DOCKET NO. 490 – The United Illuminating Company application for a Certificate of Environmental Compatibility and Public Need for the Old Town Substation Rebuild Project that entails construction, maintenance and operation of a 115/13.8- kilovolt (kV) air-insulated replacement substation facility located on the existing Old Town Substation parcel at 282 Kaechele Place and two parcels immediately north totaling approximately 3 acres that are owned by the United Illuminating Company at 312 and 330 Kaechele Place, Bridgeport, Connecticut, and related transmission structure and interconnection improvements.	}	Connecticut Siting Council January 22, 2021

DRAFT Opinion

Introduction

On June 30, 2020, The United Illuminating Company (UI or Applicant) applied to the Connecticut Siting Council (Council) for a Certificate of Environmental Compatibility and Public Need (Certificate) for the construction, maintenance, and operation of a replacement 115/13.8 kilovolt (kV) air insulated substation at 282, 312 and 330 Kaechele Place, Bridgeport, Connecticut. The purpose of the proposed replacement substation facility is to improve the reliability of service to customers in the Bridgeport area and to the New England power grid by addressing issues associated with the physical condition of the existing substation equipment and infrastructure. UI and The Connecticut Light and Power Company d/b/a Eversource Energy (Eversource) are parties in this proceeding.

UI provides electrical distribution service to 17 municipalities in Connecticut including Bridgeport. UI's existing 115-kV/13.8-kV air-insulated Old Town Substation is located on a 0.9-acre property at 282 Kaechele Place, Bridgeport. This existing substation is connected to various distribution lines and serves the City of Bridgeport, as well as Easton, Fairfield and Trumbull.

Jurisdiction

The Council's jurisdiction under Connecticut General Statutes (C.G.S) §16-50i(a) extends over electric substation facilities designed to regulate the voltage of electricity at 69-kV or more. Under the Public Utility Environmental Standards Act (PUESA), the Council's charge is to balance the need for adequate and reliable public utility services at the lowest reasonable cost to consumers with the need to protect the environment and ecology of the state. A public need exists when a facility is necessary for the reliability of the electric power supply of the state.

Under C.G.S §16-50p, the Council shall not grant a Certificate, either as proposed or modified by the Council, unless it shall find and determine the nature of the probable environmental impact of the facility alone and cumulatively with other existing facilities, including a specification of every significant adverse effect relative to electric and magnetic fields, impact on and conflict with the policies of the state concerning the natural environment, ecological balance, public health and safety, scenic, historic and recreational values, agriculture, forests and parks, air and water purity and fish, aquaculture and wildlife, and why the adverse effects are not sufficient reason to deny the application.

Public Need

Transmission System

Three overhead 115-kV transmission lines owned by Eversource occupy the right-of-way (ROW) that extends through the existing Old Town Substation site. These are the #1222 Line, #1710 Line and the #1714 Line.

Two existing approximately 105-foot tall double-circuit lattice transmission structures are located in the vicinity of the existing substation and within the Eversource ROW. Structure No. 857 is located east of the existing substation and supports the #1714 Line and the #1710 Line. Structure No. 857A is located north of the existing substation and supports the #1714 Line and the #1222 Line.

The existing Old Town Substation is connected to the #1710 Line and the #1222 Line. The #1714 Line bypasses the existing Old Town Substation and links UI's Trumbull Substation and Eversource's Weston Substation.

Asset Conditions

The existing substation has asset condition issues including, but not limited to, inadequate lightning protection; insufficient control enclosure space; a single point of failure related to infrastructure within an on-site manhole; Bus Number 3 enclosure issues; oil-filled circuit breaker issues; lack of mobile substation access; disconnect switch maintenance issues; and capacitor coupled voltage transformers (CCVTs) issues.

Specifically, the existing substation bus infrastructure does not adequately protect exposed equipment from direct lightning strikes, and thus, there is a high probability that exposed equipment would be damaged from lightning strikes.

The existing control enclosure does not meet the National Electrical Safety Code criteria with respect to sufficient work room, and it cannot be expanded due to the small size of the existing substation site.

Both the mains to and the feeders from Bus No. 3 extend through the same manhole in the substation yard. Thus, a catastrophic event in this manhole, such as a cable fault, has the potential to de-energize the entire substation.

Bus No. 3 is essentially a metal enclosed switchgear. However, its steer bus is buckling from the weight of the circuit breakers, and thus, it is becoming more difficult to "rack in" and "rack out" the circuit breakers. While UI has performed maintenance to address these breaker issues, the problem persists, and more frequent and difficult maintenance is required due to aging equipment and lack of available replacement parts.

