CONNECTICUT SITING COUNCIL

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| **PETITION NO. 1310A – Quinebaug Solar, LLC petition for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the proposed construction, maintenance and operation of a 50-megawatt AC solar photovoltaic electric generating facility on approximately 561 acres comprised of 29 separate and abutting privately-owned parcels located generally north of Wauregan Road in Canterbury and south of Rukstela Road and Allen Hill Road in Brooklyn, Connecticut** | : | **PETITION NO. 1310A**<br><br>**January 7, 2020** |

**DIRECT TESTIMONY OF STEPHEN A. MARIEN, ALI R. KARIMI, ANUJ MATHUR, MICHAEL LIBERTINE AND CHRISTOPHER PAUL SODERMAN CONCERNING TRANSMISSION INTERCONNECTION FACILITIES AND UPGRADES REQUIRED FOR THE QUINEBAUG SOLAR, LLC PROJECT**

## I. INTRODUCTION

**Q. Please identify yourselves.**

A. [Mr. Marien] I am Stephen A. Marien, P.E., Lead Engineer, Transmission Line and Civil Engineering, employed by Eversource Energy Service Company.

[Mr. Karimi] I am Ali R. Karimi, Project Engineer, Substation Design and Engineering, employed by Eversource Energy Service Company.

[Mr. Mathur] I am Anuj Mathur, Senior Project Manager, Transmission, employed by Eversource Energy Service Company.

[Mr. Libertine] I am Michael Libertine, L.E.P., Director of Siting & Permitting, employed by All-Points Technology Corporation, P.C.

Our professional qualifications and experience are set out in our respective resumes provided with this testimony.

**Q. Please introduce the other members of your witness panel.**

With us is Christopher Soderman, Interim Director, Transmission Line Engineering, employed by Eversource Energy Service Company, who may respond to questions concerning electric and magnetic fields.

Mr. Soderman's resume is also provided with this testimony.

**Q. What is the purpose of your testimony?**

A. The purpose of our testimony is to provide information concerning the role of The Connecticut Light and Power Company doing business as Eversource Energy ("Eversource") in the solar project (the "Project") proposed by Quinebaug Solar, LLC ("Quinebaug Solar").

## II. EVERSOURCE'S INTERCONNECTION OBLIGATIONS

**Q. What is Eversource's role in the Project proposed by Quinebaug Solar?**

A. Pursuant to the terms of a Large Generator Interconnection Procedure that is included in Schedule 22 of the Independent System Operator of New England's ("ISO-NE") Tariff, it is Eversource's obligation to facilitate the installation of the necessary transmission systems and transmission system upgrades and equipment for power generator entities that request to interconnect to the Eversource transmission system. Quinebaug Solar entered into a Large Generator Interconnection Agreement with ISO-NE and Eversource on February 4, 2019.

**Q. Does Eversource have any other involvement with Quinebaug Solar or the Project?**

A. No.

**Q. Explain Eversource's participation in Petition 1310A.**

A. Eversource does not take any position as to the merits of the Project. Eversource is participating in Petition 1310A solely to allow the Connecticut Siting Council ("Council") to consider not only the Project proposed by Quinebaug Solar but also the facilities and upgrades to Eversource's transmission system that are required for the Project. Such consideration would promote efficiency and economy of the Council's resources, in lieu of an additional filing by Eversource after the conclusion of the proceedings for Petition 1310A.

## III. OVERVIEW OF EVERSOURCE'S FACILITIES/UPGRADES

**Q. If Quinebaug Solar's Project is approved by the Council, what facilities and upgrades, to be owned by Eversource, would be necessary for the associated electrical interconnection to Eversource's electric transmission system?**

A. If the Quinebaug Solar Project is approved, the facilities and upgrades to be owned by Eversource that would be necessary for the associated electrical interconnection to Eversource's electric transmission system are:

(1) The construction of the Canterbury Switching Station and two (2) transmission line tap sections and associated line support structures, all in Canterbury; and,

(2) The separation of a 0.75-mile segment of a double-circuit transmission line in Norwich.

