DOCKET NO. 3B – The United Illuminating Company Amended Certificate of Environmental Compatibility and Public Need for replacement of a portion of the existing Derby – Shelton 115-kV electric transmission line facility. **Reopening of this Certificate based on changed conditions pursuant to Connecticut General Statutes §4-181a(b).**	}	Connecticut Siting Council

October 21, 2022

DRAFT Findings of Fact

Introduction

1. On January 16, 1974, the Connecticut Siting Council (Council) granted The United Illuminating Company (UI) a Certificate of Environmental Compatibility and Public Need (Certificate) for replacement of a portion of an existing 115-kilovolt (kV) electric transmission line facility that traverses the municipalities of Ansonia, Derby and Shelton (Original Project). (Council Memorandum dated May 16, 2022; UI 1, Motion to Reopen, pp. 1-2; Council Administrative Notice Item No. 24 – Docket No. 3)

2. On December 2, 1976, the Council approved an amendment to the Certificate for the Original Project. (Council Memorandum dated May 16, 2022; UI 1, Motion to Reopen, p. 2; Council Administrative Notice Item No. 25 – Docket No. 3A.)

3. UI's service area consists of the following municipalities in Connecticut: Ansonia, Bridgeport, Derby, East Haven, Easton, Fairfield, Hamden, Milford, New Haven, North Branford, North Haven, Orange, Shelton, Stratford, Trumbull, West Haven, and Woodbridge. (Council Administrative Notice Item No. 28 – Docket No. 508)

4. The parties to the original Docket Nos. 3 and 3A proceedings were UI: the City of Derby; the City of Shelton; the Attorney General; State Representative - 104th District; State Representative - 113th District; State Senator - 17th District; State Senator - 32nd District; and Tanya Malse. (UI 1, Motion to Reopen, Council Administrative Notice Item No. 24 – Docket No. 3)

5. The existing 115-kV electric transmission line facility serves customers in Ansonia, Derby and Shelton via UI's existing Indian Well and Ansonia Substations. (UI 1, Overview in Support of the Petition to Reopen and Modify Docket No. 3, "OSPRM," p. ES-1)

6. On May 13, 2022, pursuant to Connecticut General Statutes (CGS) §4-181a(b), UI filed a Motion to Reopen and Modify (Motion to Reopen) the Council's January 16, 1974 final decision to issue a Certificate and the Council's December 2, 1976 final decision to amend the Certificate for the Original Project based on changed conditions for the Derby Junction to Ansonia 115-kV Transmission Line Rebuild Project (Project). (Council Administrative Notice Item Nos. 24 and 25 – Docket Nos. 3 and 3A; Council Memorandum dated May 16, 2022; UI 1, Motion to Reopen, pp. 1-8)

7. The purpose of the Project is to improve the reliability of the transmission grid by addressing the asset condition issues associated with two existing 115-kV UI owned and operated electric transmission lines within an existing 4.1-mile long UI right-of-way between Derby Junction and Ansonia Substation, and rebuild the electric transmission lines on monopole structures to be owned and operated by UI within the right-of-way (ROW) to meet current National Electrical Safety Code (NESC) and UI standards. (UI 1, OSPRM, p. ES-1)

8. On May 16, 2022, the Council issued a memorandum to the service lists for the original Docket Nos. 3 and 3A proceedings requesting comments or statements of position in writing with respect to whether the Motion to Reopen should be granted or denied by June 2, 2022. No comments were received. (Council Memorandum dated May 16, 2022; Record)

9. At a public meeting held on June 9, 2022, the Council voted to grant UI's Motion to Reopen and to approve the schedule for a public hearing with an evidentiary session and public comment session via Zoom conferencing on July 28, 2022. (Record; Council Meeting Minutes of June 9, 2022; Council's Hearing Notice dated June 10, 2022)

Procedural Matters

10. On March 10, 2020, Governor Lamont issued a Declaration of Public Health and Civil Preparedness Emergencies, proclaiming a state of emergency throughout the state as a result of the COVID-19 pandemic. (Council Administrative Notice Item No. 57)

11. On March 12, 2020, Governor Lamont issued Executive Order No. (EO) 7 ordering a prohibition of large gatherings, among other orders and directives. (Council Administrative Notice Item No. 57)

12. On March 14, 2020, and as subsequently extended, Governor Lamont issued EO 7B ordering suspension of in-person open meeting requirements of all public agencies under CGS §1-225. (Council Administrative Notice Item No. 57; CGS §1-200, *et seq*. (2021))

13. Public Act 22-3 (PA 22-3) took effect on April 30, 2022. It permits public agencies to hold remote meetings under the Freedom of Information Act (FOIA) and the Uniform Administrative Procedure Act. FOIA defines "meeting" in relevant part as "any hearing or other proceeding of a public agency." (Council Administrative Notice Item No. 57; CGS §1-200, *et seq*. (2021))

14. PA 22-3 allows public agencies to hold remote meetings provided that:
    a) The public has the ability to view or listen to each meeting or proceeding in real-time, by telephone, video, or other technology;
    b) Any such meeting or proceeding is recorded or transcribed and such recording or transcript shall be posted on the agency's website within seven (7) days of the meeting or proceeding;
    c) The required notice and agenda for each meeting or proceeding is posted on the agency's website and shall include information on how the meeting will be conducted and how the public can access it any materials relevant to matters on the agenda shall be submitted to the agency and posted on the agency's website for public inspection prior to, during and after the meeting; and
    d) All speakers taking part in any such meeting shall clearly state their name and title before speaking on each occasion they speak.

    (Council Administrative Notice Item No. 57)

15. On June 10, 2022, all parties and intervenors to the original Docket Nos. 3 and 3A were notified of the reopened proceeding. (Council's Hearing Notice dated June 10, 2022)

16. On June 10, 2022, the Council sent correspondence to the Cities of Derby and Shelton, parties to the original proceedings, the City of Ansonia, and the Town of Seymour, which is located within 2,500 feet of the existing facility, to provide notification of the scheduled public hearing and to invite each municipality to participate in the proceeding. (Record; UI 1, OSPRM, p. 1-2)

17. Pursuant to PA 22-3 and CGS §16-50m, the Council published legal notice of the date and time of the public hearing in The Connecticut Post on June 11, 2022. (Record)

18. On June 29, 2022, the Council held a remote 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 and filing of pre-hearing interrogatories. Procedures for the remote public hearing via Zoom conferencing were also discussed. (Council Pre-Hearing Conference and remote hearing procedure Memoranda, dated June 22, 2022)

19. In compliance with Regulations of Connecticut State Agencies (RCSA) §16-50j-21, UI installed a total of four, four-foot by six-foot signs throughout the Project area. The signs presented information regarding the Project and the Council's public hearing. One sign was installed at each of the following locations on the specified dates:

    a) Structure No. 359 where UI ROW intersects Howe Avenue (State Route 110) in Shelton on July 15, 2022;
    b) Structure No. 4 at the intersection of Coon Hollow Road and Hawthorne Avenue in Derby on July 18, 2022;
    c) Along the perimeter fence at the Derby Public Works Garage located at 2 Coon Hollow Road in Derby on July 15, 2022; and
    d) Structure No. 18 adjacent to the parking area at Nolan Athletic Complex off Wakelee Avenue (State Route 334) in Ansonia on July 15, 2022.

    (UI 4; Tr. 1, pp. 16-17, 26-27)

20. Pursuant to C.G.S. § 16-50m, after giving due notice thereof, the Council held a remote public hearing on July 28, 2022, beginning with the evidentiary session at 2:00 p.m. and continuing with the public comment session at 6:30 p.m. via Zoom conferencing. The Council provided information for video/computer access or audio only telephone access. (Council's Hearing Notice dated June 10, 2022; Tr. 1, p. 1; Transcript 2, June 10, 2022, 6:30 p.m. [Tr. 2], p. 100)

21. In compliance with PA 22-3:
    a) The public had the ability to view and listen to the remote public hearings in real-time, by computer, smartphone, tablet or telephone;
    b) The remote public hearing was recorded and transcribed, and such recording and transcript were posted on the Council's website on July 28, 2022 and August 4, 2022, respectively;
    c) The Hearing Notice, Hearing Program, Citizens Guide for Siting Council Procedures and Instructions for Public Access to the Remote Hearings were posted on the agency's website;
    d) The record of the proceeding is available on the Council's website for public inspection prior to, during and after the remote public hearings; and

e) The Council, parties and intervenors provided their information for identification purposes during the remote public hearings.

(Hearing Notice dated June 10, 2022; Tr. 1; Tr. 2; Record)

Municipal Consultation and Community Outreach

22. UI began its outreach efforts to the Cities of Ansonia, Derby, and Shelton in 2021 by meeting with municipal officials. Specifically, UI conducted the following meetings with municipal officials:

a) UI met with representatives of the City of Ansonia virtually via Teams on August 19, 2021 to discuss the Project;
b) UI met with representatives of the City of Derby virtually via Teams on September 14, 2021 to discuss the Project; and
c) UI met with representatives of the City of Shelton on August 12, 2021 to discuss the Project. UI also met with City departments to discuss the Project, ROW, construction, and potential wetland impacts.

(UI 1, OSPRM, p. 8-2)

23. UI created a website (www.derbyjunctionansoniatransmissionlinerebuild.com) to provide information to the community about the Project. In March 2022, UI created a Virtual Open House (VOH), which is accessed via the Project website. (UI 1, OSPRM, p. 8-4)

24. By letters dated June 23, 2022, June 24, 2022 and June 28, 2022, respectively, the Mayors of Ansonia, Derby and Shelton expressed support for the Project and noted that it would provide greater electrical resiliency and reliability for the cities. (City of Ansonia Comments dated June 23, 2022; City of Derby Comments dated June 24, 2022; City of Shelton Comments dated June 28, 2022)

25. UI mailed a postcard to the Project abutters on July 1, 2022. The mailing included an invitation to a Public Information Meeting (PIM) for the Project. The PIM was held on July 14, 2022. UI gave a presentation on the Project and responded to questions. (UI 6)

26. Four residents, an official from the City of Shelton and the Ansonia City Engineer attended the PIM. UI responded to questions relating to construction details, electric and magnetic fields (EMF), cost, environmental concerns, and ROW/land use. (UI 6, response 1)

State Agency Comments

27. Pursuant to C.G.S. § 16-50j (g), on June 10, 2022, the following state agencies were solicited by the Council to submit written comments regarding the proposed rebuild of the existing 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)

28. The Council received comments related to watercourses, wetlands and wildlife from DEEP[1] on July 21, 2022 and CEQ[2] on August 2, 2022. Watercourses, wetlands and wildlife are addressed in the Environmental Resources section of this document. (Record)

29. No other state agencies responded with comment on the proposed rebuild of the existing facility. (Record)

30. While the Council is obligated to consult with and solicit comments from state agencies by statute, the Council is not required to abide by the comments from state agencies. (*Corcoran v. Connecticut Siting Council*, 284 Conn. 455 (2007))

Changed Conditions

31. In UI's Motion to Reopen, UI noted several changed conditions including, but not limited to, the following:

    a) In 2012, UI commenced engineering studies to assess the state of the facility and determined that the 115-kV conductors and insulators needed to be replaced due to asset condition issues; and
    b) Upgrades to the 115-kV transmission structures would be necessary to support the new conductors, insulators, and associated overhead shield wires (OHSW) and optical ground wires (OPGW) to meet current electrical industry standards, conductor clearance requirements, and improve reliability and resiliency.

    (UI 1, Motion to Reopen, pp. 6-7)

System Planning and Mandatory Reliability Standards

32. 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. (Council Administrative Notice Item No. 28 – Docket No. 508 Finding of Fact #42)

33. 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. (Council Administrative Notice Item No. 28 – Docket No. 508 Finding of Fact #43)

34. 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

[1] https://portal.ct.gov/-/media/CSC/1_Dockets-medialibrary/MEDIA_DO1_99/DO3B_reopen/ProceduralCorrespondence/DO3B-20220721-SACRCD_DEEP.pdf

[2] https://portal.ct.gov/-/media/CSC/1_Dockets-medialibrary/MEDIA_DO1_99/DO3B_reopen/ProceduralCorrespondence/DO3B_CEQ-CommentsRecd.pdf

electric system - ISO-NE, and New York Independent System Operator (NYISO). (Council Administrative Notice Item No. 28 – Docket No. 508 Finding of Fact #44)

35. ISO New England Inc. (ISO-NE) is the not-for-profit corporation 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. (Council Administrative Notice Item No. 28 – Docket No. 508 Finding of Fact #45; Council Administrative Notice Item No. 15 – ISO-NE 2022 Regional System Plan, p. iii)

36. As a transmission owner in New England, UI 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 UI's electric transmission system must perform without experiencing overloads or voltage problems. (Council Administrative Notice Item No. 28 – Docket No. 508 Finding of Fact #46)

37. ISO-NE is responsible for the reliable and economical operation of New England's electric power system, which includes managing the comprehensive, long-term planning of the regional power system to identify the region's electricity needs and plans for meeting those needs. The planning process involves the preparation of an annual Regional System Plan (RSP) that provides forecasts of annual energy use and peak loads for a ten-year planning horizon; information about amounts, locations, and characteristics of market responses; and descriptions of transmission projects for the region that could meet the identified needs, as summarized in the RSP Project List. (Council Administrative Notice Item No. 28 – Docket No. 508 Finding of Fact #47)

38. The *2021 ISO- NE Regional System Plan* (RSP21) and the regional system planning process identify the region's electricity needs and plans for meeting these needs for 2021 through 2030. (Council Administrative Notice Item No. 15 – ISO-NE 2021 Regional System Plan, p. iii)

39. The RSP Project List is a summary of projects that have a reliability need based on a criteria violation, e.g. voltage violation. The Project is not listed on the June 2022 ISO-NE RSP Project List. (Council Administrative Notice Item No. 16 – June 2022 ISO-NE RSP Project List; UI 6, response 7; Council Administrative Notice Item No. 28 – Docket No. 508 Finding of Fact #49)

40. The ISO-NE RSP Asset Condition List is a summary of pool transmission facilities in the region that are being rebuilt or modified due to their condition, age, or physical deterioration and to comply with the updated National Electrical Safety Code (NESC) standards. The Project is listed on the June 2022 ISO-NE RSP Asset Condition List. (Council Administrative Notice Item No. 15 – ISO-NE 2021 Regional System Plan, p. 86; UI 6, response 7 and 10; Council Administrative Notice Item No. 28 – Docket No. 508 Finding of Fact #50)

Project Need

41. UI's existing 115-kV lines between Derby Junction, Indian Well Substation and Ansonia Substation provide critical electrical service to the Lower Naugatuck Valley area, which consists of the Cities of Shelton, Derby and Ansonia. Collectively, via the Indian Well and Ansonia Substations, these transmission lines serve approximately 26,400 UI customers. The infrastructure that supports the existing transmission lines between Derby Junction and Ansonia Substation is almost 100 years old. (UI 1, OSPRM, p. ES-1)

42. Currently, the two existing 115-kV lines are arranged in a double-circuit configuration on a total of 40 structures: 29 lattice steel towers; 4 self-supported steel monopoles; 2 direct embed monopoles; 1 wide-flange column pole; and 4 substation takeoff structures. (UI 1, OSPRM, pp. ES-1 and ES-2)

43. These existing structures range in height from 65 feet to 140 feet and were originally built in 1924 and owned by the Derby Gas and Electric Company (DG&E). The lines were originally 13.8-kV and upgraded to 69-kV in the 1930s and 115-kV in the 1960s. (UI 1, OSPRM, p. ES-2)

44. UI purchased the structures from DG&E in 1969 and has subsequently operated and maintained the 115-kV lines. Minor repairs to structure foundations were performed in 2008-2009. (UI 1, OSPRM, p. ES-2)

45. The 4.1 linear miles of existing UI ROW between Derby Junction and Ansonia Substation include three lines arranged in a double-circuit configuration for a total of approximately 8.2 circuit-miles. The #1560-3 Line extends for 4.1 miles from Derby Junction* to Ansonia Substation. The #1808-2 Line is located on the same structures as the #1560-3 Line for about 1.5 miles from Derby Junction to Indian Well Substation. The #1595 Line is located on the same structures as the #1560-3 Line for approximately 2.6 miles from Indian Well Substation to Ansonia Substation.

