MUNICIPAL CONSULTATION FILING

for the

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

FEBRUARY 2018

Submitted to:

Chief Elected Official of the City of Bridgeport

Prepared By:

THE UNITED ILLUMINATING COMPANY

Provided in accordance the pre-application process (Connecticut General Statutes Section 16-50l(e)) for filing an Application to the Connecticut Siting Council for a Certificate of Environmental Compatibility and Public Need for an Electric Substation Facility.

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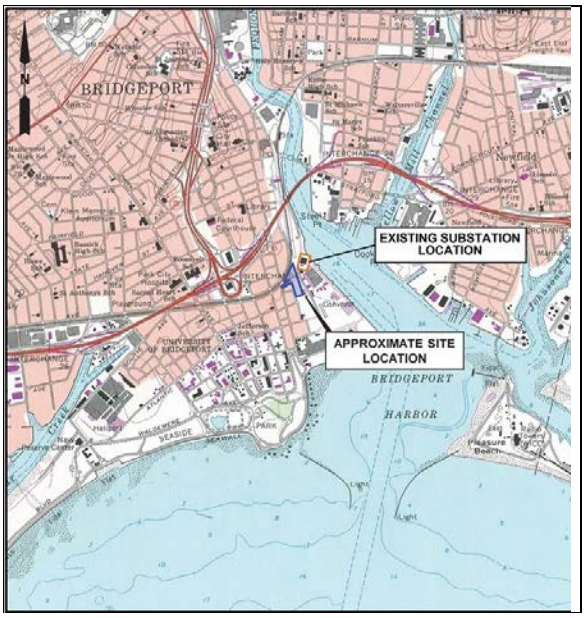
PEQUONNOCK SUBSTATION REBUILD PROJECT
EXECUTIVE SUMMMARY

Proposed Project: The United Illuminating Company (UI or the Company) proposes to rebuild its existing Pequonnock Substation, located in the City of Bridgeport, Fairfield County, Connecticut. The existing Pequonnock Substation, a 115-kilovolt (kV) air-insulated substation (AIS) transmission/13.8-kV distribution station, is located on UI property at 1 Atlantic Street, in the south-central portion of Bridgeport. Eight 115-kV 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 1.5-acre substation site abuts Bridgeport Harbor to the northeast, but is otherwise bordered by and situated within the fenced property owned by PSEG Power Connecticut LLC's (PSEG) and developed as the Bridgeport Harbor Station generating facility. North of the PSEG property, the Metro-North/Amtrak Railroad corridor extends southwest-northeast. Four of the existing 115-kV lines that feed the substation are located on catenary structures on the railroad corridor; the fifth line extends within PSEG's property to feed Bridgeport Harbor Station Unit #3. Three underground lines consist of two high-pressure gas-filled (HPGF) cables and a cross-linked polyethylene (XLPE) cable.



Due to its proximity to Bridgeport Harbor, the existing substation is at risk from coastal flooding and storm damage, such as occurred during Tropical Storm Irene in August 2011 and Super Storm Sandy in October 2012. UI preemptively de-energized the substation during Super Storm Sandy due to the risk of catastrophic failure, which would have resulted in long-term customer outages. In addition, the existing substation 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 ***Pequonnock Substation Rebuild Project (the Project)*** will involve the construction and operation of a new gas-insulated substation (GIS) and the relocation of the eight transmission and distribution lines that connect to the existing substation. The 3.7-acre site proposed for the Project is located at 1 Kiefer Street, approximately 700 feet southwest of and inland from the existing substation. This site, which is presently owned by PSEG and has long been used for various industrial purposes, includes approximately 2 acres of vacant land within PSEG's fenced Bridgeport Harbor Station property, as well as land to the north and west. The Metro-North/Amtrak Railroad corridor (owned by the Connecticut Department of Transportation [ConnDOT]) forms the northern boundary of the site. UI and PSEG have entered into a Memorandum of Understanding regarding

UI's purchase of the property. After the new substation is placed into service, the existing Pequonnock Substation will be decommissioned.

Figures ES-1 and ES-2 illustrate the proposed and existing substation/115-kV line connections, respectively, while Figures ES-3 and ES-4 provide an aerial photograph and simulation, respectively, of the proposed site for the rebuilt Pequonnock Substation.

Need for the Project: The proposed Project will upgrade the Pequonnock Substation facilities, thereby improving the bulk electric transmission grid serving Connecticut and New England and, by relocating the substation farther inland from Bridgeport Harbor, will assist in protecting the Connecticut electric grid from outages due to coastal flooding and storm damage.

Proposed Project Facilities: Within the 3.7-acre Project site, the proposed GIS substation will be located on approximately 2 acres of vacant land within the existing PSEG fence. The new 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. The substation will be designed and operated to meet or exceed all state building and fire codes, as well as to conform to UI and industry standards. The GIS will be housed within an 8,000-square foot enclosure that will contain various 115-kV components (circuit breakers, switches, bus, transformers); 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. The substation also will include a small area of AIS equipment, which will stepdown the voltage from 115-kV to 13.8-kV; an additional enclosure will contain the 13.8-kV distribution facilities. Figure ES-4 provides a visual rendering of the rebuilt Pequonnock Substation.

The eight 115-kV lines that feed the existing Pequonnock Substation will be relocated to connect to the new GIS substation. To connect the existing overhead 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 proposed 3.7-acre Project site; seven will be installed on property owned by the City of Bridgeport or the ConnDOT; and three will be installed on PSEG property. The structures to be located on City or ConnDOT property will be adjacent to the Metro-North Railroad corridor. The new 115-kV overhead line connections to the GIS substation will range in length from approximately 325 to 950 feet.

To route the existing underground 115-kV lines into the new Pequonnock Substation, UI will extend or realign each line. All of the underground line relocations will be aligned within PSEG or UI property. In addition, a new underground splice chamber, to be located on UI property adjacent to the existing Pequonnock Substation, will be installed to facilitate the extension of the HPGF cables to the new substation.

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.

For the new substation, typical 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, 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 the cables within the trenches. A new underground splice chamber also will be installed on UI property (near the existing Pequonnock Substation) to facilitate the extension of the two HPGF lines to the new substation. After the reconnection of the 115-kV lines to the new substation, the line connections (including six overhead structures) to the old Pequonnock Substation will be removed.

Most construction activities will occur either on UI's proposed 3.7-acre site, at the existing Pequonnock Substation site, 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, which is zoned for Industrial Heavy (I-H) and Downtown Village District (DVD-WF) uses, 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 potentially 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 or recreational areas are located nearby. Ambient noise is influenced by vehicular traffic on Interstate 95 (located north of the railroad corridor) and local roads, as well as by train traffic. Access to the proposed Project site is readily available via PSEG roads, as well as municipal streets such as Kiefer Street, Ferry Access Road, and Singer Avenue.

Given the existing industrial setting of the proposed site, 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 the requirements of the CT DEEP. UI also will implement procedures to avoid impacts to the state-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:
UI commissioned a study to measure the electric and magnetic fields (EMF) associated with the existing Pequonnock Substation and 115-kV line connections and to model the anticipated EMF levels from the rebuilt substation and new line connections. This study found that 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.

Alternatives: The proposed Project was selected as a result of an iterative process whereby 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" (i.e., "do nothing") 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, 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 requirement for connecting 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: at 1 Keifer Street and 375 Main Street. The 1 Kiefer Street location (the proposed site, on a 3.7-acre parcel presently owned by PSEG) 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 site.

Purpose of the Municipal Consultation Filing (MCF)

The proposed Project is subject to the statutes and regulations of the Connecticut Siting Council (Council) and other state agencies. In the second quarter of 2018, UI plans to submit to the Council the Project's *Application for a Certificate of Environmental Compatibility and Public Need* (Application). At least 60 days prior to the submission of such an application, the Council requires applicants to provide project information, in the form of a MCF, to the potentially affected municipalities. For this Project, both the existing and proposed Pequonnock Substations are located in Bridgeport, which is the only potentially affected municipality.

This MCF is a primary mechanism for informing City of Bridgeport representatives about the proposed Project and for soliciting comments from the City about the Project. UI is providing this MCF, for review and comment, to representatives of the City. The MCF process extends for 60 days, during which time UI expects to meet with City personnel to obtain input regarding the Project.

UI anticipates that the Application, which will follow a format similar to this MCF, will incorporate responses to comments received during the MCF process.

