DOCKET NO. 465 – The United Illuminating Company application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a 115/13.8-kilovolt (kV) replacement substation facility located on an approximately 1.5 acre portion of two adjoining UI-owned parcels directly adjacent to UI's existing Baird Substation, 1770 Stratford Avenue, Stratford, Connecticut, and related transmission structure and interconnection improvements.	}	Connecticut Siting Council April 28, 2016

Findings of Fact

Introduction

1. The United Illuminating Company (UI or Applicant), in accordance with provisions of Connecticut General Statutes (CGS) Sections 16-50g et seq., and Section 16-50j-1 et seq. of the Regulations of Connecticut State Agencies, applied to the Connecticut Siting Council (Council) on December 21, 2015 for the construction, maintenance, and operation of a replacement 115/13.8 kilovolt (kV) distribution substation at 1770 Stratford Avenue, Stratford, Connecticut. (UI 1, p. 1)

2. UI provides electrical distribution service to 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. (UI 2, response 3)

3. UI has an existing 115-kV/13.8-kV substation located at 1770 Stratford Avenue, Stratford, Connecticut, known as Baird Substation. The existing Baird Substation delivers electricity to UI's residential, commercial and industrial customers through a series of 13.8-kV distribution circuits. (UI 1, pp. 1 and 24)

4. On July 17, 2015, the Council received a Petition (Petition No. 1176) for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the proposed modification of an approximate 2.3-mile section of a 115-kV transmission line extending between the existing Baird Substation in Stratford and the Congress Substation in Bridgeport. The existing line consists of two separate circuits mounted on metal support "bonnets" attached to the top of the railroad catenaries. New conductors were proposed to meet capacity and reliability needs but the existing structures cannot support the new lines. The existing catenary structures range in height from 55 feet to 102 feet with a typical height of 57 feet. UI sought approval to relocate the lines onto approximately 83 new galvanized monopoles ranging in height from 80 feet to 120 feet (with a typical height of 80 feet) to be installed adjacent to the railway. The Petition was approved by the Council on September 17, 2015. (UI 1, p. 40; Council Administrative Notice Item No. 14)

5. The purpose of the proposed replacement substation facility is to address several compliance and aging infrastructure needs at the existing Baird Substation and reliably serve the customers in the Stratford and Bridgeport areas. (UI 1, pp. 1 and 13)

6. The Applicant, the Office of Consumer Counsel and the Town of Stratford are parties to the proceeding. (Transcript 1, February 25, 2016, 3:00 p.m. [Tr. 1], pp. 5-7)

7. Pursuant to CGS § 16-50*l*(b), public notice of the filing of the application to the Council was published in the Connecticut Post and the Stratford Star on November 5, 2015, November 12, 2015, December 10, 2015, and December 17, 2015. (UI 1, Tab L – Affidavit Regarding Notice Provided to Customers of UI)

8. Pursuant to C.G.S. § 16-50*l*(b), notice of the application was provided to all abutting property owners by certified mail on or about November 10, 2015. Notice was unclaimed by four abutters: Caroline Corniello; Manuel Jose Vasquez; Phoenix CT LLC; and Mark Vernon. Subsequently, the Applicant submitted a second letter to these abutters via regular mail. (UI 1, p. 21 and Tab L; UI 2, response 1)

9. In accordance with the Council's Application Guide for an Electric Substation Facility, UI provided notice to a number of community groups including Chambers of Commerce, land trusts, environmental groups, trail organizations, river protection organizations, historic preservation groups, advocacy groups for the protection of Long Island Sound, and the water company with a watershed within the Stratford area. (UI 1, pp. 18 and 19 and Appendix L)

10. UI provided notice to all federal, state and local officials and agencies listed in CGS § 16-50*l*(b). (UI 1, pp. 15-17 and Tab L)

Council Procedures

11. On December 22, 2015, the Council sent a letter to the State Treasurer, with a copy to the Chief Elected Official of the Town of Stratford stating that $25,000 was received from UI and deposited in the Office of State Treasurer's Municipal Participation Account for the Town to apply for a portion of the funds if they became a participant in the proceeding, pursuant to C.G.S. § 16-50bb. (Record)

12. During a regular Council meeting on January 21, 2016, the application was deemed complete pursuant to Regulations of Connecticut State Agencies (R.C.S.A.) §16-50*l*-1a and the public hearing schedule was approved by the Council. (Record)

13. Pursuant to C.G.S. §16-50m, the Council published legal notice of the date and time of the public hearing in the The Connecticut Post on January 26, 2016. (Record

14. Pursuant to C.G.S. § 16-50m, on January 22, 2016, the Council sent a letter to the Town of Stratford to provide notification of the scheduled public hearing and to invite the municipality to participate in the proceeding. (Record)

15. On February 2, 2016, the Council held a pre-hearing conference on procedural matters for parties and intervenors to discuss the requirements for pre-filed testimony, exhibit lists, administrative notice lists, expected witness lists, filing of pre-hearing interrogatories and the logistics of the public inspection of the site scheduled for February 25, 2016, at the Office of the Council. The Applicant was the only participant. (Council Pre-hearing Conference Memoranda dated January 26, 2016)

16. In compliance with R.C.S.A. §16-50j-21, UI erected a sign near the entrance of the Two Roads Brewing Company* (TRBC) and facing Stratford Avenue (Route 130). The sign included the Applicant's name, type of facility proposed, the date and location of the Council's public hearing, and contact information for the Council.

    *TRBC abuts UI's property directly to the east. (UI 4; UI 1, p. 4)

17. The Council and its staff made a public inspection of the proposed site on February 25, 2016, beginning at 2:00 p.m. (Council's Hearing Notice dated January 22, 2016)

18. Pursuant to C.G.S § 16-50m, the Council, after giving due notice thereof, held a public hearing on February 25, 2016, beginning with an evidentiary session at 3:00 p.m. and continuing with a public comment session at 7:00 p.m. at the Stratford City Hall, Council Chambers, 2725 Main Street, Stratford, Connecticut. (Tr. 1, p. 1; Transcript 2 – February 25, 2016, at 7:00 p.m. [Tr. 2], p. 1)

19. OCC did not attend or participate in the public hearing held on February 25, 2016. (Tr. 1, p. 51)

State Agency Comment

20. Pursuant to C.G.S. § 16-50j (g), on January 22, 2016 and February 26, 2016, the following State agencies were solicited by the Council to submit written comments regarding the proposed facility: Department of Energy and Environmental Protection (DEEP); Department of Public Health (DPH); Council on Environmental Quality (CEQ); Public Utilities Regulatory Authority (PURA); Office of Policy and Management (OPM); Department of Economic and Community Development (DECD); Department of Agriculture (DOAg); Department of Transportation (DOT); Connecticut Airport Authority (CAA); Department of Emergency Services and Public Protection (DESPP); and State Historic Preservation Office (SHPO). (Record)

21. The Council received a response from the DOT's Bureau of Engineering and Construction on February 10, 2016 indicating that UI must obtain a permit pursuant to the Highway Encroachment Permit Regulations prior to performing any work within the State right-of-way. (DOT Comments received February 10, 2016)

22. UI would apply for an encroachment permit for any work performed within the State right-of-way. (Tr. 1, p. 26)

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

Municipal Consultation and Community Outreach

24. UI began discussing the proposed project with Mayor Harkins of the Town of Stratford (Town) in February 2015. (UI 1, p. 84)