Old Town Substation has a 115-kV oil-filed circuit breaker (OCB). It is also difficult to maintain due to its age and availability of spare parts. It is the last remaining OCB in UI's system as UI has replaced other OCBs with gas-filled circuit breakers.

UI has two mobile substation transformers available to be deployed in the event of a substation transformer failure. However, the existing Old Town Substation has insufficient space to deploy even UI's smallest mobile transformer without violating clearances to the overhead strain bus.

Old Town Substation has OCB disconnect switches that do not conform to current American National Standards Institute (ANSI) standards. Additionally, the age of such disconnect switches results in maintenance challenges due to the lack of replacement parts and long lead times for specialty fabricated components.

Two CCVTs for the #1710 Line are corroded and have a high risk of moisture entering the internal components; thus, replacement is required.

Transformer Capacity

The existing Old Town Substation has two 60 MVA power transformers. The weather-normalized 90/10 loading of the existing Old Town Substation was 64.82 megavolt-amperes (MVA) during 2019. UI projects that this would grow to approximately 66 MVA by 2030. The existing Old Town Substation's transformers have a total capacity of approximately 85 MVA. Thus, from a purely MVA capacity standpoint, the Council notes that the existing Old Town Substation has ample MVA capacity to meet the forecasted loads. However, in order to address the asset design issues via a full substation replacement, a replacement substation also has to be designed for adequate capacity.

Substation Capacity and Asset Condition Mitigation

UI proposes a replacement substation with two power transformers that would be 45/60/75 MVA each. The proposed replacement substation would have a top nameplate rating of 75 MVA. The final MVA capacity of the proposed replacement substation would be determined based on a thermal analysis of the as-built transformers. Notwithstanding, the MVA capacity of the proposed replacement substation is expected to be greater than the nameplate rating of 75 MVA; thus, it is designed to be sufficient to address the forecasted 2030 loading of 66 MVA and beyond.

The existing Old Town Substation asset condition issues including, but not limited to, those related to the 115-kV (transmission) side of the substation, would be resolved by a full replacement of the substation. The existing substation with its equipment/asset issues would be decommissioned after the proposed replacement substation is in service.

New England's electric power grid has been planned and operated as a unified system of transmission owners and market participants. The New England system integrates resources with the transmission system to serve all regional load regardless of state boundaries. Most of the transmission lines are relatively short and networked as a grid. Therefore, electrical performance in one part of the system affects all areas of the system. Thus, the Council finds that by mitigating asset condition issues at the existing Old Town Substation, the proposed replacement substation would improve the reliability of service to customers in the Bridgeport area (service area) and to the New England power grid. Thus, by improving electric reliability in the Bridgeport area and the New England area (as transmission would connect to the proposed replacement substation with the 115-kV asset issues resolved), the Council finds the proposed project is necessary for the electric reliability of Connecticut.

Project Alternatives

UI considered three system alternatives. The "No Action" alternative was deemed unacceptable because the existing Old Town Substation would still have asset condition issues. The substation would remain outdated and at risk for equipment failures that would lead to outages of extended duration which would affect customers and the bulk power system. Rebuilding the substation in the same location, known as the "Rebuild in Place" option, was rejected due to the need to take the existing substation out of service for an extended period of time; the need to utilize a mobile transformer (and thus precluding its use elsewhere should it be necessary); increased complexity of construction; increased safety risks by performing upgrades in proximity to energized equipment; and increased cost versus a full replacement substation.

With respect to the location of a full replacement substation, UI identified seven potential sites for development of the project. However, six of the seven sites are not presently owned by UI or dedicated to utility use. As a result, acquiring such properties would pose challenges and increase costs. Additionally, six of the seven sites are not located in the immediate vicinity of the existing Old Town Substation. Thus,

no efficiencies would be realized via minimizing new transmission and distribution connections. Lastly, several of the six alternative sites have land use constraints such as presence of wetland and recreational uses. Therefore, after examining the potential sites, UI selected the proposed site for a replacement substation.

Finally, after system alternatives and location alternatives were explored, UI also considered the replacement substation configuration options. Specifically, UI evaluated whether a gas-insulated substation (GIS) or an air-insulated substation (AIS) would be more suitable. UI selected an AIS design because sufficient space is available at the site to accommodate this design, and it would be lower cost than a GIS design.