    *Derby Junction is a location where UI's 115-kV transmission connects to the 115-kV transmission of The Connecticut Light and Power Company d/b/a Eversource Energy (Eversource).

    (UI 1, Motion to Reopen, pp. 4-5)

46. In 2020-2021, UI inspected and analyzed the 115-kV lines between Derby Junction and Ansonia Substation. These studies included evaluations of conductor tensile strength; thermal-mechanical cycling and combined mechanical-electrical testing of insulators; climbing and visual inspections; and mechanical loading and conductor sway simulations of the existing structures. (UI 1, OSPRM, p. 1-5; UI 6, Response 8)

47. UI's analyses found that the existing copper conductors exhibited reductions in tensile strength; are nearing the end of their useful life; and include insulators that demonstrated electrical failures. Thus, UI determined that all three circuits would require new conductors, insulators and shield wires. (UI 1, OSPRM, p. 1-5; UI 6, Response 8)

48. UI evaluated the integrity of 36 existing transmission structures and 4 existing substation takeoff structures to determine if such structures could support the mechanical loading associated with new conductors, new insulators, new OHSW, and added OPGW while complying with applicable electrical standards and conductor clearance requirements. These studies concluded that a majority of the existing structures could not support the additional structural loading associated with the reconductoring, and the NESC conductor clearance requirements could not be met. (UI 1, OSPRM, p. 1-5; UI 6, Response 8)

49. The engineering studies concluded that 29 out of 36 transmission structures (or 80 percent of the structures) had asset condition deficiencies including, but not limited to, structure foundation spalling; anchor bolt/plate galvanic corrosion; failed concrete breakout tests; structural member failures; and/or inadequate shield wire support. Additionally, UI's analyses found that current NESC clearance standards are not met. (UI 1, OSPRM, p. 1-5)

50. The Project would adhere to current NESC standards and UI design criteria. UI has design standards that exceed the minimum requirements of the NESC. Specifically, UI design structure loading criteria includes the ability to withstand Category 3 hurricane* wind loads as a result of recent hurricanes and future climate change.

    *A Category 3 hurricane has a minimum wind speed of 130 miles per hour.

    (UI 1, OSPRM, p. 1-1, 9-6; UI 6, response 10; Council Administrative Notice Item No. 28 – Docket No. 508 Finding of Fact #60)

51. The June 2022 ISO-NE Asset Condition List identifies the Project as "Proposed" (as of June 2022). This means that the asset owner, UI, has determined that the solution is appropriate to address the asset condition issue, and such solution has been presented to the ISO-NE Planning Advisory Committee. (Council Administrative Notice Item No. 15 – ISO-NE 2022 Regional System Plan; June 2022 Asset Conditions List)

52. The Project would have a positive effect on the reliability of the state and regional electric system, particularly UI's distribution system served by Indian Well Substation and Ansonia Substation. (UI 1, OSPRM, p. 6-20)

53. The Project was listed in UI's March 2021 and March 2022 *Forecast of Loads and Resources Reports* as a planned 115-kV electric transmission line facility upgrade. (UI March 2021 and 2022 Forecast of Loads and Resources Reports; Tr. 1, pp. 17, 26-27)

54. The Project is consistent with the *Conservation and Development Policies Plan for Connecticut 2018-2023* (C&D Plan). It will serve a public need for a reliable source of electricity to support development, ensure the safety and integrity of infrastructure over its useful life and minimize risks from natural hazards. (Council Administrative Notice Item No. 48 – C&D Plan; UI 1, OSPRM, p. 5-23)

55. In January 2022, the U.S. Department of Energy launched a "Building a Better Grid" initiative to facilitate deployment of new and upgraded electric transmission lines and work with community and industry stakeholders to identify national transmission needs that are critical for reaching President Biden's goal of 100% clean electricity by 2035 making the U.S. power grid more resilient to the impacts of climate change, increase access to affordable and reliable clean energy, and boosting electric transmission jobs. UI is currently reviewing the full range of eligibility requirements in the context of the Project. (Council Administrative Notice Item No. 28 – Docket No. 508 Finding of Fact #66; UI 6, response 2)

56. 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 No. 36 – 2018 CES, p. 45)

Project Cost

57. The estimated cost of the Project is listed below:

Transmission Line Costs	$36,357,330
Distribution-related Costs	$1,000,000
Substation Costs	$139,052
Misc. Costs (e.g. removals, sales tax, escalation, and contingencies)	$19,703,112
Total Estimated Costs	**$ 57,199,494***

*The total cost has an accuracy band of +50/-25% percent, consistent with ISO-NE Planning Procedure 4 Attachment D for a "proposed project." Additionally, the modifications to the Structure No. 4 configuration (with a cost delta of approximately $350k) were not contemplated in the original OSPRM project cost of approximately $57.2M.

(UI 1, OSPRM, p. 2-9; UI 6, responses 16 and 19; Tr. 1, pp. 41, 94-95)

58. The cost allocation for the Project is listed below.

	Approximate PTF Regionalized Cost Allocation	
	%	$
UI Retail Customers	5%	$2.9M
ES+UI CT Retail Customers	24%	$13.7M
CMEEC + Wallingford Retail Customers	1%	$0.6M
Remaining New England Customers	75%	$42.9M
Total	100%	$57.2M

(UI 6, response 18)

59. The life-cycle costs for this project could not be calculated because life-cost cost data on double-circuit transmission line configurations are not available. (UI 1, OSPRM, p. 9-4; Council Administrative Notice Item 23 – 2017 Life-cycle Report)

60. Project construction is anticipated to begin in the second quarter of 2023 and would be completed by mid-2025. (UI 1, OSPRM, p. 4-1)

Project Alternatives

61. A "no action" alternative would not resolve the known asset condition issues associated with existing lattice tower structural deficiencies, deteriorated conductors and aging associated hardware. Transmission reliability would remain at risk due to the conductor and hardware conditions and the risk of structural failures of the lattice structures that would result in extended power outages. Such outages would adversely affect service to UI's electrical customers and the integrity of the regional

electrical transmission system. Thus, the "no action" alternative was rejected. (UI 1, OSPRM, p. 9-2)

62. UI evaluated an all underground configuration alternative consisting of a double-circuit 115-kV cross-linked polyethylene (XLPE) cable configuration from Derby Junction to Ansonia Substation. Given the significantly higher costs of underground transmission line construction and operation as well as significantly greater environmental impacts including but not limited to those associated with horizontal directional drilling or jack and bore under the Housatonic River, ledge rock removal, and wetland impacts. Thus, the all-underground alternative was rejected. (UI 1, OSPRM, p. 9-4)

63. UI evaluated four overhead alternatives as listed below.

	Alternative #1**	Alternative #2	Alternative #3	Alternative #4
Structures	Combination Double-and Single-Circuit Rebuild (41 new monopoles)	Partial Upgrade 30 Existing Structures	Partial Upgrade Existing Structures + 8 New Monopoles	Single Circuit Tower Rebuild
Conductor	795 kcmil 26/7 "Drake" ACSR + 96 or 72-fiber OPGW; No.7 Alumoweld Shieldwire	300 kcmil ACSR + OPGW	300 kcmil ACSR GA5 E3X[52] + OPGW	795 kcmil ACSS + OPGW
+50% / -25% Estimated Cost (Million$)	$36.0M	$33.7M	$22.3M	$44.2M

*Costs in Table 9-1 reflect estimates developed during the 10% Project design phase.
Alternative 1 = Preferred; at the Housatonic River crossing, 19 No.8 Alumoweld Shieldwire would be used, along with DNO-11469 OPGW (72 fiber).
**Note: 477 kcmil 30/7 ACSR "HEN" conductor also was considered for Alternative 1; this conductor Alternative would be at an estimated cost of $34.9 million.

(UI 1, OSPRM, p. 9-6)

64. Alternative 1 is the Proposed Project. Alternatives 2 and 3, partial rebuilds, are slightly less costly than Alternative 1; however, they would require complex engineering/design and construction sequencing and would pose a higher reliability risk due to leaving some existing lattice structures in place. Thus, Alternatives 2 and 3 were not selected. Alternative 4 is a full rebuild, but it was not selected because it is more costly than Alternative 1 due to the use of all single-circuit structures. (UI 1, OSPRM, p. 9-6)

65. UI also evaluated nine alternatives for aligning the rebuilt 115-kV lines across Osbornedale State Park (OSP) including configurations using or expanding the existing ROW, using the State Route 8 corridor and using local road ROWs. Option 1 is the proposed Project. The other options related to OSP are listed below.

a) **Option 1A – Underground 115-kV along existing ROW.** UI would underground double-circuit XLPE cable between Structure Nos. 10 and 12. Option 1A would have a cost delta (or increase) of approximately $31.4M relative to the proposed portion of the route;

b) **Option 1B – No ROW Expansion.** UI would utilize an overhead alternative that would avoid the need for any additional permanent easement. In lieu of installing one 120-foot monopole as Structure No. 11, Option 1B would require 7 monopoles with heights ranging from 110 to 130 feet tall. Option 1B would have a cost delta of approximately $1M relative to the proposed portion of the route;

c) **Option 1C – Reduced ROW Expansion.** This would be similar to the proposed project, except that rebuilt Structure No. 11 would be 185 feet as compared to 120 feet for the

proposed project. The ROW would be expanded by 40 feet to the west, but to increase the height of Structure No. 11, the heights of Structure Nos. 10, 12 and 13 would also have to increase from 150 to 190 feet. The smaller additional easement would be approximately 1.35 acres. Option 1C would have a cost delta, compared to the proposed Project segment across OSP, of approximately $2.8M. See Figure 19;

d) **Option 1D – ROW Expansion to the East.** This would require expanding the ROW approximately 30 feet to the east between Structure Nos. 10 through 12. The heights of the new Structure Nos. 10 through 12 would be comparable to the proposed Project. This eastern boundary of UI's ROW currently extends across the back or side yards of 7 residential properties between Division Street/Silver Hill Road and existing Structure No. 11. The expanded ROW would also extend into the backyards of 3 residential properties along Reichelt Terrace. This option was rejected due to impacts to the residential properties;

e) **Option 2A – Overhead Aligned with Route 8 Corridor.** This would require an overhead segment approximately 0.83 mile long (in lieu of 0.53 mile long) and would extend from Structure 10 to Structure 14. This option was rejected because DOT opposes co-location of electric transmission lines in state road ROW, particularly if other route alternatives exist; and additional easements would be required from private landowners;

f) **Option 2B – Underground Aligned with Route 8 Corridor.** This would be similar to Option 2A except it would be underground. This option was rejected because DOT opposes co-location of electrical transmission in state road ROW, particularly if other route alternatives exist; and additional easements would be required from private landowners;

g) **Option 3 – Underground Structure No. 10 to Structure No. 16.** This would be an underground route from Silver Hill Road to Hull Street. This option was rejected due to substantial environmental and land use impacts and significantly greater cost than overhead options;

h) **Option 4 – Underground Structure No. 10 to Ansonia Substation – Northern Route.** This would be an underground route originating from Structure No. 10. The route would continue east along Division Street, crossing under Route 8 and then turn north onto Wakelee Avenue. The cable system would continue north along Wakelee Avenue and east along Jackson Street, crossing Route 334 and entering Ansonia Substation. Option 4 would have a cost delta of approximately $148M relative to the proposed portion of the route; and

i) **Option 5 – Underground Structure No. 10 to Ansonia Substation – Southern Route.** This would be an underground route originating from Structure No. 10. The route would extend east along Division Street, cross under Route 8 and then turn north along Clifton Avenue. The cable route would continue north, first along Clifton Avenue and then would follow short segments of Route 727, Olson Drive, Route 334, and Riverside Drive before entering Ansonia Substation. Option 5 would have a cost delta of approximately $185M relative to the proposed portion of the route.
(UI 1, OSPRM, pp. 9-6 to 9-21)

66. If the proposed 60-foot wide permanent easement from DEEP cannot be secured over OSP, UI is amenable to Options 1A, 1B, 1C, 4, or 5. However, each option would involve additional cost and greater environmental and/or land use disruptions relative to such portion of the proposed Project. (UI 1, OSPRM, p. 9-21)

Project Description

67. The proposed Project entails the installation of rebuilt 115-kV electric transmission lines and related improvements as listed below:

a) Rebuild the 115-kV lines on 41 new self-supporting steel structures (consisting of 25 double-circuit monopoles, 15 single-circuit monopoles and one single-circuit H-frame structure).

b) Replace the existing 4/0 copper conductors and shield wire with 795 kcmil aluminum conductor steel reinforced (ACSR) conductor;

c) Upgrade OHSW and install OPGW between Derby Junction and Indian Well Substation;

d) Install OPGW between Indian Well Substation and Ansonia Substation;

e) Install OHSW along the Housatonic River crossing;

f) Interconnect the rebuilt circuits at Derby Junction, Indian Well Substation and Ansonia Substation; and

g) Remove and recycle or properly dispose of the existing 115-kV structures, conductors, insulators and associated hardware, and remove the existing structure foundations.

Detail of each portion of the Project is described in the following subsections. (UI 1, OSPRM, pp. ES-1, ES-3 and 1-6)

68. During the proceeding, UI determined it was feasible to install a double-circuit monopole (in lieu of two single-circuit monopoles) at Structure No. 4, thereby reducing the total monopole quantity by one. (UI 6, response 15; Tr. 1, p. 41)

Proposed Overhead 115-kV Transmission Lines

69. The proposed 115-kV overhead transmission line would consist of monopole structures supporting two sets of three 795-kcmil ACSR Drake phase conductors; 96 fiber OPGW between Derby Junction and Indian Well Substation; 72 fiber OPGW between Indian Well Substation and Ansonia Substation; and 19 No. 8 Alumoweld Shieldwire would be installed along the Housatonic River crossing. (UI 1, OSPRM, p. ES-3)

70. The monopoles would support conductors arranged in a vertical configuration. 26 proposed monopoles would be double-circuit, and 13 proposed monopoles would be single-circuit. One single-circuit H-frame structure would also be installed. (UI 1, OSPRM, p. ES-3)

71. UI does not have a policy related to telecommunications equipment collocations on its transmission line structures. The proposed monopoles are not designed to accommodate third party telecommunications equipment. (UI 6, response 6; Tr. 1, p. 60)

72. The monopoles would primarily be installed on drilled pier foundations. Direct embed structures and structures supported by pile type foundations might be installed in certain locations, subject to final engineering analyses. Subject to final analyses, generally, UI anticipates using pile type foundations for permanent structures and direct embed design for temporary structures. (UI 1, OSPRM, p. 3-9; Tr. 1, pp. 17-18)

73. The new monopoles would range in height from approximately 75 feet to 170 feet. (UI 1, OSPRM, p. 2-7)

74. The span lengths vary along route, but typically range between 325 feet to 963 feet*, depending on the terrain.

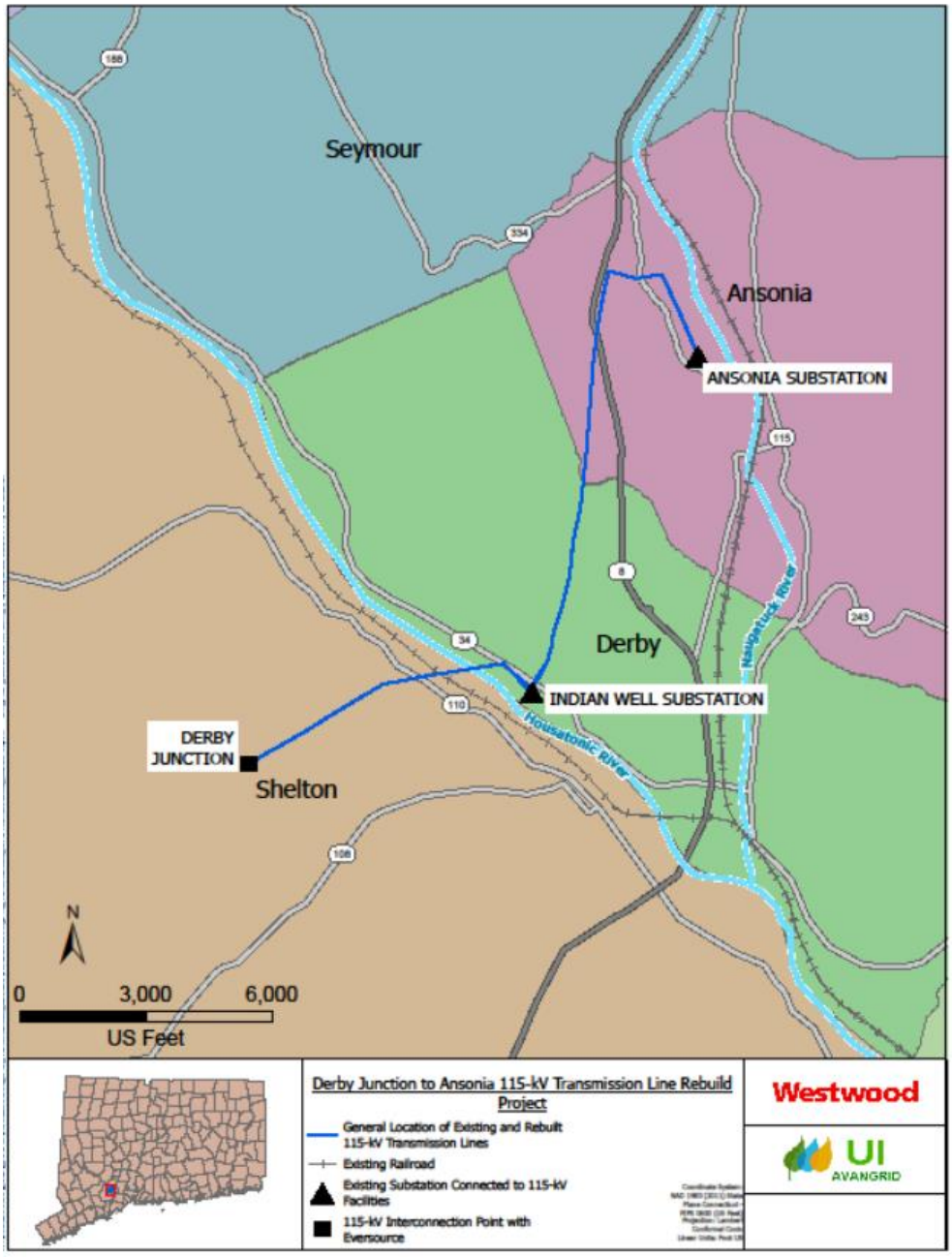
    *Exceptions are the Housatonic River span at approximately 1,742 feet and the span between the new structures near Indian Well Substation at approximately 153 feet.

