APPLICATION TO THE CONNECTICUT SITING COUNCIL
for a
CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED

for the

PEQUONNOCK SUBSTATION REBUILD PROJECT
City of Bridgeport, Fairfield County, Connecticut

April 2018

Prepared By:

THE UNITED ILLUMINATING COMPANY

TABLE OF CONTENTS

FORMAL REQUIREMENTS AND APPLICATION GUIDE FR-1
A. Purpose of the Application FR-1
B. Statutory Authority FR-1
C. Legal Name and Address of Applicant FR-1
D. Applicant's Contacts and formal signatures FR-1
APPLICATION DIRECTORY FR-2
EXECUTIVE SUMMMARY ES-1
1. PROJECT OVERVIEW AND NEED 1-1
1.1 PROJECT BACKGROUND, LOCATION, AND PURPOSE 1-1
1.2 SUMMARY OF PROPOSED PROJECT FACILITIES 1-7
2. TECHNICAL SPECIFICATIONS FOR THE PROJECT 2-1
2.1 LAND AND ACCESS REQUIREMENTS 2-1
2.2 NEW SUBSTATION FACILITIES 2-2
2.3 SUBSTATION TRANSMISSION LINE CONNECTIONS 2-3
2.3.1 Existing 115-kV Line Connections 2-4
2.3.2 Proposed 115-kV Line Connections 2-5
2.4 ESTIMATED PROJECT COSTS AND FACILITY SERVICE LIFE 2-6
2.5 DECOMMISSIONING APPROACH: EXISTING PEQUONNOCK SUBSTATION AND RELATED TRANSMISSION LINE CONNECTIONS 2-6
3. PROPOSED CONSTRUCTION AND OPERATION/MAINTENANCE PROCEDURES 3-1
3.1 CONSTRUCTION PROCEDURES: GENERAL 3-1
3.2 SUBSTATION AND 115-KV LINE CONNECTIONS CONSTRUCTION 3-1
3.2.1 Construction Sequence 3-1
3.2.2 Site Acquisition, Construction Staging Areas, and Traffic Management 3-1
3.2.3 Substation Construction 3-4
3.2.4 Substation Connections: Overhead 115-kV Line Relocations 3-5
3.2.5 Substation Connections: 115-kV Cable Relocations 3-6
3.3 EXISTING SUBSTATION DECOMMISSIONING 3-8
3.4 EROSION/SEDIMENTATION CONTROL AND STORMWATER MANAGEMENT 3-10
3.5 CONSTRUCTION SCHEDULE AND WORK HOURS 3-10
3.6 DISTRIBUTION LINE RELOCATION AND CONNECTIONS 3-11
3.7 PROJECT FACILITIES RELIABILITY, SAFETY AND SECURITY INFORMATION 3-11
3.7 TRAFFIC MANAGEMENT DURING SUBSTATION OPERATION 3-12
4. EXISTING ENVIRONMENTAL CONDITIONS 4-1
4.1 TOPOGRAPHY, GEOLOGY, AND SOILS 4-1
4.2 WATER RESOURCES AND WATER QUALITY 4-2
4.3 COASTAL RESOURCES 4-4
4.4 BIOLOGICAL RESOURCES 4-5

4.5 LAND USE, RECREATION, AND COMMUNITY FACILITIES 4-6
4.6 VISUAL AND AESTHETIC CHARACTERISTICS 4-9
4.7 TRANSPORTATION AND UTILITIES 4-11
4.8 CULTURAL (ARCHAEOLOGICAL AND HISTORIC) RESOURCES 4-12
4.9 AIR QUALITY, NOISE, AND LIGHTING 4-13
5. POTENTIAL ENVIRONMENTAL EFFECTS AND MITIGATION MEASURES 5-1
5.1 TOPOGRAPHY AND GEOLOGY 5-1
5.2 SOILS, GROUNDWATER, AND STORMWATER MANAGEMENT 5-2
5.3 WATER RESOURCES AND WATER QUALITY 5-2
5.4 COASTAL RESOURCES 5-3
5.5 SPILL PREVENTION AND CONTROL 5-3
5.6 BIOLOGICAL RESOURCES 5-3
5.7 LAND USE, RECREATION, AND COMMUNITY FACILITIES 5-4
5.8 VISUAL AND AESTHETIC CHARACTERISTICS 5-5
5.9 TRANSPORTATION AND UTILITIES 5-6
5.10 CULTURAL (ARCHAEOLOGICAL AND HISTORIC) RESOURCES 5-6
5.11 AIR QUALITY, NOISE, AND LIGHTING 5-7
6. ELECTRIC AND MAGNETIC FIELD CONSIDERATIONS 6-1
6.1 OVERVIEW 6-1
6.2 EMF MEASUREMENTS AND MODELING 6-3
6.3 ASSESSMENT CRITERIA 6-3
6.4 CONSISTENCY WITH CSC BEST MANAGEMENT PRACTICES 6-4
6.5 CONCLUSIONS 6-5
7. PROJECT SCHEDULE 7-1
8. PROJECT PERMITS, APPROVALS AND CONSULTATIONS 8-1
8.1 FEDERAL AND STATE AGENCY APPROVALS REQUIRED AND CONSULTATIONS 8-1
8.2 MUNICIPAL CONSULTATION FILING AND OUTREACH 8-1
9. ALTERNATIVES CONSIDERED 9-1
9.1 INTRODUCTION AND SUMMARY 9-1
9.2 NO ACTION ALTERNATIVE 9-2
9.3 SUBSTATION SITE ALTERNATIVES 9-3
9.3.1 Existing Pequonnock Substation Site 9-3
9.3.2 New Substation Sites 9-4
9.4 SUBSTATION DESIGN AND TRANSMISSION LINE CONFIGURATION OPTIONS 9-11
10. ACRONYMS AND GLOSSARY OF TERMS 10-1

APPENDICES

Appendix A: Maps and Drawings
- A.1: Substation Site Plan and Drawings
- A.2: Substation Transmission Line Connections - Overhead
- A.3: Substation Transmission Line Connections – Underground
- A.4: FEMA Maps

Appendix B: Agency Correspondence
- B.1: State Historic Preservation Officer (SHPO)
  - B.1.1: SHPO Project Review Form
  - B.1.2: SHPO Concurrence Letter
- B.2: Connecticut Department of Energy and Environmental Protection Natural Diversity Database (NDDB)
  - B.2.1: NDDB Preliminary Assessment
  - B.2.2: Proposed Peregrine Falcon Approach
  - B.2.3: NDDB Areas

Appendix C: Water Resources
Appendix D: Visibility Analysis
Appendix E: Cultural Resources Report
Appendix F: Noise Analysis
Appendix G: EMF Report
Appendix H: Formal Requirements

List of Figures

Figure ES-1: Project Location ES-1
Figure ES-2: Proposed Site for New Pequonnock Substation ES-2
Figure ES-3: Flooding at Existing Pequonnock Substation during Tropical Storm Irene ES-3
Figure ES-4: Photosimulation of Proposed Pequonnock Substation ES-4
Figure ES-5: Existing Pequonnock Substation and 115-kV Transmission Line Segments to be Removed ES-9
Figure ES-6: Proposed Pequonnock Substation and 115-kV Line Connections to the Substation ES-10
Figure 1-1: General Location of Existing and Proposed Pequonnock Substation Sites 1-2
Figure 1-2: Existing Pequonnock Substation Site 1-3
Figure 1-3: Existing Pequonnock Substation: NE Boundary adjacent to Bridgeport Harbor 1-5
Figure 1-4: Photograph of Coastal Flooding at Existing Pequonnock S/S during Tropical Storm Irene 1-5
Figure 1-5: Proposed Project Site 1-8
Figure 3-1: Example of a Typical Trench for an HPGF Cable System 3-7
Figure 3-2: Typical XLPE Duct Bank Construction in Road 3-9
Figure 4-1: FEMA-Designated Flood Hazard Areas in the Project Vicinity: 2010 and 2013 4-3
Figure 4-2: Coastal Boundary in the Vicinity of the Project 4-4
Figure 4-3: Existing Land Use: South End Neighborhood 4-6
Figure 4-4: Zoning in Vicinity of the Project 4-7
Figure 4-5: Community Facilities within 2,000 Feet of the Project Area 4-10
Figure 4-6: Representative View of Proposed Substation Site and Immediate Vicinity 4-11
Figure 5-1: Photosimulation of Proposed Pequonnock Substation and Vicinity 5-5
Figure 6-1: EMF Levels in the Environment 6-2
Figure 7-1: Project Schedule 7-1
Figure 9-1: Pequonnock Substation and 0.5-Mile Area for Potential New Substation Sites 9-5
Figure 9-2: Location of Proposed and Alternative Sites in Relation to Existing Pequonnock Substation 9-8

List of Tables

Table 3-1: General Construction Sequence: New Pequonnock Substation 3-2
Table 3-2: General Construction Sequence for Substation Connections: Overhead and Underground 115-kV Line Relocations 3-3
Table 3-3: Anticipated General Construction Sequence for HPGF Cable Extensions 3-7
Table 3-4: General Construction Sequence for XLPE Cable 3-9
Table 4-1: List of Community Facilities within 2,000 Feet of Project Area 4-9
Table 4-2: Typical Noise Levels Associated with Different Indoor and Outdoor Activities..... 4-14
Table 4-3: State of Connecticut and City of Bridgeport: Maximum Sound Pressure Level Noise-Control Levels (By Emitter and Receptor Land Use).....15
Table 6-2: ICNIRP and ICES guidelines for EMF exposure at 60-Hz 6-4
Table 8-1: Permits and Approvals Expected to be Applicable to the Project..... 8-2
Table 9-1: Alternatives Considered: Existing Pequonnock Substation Site 9-4
Table 9-2: Site Evaluation Summary: 1 Kiefer Street vs. 375 Main Street 9-12

Note: This page intentionally left blank.

FORMAL REQUIREMENTS AND APPLICATION GUIDE

A. PURPOSE OF THE APPLICATION

In this Application, The United Illuminating Company (UI or the Company) is requesting that the Connecticut Siting Council (Council) issue a Certificate of Environmental Compatibility and Public Need (Certificate) for the construction and operation of a new 115-kilovolt (kV) / 13.8-kV gas insulated Pequonnock Substation to be located on an approximately 3.7-acre site at 1 Kiefer Street in the City of Bridgeport, Fairfield County. Referred to as the Pequonnock Substation Rebuild Project (Project), the new substation will replace UI's existing Pequonnock Substation. As part of the Project, the transmission and distribution lines that connect to the existing substation will be relocated to the new substation. The new substation is needed to mitigate coastal flood risks and asset condition issues at the existing substation and will improve the reliability of service to customers in the Bridgeport area (service area) and to the New England power grid.

B. STATUTORY AUTHORITY

UI is applying to the Council pursuant to Connecticut General Statutes (C.G.S.) Section 16-50g et seq.

C. LEGAL NAME AND ADDRESS OF APPLICANT

UI is a subsidiary of AVANGRID, Inc.
UI's name and permanent place of business is:

The United Illuminating Company
180 Marsh Hill Road
Orange, CT 06477

Mailing Address:
180 Marsh Hill Road
Orange, CT 06477

D. APPLICANT'S CONTACTS AND FORMAL SIGNATURES

Correspondence and other communications with regard to the Project are to be addressed to, and notices, orders, and other papers may be served upon the following individuals:

Bruce McDermott
Attorney
Murtha Cullina LLP
One Century Tower
265 Church Street
New Haven, CT 06510-1220
Contact numbers:
203.772.7787 (Telephone)
860.240.5723 (FAX)
bmcdermott@murthalaw.com

Ronald Rossetti
Manager – Electric Capital Projects
The United Illuminating Company
180 Marsh Hill Road
Orange, CT 06477
203.926.4517 (Telephone)
203.926.5297 (FAX)
ron.rossetti@uinet.com

Samantha Marone
Outreach Manager
The United Illuminating Company
180 Marsh Hill Road
Orange, CT 06477
203.499.3824 (Telephone)
203.926.5297 (FAX)
samantha.marone@uinet.com

APPLICATION DIRECTORY

The following table cross-references the Council's *Application Guide for an Electric Substation Facility* (June 2016) to the sections of this Application.

June 2016 *Application Guide for an Electric Substation Facility*

Council's Application Guide (Section No. and Summary Description)	Pequonncock Substation Rebuild Project Application (Section Reference)
General Applicants shall consult Connecticut General Statutes (C.G.S.) §§ 16-50g et. seq. and Sections 16-50j-1 et. seq. of the Regulations of Connecticut State Agencies (RCSA) to assure complete compliance with the requirements of those sections.	Application meets the intent of these requirements.
I. Pre-Application Process (C.G.S § 16-50*l*) Requirements for municipal consultation.	Executive Summary, Section 8
II. Form of Application (RCSA § 16-50*l*-2) Review of information to be included in the application.	Application Formal Requirements and entire Application.
III. Filing Requirements (RCSA § 16-50j-12) Review of requirements for submission of copies of application (original plus 15 copies), bulk filings (2 copies), application format, format for exhibits and sworn testimony. All application fees shall be paid to the Council at the time an application is filed with the Council. Municipal participation fee.	Application Formal Requirements and Application
IV. Application Filing Fees Proof of Service (C.G.S. § 16-50*l*(a) and RCSA § 16-50v-1a) Filing fees shall be paid to the Council at the time the application is filed.	Procedural requirement, completed at Application submission to the Council
V. Municipal Participation Account (C.G.S. § 16-50bb; § 16-50*l*(a)(3)) Each application shall be accompanied by a payment of $25,000 to be deposited in the Municipal Participation Account.	Procedural requirement, completed at Application submission to the Council
VI. Contents of Application (C.G.S. § 16-50*1*; RCA § 16-50j-59) An application for a Certificate for the construction of an electric substation or switchyard shall include or be accompanied by the following:	
A. An executive summary	Executive Summary
B. A description of the technical specifications	Section 2, Appendix A
C. A statement describing the need for the project.	Section 1
D. A justification for overhead portions, if any, including life cycle cost studies comparing overhead alternatives with underground alternatives.	Sections 1-3 (substation 115-kV line connections)
E. A schedule of dates showing the proposed program of ROW or property acquisition, construction, completion and operation.	Section 7
F. A description of the named sites, including:	Sections 1-4, Appendix A
1. A USGS topographic map (scale 1" =2,000') showing the site of the facility and any changes within a 1-mile radius of the site.	Section 1, Appendix A
2. A map (scale note less than 1" = 200') showing the Project site, locations and names of public roads, abutting property owners, and proximity to environmental features, cultural resources, and community facilities.	Section 4, Appendices A and H
3. A site plan (scale not less than 1"=40') showing the proposed facility, setback radius, existing and proposed contour elevations, 100 year flood zones, waterways, wetlands, and all associated equipment and structures on the site.	Appendix A
4. Where relevant, a terrain profile showing the proposed facility and access road with existing and proposed grades.	Appendix A
5. The most recent aerial photograph (scale not less than 1"=1,000 feet) showing the proposed site, access roads, and all abutting properties.	Section 4, Appendices A and H

Council's Application Guide (Section No. and Summary Description)	Pequonncock Substation Rebuild Project Application (Section Reference)
G. Justification for selection of the proposed site, including a comparison with alternative sites which are environmentally, technically, and economically practical. Include enough information for a complete comparison between the proposed site and any alternative site contemplated	Section 9
H. Safety and reliability information, including provisions for emergency operations and shutdowns and fire suppression technology.	Section 3
I. A description of the effect that the proposed facility would have on the environment, ecology, and scenic, historic, and recreational values, including effects on:	Sections 5 and 6
1. Public health and safety;	Section 6
2. Local, state, and federal land use plans;	Section 5
3. Existing and future development;	Section 5
4. Roads;	Sections 3 and 5
5. Wetlands;	N/A
6. Wildlife and vegetation, including rare and endangered species, and species of special concern, with documentation by the CT DEEP Natural Diversity Data Base;	Sections 4 and 5; Appendix B
7. Water supply areas;	N/A
8. Archaeological and historic resources, with documentation by the SHPO; and	Sections 4 and 5, Appendix E
9. Other environmental concerns identified by the applicant, the Council, or any public agency:	
▪ Coastal Consistency Analysis	Sections 4 and 5
▪ Connecticut Heritage Areas	N/A
▪ Ridgeline Protection Zones	N/A
▪ Aquifer Protection Zones	N/A
▪ DOT Scenic Lands	N/A
▪ State Parks and Forests	N/A
▪ Agricultural Lands	N/A
▪ Wild and Scenic Rivers	N/A
▪ Protected Rivers	N/A
▪ Endangered, Threatened, and Special Concern Species	Sections 4 and 5; Appendix B
J. Sight line graphs to the named sites from visually impacted areas such as residential developments, recreational areas, and historic sites.	N/A; refer to Sections 4 and 5, Appendix D
K. A statement explaining mitigation measures for the proposed facility, including:	
1. Description of proposed site clearing for access and compound, including type of vegetation scheduled for removal and quantity of trees greater than 6" diameter at breast height and involvement with wetlands	Sections 4 and 5, Appendix A (no wetlands)
2. Construction techniques designed specifically to minimize adverse effects on natural areas and sensitive areas;	Sections 3 and 5
3. Special routing or design features made specifically to avoid or minimize adverse effects on natural areas and sensitive areas;	Sections 3 and 5
4. Establishment of vegetation proposed near residential, recreational, and scenic areas;	N/A
5. Methods for preservation of vegetation for wildlife habitat and screening;	N/A
L. Justification that the location of the proposed facility would not pose an undue safety or health hazard to persons or property along the area traversed by the proposed facility, including:	Sections 3 and 6, Appendix G

Council's Application Guide (Section No. and Summary Description)	Pequonncock Substation Rebuild Project Application (Section Reference)
1. Measurements of existing EMF at site boundaries and at boundaries of adjacent schools, daycare facilities, playgrounds, and hospitals, with extrapolated calculations of exposure levels during expected normal and peak normal line loading;	Section 6, Appendix G
2. Calculations of expected EMF levels at the above-listed locations that would occur during normal and peak normal operation of the transmission line;	Section 6, Appendix G
3. A statement describing consistency with the Council's "Best Management Practices for Electric and Magnetic Fields", as amended; and	Section 6, Appendix G
4. A description of siting security measures for the proposed facility, consistent with the Council's "White Paper on the Security of Siting Energy Facilities", as amended.	Section 3
M. A schedule of proposed program for ROW or property acquisitions, construction, rehabilitation, testing and operation.	Section 7
N. A statement of estimated costs for site acquisition, construction, and equipment for a facility at the various proposed sites of the facility, including all candidates referred to in the application.	Sections 3 and 9
O. Identification of each federal, state, regional, district and municipal agency with which proposed route or site reviews have been undertaken or will be undertaken, including a copy of each written agency position on such route or site, and a schedule for obtaining approvals not yet received.	Sections 4, 5, and 8, Appendix B
P. Bulk filing of the most recent conservation, inland wetland, zoning, and plan of development documents of the municipality, including a description of the zoning classification of the site and surrounding areas, and a narrative summary of the consistency of the project with the Town's regulations and plans.	Narrative summary and maps in Sections 4 and 5 Bulk filing submitted separately
Q. Such information any department or agency of the state exercising environmental controls may, by regulation, require.	Application
R. Pursuant to **C.G.S. § 16-50o**, the applicant shall submit into the record the full text of the terms of any agreement, and a statement of any consideration therefore, if not contained in such agreement, entered into by the applicant and any party to the certification proceeding, or any third party, in connection with the construction or operation of the facility. This provision shall not require the public disclosure of proprietary information of trade secrets.	N/A
S. Such information the applicant may consider relevant.	Application

Council's Application Guide (Section No. and Summary Description)	Pequonncock Substation Rebuild Project Application (Section Reference)
VII. Proof of Service (C.G.S § 16-50*l*) Each application shall be accompanied by proof of service of such application on: A. The chief elected official, the zoning commission, planning commission, the planning and zoning commissions, and the conservation and wetlands commissions of the site municipality and any adjoining municipality having a boundary not more than 2,500 feet from the facility; B. The regional planning agency that encompasses the route municipalities; C. The State Attorney General; D. Each member of the Legislature in whose district the facility is proposed; E. Any federal agency with jurisdiction over the proposed facility; and F. The state departments of Energy and Environmental Protection, Public Health, Public Utilities Regulatory Authority, Economic and Community Development, Agriculture and Transportation; the Council on Environmental Quality; and the Office of Policy and Management; and G. Other state and municipal bodies as the Council may designate by regulation, including but not limited to the SHPO and the Department of Emergency Management and Homeland Security.	Procedural requirement, completed at Application submission to the Council; refer to Formal Requirements section, Appendix H
VIII. Notice to Community Organizations The applicant shall use reasonable efforts to provide notice of the application on the following: A. Affected community groups including Chambers of Commerce, land trusts, environmental groups, trail organizations, historic preservation groups, advocacy groups for the protection of Long Island Sound, and river protection organizations within the watershed affected by the proposed facility that have been identified by the municipality where the facility is proposed to be located or that have registered with the Council to be provided notice; and B. Any affected water company that would provide water to, or be within the watershed affected by, the proposed facility.	Section 8 provides summary information; data filings related to the MCF are submitted separately as part of Application filing process; refer to other portions of Formal Requirements section, Appendix H
IX. Public Notice (C.G.S. § 16-50*l*) Provide appropriate notice of the Application, pursuant to the Council's regulations. Notice must be published at least twice prior to the filing of the application, in a newspaper having general circulation in the site municipalities, and shall be in a format as specified by the Council's requirements.	Completed as part of Application submission process; refer to Formal Requirements section, Appendix H
X. Notice to Abutting Landowners (C.G.S. § 16-50*l*) Notice of the application shall be sent by certified or registered mail to each person appearing of record as an owner of property which abuts the primary or alternative sites on which the proposed facility would be located. Notice shall be sent at the same time that notice of the application is given to the general public. The application shall be accompanied by an affidavit of notice to all abutting landowners and an affidavit of publication each time notice of the application is published.	Completed as part of Application submission process; refer to Formal Requirements section, Appendix H

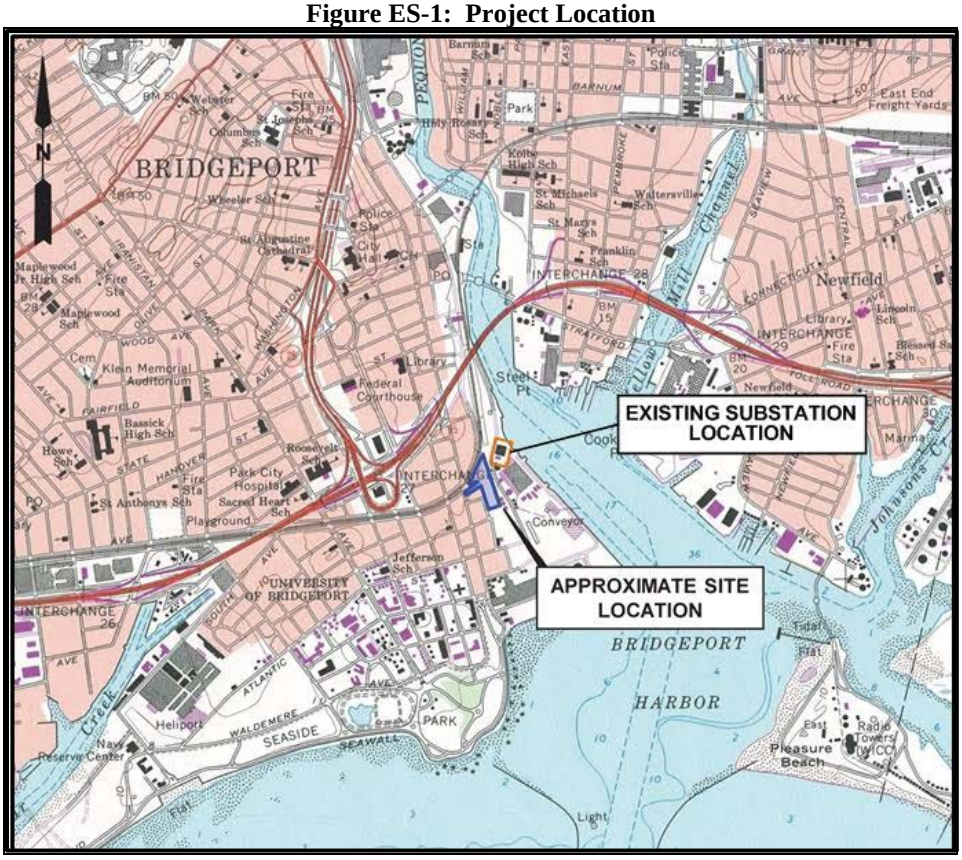
Note: This page intentionally left blank.