25. On May 27, 2015, UI held a public open house at TRBC to discuss the proposed replacement substation project with the public, answer questions and obtain comments. A total of five attendees were at the open house meeting: two representatives from the Town of Stratford; the owner of TRBC; and two residents of Stratford. (UI 1, p. 83)

26. On or about August 14, 2015, UI submitted a technical report to the Town to commence the municipal consultation process. (UI 1, p. 83; UI 1h – Municipal Consultation Filing)

27. During the municipal consultation period, UI offered to meet with the chief elected official of the Town to review the technical report in more detail in order to present an overview of the proposed project and the siting process and to review the methods available for the Town of Stratford to provide input to the siting process. (UI 1, p. 83)

28. UI has met with Mayor Harkins on several occasions and gained input regarding concerns and special considerations associated with the proposed site in Stratford. UI also had multiple meetings with the owners of the TRBC to review the proposed project and discuss potential impacts on their property and business. (UI 1, p. 83)

29. UI has incorporated concerns raised by the Town, as well as the owners of TRBC, into its final site plans for the proposed project, including moving the substation farther away from TRBC to provide a larger buffer and to accommodate customer parking for TRBC. TRBC has offered to sponsor the landscaping at the substation that would face the street. (UI 1, p. 83)

30. By letter dated July 7, 2015, Brad Hittle, Chief Executive Office of TRBC noted UI's cooperation and the redesign of the substation location to accommodate their concerns. (UI 1, Tab L – Letter from TRBC dated July 7, 2015)

31. By letter dated July 13, 2015, Mayor Harkins expressed his support of the proposed replacement substation project. Mayor Harkins noted UI's cooperation with TRBC and redesign of the substation location to accommodate TRBC. Lastly, Mayor Harkins noted that UI, the Town, and TRBC continue to work together in an effort to finalize the location of a new roundabout on Stratford Avenue and associated landscaping to best meet the needs of all three parties. (UI 1, Tab L – Letter from Town of Stratford dated July 13, 2015)

32. At the February 25, 2016 public hearing, Chief Administrative Officer Chris Tymniak of the Town noted that the Town looks forward to the proposed replacement substation project, and he complimented UI on being a great community partner. (Tr. 1, p. 8)

System Planning and Mandatory Reliability Standards

33. The proposed Baird Substation rebuild/replacement was noted in the Council's 2014/2015 Forecast of Loads and Resources Report. (Council Administrative Notice Item No. 17, Appendix C)

34. ISO New England Inc. (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 10-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. 4)

35. The RSP Project List is a summary of needed transmission projects for the region and includes the status of reliability transmission upgrades, market efficiency transmission upgrades, elective transmission upgrades and generator interconnection upgrades. A rebuild of Baird Substation is identified on the RSP Project List as a planned reliability upgrade that received Proposed Plan Application/I.3.9 Approval from ISO-NE on September 9, 2014 with a projected in service date of December 2017. (Council Administrative Notice Item No. 4)

36. 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. 28, pp. 71, 97)

Project Need

37. Two existing 115-kV transmission lines (which split into four circuits via a loop-through configuration) carry electricity along the Metro-North Railroad (MNRR) right-of-way and supply power to the existing Baird Substation. These transmission circuits not only deliver electricity to the existing Baird Substation, but they also allow electricity to pass through it to nearby substations that serve UI customers. (UI 1, p. 23; UI 1, Tab G – Electric and Magnetic Field Assessment, pp. 2-4)

38. The ISO-NE Southwest Connecticut Area Transmission Needs Assessment from July 13, 2011 identified these transmission circuits as requiring significant capacity upgrades due to projected load growth, generation and system topology changes. In addition, this assessment determined that the existing Baird transmission bus would be substantially overloaded under contingency conditions. These overloads range in severity under worst-case contingency conditions. Necessary modifications to alleviate overloaded elements of the existing Baird Substation require a substantial investment in the transmission bus system. (UI 1, p. 23; Council Administrative Notice Item No. 14)

39. There are also structural concerns regarding the transmission bus at the existing Baird Substation due to the potential for overstressing the existing strain bus and support structures under extreme weather conditions or due to certain faults on the transmission bus. The overstressed conditions could lead to a structural failure of the bus support system, which in turn could lead to an extended duration outage for the customers served from that substation. (UI 1, p. 23)

40. The existing Baird Substation utilizes two 115-kV/13.8-kV transformers that were manufactured in 1963. Currently, these two transformers fail to maintain adequate distribution voltages to UI's customers under normal and contingency conditions. Under ANSI C84.1-2006 voltage regulations, voltages provided to customers should not fall below 91.6 percent nominal voltage. UI's System Integrity Department determined that, in 2011, voltages would be below the ANSI allowable voltage on all 16 distribution circuits supplied by the substation under line and transformer contingency conditions. These levels also violate the allowable voltage levels defined by the State of Connecticut PURA. (UI 1, p. 24; UI 1, Tab H – Baird Substation Condition Assessment – Distribution Capacity and Voltage Regulation, p. 3)

41. The distribution circuits served by the existing Baird Substation are controlled by switchgear manufactured over 50 years ago that is reaching the end of its useful operating life. Aged equipment of this vintage could experience sudden failures resulting in unexpected customer outages, increased maintenance and unscheduled replacement activities. As a result of the equipment's deteriorating condition and risks to reliability, its replacement is required. (UI 1, p. 24)

42. The existing Baird Substation control house lacks sufficient space to accommodate any future expansion, upgrades or modifications at the substation. Existing identified protection system upgrades at nearby substations would require modifications of the protection and control systems at the existing Baird Substation. These modifications are not viable within the existing control enclosure. Additionally, the existing cable tray system within the control house is significantly overfilled, and any additional protection and control cable work at the system would be difficult to implement. (UI 1, p. 24)

43. A 90/10 load forecast contains load projections based on a plausible worst-case hot weather scenario. It means that there is only a 10 percent chance that the projected peak load would be exceeded in a given year. 90/10 load forecasts are used for utility infrastructure planning. (Council Administrative Notice Item No. 17, p. 12)

44. UI's most recent 90/10 load forecast for loads served by Baird Substation for 2015–2024 indicates a projected load of 50.57 megavolt-amperes (MVA) for 2015 that would grow to 57.15 MVA by 2024. The existing Baird Substation capacity is 78 MVA. The proposed replacement substation capacity is 72 MVA and would be sufficient to meet these projected loads. (UI 2, responses 32 and 33)

45. The proposed replacement substation would meet or exceed the capacity of the interconnected transmission circuits and also utilize load tap changing transformers to provide adequate distribution voltage regulation. New 13.8-kV switchgear would control the new distribution circuits. As a result, the new substation would eliminate significant compliance issues and mitigate reliability risks to UI customers as a result of aging and antiquated equipment. (UI 1, p. 25)

System Alternatives

46. UI considered five potential system alternatives as noted below.

    a) No action;
    b) Rebuild 115-kV transmission bus in place and relocate 13.8-kV distribution system;
    c) Rebuild 13.8-kV distribution system in place and relocate 115-kV transmission bus;
    d) In-kind replacement; or
    e) Full replacement

    (UI 1, p. 25)

47. With the "No Action" alternative, UI would have to accept the risks and consequences including the possibility of insufficient transmission capacity during peak load and contingency scenarios. UI would also have to accept the risk of inadequate distribution voltages to customers, potentially violating ANSI and PURA requirements, as well as the reliability risks associated with aging and antiquated distribution switchgear. Thus, the "No Action" alternative is unacceptable and was rejected due to significant adverse impacts on system reliability and customer satisfaction. (UI 1, p. 26)