**Q. Describe each such facility or upgrade that is necessary for the associated electrical interconnection to Eversource's transmission system.**

A. A new three breaker ring bus configured switching station, to be named by Eversource as "Canterbury Switching Station", would be constructed on the site designated by the Project for the purpose of interconnecting the generation output of the Quinebaug Solar generating facility to the Eversource transmission system. Eversource's existing 115-kV 1607 Line, located adjacent to the switching station site on double circuit structures with the 115-kV 1505 Line, would be looped in and out of this facility. The "break" in the 1607 Line as a result of the loop in would result in the re-designation of the existing 1607 Line into two new 115-kV transmission lines: the 1132 Line (from the new Canterbury Switching Station to Eversource's existing Killingly Substation) and the 1316 Line (from Eversource's existing Tunnel and Fry Brook Substations to the new Canterbury Switching Station).

To support the Project, Eversource would also need to upgrade its transmission system by separating its existing 1000 and 1080 115-kV transmission lines that are supported on the same structures, replacing five (5) laminated wood double-circuit structures with ten (10) new weathering steel single-circuit monopoles, within an approximately 0.75-mile section of existing Eversource right-of-way ("ROW") located between Bean Hill Substation and Wawecus Junction in Norwich.

**Q. What is the cost of each such facility or upgrade?**

A. The total cost of such facilities and upgrades is currently estimated to be $13.4 million, based on Eversource's non-binding good faith estimate to interconnect with the Quinebaug Solar Project. That estimate reflects the following estimated component costs:

- $8.3 million for the work to construct the Canterbury Switching Station;
- $1.8 million to loop the 1607 Line into the new three-breaker ring bus; and
- $3.3 million to separate the double-circuit 1000 and 1080 lines.

**Q. Who would pay for each such facility or upgrade?**

A. Quinebaug Solar would pay for these facilities and upgrades.

**Q. Are there any other facilities that Eversource would own that are within the scope of the Project?**

A. Eversource would own the portions of the collection lines (34.5 kV) that cross a public roadway and lease such line portions back to Quinebaug Solar for the Project.

## 1. CANTERBURY SWITCHING STATION AND TRANSMISSION LINE TAP SECTIONS IN CANTERBURY

**Q. Please provide a drawing depicting the proposed Canterbury Switching Station.**

A. The location map and sketch attached hereto as Attachment A-1 and A-2, respectively, show the proposed location and configuration of the new Canterbury Switching Station with a section view depicting the highest structure in the facility.

**Q. What equipment would be included in the Canterbury Switching Station?**

A. The following equipment would be included in the Canterbury Switching Station:

- three (3) 115-kV circuit breakers with foundations;
- seven (7) circuit breaker manually operated disconnect switches;
- three (3) motor operated disconnect switches;
- two (2) station service voltage transformers;
- nine (9) capacitor coupled voltage transformers (CCVTs) to be installed in sets of three;
- one wave trap;
- two (2) line terminal structures;
- bus work, bus support and switch support structures and foundations;
- a pre-fabricated control enclosure (approximately 24 feet by 40 feet by 12 feet) that would contain control panels, a DC battery system and security and communication systems;
- perimeter chain link fence (seven feet tall with an additional one foot of barbed wire fencing at the top for a total of eight feet) and similarly configured gates; and,
- lightning masts, if required, that would be proximate in size to the terminal structures depicted in Attachment A-2.

**Q. What work would be required for these transmission line tap sections?**

A. The 1607 Line would be divided at the Canterbury Switching Station and re-designated as the 1132 Line north to Killingly Substation and designated as the 1316 Line south to Tunnel and Fry Brook Substations. Two (2) proposed single circuit weathering steel dead-end structures on foundations would be installed in the ROW adjacent to existing structure 7259,

which currently supports both the 1607 and 1505 transmission lines. One of the proposed tap structures would support the new 1132 Line and the other tap structure would support the new 1316 Line. Both new structures would facilitate the transmission lines' interconnection to the Canterbury Switching Station terminal structures.

The existing double circuit structure 7259 would be modified by removing the 1607 Line arms and conductor. The remaining structure would continue to support the 1505 Line.

**Q. Who would perform this work?**

A. Eversource or its contractors would perform this work.

**Q. Who would operate and maintain the Canterbury Switching Station, and the transmission line tap sections?**

A. Eversource would operate and maintain the Canterbury Switching Station and the transmission line tap sections.

**Q. What security measures would protect the Canterbury Switching Station?**

A. Security cameras and a card reading entry system would be installed at the switching station. The camera views would be transmitted to a remote monitoring facility.

