i>                             |
| Witch Hobble                | <i>Vburnum alnifolium</i>                            |
| Witherod                    | <i>Viburnum cassinoides</i>                          |

|   |                               |                               |                                    |
|---|-------------------------------|-------------------------------|------------------------------------|
| <b>Appendix 1</b>   |                               |                               |                                    |
| <b>Right-of-Way Vegetation Initial Clearance Standard</b> |                               |                               |                                    |
| <b>for 115- and 345-kV Transmission Lines</b>             |                               |                               |                                    |
| <b>Northeast Utilities</b><br>Approved by: DEH, PJA       | <b>Design and Application</b> | <b>OTRM</b><br><b>030.006</b> | <b>Rev. 1</b><br><b>05/16/2008</b> |

# Northeast Utilities Overhead Transmission Line Standards

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## APPENDIX 2

LOW-MATURING TREE AND SHRUB SPECIES ALLOWED TO REMAIN ALONG THE SIDE ZONES: (PARTIAL LIST)

**All species listed above including:**

|                               |                             |
|-------------------------------|-----------------------------|
| Alder                         | <i>Alnus spp.</i>           |
| Dogwood - Alternate-leaved    | <i>Cornus alternifolia</i>  |
| Dogwood - Flowering           | <i>Cornus florida</i>       |
| Sumac - Shining               | <i>Rhus copillina</i>       |
| Sumac - Staghorn              | <i>Rhus typhina</i>         |
| Willows (except tree species) | <i>Salix spp.</i>           |
| Witch-Hazel                   | <i>Hamamelis virginiana</i> |

|   |                               |                               |                                    |
|---|-------------------------------|-------------------------------|------------------------------------|
| <b>Appendix 2</b><br><b>Right-of-Way Vegetation Initial Clearance Standard</b><br><b>for 115- and 345-kV Transmission Lines</b> |                               |                               |                                    |
| <b>Northeast Utilities</b><br>Approved by: DEH, PJA   | <b>Design and Application</b> | <b>OTRM</b><br><b>030.007</b> | <b>Rev. 1</b><br><b>05/16/2008</b> |

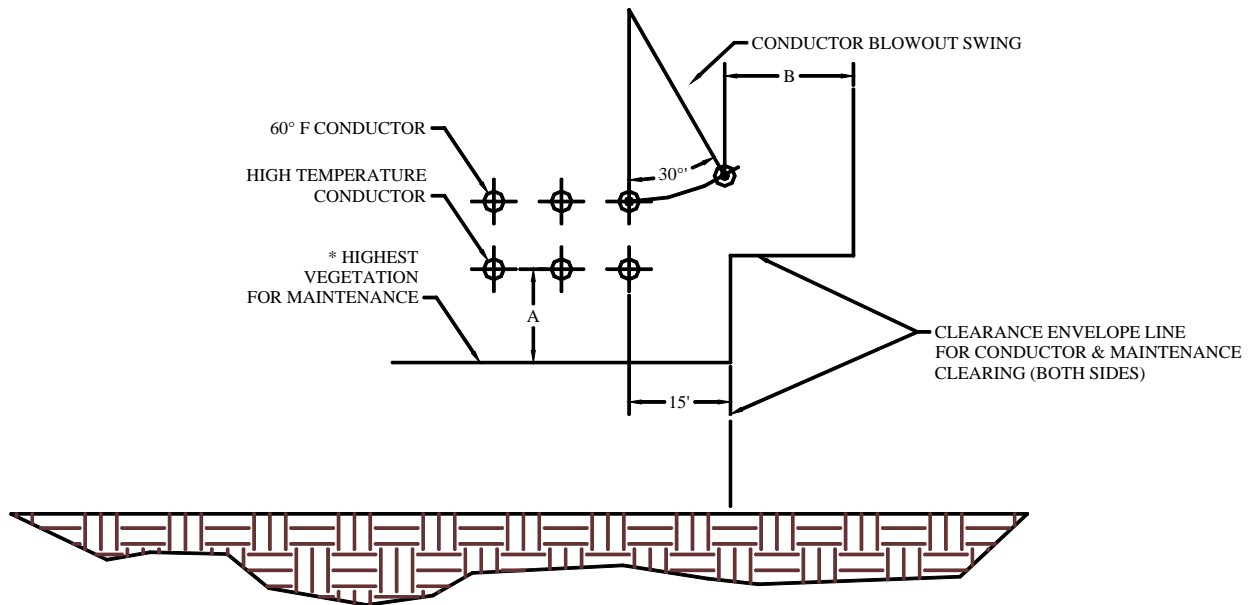
# Northeast Utilities Overhead Transmission Line Standards

## Figure A

### Minimum Conductor Clearances

| * All Other Woody Species |         |         |
|---------------------------|---------|---------|
| Line Voltage              | A (ft.) | B (ft.) |
| 69 & 115 kV               | 12      | 11      |
| 230 & 345 kV              | 16      | 15      |

| * Orchards   |         |         |
|--------------|---------|---------|
| Line Voltage | A (ft.) | B (ft.) |
| 69 & 115 kV  | 14      | 11      |
| 230 & 345 kV | 18      | 15      |



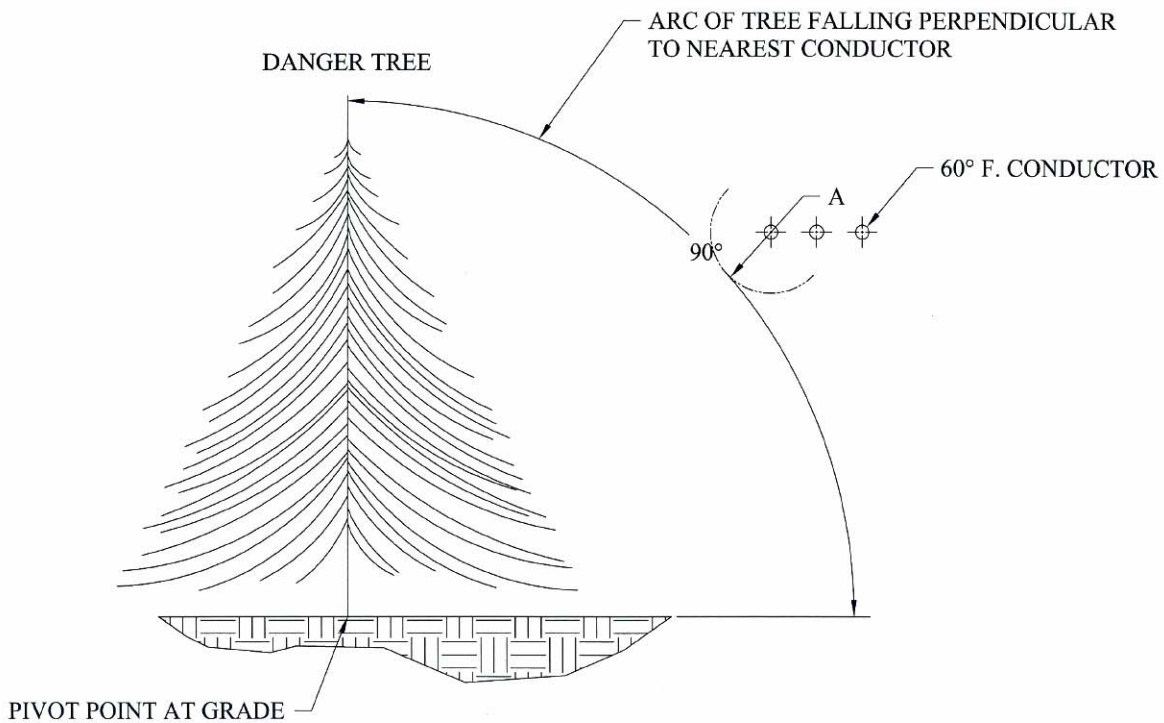
| Figure A<br>Right-of-Way Vegetation Initial Clearance Standard<br>for 115- and 345-kV Transmission Lines |                        |                 |                      |
|--|------------------------|-----------------|----------------------|
| Northeast Utilities<br>Approved by: DEH, PJA   | Design and Application | OTRM<br>030.008 | Rev. 1<br>05/16/2008 |