48. The "Rebuild and Relocate" transmission versus distribution alternative (or vice versa) is either impractical or insufficient to address all of the identified needs and thus are not viable. (UI 1, p. 26)

49. The "In-kind" replacement alternative is based on the concept of upgrading the existing substation. It would require upgrading the 115-kV transmission bus, replacing the existing transformers with load tap changing transformers, replacement of switchgear inside the existing control house, and the addition of another control house. Other minor ancillary needs could be addressed through modifications to the existing substation facility with minimal expansion of the existing footprint. While this alternative addresses all identified needs, it would expose UI's customers to significant reliability risks due to the long outages required to replace nearly the entire substation while the facility remained energized. The construction sequencing and construction hazards are substantially greater in this alternative than for a new replacement substation construction due to the energized equipment. Finally, this alternative creates a longer duration and is substantially more expensive than a full replacement facility on adjacent property. (UI 1, pp. 26-27)

50. A full replacement substation would best meet the long-term capacity, infrastructure, and compliance needs of the area safely and reliably. (UI 1, p. 27)

Location Alternatives

51. In its search for a substation site, UI considered the following criteria listed below.

    a) Distance to existing Baird Substation and to existing electric transmission lines;
    b) Site size requirements;
    c) Site terrain;
    d) Environmental and land use compatibility;
    e) Substation construction issues;
    f) Transmission and distribution line construction requirements;
    g) Accessibility; and
    h) Cost.

    (UI 1, p. 73)

52. UI identified three sites that appeared to be feasible for the development of the project. These sites are listed below.

    a) Bruce Street;
    b) West Broad Street; and
    c) Baird Annex (i.e. the proposed site)

    (UI 1, p. 76)

53. After examining the three sites, UI selected the proposed Baird Annex site for a new, replacement substation. The Bruce Street site was rejected because it has insufficient space to accommodate the proposed project. The West Broad Street Site does not have underground distribution infrastructure, and it would require approximately one mile of new distribution infrastructure. West Broad Street is also a brownfield site that would likely require considerable remediation of contaminated soils during construction. The foundations from an existing demolished building would also have to be removed at the West Broad Street site. Thus, the West Broad Street site was rejected based on cost and environmental concerns. (UI 1, p. 76)

Site Location

54. The proposed site was historically developed for industrial purposes by the U.S. Baird Corporation (USBC), which was established in the 1890s. USBC's original building had occupied the site circa 1920. (UI 1, p. 30)

55. The proposed site is currently located on two contiguous parcels owned by UI and located directly north of Stratford Avenue at 1770 Stratford Avenue. The eastern parcel is 1.8 acres, and the western parcel is 1.7 acres for a total area of 3.5 acres. (See Figures 1 and 2.) (UI 1, pp. 4-5; Tr. 1, p. 31)

56. Both parcels are zoned Commercial for the first approximately 500 feet north of Stratford Avenue. The rear (or northern portions) of both parcels are zoned Manufacturing. (UI 1, p. 4; Tr. 1, p. 50)

57. The western portion of the two-parcel site is presently occupied by the existing Baird Substation, which was constructed circa 1966. The existing substation currently occupies approximately 0.9 acres of the western parcel. The eastern portion of the site is comprised of a forested area with low-lying shrubs, a small wetland and visible rock outcroppings. The eastern-most portion of the site has an existing paved asphalt surface used for overflow parking by TRBC through an agreement with UI. (UI 1, pp. 4-5, 29, 31; UI 1, Tab H – Baird Substation Condition Assessment – Distribution Capacity and Voltage Regulation, pp. 1-3)

58. The site is bounded to the west by the Savings Auto Center, to the south by Stratford Avenue (Route 130), to the east by TRBC, and to the north by the MNRR right-of-way. Two UI-owned 115-kV transmission lines currently occupy the MNRR right-of-way. A residential area is located to the north of the MNRR right-of-way. Directly to the south of Stratford Avenue is the Russian Orthodox Church and two commercial areas on both sides of the church. Additional residences are located to the south of the church. (UI 1, p. 4; UI 1, Tab D – Noise Assessment, p. 14)

59. The nearest residence is located at 45 Jackson Avenue, approximately 310 feet northwest of the center of the proposed replacement substation and north of the MNRR right-of-way. (UI 1, p. 21; UI 2, responses 1,2, and 25)

60. There are approximately 158 residences located within a 1,000-foot radius of the center of the proposed replacement substation. (UI 2, response 24)

61. The proposed substation site has an elevation of approximately 13 feet above mean sea level (amsl). (Tr. 1, p. 22)

Proposed Replacement Substation Description

62. The proposed replacement substation site would be located immediately to the east of the existing Baird Substation and would occupy approximately 1.5 acres of the 3.5-acres (combined) for the two parcels. The proposed replacement substation would have an irregular shape with an interior fenced area of 1.15 acres or approximately 50,094 square feet. (UI 2, response 4)

63. The existing Baird Substation has a 14-foot high chain link fence with one foot of barbed wire and two-inch mesh. The proposed replacement substation would have the same fence design, except that it would also include opaque winged slats as an anti-climbing measure and for visual screening. The final fence design would be included in the D&M Plan. (UI 2, responses 5 and 6)

64. The interior of the substation would be predominately traprock, with the exception of a paved access drive that would encircle the control house. (UI 2, response 9)

65. Access to the substation would be via a new 190-foot asphalt access drive from Stratford Avenue. The approximately 16-foot wide asphalt access drive would also encircle the control house inside the proposed replacement substation. (UI 1, p. 35; UI 1, Tab DR.3 – Site Plan; UI 2, response 9)

66. Substation equipment would include but not be limited to the following: two 115-kV circuit breakers; eight 115-kV disconnect switches; two 50 MVA 115/13.8-kV transformers, provisions for a temporary mobile transformer (for emergency conditions); two switchgear enclosures each approximately 42 feet long, 15 feet wide and 13 feet high (for switching equipment, relaying and control equipment); and a control house approximately 60 feet long, 28 feet wide and 13 feet high. The control house would be designed to house the protective relaying and control equipment as well as the direct current (DC) station service equipment. (See Figure 3.)
(UI 1, p. 34)

67. Six 70-foot tall lightning masts would also be installed inside the fenced area of the proposed replacement substation. (UI 1, p. 35)

68. An overhead transmission connection is significantly more economical than an underground transmission connection because of the following reasons:
    a) the limited size of the right-of-way;
    b) additional environmental remediation requirements;
    c) exiting overhead transmission;
    d) requirements of the Metro-North Railroad for transmission line crossings; and
    e) the challenging terrain.