    (UI 1, OSPRM, p. 2-5)

75. The proposed transmission lines would be located within existing UI ROW along approximately 4.1 miles through the Cities of Ansonia (1.5 miles), Derby (1.4 miles), and Shelton (1.2 miles). (UI 1, OSPRM, pp. ES-1 and ES-2)

76. Sections of the ROW are:
    a) Ansonia Substation in Ansonia to Indian Well Substation in Derby; and
    b) Indian Well Substation in Derby to Derby Junction in Shelton.

    Such sections are shown below.



(UI 1, OSPRM, p. 1-2)

Existing ROW and Proposed ROW Expansions

77. Along the ROW, UI currently has easement rights from 82 property owners within Shelton, Derby and Ansonia. Additionally, a 50-foot wide ROW traverses approximately 1,465 feet across the northeastern portion of OSP. See Figure 18. (UI 1, OSPRM, pp. 2-7 and 2-8)

78. To maintain clearances between conductors and vegetation while taking the steep topography into account, UI would expand the ROW by approximately 60 feet to the west and would acquire approximately 1.8 acres of permanent easement from DEEP for OSP. (UI 1, OSPRM, p. 2-8)

79. Existing ROW widths and additional permanent easements required for the Project are listed below.

Municipality / Structure #s	Existing ROW Width (feet)	Additional Permanent Easement Required (estimated feet)
Shelton		
350-359	80	0 to 30
Shelton-Derby		
359-360 (Housatonic River Crossing)	80	30 to 180
Derby		
360-Indian Well Substation (1B, 361A/B)	80	25
Indian Well Substation to 3AB	Undefined	80
3AB-4AB	50	30
4AB-9	Undefined	80
9-10	50	30 to 70
Ansonia		
10-14	50	30-60
14-16	50	30-50
16-17A/B	40-50	30-40
17A/B-19A/B	50	30
19A/B-21 (Ansonia Substation)	50-100	0 to 50

(UI 1, OSPRM, p. 2-7)

80. In areas where permanent easements would be required from private landowners, UI would coordinate with the affected landowners. Within the expanded easement areas, UI would allow existing structures such as sheds, garages, and pools to remain but also plans to acquire easements that would only allow rebuilding the ROW within 18 months, if those existing structures are substantially damaged or destroyed. (UI 1, OSPRM, p. 2-8)

Indian Well Substation to Ansonia Substation

81. The existing ROW from Indian Well Substation to Ansonia Substation ranges from 40 to 100 feet wide. This section of ROW extends for approximately 2.6 miles between portions of Ansonia and Derby. (UI 1, OSPRM, pp. 1-3, 2-7; UI 1, OSPRM, Appendix A.3, 1" = 400' Maps – Maps 2 through 4)

82. The ROW contains two UI transmission lines supported by 18 double-circuit lattice structures; 6 single-circuit monopoles; and one single-circuit wide-flanged structure. Such structures range in height from 65 to 92 feet. (UI 1, OSPRM, pp. 2-3 and 2-4)

83. In this section, UI proposes to install the two rebuilt transmission lines supported by 13 single-circuit monopoles and 12 double-circuit monopoles*.

*Structure No. 4 would be replaced with a double-circuit monopole structure in lieu of two single-circuit monopoles (Structure Nos. 4A and 4B) at a cost delta of approximately $350,000.

(UI 1, OSPRM, pp. 2-3 and 2-4; UI 6, response 15; Tr. 1, pp. 41, 94-95)

84. UI reviewed the feasibility of converting Structure Nos. 17, 18 and 19 from two single-circuit monopole structures each to one double-circuit monopole structure for each location. UI found that, even with the use of temporary structures*, maintaining proper clearances of a new double-circuit monopole to the energized circuit during construction would mean placement would be such that the new conductors would shift closer to or over buildings on adjacent properties. The use of temporary structures would significantly impact the construction schedule and sequence due to flipping between outages on two circuits and the additional construction steps required.

*To convert to double-circuit monopoles, UI anticipates that temporary structures would be necessary.

(UI 6, response 15; Tr. 1, p. 88)

85. UI also prefers single-circuit monopole configurations for Structure Nos. 17 to 19 because it would maintain the positions of the proposed conductors (horizontally) as comparable to the existing conductor positions so as to minimize impacts to existing buildings. Double-circuit monopole configurations would shift conductors farther to the south, i.e. closer to residences. (Tr. 1, p. 91-92)

86. The proposed monopoles would range in height from 75 feet to 135 feet. (UI 1, OSPRM, pp. 2-3 and 2-4)

87. Land use adjacent to the ROW includes a mix of residential suburban, commercial/industrial areas, a state park, woodlands, and the Route 8 corridor. (UI 1, OSPRM, Appendix A.3, 1" = 400' Maps – Maps 2 through 4)

Derby Junction to Indian Well Substation

88. The existing ROW from Derby Junction to Indian Well Substation is approximately 180 feet wide. This section of ROW is 1.5 miles in length and extends through portions of Shelton and Derby. (UI 1, OSPRM, pp. 1-3 and 2-7; UI 1, OSPRM, Appendix A.3, 1" = 400' Maps – Maps 1 and 2)

89. The ROW contains two UI transmission lines supported by 10 double-circuit lattice structures. Such structures range in height from 78.5 to 140.5 feet. (UI 1, OSPRM, pp. 2-3 and 2-4)

90. In this section, UI proposes to install the two rebuilt transmission lines supported by 1 single-circuit H-frame structure and 10 double-circuit monopoles. (UI 1, OSPRM, pp. 2-3 and 2-4)

91. The proposed monopoles would range in height from 80 feet to 170 feet. (UI 1, OSPRM, p. 2-3)

92. Land use adjacent to the ROW includes a mix of residential suburban, agricultural, woodlands, commercial/industrial, and a state park. (OSPRM, Appendix A.3, 1" = 400' Maps – Maps 1 and 2)

Substation Modifications

93. The existing Ansonia Substation is located in the western section of Ansonia and is accessed off Riverside Drive. (UI 1, OSPRM, Appendix A.3, 1" = 400' Maps – Map 4)

94. The existing Indian Well Substation is located in the western section of Derby and is accessed off Canal Street. (UI 1, OSPRM, Appendix A.3, 1" = 400' Maps – Map 2)

95. At Indian Well Substation, hardware modifications would be performed to the H-frame structures on the line termination side, up to the switch attachment location. Additionally, two new fiber splice boxes would be installed to terminate the OPGW fibers for the #1594 and #1808-2 Lines on two existing H-frame structures inside the fenced substation. From these structures, all dielectric self-supporting (ADSS) fiber would be encased inside separate inner ducts, which would extend to the control/switchgear enclosure via the backup cable trench. The ADSS fiber would be terminated into separate fiber patch panels in the control/switchgear enclosure. (UI 1, OSPRM, p. 3-12)

96. The hardware modifications to the H-frame structures at Indian Well Substation would not result in increased height of the H-frame structures. (UI 1, OSPRM, p. 3-12; Tr. 1, p. 18)

97. At Ansonia Substation, hardware modifications would be performed to the A-frame structure on the line termination side, up to the switch attachment location. Additionally, one new fiber splice box would be installed to terminate the OGPW fibers for the #1594 Line on an existing A-frame structure inside the fenced substation. Underground ADSS fiber for the #1594 Line would be encased inside inner ducts, which would extend through the existing (secondary) cable trench before terminating at the fiber patch panel inside the control enclosure. (UI 1, OSPRM, p. 3-12)

98. The hardware modifications to the A-frame structure at Ansonia Substation would not result in increased height of the A-frame structure. (UI 1, OSPRM, p. 3-12; Tr. 1, p. 18)

99. UI does not propose any modifications at Derby Junction, other than to connect the rebuilt #1560-3 and #1808-2 Lines to the Eversource transmission system and to remove the existing 115-kV line connections. This is a critical tie-in point and work would be performed within existing UI and Eversource ROWs and access roads. (UI 1, OSPRM, p. 2-6; UI 1, Mapsheet 1 of 4; UI 6, Response 4)

100. At Derby Junction, Eversource plans to replace Structure No. 1364, a double circuit lattice structure with a two-pole structure. New Eversource Structure 19624 will support the 1560 Line and new Eversource Structure 19624A will support the 1808 Line. (UI 6, response 4; Council Petition 1527)

101. UI will tap its #1560-3 circuit from Eversource Structure 19624 to the north side of UI Structure 351, which will be a double circuit single monopole with a vertical configuration and UI will tap its 1808-2 circuit from Eversource Structure 19624A to UI Structure 350, which will be a single circuit H-frame structure with a horizontal configuration. The horizontal configuration is required for the 1808 circuit to cross underneath the 1560 circuit. (UI 6, response 4).

102. Depending on the timing and sequencing of the Eversource project and the UI project at Derby Junction, access to Structures 350, 351 and 352 may be modified to eliminate temporary impacts to wetlands. (Tr. 1, pp. 27-31, 66-69)

103. Construction will be sequenced such that one of the 115-kV circuits between Derby Junction and Ansonia Substation will be energized at all times to maintain electric service to customers. (UI 1, OSPRM, p. 3-2)

General Project Construction Procedures

104. The following subsections describe the general construction procedures for each portion of the project. If the Project is approved, UI intends to submit a Development and Management Plan for the Project. (UI 1, OSPRM, p. ES-4)

105. Pursuant to CGS Section 22a-430b, DEEP retains final jurisdiction over stormwater management and administers permit programs to regulate stormwater discharges. DEEP regulations and guidelines set forth standards for erosion and sedimentation control, stormwater pollution control and best engineering practices. (CGS §22a-430b; DEEP General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. (DEEP-WPED-GP-015)

106. The DEEP General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities (General Permit) requires implementation of a Stormwater Pollution Control Plan (SWPCP) to prevent the movement of sediments off construction sites into nearby water bodies and to address the impacts of stormwater discharges from a proposed project after construction is complete. In its discretion, DEEP could require an Individual Permit for discharges and hold a public hearing prior to approving or denying any General or Individual Permit (Stormwater Permit) application. (CGS §22a-430(b))

107. The SWPCP incorporates project designs consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control (2002 E&S Guidelines) and the *2004 Connecticut Stormwater Quality Manual* (2004 Stormwater Manual). (DEEP-WPED-GP-015)

108. DEEP has the authority to enforce proposed project compliance with its Individual or General Permit and the SWPCP, including, but not limited to, the installation of site-specific water quality protection measures in accordance with the 2002 E&S Guidelines and 2004 Stormwater Manual. (CGS §22a-430b)

109. The project would require a DEEP-issued Stormwater Permit prior to commencement of construction activities as defined in the General Permit. (CGS §22a-430b)

110. The DEEP Stormwater Permit requires an assessment of the potential for a proposed development to impact the state's archaeological and historical sites. (DEEP-WPED-GP-015)

111. The Council may impose a condition that requires subsequent compliance with DEEP standards and regulations. (*FairwindCT, Inc. v. Connecticut Siting Council*, 313 Conn. 669 (2014); Council Administrative Notice Item No. 28 – Docket No. 508 Finding of Fact #138)

Proposed Overhead 115-kV Transmission Lines

112. UI's proposed general construction sequence is as follows:

Typical Pre-Construction Activities
• Survey and stake construction work areas, edge of UI ROW, and proposed structure locations
• Confirm and re-flag environmental resource areas (e.g., wetland and watercourse boundaries) or other sensitive areas to be avoided or where special construction procedures will apply
• Mark vegetation clearing limits along the ROW
• Locate and mark utilities crossed by or along the ROW
Typical Construction Activities*
• Prepare approved laydown/material staging/contractor yard(s) to support the construction effort
• Clear vegetation along the ROW as necessary and install temporary erosion and sedimentation controls around work sites as needed
• Install temporary construction matting as needed for access across wetlands, small watercourses, agricultural areas, or other environmentally-sensitive locations
• Establish or upgrade any required access roads to provide ingress/egress to the new monopole sites and to existing structures to be removed
• Create a level work pad at each structure site, as well as at conductor pulling sites and if necessary, at guard structure sites
• Take outage on the 115-kV circuit located on one side of the existing double-circuit structures; the other 115-kV circuit will remain energized
• Remove the existing de-energized conductor, as well as associated insulators, OHSW, and cross-arm supports (as needed) from the existing double-circuit structures
• Install new structure foundations and assemble/erect new structures; new structure will be offset in transverse direction from the center of existing lattice towers to maintain adequate working clearances from the existing energized conductors
• Install new insulators, conductors, OHSW, and OPGW (for one circuit side of the new structures)
• Install rebuilt 115-kV line connections to Derby Junction and UI substations (for one circuit side)
• Energize the rebuilt 115-kV circuits (on one circuit side of the new structures) to provide service between Derby Junction, Indian Well Substation, and Ansonia Substation
• Take outage on the remaining legacy 115-kVcircuit located on the other side of the existing double-circuit structures
• Remove the remaining legacy 115-kV line wires, conductor, insulators, and OHSW from the existing double-circuit structures
• Dismantle and remove from the ROW the old lattice steel towers and other structures
• Install new insulators, conductors and OHSW/OPGW on the other side of the new structures
• Energize the rebuilt 115-kV circuits on the remaining side of the new structures
• Remove temporary construction access roads and work pads; stabilize permanent access roads / work pads and install/upgrade permanent erosion/sedimentation controls where required
• Perform final clean-up and restore/stabilize areas affected by construction (e.g., by seeding and re-vegetating as needed)
• Maintain erosion and sedimentation controls until areas affected by construction are verified to be restored/stabilized

(UI 1, OSPRM, p. 3-3)

113. Project construction would be staged from one or more laydown/material staging/contractor yards. Final sites would not be determined until a few months prior to commencement of construction, and UI would seek Council approval of such sites either as part of the D&M Plan or separately, prior to use. (UI 1, OSPRM, p. 3-4)

114. A primary laydown/material staging area/contractor yard typically requires approximately 2 to 5 acres to accommodate field office trailers, parking, project material storage, construction equipment and supplies, fractionization tanks (for temporary storage of water removed from foundation excavations), and temporary stockpiling of existing 115-kV facility materials that have been removed. (UI 1, OSPRM, p. 3-4)