# Northeast Utilities Overhead Transmission Line Standards

## **Figure B**

### Danger Tree Clearances

| Line Voltage | A (ft.) |
|--------------|---------|
| 69 & 115 kV  | 6       |
| 230 & 345 kV | 10      |

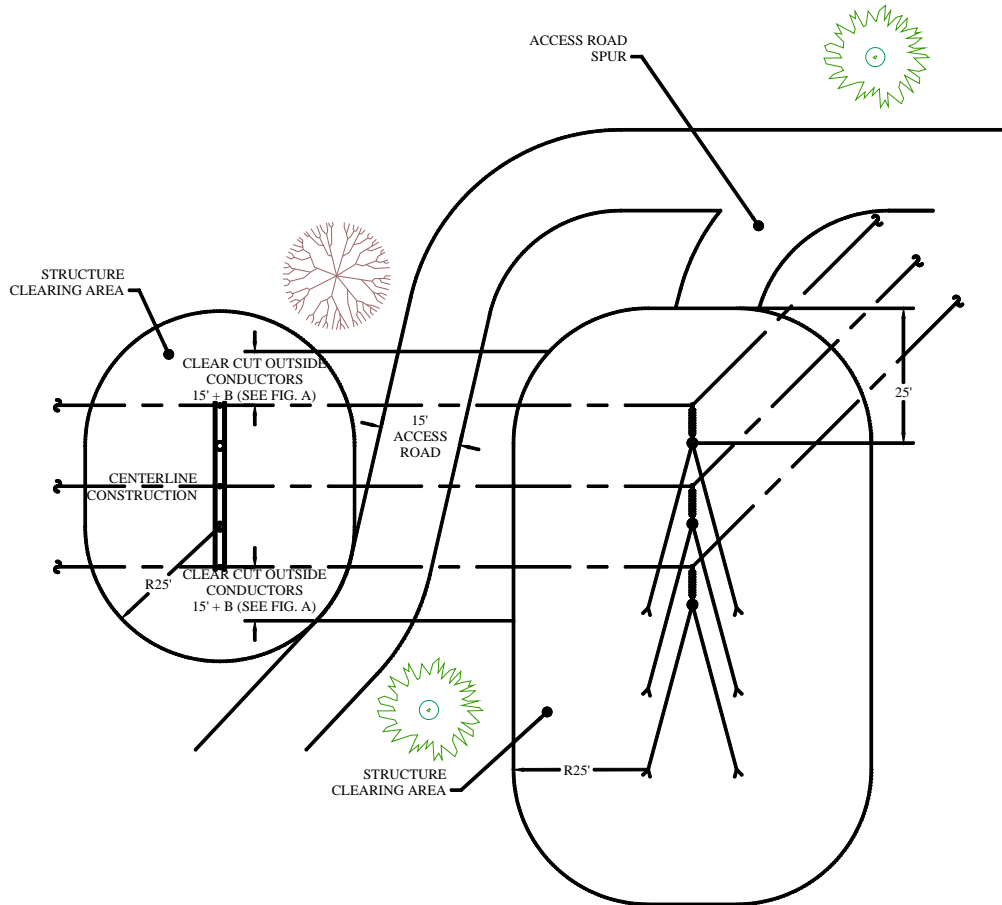


| <b>Figure B</b>  |                               |                               |                                    |
|--|-------------------------------|-------------------------------|------------------------------------|
| <b>Right-of-Way Vegetation Initial Clearance Standard<br/>for 115- and 345-kV Transmission Lines</b> |                               |                               |                                    |
| <b>Northeast Utilities</b><br>Approved by: DEH, PJA  | <b>Design and Application</b> | <b>OTRM</b><br><b>030.009</b> | <b>Rev. 1</b><br><b>05/16/2008</b> |

# Northeast Utilities Overhead Transmission Line Standards

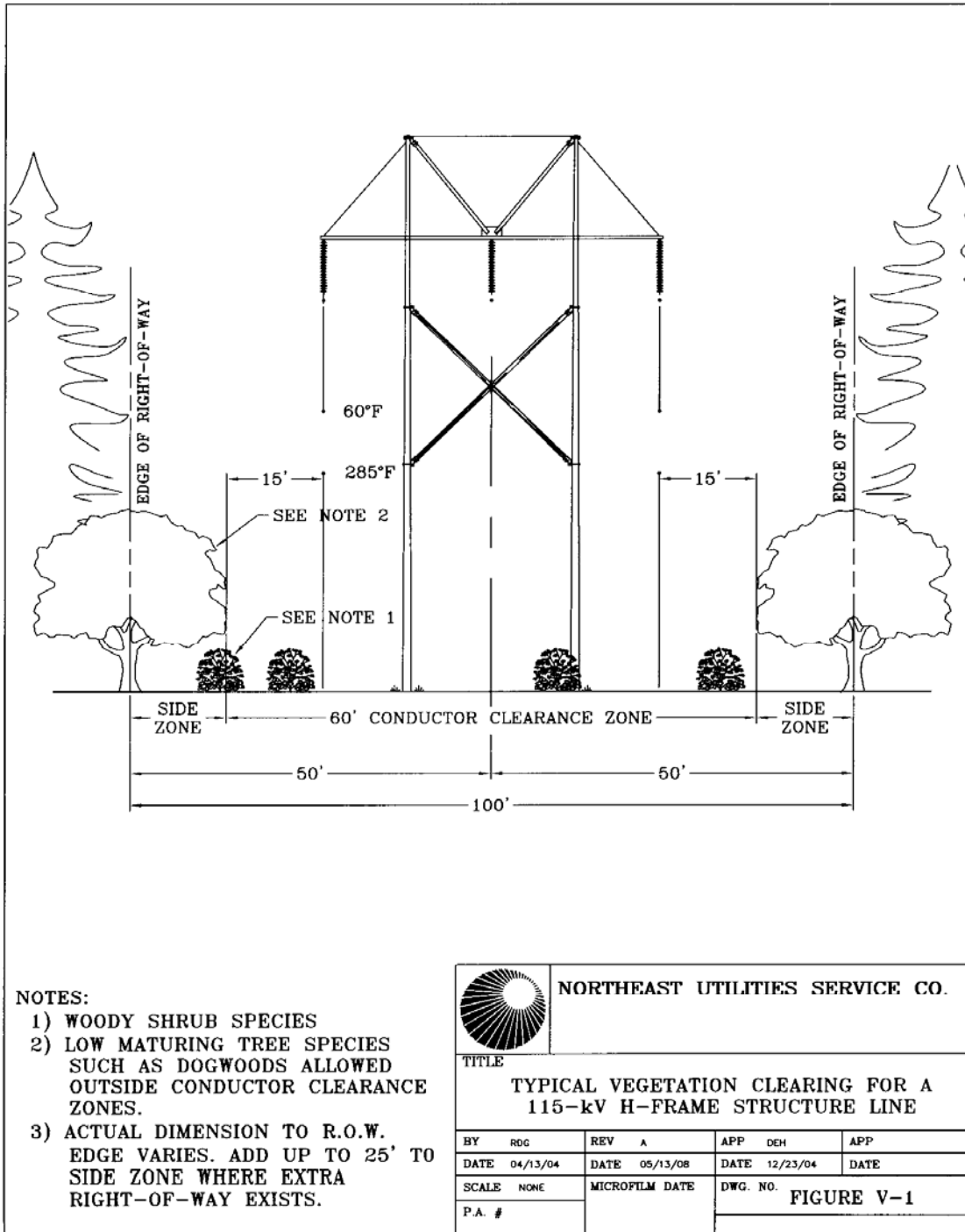
**Figure C**

Conductor Clearance Zone, Side Zones  
and Structure Clearing Areas for New Construction