    (UI 2, response 11)

69. Five new monopole transmission structures in the 70-foot to 85-foot height range are proposed in the existing MNRR right-of-way to accommodate the proposed replacement substation interconnection. Two installed structures would be directly to the north of the proposed replacement substation (i.e. the southern side of the MNRR right-of-way). One structure would be installed on the northern side of the MNRR right-of-way. One structure would be installed to the northeast of the proposed replacement substation on the northern side of the MNRR right-of-way. The last structure would be installed behind the TRBC on the southern side of the MNRR right-of-way. (UI 1, pp. 2, 34, 35, 40; UI 3, Supplemental Aerial Overlay – Proposed Changes)

70. Four monopole structures already approved in Petition No. 1176 for installation in the MNRR right-of-way would be shifted in locations. One is located on the northern side of the MNRR right-of-way and across from the proposed replacement substation. Two are located on the southern side of the MNRR right-of-way and across from the proposed replacement substation. One is located on the southern side of the MNRR right-of-way and adjacent to the existing Baird Substation. UI would seek approval of such relocations from the Council under a Request to Amend Petition No. 1176. (UI 1, p. 40; Tr. 1, pp. 38-39; UI 3, Supplemental Aerial Overlay – Proposed Changes)

71. The proposed transmission structures would be galvanized steel. UI prefers the use of galvanized steel instead of weathering or "Corten" steel for tubular transmission poles because galvanized steel is lower maintenance, particularly in the event that paint or graffiti needs to be removed. Paint or graffit is very difficult to remove from weathering steel, and its removal could compromise the protective weathering layer on the pole exposing the area to accelerated corrosion. Furthermore, galvanized steel structures would be consistent with the structures already approved by the Council in Petition No. 1176. (UI 2, response 10)

72. The existing Baird Substation has 16 feeders or distribution circuits leaving the substation. The proposed replacement substation would have 14 distribution feeders with two spare positions exiting the property. This is due to consolidation of some circuits. The distribution circuit get-away from the substation would be two new PVC underground duct banks from the substation property exiting directly into two splicing chambers located under Stratford Avenue. These new duct banks would interconnect with the existing and new underground infrastructure on Stratford Avenue. (UI 1, p. 39; UI 2, response 34; Tr. 1, pp. 26-27)

73. Notification to the Federal Aviation Administration (FAA) is required for the proposed substation and transmission structures and construction equipment. UI would provide such notice to the FAA at least 45 days prior to the start date of the proposed construction. A copy of the notice would be provided to the Council. (UI 2, response 17; Tr. 1, p. 26)

74. The construction and testing of the substation equipment would occur over a 12 to 18 month period, commencing in the fourth quarter of 2016 and ending with an in-service date in approximately the first quarter of 2018. (UI 1, p. 7)

75. Construction would generally occur from 7:00 a.m. to 5:00 p.m. Monday through Friday, although certain critical tasks would require extended work hours. (UI 1, p. 7)

76. The existing Baird Substation would be de-energized after the proposed replacement substation is in service. UI plans to keep the existing Baird Substation intact and use it as a full-scale substation training facility. The planned work at the existing Baird Substation would generally include disconnecting the transmission and distribution circuits, removing existing conductors from entering the substation, and removing some existing equipment including transmission structures on the exterior of the fence. Most existing equipment would remain. The specific existing equipment to be removed from the existing Baird Substation would be identified in a Deactivation Plan for the existing Baird Substation. Such Deactivation Plan would be included in the D&M Plan for the proposed replacement substation. (UI 1, p. 3; UI 2, response 23; Tr. 1, pp. 18-19, 49)

77. The proposed replacement substation equipment and supporting infrastructure are estimated to have a service life of approximately 40 years. (UI 1, p. 36)

78. The estimated cost for the project, including siting, design and construction of the proposed replacement Baird Substation and supporting infrastructure is approximately $35 million. (UI 1, p. 36)

Environmental Considerations

79. No historic properties would be affected by the proposed replacement substation project. (UI 1, Tab SH.2 – Letter from State Historic Preservation Office dated April 2, 2015; UI 1, Tab SH.3 – State Historic Preservation Office Project Review Cover Form, p. 3)

80. The proposed replacement substation area and its immediate surroundings retain little possibility, if any, to yield intact cultural deposits. Thus, no additional archaeological research would be recommended. (UI 1, Tab J – Heritage Consultants, LLC Cultural Resource Review, p. 2)

81. By letter dated April 14, 2015, DEEP reviewed the Natural Diversity Database (NDDB) and does not expect that the proposed project would adversely impact State-listed species. (UI 2, response 14, DEEP Letter dated April 14, 2015)

82. The DEEP NDDB determination expires on April 14, 2016. UI would seek an updated determination. Such updated determination and any associated wildlife protection measures could be included in the D&M Plan. (Tr. 1, p. 20)

83. A habitat assessment at the proposed replacement substation site was performed for the northern long-eared bat, a federally-designated Threatened Species and State-designated Endangered Species. Due to the smooth-barked trees that dominate the site, its small size and juxtaposition within a heavily urbanized area, the site is unlikely to provide critical habitat for the northern long-eared bat. Thus, the proposed project would not impact this species or its critical habitat. There are no other known federally-listed species in the vicinity of the project. (UI 1, Tab K – Habitat Assessment for Northern Long-eared Bat, pp. 1-3; Tr. 1, pp. 19-20)

84. The closest known northern long-eared bat hibernaculum to the proposed replacement substation is approximately 12 miles away. (UI 2, response 15)

85. A small wetland approximately 654 square feet in size is located within the proposed replacement substation footprint. This wetland is classified as palustrine emergent nonpersistant (PEM2) and is a small sparsely vegetated depression. (UI 1, Tab C – Wetland Delineation Report, p. 4; UI 2, response 12 – Proposed Substation Equipment and Wetland Drawing)

86. None of the thirteen functions and values commonly associated with wetlands were found to be present at anything other than very limited levels within the subject wetland area. Based on the following factors, the subject wetland does not provide even these very basic functions and values at more than a minimal level:
    a) The small size of the subject wetland is extremely limited in suitability for the listed functions and values;
    b) The surrounding land uses and site topography limits the site's suitability for viable wetland wildlife habitat functioning; and
    c) The wetland is operating at levels similar to the adjacent uplands.

    (UI 2, response 12, p. 2)

87. UI proposes to fill the existing on-site wetland. UI cannot avoid filling this wetland because the wetland is physically located within the proposed replacement substation perimeter and its location would be needed for a bus support structure. (UI 1, p. 8; UI 2, response 12 – Proposed Substation Equipment and Wetland Drawing; Tr. 1, p. 21)

88. Based on the permanent filling of this wetland, UI intends to submit a US Army Corps of Engineers (ACOE) Category I Certification Form and will copy DEEP. UI would implement the conditions per the ACOE and DEEP's approval during construction. (UI 1, p. 57)

89. Because of the permanent filling of this wetland area, UI has developed a scenario to provide compensation to the Town for this activity. The compensation scenario was developed by mirroring the ACOE's "In-Lieu Fee Program." This program allows applicants who are permanently impacting wetlands or watercourses the ability to compensate the local chapter of the Audubon Society in order to provide a positive monitoring program and long-term solution. UI will be conducting work with the Housatonic River service area, and each square foot of impact would result in a rate of $7.56 based on the compensation structure within the ACOE's program. (UI 1, p. 8 and 57)

90. Both the existing Baird Substation and the proposed replacement Baird Substation are located outside of the 100-year and 500-year Federal Emergency Management Agency (FEMA) flood zones. (UI 2, response 29)

91. The proposed replacement substation site is not located within an acquifer protection area. (UI 2, response 28)

92. The stormwater system for the proposed replacement substation would consist of a network of eight catch basins and one manhole with grates at grade elevation to collect runoff for various drainage areas within the proposed project site. The catch basins would transport runoff via piping to an underground detention chamber, located in the southwestern portion of the proposed replacement substation. The below-grade stormwater dentention chamber would be designed with a treatment chamber ahead of the storage chamber. This treatment chamber would provide for removal of sediment, trash or debris that may enter the catch basin and piping system. Finally, the below-grade detention chamber would convey runoff via a pipe to the existing stormwater system of Stratford. (UI 1, p. 41)