Figure ES-1: Proposed Pequonnock Substation and 115-kV Line Relocations

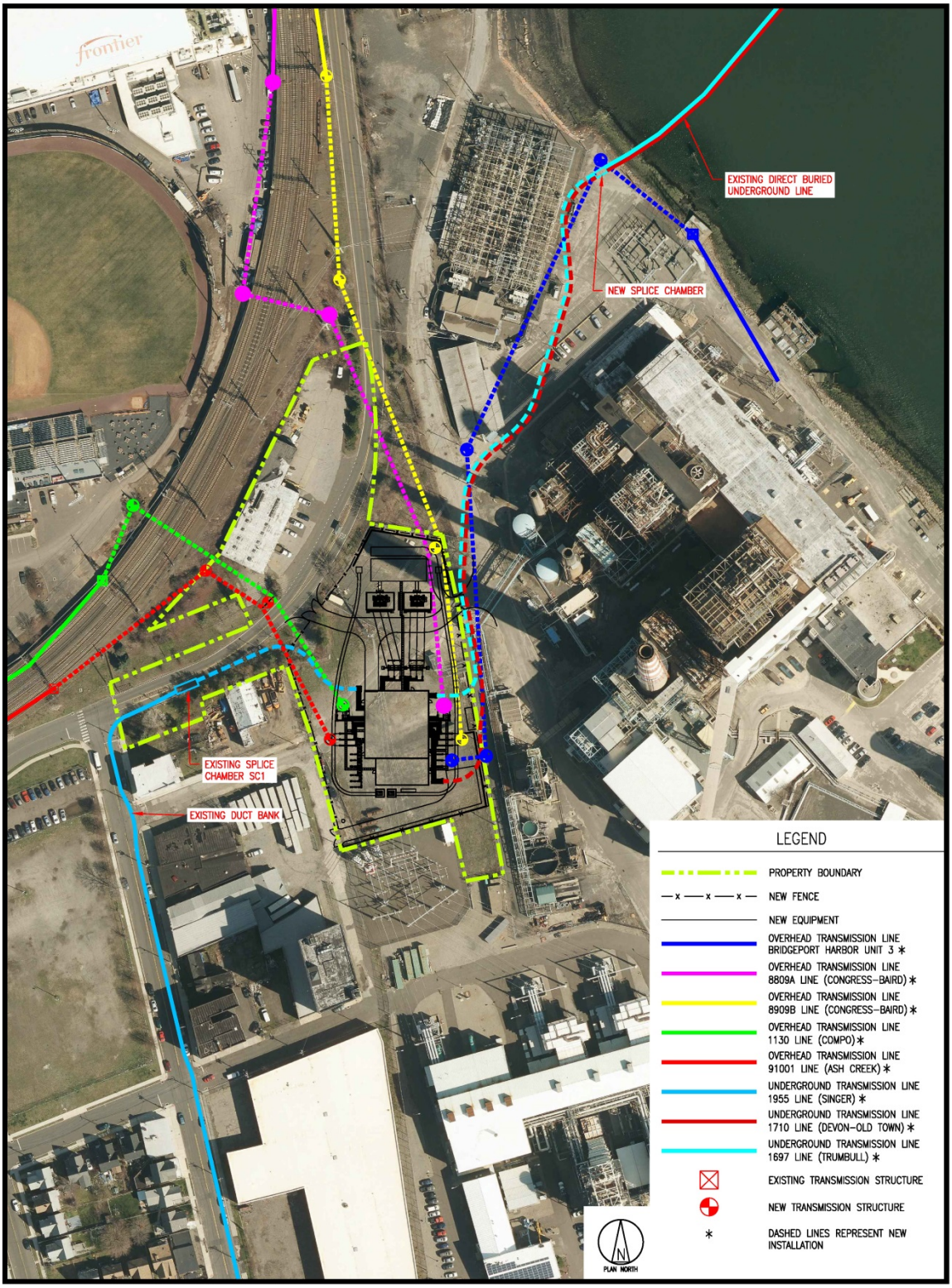


Figure ES-2: Existing Pequonnock Substation and 115-kV Transmission Lines

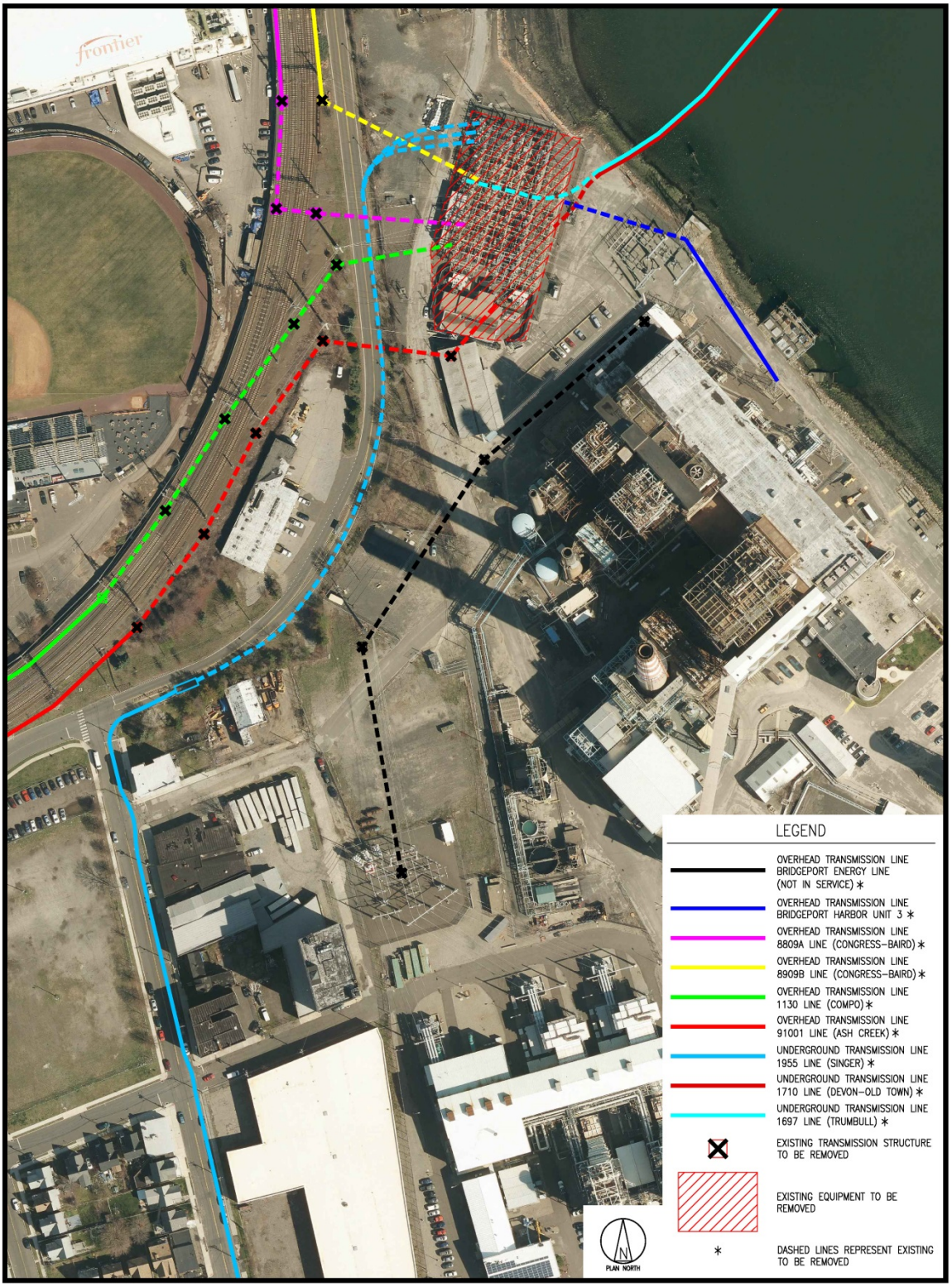


Figure ES-3: Existing Conditions: Proposed Site for Rebuilt Pequonnock Substation

Figure ES-4: Photosimulation of Proposed Pequonnock Substation

1. PROJECT OVERVIEW AND NEED

1.1 PROJECT BACKGROUND, LOCATION, AND PURPOSE

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 station. The air-insulated substation (AIS), which is classified as a Northeast Power Coordination Council (NPCC) Bulk Power System substation, is located at 1 Atlantic Street, directly west of and adjacent to Bridgeport Harbor in an industrial area in the south-central portion of 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 approximately 700 feet to the southwest, at 1 Kiefer Street (also in the City of Bridgeport), and the relocation of the existing transmission and distribution lines that connect to the existing substation. After the new substation is placed into service (and the associated transmission and distribution lines are connected), the existing Pequonnock Substation will be decommissioned. Figure 1-1 identifies the general Project location, illustrating the existing and proposed Pequonnock Substation sites.

Existing Pequonnock Substation

The existing Pequonnock Substation, which is located entirely within Bridgeport Harbor's 100-year floodplain as identified by the Federal Emergency Management Agency (FEMA)[1], occupies an approximately 1.5-acre parcel owned by UI. The existing Pequonnock 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.

[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.

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

As illustrated on Figures 1-1 and 1-2, Bridgeport Harbor (which is fed by the Pequonnock River) forms the northeastern boundary of the existing substation site. The fenced substation site 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 generating station. 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 right-of-way (ROW), which provides primary rail service along the eastern seaboard, is aligned north of and generally parallel to Ferry Access Road. Four UI 115-kV lines, which are located on bonnets on top of railroad catenary structures, are aligned along the railroad corridor.

Eight 115-kV electric transmission lines (five in overhead configurations and three underground cables) presently connect to the existing Pequonnock Substation. Four of the overhead lines connect the substation to UI's Ash Creek and Congress substations, as well as to Eversource Energy's Compo Substation.[2] The fifth overhead line connects Pequonnock Substation to PSEG's Bridgeport Harbor Station Unit #3. The three underground lines connect the Pequonnock Substation to UI's Trumbull, Old Town, and Singer substations. In addition, the substation feeds UI's local 13.8-kV distribution system.

The existing substation property includes an enclosure for the 115-kV control and relaying systems and an enclosure for the 13.8-kV distribution switchgear control and protective relaying equipment. Some of the distribution feeder cables exit underground from Pequonnock Substation and others exit through riser poles to overhead lines. No distribution or transmission cable manholes are located within the fenced substation property. The switchyard is designed with a mixed tubular aluminum and tubular copper overhead bus system with open air disconnect switches, lightning arresters (LA), capacitive coupled voltage transformers (CCVT), potential transformers (PT), current transformers (CT), combined current and potential transformers (CTPT), 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 Bridgeport Harbor generating stations are located across a parking lot outside the east perimeter of the switchyard.

Due to its 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 Super Storm Sandy in October 2012. Figure 1-3 illustrates the eastern 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 Superstorm Sandy, water levels rose to within inches of the control room floor.

[2] The 115-kV lines connecting to Pequonnock Substation are the 91001, 1130, 1710, 1697, 1955, 8809A and 8909B lines. The 91001 overhead transmission line enters from the south, while three overhead transmission lines (1130, 8809A and 8909B) enter from the west. One overhead line enters from the east (Bridgeport Harbor Unit 3). The 1955 underground line enters the substation from the west, while the 1710 and 1697 underground line enters from the east.

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 Superstorm 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, Supervisory Control and Data Acquisition (SCADA) alarm monitoring, raised 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 Pequonnock Substation and all UI's coastal substations, taking into consideration the characteristics and age of the substation, potential risks for damage to the station, outages due to future storm-related flooding, and the 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

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

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 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 identified as one of four distribution projects identified in UI's *Storm Resiliency Plan*, which was submitted to and approved by the Connecticut Public Utilities Regulatory Agency 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, to be rebuilt above the new FEMA BFE and designed to accommodate the transmission and distribution lines that presently connect to the existing station. Due to the number of 115-kV transmission and 13.8-kV distribution circuits that must be connected to the new substation, a suitable inland site, in general proximity to the existing site, was a key criteria in planning the substation relocation.

Proposed Project Site

The proposed substation relocation site at 1 Kiefer Street is situated approximately 700 feet southwest of the existing Pequonnock Substation. The 3.7-acre site, which is currently owned by PSEG, has long been used for industrial purposes. Ferry Access Road bisects and is part of the 3.7-acre property. The northerly portion of the proposed site abuts the Metro-North / Amtrak Railroad corridor and includes a single-story warehouse and some trees and lawn areas. UI would acquire the parcel from PSEG.

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

Figure 1-1 illustrates the general location of the proposed Pequonnock Substation site in relation to the existing substation. Figure 1-5 provides an aerial view of the proposed substation site, while Figure 1-6 illustrates the existing substation and line connections to be decommissioned.

Proposed Substation Facilities

Within the 3.7-acre Project site, the new Pequonnock Substation, which will be a gas-insulated substation (GIS) design, will be located on an approximately 2-acre area within the existing fenced PSEG property. The proposed substation relocation site is presently undeveloped and is bordered to the east by PSEG's Bridgeport Harbor Station 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.

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 + 1foot 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. In addition, the 115-kV lines and distribution circuits that presently connect to the existing substation will be relocated to interconnect to the new substation. Section 2 provides technical details regarding the new substation, while Appendix A includes site plans and aerials maps.

After the new substation is placed into service, the existing Pequonnock Substation and related transmission and distribution line connections will be decommissioned.

Transmission Line Relocations

As part of the Project, UI proposes to redirect the eight 115-kV transmission lines (five overhead and three underground) that presently feed the existing Pequonnock Substation to the new substation (refer to Figure 1-5 and Appendix A). These transmission lines will feed the proposed Pequonnock Substation in a similar configuration as the existing substation.

Figure 1-5: Proposed Pequonnock Substation Relocation Project Facilities

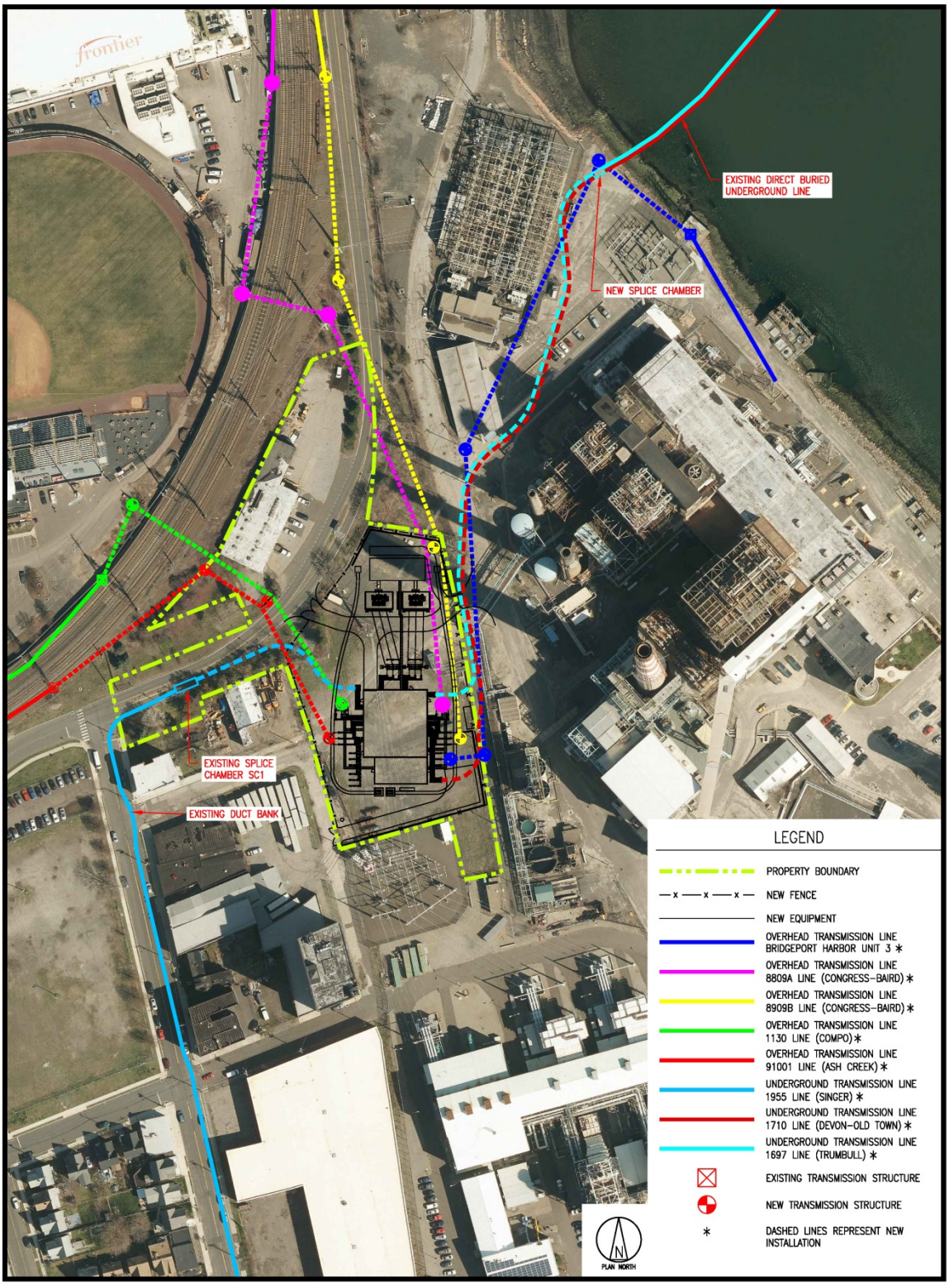
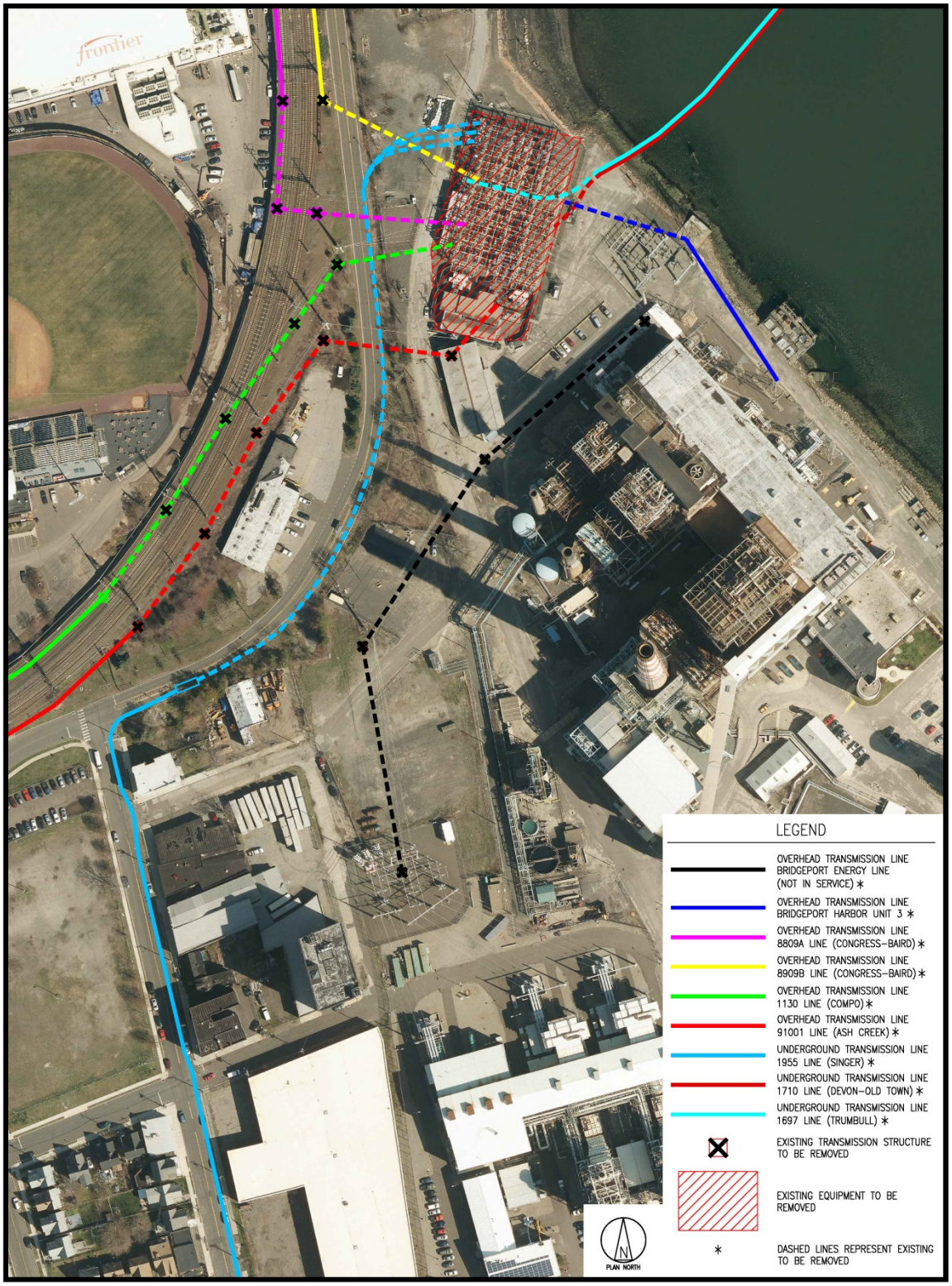