**Q. Is any lighting required at the Canterbury Switching Station?**

A. There would be lights installed at the facility for any night work, such as for maintenance or for electrical switching operations. Typically, the lights would otherwise be turned off.

**Q. What is the physical character of the switching station site and the surrounding land?**

A. The switching station site consists of approximately one acre located within an approximately 60-acre parcel south of Wauregan Road that is part of the Project. The switching station site is within and surrounded by an active sand and gravel operation, which is generally free of vegetation. A portion of the Project parcel, near Wauregan Road, has been used for growing corn or other seasonal crops. The land to the northeast, east and south of the Project parcel is primarily wooded and undeveloped with residential development located to the north and east (over 0.25 mile away). The Quinebaug River is located approximately 0.25 mile south and east of the Project parcel and the Quinebaug Valley State Trout Hatchery is located approximately 0.35 mile to the south as depicted in Quinebaug Solar's Petition, Exhibit A: Figures, Figure 2 Site Location.

**Q. Would there be any substantial adverse environmental effects from this work?**

A. Based on information provided by Quinebaug Solar and Eversource's evaluation of the proposed switching station site and tap structure locations, construction and operation of the switching station and the tap structures at this site would have no substantial adverse environmental effects.

**Q. Would any tree/vegetation removal be required for Eversource's work?**

A. No tree or vegetation removal would be required for the switching station. In the area of the transmission line tap (1607/1505 Lines ROW), limited vegetation removal would be

required where vegetation has been allowed to grow within the Eversource maintained ROW to facilitate the use of existing access roads by large construction equipment.

**Q. What would be the height of the tallest structure or piece of equipment at this switching station?**

A. The terminal structures in the switching station would be the tallest structures at approximately 55 feet above the final grade, as shown on Attachment A-2.

**Q. What would be the height of the transmission line tap structures?**

A. The height of proposed structures would be approximately 95 feet above grade level as depicted on Cross Section XS-2, attached hereto as Attachment B-1.

**Q. Would there be any visual effects from this work?**

A. The introduction of the switching station and transmission line tap structures should not result in a significant visual effect on the surrounding area. The new structures would be set back approximately 1,000 feet from the road and would be approximately the same height as the existing 94 feet tall transmission line structure. The closest residence is approximately 1,000 feet from the proposed switching station and tap structures.

**Q. Would any new permanent access be required for this switching station or the transmission line tap sections?**

A. A new permanent access road would be constructed and maintained by Quinebaug Solar. Quinebaug Solar would convey the necessary rights to Eversource to use the road for access to the switching station. Access to the transmission line taps would be provided by the new access road or through the existing Eversource transmission ROW.

**Q. Please describe the construction process, including construction equipment.**

A. Once Quinebaug Solar conveys the switching station site to Eversource, the construction would proceed in accordance with Eversource's standard practices. The construction activities would typically be segmented as follows:

- mobilization and installation of temporary fencing;
- civil construction, as required to properly compact and grade the site, including installation of below grade foundations for the new control enclosure and other associated equipment and support structures;
- installation of the grounding grid and ground rods;
- installation of the underground race way (conduit, etc.);
- installation of the major equipment (transformers, disconnect switches, circuit breakers, etc.);
- installation of the new control enclosure (which would be delivered to the site in sections);
- installation of steel supporting structures;
- installation of permanent fencing and gates; and
- testing and commissioning.

Equipment used to perform this work would typically include: excavation equipment, such as an excavator, back hoe, bucket loader and bulldozer, a compactor, dump trucks, all-terrain fork lifts, pick-up trucks with tools, concrete trucks, and cranes. Electrical work would also utilize boom trucks, drill rig and cable pulling equipment.

## 2. SEPARATION OF DOUBLE CIRCUIT TRANSMISSION LINE IN NORWICH

**Q. Why is this work necessary?**

A. As part of the Independent System Operator of New England ("ISO-NE") System Impact Study that was required for the evaluation of Quinebaug Solar's Project, it was determined that the Project's connection to the Eversource transmission system would result in the potential for an unacceptable risk of thermal overload in the event of a simultaneous interruption of both the 1000 and 1080 circuits. The proposed line separation would mitigate the possibility of the thermal overloads on the transmission system.