|  |                               |                                |                                    |
|--|-------------------------------|--------------------------------|------------------------------------|
| <b>Figure C</b>  |                               |                                |                                    |
| <b>Right-of-Way Vegetation Initial Clearance Standard<br/>for 115- and 345-kV Transmission Lines</b> |                               |                                |                                    |
| <b>Northeast Utilities</b><br>Approved by: DEH, PJA  | <b>Design and Application</b> | <b>OTRM</b><br><b>030.0010</b> | <b>Rev. 1</b><br><b>05/16/2008</b> |

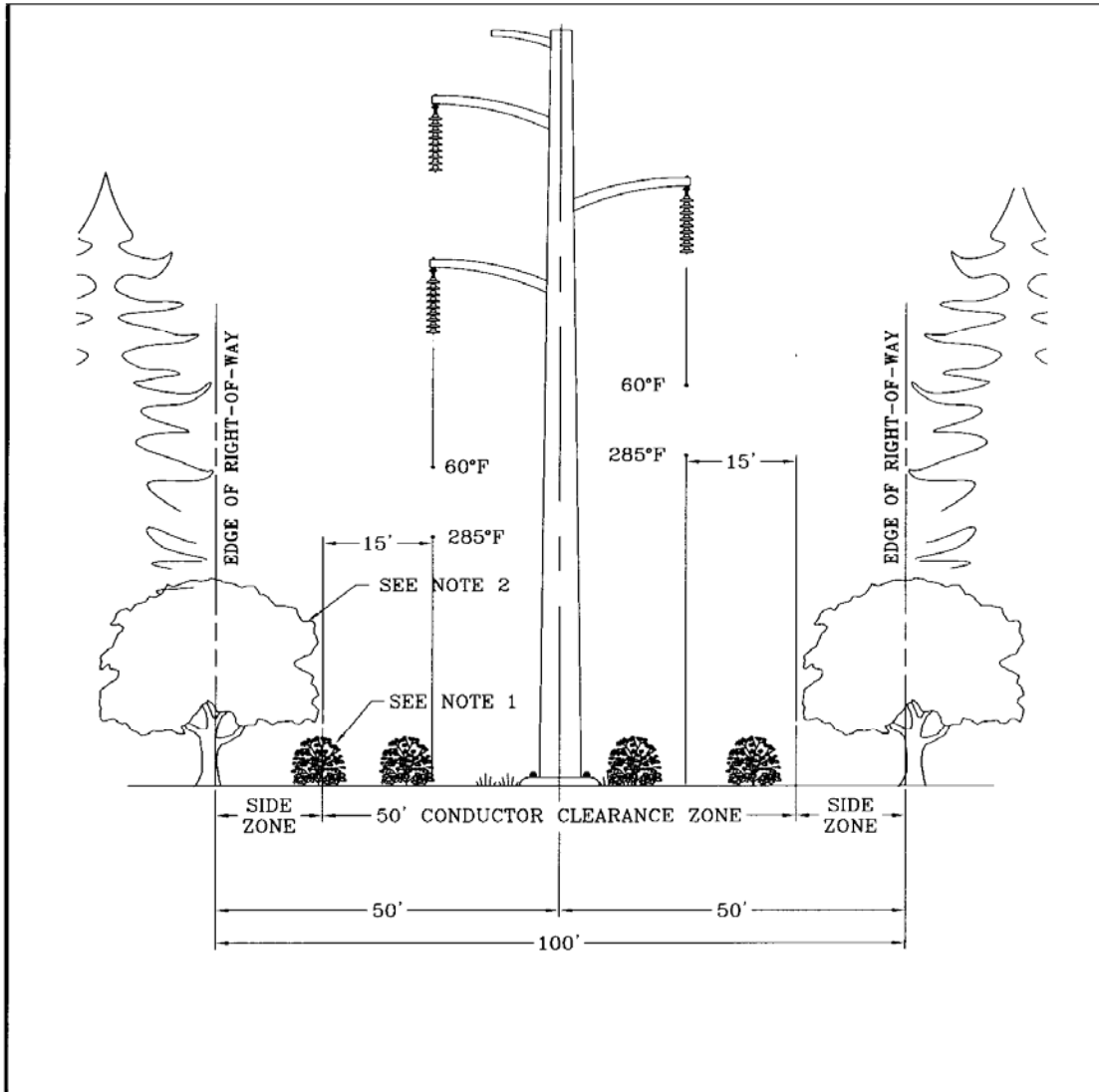
# Northeast Utilities Overhead Transmission Line Standards



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|  |                               |                                |                                    |
|--|-------------------------------|--------------------------------|------------------------------------|
| <b>Figure V-1</b>  |                               |                                |                                    |
| <b>Right-of-Way Vegetation Initial Clearance Standard<br/>for 115- and 345-kV Transmission Lines</b> |                               |                                |                                    |
| <b>Northeast Utilities</b><br>Approved by: DEH, PJA  | <b>Design and Application</b> | <b>OTRM</b><br><b>030.0011</b> | <b>Rev. 1</b><br><b>05/16/2008</b> |

# Northeast Utilities Overhead Transmission Line Standards



**NOTES:**

- 1) WOODY SHRUB SPECIES
- 2) LOW MATURING TREE SPECIES SUCH AS DOGWOODS ALLOWED OUTSIDE CONDUCTOR CLEARANCE ZONES.
- 3) ACTUAL DIMENSION TO R.O.W. EDGE VARIES. ADD UP TO 25' TO SIDE ZONE WHERE EXTRA RIGHT-OF-WAY EXISTS.