Figure 1-6: Existing Pequonnock Substation and 115-kV Line Connections to be Decommissioned



Four of the existing overhead transmission lines are supported on Metro-North Railroad catenary structures. The fifth overhead line is supported on lattice-type structure located on the PSEG property to the northeast of the Project site. Of the three underground transmission lines, two are High Pressure Gas Filled (HPGF) pipe-type cables that extend from Seaview Tap, beneath Bridgeport Harbor / Pequonnock River, and terminate at the existing substation; the third underground line is a Cross-Linked Polyethylene (XLPE) cable system (in polyvinyl chloride [PVC] conduits encased in concrete) that extends from UI's Singer Substation (located to the south of the existing substation) and is aligned beneath Main Street and Ferry Access Road.

The existing overhead transmission lines will be routed into the new substation by installation of 17 new structures (10 single circuit, two double circuit, and five walkdown structures[5]). The 17 new tubular steel monopoles, which will connect the new substation to the existing overhead transmission lines, are expected to range in height from 75 to 100 feet. These new structures are proposed for the following locations:

- Seven of the new monopoles will be located on UI property; of these, five will be directly adjacent to the substation enclosure to walkdown the conductors to the substation gas-to-air bushings, and two double-circuit structures will be installed in the northern part of the 3.7-acre site to interconnect four of the overhead lines to the Metro-North Rail corridor (1130, 91001, 8809A, 8909B lines).

- Seven single-circuit monopoles will be installed adjacent to the railroad corridor. Three will be installed on the north and four on the south of the railroad corridor. These new structures are required to extend the four 115-kV lines (the 1130, 91001, 8809A, and 8909B lines) from the railroad catenary structures, over the railroad tracks, and to the new structures located adjacent to the new substation. The seven structures will be situated on property owned by the Connecticut Department of Transportation[6] (ConnDOT) or by the City of Bridgeport.

- Three monopoles would be installed on PSEG property to interconnect Bridgeport Harbor Station Unit #3 to the new substation.

After the relocation of the overhead circuits to the new substation, six monopoles and 10 railroad bonnets that support the existing 115-kV overhead circuit feeds to the existing Pequonnock Substation will be removed.

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

[6] 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.

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, as follows:

- To extend the two HPGF lines to the new substation, approximately 730 feet of new steel pipes, encased in a Flowable Thermal Backfill (FTB), or equivalent, along with cables, and splices, will be installed. The cable extension will be routed entirely on UI or PSEG property. In addition, a new underground splice chamber 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.

- The XLPE line will be intercepted along its existing in-road alignment (e.g., at the existing splice chamber beneath Ferry Access Road) and redirected to the proposed substation site via new buried conduits. A new concrete-encased PVC duct bank would be constructed, and new cables and splices installed to turn the line south into the Project site. The XLPE line would shorten the existing circuit length by approximately 460 feet.

1.3 ORGANIZATION AND PURPOSE OF THE MCF

The proposed Project is subject to the regulations of the Connecticut Siting Council (Council or CSC) and other state regulatory agencies. In the second quarter of 2018, UI plans to submit to the Council the Project's *Application for a Certificate of Environmental Compatibility and Public Need* (*Application*). Prior to the submission of such an application, the Council requires applicants to provide project information, in the form of a Municipal Consultation Filing (MCF), to the potentially affected municipalities. For the proposed Project, both the existing and proposed Pequonnock Substations are located in the City of Bridgeport, which is the only potentially affected municipality.

The MCF is a primary mechanism for informing the public and municipal representatives about a proposed project and for soliciting comments about the project, which then can be addressed in the project's application to the Council. To provide the public and municipal representatives with currently-available information concerning the Pequonnock Substation relocation, this MCF is formatted to include the same types of information that will be presented in the Project's *Application*. Thus, the MCF:

- Describes the need for the proposed Project, the location and assets at the existing substation, and the proposed substation relocation site and facilities (Section 1);
- Provides technical specifications for the Project facilities, including the new substation and transmission / distribution line relocations, as well as the Project cost (Section 2);
- Describes construction and operation / maintenance information for the proposed Project facilities (Section 3);

- Discusses existing environmental resources (including cultural resources and visual resources), potential Project impacts, and impact mitigation measures (Sections 4 and 5);
- Provides data concerning electric and magnetic fields (EMF) associated with the Project facilities. (Section 6);
- Identifies the proposed Project schedule (Section 7);
- Reviews the permits, approvals, and consultations completed to date and expected to be performed for the Project (Section 8); and
- Discusses the alternatives analyses that led to the selection of the proposed Project at the proposed relocation site (Section 9).

Section 10 provides a glossary of terms. Appendices include supporting information, including Project plans and drawings, transmission line cross-sections (Appendix A), copies of agency correspondence (Appendix B), and environmental resource and technical reports (Appendices C-G).

2. TECHNICAL SPECIFICATIONS FOR THE PROJECT

This section provides the following technical specifications for the Project:

- Site information (history, land and access requirements)
- Proposed GIS substation facility details
- Overhead and underground transmission line relocations
- Decommissioning of the existing substation
- Estimated Project construction and service life

These technical specifications 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 SITE INFORMATION: HISTORY, LAND REQUIREMENTS, AND ACCESS

2.1.1 Existing Pequonnock Substation

The existing Pequonnock Substation, which will be decommissioned after the new substation is placed in-service, occupies an approximately 1.5-acre site owned by UI. Initially developed by UI in the mid-1950s, the substation has undergone various modifications and expansions, but has remained in continuous use for approximately 60 years. The substation is accessible via PSEG access roads on the Bridgeport Harbor Station property.

2.1.2 Proposed Pequonnock Substation

The site for the proposed new Pequonnock Substation and related transmission line relocations consists of approximately 3.7 acres owned by PSEG. Approximately 2 acres of the site are located within PSEG's fenced Bridgeport Harbor Station property; the remaining acreage is located directly to the north of and outside of the fenced property and includes a portion of Ferry Access Road (extending to Main Street) and a 9,000-square-foot warehouse that is situated on the north side of the road, adjacent to the railroad corridor.

Pursuant to an August 4, 2016 Memorandum of Understanding (MOU) between UI and PSEG, UI proposes to purchase the 3.7-acre site for the relocation of the Pequonnock Substation and the associated transmission line connections. The site will accommodate the new GIS substation,

transmission and distribution line connections and relocations, and associated support areas for parking, etc. Most Project construction activities will occur on the 3.7-acre site.

Site History

The site has been used for industrial purposes for more than 100 years.[7] 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 Bridgeport Harbor Station and the existing Pequonnock Substation. The northern portion of the 3.7-acre 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 Bridgeport Harbor Station, including the Project site, to Wisvest Connecticut, LLC (Wisvest). In 2003, Wisvest sold the property to PSEG.

Land Requirements and Access

UI proposes to develop the new Pequonnock Substation on the approximately 2-acre portion of the Project site that is presently located within the fenced PSEG Bridgeport Harbor Station property. The substation yard will be enclosed by a 14-foot-high property fence topped by 1 foot of barbed wire (three strands). Access to the substation will be provided via a new entrance from Ferry Access Road and an entrance from PSEG property to the east. Personnel access also may be added from Singer Avenue and Kiefer Street.

2.1.3 Proposed Transmission Line Relocations

The Project will involve the relocation of the five overhead and three underground 115-kV lines that presently connect to the existing Pequonnock Substation. Each of these lines will be realigned to connect to the new substation. As Figure 1-5 and the plans and drawings in Appendix A illustrate, 17 new overhead transmission line structures will be installed to connect the five overhead lines to the new substation; in addition, two of the three underground lines will be extended to the new substation from the existing substation, whereas the third cable will be realigned to enter the new substation from the northwest.

[7] 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 Bridgeport Harbor Station property, including the Project site.

As currently planned, all of the underground cable system relocations are expected to be located on UI or PSEG property. Similarly, of the 17 proposed overhead structures, 10 will be located on industrial property owned by PSEG or on the proposed 3.7-acre Project site, where access is already available. UI will consult with PSEG regarding permanent easements and temporary work areas for both the underground and overhead line relocations.

The remaining seven new structures will be located adjacent to the Metro-North Railroad corridor and will interconnect the new substation to the overhead lines that are supported on the railroad catenary structures (i.e., the 1130, 91001, 8809A, and 8909B lines). Of these, three will be installed on the north side of the railroad tracks, while four structures will be installed on the south side of the tracks. The three overhead transmission line structures to be installed on the north side of the railroad tracks are needed to extend the overhead line conductors from the new substation to the northern side, where the 1130 and 8809A lines are supported on bonnets on top of the railroad catenaries. One of these structures will be installed on City of Bridgeport property located northwest of the new substation as part of the 1130 Line interconnection and two will be located within the Metro-North Railroad corridor (ConnDOT property) heading north to allow for interconnection of the 8809A Line. All structures not on UI property will require temporary and permanent easements.

The four new structures that will be installed adjacent to, and south of the tracks, will be located within the railroad corridor owned by ConnDOT. Two of these four will connect the 91001 line from the new substation to the southern railroad line circuits, while the other two will support the conductors for the 8809A line.

To install the new transmission structures, approximately 1 acre of temporary work space will be required adjacent to and north of the railroad tracks. This temporary work space is expected to be located primarily on City of Bridgeport property, generally within paved areas used for Harbor Yard parking. Approximately 2 acres of temporary work space will be required to install the four new structures south of the railroad tracks. This temporary work space will be on ConnDOT property.

Access to the construction sites located north of the Metro-North railroad corridor will be from Broad Street or South Frontage Road. 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 the City of Bridgeport regarding the use of temporary construction work space, as well as 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 railroad corridor will be made part of an addendum to this lease agreement.

2.2 PROPOSED SUBSTATION FACILITIES

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 seismic loading, wind loading, and snow / ice loading. Appendix A includes a site plan, drawings, and aerial-photography-based map sheets that illustrate the proposed Project facilities, which are described below.

The eight 115-kV transmission lines that presently feed the existing substation will be relocated to connect to the new substation. These transmission lines will enter the new substation from the northeast and northwest, and will connect to outdoor 115-kV GIS terminations and then transition to indoor GIS equipment.

The GIS will be housed within an 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

To the north of the GIS enclosure, a small portion of AIS equipment will step the voltage down 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 OVERHEAD AND UNDERGROUND TRANSMISSION FACILITIES

As part of the Project, UI proposes to relocate the eight 115-kV transmission lines (five overhead and three underground) that presently feed the existing Pequonnock Substation to the proposed substation site. The existing and proposed 115-kV line connections are described below and illustrated generally on Figures 1-5 and 1-6; Appendix A includes maps, cross-sections, and drawings that provide further details regarding the transmission line relocations.

2.3.1 Existing 115-kV Line Connections

Overhead Lines

Four of UI's existing overhead transmission lines are supported on the Metro-North Railroad catenary structures. These lines, which are supported on approximately 65-foot-tall structures, 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. Figure 1-6 and the Appendix A drawings illustrate the locations of these existing connections.