EXECUTIVE SUMMMARY

PROJECT PURPOSE AND LOCATION

The United Illuminating Company (UI, Company) proposes to rebuild its existing Pequonnock Substation, located in the City of Bridgeport, Fairfield County, Connecticut. The rebuilt substation will be about 700 feet southwest of the existing substation (refer to Figure ES-1). The proposed Pequonnock Substation Rebuild Project (Project) is subject to the jurisdiction of the Connecticut Siting Council (Council, CSC) and other agencies. Accordingly, UI submits to the Council this *Application for a Certificate of Environmental Compatibility and Public Need* (Application).

Figure ES-1: Project Location

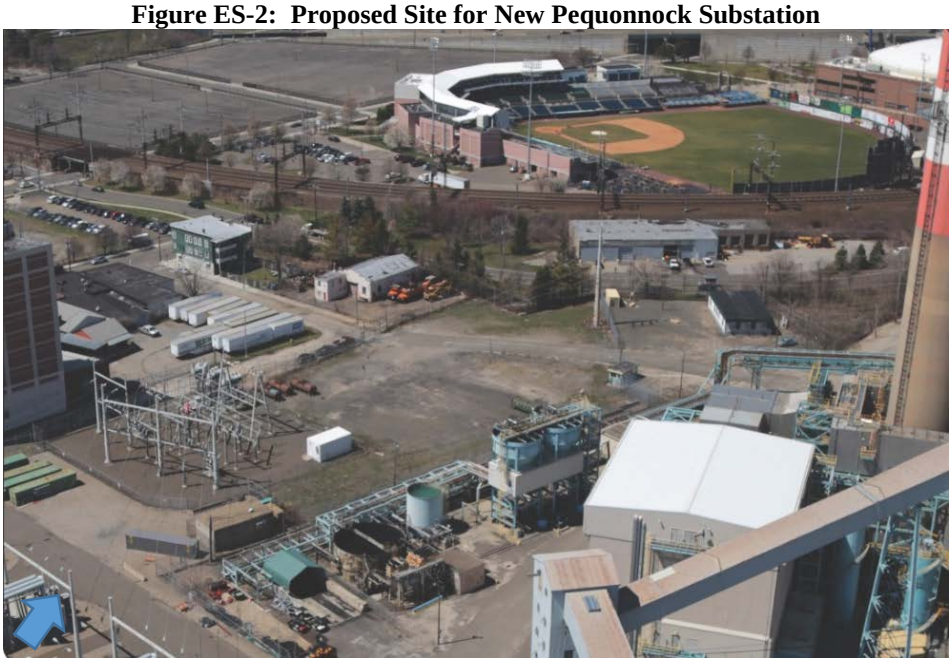


The existing Pequonnock Substation, a 115-kilovolt (kV) air-insulated substation (AIS) transmission/13.8-kV distribution station, is located on a 1.5-acre UI property at 1 Atlantic Street, in south-central Bridgeport. Eight 115-kV UI transmission lines (five overhead and three underground) feed the substation, which was initially placed into service in 1956 and has since undergone various modifications. The substation also is connected to various distribution lines.

The substation site abuts Bridgeport Harbor to the northeast, but is otherwise surrounded by and situated within fenced property owned by PSEG Power Connecticut LLC (PSEG) and developed as the Bridgeport Harbor Station (BHS) generating facility. North of PSEG's BHS property, the Metro-North Railroad (MNR) / Amtrak main Northeast rail corridor extends southwest-northeast through Bridgeport. Four of the existing 115-kV lines that feed Pequonnock Substation are located on catenary structures along the railroad; the fifth line, on PSEG's property, extends from BHS Unit #3 to feed the substation. The three underground lines connecting to the substation consist of two high-pressure gas-filled (HPGF) cables, which cross beneath Bridgeport Harbor, and a cross-linked polyethylene (XLPE) cable, which extends from UI's Singer Substation in Bridgeport.

The proposed Project will involve the construction and operation of a new gas-insulated substation (GIS) and the relocation of the eight transmission and associated distribution lines that presently connect to the existing substation. The 3.7-acre Project site is located at 1 Kiefer Street and is owned by PSEG (refer to Figure ES-2). UI and PSEG have entered into a Memorandum of Understanding regarding UI's purchase of this site, which has long been used for various industrial purposes. The site includes approximately 2 acres of vacant land within PSEG's fenced BHS property, as well as lands to the north and west (including Ferry Access Road, which is owned by PSEG). The MNR corridor (owned by the Connecticut Department of Transportation [ConnDOT]) forms the northern boundary of the site.

Figure ES-2: Proposed Site for New Pequonnock Substation



NEED FOR THE PROJECT

Due to its elevation and proximity to Bridgeport Harbor, the existing Pequonnock Substation is at risk from coastal flooding and storm damage, such as occurred during Tropical Storm Irene (as seen in Figure ES-3 below) in August 2011 and Hurricane (Superstorm) Sandy in October 2012. UI preemptively de-energized the substation during Superstorm Sandy due to the risk of catastrophic failure, which would have resulted in long-term customer outages.

Figure ES-3: Flooding at Existing Pequonnock Substation during Tropical Storm Irene

The existing substation also has asset condition issues, including settling of the enclosure and yard foundations, structural concerns, inadequate space inside the control room, and no access for the emergency mobile transformer units. The proposed Project will upgrade the substation facilities, thereby improving the bulk electric transmission grid serving Connecticut and New England and, by rebuilding the substation farther inland and at a higher elevation, will assist in protecting the Connecticut electric grid from outages due to coastal flooding and storm damage.

PROPOSED PROJECT FACILITIES

The new GIS substation will be located on approximately 2 acres of vacant land inside the existing PSEG BHS fence (refer to Figure ES-4). The substation components will be elevated 3 feet above the 14-foot Base Flood Elevation (BFE) for the area, as defined in 2013 by the Federal Emergency Management Agency[1], and thus will be about 7 feet higher in elevation than the existing substation.

Figure ES-4: Photosimulation of Proposed Pequonnock Substation

The new substation will be designed and operated to meet or exceed all state building and fire codes, and to conform to UI and industry standards. The GIS will be within an approximate 8,000-square-foot enclosure that will contain various 115-kV components (circuit breakers, switches, and bus). Control and relaying equipment associated with the GIS equipment will be located within an approximately 2,600-square foot enclosure, adjacent to the GIS enclosure. In addition, the substation will include a small area of AIS equipment, connecting the GIS equipment to distribution transformers stepping down the voltage from 115-kV to 13.8-kV. Another enclosure will contain the 13.8-kV distribution facilities.

[1] The site is located within Flood Zone AE, as designated on FEMA's Flood Insurance Rate Map (FIRM) No. 09001C0441G, Panel 441 of 626, July 8, 2013.

The eight 115-kV transmission lines that feed the existing Pequonnock Substation will be relocated to connect to the new substation. Figure ES-5 illustrates the existing 115-kV line connections to the present Pequonnock Substation, along with the line segments and structures to be removed; Figure ES-6 depicts the configurations of the proposed 115-kV line connections to the new substation. Both Figures ES-5 and ES-6 are found at the end of this Executive Summary.

To relocate the five existing overhead 115-kV lines to the new substation, 17 new galvanized steel monopole structures, ranging in height from 75 to 100 feet, will be installed. Of these 17 structures, seven will be located on the 3.7-acre Project site; seven will be installed on property owned by the City of Bridgeport or ConnDOT adjacent to or within the MNR corridor; and three will be installed on PSEG's BHS property. The new 115-kV overhead line connections to the GIS substation will range in length from approximately 325 to 1,050 feet. To connect to the new substation, all three of the underground cables will be aligned across PSEG or UI property. The cable connections will range in length from about 500 to 730 feet. A new underground splice chamber, to be located on UI property adjacent to the existing Pequonnock Substation, also will be installed to extend the HPGF cables to the new substation.

After the new substation is placed into service, the existing Pequonnock Substation will be decommissioned.

The cost of the proposed Project is estimated to be in excess of $125 million.

CONSTRUCTION ACTIVITIES, SCHEDULE, AND WORK HOURS

The Project will require approximately 18 to 24 months to construct. Standard work hours will be 7:00 AM to 7:00 PM, Monday through Saturday; however, some construction tasks will require work on Sundays or beyond these standard daily work hours.

Typical substation construction activities will include site preparation (grading, filling); foundation, enclosure, and equipment installation; 115-kV line connections; testing; and commissioning. The 115-kV overhead line relocations will involve foundation excavation and construction, followed by structure and conductor installation. The connection of the three underground cables to the new substation will require the excavation of cable trenches, followed by the installation of duct banks and cables within the trenches. As part of the relocation of the two HPGF lines, excavation also will be required to install the new underground splice chamber.

After the reconnection of the 115-kV lines to the new substation, the existing line connections (including six overhead structures) to the old Pequonnock Substation will be removed. The HPGF and XLPE cables also will be removed from the decommissioned underground line segments.
Most construction activities will occur on the proposed Project site, at the existing Pequonnock Substation, or on PSEG property. However, some work for the 115-kV overhead line connections will be required adjacent to the railroad corridor, on ConnDOT or City of Bridgeport property.

UI will coordinate with the City, ConnDOT, and PSEG to acquire any necessary temporary and permanent easements for the transmission line relocations. In addition, all construction activities will comply with the latest revisions of standards of the National Electrical Safety Code, the Institute of Electrical and Electronic Engineers and the American National Standards Institute; good utility practice; Connecticut regulations covering the method and manner of construction; UI's specifications and final engineering plans; and the conditions of approvals obtained for the Project.

ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION

Both the existing and proposed Pequonnock Substation sites are located in an urban area that has been historically and is currently used for industrial purposes. The proposed Project site is within an upland and does not include any inland or coastal water resources, significant vegetation or wildlife habitat, or cultural resources. Based on input from the Connecticut Department of Energy and Environmental Protection (CT DEEP), one state-listed threatened bird species could occur near the Project site. The visual environment in the vicinity of the Project site is dominated by industrial and commercial uses; no community facilities are located nearby.

Given the existing industrial setting, the construction and operation of the Project will result in only minor and highly localized environmental effects. To avoid or minimize construction-related impacts, UI will apply standard best management practices, including the development and implementation of a Stormwater Pollution Control Plan in accordance with CT DEEP requirements. UI also will implement procedures as needed to avoid impacts to the listed bird species. The operation of the substation will conform to state and local noise regulations. Further, the substation will be consistent with the other industrial uses in the area and thus will have no long-term adverse effect on the visual environment.

ELECTRIC AND MAGNETIC FIELDS ANALYSES

The proposed Project will not significantly change electric and magnetic field (EMF) levels. Because the configurations of the rebuilt substation and relocated 115-kV transmission line connections will be similar to those at the existing substation, the EMF levels also will be similar. The calculated magnetic field levels and measured electric levels in the vicinity of the substation will be a small fraction of those recommended for the general public by international health-based standards.

ALTERNATIVES CONSIDERED

The proposed Project was selected after various alternatives were identified and assessed. Initially, UI evaluated the asset condition and flood hazard issues at the existing Pequonnock Substation. After that evaluation determined that the consequences of the "No Action" alternative would jeopardize the electric system, increasing the risk of long-term customer outages, UI assessed whether the substation could be modified, on the existing site, to both mitigate coastal flood hazard/storm damage risks and upgrade the existing substation facilities. However, UI found that the location, size, and characteristics of the existing substation site pose critical constraints to the required improvements.

UI then investigated alternative sites on which a new Pequonnock Substation could feasibly be built, taking into consideration factors such as site size, availability of property for development, proximity to the eight existing 115-kV lines that must connect to the new substation, ownership, land use, environmental resources, and constructability. The site selection study resulted in the identification of two potentially viable locations for the new substation: at 1 Keifer Street and 375 Main Street, both in Bridgeport. The 1 Kiefer Street location (the proposed site) was identified as preferred based on proximity to the existing substation and transmission lines, size, availability, location within an industrial area, lack of environmental/cultural resources, constructability, and cost. A GIS design was identified as the preferred configuration for the new substation, given that an AIS substation would require a significantly larger parcel.

AGENCY AND MUNICIPAL CONSULTATIONS

UI consulted with various government agencies and the public regarding the proposed Project. State agencies consulted included the CT DEEP, Connecticut State Historic Preservation Office, and ConnDOT.

In addition, pursuant to the Connecticut Public Utility Environmental Standards Act and Council requirements, UI contacted representatives of the City of Bridgeport and, in February 2018, submitted to the Mayor of the City a Municipal Consultation Filing (MCF) that described the proposed Project,

including alternatives considered. The municipal consultation process included a 60-day comment period. In accordance with statutory requirements, the purpose of this process was to both inform the City of the Project and to solicit comments about it. During the MCF process, UI also contacted the City and met with members of the Mayor's administration. Further, UI attended Bridgeport's South End Neighborhood Revitalization Zone (NRZ) Community Meeting to review the proposed Project and accept input and questions.

Figure ES-5: Existing Pequonnock Substation and 115-kV Transmission Line Segments to be Removed

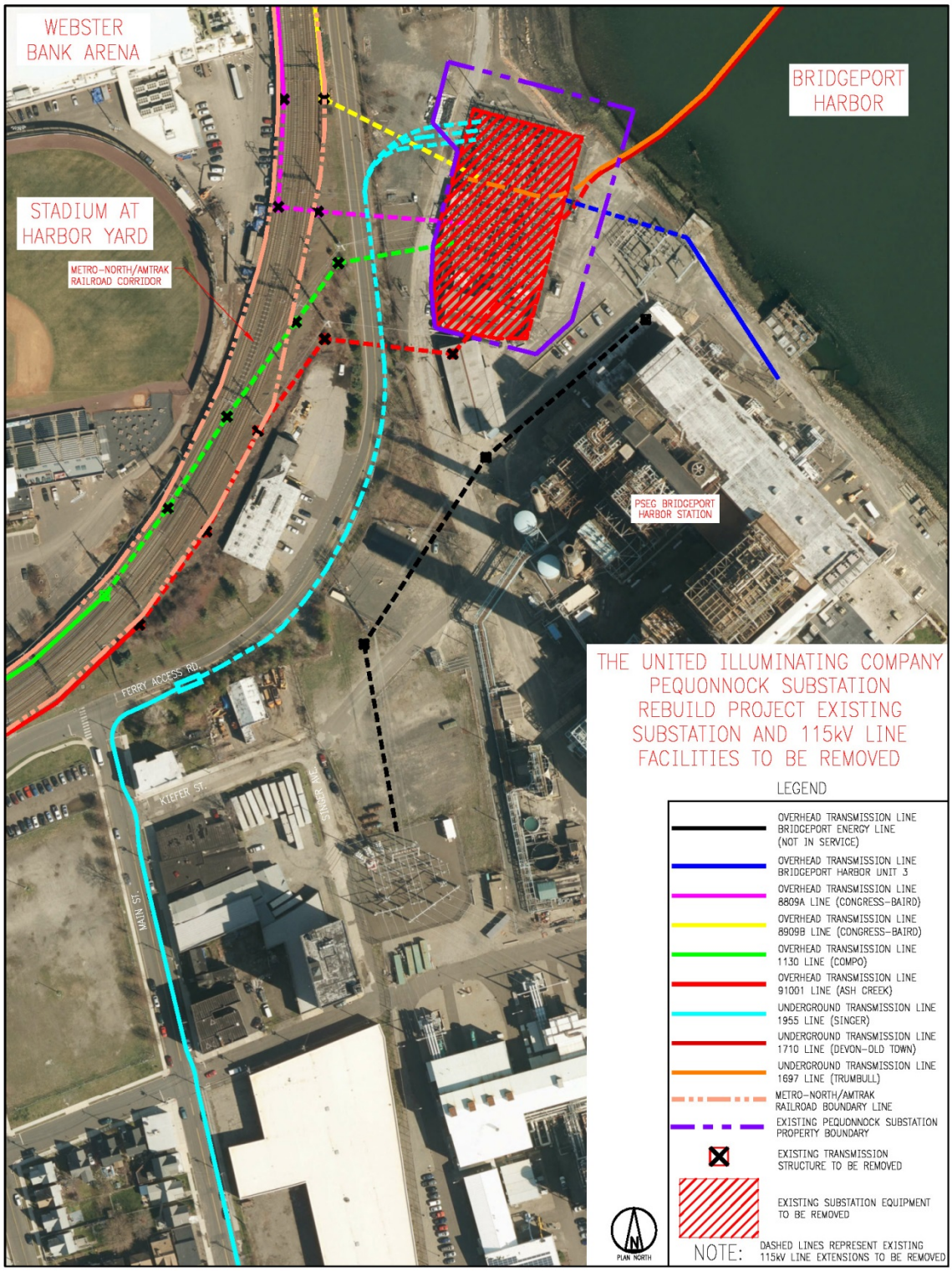
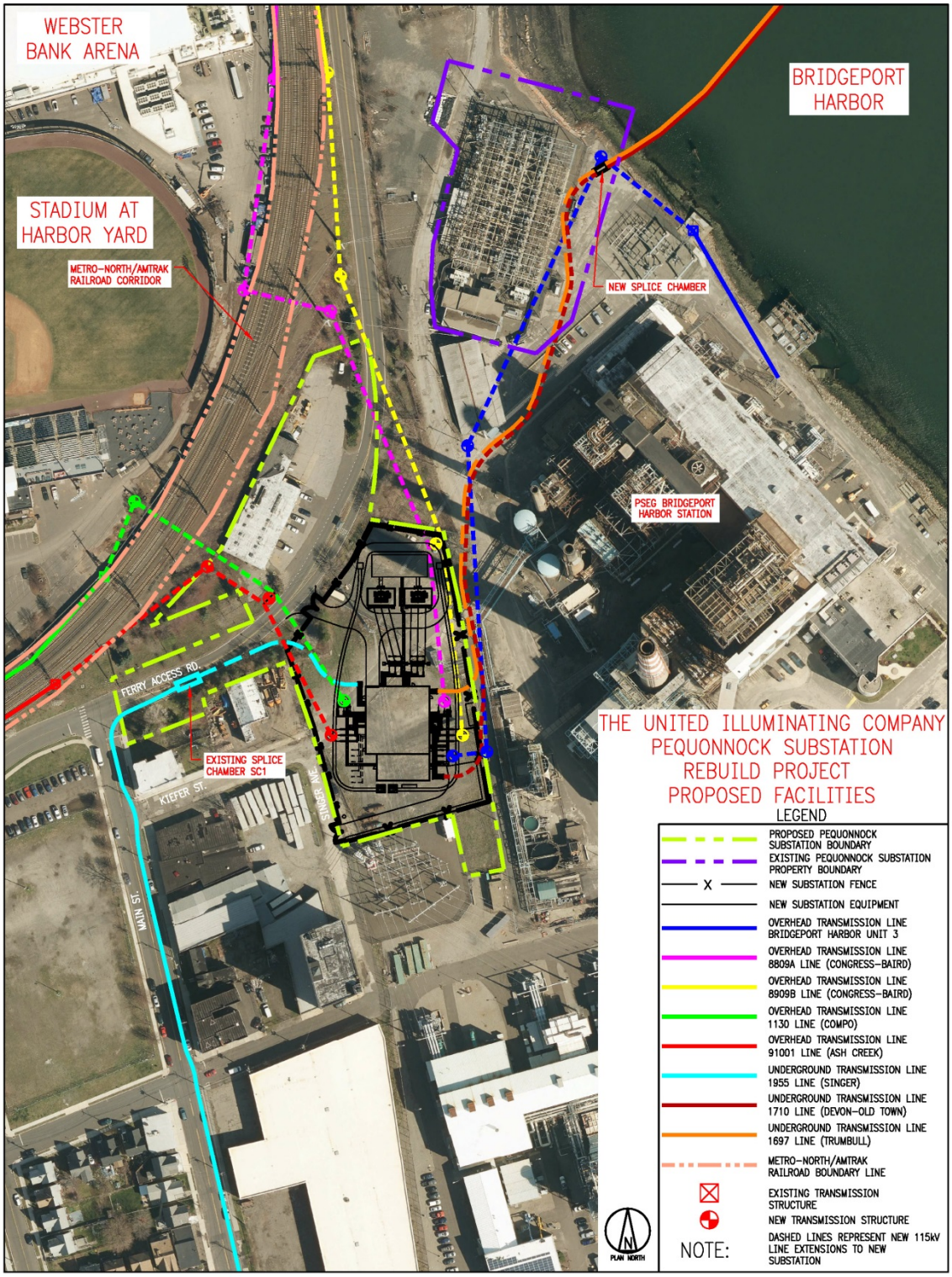


Figure ES-6: Proposed Pequonnock Substation and 115-kV Line Connections to the Substation



1. PROJECT OVERVIEW AND NEED

1.1 PROJECT BACKGROUND, LOCATION, AND PURPOSE

1.1.1 Project Objectives

As part of efforts to protect the Connecticut electric grid from outages due to coastal flooding and storm damage and to implement upgrades to the bulk electric system in general, The United Illuminating Company (UI or the Company) proposes to relocate and rebuild its existing Pequonnock Substation, a 115-kilovolt (kV) transmission/13.8-kV distribution facility. The existing air-insulated substation (AIS), which is classified as a Northeast Power Coordination Council (NPCC) Bulk Power System substation, is located at 1 Atlantic Street, in an industrial area southwest of and adjacent to Bridgeport Harbor in the City of Bridgeport, Fairfield County, Connecticut.