115. The laydown/material staging area/contractor yards also would provide a site for marshalling construction crews, holding daily safety meetings, and assigning daily work. (UI 1, OSPRM, p. 3-4)

116. The laydown/material staging areas/contractor yard areas would be restored and stabilized to approximate pre-construction conditions in accordance with the UI's SWPCP requirements as necessary. (UI 1, OSPRM, p. 3-11)

117. UI would utilize a combination of public roads and proposed or existing access roads within or proximate to the ROW. Temporary access roads across wetlands and watercourses would be temporary and utilize timber mats or equivalent. Permanent access roads located in uplands would typically consist of gravel and would be approximately 12 to 16 feet wide. Temporary timber mats or equivalent would be used to cross 3 small watercourses and 2 wetlands, as well as to install a work pad in one wetland. In Shelton, 2 permanent culverts would be installed across one intermittent stream (WC2) to create a permanent access road, which would also result in permanent fill in one wetland (W4). (UI 1, OSPRM, pp. 3-7, 3-8, 3-14, 3-15, 6-6 and 6-7)

118. Existing vegetation would be removed from construction sites (including access roads and work pads) and as required both to provide access for construction equipment and to maintain clearance from the rebuilt 115-kV line conductors. Vegetation clearing would consist of both scrub-shrub species within portions of the ROW that UI maintains as well as mature trees that are mostly located within UI's proposed additional permanent easement. (UI 1, OSPRM, p. 3-5)

119. Clearing and grubbing would be performed via conventional methods such as a combination of chain saws, hand labor, and mechanized equipment. Trees would be directionally felled to minimize impacts. (UI 1, OSPRM, p. 3-6)

120. Total tree clearing for the Project would be approximately 6 acres. Of the 6 acres, approximately 5.6 acres would remain in shrub-scrub vegetation with the ROW, and 0.4 acre would be allowed to fully revegetate after completion of the Project construction. (UI 1, OSPRM, pp. 6-11 and 6-12)

121. In wetlands, trees and brush would be cut flush to the ground, and stumps would be left in place unless removal is required for Project construction. (UI 1, OSPRM, p. 3-6)

122. In certain areas, "danger trees" or "hazard trees" (i.e. trees deemed a potential risk to overhead transmission lines) might also need to be trimmed or removed. Such trees would typically be identified after the rebuilt lines are installed. If these trees require trimming or removal and are located on private property, UI would coordinate with the property owner. (UI 1, OSPRM, p. 3-5)

123. Temporary erosion and sedimentation (E&S) controls would be installed as practicable prior to and/or during vegetation clearing in compliance with the 2002 E&S Guidelines, the DEEP General Permit, and the SWPCP. Temporary controls include, but are not limited to, straw bales and silt fence, to be used during construction involving soil disturbance. (UI 1, OSPRM, pp. 3-6, 3-13, 6-3 and 6-4)

124. The work pads would be used to provide a safe, level base for construction equipment used to install structure foundations and to erect structures. Work pads would also be used at conductor pulling sites. (UI 1, OSPRM, pp. ES-4 and 3-8)

125. Work pads would consist of gravel or timber construction mats (or equivalent). The size of each work pad would vary based on location. Generally, the typical work pad for removing an existing lattice structure and installing a monopole would be approximately 150 feet by 80 feet. Grading would be performed as necessary to establish work pads. (UI 1, OSPRM, p. 3-8)

126. Auger drilling would be used to perform the excavations for the drilled pier foundations. The size of each excavation would typically be approximately 6 to 12 feet in diameter. Casings may be used to provide soil support as needed to complete excavation work and place concrete. The casing may be removed from the pier foundations as concrete is placed or soon thereafter. (UI 1, OSPRM, p. 3-9)

127. After the foundation excavation is complete, steel reinforcing bars and an anchor bolt cage would be placed in the excavation and encased in concrete. (UI 1, OSPRM, p. 3-9)

128. After the structure foundation is in place and the concrete is cured, the transmission monopole would be assembled and erected. Transmission structure components would be delivered to work pads, assembled on the ground and then erected as a complete unit or assembled in pieces with a crane. (UI 1, OSPRM, pp. 3-9 and 3-10)

129. After a structure is erected and framed with support insulators and hardware, it would be ready for the installation of overhead lines. Conductor pulling blocks would typically be installed at this time. (UI 1, OSPRM, p. 3-10)

130. Pulling and tensioning equipment, as well as reels of conductor, would be located at temporary pulling work pads along the transmission line route for the installation of line conductors, OHSW and OPGW. Helicopters may be used to install pulling ropes at the commencement of the conductor/OPGW pulling process and/or to install marker balls on the lines at the Housatonic River crossing. (UI 1, OSPRM, p. 3-10)

131. To maintain clearance at road crossings during conductor and OPGW installation, temporary guard structures or boom trucks would be positioned adjacent to the crossings. (UI 1, OSPRM, p. 3-10)

132. Conductors, OHSW and OPGW would be pulled to their design tensions and attached to the hardware. This process would be performed via bucket trucks. (UI 1, OSPRM, p. 3-10)

133. Localized traffic congestion may occur when heavy construction equipment or large components are transported to the work sites, as well as when construction personnel travel to and from the Project area. However, traffic impacts on local roads during construction are generally expected to be minor and short term. UI would coordinate with the host municipalities and DOT to minimize potential impacts to traffic patterns. (UI 1, OSPRM, p. 6-20)

134. To expediate future line maintenance work, at new structure sites in non-agricultural upland areas, UI would leave portions of the gravel work pads in place. (UI 1, OSPRM, p. 3-7)

135. Following construction of the Project, cleanup would include the removal of construction debris, signs, flagging, and fencing, as well as temporary access and work pads. Areas affected by construction would be restored and stabilized, as necessary, to approximately pre-construction conditions (e.g. seeded, graveled, and repaved). Restoration work would be performed in accordance with the SWPCP. (UI 1, OSPRM, p. 3-11)

136. UI's Vegetation Management would comply with the NERC Reliability Standard FAC-003 to maintain Minimum Vegetation Clearance Distance as outlined in the "Transmission and Vegetation Management Operating Procedure" (TVOP) to prevent vegetation-related outages under various weather and operating conditions. (Council Administrative Notice Item No. 28 – Docket No. 508 Finding of Fact #166; UI 6, response 9)

137. UI's TVOP are based on the following industry standards and procedures:
    a) OSHA 29 CFR 1910.269 Electric Power Generation, Transmission and Distribution;
    b) ANSI Z133.3 "Pruning, Trimming, Repairing, Maintaining, and Removing Trees, and Cutting Brush Requirements";
    c) ANSI A300 Part 1 "Tree, Shrub, and other Woody Plant Maintenance – Standard Practices;
    d) ANSI A300 Part 7 "Integrated Vegetation Management, Electric Utility Rights-of-way; and
    e) NESC Rule 2018.

    (Council Administrative Notice Item No. 28 – Docket No. 508 Finding of Fact #167)

138. In accordance with CGS §16-50hh, a pollinator seed mix could be used for ROW revegetation in suitable locations. (UI 6, Response 24)

Environmental Resources

139. Vegetation in the Project area and along the ROW consists of a mix of cover types, ranging from open fields and forests to urban commercial/industrial development with minimal vegetation and suburban lawns with ornamental trees and landscaping. Riparian and wetland habitats are present along the Housatonic River and various streams and wetlands in the Project area. (UI 1, OSPRM, Appendix C, Visual Assessment, p. 1)

140. Elevations within the Project area range from 0 feet above mean sea level (amsl) to 600 feet amsl. The lowest elevations of 0 feet amsl are located along the banks of the Housatonic River in Shelton and Derby; and along the banks of the Naugatuck River in Derby and Ansonia. The highest elevation of 600 feet amsl is located off Soundview Avenue (west of Derby Junction) in Shelton. (UI 6, response 22)

141. UI would develop a final Wetland Invasives Species Control Plan (WISCP) to be included in the D&M Plan. The WISCP would include standard procedures including, but not limited to, ensuring that temporary construction mats are cleaned prior to bringing them to the site and relocating them from one wetland to another during construction. (UI 1, OSPRM, p. 3-15)

142. Approximately 0.96-acre of Prime Farmland Soils are located along the ROW in Shelton in the vicinity of Structure Nos. 350 to 352, and approximately 0.56-acre of Prime Farmland Soils are located between Indian Well Substation and Structure No. 3 in Derby. Permanent impacts to Prime Farmland Soils would be less than 0.07 acre due to the significantly smaller foundations for the proposed monopole structures versus the existing lattice structures. (UI 1, OSPRM, p. 6-4) (UI 1, OSPRM, p. 5-4)

143. UI would utilize mitigation measures to be protective of farmland soils. (UI 1, OSPRM, pp. 6-4 and 6-5)

144. The Project is consistent with the FERC Guidelines for the Protection of Natural, Historic, Scenic and Recreational Values in the Design and Location of Rights-of-Way and Transmission Facilities as it utilizes existing rights-of-way when modifying transmission facilities. (UI 1, OSPRM, p. 6-17; UI 6, Response 20; Council Administrative Notice Item No. 10)

Watercourses

145. The Project area lies within the Housatonic Drainage Basin. (UI 1, OSPRM, p. 5-5)

146. The Project area extends across a total of 10 watercourses. (UI 1, OSPRM, p. 5-8)

147. The Project area in Shelton is located within the designated coastal management boundary. This portion of the Project will be predominantly located in uplands and will span the Housatonic River north of the Ousatonic Dam, which is the demarcation point between the freshwater and tidally-influenced segment of the river. (UI 1, OSPRM p. 5-24, 6-17; UI 6, Response 20)

148. The rebuilt 115-kV transmission lines would cross the Federal Emergency Management Agency (FEMA) designated 100-year and 500-year flood zones associated with the Housatonic River and a portion of the Naugatuck River flood area, which is protected by a levee and thus has reduced flood risk. No new permanent access road would be located within the 100-year or 500-year flood zones. (UI 1, OSPRM, p. 6-9)

149. Proposed monopoles that would be located within flood zones are listed below.

Appendix A Mapsheet No		Floodplain	Proposed Structure Number	Within 100-year or 500-year Flood Zone	Monopole Foundations: Estimated Impact Area (SF)*	Monopole Foundation Estimated Impact (CF)*
400-scale	100-scale					
3	6-7	Housatonic River	360	500-year	114	114
3	6-7	Housatonic River	361A (Indian Well Substation)	100-year	55	264
3	7	Housatonic River	361B (Indian Well Substation)	100-year	40	203
3	6-7	Housatonic River	1B (Indian Well Substation)	100-year	55	239
3	7	Housatonic River	2	500-year	55	492
3	7	Housatonic River	2A	500-year	10	62
3	7	Housatonic River	2C	500-year	10	62
22	15	Naugatuck River	20	Area of Reduced Risk of Flooding	64	114
22	15	Naugatuck River	21	Area of Reduced Risk of Flooding	64	114

*Impact area (square feet [SF].cubic feet [CF]) estimated based on current engineering design data regarding structure foundations.

(UI 1, OSPRM, p. 6-10)

150. The Project is not expected to have any adverse effects on flood dynamics, and it would not alter the floodplains or risk of flooding. Notwithstanding, UI would coordinate with DEEP regarding further analyses of Project impacts on flood plains as well as any potential need for mitigation to compensate for the limited impacts to flood storage capacity. (UI 1, OSPRM, p. 6-11)

151. None of the rivers in the Project area are designated under the Federal Wild and Scenic Rivers Act. (UI 1, OSPRM, p. 5-19)

152. The Project would not be expected to affect fishery resources. The proposed 115-kV transmission lines would span the Housatonic River, which is the only waterbody containing fisheries. No vegetation removal or tree-trimming would be required in the riparian areas adjacent to the river because of the height of the new conductors above the river. (UI 1, OSPRM, p. 6-13)

153. UI would install a permanent access road from Canterbury Lane to Structure Nos. 355, 356 and 357. This would require the installation of two permanent culverts to cross a small intermittent stream (WC2) and would affect adjacent wetland W4. (UI 1, OSPRM, p. 6-6)

154. UI would utilize the following measures to minimize potential impacts on water resources:
    a) Watercourse and wetland boundaries would be clearly marked by a soil or wetland scientist prior to commencement of construction;

b) Timber construction mats (or equivalent) would be utilized for temporary wetland and stream crossings;
c) Construction contractors would comply with USACE, DEEP and Council conditions, as applicable, regarding work in water resource areas;
d) The installation of the two new culverts for the permanent stream crossing would be in accordance with the DEEP *Stream Crossing Guidelines*;
e) Existing riparian vegetation within 25 feet of watercourse banks would be maintained or cut selectively to the extent practical;
f) E&S controls would be installed to be protective of wetland and watercourses;
g) Petroleum product management procedures would be employed including, but not limited to, storing petroleum products at least 25 feet* from wetlands and performing equipment refueling in upland areas;
h) Forested wetland vegetation would be removed with stumps left in place, except where intact stumps would interfere with timber mat installation, access/workspace and/or would be a safety concern for construction personnel; and
i) Wetland areas temporarily impacted by construction would be restored and reseeded with a wetland seed mix, as necessary. Straw would be utilized for mulching in lieu of woodchips. Fertilizer would not be applied on wetlands.

*Specifically, UI could comply with a 100-foot buffer between petroleum storage and wetlands as suggested by DEEP.

(UI 1, OSPRM, p. 6-8; Tr. 1, pp. 25, 64-65; DEEP Comments dated July 21, 2022, p. 4)

155. UI would obtain the necessary permits from State and federal agencies for the permanent watercourse crossings. (UI 1, OSPRM, p. 6-8; UI 6, Response 3)

Wetlands

156. The Inland Wetlands and Watercourses Act (IWWA), CGS §22a-36, *et seq.*, contains a specific legislative finding that the inland wetlands and watercourses of the state are an indispensable and irreplaceable but fragile natural resource with which the citizens of the state have been endowed, and the preservation and protection of the wetlands and watercourses from random, unnecessary, undesirable and unregulated uses, disturbance or destruction is in the public interest and is essential to the health, welfare and safety of the citizens of the state. (CGS §22a-36, et seq.)

157. The IWWA grants regulatory agencies with the authority to regulate upland review areas in its discretion if it finds such regulations necessary to protect wetlands or watercourses from activity that will likely affect those areas. (CGS §22a-42a)

158. The IWWA forbids regulatory agencies from issuing a permit for a regulated activity unless it finds on the basis of the record that a feasible and prudent alternative does not exist. (CGS §22a-41)

159. A total of 10 wetland areas (9 non-tidal and 1 tidal) were delineated within the existing Project ROW. (UI 1, OSPRM, p. 6-6)

160. Vegetation clearing would impact 2 of the 10 wetlands. (UI 1, OSPRM, pp. 6-6 and 6-7)

161. The projected impacts to wetlands/watercourses are listed below.

Appendix A Mapsheet No.		Watercourse/Wetland No.	Estimated Project Impact, by Type (Sq. Ft.)			
			Temporary Impacts[a]		Permanent Impacts (Fill)[b]	Wetland Forest Vegetation Clearing[c]
1:400	1:100		Access Roads	Work Pads		
Shelton						
1	1, 2	W2	2,300	600	0	0
1	2	W3; WC1	2,100	0	0	0
1	3	W4; WC2 (two crossings, permanent culverts)	0	0	2,500	0
1	4	W5; WC3	300	0	0	350
Shelton/Derby						
1, 2	6	Housatonic River (WC6)[d]	0	0	0	0

[a] The placement of temporary construction matting that is not subject to federal regulatory review.
[b] Direct fill placed in wetlands or watercourses that are subject to State and Federal regulatory review.
[c] Refers to long-term change in wetland vegetation type (e.g., forested to shrub-scrub), but not a net reduction in wetland function or size.
[d] No direct fill will be placed in the Housatonic River. However, spanning a navigable waterway is subject to Federal regulatory review as potentially affecting interstate commerce.
Note: Numbers have been rounded up for impact estimation purposes.