**Q. Who would perform this work?**

A. Eversource or its contractors would perform this work.

**Q. Please provide a drawing depicting the existing and proposed structures.**

A. The existing and proposed structures are depicted on Cross Section XS-1, which is attached as Attachment B-2.

**Q. Please describe the work.**

A. To support the Project, Eversource would modify its transmission lines by separating its existing 115-kV 1000 and 1080 transmission lines that currently share the same structures, by replacing five (5) laminated wood double-circuit structures with ten (10) new weathering steel single-circuit monopoles, within 0.75 mile of existing ROW between Bean Hill Substation and Wawecus Junction in Norwich.

**Q. Would any equipment be added to the new structures?**

A. In addition to typical hardware and insulators, proposed lightning arresters would be added to some of the new structures.

**Q. Who would operate and maintain the new single circuit transmission structures?**

A. Eversource would operate and maintain the new single circuit transmission structures.

**Q. Would an expansion of the existing Eversource ROW be necessary?**

A. No.

**Q. Would the cleared area of the existing Eversource ROW be widened?**

A. Yes. See Attachment B-2 for reference. The existing ROW would require expanding the current vegetation management area, which varies from approximately 50 to 70 feet wide to approximately 105 feet wide. The width of the ROW is 250 feet.

**Q. What are the existing land uses in the vicinity of this work?**

A. The existing portion of the ROW where the line separation work is proposed (the "Line Separation Area") extends through a heavily wooded, undeveloped ridge of land. Residential development is located to the west and south of the work area (over 0.25 mile away). A single-family residence is located approximately 300 feet to the east of the ROW. Connecticut Route 2 is located immediately north of the ROW.

**Q. Would there be any environmental effects from this work on:**

**a) any sensitive areas or habitat areas identified through review of the National Diversity Data Base (NDDB) for state-listed species?**

A. The Line Separation Area is not located within a NDDB Polygon. The nearest NDDB polygon is located approximately 1.9 miles to the northeast. One federally-listed (under the federal Endangered Species Act) threatened species is known to occur near the ROW; northern long-eared bat ("NLEB"; Myotis septentrionalis). The NLEB's range encompasses the entire State of Connecticut. As a result of this preliminary finding, Eversource's consultant, All-Points Technology Corporation, P.C. performed an evaluation to determine if Eversource's proposed activities would be likely to result in an adverse impact to NLEB. The transmission line work is not located near known maternity roost trees nor is it within 0.25 mile of a known NLEB hibernaculum. The nearest NLEB habitat resource is located in North Branford, approximately 35 miles to the southwest. Therefore, Eversource's proposed activities are not likely to adversely affect NLEB.

**b) scenic or cultural resources?**

A. There are no scenic resources proximate to the ROW. The nearest public resource, the Yantic River Water Access, is located approximately 0.15 mile north of proposed structures 6804 and 6804A. See Attachment C.

Heritage Consultants, LLC ("Heritage") conducted a Phase 1A/1B Cultural Resource Reconnaissance Survey of the work area as the site was identified to retain a moderate/high archeological sensitivity. As part of this survey, Heritage excavated 57 test pits within the work

area with no significant artifacts or cultural resource locations found. As a result, no additional survey or investigation was recommended.

**c) wetlands, watercourses and flood zones?**

A. No wetlands or watercourses were identified within the proposed work pad areas or the majority of the proposed access road. One wetland is located at the southwest limit of this work area, where Eversource would access the ROW. This wetland consists of a narrow hillside seep system that contains an interior shallow/narrow intermittent watercourse. See Attachment C (W1 representing the wetland and S1 the intermittent stream).

This resource originates beyond the Eversource ROW to the northwest and drains to the southeast. As the watercourse enters the cleared ROW, the stone/sand stream channel transitions to broad sheet flow losing the defined bank/channel before extending off the ROW again just east of Wawecus Junction.

Eversource would utilize a temporary crossing of this wetland to gain access into the ROW for the proposed work activities, resulting in approximately 563 square feet of temporary wetland impact, limited to construction matting. Work would be conducted in accordance with Eversource's Best Management Practices Manual for Massachusetts and Connecticut (Construction and Maintenance Environmental Requirements), September 2016 ("BMPs") to avoid unnecessary impacts to wetland resources.

This work area is not located within or proximate to FEMA 100-year flood zones.