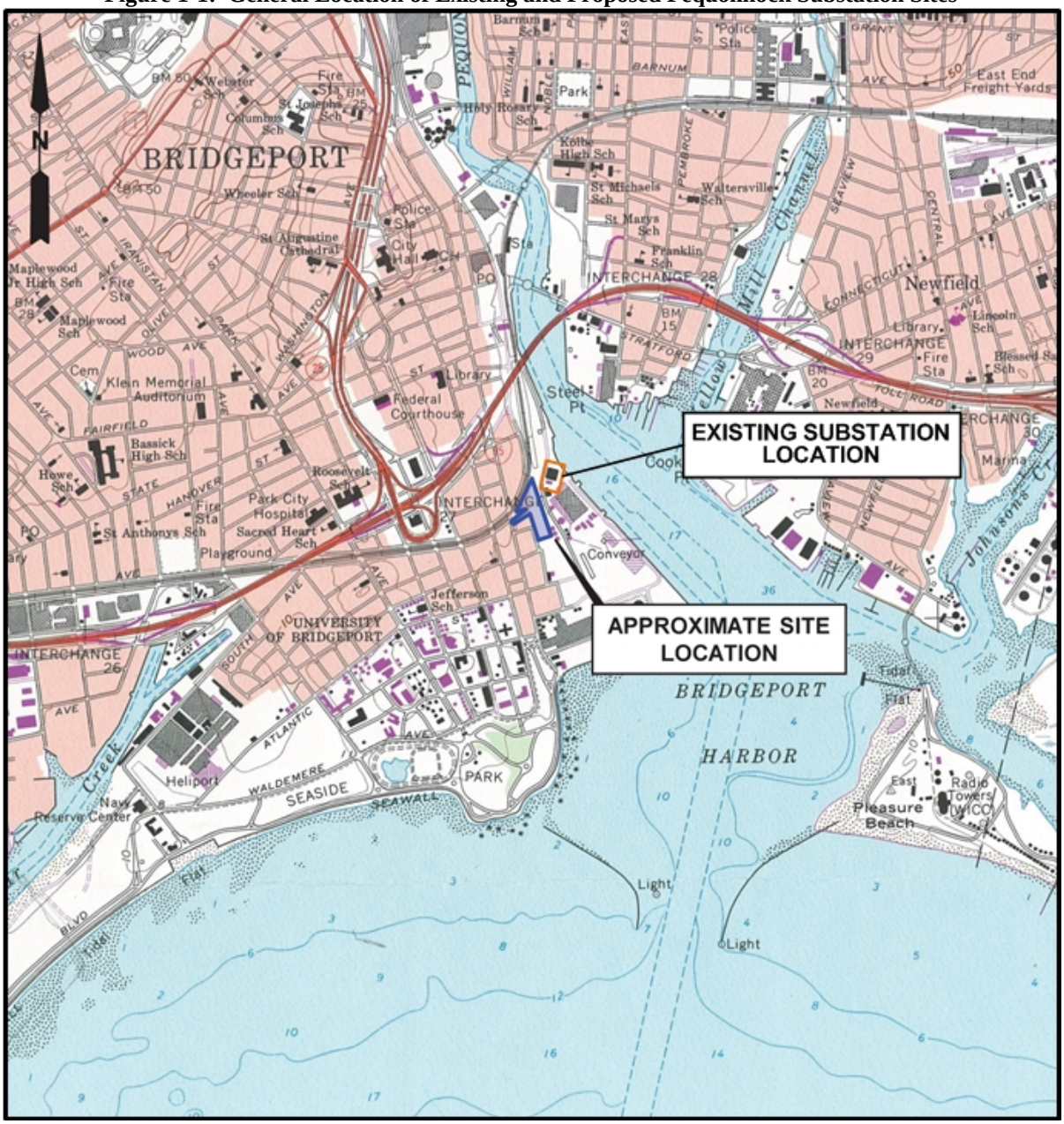
The Pequonnock Substation Rebuild Project (the Project) will entail the construction and operation of a new transmission / distribution substation, proposed for location in an industrial area approximately 700 feet southwest of the existing substation, at 1 Kiefer Street (also in the City of Bridgeport), and the relocation to the new substation of the eight existing 115-kV transmission lines and various distribution circuits that presently connect to the existing substation. After the new substation is placed into service, the existing Pequonnock Substation will be decommissioned. Figure 1-1 identifies the Project location, illustrating the existing and proposed Pequonnock Substation sites.

1.1.2 Description of Existing Pequonnock Substation and 115-kV Line Connections

The existing Pequonnock Substation, which is located entirely within Bridgeport Harbor's 100-year floodplain as identified by the Federal Emergency Management Agency (FEMA)[2], occupies an approximately 1.5-acre parcel owned by UI. The existing substation was initially placed into service in 1956 and has undergone various modifications and expansions over the intervening decades. The substation currently includes six bays (17 circuit breakers), two transformers, and two spare line termination terminals. Figure 1-2 provides an aerial view of the existing substation.

[2] The site is located within Flood Zone AE, as designated on FEMA's Flood Insurance Rate Map (FIRM) No. 09001C0441G, Panel 441 of 626, July 8, 2013. The FEMA map for the Project area is include in Appendix A.

Figure 1-1: General Location of Existing and Proposed Pequonnock Substation Sites



Source: USGS Topographic Map, Bridgeport, CT 06605 Quadrangle

Figure 1-2: Existing Pequonnock Substation Site

Source: Google Earth (February 2018)

As illustrated on Figures 1-1 and 1-2, Bridgeport Harbor (which is fed by the Pequonnock River and connects to Long Island Sound) forms the northeastern boundary of the existing substation site. The fenced substation is otherwise bordered by and situated within a 58.8-acre fenced industrial property owned by PSEG Power Connecticut LLC (PSEG). Specifically, the substation is bordered to the north by a PSEG access road and to the south and west by PSEG property associated with the Bridgeport Harbor Station (BHS) generating facility. Ferry Access Road, which extends to the Bridgeport-Port Jefferson Ferry terminal, is located to the north, outside the PSEG fence; the Metro-North/Amtrak Railroad (MNR) right-of-way (ROW), which provides primary rail service along the Eastern Seaboard, is aligned north of and generally parallel to Ferry Access Road.

Eight 115-kV electric transmission lines (five in overhead configurations and three underground cables) presently connect to the existing Pequonnock Substation. In addition, the substation feeds UI's local 13.8-kV distribution system.

Four of the overhead transmission lines (the 91001, 1130, 8809A, and 8909B lines) are aligned along the MNR corridor and are located on bonnets on top of railroad catenary structures; these lines connect Pequonnock Substation to UI's Ash Creek and Congress substations, as well as to Eversource Energy's Compo Substation. The fifth overhead line is located on PSEG property and connects Pequonnock Substation to PSEG's BHS Unit #3. The three underground lines (the 1710, 1697, and 1955 lines) link the substation to UI's Trumbull, Old Town, and Singer substations. The 1710 and 1697 lines are High Pressure Gas Filled (HPGF) pipe-type cables, while the 1955 Line is a Cross-Linked Polyethylene (XLPE) cable system (polyvinyl chloride [PVC] conduits encased in concrete).

The existing substation has enclosures for the 115-kV control and relaying systems and for the 13.8-kV distribution switchgear control and protective relaying equipment. Some of the distribution feeder cables exit underground from the substation, while others exit through riser poles to overhead lines.

The substation switchyard is designed with a mixed tubular aluminum and tubular copper overhead bus system with open air disconnect switches, lightning arresters, capacitive coupled voltage transformers, potential transformers, current transformers, combined current and potential transformers, and line terminals for interconnecting transmission lines. The bus conductors are supported with porcelain insulators. Within the switchyard, a single transmission structure supports the 91001 Line, which enters the substation from the south. Two main transformers are located on the southern portion of the switchyard, adjacent to the 13.8-kV control enclosure. The single 13.8-kV capacitor bank is located at the southeast corner of the switchyard. The BHS facilities are located across a parking lot, outside the east perimeter of the switchyard.

1.1.3 Issues Regarding the Existing Pequonnock Substation and Need for the Project

Due to its elevation and proximity to Bridgeport Harbor, the existing Pequonnock Substation has in the past been adversely affected by coastal flooding and storm damage, such as from Tropical Storm Irene in August 2011 and Hurricane (Superstorm) Sandy in October 2012. Figure 1-3 illustrates the northeastern boundary of the site in relation to Bridgeport Harbor. During Tropical Storm Irene, the site experienced flooding 1-2 feet above the yard elevation (refer to Figure 1-4), and during Hurricane Sandy, water levels rose to within inches of the control room floor.

Figure 1-3: Existing Pequonnock Substation: Northeastern Boundary adjacent to Bridgeport Harbor (View to South)

Figure 1-4: Photograph of Coastal Flooding at Existing Pequonnock Substation during Tropical Storm Irene (August 28, 2011)

During Hurricane Sandy, UI preemptively de-energized the substation due to the risk of catastrophic failure and associated long-term recovery issues. Thereafter, as a short-term solution, UI installed HESCO™ block flood barriers, enclosure door seals, sump pumps, additional interior cameras for flood monitoring, a backup station service generator, and a Supervisory Control and Data Acquisition (SCADA) alarm monitoring. UI also raised the substation battery chargers and sealed all conduits entering the substation.

In 2013, FEMA issued significantly revised base flood elevation (BFE) maps for Fairfield County, including the City of Bridgeport. According to FEMA, a base flood, which is also referred to as the 100-year flood, is defined as having a 1% chance of being equaled or exceeded in any given year. The base flood is the national standard used by the National Flood Insurance Program (NFIP) and all federal agencies for the purposes of requiring the purchase of flood insurance and regulating new development. BFEs are typically shown on Flood Insurance Rate Maps (FIRMs); the BFE at and in the vicinity of Pequonnock Substation, as currently defined by FEMA is 14 feet NAVD88.[3] Previously, FEMA's BFE for the area was 10 feet NAVD88 (2010).

After the recent coastal storm events and the FEMA BFE revisions, UI commissioned an asset condition survey to evaluate all of its coastal substations, including Pequonnock Substation. The survey considered the characteristics and age of each substation, potential risks for damage to the station, outages due to future storm-related flooding, and options for mitigating the identified risks. These analyses determined that for Pequonnock Substation:

- Most major substation components (control room, yard equipment) are constructed at elevations below the new FEMA BFE (or FEMA 1% annual chance flood level); thus, such a storm event would significantly impact the substation, interrupting service to customers and impacting transmission reliability and generator interconnections.

- The substation has non-flood related deficiencies, including uneven settlement of enclosure and yard foundations, structural concerns, control room overcrowding and clearance issues, and inadequate outdoor space for emergency mobile 115-kV/13.8-kV transformer units.

- The substation has a limited capacity to meet certain contingencies (e.g., short circuit margins, which are affected by generation additions and retirements in the region).

- Rebuilding the substation, at an elevation sufficiently above the BFE on the current site would be challenging and potentially infeasible. Due to the limited site size (1.5 acres), the existing facility would have to be taken out of service to accomplish the rebuilding effort. However, because service to customers and connections to the transmission system would

[3] Source: http://www.fema.gov/base-flood

have to be maintained during the rebuilding effort, temporary electric facilities would have to be constructed on adjacent property, which UI would have to acquire.

Consequently, UI determined that the proposed Project - rebuilding Pequonnock Substation on a nearby site, in accordance with a design that would place critical substation facilities above the new FEMA 100-year flood level – would best address both the coastal flood hazards and the other asset deficiencies at the existing substation.

Further, with respect to the distribution components, the Pequonnock Substation rebuild was one of four distribution projects identified in UI's *Storm Resiliency Plan*, which was submitted to and approved by the Connecticut Public Utilities Regulatory Authority (PURA) in October 2016[4]. The four projects would protect vulnerable components of the electric distribution grid from flood- and storm-related damage, reduce the time required to restore power if outages do occur, and complement other measures that UI has already implemented to increase the resiliency of the electric grid and protect it from future storms.

1.2 SUMMARY OF PROPOSED PROJECT FACILITIES

The Project will entail the construction and operation of a new Pequonnock Substation, which will be a gas-insulated substation (GIS) design. The substation will be built 3 feet above the new FEMA BFE and designed to accommodate the transmission and distribution lines that presently connect to the existing station. Appendix A includes detailed maps and drawings of Project facilities.

1.2.1 Proposed Project Site: Location and History

The Project site at 1 Kiefer Street consists of 3.7 acres and is currently owned by PSEG (refer to Figure 1-5). Approximately 2 acres of the site are located within PSEG's fenced BHS property; the remaining acreage is directly to the north and outside of the fenced property and encompasses a portion of Ferry Access Road. The northerly portion of the proposed site abuts the MNR corridor and includes a single-story approximate 9,000-square-foot warehouse and some areas of trees and lawn.

Pursuant to a Memorandum of Understanding (MOU) between UI and PSEG, UI proposes to purchase the 3.7-acre site from PSEG. The site will accommodate the new GIS substation, transmission and distribution line connections, and associated support areas.

[4] UI Storm Resiliency Plan, dated July 22, 2016; PURA Decision, dated October 26, 2016 in Docket No. 16-07-11.

Figure 1-5: Proposed Project Site

Source: Google Earth (April, 2018)

The proposed site has been used for industrial purposes for more than 100 years.[5] From the 1880s to the 1950s, most of the site was used predominantly by the New York, New Haven, and Hartford Railroad Company/Naugatuck Railroad, which operated an extensive rail yard and railcar maintenance facility on the lands currently owned by PSEG. Beginning in the 1950s, UI purchased and integrated multiple smaller properties, including the site, to develop and operate the BHS and the existing Pequonnock Substation.

The northern portion of the Project site (outside the PSEG fence) was initially acquired by private developers, who built the existing warehouse in 1964-1965 for use as a truck terminal. In 1999, UI sold its properties related to BHS, including the Project site, to Wisvest Connecticut, LLC (Wisvest). In 2003, Wisvest sold the property to PSEG.

1.2.2 Proposed Substation Facilities and Transmission Line Connections

The new Pequonnock Substation is proposed for location on the approximately 2-acre area within the fenced PSEG property. This area is presently undeveloped and is bordered to the east by PSEG's

[5] In conjunction with standard practices and regulatory requirements for property transfers, over the past 20 years, multiple comprehensive environmental site assessments and historical records reviews have been performed on the overall BHS property, including the Project site.

BHS facilities, to the north by Ferry Access Road, to the south by the switching station for Emera Energy's combined cycle power plant (Bridgeport Energy), and to the west by private industrial/commercial uses along Kiefer Street. Portions of the Project site also will be used to realign the eight 115-kV lines and distribution circuits to connect to the new substation.

The new substation will be developed above the BFE using a Design Flood Elevation (DFE) that will place the substation equipment at an elevation of BFE + 3 feet. Although electric utilities in Connecticut historically considered the BFE + 1 foot as the minimum DFE level, recent storm events led to a re-evaluation of industry practices and codes for the DFE with respect to critical infrastructure. In accordance with these updated practices, for this Project, UI proposes to use a DFE level of the BFE + 3 feet. The substation will include five bays of circuit breakers and space for a future GIS circuit breaker bay.

UI also will redirect the eight 115-kV transmission lines that presently feed the existing Pequonnock Substation to connect to the new substation. These transmission lines will feed the proposed Pequonnock Substation in a similar configuration as at the existing substation.

To route the five overhead transmission lines into the new substation, 17 new tubular steel monopole structures (10 single circuit, two double circuit, and five walkdown structures[6]) will be installed. These structures are proposed for location on the Project site, on PSEG's BHS property, and within or adjacent to the MNR corridor on lands owned by the Connecticut Department of Transportation[7] (ConnDOT) or by the City of Bridgeport.

Similarly, the three underground transmission lines (consisting of conduits and conductors) that feed the existing substation will be re-routed or extended to connect to the new substation. Both the HPGF and XLPE cable realignments will be located entirely on UI or PSEG property. In addition, a new splice chamber for the HPGF cables will be installed on UI's property at the existing Pequonnock Substation site; this new splice chamber is required because the nearest existing splice chamber is too far away to allow the pipe-type cable to be installed, in a single pull, to the new substation.

[6] A walkdown structure allows the conductors to be brought down from higher elevations to lower levels so as to connect to the GIS terminals.

[7] ConnDOT owns the railroad corridor, which it leases to Metro-North Railroad. UI has an existing license agreement with ConnDOT for the location of transmission facilities on ConnDOT property.

After the new substation is placed into service, the existing Pequonnock Substation and related transmission and distribution line connections will be decommissioned. As currently planned, the six monopoles and 10 railroad bonnets that presently support the 115-kV overhead circuit feeds to the existing Pequonnock Substation will be removed. Segments of the existing underground cable connections to the existing substation also will be removed or abandoned in place.

2. TECHNICAL SPECIFICATIONS FOR THE PROJECT

The technical specifications contained in this section are based on currently available data concerning the Project. As the Project planning and engineering design processes proceed, these technical specifications will be refined.

2.1 LAND AND ACCESS REQUIREMENTS

The new substation will be located on PSEG property that UI plans to purchase. Some of the transmission line connections and removals will require temporary or permanent easements along the MNR corridor or on PSEG property. All proposed Project facilities are readily accessible from private roads (e.g., Ferry Access Road, PSEG's BHS roads), public streets (e.g., Kiefer Street, Singer Avenue, Broad Street), and the MNR corridor.

2.1.1 Proposed Substation

During construction, access to the new substation site will be via PSEG's BHS on-site access roads or via a new entrance from Ferry Access Road. Personnel access also may be added from Singer Avenue and Kiefer Street.

2.1.2 Substation Transmission Line Connections

The realignment of the eight existing 115-kV lines that feed the present Pequonnock Substation will require access and work areas. All of the underground cable system relocations will be on UI or PSEG property. Of the 17 proposed overhead transmission line structures, 10 will be located on industrial property owned by PSEG or on the Project site. UI will consult with PSEG regarding permanent easements and temporary work areas for these line connections.

The remaining seven new structures will be located on or adjacent to the MNR corridor and will interconnect the new substation to the four overhead transmission lines (the 91001, 1130, 8809A, and 8909B lines) that are supported on the railroad catenary structures. Of these seven structures, three will be installed on the north side of the railroad tracks, and four will be installed on the south side of the tracks (refer to the Appendix A mapsheets), as summarized below:

- ***North of Railroad Tracks***. The three overhead 115-kV structures to be installed north of the railroad tracks are needed to extend the overhead line conductors from the new substation to the northern side of the MNR corridor, where the 1130 and 8809A lines are supported on bonnets on top of the railroad catenaries. One of these structures may be installed on City of

Bridgeport property located northwest of the new substation (the 1130 Line connection) and two will be located within the MNR corridor (ConnDOT property) heading north to interconnect the 8809A Line. An estimated 1 acre of temporary work space will be required for this structure installation work. Access to construction sites north of the MNR corridor is expected to be from Broad Street or South Frontage Road.

- ***South of Railroad Tracks***. The four new structures that will be installed adjacent to, and south of the tracks, will be located within the MNR corridor. One of these structures will connect the 91001 Line from the new substation to the southern railroad line circuits, one will connect the 8809A Line from the south side of the railroad tracks to the north side, and the remaining two will connect the 8909B Line on the south side of the tracks. Approximately 2 acres of temporary work space will be required to install these four new structures. Ferry Access Road will be used for ingress/egress for transmission line construction activities on the south side of the railroad corridor.

UI will coordinate with ConnDOT and, if necessary, the City of Bridgeport regarding the use of temporary construction work space and permanent easements for the relocated transmission lines. UI has a long-term lease agreement with ConnDOT that covers the transmission lines installed within the railroad corridor from UI's West River Substation in the City of New Haven to the Fairfield/ Westport town line. Any new transmission line assets installed within the MNR corridor will be made part of an addendum to this lease agreement.

2.1.3 Existing Substation Decommissioning and Transmission Line Removals

Work to decommission the existing Pequonnock Substation, which will be conducted after the new substation is placed in service, will be performed within UI's existing 1.5-acre property, using established access. Similarly, the removal of the existing overhead and underground transmission line connections (refer to the Appendix A mapsheets) will be conducted on UI's existing easements, or on property owned by ConnDOT or PSEG.

2.2 NEW SUBSTATION FACILITIES

As illustrated on the Appendix A maps and drawings, all critical equipment within the new Pequonnock Substation will be elevated at least 3 feet above FEMA's current 14-foot BFE for the site and will be designed to meet or exceed all state building and fire codes, including provisions for seismic loading, wind loading, and snow / ice loading. The GIS will be housed within an approximate 8,000-square-foot equipment enclosure, with approximate dimensions of 34 feet in height by 92 feet long by 87 feet wide. The GIS equipment enclosure will include the following components:

- 115-kV circuit breakers

- 115-kV motor-operated line disconnect switches
- 115-kV motor-operated ground switches
- 115-kV GIS bus
- GIS access platforms
- 115-kV current and potential transformers for metering and equipment protection
- AC station service equipment
- Local control cabinets for GIS equipment
- Overhead crane for equipment installation and maintenance
- Heating and ventilation equipment

The control and relaying equipment associated with the GIS equipment will be housed in an approximately 2,600-square-foot enclosure (dimensions of about 36 feet wide x 72 feet long x 14 feet high), which will include the following:

- Protection and control panels with associated relay and metering equipment
- 125-V DC battery banks and associated chargers
- Lavatory facility
- Communication equipment
- HVAC equipment

North of the GIS enclosure, a small portion of AIS will connect the GIS equipment to distribution transformers, stepping down the voltage from 115-kV to 13.8-kV. This portion of the substation site will include:

- Two 115-kV/13.8-kV power transformers.
- 115-kV disconnect switches mounted on steel structures.
- Associated insulators, tubular aluminum bus, surge arrestors, and connectors.
- Provisions to accommodate a temporary mobile transformer for emergency conditions.
- 90-foot telecommunications wooden pole.
- An additional prefabricated or pre-engineered equipment enclosure housing the 13.8-kV distribution circuit breakers and associated outgoing distribution cable circuits. The distribution equipment enclosure will be approximately 2,250 square feet (with expected dimensions of 30 feet wide x 75 feet long x 13 feet high).

2.3 SUBSTATION TRANSMISSION LINE CONNECTIONS

UI proposes to relocate the eight 115-kV transmission lines that presently feed the existing Pequonnock Substation to connect to the new substation. Technical specifications regarding the existing and proposed 115-kV line connections are described below and illustrated on the Appendix A maps, cross-sections, and drawings.

2.3.1 Existing 115-kV Line Connections

Overhead Lines

The four existing overhead transmission lines aligned along the MNR catenary structures are supported on approximately 65-foot-tall structures that extend east-to-west along the railroad corridor and north-to-south along the western side of the existing substation site. Each of the existing 115-kV lines are constructed with three 1590 kcmil Aluminum Conductor Steel Reinforced (ACSR) or Aluminum Conductor Steel Supported (ACSS) conductors and one 336.4 kcmil ACSR conductor or 48 fiber optical ground shield wire (OPGW).

Near the existing Pequonnock Substation, the transmission lines diverge south off the railroad catenaries, spanning Ferry Access Road into the substation. From the railroad corridor to the substation, these line connections are approximately 200 feet in length. The two lines from the south are connected to the existing substation by three single-circuit monopoles, each approximately 90 feet in height. The transmission line connections from the north extend from the catenary structures, directly into the existing substation.

The fifth overhead line, which connects to BHS Unit #3, is supported on three lattice type structures, each approximately 110 feet tall. These structures are owned by PSEG and are located on PSEG property south of the existing substation. This overhead interconnection to the existing Pequonnock Substation is approximately 550 feet long.

Underground Lines

The two HPGF pipe-type cables that cross beneath Bridgeport Harbor and terminate at the existing substation consist of 1750 kcmil conductor, insulated with fluid-impregnated (polybutene) craft paper. There are three cables (one cable per phase), pulled together into a sealed 8-inch steel pipe, which is pressurized with 200 pounds per square inch (psi) of nitrogen gas.

The XLPE cable system, which extends from Singer Substation to the existing Pequonnock Substation, consists of 3500 kcmil cables insulated with solid dielectric, cross-linked polyethylene. There are three cables per phase, with each conductor pulled individually into its own 6-inch PVC conduit. The XLPE cable is aligned beneath local roads, traversing along Ferry Access Road before diverging to the south to terminate at the substation.

2.3.2 Proposed 115-kV Line Connections

The Appendix A mapsheets and drawings illustrate the proposed locations of the transmission line connections to the new substation. Existing information regarding these proposed line connections is summarized below. As UI proceeds with the engineering design of the Project, the final locations and heights of the new overhead transmission line structures and the routes of the underground transmission line connections may be modified slightly from those illustrated in Appendix A.

Overhead Lines

As is the case for the existing substation, the five overhead transmission lines will be terminated at the new Pequonnock Substation. To route these lines into the new substation, UI will install 17 new galvanized tubular steel monopoles. All of the lines will support 1590 ACSS conductors and OPGW.

The 17 structures will include 10 single-circuit, two-double circuit, and five walkdown tubular steel monopoles, ranging in height from 75 to 100 feet. As illustrated on the Appendix A mapsheets, these 17 structures and line connections to the new substation are proposed as follows:

- Five monopoles will be located on UI's new substation site, directly adjacent to the GIS enclosure. These monopoles will serve to walk down the conductors to the substation gas-to-air bushings.

- Two monopoles will be installed on the northern part of UI's proposed 3.7-acre property to connect the four overhead lines located along the MNR corridor (the 91001, 1130, 8809A, 8909B lines) to the new substation

- Seven monopoles (three on the north side of the MNR tracks and four south of the tracks) will be installed on ConnDOT or City of Bridgeport property to complete the connection of the 91001, 1130, 8809A, and 8909B lines between the railroad corridor and the new substation. The lengths of these line connections will be:

  91001 Line – Approximately 325 feet
  1130 Line – Approximately 400 feet
  8809A Line – Approximately 950 feet
  8909B Line – Approximately 900 feet

- Three monopoles will be installed on PSEG property to connect BHS Unit #3 to the new substation. The length of this proposed 115-kV connection will be approximately 1,050 feet.