93. UI would provide a Stormwater Pollution Control Plan (SPCP) in the D&M Plan. (UI 2, response 16)

94. Approximately 0.73 acres of wooded area exists currently at the site. Approximately all of the 0.73 acres of trees would be cleared to construct the project. Of those trees, the total number of trees six inches or greater in diameter to be removed would be approximately 130. (UI 1, p. 55; UI 1, Tab K – Habitat Assessment for Long-Eared Bat, p. 2; Tr. 1, p. 22)

95. Erosion and sedimentation controls would be consistent with the 2002 Connecticut Guidelines for Erosion and Sedimentation Control, the SPCP and the DEEP General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities. The final erosion and sedimentation control plan would be included in the D&M Plan. (UI 1, p. 38; UI 2, response 13)

96. The total amounts of cut and fill required for the proposed replacement substation itself would be 2,043 cubic yards and 2,823 cubic yards, respectively. The total amounts of cut and fill required for the proposed transmission line access including construction on both the north and south sides of the Metro-North right-of-way would be 1,142 cubic yards and 1,682 cubic yards, respectively. Some of the existing cut material would be re-used on-site as fill. However, material that does not meet solid waste standards for Connecticut would be shipped off-site. (UI 1, response 27; Tr. 1, pp. 25-26)

97. Based on DEEP records, the portion of the site where the proposed replacement substation would be located has had no historic environmental soil and/or groundwater contamination issues. However, abutting properties such as 1725 Stratford Avenue and 1650 through 1700 Stratford Avenue are on record with DEEP as having remedial activities performed. These activities at abutting properties include, but are not limited to, leaking underground storage tanks and a phase I/III site investigation. UI does anticipate performing minor remedial activities during the construction of the proposed replacement substation. (UI 1, p. 33)

98. Noise levels at the nearest receptors are expected to be in compliance with DEEP and Town of Stratford noise regulations. (UI 1, Tab D – Baird Replacement Substation Project Noise Evaluation)

99. The proposed transformers would have a secondary containment system designed to hold up to 110 percent of the transformers' dielectric fluid capacity. The proposed transformers' dielectric fluid would not contain polychlorinated biphenyls (PCBs). (UI 1, p. 39; Tr. 1, pp. 20-21)

Visibility

100. The tallest features of the proposed replacement substation facility would be the 80-foot tall communications pole, 70-foot tall lightning masts and transmission structures ranging in height from 70 feet to 85 feet tall. (See Figure 4.) (UI 1, Tab E – Visibility Analysis, p. 2)

101. While six 70-foot lightning masts are proposed, it is possible to install shorter, 55-foot lightning masts. However, the tradeoff is that seven 55-foot lightning masts would be required. UI consulted with the Town on this issue. The Town and UI believe that less (i.e. six) lightning masts at 70 feet tall is the less visually obtrusive option. (UI 1, p. 35; UI 2, response 22; Tr. 1, pp. 44-45)

102. The tops of the proposed structures that are in the 70-foot to 85-foot height range may be visible year-round above the trees from some locations within a total area of approximately 34 acres. The majority of the views of these structures would occur in the immediate area of the site and extend approximately 0.3 miles to the south and up to 0.75 miles to the east and west. To the north, views would be more limited because of intervening structures and vegetation. Seasonally (i.e. during leaf-off conditions), views may be extended to some locations over an additional approximately seven acres. However, these proposed new structures would create views that are similar to what currently exists. (See Figure 5.) (UI 1, Tab E – Visibility Analysis, pp. 5-6)

103. The primary portions of the replacement substation are lower structures with heights that range up to 26 feet tall. Year-round views of these structures are possible from locations within an area of 22 acres. Seasonal views are possible from an additional area of six acres. (UI 1, Tab E – Visibility Analysis, p. 6)

104. The visibility of the approximately 13-foot high control house is expected to be minimal due to the visual barrier created by the proposed 14-foot fence with opaque winged slats. Thus, UI has not included any architectural design and/or color/painting schemes for the control house at this time. However, the final design of the control house would be included in the D&M Plan. (UI 2, response 7)

105. A residential area is located directly north of the substation site, on the opposite site of the MNRR right-of-way. The Jackson Avenue, Hollister Street and Knowlton Street neighborhood is located in this area. Currently, some of the infrastructure associated with the electrical corridor is visible from locations on these residential roads. (UI 1, Tab E – Supplemental Visual Assessment p. 1)

106. The residences located directly to the north of the substation are at a higher ground elevation, approximately 38 feet higher than the proposed replacement substation elevation. The higher elevation would reduce the visual impact from Jackson Avenue, particularly for near views, because viewers would be looking over the substation. (Tr. 1, pp. 23-24)

107. UI is considering implementing landscaping on the southern side of the substation (i.e. between the substation's southern fence and the proposed roundabout on Stratford Avenue) as part of a collaborative effort between UI, the Town and TRBC. TRBC has offered to sponsor the vegetative screening, which would be designed in partnership with the Town of Stratford's streetscaping efforts and UI's proposed substation design criteria. Final details of any landscaping would be submitted in the D&M Plan. However, it may be subject to change pending the Town of Stratford's proposed roundabout and corresponding streetscaping efforts. (UI 2, response 8; Tr. 1, pp. 17-18; UI 3, Supplemental Aerial Overlay – Proposed Changes)

108. The Merritt Parkway (Route 15) is a National Scenic Byway. It is located approximately 3.5 miles north of the proposed replacement substation. The proposed replacement substation is not expected to be visible from Route 15. (UI 2, response 26; UI 1, Tab E – Visibility Analysis, Viewshed Map; Council Administrative Notice Item No. 56 – Stratford Mail-A-Map)

109. The nearest school to the proposed replacement substation site is the Franklin Elementary School approximately 0.5 miles to the north. The nearest commercial child day care center facility is The Fun Learning Day Care Home approximately 0.35 miles to the east-southeast of the site. The proposed replacement substation and its associated infrastructure would not be visible from the school or day care facility. (UI 1, Tab E – Visibility Analysis, p. 6)

110. During operation, the substation would have low-level lighting for safety and security purposes. The illumination would be visible in the immediate vicinity of the substation. However, UI would utilize low-level LED lighting to achieve the necessary illumination while minimizing light dissipation to adjacent properties. UI would employ additional lighting only for work at night under normal or emergency conditions. The final lighting design would be included in the D&M Plan. (UI 1, pp. 62-63; Tr. 1, p. 28)

Magnetic Field Levels

111. 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. (Council Administrative Notice Item No. 15)

112. EF is produced whenever voltage is applied to electrical conductors and equipment. Electric fields are typically measured in units of kilovolts/meter. As the weight of scientific evidence indicates that exposure to electric fields, beyond levels traditionally established for safety, does not cause adverse health effects, and as safety concerns for electric fields are sufficiently addressed by adherence to the National Electrical Safety Code, as amended, health concerns regarding Electric and Magnetic Fields (EMF) focus on MF rather than EF. (Council Administrative Notice Item No. 15)

113. MF is produced by the flow of electric currents. The magnetic field at any point depends on the characteristics of the source, including the arrangement of conductors, the amount of current flow through the source, and the distance between the source and the point of measurement. Magnetic fields are typically measured in units of milligauss (mG). (Council Administrative Notice Item No. 15)