The fifth overhead line, which connects to Bridgeport Harbor Station Unit 3, is supported on three lattice type structures, each approximately 110 feet tall. These structures are owned by and located on the PSEG property to the 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 Pequonnock Substation property consist of 1750 kcmil conductor, which is 2.626 inches in diameter and insulated with fluid-impregnated (polybutene) craft paper. There is 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 consists of 3500 kcmil 4.8-inch diameter 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, which extends north-northeast from Singer Substation to the existing Pequonnock Substation, is aligned beneath local roads, traversing

along Ferry Access Road before diverging to the south to terminate at the substation. Appendix A includes cross-sections that illustrate the typical configurations of the HPGF and XLPE cables.

2.3.2 Proposed 115-kV Line Connections

Figure 1-5 and the Appendix A plans, maps, 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 in Appendix A. Updated information will be described in UI's *Application* to the Council.

Overhead Lines

As is the case for the existing substation, the eight overhead transmission lines will be terminated at the proposed Pequonnock Substation. To route the overhead transmission lines into the new substation, 17 new galvanized tubular steel monopoles supporting 1590 ACSS conductors and OPGW will be installed (refer to Figure 1-5 and the Appendix A drawings). The 17 structures will include 10 single-circuit, two-double circuit, and five walk down tubular steel monopoles, ranging in height from 75 to 100 feet. Seven of the 17 new monopoles will be located on UI's proposed 3.7-acre property, as follows:

- Five monopoles will be located on the 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 the property to interconnect the four overhead lines located along the Metro-North Railroad corridor (i.e., the 1130, 91001, 8809A, 8909B lines) to the new substation The lengths of these proposed line connections are:
  - 91001 Line – Approximately 325 feet
  - 1130 Line – Approximately 400 feet
  - 8809A Line – Approximately 950 feet
  - 8909B Line – Approximately 900 feet

Seven monopoles will be installed on ConnDOT or City of Bridgeport property to complete the connection of the 1130, 91001, 8809A, and 8909B lines between the railroad corridor and the new substation. To interconnect these lines, three structures will be installed on the north side of the railroad tracks, while four will be located on the south side of the tracks.

The three overhead transmission line structures to be installed on the north side of the railroad tracks are needed to bring the conductors from the south side, where the new substation will be built, to the north side where the 1130 line and 8809A lines are supported on the railroad catenaries. One of these structures will be installed on City of Bridgeport property northwest of the new substation as part of the 1130 Line interconnection and two will be located within the Metro-North Railroad ROW (ConnDOT property) to interconnect the 8809A Line. The four new structures installed on the south side of the tracks will be installed within the existing railroad ROW owned by ConnDOT, connecting the 91001 and 8909B lines from the new station to the southern railroad line circuits.

Three monopoles will be installed on PSEG property to connect Bridgeport Harbor Station Unit 3 to the new substation. The length of this proposed 115-kV connection is 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 HPGF cable relocations will be aligned within PSEG or UI property. The XLPE cable connection is expected to be aligned on UI property.

The two pipe type HPGF underground lines will be brought into the new substation from the east by extending the existing steel pipes for approximately 730 feet across PSEG property. The new steel pipe will be encased in thermal backfill, along with cables. In addition, UI will install a new buried splice chamber for the HPGF lines on UI's existing Pequonnock Substation property. This splice chamber, which will have an outer dimension of approximately 20 feet by 10 feet by 11 feet, is required because the closest existing splice chamber for the HPGF lines is located on Pembroke Street, approximately 0.4 mile from the new substation. The distance between the existing Pembroke Street splice chamber and the new Pequonnock Substation terminations is too far for a single pull of this type of cable with this pipe configuration.

As currently planned, the 1955 Line (115-kV XLPE cable), which extends along Ferry Access Road to the existing substation, will be intercepted at the existing transmission splice chamber (referred to as SC1) located within Ferry Access Road. A new concrete-encased PVC duct bank will be constructed, and new cables and splices installed to turn the line south into the new substation. The XLPE line relocation will shorten the existing circuit length by approximately 460 feet (removal of 960 feet of existing cable from SC1 to the existing Pequonnock substation and installation of approximately 500 feet of new cable). The XLPE cables will be removed from the 460-foot section

of the underground line that presently extends from SC1 to the existing Pequonnock Substation and the duct bank will be abandoned in place.

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

After the new Pequonnock Substation is constructed, the related 115-kV transmission lines are relocated, and the new substation is placed into service, UI will decommission the existing Pequonnock Substation facilities. 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); the removal of above-ground structural components as necessary; the removal of the existing overhead transmission line connections to the substation (e.g., removal of conductors, arms, and structures); and the removal of the XLPE cable connection to the substation.

The removal of the existing overhead transmission line structure connections to the existing Pequonnock Substation will entail the removal of the 10 bonnets on which the lines are located above the catenary structures, as well as the removal of six monopole structures located to the south of the railroad corridor. This work will require the use of temporary access and work pads. In addition, UI will coordinate with ConnDOT regarding work activities along the railroad ROW.

Apart from the related equipment within the existing substation, a short section of cable will be removed in conjunction with the extension of the two HPGF pipe cables to the new substation. For the XLPE cable, assuming an interconnection to the new substation at SC1, approximately 960 feet of cable will be removed; the buried duct bank will be left in place.

2.5 ESTIMATED PROJECT COSTS

The estimated cost for the siting, design, and construction of the Project is currently in excess of $125 million.

2.6 FACILITY SERVICE LIFE

The substation equipment, transmission lines, and supporting infrastructure are expected to have a service life of approximately 40 years.

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 Public Utilities Regulatory Authority (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.

This section describes the procedures and methods that would be used to construct and operate the new Pequonnock Substation and to relocate the transmission and distribution line connections from the existing substation to the new substation. The section also reviews the general plans for decommissioning the existing Pequonnock Substation, as well as the approach for stormwater management and physical security at the new substation.

3.1 CONSTRUCTION PROCEDURES: GENERAL

Before any construction activities occur, UI will prepare and submit a Development and Management (D&M) Plan to the Council for review and approval. The D&M Plan will reflect conformance to conditions of Council's approval of the Project, as well as compliance with other regulatory requirements. For example, 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 minimize or eliminate potential adverse environmental effects that may result from construction activities.

The D&M Plan also will include specific procedures and information regarding, but not limited to, erosion and sedimentation control, spill prevention and control, construction staffing and hours, traffic control, and provisions for restoration and landscaping (if applicable) after construction of the substation. In addition, the D&M Plan will also provide contact information for the public and the City of Bridgeport should questions or concerns arise during construction or operation of the Project.

3.2 SUBSTATION AND 115-KV LINE CONNECTIONS CONSTRUCTION

3.2.1 Construction Overview and 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. During construction, certain work activities and sequences may vary, based on factors such as site-specific conditions, final Project designs, 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.

Temporary erosion and sediment controls will be deployed during the earthwork and construction phases of the Project in accordance with UI's SWPCP and as depicted on approved Project site plans. On a weekly basis, UI's environmental contractor will inspect the temporary erosion control measures and maintain conformance to UI's SWPCP. During construction if any non-conformance items arise, UI's environmental contractor will work with UI's civil contractor to fix erosion and sediment control measure or remove any build-up of sediment as needed. In addition, inspections will occur to the best of UI's environmental contractor's capabilities within 24 hours after each qualifying rain event, assessing turbidity and the stability of sediment erosion controls. After each qualifying rain event, if any non-conformance items arise, UI's environmental contractor will work with UI's civil contractor to realign compliance to UI's SWPCP.

In addition, UI's contractor will be fully responsible for sequencing construction activities such that earth materials are exposed for a minimum of time before they are covered, seeded, or otherwise stabilized to prevent or minimize the potential for erosion. Upon completion of construction and establishment of permanent ground cover, the contractor will remove and dispose of erosion-control measures and remove sediment and debris from areas where control measures were used. UI's environmental contractor will then conduct the required restoration inspections once a month for three months or until final stabilization is achieved.

All construction activities will be conducted in accordance with the D&M Plan as approved by the Council. The construction and testing of the substation facilities is expected to occur over an 18 to 24-month period. Site preparation, including grading and installation of foundations, will take place during the initial six months of construction and will involve the use of earth-moving equipment and construction vehicles.

Table 3-1
General Construction Sequence: New Pequonnock Substation

SUBSTATION 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: 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 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, erosion and sedimentation 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 on the XLPE line (Ferry Access Road)
Install new structure foundations and assemble/erect new structures	Establish construction access along the cable routes
Install conductors, shield wire, and OPGW on relocated transmission line connections	For the HPGF lines, excavate and install the new splice chamber, near the existing Pequonnock Substation. Construct the cable duct bank system (i.e., excavate the trench, install the conduits in the trench, encase the conduits in FTB or equivalent, backfill the trench with FTB other approved material)
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
Energize the line connections in conjunction with new substation energization	Pull the cables into the new 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

3.2.2 Site Acquisition, ROWs, Access Requirements, and Traffic Management

UI will acquire the 3.7-acre Project site from PSEG; this acquisition is defined in a 2016 MOU between UI and PSEG. UI also 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 adjacent to the railroad corridor, as well as for the removal of the existing 115-kV line connections from the railroad corridor.

Staging for construction support (e.g., for material laydown, parking for vehicles and equipment, temporary construction trailer) is expected to be located on the 3.7-acre proposed Project site, the existing Pequonnock Substation, or similar industrial sites nearby. Temporary access for the transmission line relocations will be in the vicinity of the work sites depicted on the Project plans in Appendix A. Detailed information about staging areas and temporary work sites will be provided in the D&M Plan.

To minimize the potential for traffic delays on local roads and for conflicts with activities at the Bridgeport Harbor Station, UI will coordinate with PSEG and the City of Bridgeport regarding vehicular traffic management. Similarly, UI will coordinate with ConnDOT regarding construction activities on and near the Metro-North / Amtrak railroad 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 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.

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 the placement of foundations, structures and equipment will be installed pursuant to the new substation plans. 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 because these activities necessitate taking critical transmission and/or distribution equipment out of service. The major 115-kV GIS substation equipment installation will take place inside a pre-engineered enclosure utilizing indoor cranes and lifts. As a result, UI will schedule this work for off-peak electrical demand hours and coordinate with the City of Bridgeport.

GIS technology uses SF6 gas as the insulting medium as it has better insulating properties than air. To monitor the SF6 gas a density monitoring system will be installed on the GIS equipment to log and trend the gas pressure within the GIS tubes and equipment.

The substation design includes 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 Site. Periodic inspections of the sumps would be performed by UI personnel to promote proper function of the systems.

Wiring, Testing, and Interconnections

Wiring that will allow the equipment to operate and communicate with the system protection equipment will be installed. This work, which will be primarily within the substation enclosures, will be performed by local electricians. 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 three strands of barbed wire to discourage unauthorized entry and/or vandalism. UI also will install lighting within the substation yard.

3.2.4 Overhead 115-kV Transmission Line Relocations

Access and Work Sites

Temporary access and work areas will be required to install the 17 new overhead transmission structures. Most temporary work space will be on UI or PSEG property. However, approximately 1 acre of temporary work space north of the Metro-North railroad tracks, primarily on City of Bridgeport property, and approximately 2 acres of temporary work space south of the tracks, on ConnDOT property, will be needed.

Access to the transmission line construction sites will be from Broad Street or South Frontage Road on the north side of tracks and from Ferry Access Road on the south side of the railroad corridor.

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 and any spoils will be handled per the Project soil and groundwater management plan. 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 will be installed first. When the new substation is ready to accept the 115-kV lines, the remaining structures (located near the existing substation connections) 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 Underground 115-kV Transmission Cable Relocations

HPGF Lines

To extend the 1697 and 1710 HPGF 115-kV circuits from the existing to the new Pequonnock Substation, approximately 750 feet of trench will be required. In addition, a new splice chamber will be installed on UI property adjacent to the existing Pequonnock Substation. All spoils and groundwater generated from these activities will be managed in accordance with UI's Soil and Groundwater Management Plan.

The HPGF cable extensions will consist of the same materials as the rest of these 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 substation GIS enclosure.

The construction sequence expected to be followed to extend the HPGF cables to the new substation is summarized in Table 3-3. As this table describes, construction activities for the HPGF cable system extension will involve first opening a trench from above grade. A thin layer of FTB or equivalent bedding material then will be laid on the bottom of the trench. Figure 3-1 illustrates a typical trench installation for an HPGF cable system. The cable system will be laid on top of the bedding material and then the trench will be backfilled with additional bedding material. The FTB is designed to dissipate heat from the cables and is less susceptible to dry-out compared to most native soil or other uniform granular materials.

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 and then installed in the pipe. This wire will be pulled through the pipe until the cables are fully pulled through the pipe. The cable will be inspected for damage after the pull, 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

- 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. All spoils and groundwater generated from this activity will be managed in accordance with UI's Soil and Groundwater Management Plan. Table 3-4 summarizes the anticipated construction sequence for the XLPE connection to the new Pequonnock Substation, while Figure 3-2 illustrates a typical duct bank installation within a paved area.

For the XLPE cable connection to the new substation, a trench will be excavated at a required depth and width. Then, a layer of bedding material will be placed to ensure a stable and level ground. 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. FTB is a low strength "diggable" thermal concrete mixture and does not require compaction. A warning tape will be installed above the FTB.

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). This final cover layer will match the surrounding elevations. After the duct bank is installed, one cable per conduit will be pulled through the entire duct bank length from the termination at the new substation to the splice chamber.