Underground Lines

To route the existing underground 115-kV lines into the new Pequonnock Substation, UI will extend or realign each line. The two pipe type HPGF underground lines (the 1697 and 1710 lines) will

connect to the new substation from the east by extending the existing steel pipes for approximately 730 feet southwest, crossing PSEG and UI property. The new buried splice chamber for the HPGF lines, which will have an outer dimension of approximately 20 feet by 10 feet by 11 feet, will be on UI property at the existing Pequonnock Substation site.

The 115-kV XLPE cable (1955 Line), which extends along Ferry Access Road to the existing substation, will be intercepted at an existing transmission splice chamber (referred to as SC1) located beneath Ferry Access Road and, from there, redirected to the new substation. Approximately 500 feet of new concrete-encased PVC duct bank will be constructed. The XLPE line relocation will shorten the existing circuit length by approximately 460 feet.

2.4 ESTIMATED PROJECT COSTS AND FACILITY SERVICE LIFE

The estimated cost for the siting, design, and construction of the Project is currently in excess of $125 million. The substation equipment, transmission lines, and supporting infrastructure are expected to have a service life of approximately 40 years.

2.5 DECOMMISSIONING APPROACH: EXISTING PEQUONNOCK SUBSTATION AND RELATED TRANSMISSION LINE CONNECTIONS

After the new Pequonnock Substation is constructed, the eight 115-kV transmission lines are connected, and the facility is placed into service, UI will decommission the existing Pequonnock Substation and associated 115-kV line connections. This work will include:

- Decommissioning electrical components within the substation (e.g., the removal of sulfur-hexafloride [SF6] gas from circuit breakers and dielectric fluid from transformers);
- Removing above-ground structural components within the substation, as necessary;
- Dismantling and removing the existing overhead transmission line connections to the substation (e.g., removal of conductors, arms, and six monopole structures), as well as 10 bonnets on which the lines are located above the railroad catenary structures; and
- Removing a short segment of HPGF cable and an approximately 960-foot-long segment of XLPE cable, extending from SC1 to the substation. (The buried duct bank for the XLPE cable will be left in place.)

3. PROPOSED CONSTRUCTION AND OPERATION/MAINTENANCE PROCEDURES

UI will construct, operate, and maintain the Project in full compliance with the latest revisions of standards of the National Electrical Safety Code (NESC), the Institute of Electrical and Electronic Engineers (IEEE) and the American National Standards Institute (ANSI); good utility practice; and state PURA regulations covering the method and manner of construction, as well as with UI's specifications, final engineering plans, and the conditions of approvals obtained for the Project.

3.1 CONSTRUCTION PROCEDURES: GENERAL

Pursuant to the Council's requirements, prior to the commencement of construction activities, UI will prepare and submit a Development and Management (D&M) Plan to the Council for review and approval. Project construction will be performed in accordance with the D&M Plan, which will reflect conformance to the conditions of the Council's approval of the Project, as well as compliance with other regulatory requirements and UI specifications. UI will monitor and perform inspections of Project construction activities for conformance to these requirements.

3.2 SUBSTATION AND 115-KV LINE CONNECTIONS CONSTRUCTION

3.2.1 Construction Sequence

The Project will be developed in several stages. Tables 3-1 and 3-2 summarize the general sequence of activities for the construction of the new substation and the relocation of the associated 115-kV lines, respectively. These activities are discussed in Sections 3.2.3 through 3.2.5. During construction, certain work activities and sequences may vary, based on factors such as final Project design and the conditions of the Council's or other regulatory approvals. Additional details regarding construction procedures and sequencing will be provided in the Project's D&M Plan.

3.2.2 Site Acquisition, Construction Staging Areas, and Traffic Management

UI will acquire the Project site from PSEG, pursuant to the MOU, and will coordinate with ConnDOT and the City of Bridgeport as necessary regarding temporary or permanent easements for work space and access for the installation of the new overhead structures within and adjacent to the MNR corridor. UI also will coordinate with ConnDOT for the removal of the existing 115-kV line connections from the railroad corridor.

Table 3-1: General Construction Sequence: New Pequonnock Substation

TYPICAL CONSTRUCTION ACTIVITIES
Vegetation management
Install erosion and sedimentation control measures
Prepare the site for development (fill, grading)
Install perimeter fencing
Install gas insulated switchgear (GIS) equipment pre-engineered enclosure and control room foundation
Install substation foundations, conduits, grounding grid, and distribution facilities
Install overhead transmission line structure foundations (on site)
Install GIS equipment pre-engineered enclosure and control room
Install 13.8-kV equipment enclosure
Install 115-kV GIS equipment inside enclosure
Install backup station service generator
Install underground 115-kV duct banks
Spread trap rock
Offload and install power transformers
Install 13.8-kV switchgear in 13.8-kV equipment enclosure
Install outdoor steel structures and outdoor substation equipment
Pull and terminate control wiring
Commission/test the substation
Pull and terminate 115-kV underground transmission line conductors
Install overhead transmission line conductors and insulators
Perform 115-kV circuit by circuit transmission line cutovers
Perform 13.8-kV circuit by circuit distribution line cutovers
Install asphalt access drives
Complete site restoration activities
Remove temporary erosion and sedimentation control measures after site stabilization is achieved

Table 3-2: General Construction Sequence for Substation Connections: Overhead and Underground 115-kV Line Relocations

TYPICAL CONSTRUCTION ACTIVITIES	
Overhead 115-kV Line Connections	**Underground 115-kV Cable Connections (HPGF and XLPE)**
Locate and mark utilities and work area boundaries	Locate and mark utilities and work area boundaries
Establish staging areas; erosion and sedimentation (E&S) controls; prepare access roads and work pads (as needed) to the new structure locations and to the locations of structures to be removed	Establish construction access, E&S controls, work sites, and staging areas for the underground cable extensions, the new HPGF splice chamber adjacent to the existing Pequonnock Substation, and the work area needed near SC1 along the XLPE line (Ferry Access Road)
Install new structure foundations and assemble/erect new structures	For the HPGF lines, excavate and install the new splice chamber, near the existing Pequonnock Substation. For the HPGF and XLPE lines, construct the cable pipe or duct bank system (i.e., excavate the trench, install the pipes or conduits in the trench, encase the pipes or conduits in fluidized thermal backfill [FTB] or equivalent, backfill the trench with FTB or other approved material).
Install conductors, shield wire, and OPGW on relocated transmission line connections	
Remove structures, conductors, shield wire, and OPGW from the existing line connections to the old substation	Restore or repave areas affected by the cable system excavations and new HPGF splice chamber and perform other restoration as needed. Maintain E&S controls until sites affected by construction are stabilized.
Energize the line connections in conjunction with new substation energization	Pull the cables into the new pipes and conduits and then splice the new cable connections to the existing HPGF and XLPE systems. The old cable connections to the existing Pequonnock Substation will be removed or abandoned in place
Remove temporary construction access and work pads, and restore/stabilize areas affected by construction	Install nitrogen gas in the HPGF pipe cables; test both HPGF and XLPE cable connections and then energize the new connections
Maintain E&S controls until sites affected by construction are stabilized	Complete any remaining site restoration and stabilization work

Staging for construction support (e.g., for material laydown, parking for vehicles and equipment, temporary construction trailer) is expected to be located on the Project site, at the existing Pequonnock Substation, or at similar industrial/commercial sites nearby. Temporary access for the transmission line relocations will be in the vicinity of the structure sites depicted on the Project plans in Appendix A. UI anticipates that approximately 3 acres of temporary work space will be required to install the new 115-kV overhead structures near the MNR corridor (approximately 1 acre north of the railroad tracks and 2 acres south of the tracks). Details about staging areas and temporary work sites will be provided in the D&M Plan.

During construction, the Project work sites will be accessed via local roads and PSEG's BHS on-site access roads. To minimize the potential for traffic delays on local roads or for conflicts with activities at the BHS, UI will coordinate with PSEG and the City of Bridgeport regarding vehicular traffic management. Similarly, UI will coordinate with ConnDOT regarding construction activities within the MNR corridor. Based on past experience, UI anticipates that the overhead 115-kV transmission line relocation work on and near the railroad will be subject to timing restrictions to avoid or minimize conflicts with rail operations. Such timing restrictions may involve nighttime work or work during non-peak rail use periods (e.g., weekends).

3.2.3 Substation Construction

Site Preparation

UI will prepare the substation site to place the substation equipment at the DFE equivalent to the BFE + 3 feet. This elevation will be achieved by a combination of grading and importing fill. E&S controls will be installed around the work site as needed.

Foundation and Equipment Installation

The installation of foundations will typically involve excavation, form work, use of steel reinforcement, and concrete placement. Excavated materials will be handled in accordance with appropriate regulatory requirements and will be disposed of properly, off-site as required. After foundations are in place, structures and equipment will be installed pursuant to the new substation plans. The major 115-kV GIS substation equipment will be installed inside a pre-engineered enclosure. The installation of the equipment could take approximately 12 months and will involve the use of cranes to unload and place large equipment and structural elements.

The installation of the 115-kV monopoles, interconnection of the supply lines to the substation, and connections to the existing distribution system will occur inside and outside of normal work hours

(refer to Section 3.5) because these activities necessitate taking critical transmission and/or distribution equipment out of service. As a result, UI will schedule this work for off-peak electrical demand hours and will coordinate as appropriate with the City of Bridgeport.

The substation will include two 115-kV/13.8-kV transformers that will contain insulating (mineral) oil. The transformer equipment will each have a secondary containment designed to hold 110% of a transformer's fluid capacity and will include accidental spill prevention measures. UI proposes to install a petro barrier gravity drain system to assist in minimizing the potential for inadvertent oil discharges from the containment. Further, UI will remotely monitor a low oil level alarm that is integral to the system and will notify UI in the event of an abnormal condition at the substation.

Wiring, Testing, and Interconnections

Wiring that will allow the equipment to operate and communicate with the system protection equipment will be installed. After all equipment is installed and wired, the new equipment will be tested to confirm that it is in proper functioning condition and is operating as specified.

Final Site Cleanup/Restoration and Site Security

The portions of the substation not otherwise occupied by equipment and enclosures will be stabilized as necessary. UI will enclose the perimeter of the substation with a 14-foot-high chain link fence, topped with an additional 1 foot of barbed wire to discourage unauthorized entry and/or vandalism. UI also will install lighting within the substation yard.

3.2.4 Substation Connections: Overhead 115-kV Line Relocations

Site Preparation

Temporary construction work pads will be established as needed to install each new transmission line structure. The locations of work pads and access to them will be identified in the D&M Plan.

Foundation and Structure Assembly/Installation and Conductor Work

The 17 new monopole structures will be installed on concrete drilled pier foundations. These foundations will be excavated by heavy equipment. The foundations will utilize steel rebar for strength and anchor bolts for equipment mounting. The concrete will be brought to the structure locations via concrete trucks from a local ready mix concrete plant.

The construction of the new structures will be sequenced, based on structure location. The new structures (and conductors) that are not located near the existing transmission line connections to the current Pequonnock Substation are expected to be installed first. When the new substation is ready to accept the 115-kV lines, the remaining structures and conductors and OPGW will be installed. Transmission terminations and any other transmission structures not requiring an outage will be constructed prior to any outage required for relocating the new lines. New conductors will be installed between structures where outages are not required. Transmission lines will be terminated along the railroad and new conductors will be installed to the remaining structures.

Cleanup and Restoration

After the installation of the new 115-kV structures, temporary work pads and access roads typically will be removed, and the areas affected by Project construction will be restored and stabilized.

3.2.5 Substation Connections: 115-kV Cable Relocations

HPGF Lines

To extend the 1697 and 1710 HPGF 115-kV circuits from the existing to the new Pequonnock Substation, approximately 730 feet of trench will be required, along with the new splice chamber to be installed adjacent to the existing Pequonnock Substation. The HPGF cable extensions will consist of the same materials as the rest of the 1697 and 1710 underground circuits (i.e., three paper-insulated cables installed in an 8-inch diameter steel pipe filled with nitrogen gas at 200 psi). New pipe and cable will be installed between the new splice chamber and the new Pequonnock Substation GIS enclosure. Figure 3-1 illustrates a typical trench installation for an HPGF cable system, while Table 3-3 summarizes the typical construction sequence for the HPGF cable extensions.

As Table 3-3 describes, after the trench for the HPGF cables is excavated, a thin layer of FTB or equivalent bedding material will be placed on the bottom of the trench. The cable system will be laid on top of the bedding material and then the trench will be backfilled with additional bedding material. The steel pipe will be installed in the trench in lengths of 30 to 40 feet, welded, and x-rayed at the connection to detect any welding defects. After the pipe is placed, swabbed, and mandreled, a wire will be connected to the power cables; this wire will be pulled through the pipe until the cables are fully installed through the pipe. Thereafter, cable will be inspected for damage, and the pipe system will be vacuum-tested to detect any system leaks and moisture ingress. The pipe then will be pressurized with nitrogen gas and capped.

Figure 3-1: Example of a Typical Trench for an HPGF Cable System

Table 3-3: Anticipated General Construction Sequence for HPGF Cable Extensions

TYPICAL CONSTRUCTION ACTIVITIES
Excavate trench from the new Pequonnock Substation to 20 feet outside of the new splice chamber near the existing substation (open excavations may be steel-plated as needed).
Lay new pipes in the trench.
Install new splicing chamber around the two existing pipes at a relatively flat section outside of the existing Pequonnock Substation fence.
De-gas the transmission lines from Seaview Tap to the existing Pequonnock Substation.
During cutover, cut existing steel pipe outside of existing splicing chamber (removing the connection between the new splice chamber and the terminations at the existing Pequonnock Substation).
Bring down the pipe to horizontal position. The splicing chamber side wall will be slotted to allow such movement of the pipe.
Secure existing pipe to splicing chamber floor with supports.
Cut existing pipe at splicing location without damaging cables inside.
Cut and remove the existing cables back to terminations at the existing Pequonnock Substation.
Connect the new pipe with the existing pipe if the condition of existing pipe allows. Pull out existing pipe and insert new pipe into splicing chamber if existing pipes are not fit for reuse.
Cable installation will commence after the last section of pipe has been successfully swabbed, mandreled, and proofed.
Splice the new cable to existing cable at new splicing chamber and terminate the new cable at the new GIS enclosure.
When the cable and piping systems are complete from termination to manhole, the circuit may be considered ready for final evacuation and pressurization. Draw vacuum at new Pequonnock Substation and new splicing chamber.
Start filling nitrogen gas to the system upon successful evacuation and final pressurization of the cable and piping system.
Perform commission tests on the system upon completion of installation.

XLPE Line

The 1955 Line consists of XLPE cables that are installed in 6-inch Schedule 40 PVC conduits, encased in concrete. UI will establish a new duct bank connection between the new substation GIS enclosure and the existing splice chamber (SC1) on Ferry Access Road. Figure 3-2 illustrates a typical duct bank installation within a paved area. Table 3-4 summarizes the anticipated construction sequence for the XLPE cable connection to the new Pequonnock Substation.

In general, for the XLPE cable connection, a trench will be excavated at a required depth and width. After the trench is excavated, a layer of bedding material will be placed to ensure a stable and level subsurface. PVC conduits with a specified diameter and thickness will be assembled and placed in the trench at a predetermined depth and configuration. Conduit spacers will be used to ensure the exact designed configuration and spacing between conduits.

The trench will then be filled with high strength concrete to protect the conduits and facilitate the heat dissipation from the cable. This concrete will extend from the bottom of the trench to cover the conduits, conduit fittings, and reinforcement. The reinforcement, where required, will be designed to meet the particular performance requirements such as high load pressure and ground vertical and/or lateral deformation. An additional layer of FTB will typically be placed on top of the high strength concrete in order to further facilitate the heat transfer.

The topmost layer of cover for the duct bank will consist of either pavement over compacted road base (where the cable is installed beneath Ferry Access Road) or soil / gravel (where the duct bank is aligned beneath un-paved areas of the Project site). This final cover layer will match the surrounding elevations. After the duct bank is installed, one cable per conduit will be pulled through the duct bank, from the termination at the new substation to the splice chamber.

3.3 EXISTING SUBSTATION DECOMMISSIONING

The existing Pequonnock Substation and associated line connections will be decommissioned in accordance with standard UI protocols and any applicable regulatory requirements. Details regarding the decommissioning of these facilities, which will be performed after the Project facilities are operational, will be provided as appropriate in the D&M Plan.

Figure 3-2: Typical XLPE Duct Bank Construction in Road

Source: UI (September, 2011)

Table 3-4: General Construction Sequence for XLPE Cable

TYPICAL CONSTRUCTION ACTIVITIES
Construct the duct bank from the new Pequonnock Substation toward existing splicing chamber SC1, located along the existing 115-kV XLPE cable route in Ferry Access Road. The south traffic lane of Ferry Access road will likely have to be closed during duct bank construction on Ferry Access Road.
In SC1, connect the existing XLPE cable from Singer Substation to the new XLPE segment that will extend to the new Pequonnock Substation.
Pull cable from termination to splicing chamber SC1 after conduits are swabbed and mandrel proofed.
Terminate the XLPE cables at the GIS terminations and splice the new cables to the existing XLPE line from Singer Substation at SC1.
Remove the existing XLPE cable segment that extends from SC1 to the existing Pequonnock Substation. Working from SC1, the cable will be pulled out of the PVC conduits. The empty conduits, which are embedded within the concrete duct bank and buried beneath Ferry Access Road and on UI and PSEG property, will be plugged at both ends and abandoned in place. The cable section that is removed will be disposed of properly, off site.
Perform necessary commission tests on the system upon completion of installation.

3.4 EROSION/SEDIMENTATION CONTROL AND STORMWATER MANAGEMENT

The Project will conform to applicable regulations concerning soil and erosion control and stormwater management. In accordance with the Connecticut Department of Energy and Environmental Protection's (CT DEEP's) *General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities*, UI will prepare a Stormwater Pollution Control Plan (SWPCP) for the construction of the Project and will adhere to the *2002 Connecticut Guidelines for Sedimentation and Erosion Control*, which are designed to avoid or minimize potential adverse environmental effects that may result from construction activities. In addition, any spoils generated during Project construction will be managed in accordance with UI procedures and applicable regulatory requirements.

3.5 CONSTRUCTION SCHEDULE AND WORK HOURS

All construction activities will be conducted in accordance with the work hours identified in the D&M Plan as approved by the Council. In general, Project construction (the new substation and line connections, as well as the removal of the 115-kV line connections to the existing Pequonnock Substation) is expected to require approximately 18-24 months.[8] (Refer to the Project schedule in Section 7 for additional information.)

Typical construction hours will be from 7:00 AM to 7:00 PM, Monday through Saturday. However, some extended hours and Sunday work will be necessary on a limited basis. Substation site preparation, including grading and foundation installation will be performed during the initial six months of construction and will involve the use of earth-moving equipment and construction vehicles. The installation and testing of substation equipment will require approximately 18 months. These activities will involve the use of cranes to unload and install structural elements and large equipment.

To connect the 115-kV lines, substation terminal structures, and the distribution lines, certain transmission and/or distribution equipment will have to be taken temporarily out of service. As a result, this work will be coordinated with the Connecticut Valley Exchange (CONVEX). To complete these interconnections as efficiently as possible with minimal service disruptions, work will have to be performed continuously, requiring construction activities outside of normal work hours.

[8] Plans for the decommissioning of the existing Pequonnock Substation have not been finalized. However, the decommissioning work will likely extend beyond the schedule for the completion of the new substation and line connections.

3.6 DISTRIBUTION LINE RELOCATION AND CONNECTIONS

To deliver power from the substation into UI's electric distribution system in the Bridgeport area, the distribution circuits that connect to the existing Pequonnock Substation will be extended and reconfigured as necessary to link to the new substation. These distribution circuits will consist of duct lines and splice chambers, which will be buried on PSEG and UI property, as well as beneath local roads. The distribution circuit get-away from the new substation will be two new PVC underground duct banks from the substation property exiting directly from new splice chambers. The new PVC duct banks will be installed from the splice chambers to existing distribution duct banks or overhead pole lines.

3.7 PROJECT FACILITIES RELIABILITY, SAFETY AND SECURITY INFORMATION

UI will operate and maintain the new Pequonnock Substation in accordance with standard UI protocols, required industry standards, and good utility practice.

Emergency Operations and Shutdown

UI will equip the substation with measures designed to ensure continued service in the event of outages or faults in transmission or substation equipment. If an energized line or piece of substation equipment fails, protective relaying equipment will immediately remove the failed line or equipment from service, thereby protecting the public and the remaining equipment within the substation.

The Project design includes protective relaying equipment to automatically detect abnormal system conditions (e.g., a faulted overhead transmission line) and to send a protective trip signal to circuit breakers to isolate the faulted section of the transmission system. The protective relaying schemes will include fully redundant primary and backup equipment so that a failure of one scheme will not require the portion of the system being monitored by the protective relaying equipment to be removed from service. The protective relaying and associated equipment, along with a SCADA system for 24/7 remote control and equipment monitoring, will be housed at UI's System Operations Center.

Fire Detection and Suppression Technology

UI incorporates IEEE/ANSI and National Fire Protection Association (NFPA) standards for fire protection in its substation design and operates its facilities to minimize the impact of fire, in the unlikely event of such an occurrence. UI also trains its employees and the local fire department on the safe methods to deal with a substation fire.

At the new Pequonnock Substation, UI will secure the control enclosure and equip it with fire extinguishers and remotely monitored smoke detectors. In the event of a fire, the smoke detectors will automatically activate an alarm at UI's System Operations Center, and the system operators then will take appropriate action.

Physical Site Security

UI will use fencing and gates to protect the Pequonnock Substation; access will be limited to authorized personnel only. Security devices will constantly monitor the substation to alert UI of any abnormal or emergency situations. UI's planned physical site security measures for the substation are outlined as follows:

- A 14-foot-high chain link fence, topped with an additional 1 foot of barbed wire, will be installed around the substation perimeter to discourage unauthorized entry and/or vandalism.
- Security cameras and motion detectors will be installed to provide complete visibility within the interior of the proposed substation and perimeter fence.
- The substation yard will be gated and locked. All gates will be padlocked at the end of the workday during construction activities and at all times once the substation is in service.
- Appropriate signs will be posted at the substation fence and gates, alerting the general public of the presence of high-voltage facilities.
- UI will install low-level LED lighting within the substation yard to facilitate work at night or during inclement weather, as well as to identify entry by unauthorized personnel.

3.7 TRAFFIC MANAGEMENT DURING SUBSTATION OPERATION

UI will design the substation for remote operation, with personnel on site only for periodic inspections, maintenance, and (as needed) emergency work. Permanent access to the property will be via the access road on PSEG property, as well as from Kiefer Street and/or Singer Avenue. The substation access gates will be located such that vehicles entering the site will not impede traffic while unlocking the security gates. UI also will develop an on-site access road to facilitate the movement of maintenance equipment and access to the control enclosure.

4. EXISTING ENVIRONMENTAL CONDITIONS

This section summarizes the existing environmental conditions at the current and proposed Pequonnock Substation sites and associated 115-kV connections, as well as in the general vicinity. This information was compiled from published data, including previous studies conducted of the existing Pequonnock Substation and the PSEG property, as well as environmental and land use data maintained by federal, state, and local governments. In addition, UI conducted field investigations of the Project site and 115-kV line connections, and consulted with various agencies concerning environmental resources in the vicinity.

In addition to the information included in this section, Appendix A includes mapsheets that illustrate the existing conditions in the vicinity of the proposed Project. Appendix B includes correspondence from state agencies concerning the Project, while Appendices C, D, E, and F contain reports commissioned by UI to assess the Project area's environmental characteristics (e.g., water resources, visual resources, cultural resources, noise).

4.1 TOPOGRAPHY, GEOLOGY, AND SOILS

Located within the Coastal Slope physiographic province, the Project area is characterized by topography and soils that have been modified by previous industrial developments, such as BHS, the existing Pequonnock Substation, and the MNR corridor. The U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) identifies all soils in the Project area as urban land (refer to the soils map included in Appendix C). Most of the surficial (unconsolidated) materials are classified as artificial fill with some areas of sand and gravel overlying fines found near the Project site.[9] According to historic aerial photography, the eastern portion of the Project area was reclaimed from the Pequonnock River by fill, generally deposited in the area between the 1930s-1960s.