**d) vernal pools?**

A. There are no vernal pools located within or proximate to this work area.

**e) surface, or groundwater resources or public drinking water supply/private wells?**

A. There are no surface, or groundwater resources or public drinking water supply/private wells located within or proximate to the work area. The nearest public drinking water supply (water tank/tower) is located approximately 175 feet to the northwest of proposed Structure 6801A work pad.

**f) air quality?**

A. Upon completion of construction and during operation, the proposed line separation would have no effect on air quality. Potential, temporary construction-related mobile source emissions would include those associated with construction vehicles and equipment, but these potential air quality impacts related to construction activities can be considered de minimis. Such emissions would, nonetheless, be mitigated using available measures, including, inter alia, limiting idling times of equipment; proper maintenance of all vehicles and equipment; and, watering/spraying to minimize dust and particulate releases, under the terms of contracts with contractors. In addition, all on-site and off-road equipment would meet the latest standards for diesel emissions, as prescribed by the United States Environmental Protection Agency.

**g) or noise (other than during construction) and sound pressure levels?**

A. Upon completion of construction and during operation, the proposed line separation would have no effect on noise or sound pressure levels. Construction noise is exempted under the Connecticut regulations for the control of noise, RCSA 22a-69-1.8(g). During construction of Eversource's facilities, the temporary increase in noise would likely raise localized ambient sound levels immediately surrounding the work area. Standard types of

construction equipment would be used for this work. In general, the highest noise level from this type of equipment (e.g., backhoe, bulldozer, crane, trucks, etc.) is approximately 88 dBA at the source.

**Q. What is the typical height of the existing double-circuit structures?**

A. The existing structure heights at this location range between 74.5 and 92.5 feet.

**Q. What would the typical height of the new single-circuit monopoles be?**

A. The proposed structure heights would range between 84 and 93.5 feet.

**Q. Would there be any visual effects from this work?**

A. The proposed work would consist of removing five (5) existing double circuit laminated wood structures and replacing them with ten (10) new single circuit weathering steel monopoles. In general, year-round and seasonal visibility of the new monopoles would be consistent with existing conditions. The minor structure height increase is not significant and even with the addition of new structures and vegetation management activities necessary for construction, the ROW would retain sufficient tree cover and distances to receptors such that there would be no substantive increase of visibility to the surrounding area. The nearest residence, located approximately 300 feet to the southeast, is set at an elevation that is substantially lower than the ROW.

**Q. Would any new permanent access be required for the new monopoles?**

A. Eversource would use an existing access road originating off of Philanne Drive to access the work. Once within the ROW, approximately 2,300 feet of new permanent access road would be installed along the western side of the existing ROW.

**Q. Would any tree/vegetation removal be required for Eversource's work? If so, where?**

A. In the area of the double circuit separation (1000/1080 Lines ROW) the existing vegetation management corridor would be expanded by 35 to 55 feet from a typical width of 50 to 70 feet to a width of approximately 105 feet, resulting in the removal of trees along the length of the ROW segment. However, trees within the remainder of the 250 feet wide ROW would remain in place.

**Q. Please describe the construction process, including construction equipment.**

A. The construction process for this work, including construction equipment would be as described below.

Establishing Staging Areas

Staging areas would be used for surface storage of construction materials, equipment, tools, and supplies (including insulators, hardware, structure sections and mats) for the work. Materials removed during the work (structures, hardware and insulators) may be temporarily accumulated and stored at the staging areas prior to transporting off-site for salvage and/or disposal. The staging areas may also be used by construction crews for parking personal vehicles as well as for construction vehicles and equipment storage, and for performing minor maintenance, when needed, on construction equipment.

Clearing and Vegetation Removal

Clearing and vegetation removal would be accomplished using mechanical methods and typically requires the use of flat-bed trucks, brush hogs or other types of mowing equipment,

skidders, forwarders, bucket trucks for canopy trimming, feller bunchers for mechanical tree cutting, wood chippers, log trucks, and chip vans. Eversource would conduct vegetation removal activities in accordance with its BMPs.

Eversource would require the contractor to use low-impact clearing methods to remove brush vegetation to protect wetlands, watercourses, state-listed species and their habitats, and cultural resources. Low-impact clearing incorporates a variety of approaches, techniques, and equipment to minimize site disturbance. Eversource would require the clearing contractor to use some or all the following low-impact clearing methods, depending on site-specific considerations:

- Take into consideration soil and weather conditions when scheduling vegetation removal activities, such as during periods of heavy rainfall.
- Maximize the use of uplands for clearing access routes.
- Use appropriately sized equipment for the site conditions, where possible, to minimize impacts.
- Where practical, cut brush close to the ground, leaving root systems and stumps, to provide additional soil stability.