114. International health and safety agencies, including the World Health Organization, the International Agency for Research on Cancer (IARC), and the International Commission on Non-Ionizing Radiation Protection (ICNIRP), have studied the scientific evidence regarding possible health effects from MF produced by non-ionizing, low-frequency 60-Hertz alternating currents in transmission lines. Two of these agencies attempted to advise on quantitative guidelines for mG limits protective of health, but were able to do so only by extrapolation from research not directly related to health: by this method, the maximum exposure advised by the International Committee on Electromagnetic Safety (part of IARC) is 9,040 mG, and the maximum exposure advised by the ICNIRP is 2,000 mG. Otherwise, no quantitative exposure standards based on demonstrated health effects have been set world-wide for 60-Hertz MF, nor are there any such state or federal standards in the U.S. The existing and calculated MF levels for this project are well below these recommended exposure levels. (Council Administrative Notice Item No. 15)

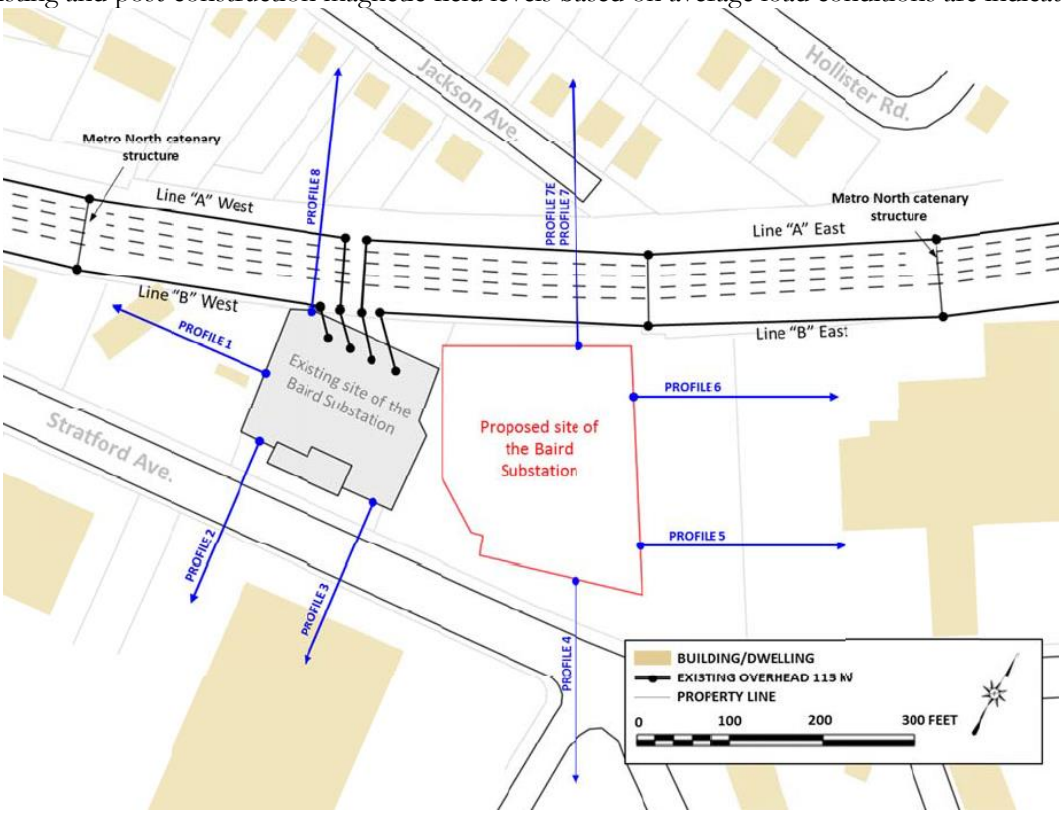
115. Although substations are not the subject of the Council's *EMF Best Management Practices* (BMPs) *for the Construction of Electric Transmission Lines in Connecticut,* UI applied certain design elements that comport with the Council's BMPs as follows;
    a) peak load conditions at that time of the application filing in 2016 and the projected "average daily peak" in 2023 were considered;
    b) any already approved changes to the electrical system were considered;
    c) calculations were performed at a height of one meter above grade;
    d) it is noted that there are no adjacent statutory facilities where children might congregate in the vicinity of the existing substation or the proposed replacement substation; and
    e) the location for the proposed replacement substation would be no closer to nearby residences consistent with the "no cost/low-cost designs that do not compromise system reliability or worker safety, or environmental and aesthetic project goals."

    (UI 1, Tab G – Electric and Magnetic Field Asssessment, pp. 25-26)

116. In UI's EMF analysis, "existing" or "pre-construction" conditions assume that the 115-kV lines are supported on the MNRR catenary structures and the existing Baird Substation is operating. "Post-construction" conditions assume that the 115-kV lines are transferred to the new monopole structures closer to the edges of the right-of-way and the proposed replacement substation is constructed and operating. (UI 1, Tab G – Electric and Magnetic Field Assessment, pp. vi and vii)

117. Average daily peak load conditions are referred to as "average load conditions" in UI's EMF analysis. (UI 1, Tab G – Electric and Magnetic Field Asssessment, pp. 25-26)

118. The existing and post-construction magnetic field levels based on average load conditions are indicated below.



Profile	Heading	Modeling condition	Distance from proposed substation perimeter (ft)					
			0	100	150	170	200	300
1	west	Pre-Project	39.7	10.5	14.4	16.2	19.1	33.6
		Post-Project	14.3	21.9	25.4	26.1	26.2	35.1
2	south	Pre-Project	17.7	2.3	1.4	1.2	0.9	0.4
		Post-Project	5.8	2.6	1.8	1.6	1.4	0.8
3	south	Pre-Project	36.1	4.8	2.3	1.8	1.3	0.5
		Post-Project	5.6	2.4	1.6	1.4	1.2	0.7
4	south	Pre-Project	1.2	4.0	0.2	0.2	0.2	0.1
		Post-Project	5.5	3.2	0.9	0.8	0.6	0.3
5	east	Pre-Project	1.4	1.2	1.2	1.2	1.1	1.1
		Post-Project	3.8	2.6	2.6	2.6	2.6	2.7
6	east	Pre-Project	5.0	5.4	5.5	5.5	5.4	5.0
		Post-Project	40.8	14.0	12.7	12.4	11.9	10.7
7	north	Pre-Project	29.3	60.3	18.4	10.7	5.5	1.3
		Post-Project	†64.0	†90.9	31.7	18.0	9.4	2.5
8	north	Pre-Project	†137.2	†30.8	12.4	8.3	4.6	1.1
		Post-Project	47.8	38.0	37.0	25.9	15.2	4.2

† This location is near 115-kV transmission-line interconnections on the adjoining ROW.