Figure 3-2: Typical Duct Bank Construction in Road

Table 3-4: General Construction Sequence for XLPE Cable

- Construct duct bank from the new Pequonnock Substation toward existing splicing chamber SC1, located along the existing 115-kV XLPE 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, the existing XLPE cable from Singer Substation will be connected to the proposed XLPE extension 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.
- Necessary commission tests will be performed on the system upon completion of installation.

3.3 EXISTING SUBSTATION DECOMMISSIONING

The existing Pequonnock Substation and associated overhead transmission line connections (structures and conductors/OPGW) will be decommissioned in accordance with standard UI protocols and any applicable regulatory requirements. Specific plans for 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.

3.4 EROSION/SEDIMENTATION CONTROL AND STORMWATER MANAGEMENT

The construction and operation of the Project will conform to applicable regulations concerning soil and erosion control and stormwater management. Stormwater quality requirements include infiltration or treatment of the first 1 inch of precipitation. Stormwater quantity requirements include a reduction in runoff volume and peak flow rates to 10% less than pre-development levels. The new Pequonnock Substation site is required to meet both of these 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, the Project construction (new substation development, line interconnections, and removal of the existing 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 work hours for the construction of the Project (including the development of the new substation and related line interconnections and the decommissioning of the existing substation and line interconnections) 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 installation of foundations, will take place 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 take approximately 18 months. These activities will involve the use of cranes to unload and install structural elements and large equipment.

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

The connection of the 115-kV lines and substation terminal structures, as well as the distribution line connections, will require that certain transmission and/or distribution equipment be taken temporarily out of service. As a result, this work will require coordination 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.

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 substation at this site will be two new PVC underground duct banks from the substation property exiting directly from new splicing 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 and in conformance with 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 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 will 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 would not require the portion of the system being monitored by the protective relaying equipment to be removed from service.

UI will house the protective relaying and associated equipment, along with a SCADA system for 24/7 remote control and equipment monitoring, at the UI 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 these facilities to minimize the impact of fire, in the unlikely event it occurs. UI also trains its employees and the local fire department on the safe methods to deal with a substation fire. 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 the UI System Operations Center, and the system operators would then take appropriate action.

Physical Site Security

UI will use fencing and gates to protect the Pequonnock Substation facilities. Security devices will constantly monitor the substation to alert UI of any abnormal or emergency situations. UI plans to implement several physical site security measures outlined as follows:

- UI will enclose the perimeter of the substation with a 14-foot-high chain link fence topped with an additional 1 foot (three strands) of barbed wire to discourage unauthorized entry and/or vandalism.
- Security cameras and motion detectors will be installed that 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

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 in a location where vehicles entering the site will not impede traffic while unlocking the security gates. UI 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 existing and proposed Pequonnock Substation sites and associated interconnections, 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 and environmental and land use information maintained by federal, state, and local governments. In addition, UI conducted field investigations of the proposed Pequonnock Substation site and transmission line interconnection routes, and consulted with federal, state, and local agencies concerning environmental resources in the Project vicinity.

Figure 1-6 provides an aerial photography-based map that illustrates 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 and resources (e.g., water resources, visual resources, cultural resources, noise assessment).

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 Bridgeport Harbor Generating Station, the existing Pequonnock Substation, and the Metro-North – Amtrak railroad 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 proposed substation 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.

Elevations in the Project area are relatively level, and 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. The existing Pequonnock Substation, proposed substation site, and 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 these sites.

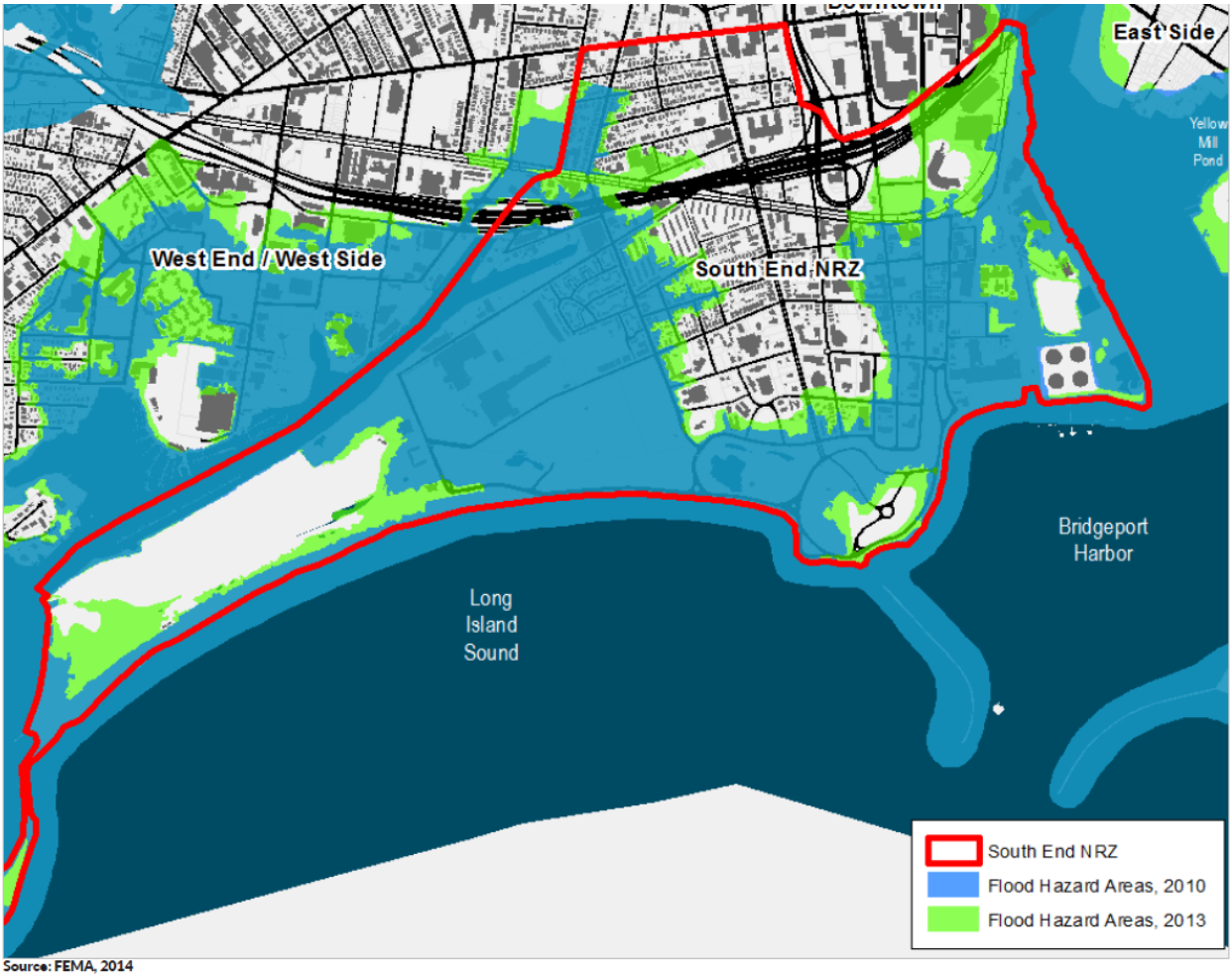
Bridgeport Harbor, which abuts the existing Pequonnock Substation property, has a water quality classification of SB, denoting saline waters that are connected to Long Island Sound and provide habitat for marine fish, other aquatic life and wildlife, commercial shellfish harvesting, recreation, industrial water supply, and navigation.

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., the area 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 area is located.

The AE designation signifies areas within a 100-year flood zone within which base flood elevations and flood hazard factors have been determined. At both the existing and proposed Pequonnock Substation sites, the base flood elevation listed by FEMA is 14 feet (FEMA Flood Insurance Rate Map, Bridgeport, Connecticut, BFE also applies to the proposed Pequonnock Substation site.

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

Monitoring data collected historically by PSEG indicates that 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.

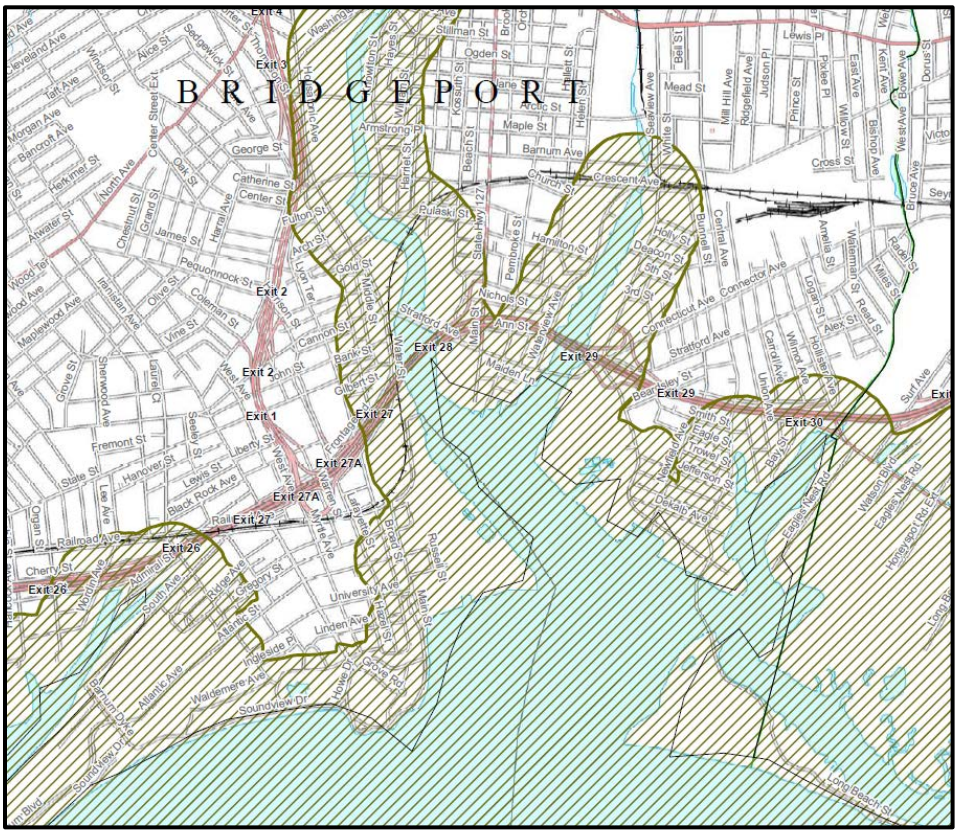
Based on the latest available (January 2011) DEEP Groundwater Quality Classification Map data, groundwater in the Project area is classified as GB. Water with a GB classification includes industrial process and cooling waters and base flow for hydraulically connected water bodies. Such water is presumed not suitable for human consumption without treatment. The classification of groundwater as GB is consistent with the historic industrial uses of 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) Whereas the existing Pequonnock Substation is adjacent to the Harbor, the proposed substation will be located inland from the Harbor.

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



The proposed substation and related transmission line relocation routes do not encompass or abut any designated coastal resources as defined by Connecticut's Coastal Management Act (CCMA; CGS Section 22a-93 (7)(H)), with the following exception: the entire Project area is within a designated "Coastal 'Flood' Hazard Area". As defined in the CCMA, such areas are land areas 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.

The CCMA 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 proposed Project site is situated within an upland, industrial/commercial area; thus, the Project is not expected to conflict with coastal resource or use policies.

4.4 BIOLOGICAL RESOURCES

Vegetation and Wildlife

The existing Pequonnock Substation is entirely developed for utility use (substation equipment within graveled/paved areas) and contains no vegetation. The 3.7-acre proposed Project site is characterized by limited vegetation, except for lawn and landscaped areas long Ferry Access Road and some wooded areas adjacent to the Metro-North Railroad corridor.

Within the 3.7-acre Project site, the approximately 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. Along the proposed transmission line route from the railroad corridor to the new substation, vegetation consists of some trees (a mix of conifers and deciduous species) and brush, as well as lawn areas along either side of Ferry Access Road.

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).

Federal and 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. Habitat for listed species is identified approximately 500 feet east of the existing Pequonnock Substation, along the Pequonnock River, as well as in Bridgeport Harbor and Long Island Sound.