Glacial deposits underlying the fill are primarily medium-to-dense sand and silt, laid down in a layer that ranges from 5 to 50 feet deep. Bedrock in the Project area consists of schist, gneiss, and phylite in the Orange-Milford belt, Connecticut Valley Synclinorium Iapetos [Oceanic] terrane. Depth to bedrock is identified as approximately 80 feet. There are no bedrock outcrops in the area. The topography of the Project site is flat, and elevations in the Project area are generally approximately 10 feet North American Vertical Datum 1988 (NAVD 88).

[9] Map Catalog, Connecticut Environmental Conditions Online, accessed January 8, 2018, available at http://www.cteco.uconn.edu/map_catalog.asp?town=138.

4.2 WATER RESOURCES AND WATER QUALITY

Surface Water Resources

The City of Bridgeport is located within Connecticut's Southwest Coast Drainage Basin, which includes the Pequonnock River watershed. Both the existing Pequonnock Substation and proposed substation site, along with the existing and proposed transmission line interconnections, are located in upland areas. As determined by a review of the NRCS soil survey mapping and on-site field investigations conducted for UI by Fuss & O'Neill (refer to Appendix C), no inland wetlands or watercourses (based on federal or state jurisdictional criteria) are located on the Project site.

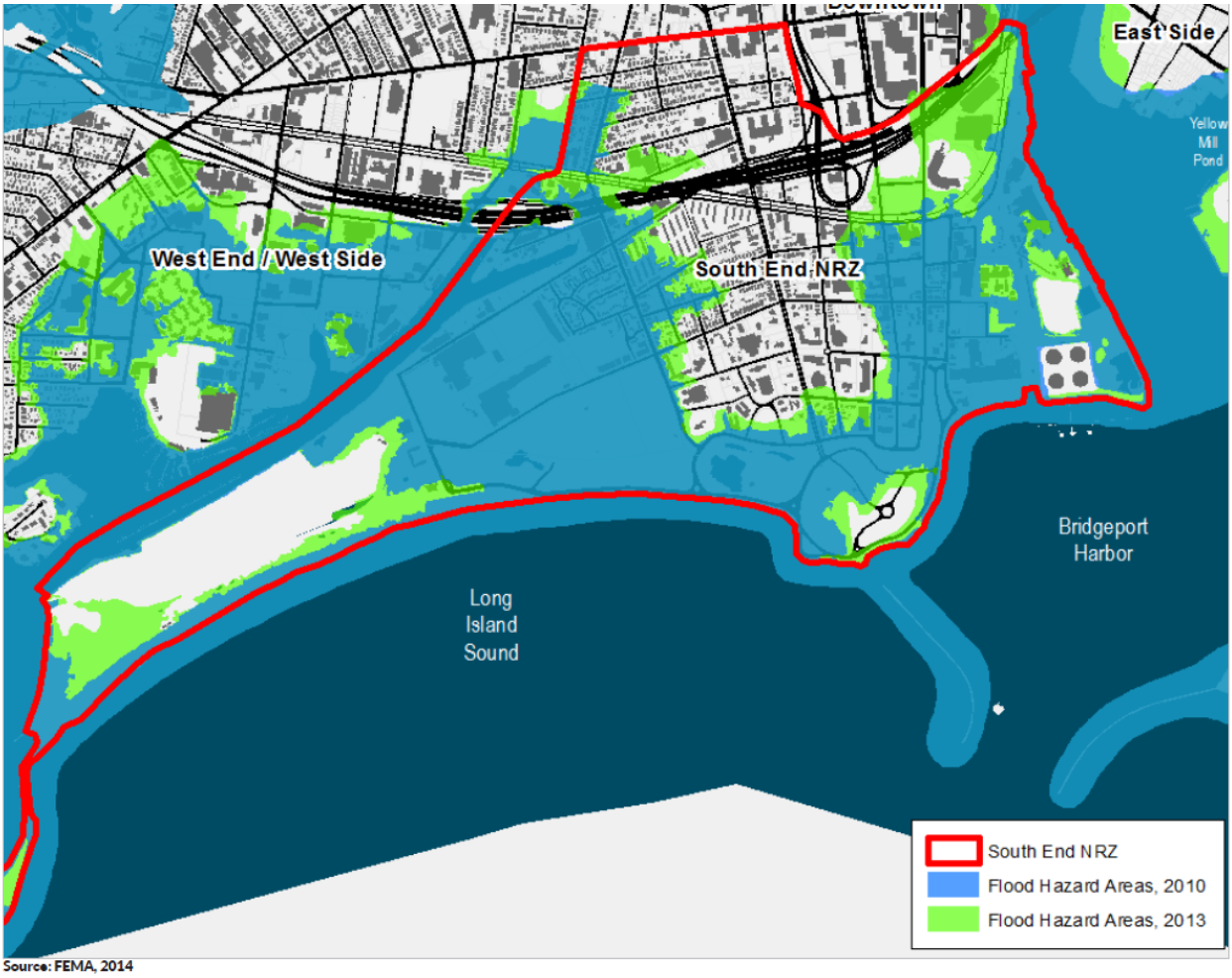
Bridgeport Harbor, which abuts the existing Pequonnock Substation property, has a water quality classification of SB, denoting saline waters that are connected to Long Island Sound and provide habitat for marine fish, other aquatic life and wildlife, commercial shellfish harvesting, recreation, industrial water supply, and navigation. The Harbor is located approximately 0.1 mile east of the Project site. No tidal wetlands are located on the proposed Project site or at the existing Pequonnock Substation, adjacent to which the Harbor shoreline consists of fill armored with stone riprap.

Flood Zones

The FEMA Flood Insurance Rate Map for Bridgeport depicts the existing Pequonnock Substation and proposed Project facilities as within flood Zone AE. As illustrated generally on Figure 4-1 and more specifically on the FEMA floodplain maps in Appendix A, this flood zone designation covers most of the southwestern portion of Bridgeport (i.e., lands south of I-95), including the area identified by the City of Bridgeport as the South End Neighborhood Revitalization Zone (NRZ), in which the proposed Project site is located.

The AE designation signifies areas of a 100-year flood zone within which BFEs and flood hazard factors have been determined. At both the existing and proposed Pequonnock Substation sites, the BFE listed by FEMA is 14 feet.

Figure 4-1: FEMA-Designated Flood Hazard Areas in the Project Vicinity: 2010 and 2013



Source: FEMA, 2014

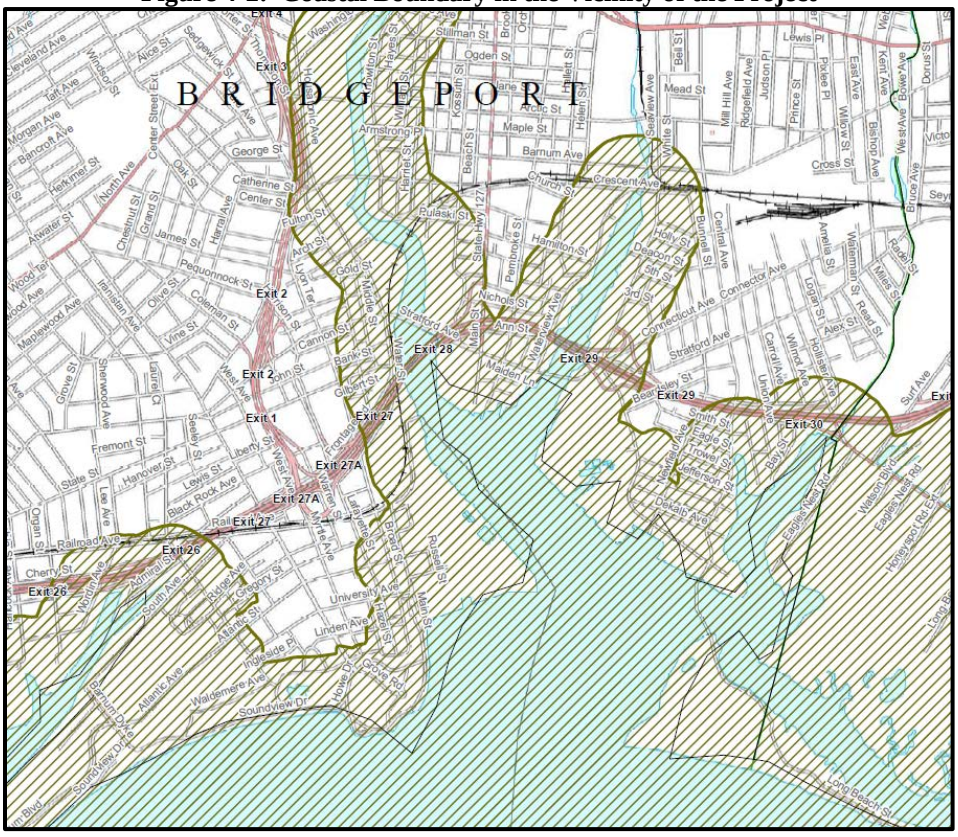
Groundwater Resources, Public Water Supply, and Aquifer Protection Areas

The depth to groundwater in the Project area ranges from 5-9 feet below grade. Regional groundwater flows are to the southeast, toward Bridgeport Harbor. Based on the latest available (January 2011) CT DEEP Groundwater Quality Classification Map data, groundwater in the Project area is classified as GB. Water with a GB classification includes industrial process and cooling waters and base flow for hydraulically-connected water bodies. Such water is presumed not suitable for human consumption without treatment. The classification of groundwater as GB is consistent with the historic industrial uses in the Project area. No Aquifer Protection Areas or public water supply wells are within 0.5 mile of the Project area.

4.3 COASTAL RESOURCES

The existing and proposed Pequonnock Substation sites are within the designated coastal boundary associated with the Pequonnock River and Bridgeport Harbor (refer to Figure 4-2).

Figure 4-2: Coastal Boundary in the Vicinity of the Project



Source: Coastal Boundary, Bridgeport, CT (CT DEEP, 2013)

Connecticut's Coastal Management Act (CCMA; Connecticut General Statutes [C.G.S.] Section 22a-93 (7)(H)) includes both *coastal resource policies*, which pertain to all uses occurring in or affecting any resource category identified in the CCMA, and *coastal use policies*, which apply to major uses and activities subject to the coastal management program. The existing Pequonnock Substation is adjacent to Bridgeport Harbor, but is otherwise surrounded by PSEG's BHS property. The proposed Project site does not encompass or abut any designated coastal resources. However, the site is within a designated "Coastal 'Flood' Hazard Area"; as defined in the CCMA, such areas are lands inundated during coastal storm events or subject to erosion induced by such events, including flood hazard areas as defined and determined by the National Flood Insurance Act and all erosion hazard areas as determined by the Commissioner of the CT DEEP.

4.4 BIOLOGICAL RESOURCES

Vegetation

The existing Pequonnock Substation is entirely developed for utility use (substation equipment within graveled/paved areas) and contains no vegetation. The 3.7-acre Project site is characterized by limited vegetation, except for small areas of lawn and landscaping along Ferry Access Road and a sparsely wooded area adjacent to the MNR corridor.

The 2-acre area proposed for the new substation consists predominantly of a vacant, graveled lot that is presently used by PSEG for equipment and material laydown in support of the construction of its new Unit #5 generator. Small patches of weeds are found along portions of the site boundaries. Vegetation on the northern portion of the Project site (from the MNR corridor to the new substation) consists of some trees (a mix of conifers and deciduous species) and brush, as well as lawn areas and non-native ornamental plantings along either side of Ferry Access Road. Most other vegetation found on the Project site is dominated by state-listed invasive species that are typical of disturbed sites (e.g., Asiatic bittersweet, Norway maple, Tree of heaven, garlic mustard, multiflora rose).

Wildlife

Due to the industrial character of the area and the presence of chain-link security fencing around the existing and proposed substation sites, limited wildlife habitat is available in the Project vicinity. The wildlife that may occur can be expected to be typical of that found in such industrial, urban areas (e.g., nuisance species such as crows, rats, and other small rodents; squirrels, and birds common in developed sites).

Fisheries

Bridgeport Harbor, which abuts the northeastern boundary of the existing Pequonnock Substation site, is designated as Essential Fish Habitat (EFH) by the National Oceanographic and Atmospheric Administration. EFH includes areas used by various fish species for spawning, breeding, feeding, or juvenile growth and protection. Bridgeport Harbor provides EFH for species such as scup, Atlantic herring, summer flounder, black sea bass, and bluefish, among others.

State-Listed Threatened, Endangered, or Special Concern Species

Based on review of the CT DEEP Natural Diversity Database (NDDB) map for the City of Bridgeport dated December 2017, no listed threatened, endangered, or special concern species are located in the upland Project area (refer to the NDDB map included in Appendix B). Habitats for listed species are

identified along the Pequonnock River (northeast of the existing Pequonnock Substation), as well as in Bridgeport Harbor and Long Island Sound.

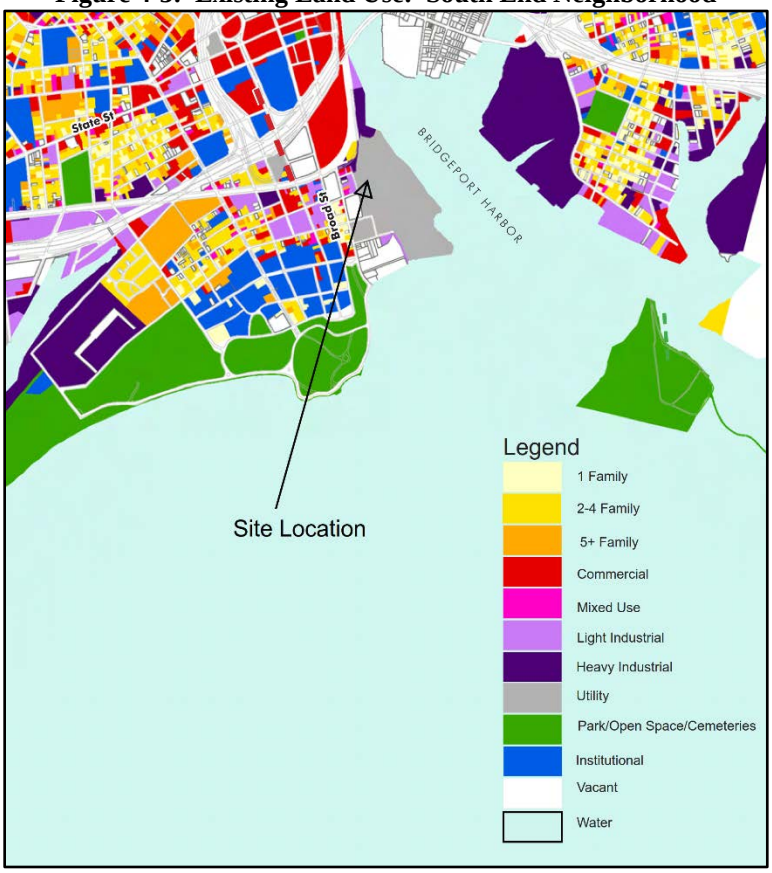
However, because the Project is less than 0.25 mile from the NDDB-mapped habitat associated with the Pequonnock River/Bridgeport Harbor, UI consulted with CT DEEP NDDB to obtain an assessment of the species that might be present in the area. According to the NDDB, Peregrine Falcons (*Falco peregrinus*; a state-listed endangered species) are known to occur close to the boundaries of the Project (refer to CT DEEP NDDB correspondence in Appendix B).

4.5 LAND USE, RECREATION, AND COMMUNITY FACILITIES

Existing Land Use, Zoning, and Recreation

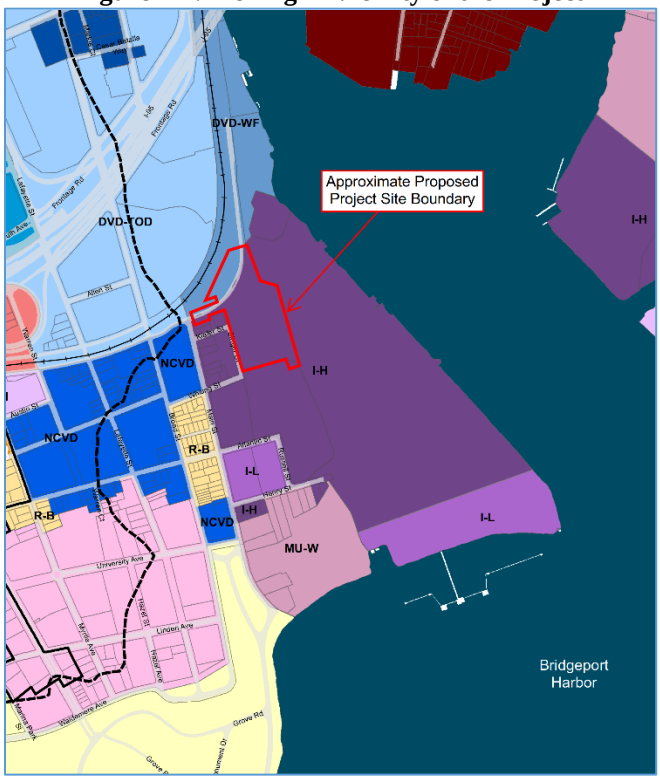
The Project is located in the eastern portion of the City of Bridgeport's South End neighborhood district, in an area historically used and zoned for industrial and commercial development (refer to Figures 4-3 and 4-4). The South End consists of approximately 675 acres, situated predominantly on a peninsula that borders Long Island Sound, immediately south of downtown Bridgeport.

Figure 4-3: Existing Land Use: South End Neighborhood



Source: City of Bridgeport Land Use Map (Excerpted from, 2018)

Figure 4-4: Zoning in Vicinity of the Project



Source: Excerpted from City of Bridgeport Zoning Map, 2016.

As illustrated in Figure 4-3 and the Appendix A maps, lands in the vicinity of the Project site consist of PSEG's BHS facilities, a mix of industrial and commercial uses along Kiefer Street, and Emera Energy's Bridgeport Energy Center and UI's Singer Substation, both located to the south. PSEG is in the process of building a new approximately 485-megawatt (MW) Combined Cycle Facility on the southern portion of the BHS property. Ferry Access Road, which provides public access to the Bridgeport-Port Jefferson Ferry, and the MNR corridor separate the existing and proposed substation sites from downtown Bridgeport. I-95 traverses east-west through Bridgeport, north of the railroad corridor.

In addition, the South End also includes the 258-acre Seaside Park and the University of Bridgeport, which are located approximately 0.27 and 0.25 mile south of the proposed substation site, respectively. Other recreational uses in the Project vicinity include the Ballpark at Harbor Yard (to be redeveloped as an amphitheater) and Webster Bank Arena, both located north of the railroad corridor.

Residential uses are found predominantly in the north-central portion of the South End, generally in the vicinity of Park Avenue. Although some residences are situated approximately 600 feet south of

the proposed substation site, primarily south of Whiting Street, most residential areas are located farther to the west and south.

Based on the 2013 FEMA mapping, approximately two-thirds (459.5 acres) of the South End is located in a designated FEMA flood hazard area (refer to Figure 4-1). Bridgeport Harbor offers water-related recreational opportunities; however, there is no public access to the Harbor via the existing or proposed substation sites.

Lands in the vicinity of the Project area, including the existing Pequonnock Substation and most of the proposed Project site, are zoned predominantly for Industrial-Heavy (I-H) use[10] (refer to Figure 4-4). However, the northern portion of the proposed Project site is within the Downtown Village District (DVD-WF); in this area, land uses consist of the railroad tracks, Ferry Access Road, and PSEG's commercial warehouse building.

Land Use Plans

As the central planning document for the city, Bridgeport's *Master Plan of Conservation and Development: Bridgeport 2020: A Vision for the Future* (March 2008) focuses on six major themes relating to downtown revitalization, expansion of economic opportunities, neighborhood quality, education, infrastructure improvements, and environmental quality initiatives. The Master Plan calls for the modernization of infrastructure, including utilities, as needed. Other City of Bridgeport land use plans that address areas in the general Project vicinity include:

- The *Waterfront Master Plan* (January 2017) describes opportunities for waterfront redevelopment and revitalization. The Plan contemplates a potential public waterfront pathway along the western side of Bridgeport Harbor, adjacent to the ferry terminal, the existing Pequonnock Substation, and PSEG BHS property.

- The *South End Revitalization Zone Strategic Plan* (2014) shows the Project area as within an "eco-industrial" planning district that encompasses waterfront areas. The Plan recognizes that the properties along Bridgeport Harbor consist nearly exclusively of power generation-related uses, such as PSEG's BHS, and recommends that the effect that these uses have on the South End be mitigated by screening and landscaping and that eventually the older power generation facilities be transitioned to renewable energy.

- The *Pequonnock River Trail Extension Alignment Study* (draft April 2015) focused on bicycle routes for recreational cyclists to connect Bridgeport destinations such as Seaside Park, the

[10] Per the City of Bridgeport Zoning and Subdivision regulations, the I-H Zone is intended to reserve appropriate areas of the City for those industries that are not desirable in or adjacent to non-industrial areas.

University of Bridgeport, Beardsley Park and Zoo, etc. The study identifies Ferry Access Road as part of the bicycle route.

Connecticut's *Conservation & Development Policies Plan 2013-2018* (2013) identifies the Project area as directly south of Bridgeport's Regional Center. The Plan advocates redeveloping and revitalizing regional centers with existing or currently planned physical infrastructure (Growth Management Principle #1). Part of this Growth Management Principle calls for minimizing potential impacts from natural hazards, such as flooding, when siting infrastructure and developing property.

Community Facilities

Community facilities consist of daycare facilities, community centers, senior centers, hospitals, schools, recreational areas, and youth camps. The community facilities within 2,000 feet of the Project area (all located in the City of Bridgeport) are illustrated on Figure 4-5 and listed in Table 4-1.

Table 4-1: List of Community Facilities within 2,000 Feet of Project Area

Community Facility Type/Name	Address	Distance from Proposed Project Site (feet, direction)
Schools		
Capital Prep Harbor Upper School	777 Main Street	1,640' N
Housatonic Community College	900 Lafayette Blvd	1,584' NW
Abcd Jamie Hulley Early Learning	460 Lafayette Street	900' W
Recreational Area/Park		
Seaside Park	1 Barnum Dyke	1,425' S
Knights Field	113 University Avenue	1,425' SW

4.6 VISUAL AND AESTHETIC CHARACTERISTICS

In the Project area, heavy industrial uses and transportation facilities (e.g., the various power generating facilities, existing Pequonnock Substation, railroad corridor, ferry terminal) dominate the visual environment. As a result of these land uses, the Project area has no designated scenic attributes.

Figure 4-5 provides a representative aerial view of the Project area, while Figure 4-6 illustrates the existing visual characteristics of the proposed substation site and immediate vicinity. The *Visibility Analysis* (Appendix D) includes additional photographs that illustrate the existing visual landscape.

Figure 4-5: Community Facilities within 2,000 Feet of the Project Area

Figure 4-6: Representative View of Proposed Substation Site and Immediate Vicinity

4.7 TRANSPORTATION AND UTILITIES

The City of Bridgeport has a well-developed transportation network and is served by a full complement of utilities (electric, natural gas, sewers, public water, telephone, cable). The public transportation system in the vicinity of the Project consists of I-95, the MNR/Amtrak railroad lines and Bridgeport railroad station, Bridgeport bus terminal, and the Bridgeport-Port Jefferson Ferry, as well as local roads such as Main Street, Kiefer Street, and Singer Avenue.

Ferry Access Road, which bisects the Project site, provides the only direct vehicular access to the ferry terminal. The road is public west of Main Street; however, the portion of the road from Main Street to the ferry terminal, including the segment within the Project site, is privately-owned. The Bridgeport-Port Jefferson Ferry operates seven days/week, typically from 6:00 AM to 8:15 PM Monday – Thursday; 6:00 AM to 10:15 PM Friday – Saturday; and 7:30 AM to 10:15 PM on Sunday.