(UI 1, OSPRM, pp. 6-7)

162. UI would coordinate with DEEP and/or U.S. Army Corps of Engineers and obtain the necessary authorizations for proposed activities in wetlands. (UI 1, OSPRM, p. 3-21)

163. No vernal pools are located within or proximate to the Project ROW. (UI 1, OSPRM, p. 5-16)

164. The Project ROW traverses approximately 0.75-mile of DEEP-designated Level A Aquifer Protection Area (APA) in Shelton. (UI 1, OSPRM, p. 5-7; Council Administrative Notice Item No. 73 – DEEP Statewide APA Map)

165. UI would implement protective measures for the APA including, but not limited to, adherence to SWPCP, UI best management practices, and state and federal requirements regarding storage and handling of petroleum products; and a spill prevention and control plan to be included in the Project D&M Plan. (UI 1, OSPRM, p. 6-9)

166. If groundwater is encountered during any Project excavations, dewatering would be performed in accordance with applicable regulatory requirements. (UI 1, OSPRM, p. 6-9)

Wildlife

167. By letter dated January 18, 2022, DEEP indicated that its review of the Natural Diversity Database (NDDB) identified two state-listed species that may occur within or proximate to the Project area. The two state-listed species are listed below:

State-listed Bird Species	Designation
Sedge wren	Endangered
Bald eagle	Threatened

(UI 1, OSPRM, Appendix B.4, DEEP NDDB Letter dated January 18, 2022)

168. The sedge wren nests in dense, tall growths of sedges and grasses in wet meadows, hayfields, retired croplands, upland margins of ponds and marshes, coastal marshes, and sphagnum bogs. DEEP notes that reducing the disturbance to any of these habitats in the project area and enhancing wetland

function would be beneficial to this bird species. (UI 1, OSPRM, Appendix B.4, DEEP NDDB Letter dated June 18, 2022)

169. To be protective of the sedge wren, DEEP recommends that UI not conduct work in suitable habitat near Derby Junction during the May 1 and August 31 breeding season unless surveys are performed that indicate this bird species is not present. DEEP also notes that reducing disturbance to any of these habitat areas in the Project area and enhancing wetland function would be beneficial to the sedge wren. (UI 1, OSPRM, Appendix B.4, DEEP NDDB Letter dated January 18, 2022)

170. To be protective of the bald eagle, DEEP provided the following measures to be employed in areas of concern identified by DEEP in a map:

    a) Work activities and staging areas are prohibited within 330 feet of active nests/roosts that are out of the line of sight, or within 660 feet from the nests/roosts that are in the line of sight during periods of eagle use, unless surveys demonstrate that the nest or roost is not being used;
    b) Minimize cutting of large trees. No known bald eagle nest trees, perchs, or roost trees shall be removed or modified; and
    c) Avoid leaving exposed food, trash or hazardous materials that could be scavenged by bald eagles. Incidental carcasses that may appear on the work site should be promptly removed.

    (UI 1, OSPRM, Appendix B.4, DEEP NDDB Letter dated January 18, 2022)

171. UI would comply with the DEEP-recommended mitigation measures. Furthermore, UI would continue to consult with DEEP regarding species-appropriate mitigation strategies, and such final mitigation plans would be incorporated in the D&M Plan. (UI 1, OSPRM, pp. 6-17 and 6-18; UI 6, Response 26)

172. UI consulted with the U.S. Fish and Wildlife Services (USFWS) Information for Planning and Consultation (iPaC) to determine if any federally-listed species may be present within the Project area. The iPaC review identified two species: northern long-eared bat (NLEB), a federally-listed Threatened Species; and the monarch butterfly, a candidate for federal listing (but not currently listed as Threatened or Endangered). (UI 1, OSPRM, p. 5-17; UI 1, OSPRM, Appendix B, Ecological Assessment Report, p. 12)

173. While the NLEB is currently federally-listed as Threatened, on March 24, 2022, the USFWS proposed the NLEB as a candidate for listing as Endangered. (UI 1, OSPRM, p. 5-17)

174. The Project area is not located within 150 feet of a known occupied maternity roost tree or within 0.25-mile of a known NLEB hibernaculum. The nearest NLEB habitat resource to the Project area is located over 18 miles to the east in the Town of North Branford. Notwithstanding, UI would avoid tree clearing during the months of June, July and August to protect tree roosting bat species. (Tr. 1, p. 25; UI 1, OSPRM, p. 5-17; Council Administrative Notice Item No. 74 – DEEP NLEB Map; DEEP Comments dated July 21, 2022, p. 4)

175. No critical habitat has been designated for the monarch butterfly at this time. (UI 1, OSPRM, pp. 5-17)

Scenic, Historic and Recreation Areas

176. A Phase 1A Cultural Resources Assessment Survey was performed by Heritage Consultants (Heritage) and a report dated October 2021 (Phase IA Report) indicated that no properties/districts listed on the National Register of Historic Places (NRHP) are located proximate to the Project ROW. (UI 1, OSPRM, p. 5-26; UI 8, SHPO Letter dated July 26, 2022)

177. The Phase IA Report also indicated that there are no identified archaeological sites proximate to the Project ROW. Notwithstanding, review of current landscape conditions and qualities of the western portion of the ROW between Structure Nos. 350 and 356 suggests a moderate to high potential to yield intact cultural deposits. Thus, Heritage recommended that a Phase IB Cultural Reconnaissance Survey (Phase IB Survey) be performed and focus on locations where it would not be feasible to employ best management practices such as the use of timber matting for access roads/work pads and the installation of high visibility fencing along the limits of the work areas. The Phase IA Report was submitted to the SHPO on March 17, 2022. (UI 1, OSPRM, p. 6-19; UI 8, SHPO Letter dated July 26, 2022)

178. A Phase 1B Survey was performed by Heritage and a report dated March 2022 (Phase IB Report) was submitted to SHPO. By letter dated July 16, 2022, SHPO concurs with the Phase IB report that no additional archaeological investigations are warranted, and the Project would not have an adverse effect on historic resources. (UI 1, OSPRM, p. 6-19; UI 8, SHPO Letter dated July 26, 2022)

179. The Project is located near various public recreational and open space areas, including, but not limited to, the Paugussett Trail and municipal conservation lands in Shelton, OSP in Derby and Ansonia, and the Nolan Field Athletic Complex in Ansonia. The existing 50-foot ROW extends for approximately 1,465 feet across the northeastern, undeveloped portion of OSP. (UI 1, OSPRM, pp. 1-4, 1-6, and 5-20 to 5-22)

180. Existing lattice Structure Nos. 10 through 12 are located in the ROW in OSP. UI would remove Structure Nos. 10 and 12 from within OSP and install replacement Structure Nos. 10 and 12 outside of OSP. UI would replace Structure No. 11 with a double-circuit monopole within OSP. UI would also acquire approximately 1.82 acres of additional permanent easement within OSP to comply with national and UI clearance requirements. (UI 1, OSPRM, p. 9-7)

181. UI is coordinating with DEEP regarding the proposed ROW expansion/additional easement in OSP. Specifically, UI held teleconferences with DEEP on May 9, June 16, June 29, and July 19, 2022. DEEP is looking at possible mitigation strategies to offset forest loss within the proposed ROW expansion within OSP. Possible mitigation options include, but are not limited to, a conservation easement on 3.5 acres of UI property adjacent to OSP; a revegetation plan for the entire ROW within OSP; tree planting in OSP; beneficial reuse and recovery plan for any trees cut due to ROW expansion (e.g. for park benches or firewood); visual impact mitigation; and potential funding for enhanced recreational use or habitat restoration in OSP. (UI 6, response 12)

182. In the event that the proposed additional easement cannot be acquired, UI has identified and evaluated potential routes and 115-kV line rebuild configurations within OSP that would avoid the need to acquire additional easement, minimize the required width of the expanded easement or possibly avoid OSP entirely. See section titled "Alternatives." UI does not have a preference for an alternative (if the expanded easement is not available) at this time. (UI 1, OSPRM, p. 9-7; Tr. 1, p. 37)

Visibility

183. UI used a combination of predictive computer modeling, in-field analysis, and a review of various data sources to evaluate the visibility of the proposed facility. (UI 1, OSPRM, Appendix C, Visual Assessment, p. 1)

184. Information obtained during the field reconnaissance was incorporated into a viewshed map that depicts areas with year-round and seasonal visibility for areas within a one-mile radius Study Area (6,611 acres) from the route of the proposed structures based on computer modeling and in-field observations from publicly-accessible locations. (UI 1, OSPRM, Appendix C, Visual Assessment, pp. 2-3 and Attachment 2, Viewshed Analysis Map Sheets 1 and 2)

185. Based on the final viewshed analysis, the existing lattice structures are visible year-round from approximately 352 acres (5% of the Study Area) and seasonally visible from about 681 acres (10% of the Study Area). (UI 1, OSPRM, Appendix C, Visual Assessment, pp. 3)

186. Based on the final viewshed analysis, the Project would be visible year-round from approximately 405 acres (6% of the Study Area) and seasonally visible from about 732 acres (11% of the Study Area). (UI 1, OSPRM, Appendix C, Visual Assessment, pp. 3)

187. Views of the ROW would continue to generally extend over distances of 0.25-mile or less in most areas due to a combination of topography and mature vegetation. In non-residentially developed areas and over open water, areas of visibility would extend to 0.5 to 0.75-mile due to the sparse vegetation and relatively unobstructed sight lines. (UI 1, OSPRM – Appendices – Part II, Appendix C, Visual Assessment, p. 3)

188. The majority of the existing transmission structures along the Project ROW are four-legged lattice towers. The lattice towers are painted steel that vary in color; for example, some are yellow, and some are gray. The proposed replacement structures would be taller steel monopoles with a galvanized gray finish. Thus, the primary visual changes from the Project would be specific characteristics of views from some locations because of the changes in structure types, placement and height. (UI 1, OSRPRM, p. 2-2 and Appendix C, Visual Assessment, p. 3; Tr. 1, pp. 19-20)

189. There are no state or locally-designated scenic roads located within the one-mile Study Area. (UI 1, OSPRM, Appendix C, Viewshed Analysis Map Sheets 1 and 2)

190. Construction of facilities defined under CGS §16-50i, including but not limited to, electric transmission line facilities, is permissible on ridgelines within the state. (CGS §8-1aa; CGS §8-2; C.G.S. §16-50*x*)

191. The Project area is not located proximate to or traverse any traprock ridge or amphibolite ridge areas as specified in CGS §8-1aa. Similarly, the ROW does not parallel any major ridgelines. (UI 1, OSPRM, p. 5-1)

192. Views of the existing ROW would continue from portions of the Paugussett Trail for approximately 0.5 mile east of Derby Junction where it veers to the north. Some portions of the trail system within the Osbornedale State Park would also have views of the monopoles within the ROW. (UI 1, OSPRM, Appendix C, Visual Assessment, p. 3 and Attachment 2, Viewshed Analysis Map Sheets)

193. The Project is not located proximate to any National Heritage Corridors or any State designated heritage areas. (UI 1, OSPRM, p. 5-26)

194. The Project is not located proximate to any DOT designated Scenic Land Strips. (UI 1, OSPRM, p. 5-26)

195. The Project is not located proximate to any locally-designated scenic roads. (UI 1, OSPRM, p. 5-26)

Electric and Magnetic Fields

196. 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 the United States, electric utilities provide power at 60 hertz (oscillates 60 times per second). (Council Administrative Notice Item No. 20 – Council's Best Management Practices for Electric and Magnetic Fields, p. 1)

197. Electric fields result from voltages applied to electrical conductors and equipment. Appliances within homes and the workplace are the major sources of electric fields indoors, and power lines are the major sources of electric fields outdoors. EF levels decrease rapidly with distance from the source, diminishing even faster when interrupted by conductive materials, such as buildings and vegetation. The scientific community does not regard EF levels to be a concern to the general public, and thus studies of health effects from electrical transmission lines and equipment has focused on MF. (Council Administrative Notice Item No. 20 – Council's Best Management Practices for Electric and Magnetic Fields, p. 1; Council Administrative Notice Item No. 28 – Docket No. 508 Finding of Fact #239)

198. MF are produced by the flow of electric currents. The level of a magnetic field is commonly expressed as magnetic flux density in units called gauss (G), or in milliGauss (mG). The magnetic field level at any point depends on characteristics of the source, which can include the arrangement of conductors, the amount of current flow through the source, and its distance from the point of measurement. MF levels decrease rapidly with distance from the source but are not easily interrupted as they pass through most materials. (Council Administrative Notice Item No. 20 – Council's Best Management Practices for Electric and Magnetic Fields, p. 2; Council Administrative Notice Item No. 28 – Docket No. 508 Finding of Fact #240)

199. 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 No. 20 – Council's Best Management Practices for Electric and Magnetic Fields, p. 3; Council Administrative Notice Item No. 28 – Docket No. 508 Finding of Fact #241)

200. 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), UI 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 ROW and in areas of particular interest, as long as such designs do not compromise system reliability or worker safety, or environmental and aesthetic project goals. (Council Administrative Notice Item No. 20 – Council's Best Management Practices

for Electric and Magnetic Fields, pp. 4-10; Council Administrative Notice Item No. 28 – Docket No. 508 Finding of Fact #242)

201. As required by the Council's EMF BMPs, UI 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. (Council Administrative Notice Item No. 20 – Council's Best Management Practices for Electric and Magnetic Fields, pp. 3 and 8)

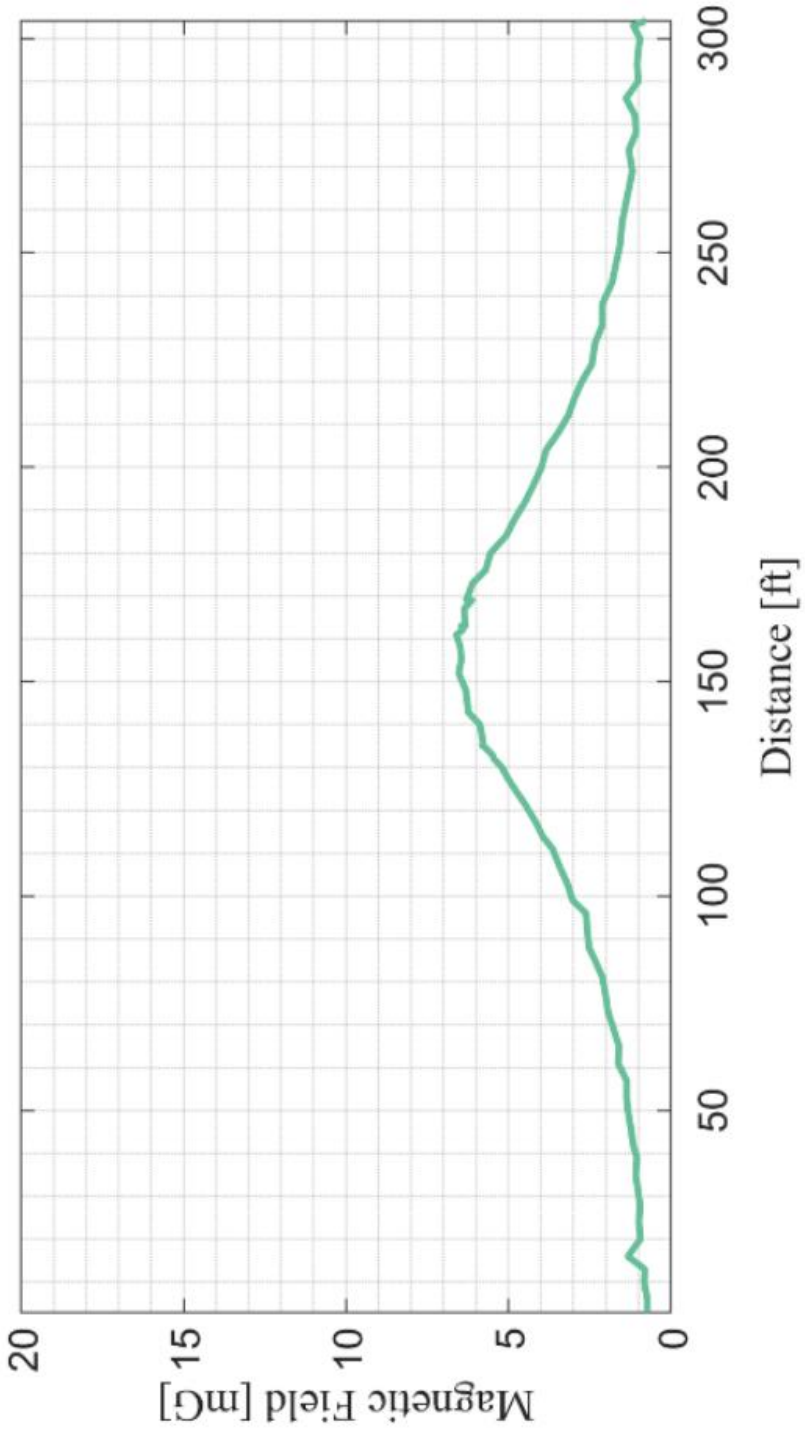
202. As required by the Council's EMF BMP, UI examined the project route to determine the location of any schools, daycare facilities, playgrounds, hospitals, and residential areas, as defined under C.G.S. § 16-50p(a)(3)(D), for specific MF analysis. Such locations are identified below.