Although no known state-listed species habitat is located in the proposed Project area, because the Project is within approximately 0.25 mile of the NDDB-mapped habitat associated with the Pequonnock River/Bridgeport Harbor, pursuant to the requirements of the CT DEEP's *General*

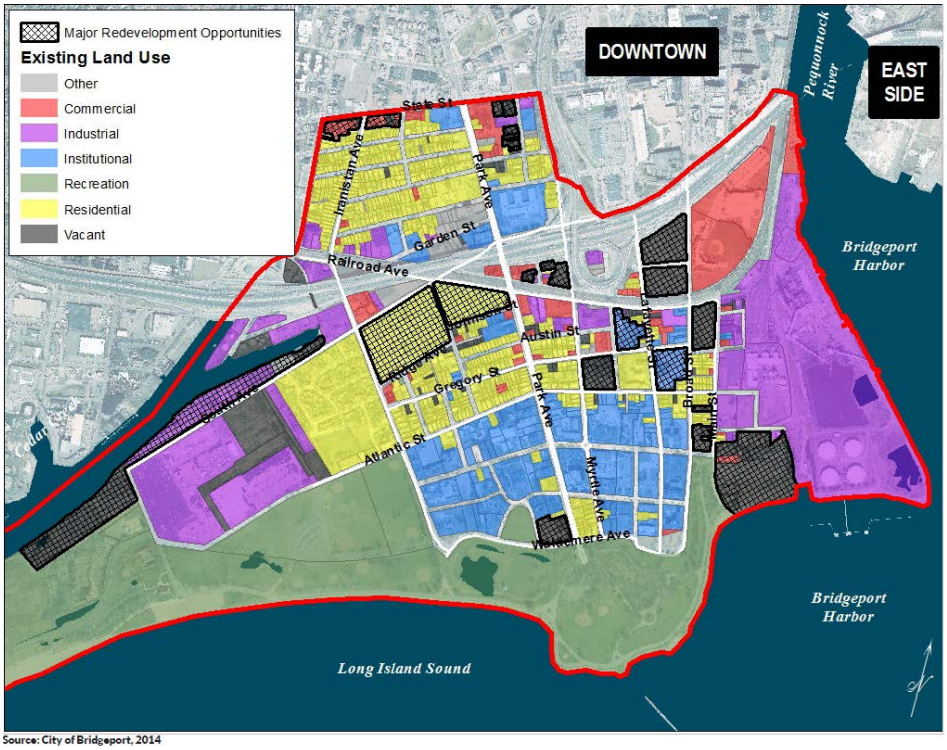
Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities (refer to Appendix A of the General Permit), UI consulted with CT DEEP NDDB to obtain an assessment of the species that might be present in the area. According to the NDDB, Peregrine Falcons (*Falco peregrinus*; a state-listed endangered species) are known to occur within or close to the Project 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 zoned and used for industrial and commercial development (refer to Figure 4-3). The South End consists of approximately 675 acres, situated predominantly on a peninsula that borders Long Island Sound and is located immediately south of Downtown Bridgeport.

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

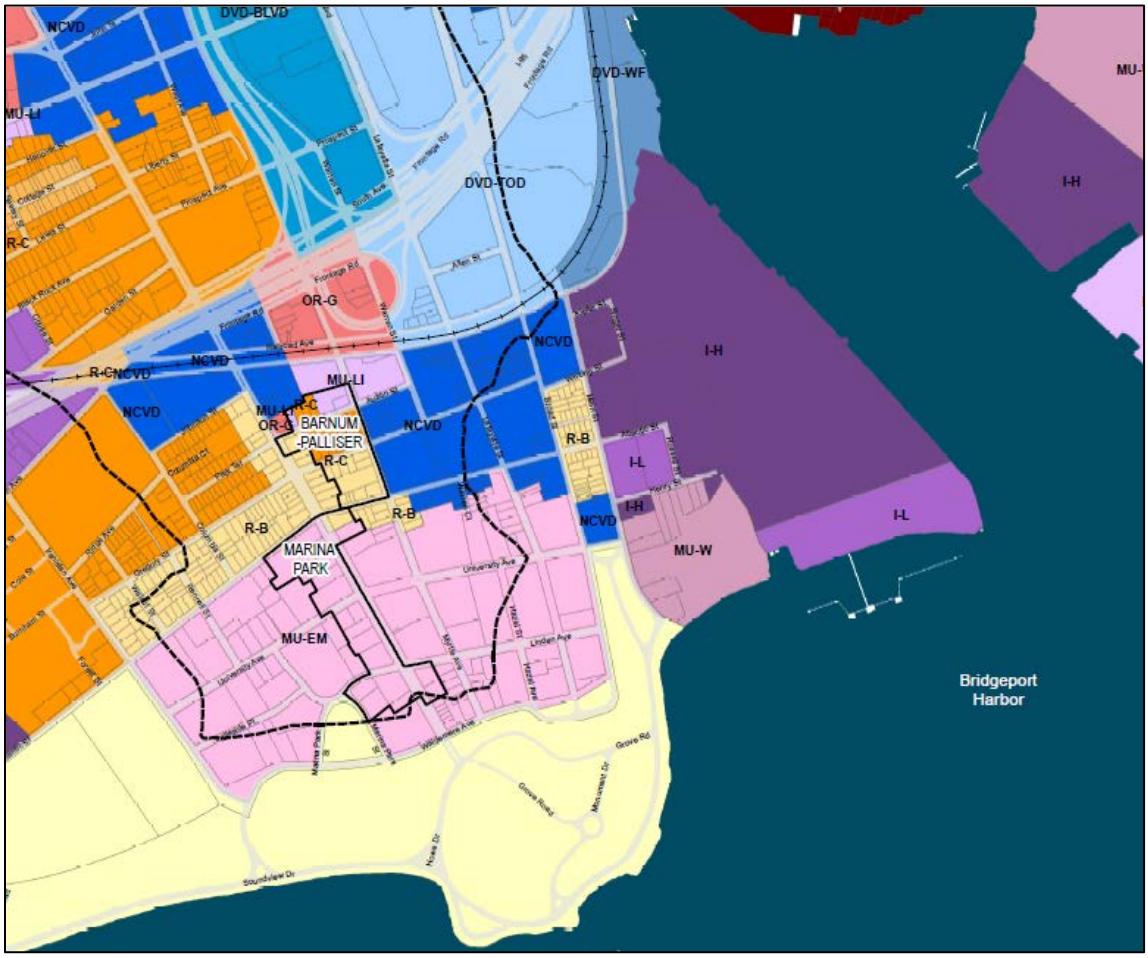


Source: City of Bridgeport, 2014

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). There are no recreational resources in the immediate Project vicinity; although Bridgeport Harbor offers water-related recreational opportunities, there is no public access to the harbor in the vicinity.

Most of the Project area, including the existing and proposed Pequonnock Substation sites and transmission line routes from the existing substation to the new substation, is zoned for Industrial-Heavy (I-H) use[10] (refer to Figure 4-4). The transmission line connections from the Metro-North Railroad extend through a portion of 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.

Figure 4-4: Zoning in Vicinity of the Project



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

The existing Pequonnock Substation site is bordered to the east by Bridgeport Harbor, which is fed by the Pequonnock River to the north, and is otherwise surrounded by property owned by PSEG and developed for the Bridgeport Harbor Station. PSEG is in the process of building a new approximately 485-MW Combined Cycle Facility on the southern portion of the Bridgeport Harbor Station property.

[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.

The proposed 3.7-acre Project site is located on the northwestern portion of PSEG property. Approximately 2 acres of the 3.7-acre parcel, including the planned Pequonnock Substation site, are within PSEG's fenced property. The proposed substation site, which is adjacent to the end of Kiefer Street and east of Singer Avenue, is vacant and used by PSEG for the storage of miscellaneous materials associated with the construction of the new generating unit. A PSEG access road traverses the parcel. The remaining portions of the 3.7-acre site are located outside the PSEG fence and include a single-story warehouse, Ferry Access Road, lawn and landscaped areas along Ferry Access Road, and a small area of shrubs and trees adjacent to the Metro-North / Amtrak corridor.

As illustrated by the City of Bridgeport's existing land use map for the South End (refer to Figure 4-2), land uses in the vicinity of the Project site consist of a mix of industrial and commercial uses along Kiefer Street, as well as Emera Energy's Bridgeport Energy Center and UI's Singer Substation, both located to the south. Ferry Access Road, which provides public access to the Bridgeport-Port Jefferson Ferry, and the Metro-North / Amtrak Railroad corridor separate the existing and proposed substation sites from downtown Bridgeport. To the north of the railroad corridor, I-95 traverses east-west through Downtown Bridgeport.

In addition to the commercial and industrial uses clustered primarily near Bridgeport Harbor, Black Rock Harbor, and the railroad corridor, the South End also includes the 258-acre Seaside Park and the University of Bridgeport. Residential uses are located predominantly in the north-central portion of the district, generally in the vicinity of Park Avenue. However, some residences are situated within 600 feet to the south of the proposed substation site, primarily south of Whiting Street. Other residential areas are located farther to the west and south.

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 a six major themes relating to downtown revitalization, expansion of economic opportunities, neighborhood quality, education, infrastructure improvements, and environmental quality initiatives. The Plan calls for the modernization of infrastructure, including utilities, as needed.

In January 2017, Bridgeport published a *Waterfront Master Plan* that describes opportunities for waterfront redevelopment and revitalization, with a particular emphasis on six waterfront sites. The current Bridgeport-Port Jefferson Ferry terminal site, which occupies 0.76 acre of land leased from

the Bridgeport Port Authority and is located approximately 900 feet north of the existing Pequonnock Substation site, is the closest site to the Project area. The Plan anticipates that if the Bridgeport-Port Jefferson Steamboat Company relocates its ferry terminal across Bridgeport Harbor, then this site presents an opportunity to enhance waterfront connections to downtown Bridgeport and establish a public dock for visitors and excursion boats. In addition, the Plan contemplates a potential public waterfront pathway along the western side of Bridgeport Harbor, adjacent to the existing ferry terminal, Pequonnock Substation, and PSEG Bridgeport Harbor Generating Station property.

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 the minimization of potential impacts from natural hazards, such as flooding, when siting infrastructure and developing property.

Bridgeport's *South End Revitalization Zone Strategic Plan* (2014) identifies 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 the PSEG facility, 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.

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.

Figure 4-5: Community Facilities within 2 Miles of the Project Area

Table 4-1: List of Community Facilities within 2 Miles 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 and vicinity, 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 includes a representative aerial photograph of the Project area, while Figure 4-6 provides a view of 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 4-6: Representative View of Proposed Substation Site and Immediate Vicinity

4.7 TRANSPORTATION AND UTILITIES

The City of Bridgeport is characterized by 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 Metro-North / Amtrak railroad lines, Bridgeport's bus terminal, and the Bridgeport-Port Jefferson Ferry, as well as local roads such as Main Street, Kiefer Street, and Singer Street. Ferry Access Road, which traverses the Project site and extends to the ferry terminal, is a privately-owned road that is maintained by Bridgeport. No airports are located in the immediate Project area; the nearest airport is Sikorsky Memorial Airport, a general aviation facility that is located adjacent to Long Island Sound in the Town of Stratford approximately 3 miles to the southeast.

The existing Pequonnock Substation is located within PSEG's fenced Bridgeport Harbor Station property and is accessible through a PSEG security gate. The location of the proposed GIS substation is similarly located within the fenced PSEG property; however, the southwestern boundary of the site abuts the eastern end of Kiefer Street and Singer Avenue. The remainder of the site that UI proposes to acquire for the substation consists of a portion of Ferry Access Road and the land directly to the north, which is bounded by Ferry Access Road and the railroad corridor.

Major utility facilities in the Project area include PSEG's existing Bridgeport Harbor Station and its associated combined-cycle power plant (currently under construction and expected to be placed into 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. A 345-kV underground transmission cable (located beneath Main Street in the Project vicinity) links Singer Substation to the regional transmission grid. Other transmission facilities in the Project area consist of the eight 115-kV lines that connect to the existing Pequonnock Substation.

In addition, 13.8-kV lines link the 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. In addition, Heritage identified a single archaeological site and two National Register of Historic Places (NRHP) districts situated within approximately 500 feet of the proposed new substation site. 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 archeaological or NHRP sites.

In addition to commissioning Heritage, UI submitted a "Project Review Cover Form" to the Connecticut SHPO (*along with Heritage's Cultural Resource Review*), seeking the SHPO's concurrence with Heritage's findings. On July 25, 2017, the SHPO 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.

4.9 AIR QUALITY, NOISE, AND LIGHTING

Air Quality

The construction of the substation will require the movement of construction equipment, as well as site preparation activities (e.g., grading, filling), that will create vehicular air emissions and dust. UI will minimize emissions from construction equipment and vehicles through proper maintenance and by limiting unnecessary idling per CT DEEP's Anti-Idling Program. In addition to minimizing the emissions generated from idling vehicles, UI's below-grade contractor will be responsible for controlling dust emissions by applying water or equivalent substances to exposed soils on the Site, as necessary, per guidance through UI's SWPCP.

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 on the railroad 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

[11] Pursuant to the National Historic Preservation Act (36 CFR 800.16[d]), the Area of Potential Effect 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 area of potential effect 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.

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 to the 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 Bridgeport Harbor Generating Station, Bridgeport Energy facility, Bridgeport-Port Jefferson Ferry, I-95, the Metro-North / Amtrak railroad corridor, 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

5. POTENTIAL ENVIRONMENTAL EFFECTS AND MITIGATION MEASURES

This section identifies and discusses the potential environmental effects that would result from the construction and operation of the Project, as well as the measures that UI proposes to avoid, minimize, or mitigate such effects. Overall, 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, the Project's environmental effects are expected to be minor and highly localized to the vicinity of the Project. UI will mitigate such impacts to the extent practical, 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 MCF process, ongoing engineering design and constructability reviews, the Council's Application process, and further consultations with other regulatory agencies. All mitigation measures will be reflected in the final Project design and incorporated into the D&M Plan.

5.1 TOPOGRAPHY AND GEOLOGY

The construction and operation of 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.

UI anticipates that the DFE will be achieved by grading as needed, as well as by designing the substation to 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 appropriate engineering controls to manage stormwater runoff during the operation of the facility.

During Project construction, in addition to the topographic modifications to the site of the new substation, 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 excavation of the trenches for the relocation of the underground 115-kV lines and the excavation for proposed HPGF splice chamber at the existing Pequonnock Substation. Soils will be pre-characterized and subsequently managed in accordance with CT DEEP solid waste regulations and UI's Soil and Groundwater Management Plan. In general, soils excavated during Project construction are expected to be removed from the Project area and properly disposed off-site. UI will adhere to appropriate State and Federal requirements for the disposal of any contaminated soils.