No airports are located in the immediate Project area. The nearest airport is Sikorsky Memorial Airport, a general aviation facility that is situated approximately 3 miles to the southeast, adjacent to Long Island Sound in the Town of Stratford.

Major utility facilities in the Project area include PSEG's BHS and associated combined-cycle power plant (currently under construction and expected to be in service in 2019), Emera Energy's 560-MW Bridgeport Energy combined-cycle natural-gas fired plant and associated switching station, and UI's Singer Substation. Nearby transmission facilities include the eight 115-kV lines that connect to the existing Pequonnock Substation, as well as the Middletown-Norwalk 345-kV underground transmission cable (located beneath Ferry Access Road and Main Street in the Project vicinity). In addition, 13.8-kV lines link the existing Pequonnock Substation to UI's distribution system.

4.8 CULTURAL (ARCHAEOLOGICAL AND HISTORIC) RESOURCES

To assess the potential sensitivity of the Project area for the location of archaeological resources and to identify known archaeological and historic sites in the vicinity, UI commissioned Heritage Consultants LLC (Heritage) to perform a cultural resources review of the proposed Project site and vicinity; Appendix E includes a copy of the Heritage cultural resource report (dated January 4, 2017).

Heritage's analyses determined that the Area of Potential Effect (APE)[11] no longer has any archeological sensitivity due to a long history of land modification and urban development. Within approximately 500 feet of the proposed Project site, Heritage identified a single archaeological site and two National Register of Historic Places (NRHP) districts. In line with the determination on the APE, Heritage also concluded that due to a long history of land modification and urban development, the Project would not have any effect on the viewsheds of the archaeological or NHRP sites.

UI submitted Heritage's report, along with a "Project Review Cover Form" to the Connecticut SHPO, seeking the SHPO's concurrence with Heritage's findings (refer to Appendix E). On July 25, 2017, the SHPO concurred with Heritage's findings and determined that no historic properties will be affected by the Project and that no further review is required. Appendix B includes the correspondence from the SHPO.

[11] Pursuant to the National Historic Preservation Act (36 CFR 800.16[d]), the Area of Potential Effect (APE) refers to the geographic area within which a project may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking. Direct impacts would result from ground disturbance, whereas indirect effects may involve change in the visual environment and context of standing historic structures.

4.9 AIR QUALITY, NOISE, AND LIGHTING

Air Quality

Ambient air quality is affected by emissions from mobile sources (e.g., vehicles) and stationary sources (e.g., manufacturing facilities, gasoline stations, power plants). Naturally-occurring pollutants, such as radon gas, also affect air quality. Ambient air quality in Connecticut is monitored by CT DEEP; air quality conditions are assessed based on compliance with the National Ambient Air Quality Standards (NAAQS) for six criteria pollutants (sulfur dioxide, carbon monoxide, nitrogen dioxide, particulate matter, lead, and ozone). The state is in attainment for all criteria pollutants except ozone. CT DEEP data shows that measured ozone levels in Connecticut exceed the NAAQS on several days each summer, depending on weather conditions. Ambient air quality in the Project area can generally be expected to mirror conditions in the state as a whole.

Noise

Existing noise levels in the Project area are representative of a developed urban setting and are particularly influenced by the surrounding industrial and commercial uses, as well as by train movements/whistles and traffic on both local roads and I-95. Table 4-2 lists the typical sound levels associated with different types of land use conditions and activities, as defined by sound pressure level (decibels on the A-weight scale [dbA] – an expression of the relative loudness of sounds in air as perceived by the human ear).

Both the City of Bridgeport Noise Ordinance and Connecticut noise regulations (RCSA §§ 22a-69-1 to 22a-69-7.4, 2015) prescribe the same A-weighted maximum sound pressure levels, based on land use at the noise emitter and receptor. These regulations define daytime vs. nighttime noise periods, classify noise zones based on land uses, and identify noise standards for each zone, specifying that noise emitters must not cause the emission of excessive noise beyond the boundaries of their noise zone so as to exceed the allowable noise levels on a receptor's land.

Table 4-3 lists the City and Connecticut noise zone standards, by emitter (source) and receptor (receiver) noise classification. The existing Pequonnock Substation is considered an industrial emitter, as will be the proposed substation.

Table 4-2: Typical Noise Levels Associated with Different Indoor and Outdoor Activities

SOUND PRESSURE LEVEL, dBA	SUBJECTIVE EVALUATION	COMMON OUTDOOR ENVIRONMENT OR SOURCE	COMMON INDOOR ENVIRONMENT OR SOURCE
140	Deafening	Jet aircraft at 75 ft	
130	Threshold of pain	Jet aircraft during takeoff at a distance of 300 ft	
120	Threshold of feeling	Elevated train	Hard rock band
110	Extremely loud	Jet flyover at 1000 ft	Inside propeller plane
100	Very loud	Power mower, motorcycle at 25 ft, auto horn at 10 ft	
90	Very loud	Propeller plane flyover at 1000 ft, noisy urban street	Full symphony or band, food blender, noisy factory
80	Moderately loud	Diesel truck (40 mph) at 50 ft	Inside auto at high speed, garbage disposal, dishwasher
70	Loud	B-757 cabin during flight	Close conversation, vacuum cleaner, electric typewriter
60	Moderate	Air-conditioner condenser at 15 ft, near highway traffic	General office
50	Quiet		Private office
40	Quiet	Farm field with light breeze, birdcalls	Soft stereo music in residence
30	Very quiet	Quiet residential neighborhood	Bedroom, average residence (without TV and stereo)
20	Just audible		Human breathing
10	Threshold of hearing		
0			

Source: Adapted by Black & Veatch from *Architectural Acoustics*, by David M. Egan (1988) and *Architectural Graphic Standards*, by Ramsey and Sleeper (1994).

Table 4-3: State of Connecticut and City of Bridgeport: Maximum Sound Pressure Level Noise-Control Levels (By Emitter and Receptor Land Use)

Noise Emitter Land Use	Noise Receptor Land Use			
	Industrial	Commercial	Residential (Day)	Residential (Night)
Industrial	70 dBA	66 dBA	61 dBA	51 dBA
Commercial	62 dBA	62 dBA	55 dBA	45 dBA
Residential	62 dBA	55 dBA	55 dBA	45 dBA

Notes:
The State of Connecticut defines "day" as the hours from 7:00 AM to 10:00 PM, and night from 10:00 PM to 7:00 AM all days of the week. The City of Bridgeport defines "day" as the hours from 7:00 AM to 6:00 PM, and night from 6:00 PM to 7:00 AM, Monday through Friday. On Saturday and Sunday, the City defines "day" as from 9:00 AM to 6:00 PM, and night from 6:00 PM to 9:00 AM.

To define baseline ambient noise levels specific to the Project area and the proposed substation site in particular, UI commissioned a noise study (refer to Appendix F). Measurements were taken at the PSEG property line near the proposed substation site, as well as at three residential areas (along Main, Whiting, and Broad streets) located west of the Project area.

This study demonstrated that at the proposed substation site and at measurement locations along municipal streets to the west, short-term ambient daytime noise levels ranged from about 60.6 to 62.9 dBA, while nighttime ambient noise levels were between 55.5 and 58 dBA[12]. Based on the results of the noise study, the ambient sound environment at most residential sites presently exceeds the 61 dBA day time and 51 dBA nighttime regulatory criteria; highway noise is the dominant contributing source to the ambient noise environment. In comparison, existing noise levels at the industrial sites closest to the proposed substation site did not exceed the 70 dBA criteria during either the day or night time.

Lighting

The Project area is located in a busy, well-lit urban region, characterized by a variety of lighting sources from the surrounding industrial, commercial, and transportation uses. Such uses include the PSEG BHS, Bridgeport Energy facility, Bridgeport-Port Jefferson Ferry, I-95, MNR, and general commercial uses in the South End and downtown sections of the City of Bridgeport.

[12] These measurements reflect "filtered" sound levels, expressed in Leq, for each site. The levels were "filtered" to eliminate atypical sounds, such as wind-induced noise and sounds from trains, etc., and thereby to allow a better comparison of noise levels. (Leq, or equivalent sound level, is the preferred method to describe sound levels that vary over time, resulting in a single decibel value that takes into account the total sound energy over the time period of interest.)

Note: This page intentionally left blank.

5. POTENTIAL ENVIRONMENTAL EFFECTS AND MITIGATION MEASURES

The Project will be consistent with the long-established industrial uses in the vicinity and will have a positive long-term effect on the reliability of the electric system. The new Pequonnock Substation and associated 115-kV line interconnections will be located entirely within upland areas affected by previous industrial uses. As a result, environmental effects are expected to be minor and highly localized to the Project vicinity. UI will mitigate such impacts to the extent practical by implementing standard construction best management practices and conforming to the conditions of Project permits and approvals.

The anticipated impacts and proposed mitigation measures identified in this section are based on UI's experience in constructing, operating, and maintaining substations and associated electric transmission and distribution connections, as well as on the results of the Project-specific environmental studies, engineering and constructability reviews, and agency consultations conducted to date. Additional measures to avoid or minimize environmental effects may be identified as part of the ongoing engineering design and constructability reviews, the Council's Application review process, and further consultations with regulatory agencies. Mitigation measures will be reflected in the final Project design and incorporated into the Project D&M Plan.

5.1 TOPOGRAPHY AND GEOLOGY

The Project will not affect geological conditions and will have only minor and highly localized effects on topography.

The construction of the Project will involve both short- and long-term topographic modifications. The proposed substation site will be modified as appropriate to assure that the new substation equipment is situated above FEMA's current BFE for the area of 14 feet NAVD88. UI anticipates that the substation will be developed above the BFE using a DFE that will place the substation equipment at an elevation of BFE + 3 feet NAVD88. This will require topographic modifications to the relatively flat site, which is currently at an elevation of approximately 10 feet NAVD88.

The DFE will be achieved by grading and/or filling as needed, as well as by incorporating a design that will elevate the substation equipment above ground level. Appendix A includes the site plan and elevations for the proposed substation.

5.2 SOILS, GROUNDWATER, AND STORMWATER MANAGEMENT

Soils, groundwater, and stormwater will be managed appropriately during the construction of the Project. Further, as part of the design of the new substation, UI will incorporate engineering controls to manage stormwater runoff during the operation of the facility.

During Project construction, in addition to the topographic modifications to the new substation site, certain work activities will disturb soils. Groundwater also could be encountered in the excavations for the Project facilities.

Construction activities that will disturb soils include the installation of foundations for the substation enclosures and overhead transmission line structures, as well as the excavations for the underground 115-kV line trenches and for the new HPGF splice chamber. Soils will be pre-characterized and subsequently managed in accordance with CT DEEP solid waste regulations and UI requirements. Certain impacted soils excavated during Project construction may be removed from the Project area and properly disposed off-site. UI will adhere to state and federal requirements for the disposal of any contaminated soils.

Contaminated groundwater, if any, encountered during Project construction will be managed in accordance with applicable CT DEEP permits. For example, prior to discharge, the groundwater may be pumped into an appropriate treatment system, which may include a fractionization (frac) tank, a series of bag filters, and/or carbon vessels. Specific measures will be further identified in the D&M Plan.

To minimize the potential for off-site erosion and sedimentation during construction, UI will prepare and submit a Project-specific SWPCP pursuant to the requirements of the CT DEEP's *General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities*. UI will deploy temporary soil erosion and sedimentation controls around construction work areas, as appropriate. Controls commonly used during construction activities include hay/straw bales, silt fence, straw wattles, diversion swales, track pads, hay bale corrals for management of spoils or concrete washout areas, and erosion control blankets. UI will routinely perform monitoring and inspections to verify the effectiveness of the erosion and sedimentation controls and will modify such measures as required.

5.3 WATER RESOURCES AND WATER QUALITY

The Project will not affect inland or coastal water resources or water quality, and is not located near any designated aquifer protection areas. In addition, the new substation will be designed to be above the FEMA BFE for the area. To minimize the potential for runoff into municipal sewers and to protect water

resources in the vicinity (e.g., Bridgeport Harbor), during the construction of the Project, UI will install erosion and sediment controls and will perform environmental inspections, pursuant to the SWPCP.

5.4 COASTAL RESOURCES

The Project will be located in uplands and will not affect any coastal water resources, coastal uses, or public access to Bridgeport Harbor. All Project activities, including those at the existing Pequonnock Substation site (e.g., installation of the new HPGF splice chamber and HPGF line extensions), will be located inland of the Coastal Jurisdiction Line, which for the City of Bridgeport is at an elevation of 5.0 NAVD88[13]. Although the entire Project site is within the designated coastal boundary, the Project will not conflict with any defined coastal policies that provide guidelines for uses and activities subject to Connecticut's coastal management program.

5.5 SPILL PREVENTION AND CONTROL

UI will require its contractors to adhere to spill prevention and control protocols during Project construction. Such protocols may include maintaining adequate spill kits on site and assuring that contractor personnel are aware of the proper procedures for promptly containing, cleaning up, and disposing of spilled materials, as well as for reporting spills to the CT DEEP Emergency Response Unit. As part of the decommissioning of the existing Pequonnock Substation, UI will properly remove and dispose of all equipment and fluids.

For the operation of the new substation, UI will develop and implement a *Spill Prevention Control and Countermeasures (SPCC) Plan*. The SPCC Plan will include, but will not be limited to, mitigation measures to be used during facility operation (secondary containment, audio/visual alarms, etc.), environmental emergency contacts, and oil-filled equipment inspections.

5.6 BIOLOGICAL RESOURCES

Because the Project will be predominantly located within areas already developed for industrial use, little vegetation and wildlife habitat will be affected. Except for the lawn areas and landscaping adjacent to Ferry Access Road and a small area of trees south of the MNR corridor, the Project site consists of vacant or paved/graveled land that is devoid of vegetation other than scattered areas of low-growing weeds. The development of the new substation will not require the removal of any trees or shrubs, but all herbaceous (weed) species will be cleared during site preparation activities. The relocation of the 115-kV lines will require tree removal or pruning only as needed to bring the overhead lines from the MNR corridor, over

[13] Projects involving work at or below the Coastal Jurisdiction Line require coastal permits from CT DEEP.

Ferry Access Road, and into the new substation. Low-growing vegetation also will be mowed or removed as necessary where work pads and temporary access will be required to install the new 115-kV structures and remove the existing 115-kV structures.

No vegetation removal will be required along the routes for the underground 115-kV line relocations or for the new HPGF splice chamber. All underground cable relocation work will either extend across PSEG and UI industrial property or will be located in Ferry Access Road.

Because of the Project site's industrial/urban characteristics, the construction and operation of the new substation will result in only minor and localized impacts to the limited urban wildlife species that could be found in the vicinity. Such species, if present, would be displaced from Project construction sites; however, other similar urban habitats are available in the vicinity.

Further, no impacts to the Peregrine Falcon (state-listed Threatened species) are anticipated because UI will implement measures, as endorsed by the CT DEEP NDDB to protect this species, such as retaining a qualified ornithologist to monitor construction activities during the period when this species could be present in the area. The measures that UI proposes to protect the species are included in correspondence to CT DEEP NDDB (refer to Appendix B).

5.7 LAND USE, RECREATION, AND COMMUNITY FACILITIES

The Project will be located entirely within areas that historically have been dedicated to industrial and utility/transportation uses. As a result, the Project will be consistent with existing and future land use plans and will not affect any designated public recreational uses.

The development of the new Pequonnock Substation will result in the conversion of the Project site to productive utility use. The new substation will be consistent with the adjacent and nearby energy developments (e.g., PSEG's BHS, Emera's Bridgeport Energy facility, UI's Singer Substation) and will not adversely affect land uses. No residential areas or community facilities are located in the immediate site vicinity. Similarly, the 115-kV transmission line connections to the new substation will be routed in areas devoted to transportation or utility uses (e.g., UI, ConnDOT, or PSEG properties) and will have no adverse effect on existing land uses.

5.8 VISUAL AND AESTHETIC CHARACTERISTICS

To evaluate the potential views of the Project from nearby locations, UI retained All-Points Technology Corporation, P.C. The resulting *Visibility Analysis*, which is provided in Appendix D, included a combination of field evaluations and three-dimensional computer modeling to portray scaled renderings of the proposed substation and associated overhead 115-kV line connections.

The *Visibility Analysis* determined that the Project will not adversely affect views in the surrounding community. The new substation will be visible from abutting locations along Ferry Access Road (to the north and west), as well as from a short stretch along I-95. In addition, the new transmission line structures will be visible for approximately 0.25 mile to the north and west. However, the extensive adjacent industrial, commercial, and infrastructure developments will serve to obstruct most views of the substation. Figure 5-1 provides a photographic simulation of the rebuilt Pequonnock Substation in relation to surrounding land uses.

Figure 5-1: Photosimulation of Proposed Pequonnock Substation and Vicinity

5.9 TRANSPORTATION AND UTILITIES

The construction and operation of the proposed Project will not result in any significant adverse effects on transportation or utility systems. Moreover, by mitigating the risk of damage to the substation from coastal flooding and updating the substation equipment in general, the Project will have a positive effect on the reliability of the state and regional electric system.

The Project area is readily accessible from the local and regional highway network. Access for construction will be via local roads, including private roads on PSEG property and Ferry Access Road. Some construction activities could result in minor and short-term effects to vehicular traffic on the local roads leading to the Project area, such as Ferry Access Road. For example, localized traffic congestion may occur when heavy construction equipment or large components are transported to work sites, when construction personnel travel to and from the Project, and when the work is performed along Ferry Access Road to connect the new overhead 115-kV lines and the XLPE cable to the new substation and to remove the existing 115-kV connections to the old substation. However, these effects will be minor and short-term. To the extent practical, UI will coordinate work to minimize potential impacts to traffic on Ferry Access Road and to maintain access to the Bridgeport-Port Jefferson Ferry.

The Project area also is served by public water, sewer, and storm sewer systems, as well as other utilities. The Project will not affect any above-grade existing municipal utilities. UI will coordinate with the City of Bridgeport regarding other municipal utilities, and will design the Project to avoid impacts to existing utility systems.

5.10 CULTURAL (ARCHAEOLOGICAL AND HISTORIC) RESOURCES

The Project will not result in any adverse effects to known cultural (archaeological or historic) resources. As documented in the Heritage cultural resources review (refer to Appendix E), throughout the 19th and 20th centuries, the Project site was affected by a variety of urban developments; as a result, the site no longer has any archaeologic sensitivity. Similarly, the existing large energy facilities and other urban developments in the vicinity preclude the potential for the Project to cause indirect impacts to the viewsheds of nearby standing historic structures (i.e., the Mary and Eliza Freeman Houses and William D. Bishop Cottage Development). After review of the Heritage report, the SHPO concurred that the Project would have no adverse effect on cultural resources and determined that no further cultural review is required (refer to SHPO correspondence in Appendix B).

Although unlikely, buried archaeological materials could be encountered during excavation activities performed during Project construction. To address this contingency, UI will include in the Project D&M Plan protocols for implementation in the event that unanticipated cultural materials are unearthed during construction. UI's civil contractor will be briefed on such protocols.

5.11 AIR QUALITY, NOISE, AND LIGHTING

The construction and operation of the Project will have minimal and highly localized effects on air quality, noise, and lighting.

Air Quality

The development of the Project will result in short-term and localized effects on air quality as a result of emissions from construction equipment and vehicles, as well as from fugitive dust emissions generated during earth-moving activities. The operation of the Project facilities will not result in adverse impacts to air quality.

To minimize emissions from construction equipment and vehicles, UI will require Project contractors to properly maintain equipment and to adhere to Connecticut's anti-idling requirements (RCSA § 22a-174-18). In addition, UI will require its contractors to control dust emissions by applying water or equivalent substances to exposed soils on the site, as necessary, per guidance provided in the SWPCP. To minimize tracking of dirt from Project construction areas onto Ferry Access Road (and other paved roads, if used for construction access), UI will install crushed stone anti-tracking pads, if necessary.

Noise

The construction of the Project will result in minor and highly localized increases in noise associated with construction activities, such as the operation of equipment, the excavations for foundations and cable trenches, and the installation of the substation and transmission line facilities, etc. However, because the proposed Project facilities are located within an industrial area, adjacent to the railroad corridor, and near I-95, the temporary increases in sound levels will be consistent with the existing ambient conditions.

The operation of the substation will generate noise due to sound propagated from the 115-kV / 13.8-kV power transformers. However, the results of the noise study commissioned for the Project (refer to Appendix F) demonstrate that the sound from the substation is predicted to be below allowable state and municipal sound limits. Moreover, the new substation is within an area characterized by high background (ambient) sound due to sources such as traffic on I-95 and on local roads. As a result, the operational

noise from the new substation is expected to be within the allowable sound level limits for adjacent land uses in the surrounding community and at the property line. In addition, when considered in the context of existing ambient sound levels, the substation is not expected to produce prominent discrete tones under the definitions contained in CT DEEP noise regulations. Appendix F includes detailed information concerning the noise modeling results at receptors in the vicinity of the new substation.

Lighting

The Project is located within a densely-developed urban area that is well-lit due to the existing industrial facilities and nearby transportation network. As a result, the construction and operation of the Project will result in only localized and minor modifications to the lighting environment.

The construction of the Project facilities will typically occur during the day-time, when artificial lighting will not be required. If certain construction activities must be performed during night-time (e.g., to adhere to outage requirements), temporary lighting will be positioned to illuminate work areas. Such temporary lighting will not affect areas outside the general vicinity of work sites.

At the new Pequonnock Substation, low-level lighting will be installed for safety and security purposes. The illumination from these lights will be visible in the immediate vicinity of the substation; however, such lighting will be consistent with the illumination of other industrial facilities in the vicinity. UI will employ additional lighting only for work at night under abnormal or emergency conditions. The lights at the new substation will incorporate UI's standard design for illumination of substation yards (i.e., the use of area lights mounted on equipment support structures, perimeter fence posts, and enclosures).

6. ELECTRIC AND MAGNETIC FIELD CONSIDERATIONS

To assess the electric and magnetic fields (EMF) associated with the Project, UI retained Exponent, a company that specializes in such evaluations. Exponent's report includes measurements of existing EMF levels near the existing Pequonnock Substation and associated transmission lines and provides the results of modeling of anticipated EMF levels associated with the proposed Project facilities. This section summarizes the key findings of the Exponent report, which is included in Appendix G.