Location Name	**Category**	**Address**	**Distance from proposed transmission line**
Glider Boathouse	School	280 Roosevelt Drive, Derby	~259 feet west
Derby Hill School	School	75 Chatfield Street, Derby	~212 feet west

(UI 1, OSPRM, Appendix E – EMF Report, p. D-1)

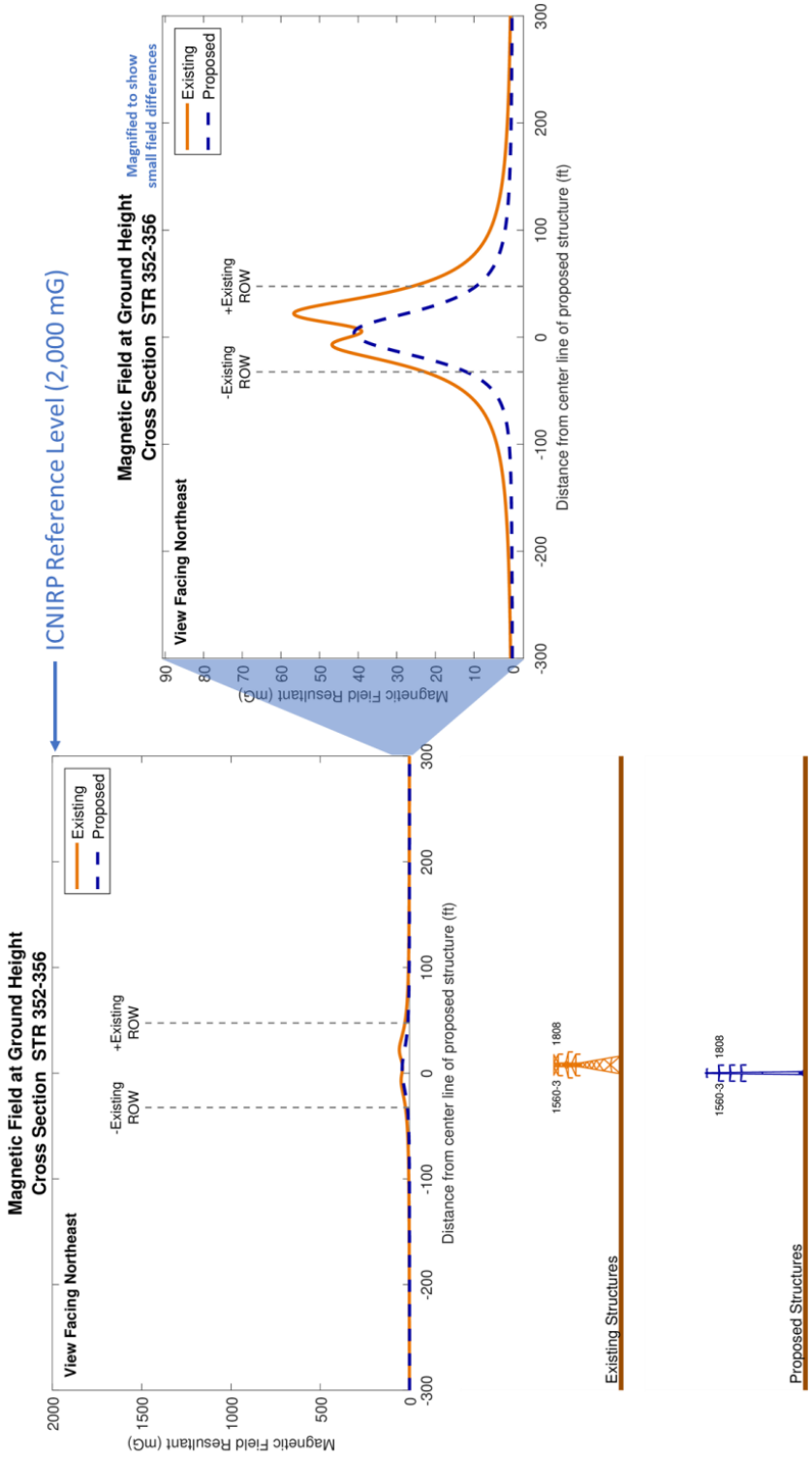
203. Field measurements of existing, preconstruction MF were taken along approximately 0.9-mile of the Project route between Derby Junction and the Housatonic River in Shelton. (UI 1, OSPRM, Appendix E – EMF Report, p. D-4)

204. Field measurements of existing MF between Derby Junction and the Housatonic River are listed below.



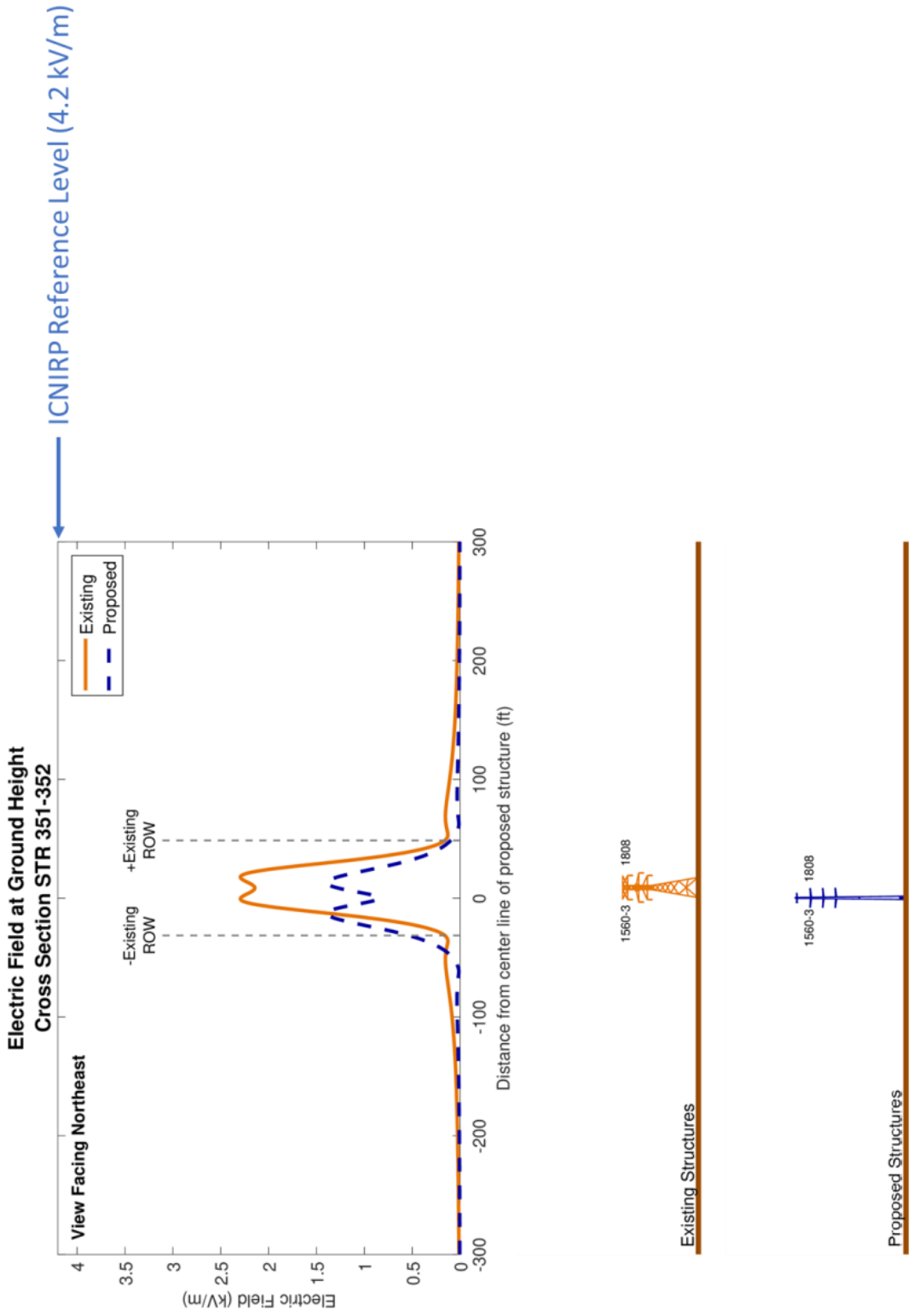
(UI 1, OSPRM, Appendix E – EMF Report, pp. D-2 and D-6)

205. A cross-section of the Project with existing and proposed MF values is listed below.



(UI 1, OSPRM, Appendix E – EMF Report, p. 15)

206. A cross-section of the Project with existing and proposed EF values is listed below.



(UI 1, OSPRM, Appendix E – EMF Report, p. 16)

207. A vertical conductor arrangement is proposed by UI because that is the existing configuration, and it would minimize the required ROW width. (Tr. 1, pp. 18-19)

208. The EMF BMPs 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 No. 20 – Council's Best Management Practices for Electric and Magnetic Fields, pp. 4-10)

209. UI's base Field Management Design Plan incorporates "no cost/low cost" magnetic field reduction measures, consistent with the Council's EMF BMPs, through the use of the following: taller structures to raise the heights of the conductors; and the use of double-circuit vertical structures* while arranging the conductor phases to achieve mutual MF cancellation. This "no cost/low cost" design was used to develop the pre and post Project MF calculations.

*Where UI would utilize two single-circuit monopoles with a vertical configuration (e.g. Structure Nos. 2-4 and 17-19), UI would still maintain optimal phasing, and the horizontal conductor separation would be similar to that of double-circuit monopoles.

(UI 1, OSPRM, Appendix E – EMF Report, pp. 7-8)

210. The originally proposed Structure No. 4 consisted of two single-circuit monopoles with a height of approximately 110 to 115 feet. Revised Structure No. 4 consists of one double-circuit monopole with a height of approximately 110 feet. At a distance of approximately 50 feet from the centerline of the originally proposed Structure No. 4, the change in magnetic fields would be less than 1.5 mG. (UI 6, response 15, Attachment F)

Public Safety

211. The proposed Project would be constructed in full compliance with the NESC, standards of the Institute of Electrical and Electronic Engineers, the American National Standards Institute, good utility practice, and UI's technical specifications. (UI 1, OSPRM, p. 3-1)

212. The Federal Aviation Administration issued Determinations of No Hazard to Air Navigation (FAA No Hazard Determinations) for the Project. No marking or lighting is required for any of the proposed structures. (UI 1, OSPRM, p. 6-20)

213. The FAA No Hazard Determinations indicated that UI could voluntarily mark the wires to make them more conspicuous to any low flying aircraft along the Housatonic River crossing per FAA's Advisory Circular AC-70/7460-1M (FAA Advisory Circular). UI would voluntarily install unlighted marker balls of alternating orange, white and yellow colors on the topmost overhead shield wires along the Housatonic River crossing (i.e. between Structure Nos. 359 and 360) per the FAA Advisory Circular*.

*UI's existing Housatonic River crossing does not have marker balls.

(UI 1, OSPRM, p. 6-20; UI 6, response 28)

214. UI would utilize existing protective relaying equipment to automatically detect abnormal system conditions and isolate the faulted section of the transmission system. (UI 1, OSPRM, p. 3-18)

215. New OPGW fibers would provide a reliable communications path for the protective relaying systems. (UI 1, OSPRM, p. 3-18)

216. Protective relaying and associated equipment, along with a Supervisory Control and Data Acquisition (SCADA) system for 24/7 remote control and equipment monitoring is housed at UI's System Operations Center. (UI 1, OSPRM, pp. 3-18 and 3-19)

217. Smoke detection systems are already in place in the existing relay and control enclosures at the two UI substations. In the event smoke is detected, an alarm would be activated at UI's Electric Control Center, and system operators would take appropriate action. (UI 1, OSPRM, p. 3-19)

218. The relay and control enclosures at each of the two substations are equipped with portable fire extinguishers that comply with National Fire Protection Association standards. The manual fire extinguishers are monitored by the fire alarm system. (UI 1, OSPRM, p. 3-19)

219. The Project would be 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 No. 22; UI 1, OSPRM, pp. 3-19 and 3-20)

220. The two substations are equipped with lighting to facilitate work at night under emergency conditions or during inclement weather. (UI 1, OSPRM, p. 3-19)

221. Project construction is expected to be performed during the daytime when temporary lighting would not be required. In the event that nighttime work is necessary, UI would install temporary lighting at the work sites. (UI 1, OSPRM, p. 6-22)

222. Operation of the Project would not result in any long-term changes to ambient lighting along the ROW or to the existing lighting at the two substations. (UI 1, OSPRM, p. 6-22)

223. Signs are installed at each substation to alert the public to the presence of high voltage at the facilities. (UI 1, OSPRM, p. 3-19)

224. UI expects only short-term construction-related noise effects from the Project. Typical construction related noise would occur during normal work hours of 7 AM to 7 PM Monday through Saturday. Certain construction tasks would need to be performed on Sundays or at nighttime. (UI 1, OSPRM pp. ES-5 and 6-22)

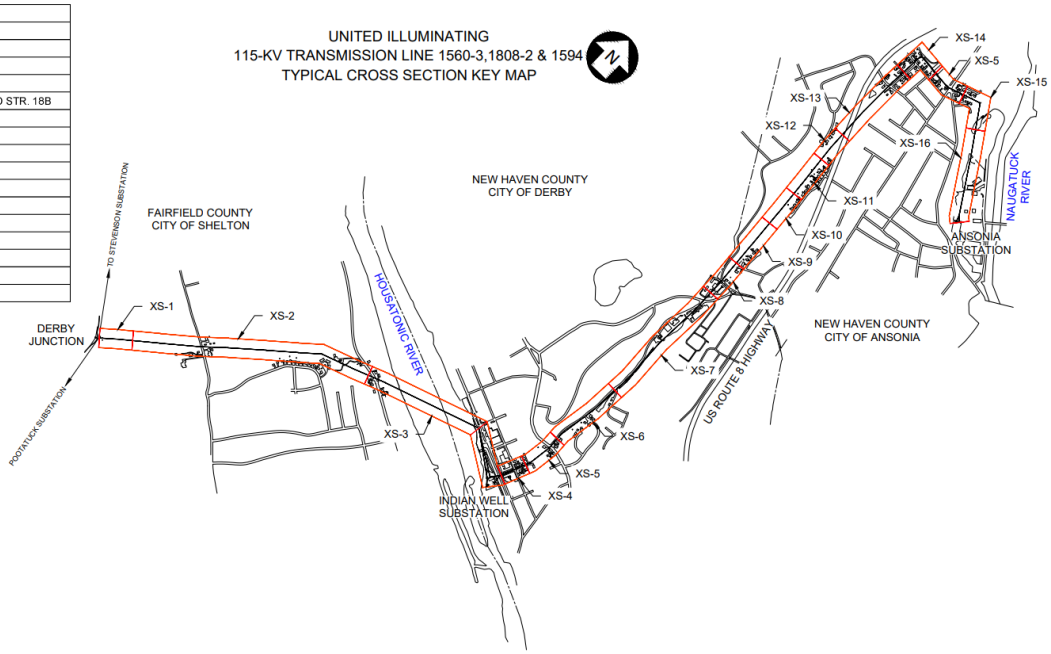
225. Blasting is not expected to be necessary for the Project. (UI 6, response 1)

226. Construction noise is exempt from the State of Connecticut Noise Control Regulations §22a-69-1.8(g), which includes, but is not limited to, "physical activity at a site necessary or incidental to the erection, placement, demolition, assembling, altering, blasting, cleaning, repairing, installing, or equipping of buildings or other structures, public or private highways, roads, premises, parks, utility lines, or other property." (R.C.S.A. §22a-69-1.8(g))