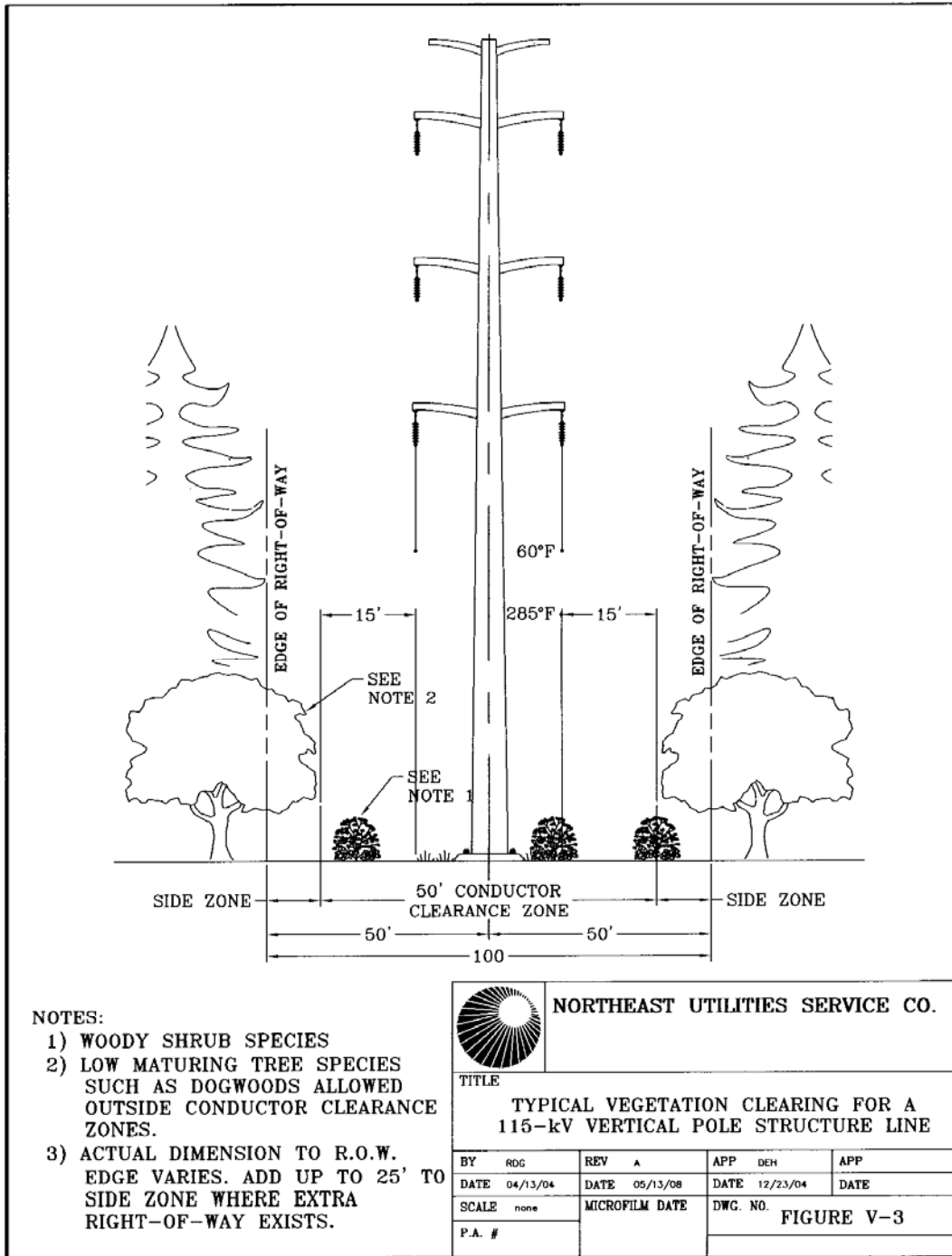
|  |          |  |          |                            |          |
|--|----------|--|----------|----------------------------|----------|
|  |          | <b>NORTHEAST UTILITIES SERVICE CO.</b> |          |                            |          |
| TITLE  |          |  |          |                            |          |
| TYPICAL VEGETATION CLEARANCE<br>FOR A 115-kV DELTA POLE STRUCTURE LINE |          |  |          |                            |          |
| BY   | RDG      | REV                                    | RDG      | APP                        | DEH      |
| DATE   | 04/13/04 | DATE                                   | 05/13/08 | DATE                       | 12/23/04 |
| SCALE  | none     | MICROFILM DATE                         |          | DWG. NO. <b>FIGURE V-2</b> |          |
| P.A. #   |          |  |          |                            |          |

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|  |                               |                                |                                    |
|--|-------------------------------|--------------------------------|------------------------------------|
| <b>Figure V-2</b>  |                               |                                |                                    |
| <b>Right-of-Way Vegetation Initial Clearance Standard<br/>for 115- and 345-kV Transmission Lines</b> |                               |                                |                                    |
| <b>Northeast Utilities</b><br>Approved by: DEH, PJA  | <b>Design and Application</b> | <b>OTRM</b><br><b>030.0012</b> | <b>Rev. 1</b><br><b>05/16/2008</b> |



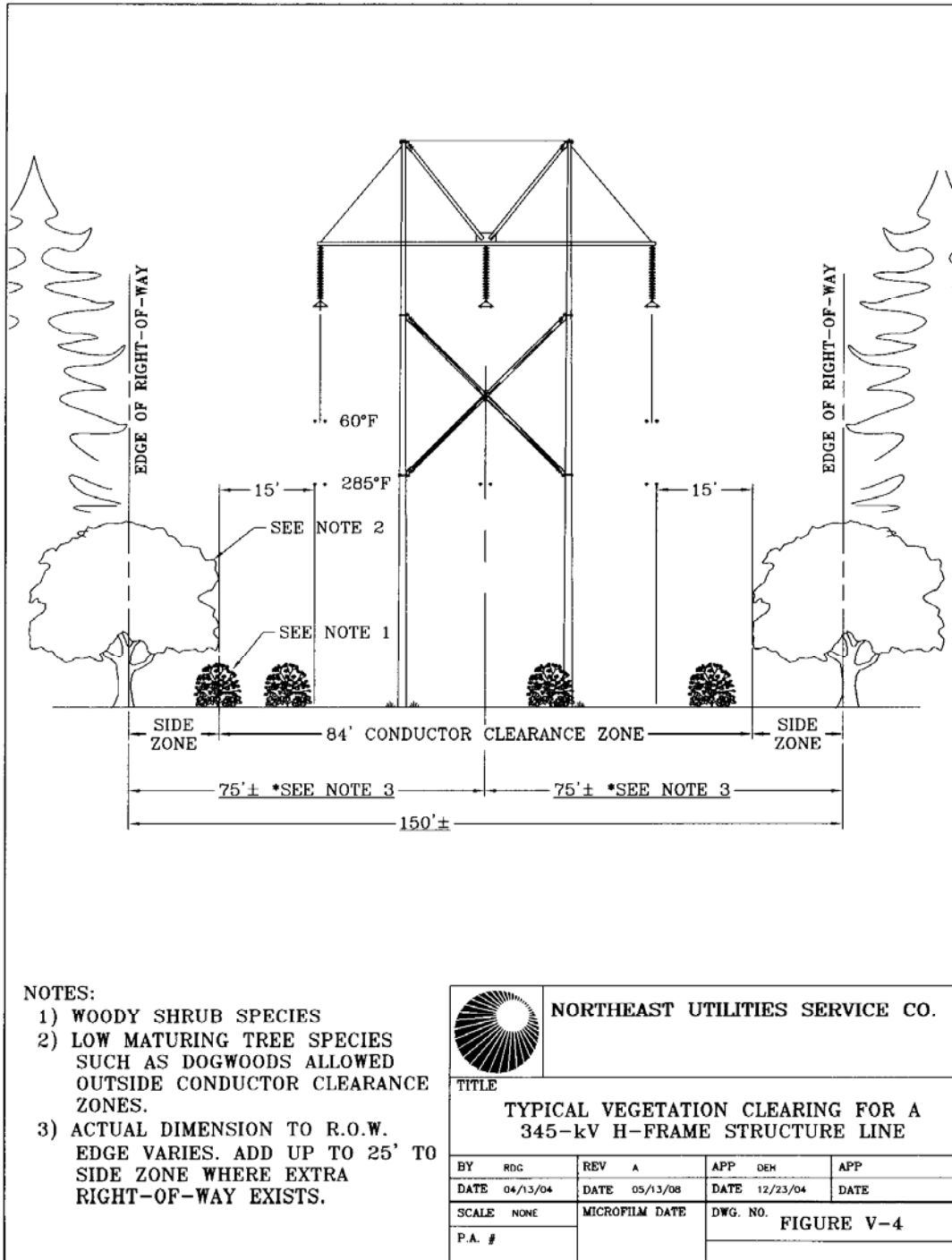
# Northeast Utilities Overhead Transmission Line Standards