Proposed Project

The proposed replacement substation would have an irregular shape with an interior fenced area of 2.25 acres. It would be enclosed by a 14-foot high chain link fence with privacy slats and one foot of barbed wire on top. The interior surface of the proposed replacement substation would consist of traprock, with the exception of the access drives.

Access to the substation would be via a new paved access drive inside the fenced substation from two gates located off of Kaechele Place. A third gate would be located within the transmission line ROW.

The primary substation components would include, but not be limited to:

a) A new approximately 3,840 square foot control enclosure and 13.8-kV switchgear enclosure;
b) Two 115-kV/13.8-kV 45/60/75 MVA power transformers;
c) Three 115-kV sulfur hexafluoride (SF_6) dead tank circuit breakers;
d) 115-kV disconnect switches;
e) Capacitor coupled voltage transformers;
f) Associated 115-kV insulators, tubular aluminum bus, surge arrestors, and connectors;
g) Provisions to accommodate a temporary mobile transformer for emergency conditions;
h) Lightning masts; and
i) Associated structural steel to support electrical equipment.

The #1710 Line and the #1222 Line would connect to the line terminals at the proposed replacement substation. The #1714 Line would be re-routed through the proposed substation yard in anticipation of a future connection, but it would not be connected to the substation at this time.

Eversource would replace the two existing steel lattice transmission structures with four new 105-foot Eversource-owned monopole transmission structures. UI would install five monopoles inside the proposed replacement substation, each with a height of less than 100 feet.

Environmental Considerations

The proposed site is currently located on a total of 3.9 acres owned by UI. The subject property consists of a 0.9 acre parcel at 282 Kaechele Place and two additional parcels (totaling 3 acres) located at 312 and 330 Kaechele Place, respectively. The 0.9 acre existing substation parcel is entirely developed for utility use. The two additional parcels contain an upland forest, shrub vegetation and a wetland. The subject property is located within the City of Bridgeport's Residential (R-A) Zone.

Commercial development exists west of the subject property along Kaechele Place and Main Street. A single commercially-developed property with frontage on Main Street and multiple residentially-developed properties located along Sequoia Road are located directly to the north of the subject property. Elton Rodgers Woodland Park (ERWP) is a wooded City of Bridgeport park located directly to the east and south of the subject property. The Eversource electrical transmission ROW extends from the east through ERWP and through a portion of the existing substation site before continuing to the west.

The most prominent views of the proposed replacement substation would be from nearby locations along Kaechele Place and Main Street immediately west of the subject property. During leaf-off conditions, portions of the substation's infrastructure would also be visible from locations on Sequoia Road north of the subject property. In general, views of the proposed replacement substation from Main Street would be screened by existing intervening commercial buildings. Many nearby views of the substation would be mitigated seasonally by foliage (which includes new plantings) and screening elements incorporated into the facility design.

The proposed replacement substation would include general task lighting that would only be turned on during maintenance or switching operations. UI would also install entry lighting that would operate at night. UI would also include security lighting and would work closely with its security department and neighbors in the direct vicinity with respect to such security lighting. However, given that the proposed replacement substation would be located immediately east of a well lit developed urban area, construction and operating of the proposed project would result in only localized and minor modifications to the lighting environment.

Wetland A is an on-site 0.49 acre wetland and unnamed intermittent stream in the northern portion of the site. Wetland B is an off-site wetland and unnamed intermittent stream located southeast of the proposed site with the ERWP and the Evesource ROW. UI does not anticipate any permanent impacts to Wetland A. However, it is possible that vegetation may need to be cut within Wetland A, and some construction activities such as the retaining wall installation may necessitate the use of temporary construction mats in a portion of Wetland A.

If any temporary wetland impacts are required, UI would consult with and provide necessary submittals to DEEP and the U.S. Army Corps of Engineers (ACOE). If any portion of Wetland A must be filled to develop the substation, UI would also consult with and secure appropriate permitting from DEEP and ACOE.

No viable vernal pool habitat was observed in Wetland A or Wetland B.

During construction of the project, UI would implement measures to protect water resources and would utilize erosion and sedimentation control measures in accordance with its Stormwater Pollution Control Plan (SWPCP) and DEEP Stormwater Permit.

Groundwater in the project area is classified by DEEP as GB. Water with a GB classification includes industrial process and cooling waters and base flows for hydraulically connected water bodies. Such water is presumed not suitable for human consumption without treatment. The depth to groundwater in the project area is approximately 10 feet below grade. UI would implement dewatering protocols as necessary consistent with its SWPCP and DEEP Stormwater Permit. If contaminated groundwater is encountered, UI would manage such groundwater in accordance with DEEP requirements. The proposed substation site is not located within a DEEP-designated Aquifer Protection Area.