If contaminated groundwater is encountered during civil activities on the project, UI will be manage in accordance with one of the following two CT DEEP General Permits: Groundwater Remediation Wastewater to Surface Water or Groundwater Remediation Wastewater to Sanitary Sewer. Prior to discharge of the contaminated groundwater, the groundwater may be pumped into a fractionization (frac) tank, through a series of bag filters and lastly through carbon vessels prior to discharge into any piece of sanitary sewer infrastructure or surface water body. UI will better define the methods of groundwater management within its 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*. The SWPCP will

address stormwater management during the construction of the new substation and 115-kV line connections.

Pursuant to the SWPCP, UI's civil contractor will deploy temporary soil erosion and sedimentation controls around construction work areas. Erosion and sediment controls commonly used during construction activities and expected to be implemented for this Project include, but are not limited to:

- Hay bales
- Silt fence
- Straw wattles
- Diversion swales
- Track pads
- Hay bale corrals for management of spoils or concrete washout areas
- Erosion control blankets

In addition, as required by the *General Permit* and as will be described in the Project-specific SWPCP, for the duration of construction until site stabilization is achieved and verified, UI's environmental contractor will perform inspections to verify the effectiveness of the measures identified in the SWPCP and there is no offsite discharge of sediment. Outlined below is the inspection protocol to be used by UI's environmental contractor:

- Initial inspection by Qualified Environmental Professional within 30 days of erosion and sediment control installation.
- Weekly inspections during construction
- Monthly turbidity monitoring at dedicated discharge points
- Inspections (within) 24-hour period of rain event
- Once construction is complete and site is restored, inspect site once a month for three months

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, pursuant to the SWPCP.

5.4 COASTAL RESOURCES

The proposed Project will not directly affect any coastal water resources. Although the entire Project site is situated within the State of Connecticut's designated coastal boundary within Bridgeport, the Project will not conflict with any defined coastal use policies that provide guidelines for uses and activities subject to the 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 contractors 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 and Spill Prevention Division. 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, based on the regulatory framework under 40 CFR 112, UI will develop and implement a Spill Prevention Control and Countermeasures (SPCC) Plan. The SPCC Plan will include, but is not limited to, such items as mitigation measures used during 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. 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.

Except for lawn and landscaping adjacent to Ferry Access Road and a small area of trees next to the Metro-North Railroad 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 not require any tree removal or pruning except as needed to bring the overhead lines from the Metro-North Railroad corridor, over Ferry Access Road, and into the new substation. Low-growing vegetation also would 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 vault. 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 industrial characteristics of most of the Project site, the construction and operation of the Project will result in only minor and localized impacts to the limited urban wildlife species that could potentially 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.

5.7 LAND USE, RECREATION, AND COMMUNITY FACILITIES

The proposed 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 existing largely vacant 2.7-acre area to productive utility use. The new substation will be consistent with the adjacent and nearby energy developments (e.g., PSEG Bridgeport Harbor Station, Emera's Bridgeport Energy facility, UI's Singer Substation) and will not adversely affect the commercial and industrial areas to the west. No residential areas are located in the immediate site vicinity.

The 115-kV transmission line connections to the new Pequonnock Substation will be routed across UI, ConnDOT, or PSEG properties and will have no adverse effect on existing land uses. UI will coordinate with Metro-North Railroad and ConnDOT regarding the relocation of the overhead line connections from

the railroad catenary structures, and will obtain coordinate with ConnDOT, pursuant to its existing license agreement with that agency, regarding new structure locations on railroad property.

5.8 VISUAL AND AESTHETIC CHARACTERISTICS

To evaluate the potential visual effects of the Project, UI retained All-Points Technology Corporation, P.C. to conduct a Visibility Analysis. This 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 rebuilt substation will be visible from abutting locations along Ferry Access Road (to the north and west), as well as from a short stretch along the I-95 corridor. 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 in the area will serve to obstruct most views of the substation. Figure 5-1 provides a photographic simulation of the proposed substation and vicinity.

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. The Project area is readily accessible from the local and regional highway network and is near UI's existing 115-kV lines that extend along the Metro-North Railroad corridor and connect to the existing Pequonnock Substation. Access for construction will be via local roads, including private roads on PSEG property and Ferry Access Road. To install the four structures to be located on the north side of the Metro-North Railroad corridor, UI will coordinate with ConnDOT and the City of Bridgeport regarding access and temporary work space, which is expected to be located adjacent to the railroad tracks.

The Project area also is served by public water, sewer, and storm sewer systems, as well as other utilities. UI will coordinate with the City of Bridgeport regarding municipal utilities. UI will design the Project to avoid impacts to existing utility systems and transportation services.

Overall, the development of the Project will improve the reliability of UI's transmission system and the New England Bulk Electric System by replacing the existing Pequonnock Substation. The development of the new substation will not only mitigate the risk for damage to the substation (and the electric system in general) from coastal flooding, but also will provide needed updates to the Pequonnock Substation in general. For example, the existing Pequonnock Substation has a number of non-flood related physical issues that pose risks to the continued reliable operation of the facility at the current site. Such issues include persistent site settling (due to the shifting and movement of the fill beneath the site), which has led to cracks in foundations, excessive forces on switchgear bushings, misalignment of 115-kV disconnect switches, etc. In addition, the existing substation site is small and fully-built-out, with little space to accommodate routine operations and maintenance activities and no room to accommodate access for a mobile transformer, if needed in an emergency.

The Project will not affect any above-grade existing municipal utilities. The operation of the substation will not require full-time on-site personnel and thus will not result in any long-term effects on traffic.

The construction of the Project could result in minor and short-term effects to vehicular traffic on the local roads leading to the Project site, particularly Ferry Access Road. At times, localized traffic congestion may occur when heavy construction equipment or large components are transported to the site, as well as when construction workers travel to and from the site. However, these effects will be limited to the immediate vicinity of the site and will be minor and short-term. UI will coordinate work to minimize

potential impacts to traffic on Ferry Access Road and to assure that access remains available to users of the Bridgeport-Port Jefferson Ferry.

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 development 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 proposed 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.

The construction of the new Pequonnock Substation and the relocation of the 115-kV line connections will require the movement of construction equipment, as well as site preparation activities that will result in vehicular air emissions and generate dust.

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 and are adjacent to the Metro-North Railroad corridor, 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 substation.

Lighting

The Project site 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, which includes measurements of existing EMF levels near the existing Pequonnock Substation and associated transmission lines and modeling of anticipated EMF levels associated with the proposed Project facilities, is included in Appendix G. This section summarizes the key findings of the report.

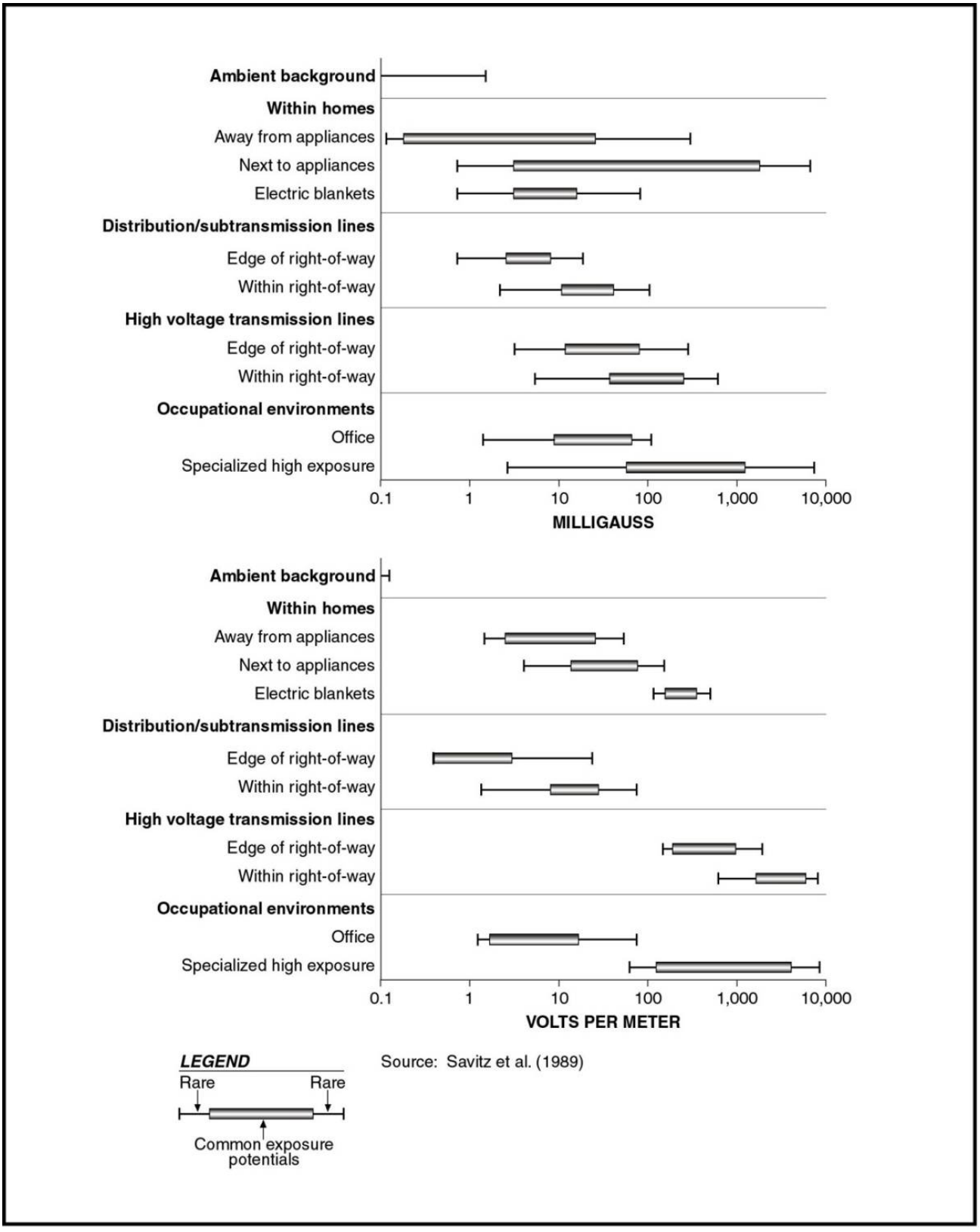
6.1 OVERVIEW

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 to the CSC (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 CSC 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.[13] In a June 2007 Factsheet, the World 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.[14]

[13] 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.

[14] 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.

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:

- 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

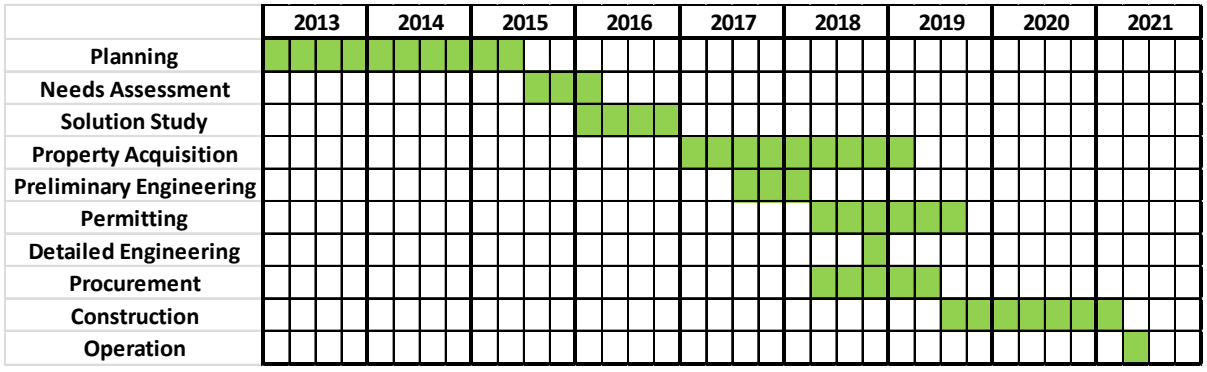
The proposed Project will not significantly change EMF levels in the vicinity. Because the configurations of the rebuilt substation and relocated 115-kV transmission line connections will be similar to those at the existing substation, the EMF levels also will be similar. The calculated magnetic field 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).

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 proposed schedule for developing the Project.

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 second 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: Anticipated Project Schedule



8. PROJECT PERMITS, APPROVALS AND CONSULTATIONS

During the planning of the proposed Project, to date, UI has coordinated with representatives of the City of Bridgeport and PSEG, as well as with the CT DEEP and SHPO[15]. Appendix B includes correspondence conducted 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 that would be 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 has consulted with City of Bridgeport officials and coordinated with PSEG. In addition, the Council's MCF process represents a formalized 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. In accordance with CGS § 16-50*l*, applicants intending to apply for a Certificate of Environmental Compatibility and Public Need from the Council must consult with potentially affected municipalities at least 60 days prior to the Application filing date.

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

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

Agency	Permit/Approval Required	Application Submitted or Consultation (Date)	Status
STATE			
CONNECTICUT SITING COUNCIL	Municipal Consultation Filling Certificate of Environmental Compatibility and Public Need under CGS § 16-50*l*(a)(1) Development and Management Plan (after issuance of certificate and prior to approval to start construction)	MCF – February 2018	MCF in progress
CT DEEP • NDDB	Threatened and endangered species review	Review form submitted December 2017; NDDB identified Peregrine falcon identified as in vicinity (letter dated March 2017 – will need to resubmit in March 2018)	Consultation complete; mitigation measures to avoid potential impacts to species will be determined based on 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 Metro-North Railroad corridor	Pending	Pending
CT SHPO	Cultural Resource Consultation under Connecticut General Statutes § 16-50*l*(e)	Review form May 2017; July 2017 SHPO determination of no adverse effect	Complete

The pre-application consultation must include, but not be limited to, good faith efforts to meet with the chief elected official of each potentially affected municipality and to provide technical reports concerning the public need, site selection process and environmental effects of the proposed facilities. Accordingly, this MCF is being provided to the City of Bridgeport, the municipality in which the proposed Project would be located.