227. Once completed, operation of the Project would comply with DEEP Noise Control Regulations. (Tr. 1, pp. 24-25)

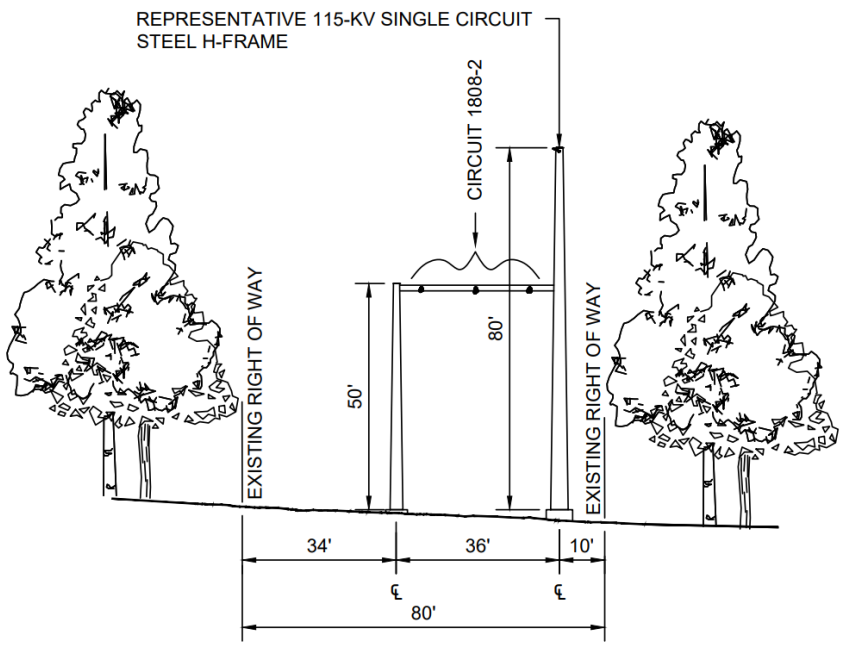
Figure 1 – Map Key

DRAWING INDEX	
XS-1	STR. 350
XS-2	STR.351 TO STR. 358
XS-3	STR. 359 TO STR. 360
XS-4	STR. 2A AND STR. 2B
XS-5	STR. 3A,3B,4A,4B,18A, AND STR. 18B
XS-6	STR. 5 TO STR. 6
XS-7	STR. 7 TO STR. 9
XS-8	STR. 10
XS-9	STR. 11
XS-10	STR. 12
XS-11	STR. 13
XS-12	STR. 14
XS-13	STR. 15 TO STR. 16
XS-14	STR. 17A AND STR. 17B
XS-15	STR. 19A AND STR. 19B
XS-16	STR. 20 TO STR. 21



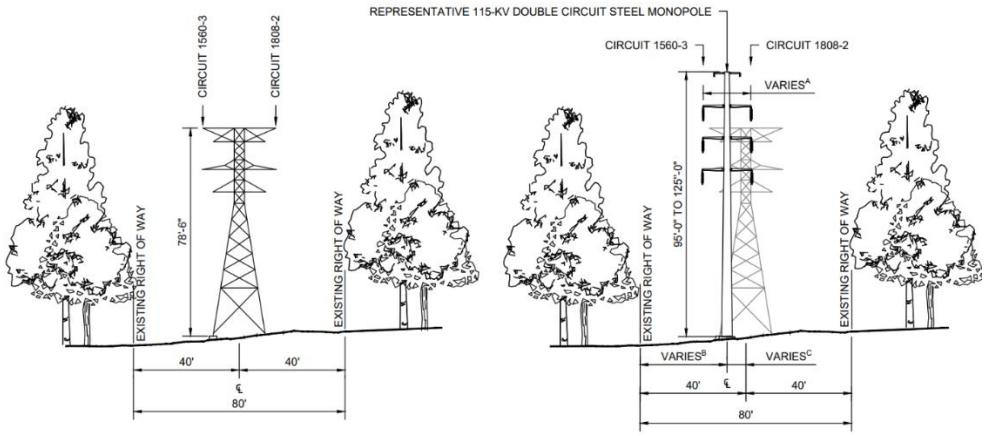
(UI 1, OSPRM, Appendix A.2)

Figure 2 – Structure No. 350 – Cross Section XS-1



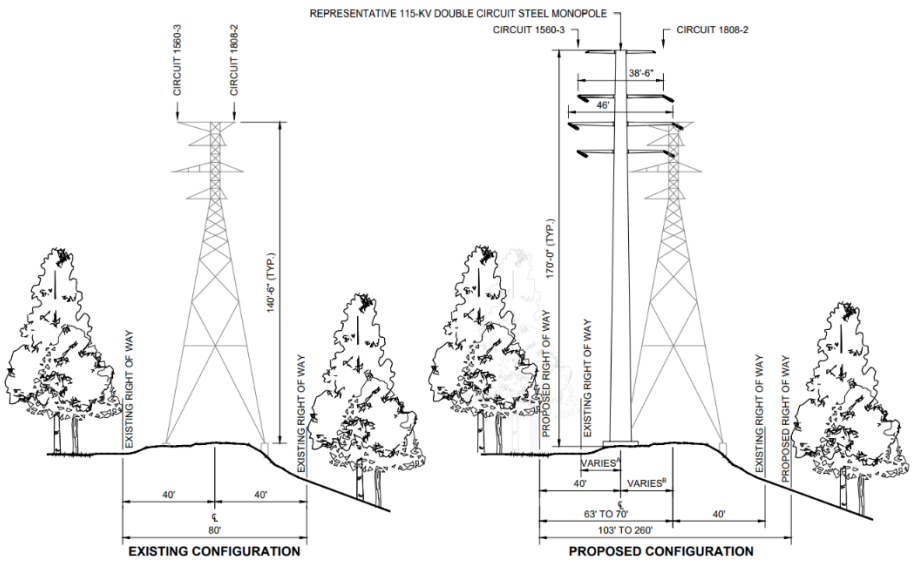
(UI 1, OSPRM, Appendix A.2)

Figure 3 – Structure Nos. 351 to 358 – Cross Section XS-2



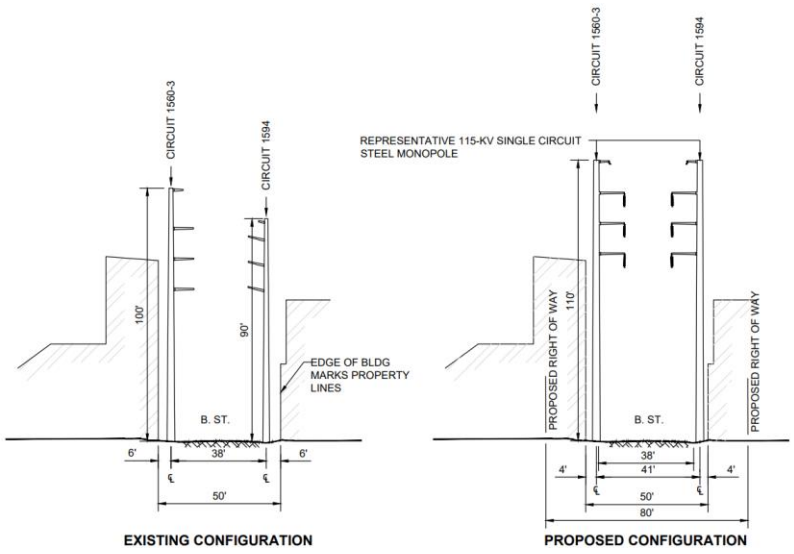
(UI 1, OSPRM, Appendix A.2)

Figure 4 – Structure Nos. 359 to 360 – Cross Section XS-3



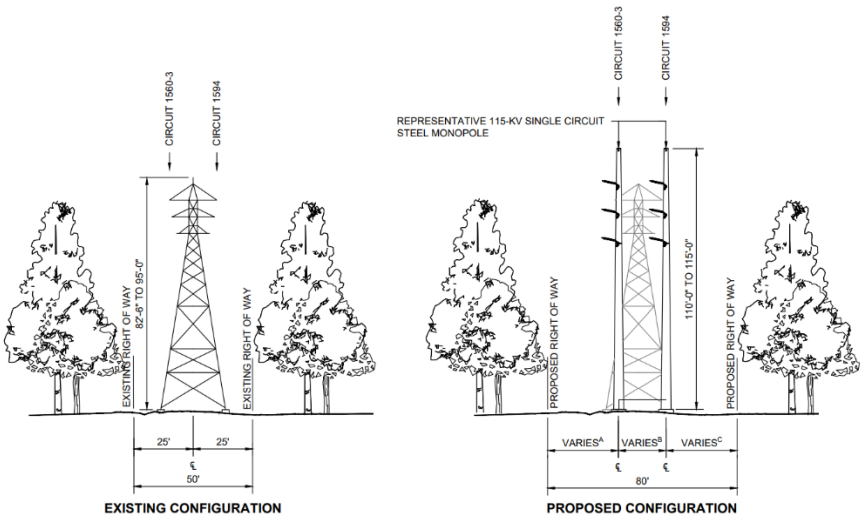
(UI 1, OSPRM, Appendix A.2)

Figure 5 – Structure Nos. 2A and 2B – Cross Section XS-4



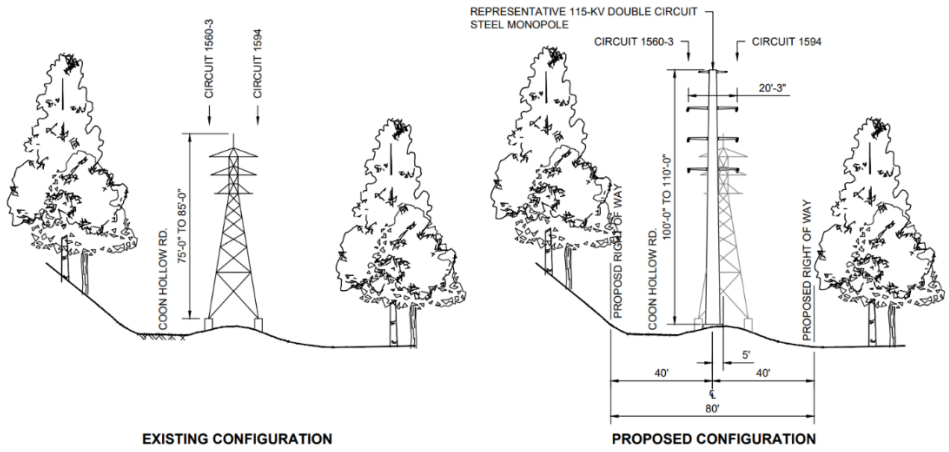
(UI 1, OSPRM, Appendix A.2)

Figure 6 – Structure Nos. 3A, 3B, 18A, and 18B – Cross Section XS-5



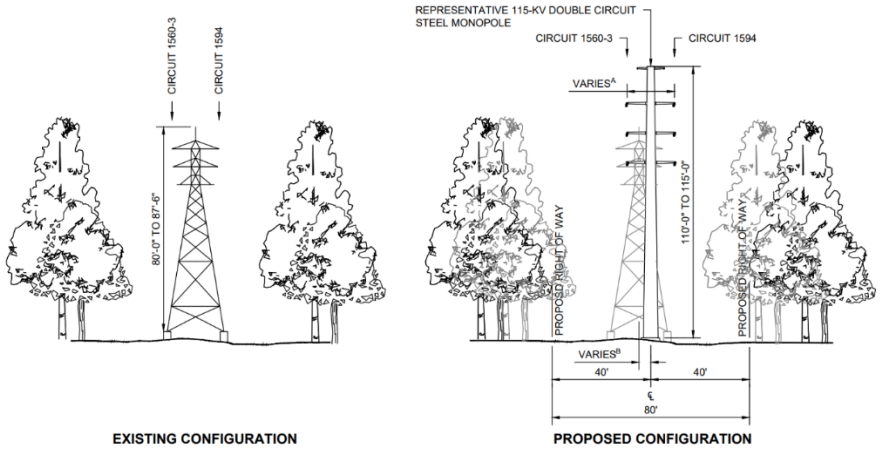
(UI 1, OSPRM, Appendix A.2)

Figure 7 – Structure Nos. 5 to 6 – Cross Section XS-6



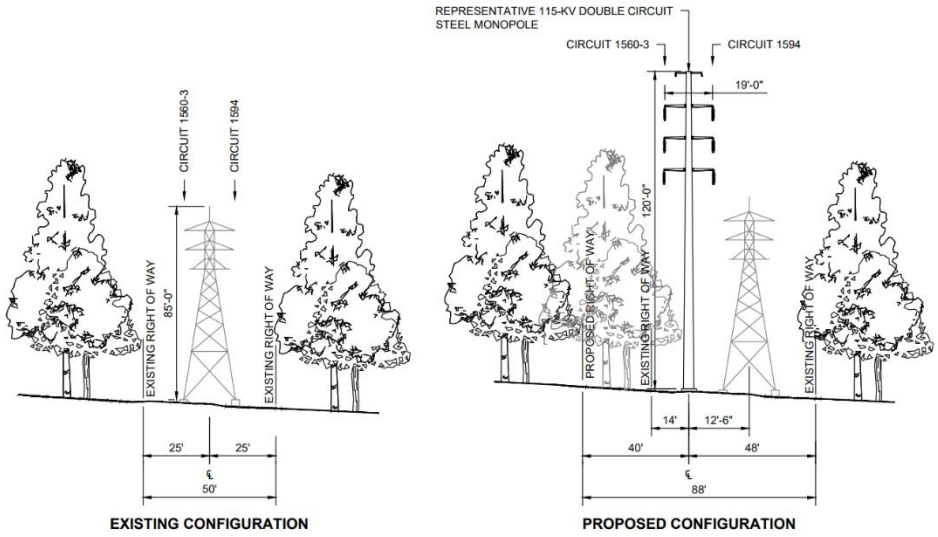
(UI 1, OSPRM, Appendix A.2)

Figure 8 – Structure Nos. 7 to 9 – Cross Section XS-7



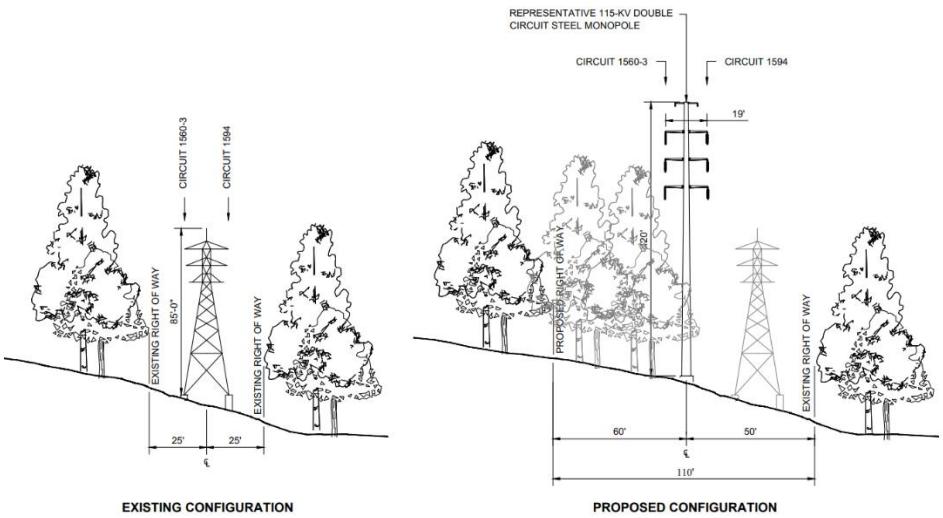
(UI 1, OSPRM, Appendix A.2)