(UI 1, Tab G – Electric and Magnetic Field Asssessment, pp. 9 and 28)

119. The highest calculated magnetic field level for pre-construction conditions was 137.2 mG at the northern fence line of the existing Baird Substation. This is due to the existing 115-kV transmission and interconnection with the existing substation. Magnetic field levels at this location under average load conditions would decrease to approximately 47.8 mG post-construction. (UI 1, p. 66; UI 1, Tab G – Electric and Magnetic Field Assessment, pp. 9 and 28)

120. The highest post-construction magnetic field level under average load conditions would be approximately 90.9 mG at a distance of 100 feet north of the northern fence line of the proposed replacement substation. This is due to the repositioning of the 115-kV transmission onto new monopole structures located closer to the edges of the right-of-way and the proposed interconnection with the proposed replacement substation. This would be an increase from the existing (or pre-construction) magnetic field level of 60.3 mG at this location. (UI 1, Tab G – Electric and Magnetic Field Assessment, pp. vii, 9 and 28)

121. The nearest home to the proposed replacement substation is located to the north on Jackson Avenue and has an existing (or pre-construction) magnetic field level of approximately 4.6 mG. The post-construction magnetic field level at this home would be approximately 15.2 mG (based on average line loading). This is due to the repositioning of the 115-kV transmission onto new monopole structures located closer to the edges of the right-of-way and the proposed interconnection with the proposed replacement substation. (UI 1, Tab G – Electric and Magnetic Field Assessment, pp. vii, 9 and 28; Tr. 1, pp. 28-30)

Safety and Reliability

122. UI's proposed replacement substation would comply with the standards of the National Electrical Safety Code, American National Standards Institute (ANSI), and the Institute of Electrical and Electronic Engineers (IEEE). (UI 2, response 30)

123. For fire protection, the proposed replacement substation would meet the requirements of IEEE/ANSI as well as the National Fire Protection Agency. (UI 1, p. 44)

124. UI trains its employees and the local fire department on safe methods to address a substation fire. (UI 1, p. 44)

125. UI would secure the control house and equip it with fire extinguishers, as well as remotely monitored smoke detectors. Smoke detection would automatically activate an alarm at the UI System Operations Center, and the system operators would then take appropriate action. (UI 1, p. 44)

126. The proposed replacement substation would be gated and locked. Security cameras and motion detectors would be installed that provide complete visibility within the interior of the proposed replacement substation and perimeter fence. (UI 1, p. 44)

127. Appropriate signs would be posted at the proposed replacement substation fence and gates in order to alert the general public of the presence of high voltage equipment. (UI 1, p. 44)

128. By letter dated September 9, 2014, the ISO New England Reliability Committee (ISO-NE RC) determined that the proposed Baird Substation would not have a significant adverse effect on the reliability or operating characteristics of the transmission system. (UI 2, response 19 – ISO-NE RC Letter dated September 9, 2014)

129. The proposed replacement substation would have a "loop through" design that would essentially split the two existing transmission lines into four circuits. The substation could still operate and serve load with the loss of one of those circuits. (Tr. 1, pp. 31-33)

130. Corona noise generated by the 115-kV system is too weak and too low a frequency to interfere with communications in the very high frequency (VHF) and ultra high frequency (UHF) bands in radio, wireless telecommunications, cable television, or satellite television. (UI 2, response 18)

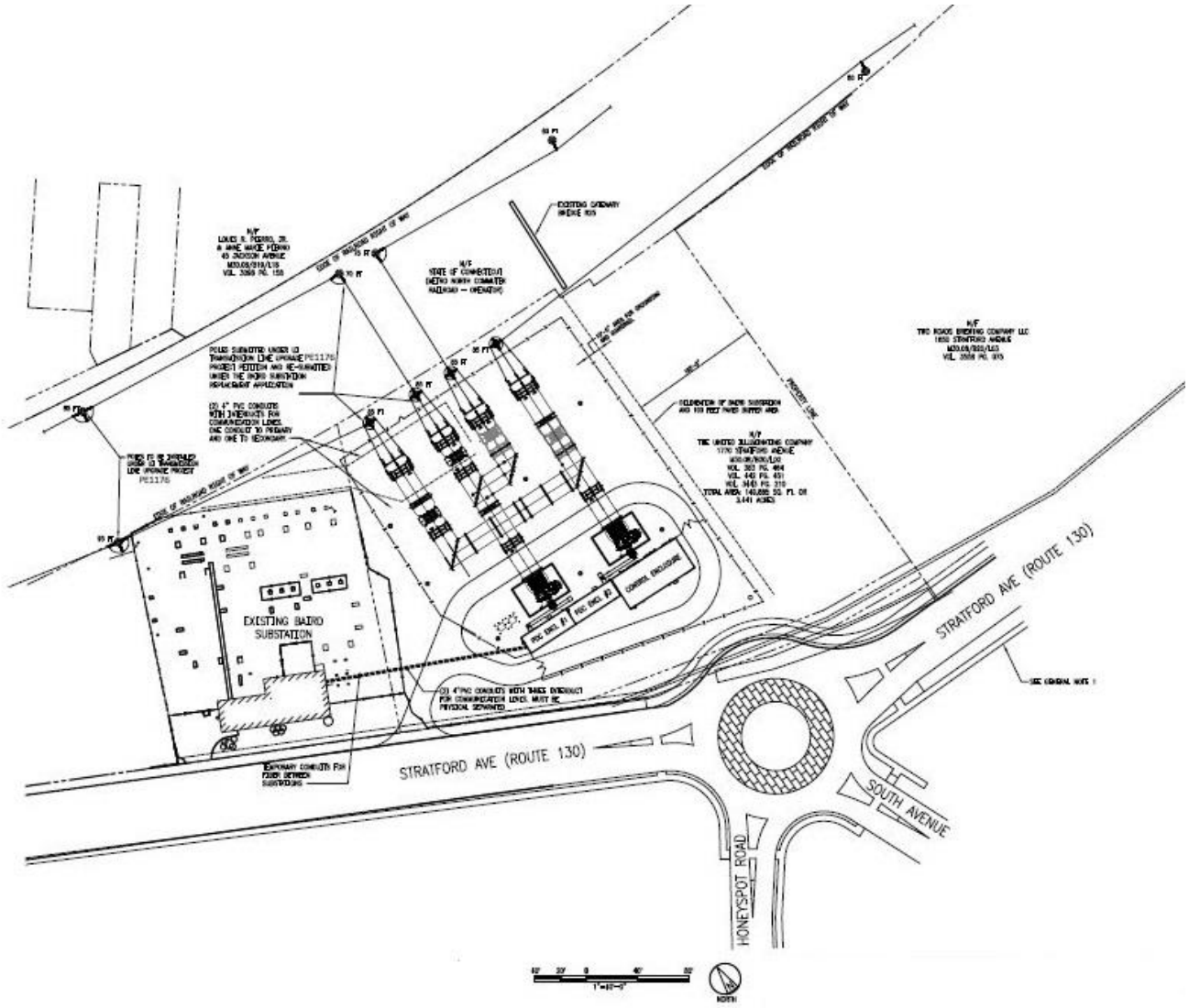
131. In the event of an emergency such as the loss of an existing transformer, the proposed replacement substation would have a position for the interconnection of a temporary mobile transformer. (UI 2, response 21)

132. A battery backup system would be included in the control house. An emergency generator would not be required for backup power for control equipment. However, provisions would be included in the alternating current (AC) station service equipment design to readily accommodate the interconnection of a backup generator on a temporary or permanent basis should the need arise in the future. (UI 2, response 20)