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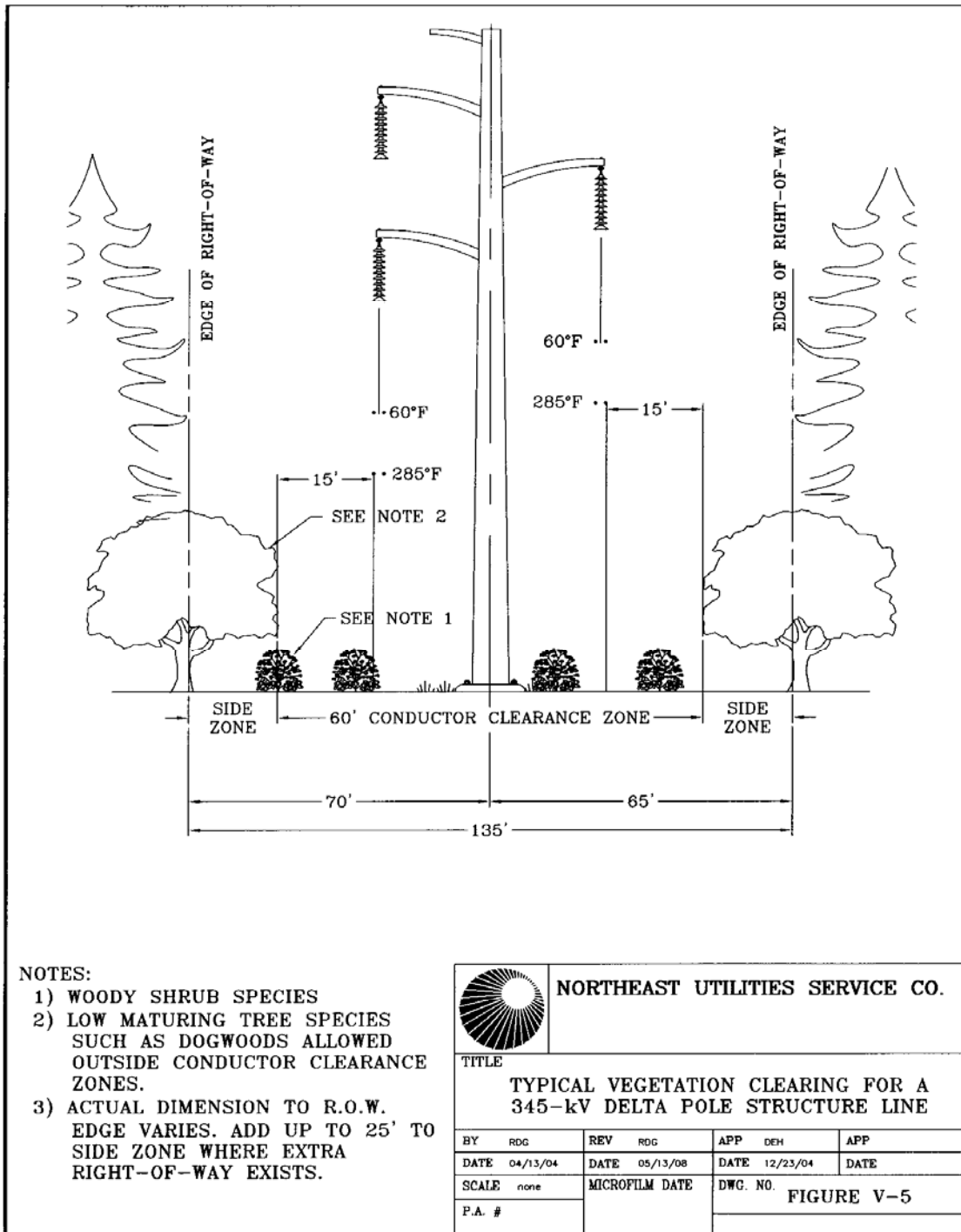
|  |                               |                                |                                    |
|--|-------------------------------|--------------------------------|------------------------------------|
| <b>Figure V-3</b>  |                               |                                |                                    |
| <b>Right-of-Way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines</b> |                               |                                |                                    |
| <b>Northeast Utilities</b><br>Approved by: DEH, PJA  | <b>Design and Application</b> | <b>OTRM</b><br><b>030.0013</b> | <b>Rev. 1</b><br><b>05/16/2008</b> |

# Northeast Utilities Overhead Transmission Line Standards



|  |                               |                                |                                    |
|--|-------------------------------|--------------------------------|------------------------------------|
| <b>Figure V-4</b>  |                               |                                |                                    |
| <b>Right-of-Way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines</b> |                               |                                |                                    |
| <b>Northeast Utilities</b><br>Approved by: DEH, PJA  | <b>Design and Application</b> | <b>OTRM</b><br><b>030.0014</b> | <b>Rev. 1</b><br><b>05/16/2008</b> |