Figure 9 – Structure No. 10 – Cross Section XS-8



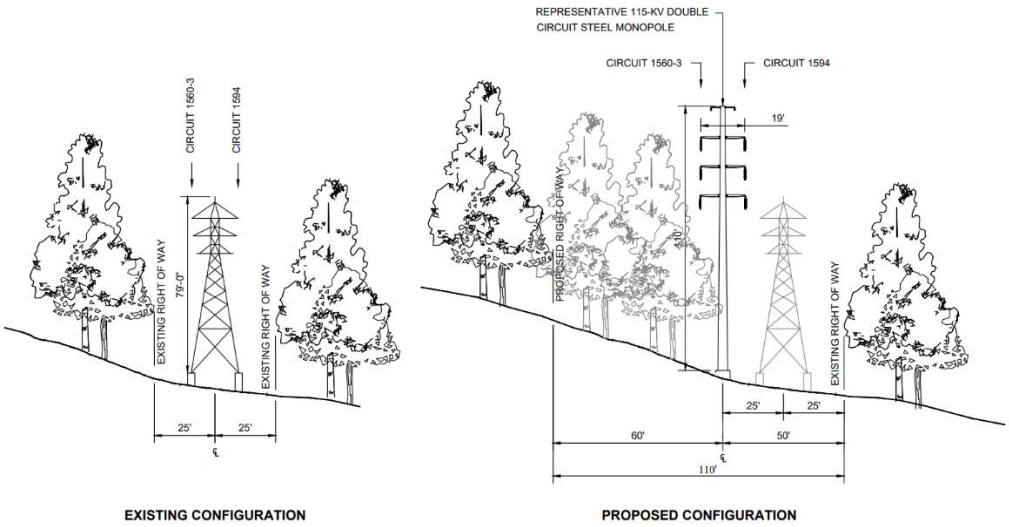
(UI 1, OSPRM, Appendix A.2)

Figure 10 – Structure No. 11 – Cross Section XS-9



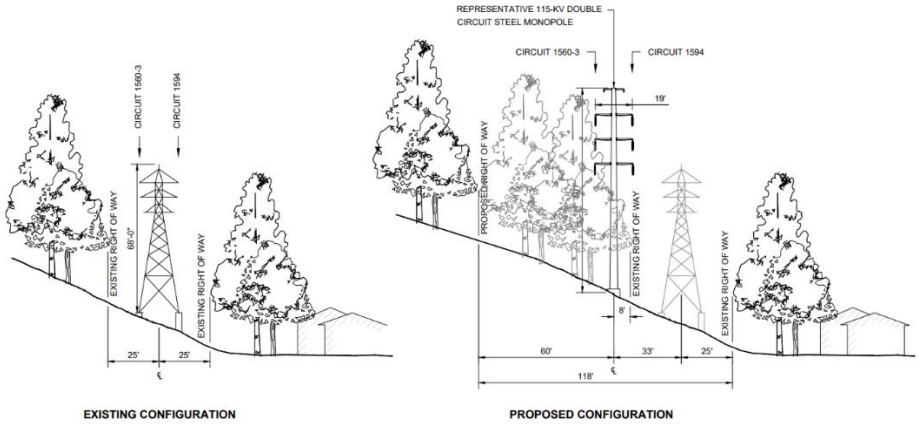
(UI 1, OSPRM, Appendix A.2)

Figure 11 – Structure No. 12 – Cross Section XS-10



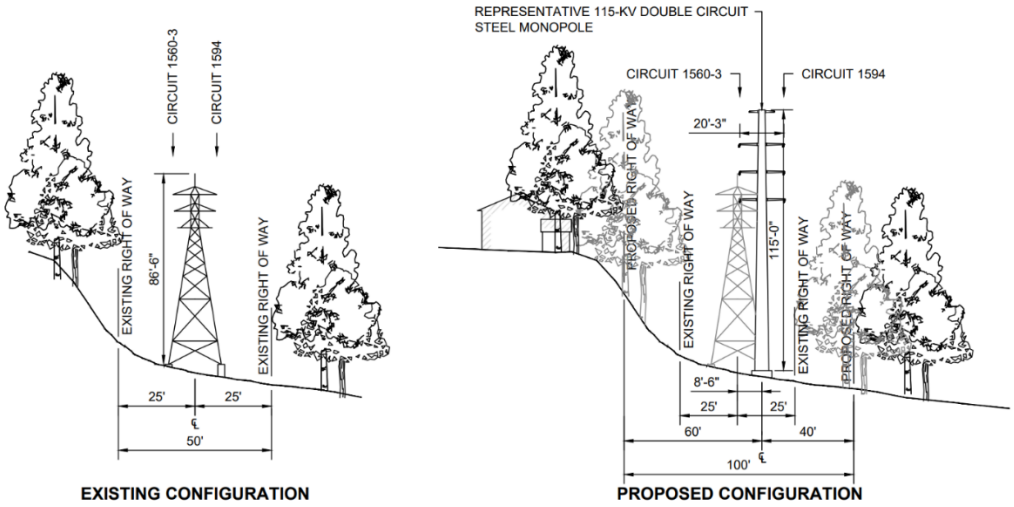
(UI 1, OSPRM, Appendix A.2)

Figure 12 – Structure No. 13 – Cross Section XS-11



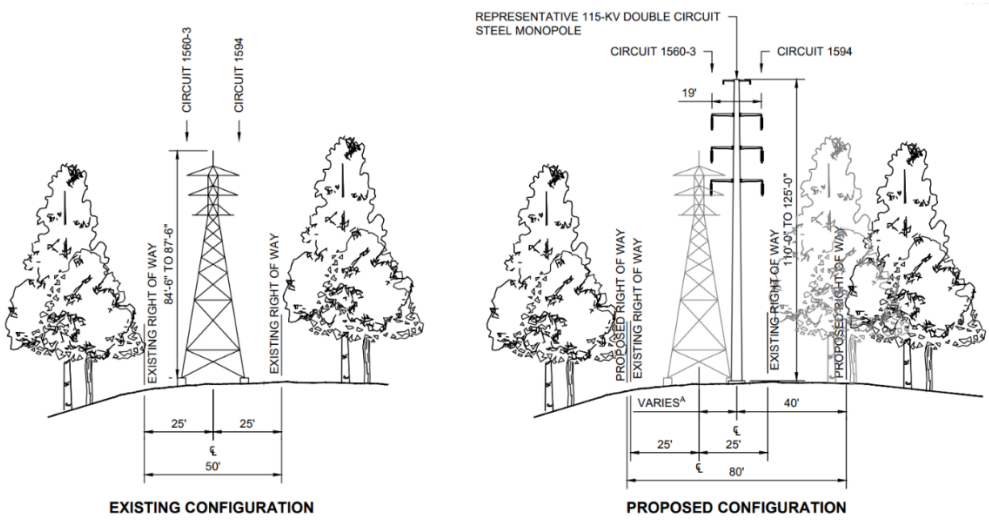
(UI 1, OSPRM, Appendix A.2)

Figure 13 – Structure No. 14 – Cross Section XS-12



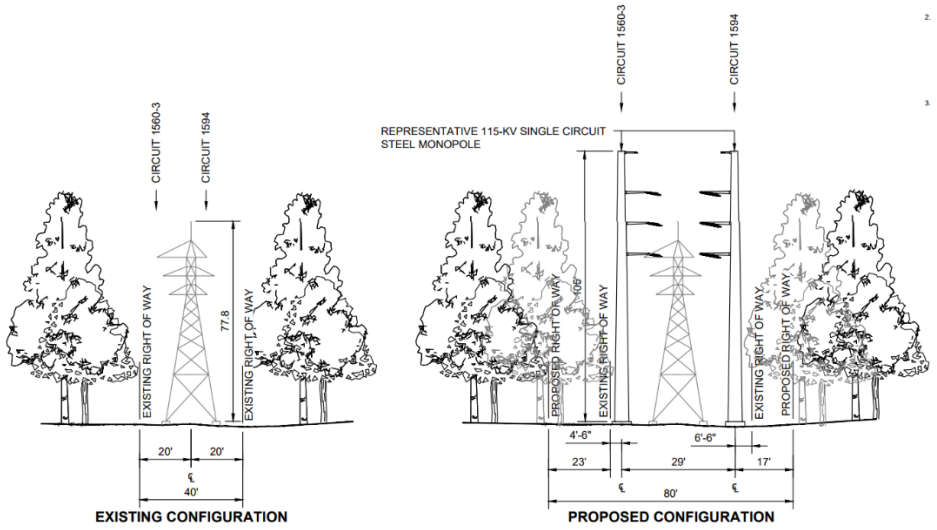
(UI 1, OSPRM, Appendix A.2)

Figure 14 – Structure Nos. 15 to 16 – Cross Section XS-13



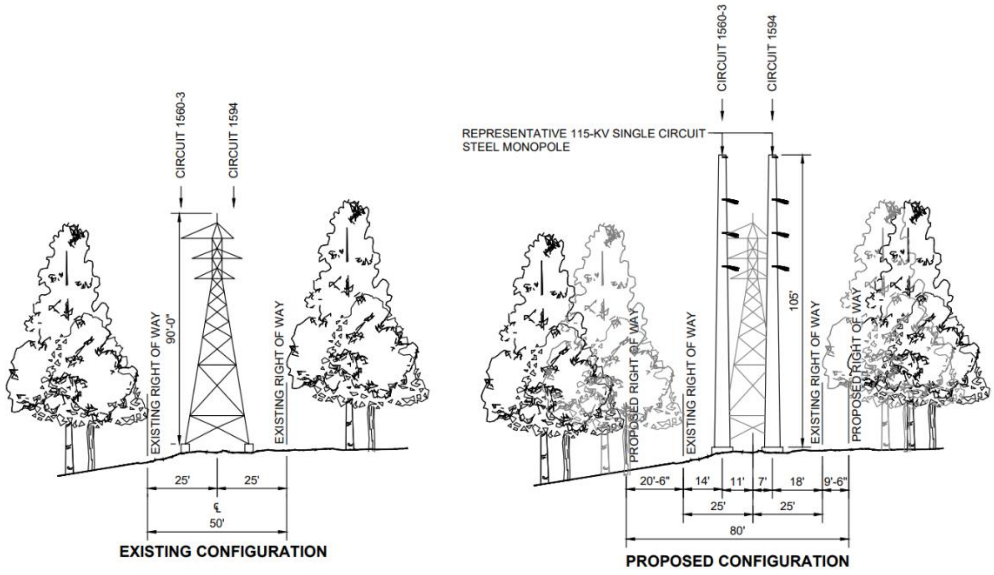
(UI 1, OSPRM, Appendix A.2)

Figure 15 – Structure Nos. 17A and 17B – Cross Section XS-14



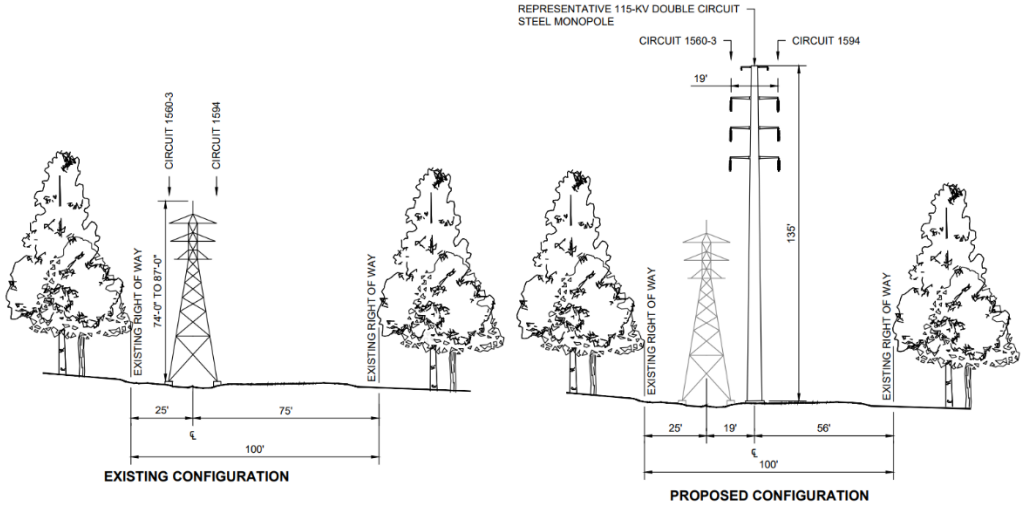
(UI 1, OSPRM, Appendix A.2)

Figure 16 – Structure Nos. 19A and 19B – Cross Section XS-15



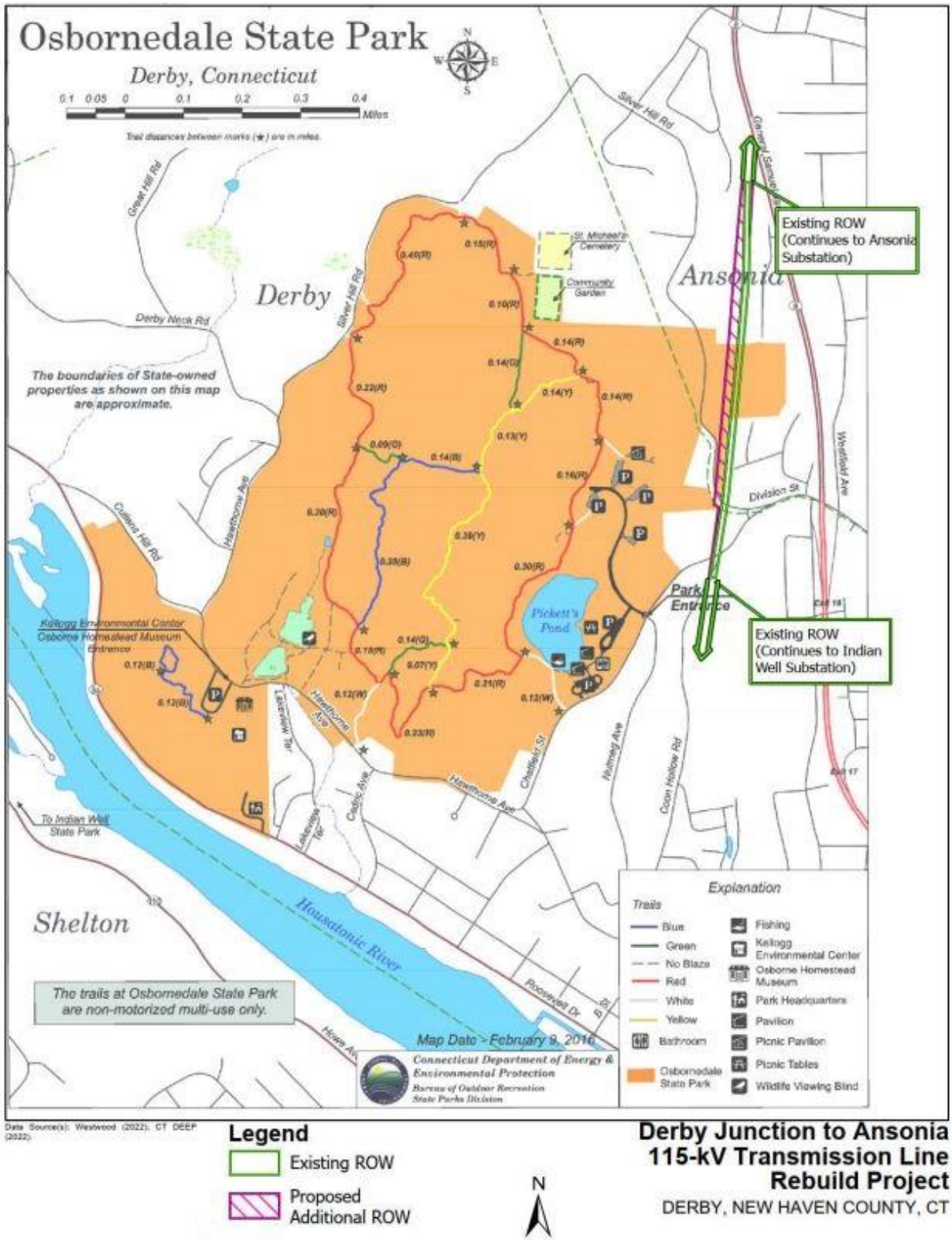
(UI 1, OSPRM, Appendix A.2)

Figure 17 – Structure Nos. 20 to 21 – Cross Section XS-16



(UI 1, OSPRM, Appendix A.2)

Figure 18 – Project ROW through Osbornedale State Park



(UI 1, OSPRM, p. 5-22)

Figure 19 – Cost Table

Option	Project Component	Total Cost Estimate (A)	Proposed Project Cost for this Section or Alternative (B)	Cost Delta (A-B)
1A – OSP	Underground Along Existing ROW	$35M	$3.6M	$31.4M
1B – OSP	No ROW Expansion	$4.6M	$3.6M	$1M
1C – OSP	Reduced ROW Expansion	$6.4M	$3.6M	$2.8M
4 – OSP	Underground Structure No. 10 to Ansonia Substation – Northern Route	$170M	$22M	$148M
5 – OSP	Underground Structure No. 10 to Ansonia Substation – Southern Route	$207M	$22M	$185M

(UI 1, OSPRM, pp. 9-2 to 9-21)