During the 60-day municipal consultation period, UI will offer 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. Comments provided by the City will be reflected in the Application that UI submits to the Council for the Project.

In accordance with the Council's requirements and Connecticut General Statutes § 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.

9. ALTERNATIVES CONSIDERED

9.1 INTRODUCTION AND SUMMARY

Overview and Conclusions of the Alternatives Evaluation Process

The proposed 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 requirement for connecting the relocated 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: at 1 Keifer Street and 375 Main Street. The 1 Kiefer Street location (the proposed site, on a 3.7-acre parcel presently owned by PSEG) 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 represents a feasible, but less preferable, alternative to the PSEG site. Although also directly south of the four 115-kV transmission lines collocated along the Metro-North Railroad 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. The existing 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 700 feet longer than the HPGF cable extensions to the proposed site.

In addition, the existing overhead 115-kV line that extends from Pequonnock Substation to the Bridgeport Harbor Station generating facilities would have to be extended overhead, along Ferry Access Road, between the 375 Main street site and PSEG and Bridgeport Energy. In addition, 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 and 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 relocated Pequonnock Substation, UI also 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 proposed 2-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 only across property owned by ConnDOT, PSEG, or to be acquired by UI.

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 facilities at Pequonnock Substation, thereby enhancing the reliability of the electric system to the benefit of Connecticut consumers. The Project is consistent with the surrounding industrial land uses. The relocation of the Pequonnock Substation to the proposed site, in close proximity to the existing substation that it will replace, will facilitate interconnections to not only the existing transmission infrastructure, but also to UI's existing distribution system.

Organization of this Alternatives Section

This section complies with the Council's Application Guide (June 2016), which requires a description of alternatives and justification for the selection of the proposed site, including a comparison with alternative sites that are environmentally, technically, and economically practicable. Accordingly,

Section 9.2 reviews the consequences of the No Action Alternative, while Section 9.3 describes the process by which site alternatives, including the option of redeveloping the existing Pequonnock Substation site, were identified and evaluated, leading to the selection of the proposed site. Section 9.4 discusses alternative substation designs (AIS vs. GIS) at the proposed site, as well as alternative routes for the transmission line interconnections.

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, was placed into service in 1956 and has undergone various modifications and expansions over the intervening decades. The existing substation site 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 site 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 floodwall 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, as a result of the challenging construction, the substation redevelopment could require more than five years, and would be more costly than new site alternatives.

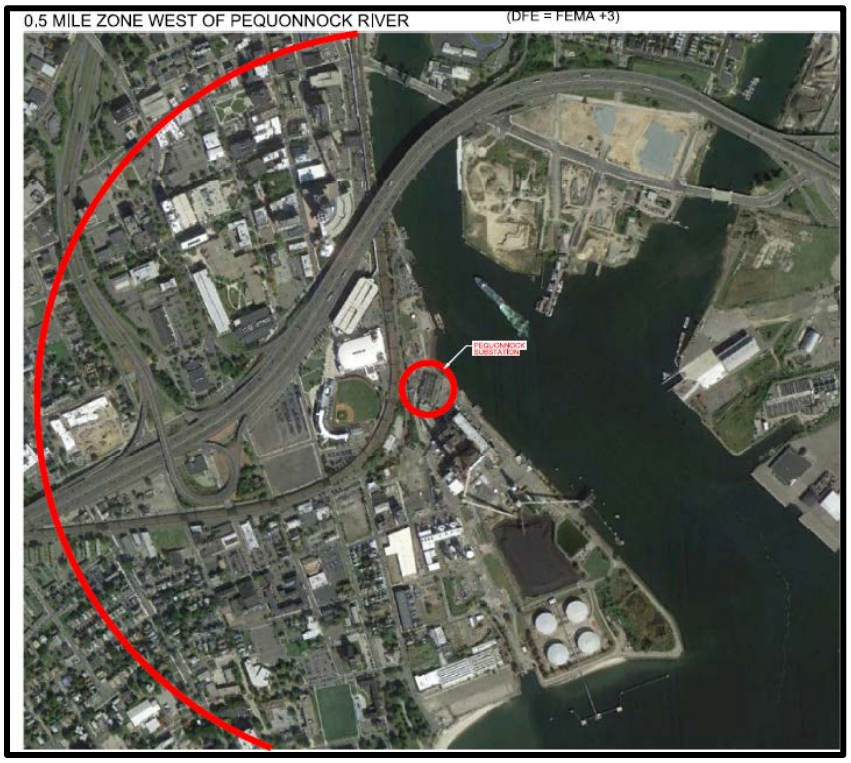
Overall, Alternative A (raising substation equipment components above the BFE) and Alternative B (installing a perimeter flood wall) were quickly found to be infeasible and thus not evaluated in detail. The third alternative (Alternative C: rebuild the entire substation in place) was investigated in 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 side of the Pequonnock River / Bridgeport Harbor, within a 0.5-mile radius of the existing substation. Figure 9-1 illustrates the 0.5-mile radius, which falls entirely within the City of Bridgeport, in relation to the existing substation site. This 0.5-mile radius reflects 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 Radius for Potential Site Selection



General Site Selection Guidelines

To identify potentially feasible alternative sites for the relocation of the substation within the 0.5-mile radius, 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 Relocation

In addition to the standard Guidelines, key considerations in the identification of potential sites for relocating 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 length of new transmission and distribution lines that would have to be developed to effectively interconnect the new substation to the transmission network and to UI's distribution system were considered.

Results of the Site Screening Process

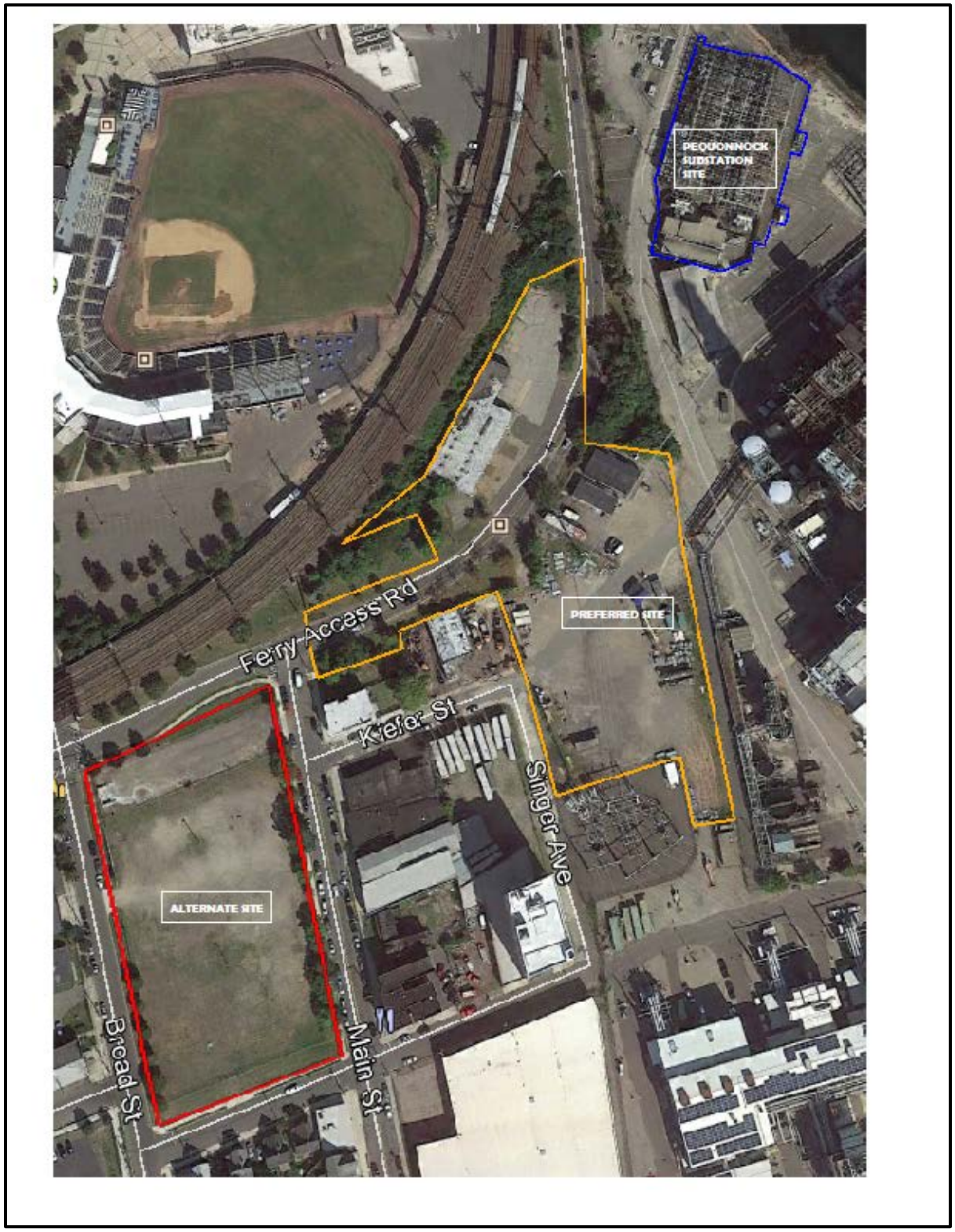
Because of the extensive urban development within 0.5 mile of the existing Pequonnock Substation and the need to relocate the substation to property in proximity to the existing 115-kV transmission lines, UI found only two potentially viable sites for the new substation that would meet the siting guidelines 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 are within the FEMA-designated 100-year floodplain associated with Bridgeport Harbor. The designated floodplain encompasses most of Bridgeport's South End area (refer to the FEMA floodplain maps in Appendix A). No potential sites for the new substation were identified north of the Metro-North Railroad 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 alternative site evaluation process led to the identification of two potential locations for the Pequonnock Substation relocation, as illustrated on Figure 9-2. As summarized below, UI conducted more detailed investigations of 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 relocated 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 side-by-side comparison of each site, based on physical attributes, environmental and land use features, constructability considerations, and cost.

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



Source: Google Earth, September 2017

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 Bridgeport Harbor Station property, and property encompassing Ferry Access Road and abutting the Metro-North Railroad corridor. The site is located on the northwestern portion of PSEG's Bridgeport Harbor Station property and directly abuts the Metro-North Railroad corridor. To the west, it is bordered by Singer Avenue and the dead-end of Kiefer Street; the 3.7-acre parcel also encompasses a portion of Ferry Access Road.

Approximately 2 acres of the site (all within the existing PSEG fenced property and zoned I-H) would be used for the new substation; this portion of the PSEG property is vacant and is currently being used for parking and equipment/material laydown to support PSEG's construction of its new Bridgeport Harbor Station 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 Metro-North Railroad corridor would 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 the site location near the existing Pequonnock Substation and UI's existing 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 375 Main Street site is bordered by Main Street on the east, Ferry Access Road and the Metro-North Railroad 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 contains no buildings and currently functions 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., the PSEG Bridgeport Harbor Generating Station, 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 to the 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 sites. 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 line serving Bridgeport Harbor Station 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 impact implications (e.g., some or all of the underground lines could have to be de-rated to have a lower current carrying capacity).

Finally, the timely acquisition of the site from the City of Bridgeport / HUD 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 the development of the relocated 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 infrastructure to interconnect new transmission and distribution circuits to existing facilities.

- **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 Metro-North 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 property PSEG property.

The 375 Main Street represents a feasible, but less preferable, alternative to the PSEG site. Although also adjacent to the 115-kV transmission lines along the Metro-North Railroad corridor, the 375 Main Street site would be more costly to develop and would require much 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 because it is close to residential areas and to the two NRHP sites.

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 and to maximize the use of existing industrial and commercial properties. 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 to Existing Pequonnock Substation	700 feet	1,200 feet
Site layout	• Supports GIS design • Substation can be accommodated within 2.7-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
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 two NRHP sites
Land Use and Zoning	• Zoned I-H and DVD-WF • Located within an industrial area, with no residences in immediate vicinity • Future land use 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 property	• 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 and Emera generating facilities • Underground HPGF cable extensions of 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 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
AC (alternating current):	An electric current that reverses its direction of flow periodically. (In the United States this occurs 60 times a second-60 cycles or 60 Hertz.) This is the type of current supplied to homes and businesses.
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.
Ampere:	(Amp): 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
ASTM:	American Society for Testing and Materials
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
CCVT	Capacitive coupled voltage transformers
CEII:	Confidential Energy Infrastructure Information
Certificate:	Certificate of Environmental Compatibility and Public Need (from the Connecticut Siting Council)
CGS:	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

Acronym	Description
Council (or CSC):	Connecticut Siting Council
CT	Current transformer
CTPT	Combined current and potential transformer
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
DC:	Direct current
Deadend Structure:	A line structure that is designed to have the capacity to hold the lateral strain of the conductor in one direction.
DFE	Design Flood Elevation
Distribution:	See line, system. 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.
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 fields.
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

Acronym	Description
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)
Lightning Shield Wire:	A wire positioned such that it prevents lightning from striking transmission circuit conductors.
Line:	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.
Manhole:	See splice chamber
MCF:	Municipal Consultation Filing, part of the Connecticut Siting Council application process
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

Acronym	Description
PSI:	Pounds per square inch
PT:	Potential transformer
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.
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