# Northeast Utilities Overhead Transmission Line Standards

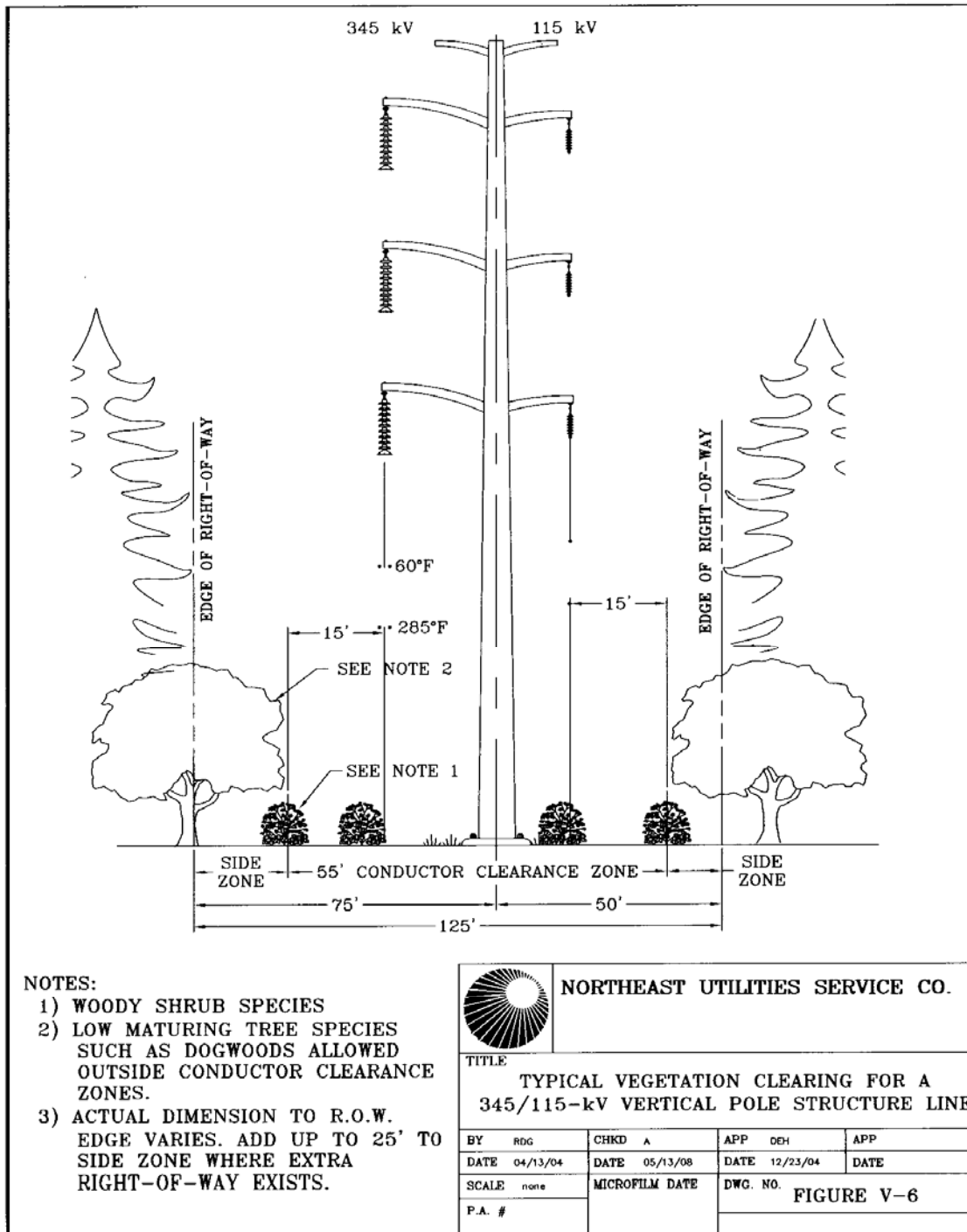


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**Figure V-5  
Right-of-Way Vegetation Initial Clearance Standard  
for 115- and 345-kV Transmission Lines**

|   |                               |                                |                                    |
|---|-------------------------------|--------------------------------|------------------------------------|
| <b>Northeast Utilities</b><br>Approved by: DEH, PJA | <b>Design and Application</b> | <b>OTRM</b><br><b>030.0015</b> | <b>Rev. 1</b><br><b>05/16/2008</b> |
|---|-------------------------------|--------------------------------|------------------------------------|

# Northeast Utilities Overhead Transmission Line Standards



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|  |                               |                                |                                    |
|--|-------------------------------|--------------------------------|------------------------------------|
| <b>Figure V-6</b>  |                               |                                |                                    |
| <b>Right-of-Way Vegetation Initial Clearance Standard<br/>for 115- and 345-kV Transmission Lines</b> |                               |                                |                                    |
| <b>Northeast Utilities</b><br>Approved by: DEH, PJA  | <b>Design and Application</b> | <b>OTRM</b><br><b>030.0016</b> | <b>Rev. 1</b><br><b>05/16/2008</b> |

## **ATTACHMENT 2**

### ***Vegetation Clearing Procedures and Practices for Transmission Line Sections (OTRM 230)***

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# Northeast Utilities Overhead Transmission Line Standards



1. Scope

This standard details the procedures for:

1. Cutting, pruning, and disposal of trees, tree parts and other woody vegetation within Right-of-Way (“ROW”) areas requiring clearing; the Conductor Clearance Zone and Side Zones.
2. Structure Clearing Areas and access routes on or to the ROW.
3. Cutting, trimming and disposal of danger trees located outside the construction clearing limits.

Contract clearing scopes vary depending upon the classification of the area to be cleared. Contract drawings will designate two categories of Clearing Areas; the Conductor Clearance Zone and Side Zones.

This standard applies to vegetation management work in support of new construction projects in Northeast Utilities (NU) transmission rights-of-way in Connecticut, Western Massachusetts and New Hampshire.

2. Regulations and Related Codes and Standards

- A. OTRM 030 - Right-of-Way Vegetation Initial Clearance Standard for 115kV and 345-kV Transmission Lines
- B. Occupational Health and Safety Regulations (29 CFR 1910.269 and ANSI Z-133)
- C. OTRM 222 - Operation of Equipment on NU Rights-of-Way

3. Responsibilities

- A. NU is responsible for clearly defining the scope and boundaries of the vegetation management activities.
- B. NU is responsible for providing and identifying access routes to the work site.
- C. NU is responsible for identifying environmentally sensitive areas such as wetlands, priority habitat and water supply areas.
- D. The contractor is responsible for conducting vegetation management activities in accordance with this standard and all applicable federal, state and local regulations.

4. Definitions

For further illustration of definitions 3.A through 3.K, see OTRM 030 Figures A through C and V-1 through V-6

- A. Clearing Area – The work area, which includes a central Conductor Clearance Zone flanked by two Side Zones.
- B. Conductor Clearance Zone – Areas normally located along the center portion of the width to be cleared that includes the structures and areas beneath the conductors. The width varies with the type of structure to be installed. Contract drawings provide details of the locations of the conductor clearance zones.

|  |                     |             |            |
|--|---------------------|-------------|------------|
| <b>Vegetation Clearing Procedures and Practices for Transmission Line Sections</b> |                     |             |            |
| <b>Northeast Utilities</b><br>Approved by: KMS, AJ (CT/MA) & JJJ, CB (NH)          | <b>Construction</b> | OTRM 230    | Rev. 2     |
|  |                     | Page 1 of 9 | 08/19/2013 |

## Northeast Utilities Overhead Transmission Line Standards

- C. Side Zones – Areas adjoining the Conductor Clearance Zone to the edge of the cleared limits of the right-of-way to provide for clearances between conductors and vegetation. Contract drawings provide details of the locations of side zones.
- D. Water Supply Area – Areas owned or controlled by a public or private water supply agency for water supply purposes.
- E. Tree – A woody plant normally maturing at 20 feet or more in height, usually with a single trunk un-branched for several feet above the ground, with a definite crown.
- F. Danger Tree – Any tree located outside the limits of clearing shown on the drawing identified by NU’s representative, which could endanger the transmission line by falling closer than 6 feet to the normal 60°F sag position of a conductor.
- G. ROW Access Route – Routes within the limits of the right-of-way generally but not necessarily within the area to be cleared, to which construction traffic is to be confined. This route shall be cleared for a width of 15 feet in the manner specified within the project documents.
- H. Off-ROW Access Route – Routes outside of the limits of the ROW on private property for which rights have been or will be obtained. Such routes provide shortened access from public highways or circumvent obstacles on the ROW. This route shall be cleared for a width of 15 feet in a manner specified elsewhere.
- I. Structure Clearing Area – Area that is required for the installation, equipment set up or removal work, within the conductor clearing area as shown in OTRM 030 Figure C.
- J. 60° Sag Position – Conductor design elevation at any given point at 60°F – no wind.
- K. Maximum Hot Sag Position – Conductor elevation at any given point under emergency high temperature operation 285°F unless otherwise noted on project profile drawings.

### 5. General Requirements

#### A. Access to and along the ROW

NU has acquired entry and access rights to the ROW covering the project as stated elsewhere in the contract documents. The contractor shall obtain the approval of NU’s representative prior to the clearing and use of each section of access routes.

The normal access to any job site is along NU’s ROW from the intersection with the nearest public way. The ROW Development and Management (D & M) Plan for the project, which is a part of the contract drawings, establishes the location of access roads along the ROW. The contractor shall confine all travel within the ROW to the routes designated on the D & M plan. Alternative access routes shall not be used without the approval of NU’s representative, who will ascertain if any additional regulatory approval is required before use. Use of alternative access will typically result in NU’s re-designation of identified access routes.

Temporary rights of access over adjacent land may also be indicated on the drawings or subsequently be available via NU’s representative or construction manager. The contractor shall strictly observe established conditions attendant to the use of any temporary rights.

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Continuing negotiations with property owners and regulatory authorities may result in access roads being located other than shown on the contract drawings. NU's representative or construction manager shall instruct the contractor regarding such changes. The contractor shall make no access route changes except on the instruction of NU's representative.