UI would clear shrub vegetation and remove approximately 60 trees of six inches diameter or greater on the subject property to construct the project. Additionally, approximately 10 additional trees of six inches diameter or greater would be removed within the easement in the ERWP to accommodate the relocated overhead 115-kV transmission line connections to the proposed replacement substation. No tree clearing or widening of the ROW would be necessary for the installation of Eversource's monopole structures. No tree clearing within core forest is proposed for this project.

By letter dated October 18, 2019, DEEP reviewed the Natural Diversity Database (NDDB) and found that the eastern box turtle (EBT), a state-listed Species of Species Concern, occurs vicinity of the proposed site. DEEP included recommended protective measures for the EBT, and UI would implement such measures.

UI consulted with the U.S. Fish and Wildlife Service (USFWS) regarding the northern long-eared bat (NLEB), a federally-listed Threatened Species and state-listed Endangered Species. USFWS indicated that no NLEB habitat occurs at the site. However, based on UI's ecological assessment of the site, three to five viable NLEB roosting trees were identified at the proposed site. In the unlikely event that NLEB utilizes such trees as roosting or nursery habitat, UI would limit clearing to outside of the June through July pup season.

The proposed site is not located within a Coastal Boundary. The proposed site is not located within any mapped 100-year or 500-year Federal Emergency Management Agency flood zones.

There are no Prime Farmland Soils located on the proposed site.

No historic properties would be affected by the proposed replacement substation project.

The proposed project is expected to comply with DEEP noise control standards.

The Council is satisfied that the proposed project's electric and magnetic fields have been demonstrated to be well below recommended exposure standards established by the International Commission on Non-Ionizing Radiation Protection and the International Committee on Electromagnetic Safety and are not of a concern.

Cost

The cost of the Proposed Project is approximately $39.1M for UI's substation replacement project plus an additional $3M for Eversource's portion of the project associated within the electrical interconnection.

Of the $39.1M, $23.4M would be regionalized across all New England ratepayers, and $15.6M are associated with distribution and non-Pool Transmission Facilities which are typically borne by UI customers. The regionalized costs are based on load share and are approximately 75 percent for New England and 25 percent for Connecticut. Thus, of the $23.4M, about $17.5M would be borne by New England, and $5.9M would be borne by Connecticut. The $3M cost associated with Eversource's portion of the project would also be regionalized.

The Council notes that the proposed replacement substation would be less costly than the Rebuild In Place option which would cost about $47M. None of the six raw land alternative sites (for a full substation replacement) would offer any cost efficiencies relative to the proposed replacement substation site due to new land to be acquired; and with none of these sites located in the immediate vicinity of the existing substation, there would not be an opportunity to minimize the lengths (and thus costs) of

transmission/distribution connections. Thus, the Council finds that the proposed project is the most economic option to address the asset condition issues at the existing Old Town Substation.

Conclusion

The Council finds the project is necessary for the reliability of the electric power supply of the state, serving the interests of electric system economy and reliability, and as such, conforms to a long-range plan for expansion of the electric system serving the state and related interconnected utility systems. The project is consistent with the 2018 Comprehensive Energy Strategy as it improves grid reliability.

Based on the record of this proceeding, the Council finds and determines that there is a public need for the facility. The Council also finds and determines that the Proposed Project is not in conflict with the policies of the state concerning the natural environment, ecological balance, public health and safety, scenic, historic and recreational values, agriculture, forest and parks, air and water purity, and fish, aquaculture and wildlife, together with all other environmental concerns, including EMF, and balanced the interests in accordance with C.G.S §16-50p(a)(3)(B) and C.G.S §16-50p(a)(3)(C). The environmental effects that are the subject of C.G.S §16-50p (a)(3)(B) can be sufficiently mitigated and do not overcome the public need for the facility.

The Council will require UI to submit a Development and Management (D&M) Plan for the proposed project to include, but not be limited to, detailed site plans identifying structure and equipment locations as well as temporary and permanent facilities and roadways; an erosion and sediment control plan consistent with the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control*; a Spill Prevention, Control, and Countermeasures Plan; and a decommissioning plan for the existing Old Town Substation.

With the conditions listed above, the Council will issue a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a replacement 115-kV/13.8-kV air-insulated substation located at 282, 312 and 330 Kaechele Place, Bridgeport, Connecticut.