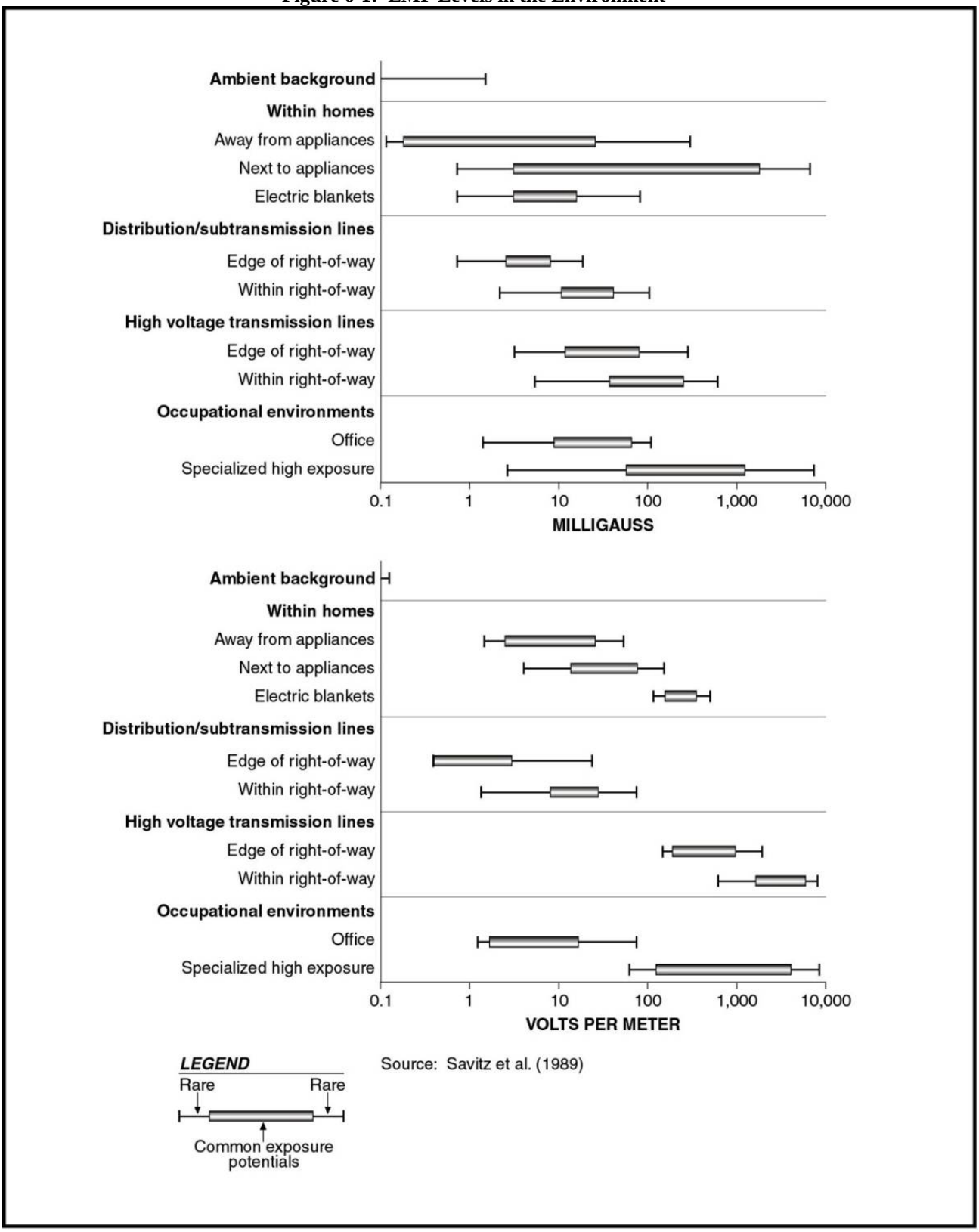
6.1 OVERVIEW

EMF surround anything that generates, transmits, or uses electricity. As a result, people living in modern communities are surrounded by sources of EMF on a daily basis. Figure 6-1 depicts typical EMF levels in residential and occupational environments, as well as on or at the edges of transmission line ROWs. Magnetic and electric fields are described as follows:

- ***Magnetic Fields:*** The current flowing in the conductors of a substation bus-line or an overhead transmission line generates a magnetic field near the conductor. The strength of Project-related magnetic fields is expressed as magnetic flux density in units of milligauss (mG) where 1 Gauss = 1,000 mG. In the case of alternating current (AC) transmission lines, these currents (and thus magnetic fields) vary in direction and magnitude with a 60-Hertz (Hz) cycle. The level of the magnetic field around conductors varies with the circuit loading. Circuit loadings are expressed in units of amperes (A). Because of variations in circuit loading, measurements or calculations of the magnetic field present a snapshot of the magnetic field at only one moment in time. On a given day, throughout a week, or over the course of months and years, the magnetic field level can change depending upon the patterns of power demand on the bulk transmission system.

- ***Electric Fields:*** The voltage on the conductors of transmission lines generates an electric field in the space between the conductors and the ground. Many objects are conductive, including fences, shrubbery, and buildings, and thus shield electric fields. Electric fields within the Pequonnock Substation therefore are not calculated since they are likely to be blocked by the substation fence. In addition, the buried distribution lines will not be a source of 60-Hz electric fields above ground, since electric fields are confined by the cables' conductive sheath and armor, as well as blocked by the surrounding soil and duct bank. Electric field levels were calculated beneath the transmission lines and are expressed in units of kilovolts per meter ("kV/m"); 1 kV/m is equal to 1,000 volts per meter ("V/m").

Figure 6-1: EMF Levels in the Environment



6.2 EMF MEASUREMENTS AND MODELING

To assess pre-Project conditions, measurements of EMF levels from existing sources were taken at the proposed boundaries of the existing substation site and at locations along the existing and proposed 115-kV line connections. Exponent modeled magnetic field levels associated with the existing and proposed configurations of the substation and the 115-kV lines, assuming peak load conditions at the time of UI's submission of the Application for the Project to the Council (i.e., second quarter 2018) and projected peak daily average load anticipated within five years after the Project is completed.

Magnetic field profiles were calculated along six profiles around the Project, as detailed in Exponent's report, while electric field measurements were taken at 16 locations in the vicinity of the existing Pequonnock Substation/115-kV line connections and proposed Project facilities. The assumptions used in the modeling are consistent with Council guidelines, as summarized in Section 6.4.

6.3 ASSESSMENT CRITERIA

Neither the federal government nor the State of Connecticut has enacted standards for EMF from power lines or other sources at power frequencies; however, the CSC has developed guidelines for siting new transmission lines, as summarized in Section 6.4. Several states have statutes or guidelines that apply to fields produced by new transmission lines, but these guidelines are not health based. For example, New York and Florida have limits on EMF that were designed to limit fields from new transmission lines to levels characteristic of the fields from existing transmission lines.

More relevant EMF assessment criteria include the exposure limits recommended by scientific organizations. These exposure limits are included in guidelines developed to protect health and safety and are based on reviews and evaluations of relevant health research.

The guidelines include exposure limits for the general public recommended by the International Committee on Electromagnetic Safety (ICES) and the International Commission on Non-Ionizing Radiation Protection (ICNIRP) to address health and safety issues.[14] In a June 2007 Factsheet, the World

[14] International Committee on Electromagnetic Safety (ICES). IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields 0 to 3 kHz. Piscataway, NJ: IEEE, 2002; International Commission on Non-ionizing Radiation Protection (ICNIRP). Guidelines for limiting exposure to time-varying electric and magnetic fields (1 Hz to 100 kHz). Health Phys 99: 818-836, 2010.

Health Organization recommended that policy makers adopt international exposure limit guidelines, such as those from ICNIRP or ICES (refer to Table 6-2), for occupational and public exposure to EMF.[15]

Table 6-2: ICNIRP and ICES guidelines for EMF exposure at 60-Hz

	Exposure (60 Hz)	
	Electric Field	Magnetic Field
ICNIRP		
Occupational	8.3 kV/m	10 G (10,000 mG)
General Public	4.2 kV/m	2 G (2,000 mG)
ICES		
Occupational	20 kV/m	27.1 G (27,100 mG)
General Public	5 kV/m*	9.040 G (9,040 mG)

*Within power line ROWs, the guideline is 10 kV/m under normal load conditions.

6.4 CONSISTENCY WITH CSC BEST MANAGEMENT PRACTICES

In 2007, the CSC adopted *EMF Best Management Practices for the Construction of Electric Transmission Lines in Connecticut* (EMF BMP) based upon a consensus of health and scientific agencies that the scientific evidence "reflects the lack of credible scientific evidence for a causal relationship between MF [magnetic field] exposure and adverse health effects." (CSC, p. 3). Nevertheless, the CSC concluded that precautionary measures for the siting of new transmission lines in Connecticut are appropriate and should include "the use of effective no-cost and low-cost technologies and management techniques on a project-specific basis to reduce MF [magnetic field] exposure to the public while allowing for the development of efficient and cost-effective electrical transmission projects" (CSC, p. 11).

The CSC's EMF BMP was revised on February 20, 2014; this version of the EMF BMP formed the basis for Exponent's review of the Project's consistency with the CSC guidelines. Although the EMF BMP explicitly applies to transmission lines, not substations, Exponent endeavored to meet the spirit of these BMPs as interpreted for a substation. The Project does not involve the development of new transmission lines, but rather the relocation of existing 115-kV transmission lines. However, the EMF levels from these lines post-Project will be similar to the pre-Project EMF levels.

Exponent described the Project as consistent with the CSC's EMF BMP for "no cost/low-cost" design because:

[15] World Health Organization (WHO). Fact Sheet No. 322: Electromagnetic Fields and Public Health – Exposure to Extremely Low Frequency Fields. Geneva, Switzerland: World Health Organization, 2007.

- There are no adjacent statutory (community) facilities in the vicinity of the Project; and
- The rebuilt Pequonnock Substation will be located in an industrial area and the proposed terminations of overhead transmission lines will have essentially no effect on the calculated magnetic field at the closest residences (which are located west of the substation, along Main Street).

6.5 CONCLUSIONS

The proposed Project will not significantly change EMF levels in the vicinity. Because the configurations of the rebuilt substation and relocated 115-kV transmission line connections will be similar to those at the existing substation, the EMF levels also will be similar. The calculated magnetic field levels and measured electric levels in the vicinity of the substation will be a small fraction of those recommended for the general public by international health-based standards (i.e., ICES and ICNIRP).

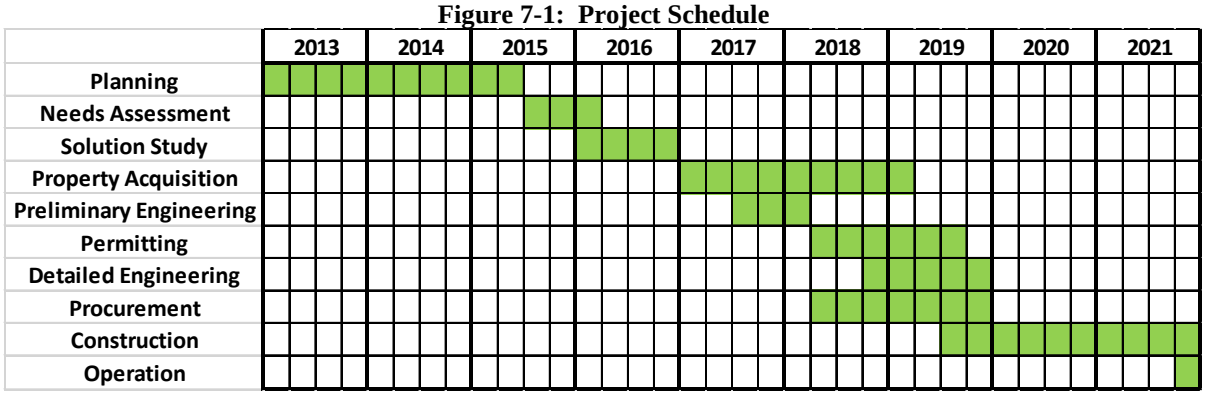
Note: This page intentionally left blank.

7. PROJECT SCHEDULE

As illustrated in the schedule presented in Figure 7-1, the planning for the Project was initiated in 2013, prompted by the need to minimize or avoid the potential for impacts to the electric grid as a result of coastal flooding and storm damage, as well as the need to address aging infrastructure concerns at the existing Pequonnock Substation. Figure 7-1 lists the key activities in UI's schedule for developing the Project, including the tasks that led up to the development of this Application and the planned time line for the completion of Project engineering, permitting, procurement, and construction.

Based on the current schedule, UI anticipates that Project construction will commence in the third quarter of 2019 and that the rebuilt Pequonnock Substation will be placed into service in the fourth quarter of 2021. This schedule could change based on the timing of the receipt of approvals from the Council and other involved regulatory agencies.

Figure 7-1: Project Schedule



Note: This page intentionally left blank.

8. PROJECT PERMITS, APPROVALS AND CONSULTATIONS

During the planning of the proposed Project, UI consulted with representatives of the City of Bridgeport and PSEG, as well as with the CT DEEP, SHPO, and ConnDOT[16]. Appendix B includes correspondence with the regulatory agencies regarding the Project. UI expects to continue to consult with the involved regulatory authorities as the planning for and development of the Project continues. This section identifies the permits and approvals required for the construction and operation of the Project, and summarizes the agency and municipal consultations that UI has conducted thus far.

8.1 FEDERAL AND STATE AGENCY APPROVALS REQUIRED AND CONSULTATIONS

In addition to the *Certificate of Environmental Compatibility and Public Need* from the Council, the Project will require various approvals from other regulatory agencies. Table 8-1 summarizes the permits and approvals expected to be required for the Project and the consultations that UI has held to date with the involved agencies regarding these approvals.

8.2 MUNICIPAL CONSULTATION FILING AND OUTREACH

As part of the Project planning process, UI consulted with City of Bridgeport officials, coordinated with PSEG, and conducted a formal municipal consultation process, pursuant to the Council's pre-application requirements (C.G.S. § 16-50*l*). These requirements specify that applicants intending to apply for a *Certificate of Environmental Compatibility and Public Need* from the Council consult with potentially affected municipalities at least 60 days prior to the Application filing date.

Accordingly, in February 2018, UI submitted a Municipal Consultation Filing (MCF) to the City of Bridgeport (the only municipality affected by the Project). The MCF included a description of the Project, as well as information concerning the public need, site selection process, construction schedule, potential environmental effects and mitigation measures, and EMF analyses. The MCF provided a formal mechanism both for informing the public and elected officials about the proposed Project and for soliciting comments on the Project from local leadership and the interested public.

[16] The Project will not affect any federal or state inland or coastal water resources. As a result, consultation with the U.S. Army Corps of Engineers, New England District, was not necessary.

Table 8-1: Permits and Approvals Expected to be Applicable to the Project

Agency	Potential Permit/Approval Required	Application Submitted or Consultation (Date)	Status
STATE			
CONNECTICUT SITING COUNCIL	Municipal Consultation Filling	MCF – February 23, 2018	Complete
	Certificate of Environmental Compatibility and Public Need under C.G.S. § 16-50*l*(a)(1)	April 2018	Review ongoing
	Development and Management Plan (after issuance of certificate and prior to Council's approval to start construction)	To be determined	Pending
CT DEEP			
• NDDB	Threatened and endangered species review	Review form submitted December 2016; NDDB identified Peregrine falcon as in Project vicinity (letter dated March 2017). UI submitted proposed protective measures to CT DEEP on March 30, 2018 and is coordinating with CT DEEP on final protection measures.	Initial consultation complete; mitigation measures to avoid potential impacts to species will be finalized with CT DEEP, based on observed proximity of the species to the Project site and the Project construction schedule
• Stormwater	General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities (DEEP-WAPED-GP-015)	Pending	Pending
• Groundwater	General Permit for Discharge of Groundwater Remediation Wastewater Directly to Surface Water (DEP-PED-GP-020) / General Permit for the Discharge of Remediation Wastewaters to Sanitary Sewer (DEP-PED-GP-007)	Pending	Pending
ConnDOT	Coordination, via existing lease agreement, for work on MNR corridor	Pending	Pending
CT SHPO	Cultural Resource Consultation under C.G.S. § 16-50*l*(e)	Review form submitted to SHPO May 2017; July 2017 SHPO determination of no adverse effect	Complete
CITY OF BRIDGEPORT			
	Coastal Site Plan Review	Pending	Pending
	Consultations in conjunction with MCF process	February 23, 2018 to April 23, 2018	Complete

During the 60-day municipal consultation period, UI offered to meet with the City of Bridgeport mayor or his designated representatives to review the proposed Project and MCF, as well as to present an overview of the Council's siting process and the methods available for the City to provide input to that process.

UI met with the City of Bridgeport on March 20, 2018, describing the proposed Project to City representatives. In addition, UI met with the Mayor's office on April 16, 2018 to provide a further overview of the Project prior to the completion of the MCF public review period and the submission of the Application to the Council. UI also attended Bridgeport's South End Neighborhood Revitalization Zone (NRZ) Community Meeting on April 12, 2018 to review the proposed Project and accept input and questions. A summary of all outreach efforts can be found in Appendix H.

In accordance with the Council's requirements and C.G.S. § 16-50*l*(e), within 15 days after submitting the Application, UI will supply to the Council all MCF materials provided to the City of Bridgeport and a summary of the consultations with the City, including any comments or recommendations issued by the City.

Note: This page intentionally left blank.

9. ALTERNATIVES CONSIDERED

9.1 INTRODUCTION AND SUMMARY

Overview and Conclusions of the Alternatives Evaluation Process

The Project was selected as a result of an iterative process whereby various alternatives were identified and assessed. Initially, UI performed a comprehensive evaluation of the asset condition and flood hazard issues at the existing Pequonnock Substation. After that evaluation determined that the consequences of the "No Action" (i.e., "do nothing") alternative would pose unacceptable jeopardy to the electric system, including increased risk of long-term outages, UI assessed whether the substation could be modified, on the existing site, to both mitigate coastal flood hazard/storm damage risks and upgrade the existing substation facilities. As a result of that study, UI found that the location, size, and characteristics of the existing substation site pose critical constraints to the required improvements.

UI then investigated alternative sites on which a new Pequonnock Substation could feasibly be built, taking into consideration factors such as site size, availability of property for development, proximity to the existing 115-kV lines in the vicinity, ownership, land use, environmental resources, and constructability. The identification of potential relocation sites in the immediate vicinity (e.g., within a 0.5-mile radius) of the existing substation was a primary criteria in the siting study, due to the need to connect the rebuilt substation to the same eight 115-kV lines that connect to the existing Pequonnock Substation. All potential relocation sites necessarily were within the City of Bridgeport.

The site selection study resulted in the identification of two potentially viable locations for the new substation: 1 Keifer Street and 375 Main Street. The 1 Kiefer Street location (the proposed site) was identified as preferred based on proximity to the existing substation and transmission lines, size, availability, location within an industrial area, lack of environmental/cultural resources, constructability, and cost.

The 375 Main Street site, a vacant parcel owned by the City of Bridgeport, represents a feasible, but less preferable, alternative to the 1 Kiefer Street site. Although directly south of the four 115-kV transmission lines along the MNR corridor and adjacent to the 115-kV XLPE cable from Singer Substation that is located beneath Main Street, the 375 Main Street site would be more costly to develop than the proposed site. The underground HPGF 115-kV lines that connect to the existing Pequonnock Substation would have to be extended to the west by approximately 1,300 feet to reach

the new substation at 375 Main Street, or about 570 feet longer than the HPGF cable extensions to the proposed site. In addition, the overhead 115-kV line that connects to the substation from BHS Unit #3 similarly would have to be extended to the 375 Main Street site. Further, the 375 Main Street site is identified by the City of Bridgeport as a potential location for major redevelopment and is within a mixed land use area, with residences, churches, and two NRHP sites (i.e., the Mary and Eliza Freeman Houses and the William D. Bishop Cottage District) nearby.

After the proposed site was identified as the preferred location for the rebuilt Pequonnock Substation, UI examined substation configuration options, evaluating both a GIS and an AIS design. However, an AIS design requires a larger area (more than approximately 2.8 acres) and could not be accommodated on the 2-acre portion of the 3.7-acre site. As a result, an AIS design was quickly dismissed from consideration as a viable option.

In addition to the site configuration alternatives, UI reviewed alternatives for the transmission line connections to the new substation. As proposed, the relocated transmission line connections will follow the most direct routes and will extend across property owned by ConnDOT, PSEG, and UI, or to be acquired by UI from PSEG.

In summary, based on the results of the alternatives evaluation process, the proposed Project represents the optimal solution for achieving the dual objectives of mitigating coastal flood hazard/storm damage risks and upgrading the Pequonnock Substation, thereby enhancing the reliability of the electric system to the benefit of Connecticut and New England consumers. The Project is consistent with the surrounding industrial land uses. The location of the new Pequonnock Substation on the proposed site, proximate to the existing substation that it will replace, will facilitate interconnections to UI's existing transmission and distribution systems.

9.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the existing Pequonnock Substation would continue in-service at the present site, with no improvements made to mitigate coastal flood hazard risks or to upgrade the substation's existing transmission and distribution system infrastructure. Consequently, the substation would remain at risk from flooding due to coastal storms (the control room and yard equipment is below the FEMA-designated 100-year flood elevation of 14 feet) and no action would be taken to resolve the substation's current infrastructure issues (e.g., structural integrity risks due to

soil settling, inadequate short-circuit duty margins, insufficient access/clearance for emergency 115/13.8-kV mobile transformers).

The No Action Alternative was rejected because it would not mitigate the identified coastal flood hazard risks and would not resolve the asset condition issues at Pequonnock Substation, and thus would not improve the reliability of the electric system. As a result, the substation would remain vulnerable to damage from coastal storms or to the failure of structural components, either of which could lead to extended duration outages affecting customers and the bulk power system.

9.3 SUBSTATION SITE ALTERNATIVES

The existing Pequonnock Substation, which is located on a 1.5-acre site directly adjacent to Bridgeport Harbor, has undergone various modifications and expansions since it was placed into service in 1956, and now is fully built out, with no room for expansion. Studies commissioned by UI (i.e., the *Coastal Substation Flooding Asset Condition Review* and *Coastal Substation Flood Mitigation Study*) confirmed that the substation has significant asset condition deficiencies, ranging from exposure to destructive coastal flooding events (almost all of the substation's critical equipment is below the FEMA BFE of 14 feet) to widespread and persistent settling of the substation's equipment, congestion and clearance issues, and inadequate access for emergency mobile transformers. To rectify these deficiencies, UI investigated alternatives involving both modifications to the Pequonnock Substation on the existing site, as well as the replacement of the substation on alternative sites.

9.3.1 Existing Pequonnock Substation Site

Three primary alternatives were considered for modifying the Pequonnock Substation on the existing site. These alternatives (designated Alternative A-C), along with the reasons why each was found to be impractical, are summarized in Table 9-1.

Table 9-1: Alternatives Considered: Existing Pequonnock Substation Site

Alternative	Summary Results of Alternative Evaluation
Alternative A. Raise substation equipment components above the 14-foot BFE.	Because almost all of the substation equipment is below the BFE, this alternative was deemed impractical. Further, even if the equipment could be raised cost-effectively on the existing 1.5-acre site, the other site deficiencies (e.g., site settling, inadequate space for emergency mobile transformers) would not be resolved.
Alternative B. Install a perimeter flood wall system to protect the substation.	A perimeter flood wall could be constructed to mitigate coastal flooding at the substation. However, the flood wall would not address the asset condition deficiencies at the substation. As a result, in addition to the construction of a flood wall, all of the existing substation components would have to be rebuilt and replaced, thereby making the installation of a flood wall cost-ineffective and effectively requiring the rebuilding in place of the substation, as discussed in Alternative C. For these reasons, the flood wall alternative was eliminated from consideration.
Alternative C. Rebuild the entire substation in place, over the existing footprint.	Under this alternative, the entire substation would be rebuilt in place, using a design that would raise substation components above the BFE, provide space for the mobile transformer, and address the other asset condition issues. However, during the rebuild, the substation would have to remain in service to supply Bridgeport area customers and to maintain the reliability of the bulk electric system in general. Because the existing 1.5-acre site is not large enough to accommodate the substation rebuild while maintaining service, property surrounding the substation would have to be acquired for the development of a temporary GIS facility and for construction support. Complex construction sequencing would be required. This alternative was eliminated from consideration due to the significant construction challenges, including the need to acquire adjacent property and build temporary substation facilities, and extensive outage sequencing requirements. In addition, due to the challenging construction, the substation redevelopment could require more than five years, and would be more costly than new site alternatives.

Overall, Alternative A (raising substation equipment components above the BFE) and Alternative B (installing a perimeter flood wall) were quickly found to be infeasible and thus not evaluated in detail. The third alternative (Alternative C: rebuild the entire substation in place) was investigated in sufficient detail to determine that the solution would be extremely challenging, costly, time-consuming to develop, and potentially infeasible.