### B. Site Location

NU will flag the limits of clearing work to be done by the contractor; this shall include the limits of the clearing areas on the ROW and the location of all access routes, structures, Conductor Clearing Areas and Side Zones. NU will identify individual trees that have been approved by NU's representative to remain and mark them for preservation. The contractor shall confirm the location of all access routes both on and off the ROW with NU's representative before commencing work or making entry into a new work area.

The contractor shall preserve these field markings established by NU for the duration of the project. The contractor is further responsible to preserve and leave undisturbed all permanent property monuments.

### C. Contact with Property Owners and the Public

Property owners along the ROW will be advised by NU's representative or construction manager of the nature of the work to be conducted on the ROW in advance of any contractor entry. All subsequent contacts with property owners on or adjacent to the ROW and access routes will be established by or with the prior specific permission of NU's representative. The contractor shall immediately advise NU's representative of any inquires or complaints made by property owners during the progress of the work.

NU reserves unto itself the responsibility for public relations. The contractor shall make no statements regarding the work in progress. The contractor shall refer to NU's representative any interest in the work expressed by individuals or groups for the general public.

### D. Regulatory Aspects

NU has general environmental obligations as well as specific development and management (D & M) plan obligations relative to the overall construction of the transmission line. As applied to the work under this specification, these obligations bear on the elimination or reduction of adverse environmental effects on desirable vegetation, fish, wildlife, forests, water purity, and water resources.

Stream crossings with equipment shall only be performed in a manner consistent with the D & M plan to avoid disturbance of stream banks and stream bottoms, which would result in siltation.

Where a wet area must be traversed by an access road or other construction, careful provision must be made to assure that surface and subsurface drainage is not impaired. The contractor shall repair any disturbance to natural drainage caused by the contractor's operation to the equivalent of the original condition.

The contractor shall take special care when moving equipment to prevent erosion on slopes leading to wetland areas. Disturbed surfaces caused by the contractor's

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operation which may lead to erosion or siltation shall be quickly repaired to the equivalent original condition by the contractor.

Any storage yards for trucks, equipment, etc, shall be located as far as practical away from stream and wetland buffer zones to minimize the potential adverse effects on these resources. The recommended distance for storage of equipment is 100 feet from the edge of any stream or wetland.

The statements above shall serve to advise the contractor of the scope and character of any Environmental Protections for which he shall be responsible.

The conduct of the work may be monitored by representatives of appropriate regulatory agencies. All contacts with such agencies and their representatives will be initiated by or referred to NU's representative.

### E. Contractor's Field Headquarters

NU has made no provision for a contractor's field headquarters near the right-of-way. The contractor shall make their own provisions for a field reporting headquarters off the ROW and the cost thereof shall be included as part of their operating overhead. The cost of the contractor's field reporting headquarters shall not be separately billed to tNU. The contractor shall obtain the approval of NU's representative as to the location of any field reporting headquarters.

### F. Fences

No fence on the ROW or crossing access routes may be cut without permission of NU's representative. Fences cut for any temporary purpose shall be repaired immediately upon completion of that purpose.

Gates may exist or be required along the ROW. The contractor shall furnish and install such gates as NU's representative may direct as an extra cost to NU.

The contractor shall keep closed except when moving personnel and equipment, all fence openings or gates. Particular care shall be taken to see that livestock are not allowed out of their intended bounds. The contractor is responsible for all consequential damages arising out of livestock being allowed out of their intended bounds or unauthorized access and damage from the general public as a result of their activities.

### G. Overhead Electric Lines

Overhead lines energized at various voltages may be located within the ROW, cross the ROW and/or be parallel to the ROW at various locations. Such lines shall be considered energized at all times.

When in proximity to any overhead line:

- 1) The contractor is responsible to alert their people to the energized potential electrical hazard
- 2) The contractor is independently responsible to train maintain working clearance required b Occupational Health and Safety Regulations (29 CFR 1910.269 and ANSI Z-133)
- 3) The contractor shall further respond to applicable requirements of NU's safety manual as NU's representative may direct.

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Should conditions develop where the performance of the work and overhead lines on the ROW are in conflict, the contractor shall not proceed with the work until after the situation has been reviewed with NU's representative and all appropriate arrangements to address safety concerns or corrective actions made by the contractor.

During ROW clearing operations, including travel to and from worksites, the contractor shall set up equipment and arrange procedures to maintain safe vertical and horizontal clearances in accordance with OTRM 222. Elevating equipment shall be positioned in a manner and location so that the operation of this equipment would not violate NU's requirements or safety regulations.

In any case, where equipment must be positioned so that it is capable of contacting any conductors, NU's representative may require that the work proceed under NU's protective tagging system. In such cases, NU's representative shall define to the contractor whether the application of the protective tagging system provides an energized or de-energized line, and if energized, the limits of the protection provided.

### H. Water Supply Areas

NU will show on the project drawings where any portion of the work falls within a public water supply watershed or well field. It is the contractor's responsibility in a water supply area to:

- 1) Immediately remove any litter originating with his operations
- 2) Provide commercial toilet service for the control and removal of wastes
- 3) Ensure proper storage and containment of all chemicals and petroleum products. Prevent the spillage of any chemical or petroleum products. In the event of a spill, the contractor shall immediately report the spill to NU's representative to initiate the necessary regulatory notifications and corrective action. Payment under the contract documents shall not be made for the work and materials expended to accomplish the required spill cleanup and rehabilitation.

### I. Wetlands

Wetland areas designated on the plans or drawings shall be avoided to the extent practical and all activities within or adjacent to wetland areas shall follow the prescribed procedures or practices to be followed when working within or in close proximity to these areas.

- 1) Heavy machinery or equipment shall not be used in wetland areas
- 2) All vegetative debris must be removed immediately from wetland areas.
- 3) Storing of equipment and refueling shall not be allowed within 100 feet of any designated wetland boundary.
- 4) Prevent the spillage of any chemical or petroleum products. In the event of a spill, the contractor shall immediately report the spill to NU's representative to initiate the necessary regulatory notifications and corrective action. Payment under the contract documents shall not be made for the work and materials expended to accomplish the required spill cleanup and rehabilitation.

### J. Priority Habitat

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Priority habitat areas that are designated on the patrol map drawings shall have all work conform to the restrictions for work within these areas taking into account the species to be protected and the timing of such work if time restrictions are required.

- 1) Contractor shall adhere to any restrictions or management practices required in the priority habitat areas as designated on the patrol map drawings.
- 2) Timing of work shall be scheduled to minimize disturbance (including vegetation removal, excavations and grading) within the priority habitat areas and in accordance with the management restrictions or requirements.
- 3) Areas where work shall not be performed must be fenced off or flagged to avoid any unintentional disturbance

### K. Herbicide Treatments

Herbicides are not usually applied within the scope or during the schedule of work under a ROW clearing specifications. Any unusual case, which is an exception to this generality, shall be specified elsewhere in the contract documents.