Figure 1 - Site Location

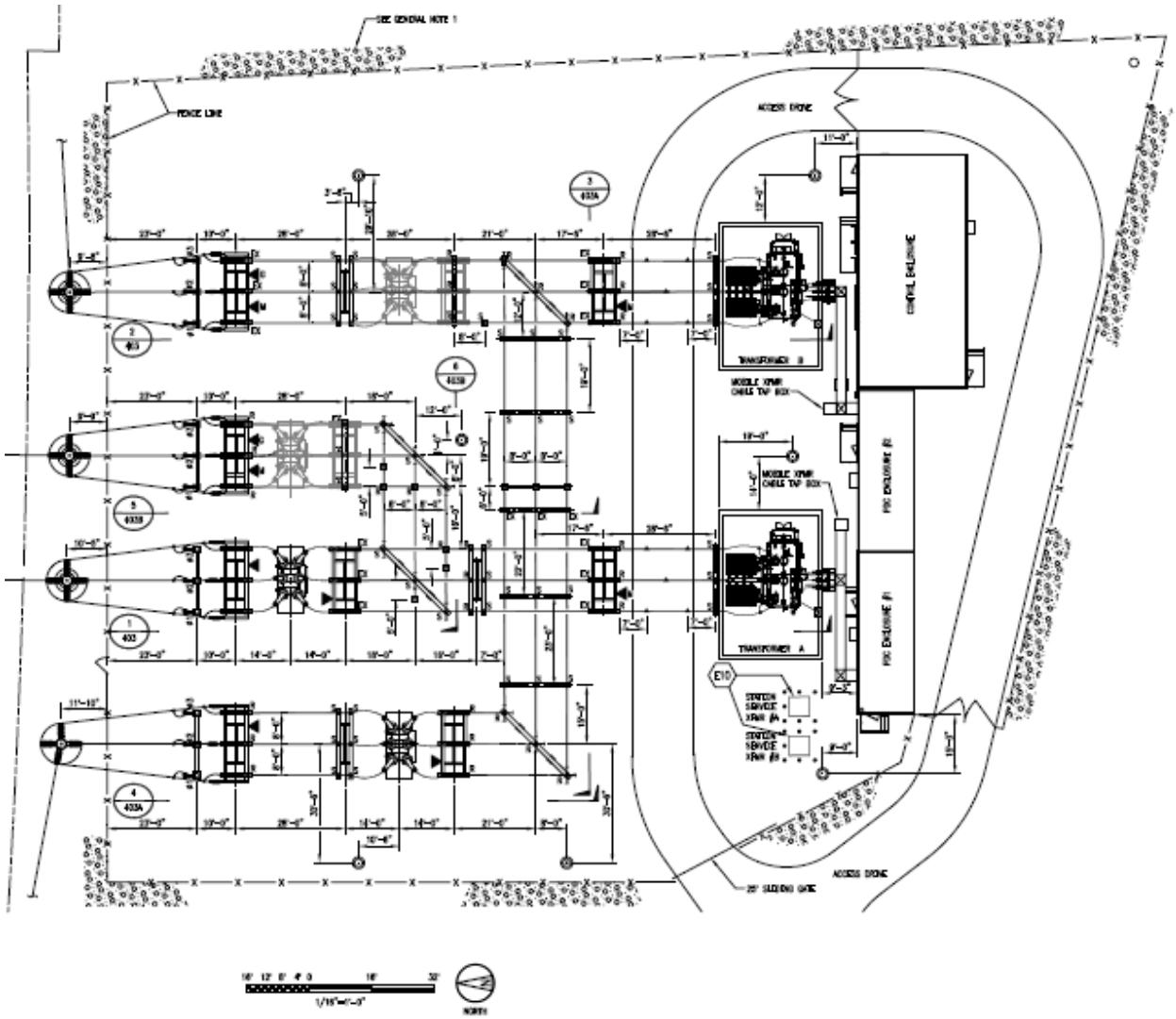
(UI 1, p. 29)

Figure 2 - General Site Plan



(UI 1, Tab DR.3 – Site Plan)

Figure 3 - Proposed Replacement Substation Site Plan

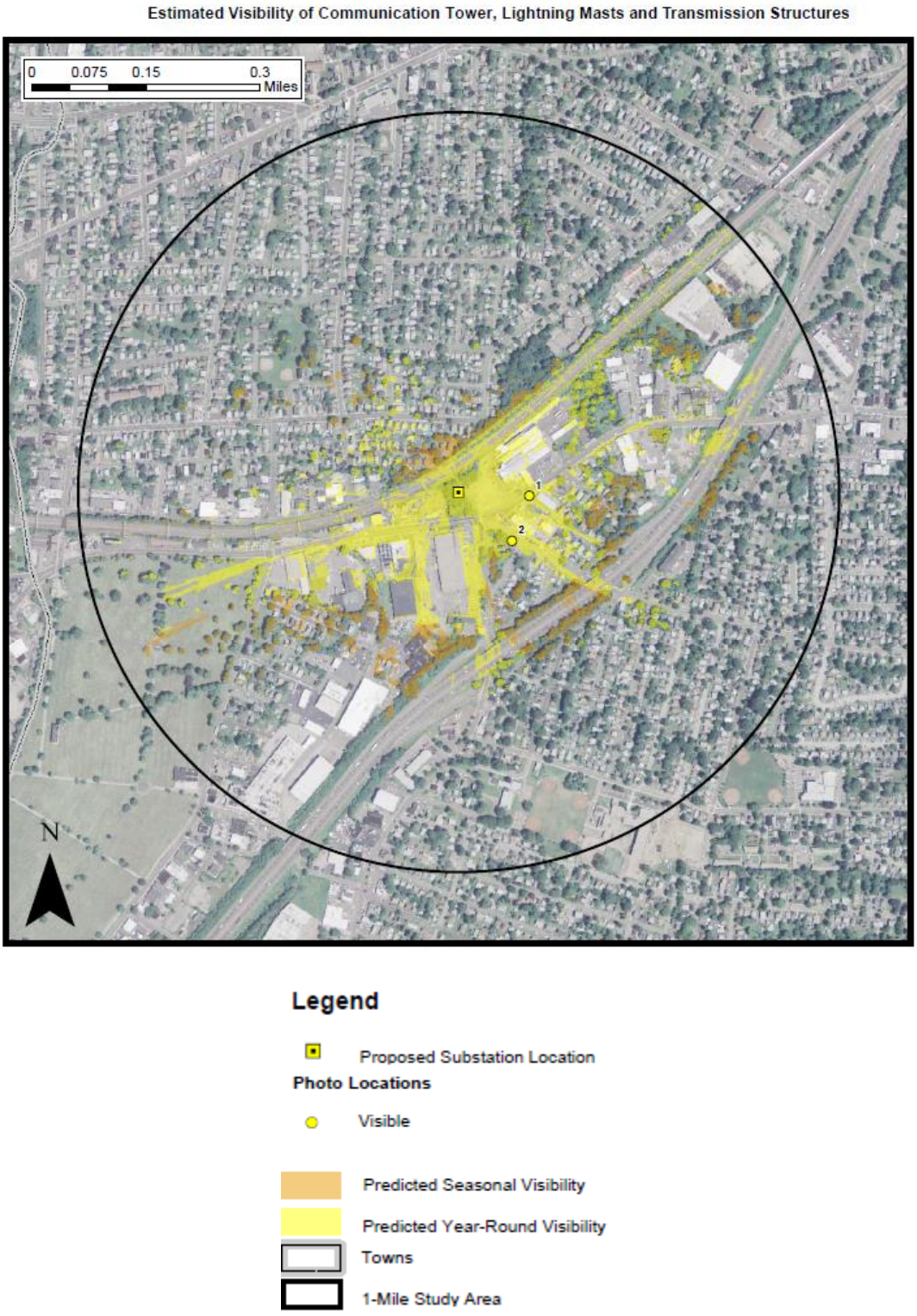


(UI 1, Tab DR.4 – Substation Plan)

Figure 4 - Aerial View and Simulation of Proposed Project

(UI 3, Pre-Hearing Submission, Supplemental Aerial Overlay – Final Configuration)

Figure 5 - Viewshed Map for Proposed Project



(UI 1, Tab E – Visibility Analysis – Viewshed Map)