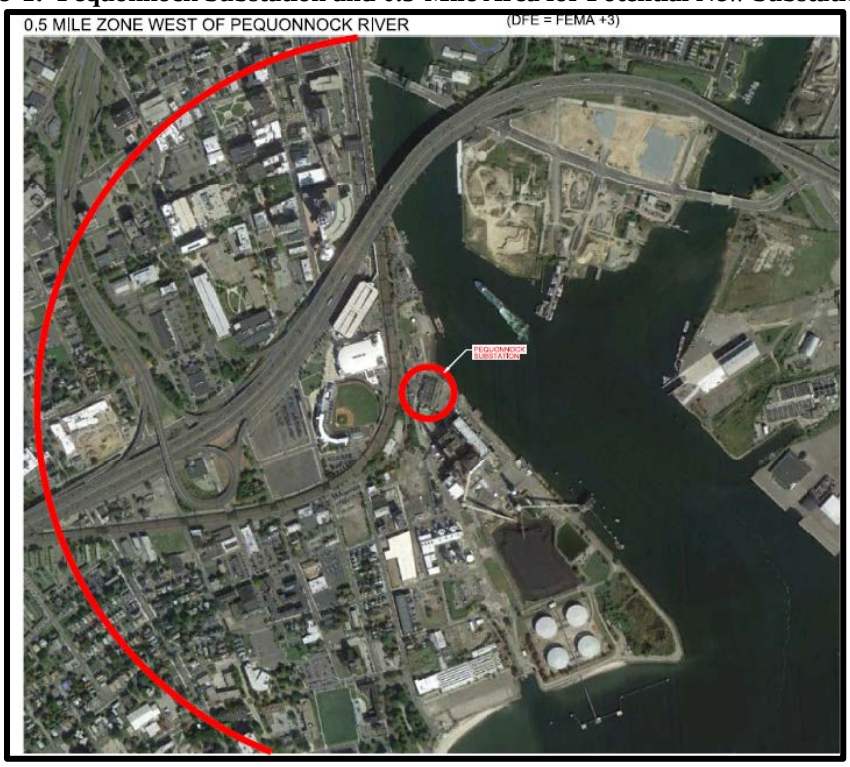
9.3.2 New Substation Sites

9.3.2.1 Alternative Site Selection Process

After determining that Pequonnock Substation's coastal flood hazard and asset condition issues could not feasibly be addressed by any solutions on the existing site, UI conducted a site selection study to identify potential new sites for rebuilding the substation. This study focused on potential alternative sites located west of the Pequonnock River / Bridgeport Harbor, within 0.5-mile of the existing substation. As Figure 9-1 illustrates, the 0.5-mile area falls entirely within the City of Bridgeport.

This 0.5-mile distance reflected the need to define sites near the existing substation, where the eight 115-kV lines that presently connect to the existing Pequonnock Substation could efficiently and cost-effectively be relocated to the new substation.

Figure 9-1: Pequonnock Substation and 0.5-Mile Area for Potential New Substation Sites



General Site Selection Guidelines

To identify potentially feasible alternative sites for the relocation of the substation within the 0.5-mile area, UI used an iterative process whereby potential properties were first identified and screened in accordance with UI's standard objectives for substation siting. These standard criteria, which are detailed in UI's *Transmission and Distribution Guideline for Substation Site Selection* (Guideline), include the following guiding principles:

- Minimize the need to acquire residences and viable commercial/industrial uses to accommodate substation development.
- Maintain consistency/compatibility with existing land uses and land use plans to the extent possible.
- Minimize adverse effects on sensitive environmental resources and the social environment.
- Maintain public health and safety.

- Demonstrate cost-effectiveness, while adhering to good engineering and sound environmental planning practices.

- Present the public with a clear and well documented methodology for the identification of the proposed and alternative sites.

Site Selection Criteria Specific to the Substation Rebuild

In addition to the standard Guideline, key considerations in the identification of potential sites for rebuilding Pequonnock Substation were:

- Distance to the existing Pequonnock Substation and 115-kV transmission lines.

- Availability of property (e.g., sites that are vacant, for sale, or would not require the removal or relocation of existing commercial or residential uses).

- Site size (a minimum of 1.5 acres, including buffer areas and setbacks, is needed for a 115-kV/13.8-kV GIS facility of the type required for the relocated substation).

- Site topography and subsurface conditions.

- Environmental and land use characteristics, including present and past property uses; presence of tidal or inland water resources, cultural resources, or threatened or endangered species; need for environmental remediation, etc.

.

- Substation constructability.

- Availability of property (e.g., via fee ownership or easement) for transmission and distribution line connections to the relocated substation.

- Accessibility.

- Permitability (the anticipated ability to obtain all required regulatory approvals for construction at the site).

- Cost.

In addition, the lengths of the new transmission and distribution line segments required to effectively interconnect the new substation to the transmission network and to UI's distribution system were considered.

Results of the Site Screening Process

Because of the extensive urban development within 0.5 mile of the existing Pequonnock Substation and the need to rebuild the substation on property in proximity to the existing 115-kV transmission lines, UI found only two potentially viable sites that would meet its siting guidelines and criteria. As discussed further in Section 9.3.2.2, both sites are situated in upland areas, west of the existing Pequonnock Substation, but within the FEMA-designated 100-year floodplain associated with Bridgeport Harbor, which encompasses most of Bridgeport's South End area (refer to the FEMA floodplain maps in Section 4 and Appendix A). No potential sites for the new substation were identified north of the MNR corridor, due to the lack of available properties within the densely developed downtown Bridgeport area.

9.3.2.2 Alternative Sites: Identification and Comparison

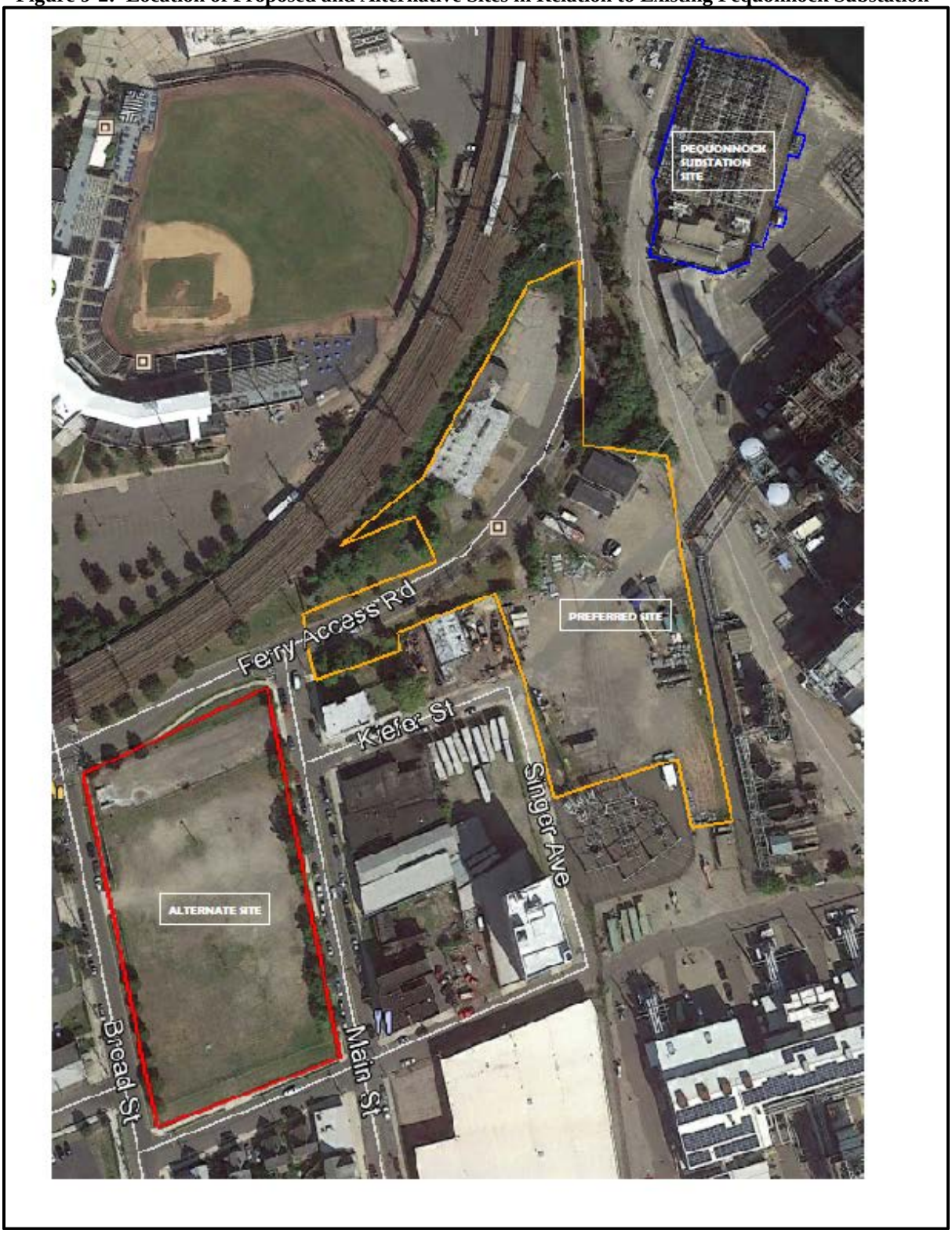
The two potential locations considered for the rebuilt Pequonnock Substation are illustrated in Figure 9-2. As summarized below, UI investigated both sites, taking into consideration factors such as property availability, usable site acreage, site acquisition costs, length of 115-kV and distribution system interconnections that would be required, land use compatibility, and construction costs. Based on these factors, UI determined that the development of the new substation on the PSEG property at 1 Kiefer Street would best meet the Project objectives.

Table 9-2, located at the end of this section, provides a summary comparison of each site, based on physical attributes, environmental and land use features, constructability considerations, and cost.

1 Kiefer Street (Proposed Site)

This PSEG-owned site, which is approximately 700 feet southwest of the existing Pequonnock Substation, encompasses 3.7 acres, including a vacant approximately 2-acre area within the fenced PSEG BHS property and property adjacent to and encompassing Ferry Access Road. The site is located on the northwestern portion of PSEG's BHS property and directly abuts railroad corridor. To the west, the site is bordered by Singer Avenue and the dead-end of Kiefer Street.

Figure 9-2: Location of Proposed and Alternative Sites in Relation to Existing Pequonnock Substation



Source: Google Earth, September 2017

Approximately 2 acres of the site (all within the existing PSEG fenced property and zoned I-H) will be used for the new substation; this portion of the PSEG property is currently being used for parking and equipment/material laydown to support PSEG's construction of its new combined cycle facility (BHS Unit #5). The remainder of the 3.7-acre site includes a one-story warehouse with parking, as well as grassed/landscaped areas along Ferry Access Road. The overhead 115-kV lines along the MNR corridor will be aligned to enter the substation over the portion of the property along Ferry Access Road, which is zoned for DVD-WF.

The development of the new Pequonnock Substation at this site will be consistent with the existing and former uses of the property for industrial purposes. The site can accommodate a GIS design, and its proximity to the existing Pequonnock Substation and 115-kV transmission lines will facilitate the line connections to the new substation. This site also will facilitate connections to the 13.8-kV distribution circuits that must be relocated from the existing substation.

375 Main Street (Alternative Site)

This 2.57-acre site, which is situated approximately 1,200 feet west of the existing Pequonnock Substation, is presently vacant and is owned by the Housing Authority of the City of Bridgeport. The site is bordered by Main Street on the east, Ferry Access Road and the MNR corridor on the north, Broad Street on the west, and Whiting Street on the south. Although historically used for residential and later industrial uses, the site most recently functioned as an overflow parking area for users of the Bridgeport-Port Jefferson Ferry.

The City of Bridgeport has identified 375 Main Street, which is within a Neighborhood Center Village District (NCVD) zone, for priority redevelopment. Residential uses border the site south of Whiting Street, while a mix of commercial, institutional (church), and residential areas are located along Broad Street and to the west. Areas along Main Street and to the east of the site include mostly industrial areas (e.g., PSEG's BHS, Emera's Bridgeport Energy facility), and commercial uses. Two significant historic sites, both listed on the NRHP, are located directly adjacent to 375 Main Street: the Mary and Eliza Freeman Houses NRHP site is across Main Street east of the site, while the William D. Bishop Cottage Development NRHP district directly borders the site to the south.

The development of the new Pequonnock Substation at 375 Main Street is feasible. The site is in general geographic proximity to the existing Pequonnock Substation and the redevelopment of the vacant lot for utility purposes would restore the site to productive use.

However, compared to the 1 Kiefter Street property, 375 Main Street is farther from the existing Pequonnock Substation and is adjacent to residential and institutional areas, as well as to the NRHP properties. Because of the location of the site within a mixed land use area and directly adjacent to the historic sites, the new substation could represent a visual intrusion and likely would have to be enclosed (on at least three sides) by an architectural wall to minimize adverse visual effects. Further, because of the past industrial use of the property, soil testing and classification would be required.

In addition, the development of the new substation at this site would require longer extensions of the HPGF cables and the 115-kV overhead line that connects to BHS Unit #3. The extension of these lines to the new substation would require a crossing of the two Middletown-Norwalk underground 345-kV cables, which are buried beneath Main Street. This could have thermal implications to the ratings of the underground transmission lines (e.g., some or all of the underground lines may have to be de-rated to have a lower current carrying capacity).

Finally, the timely acquisition of the site from the City of Bridgeport could pose issues. As a result, compared to the 1 Kiefer Street location, the development of the substation on this site would result in greater environmental impacts and be more costly.

9.3.2.3 Justification for the Selection of the Preferred Site

The 1 Kiefer Street site represents the least-cost option for rebuilding Pequonnock Substation. In addition to cost, UI selected the site as the preferred location due primarily to the following factors:

- **Availability of Property**. The property, which is of sufficient size to accommodate a GIS substation and the related line connections, is available and PSEG and UI have executed a MOU regarding UI's proposed purchase of the site.

- **Proximity to Existing Pequonnock Substation**. Compared to the 375 Main Street alternative, the proposed site is approximately 500 feet closer to the existing substation and thus will minimize the impacts and costs of reconnecting the eight 115-kV transmission lines and distribution circuits from the existing substation to the new substation.

- **Land Use Compatibility**. The site has historically been used for industrial purposes and is adjacent to long-established energy and transportation facilities. The redevelopment of the site for the new Pequonnock Substation will be consistent with the surrounding industrial/commercial land uses.

- **Proximity to 115-kV Lines to Facilitate Connections to the New Substation**. The site is located adjacent to UI's existing 115-kV transmission lines on the railroad corridor. In addition, the underground 115-kV cable connections and 115-kV overhead connection to the PSEG and Emera generating facilities can be accomplished within the 3.7-acre site or on other UI or PSEG properties.

The 375 Main Street represents a feasible, but less preferable, alternative to the 1 Kiefer Street site. Although also adjacent to the 115-kV transmission lines along the railroad corridor, the 375 Main Street site would be more costly to develop and would require longer transmission and distribution lines to interconnect to the existing infrastructure that terminates at the existing Pequonnock Substation. The use of the 375 Main Street site also would result in increased land use and cultural resource impacts due to its proximity to residential areas and to the NRHP properties.

9.4 SUBSTATION DESIGN AND TRANSMISSION LINE CONFIGURATION OPTIONS

An AIS configuration was not considered for the Project because the proposed site is not large enough to accommodate any configuration other than GIS. In fact, the use of an AIS design was not considered viable for any location in the general Project area, due to the extensive urban development, which precludes the option of acquiring a sufficiently large site without having to purchase and remove existing buildings.

The relocation of the eight 115-kV line connections from the existing Pequonnock Substation to the new substation was a primary consideration in the overall site selection process. UI's proposed alignments for the line reconnections were selected to minimize the length of each line. As a result, the line realignments, as proposed, represent the most efficient and cost-effective routes and configurations for reconnecting the 115-kV lines to the new substation.

Table 9-2: Site Evaluation Summary: 1 Kiefer Street vs. 375 Main Street

Evaluation Criteria	Site Characteristics	
	1 Kiefer Street	**375 Main Street**
Site Size and Existing Ownership	3.7 acres PSEG (UI has MOU with PSEG to purchase property)	2.57 acres City of Bridgeport
Distance (Approx.) to Existing Pequonnock Substation	700 feet	1,200 feet
Site layout	• Supports GIS design • Substation can be accommodated within 2-acre portion of site within currently fenced PSEG property • Proximity to all overhead and underground 115-kV connections to existing Pequonnock Substation	• Supports GIS design. • Sufficiently large to accommodate future expansion • Proximity to UI transmission lines along railroad corridor and to underground cable from Singer Substation • Farther from other underground cables and overhead line feed from BHS Unit #3
Environmental Resources	• Upland area, no water resources, cultural resources, designated visual resources • Soil characterization previously performed • Within FEMA 100-year floodplain (BFE 14 feet) • Within coastal boundary • Not within the viewshed of any historic structures	• Upland area, no water resources • Site requires soil testing and classification • Within FEMA-designated 100 year floodplain (BFE 14 feet) • Within coastal boundary • Directly adjacent to NRHP properties
Land Use and Zoning	• Zoned I-H and DVD-WF • Located within an industrial area, with no residences in immediate vicinity • Identified future land use is for energy/industrial purposes	• Zoned NCVD • Commercial/industrial/residential uses on three sides • Less than 100 feet to residence on Whiting Street • Less than 100 feet to churches west of Broad Street • City of Bridgeport has prioritized for redevelopment
Proximity to Transmission System	• Borders railroad corridor and four overhead 115-kV lines co-located there • Underground HPGF and XLPE cables can be connected to site via existing PSEG and UI properties	• Borders railroad corridor and four overhead 115-kV lines co-located there, as well as XLPE 115-kV cable from Singer Substation (in Main Street) • Transmission line ROW acquisition required for interconnection to PSEG BHS Unit #3 • Underground HPGF cable extensions of about 1,300 feet required, across PSEG property and beneath Kiefer Street
Proximity to Distribution System	• Near existing circuits	• Near existing circuits
Estimated Costs (including Substation, Transmission and Distribution)	• >$125 million	• +$20 million more than the development of the substation at the 1 Kiefer Street site

10. ACRONYMS AND GLOSSARY OF TERMS

Acronym	Description
115-kV	115-kilovolts or 115,000 volts
345-kV	345-kilovolts or 345,000 volts
ACSR	Aluminum conductors with steel reinforcement, a common type of overhead conductor
ACSS	Aluminum Conductor with Steel Support, a common type of overhead conductor
AIS	Air-insulated substation
Amp	Ampere; A unit measure for the flow (current) of electricity. A typical home service capability (i.e., size) is 100 amps; 200 amps is required for homes with electric heat
ANSI	American National Standards Institute
APE	Area of Potential Effect (for cultural resources)
Application	Application to the Connecticut Siting Council for a Certificate of Environmental Compatibility and Public Need
BFE	Base Flood Elevation (FEMA)
BMP	Best Management Practices
Cable	A fully insulated conductor usually installed underground but in some circumstances installed overhead.
CCMA	Connecticut Coastal Management Act
Certificate	Certificate of Environmental Compatibility and Public Need (from the Connecticut Siting Council)
C.G.S.	Connecticut General Statutes
Circuit	A system of conductors (three conductors or three bundles of conductors) through which an electrical current is intended to flow and which may be supported above ground by transmission structures or placed underground
Circuit Breaker	A switch that automatically disconnects power to the circuit in the event of a fault condition. Located in substations. Performs the same function as a circuit breaker in a home
Conductor	A metallic wire, busbar, rod, tube or cable that serves as a path for electric current flow
Conduit	Pipes, usually PVC plastic, typically encased in concrete, for housing underground power cables
ConnDOT	Connecticut Department of Transportation
CONVEX	Connecticut Valley Electric Exchange
Council (or CSC)	Connecticut Siting Council
CT DEEP	Connecticut Department of Energy and Environmental Protection
D&M Plan	Development and Management Plan (required by the Connecticut Siting Council)
dBA	Decibel, on the A-weighted scale
DFE	Design Flood Elevation

Acronym	Description
Distribution	The facilities that transport electrical energy from the transmission system to the customer
Disconnect Switch	Equipment installed to isolate circuit breakers, transmission lines or other equipment for maintenance or sectionalizing purposes
Duct	Pipe or tubular runway for underground power cables (see also Conduit)
Duct Bank	A group of ducts or conduit installed underground and usually encased in concrete
EF	Electric Field; Invisible lines of force produced by voltage applied to conductors and equipment. The electric field is expressed in measurement units of volts per meter (V/m) or kilovolts per meter (kV/m); 1-kV/m is equal to 1,000 V/m
EFH	Essential Fish Habitat
Electric Transmission	The facilities (69-kV and higher) that transport electrical energy from generating plants to distribution substations
EMF	Electric and magnetic field
EMF BMP Document	Electric and Magnetic Fields Best Management Practices for the Construction of Electric Transmission Lines in Connecticut prescribed by The Connecticut Siting Council
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FTB	Fluidized thermal backfill
G	Gauss; 1G = 1,000 mG (milliGauss); a unit of measure for magnetic field
GIS	Gas Insulated Substation
Ground Wire	Cable/wire used to connect wires and metallic structure parts to the earth. Sometimes used to describe the overhead lightning shield wire.
HPGF	High-pressure gas-filled; a type of underground pipe cable system. Gas used is nitrogen.
Hz	Hertz, a measure of alternating current frequency; one cycle/second.
ICES	International Committee on Electromagnetic Safety, a committee of the Institute of Electrical and Electronics Engineers)
ICNIRP	International Council on Non-Ionizing Radiation Protection, a specially chartered independent scientific organization
IEC	International Electro-technical Commission
IEEE	Institute of Electrical and Electronics Engineers
kcmil	1,000 circular mils, approximately 0.0008 sq. in
kV	Kilovolt - Equals 1,000 volts
kV/m	Electric field unit of measurement (kilovolts/meter)
Lin	A series of overhead transmission structures that support one or more circuits; or in the case of underground construction, a duct bank housing one or more cable circuits
MCF	Municipal Consultation Filing, part of the Connecticut Siting Council application process

Acronym	Description
MF	Magnetic Field; Invisible lines of force produced by the flow of electric currents; however, unlike electric fields, most materials do not readily block magnetic fields. The level of a magnetic field is commonly expressed as magnetic flux density in units called gauss (G), or in milliGauss (mG), where 1 G = 1,000 mG.
mG	milliGauss; (see Magnetic Field)
MNR	Metro-North Railroad
MOU	Memorandum of Understanding
NAAQS	National Ambient Air Quality Standards
NAVD88	North American Vertical Datum 1988
NDDB	Connecticut Natural Diversity Data Base (CT DEEP)
NERC	North American Electric Reliability Council, Inc. (initially, the National Electric Reliability Council)
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
NFIP	National Flood Insurance Program
NPCC	Northeast Power Coordinating Council
NRCS	Natural Resources Conservation Service (United States Department of Agriculture)
NRHP	National Register of Historic Places
OPGW	Optical groundwire (a shield wire containing optical glass fibers for communication purposes)
Phases	Transmission (and some distribution) AC circuits are comprised of three phases that have a voltage differential between them.
Project	Pequonnock Substation Rebuild Project
PSEG	PSEG Power Connecticut LLC
PSI	Pounds per square inch
PURA	Public Utilities Regulatory Authority (part of CT DEEP)
PVC	Polyvinyl chloride (material used in making conduits for XLPE-insulated cable)
RCSA	Regulations of Connecticut State Agencies
ROW	Right-of-Way
SCADA	Supervisory Control and Data Acquisition
SHPO	State Historic Preservation Office
SPCC	Spill Prevention and Countermeasures Plan
Splice	A device to connect together the ends of bare conductor or insulated cable.

Acronym	Description
Splice Chamber	A buried concrete enclosure where underground cable ends are spliced and cable-sheath bonding and grounding is installed.
S/S	Substation - A fenced-in yard containing switches, transformers, line-terminal structures, and other equipment enclosures and structures. Adjustments of voltage, monitoring of circuits and other service functions take place in this installation.
Steel Monopole Structure	Transmission structure consisting of a single tubular steel column with horizontal arms to support insulators and conductors.
SWPCP	Stormwater Pollution Control Plan - A sediment and erosion control plan that also describes all the construction site operator's activities to prevent stormwater contamination, control sedimentation and erosion, and comply with the requirements of the federal Clean Water Act.
Terminal Point	The substation or switching station at which a transmission circuit terminates.
Terminal Structure	Structure typically within a substation that ends a section of transmission line.
Transformer	A device used to transform voltage levels to facilitate the efficient transfer of power from the generating plant to the customer. A step-up transformer increases the voltage while a step-down transformer decreases it.
Transmission Line	Any line operating at 69,000 or more volts.
UI	The United Illuminating Company or "the Company"
USGS	United States Geological Survey (U.S. Department of the Interior)
Voltage	A measure of the push or force that transmits energy.
XS	Cross-section (drawing)
XLPE	Cross-linked polyethylene (solid dielectric) insulation for underground transmission cables