## 6. Cutting

### A. General Requirements

- 1) Stump Height - All stumps except those within access route areas shall be cut to a height above ground of not more than one-half the stump diameter. However, in no case shall stumps be left higher than 10" on the uphill side unless used as a support for a fence or for removal in areas where stumps will be removed. Within the Conductor Clearance Zone, all access routes and at all Structure Clearing Areas stumps shall be cut to within 3" of the ground. Stumps in developed lawn areas shall be ground to 6" below the surface, covered with 6" of soil, seeded, and mulched.
- 2) Cordwood – Where specifically designated on the drawings or in the Special Conditions, cordwood shall be cut in four (4) foot lengths and piled in accordance with the Disposal section.
- 3) Tree-length Logs – All logs not designated for use as cordwood shall be limbed-out into tree-length logs and disposed of as indicated in the Disposal section. The contractor may elect to cut the logs into shorter lengths.
- 4) Brush – The remaining limbed-out branches and small stems measuring less than 3" in diameter on the large end are designated "brush" and shall be disposed of as indicated in the Disposal section.
- 5) Danger Trees – NU's representative shall designate removal of certain danger trees situated outside the limits of clearing shown on the drawings for which rights of removal have been obtained. These trees shall be removed and disposed of under the same provisions of the contract documents applying to these activities on the adjacent cleared ROW. Re-inspection of the ROW after the initial removal of marked danger trees may result in NU's representative marking additional danger trees for removal.
- 6) Prohibitive Cutting – The contractor shall not remove trees outside the limits of clearing shown on the drawings unless marked by NU's representative as a danger tree to be removed or in an Off-ROW Access Route marked by NU's representative.

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### B. Cutting Areas

- 1) Conductor Clearance Zone – Within these areas all tall-maturing tree species as well as low growing shrub species shall be cut in order to provide a clear and accessible area for the construction of the new facilities.
- 2) Side Zones – Within these areas all tall-maturing tree species shall be removed. Where the density of trees to be removed in a given area will allow practical preservation of specimens in good condition, NU's representative will preserve low-growing desirable species listed under OTRM 030 Appendix 1 and Appendix 2 to the extent practical. This will be allowed where vegetation to be preserved will not impinge upon the clearance envelope nor with construction, maintenance or operation of the proposed transmission line.

### C. Pruning Practices – Trimming shall be accomplished in accordance with proper arboricultural practices and follow the guidelines established under ANSI Z-133;

- 1) When cutting back or topping trees, drop crotch trimming shall be used as much as possible and avoid cutting back to small suckers.
- 2) In general reduction of size (cut back or topping) not more than 1/3 of the total area should be reduced at a single operation.
- 3) All cuts shall be made sufficiently close to the parent stem so that healing can readily start under normal conditions.
- 4) All limbs 1 inch in diameter (size of a quarter) or over must be pre-cut to prevent splitting.
- 5) Trees showing visible signs of disease or damage shall be reported to NU, who will decide whether they will be trimmed or removed.

## 7. Disposal

### A. General

- 1) Techniques – Disposal techniques will be as hereinafter specified or as may be more explicitly called for on the drawings or plans at a specific location.
- 2) Fallen Trees and Limbs – All trees and limbs in the proposed clearing area, which have fallen or were cut prior to the clearing of the ROW shall be considered part of the contract and disposed of accordingly. This does not apply to cuttings that were stacked to decay and provide wildlife habitat.
- 3) Danger Trees – Danger trees shall be disposed of under the same provisions of the contract documents that apply to disposal on the adjacent cleared ROW.
- 4) Cherry Tree Disposal Precaution – Wilted cherry leaves are poisonous to livestock, therefore, in areas frequented by livestock any cherry cuttings shall be disposed of immediately out of reach of livestock.

### B. Logs

- 1) Tree-Length Logs – Removal of tree length logs in all areas shall be the primary method of disposal. Tree length logs including shorter lengths and limbs measuring at least three (3) inches in diameter on the small end shall be temporarily piled neatly within the cleared portions of the ROW outside the conductor clearance zone and as near the ROW boundaries as possible. However, none shall be piled within roads, paths, cleared areas for access roads,

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within 100 feet of a wetland boundary or within 100 feet longitudinally on either side of an angle point.

Each pile shall be no higher than then (10) feet and no wider on the ground than sixteen (16) feet. Each pile shall be spaced at least six (6) feet from adjacent log piles or brush piles.

- 2) Cordwood – Where specified on the drawings cordwood in four (4) foot lengths shall be piled in four (4) foot high piles parallel to the sides of the ROW along the edges of the cleared areas. Single piles of cordwood shall not exceed sixteen (16) feet in length.
- 3) Salvageable Wood Products – For those forest products owned by the NU Operating Subsidiary and for which there is marketable value, NU will estimate the value of the timber and it shall be the contractor’s responsibility to validate the value of the timber, to perform the cutting, salvage, and marketing operation at his sole discretion, and shall be conducted subject to the constraints expressed below.
  - a) All forest products cut by the contractor for market become the property of the contractor and shall be removed from the ROW. Cutting remnants shall be disposed by either the manner specified for brush disposal at the cutting location, or when larger than brush size, shall be combined with the disposal of unmarketable logs in the manner specified for logs at the cutting location.
  - b) The contractor shall state the scope of their marketing intentions in their proposal, and shall quote a unit price or prices, which apply to material actually removed for market. The contractor shall report, subject to confirmation by NU’s representative, the materials actually removed from the ROW.
  - c) The contractor shall complete his removals for market within 90 days after cutting. With the expiry of the stated time, all materials then remaining on the ROW reverts to being NU’s property.
  - d) The contractor may not conduct sales to the general public at or on the ROW locations
  - e) Sawlog measurement shall be based on the international (1/4” kerf) log scale. Trees cut for sawlogs shall be to a minimum of:
    - i) 10” tip DIB for hardwoods (deciduous)
    - ii) 6” tip DIB for softwoods (coniferous, including cedar)

Other measurements shall be as follows:

- i) Posts – linear foot, 10”DIB maximum
- ii) Cordwood – Standard Cord, 4X4X8
- iii) Wood Chips – cubic yard

### C. Brush

- 1) Chipping – shall be the primary method of disposal. The chips shall not be left in piles but shall be spread on the ROW. The maximum depth of fresh chips shall be no greater than three (3) inches. Avoid burying desirable low-growing shrubs such as lowbush blueberries as practicable. Chips shall not be placed within access roads, structure-clearing areas, or within defined wetlands.

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- 2) Piling – to the extent, may be allowed as method of disposal in some areas if noted on the Development and Management Plan. Brush shall be piled within the same cleared areas as the log piles. Each brush pile shall be no higher than four (4) feet and no longer than sixteen (16) feet on its maximum horizontal dimension. Each brush pile shall be separated from any other brush or log pile by at least six (6) feet. Care shall be taken not to pile within the Conductor Clearance zone or within 100 feet longitudinally in both directions from an angle point.

**D. Burying**

Burying of vegetative debris is not permitted as a means of disposal

**E. Burning**

Burning is not permitted as a method of disposal.

**8. Deviations**

This standard sets forth the current NU 'best practices' for most applications of this subject matter. Therefore, deviation from this standard is generally not permitted. However, in unique instances a user may submit a written deviation request including justification to the listed Subject Matter Expert (SME). The SME must approve or deny the request in writing prior to the user commencing any non-standard activities. The SME may consult with his/her supervisor, co-SME if any and co-SME supervisor, and subsequently must copy any approval to them.

**9. Cognizant Engineering Group**

Transmission Line & Civil Engineering- CT/MA

Transmission Engineering- NH

Transmission Vegetation Management- CT/MA/NH

Refer to Master Standards List (MSL) for the names of the current approving manager(s) and SME(s).

Revision History

Rev.0 – original issue 8/22/2006

Rev 1 – Complete rewrite to comply with new national standards 7/29/2008

Rev.2 –Revision to update to format currently in use. Added new Section 3 “Responsibilities”, Section 5.J “Priority Habitats, and Section 9 “Cognizant Engineering Groups”. 08/19/2013

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**ATTACHMENT 3**

**Making Requests for Wood**  
**[www.Eversourcerightsofway.com](http://www.Eversourcerightsofway.com)**)

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