Soil Erosion and Sediment Control Installation

Project construction would conform to best management practices for soil erosion and sedimentation ("E&S control"), including those provided in the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control ("Connecticut Guidelines") and Eversource's BMPs. This would include the development of a project specific Stormwater Pollution Control Plan

("SWPCP") and registration under CT DEEP's General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, effective 10/1/13 ("General Permit").

Typical E&S control measures include, but are not limited to, straw blankets, hay bales, silt fencing, rock construction entrances, soil and slope protection, water bars, check dams, berms, swales, plunge pools, and sediment basins. Silt fence would be installed prior to construction to intercept and retain sediment and/or construction materials from disturbed areas and prevent such materials from discharging to water resources or off ROW. Temporary E&S control measures would be maintained and inspected throughout the Project to ensure their integrity and effectiveness and for compliance with the General Permit. The SWPCP inspections would be in accordance with the General Permit requirements. Following completion of construction, seeding and mulching or hydroseeding would occur to permanently stabilize the areas disturbed by the work. The temporary E&S control measures would remain in place until the Project work is complete and all disturbed areas have been deemed and remain stabilized.

Access Roads and Work Pads

Access to each transmission structure location would be required during construction. Eversource would utilize an existing access to the ROW. However, a new permanent access road would be required within the ROW to access the structure locations. Timber matting would be utilized to construct temporary access roads through wetland W-1 to reach the structure locations. The access roads expected to be used for the proposed work are illustrated on the mapsheets in Attachment C.

The existing access road may need to be improved (graded, widened, and/or reinforced) with additional stone material to accommodate the safe passage of construction vehicles and

equipment. Access road improvements typically include trimming adjacent vegetation and widening roads, as needed, to provide a minimum travel surface that is approximately 12 to 16 feet wide (additional width may be needed at turning or passing locations). Access roads would typically be graveled; however, where the access road traverses wetland W1, timber construction mats would be used. E&S controls would be installed as necessary before the commencement of any improvements to or development of access roads.

At each transmission line structure site, a work pad is required to stage material for final on-site assembly and/or removal, and to provide a safe, level work base for the construction equipment. Typical work pads would be approximately 140 feet by 140 feet, which may vary based on terrain.

A typical (upland) installation of a work pad at a structure location involves several steps: (1) removal of vegetation, (2) grading to create a level work area, and (3) removal of the upper three to six inches of topsoil (which is usually unsuitable to support the necessary construction activities). The removed topsoil would be temporarily stockpiled within the ROW, typically near the work pad. A rock base, which allows drainage, would be layered on top of filter fabric, if necessary. Additional layers of rock with dirt/rock fines (processed gravel) are typically placed over the rock base.

To facilitate future transmission line maintenance, access roads, structure work pads and pull pads in uplands would be left in place, unless the property owner requests their removal. No new permanent access roads or work pads are proposed in water resource areas.

The preliminary locations and configuration of the work pads, as determined based on the environmental field studies and constructability reviews, are shown on Attachment C.

Foundation Installation

Structures would have either direct embed or concrete foundations. This work would require the use of equipment such as augers, drill rigs, and dump trucks. If groundwater is encountered, and when working within wetlands, pumping (vacuum) trucks or other suitable equipment would be used to pump water from the excavated areas as the shaft is being drilled or as the structure is being set. The water would then be discharged in accordance with applicable regulatory requirements.

Excavated soils that are generated during construction activities would not be stored or stockpiled inside of a wetland, or adjacent to a watercourse. Materials that cannot be utilized as back fill would be disposed in accordance with applicable regulations.

Counterpoise installation would also take place at this time in accordance with the design. Depending on site-specific soil conductivity, supplemental grounding would be installed. Counterpoised would be installed using a quad "ditch-witch" plow-cable trencher or similar equipment.

Structure Assembly/Installation

Structure sections, structure components and hardware would be delivered to the individual structure locations using flat-bed trucks and assembled on-site using a crane and bucket trucks. After assembly, the area around direct embed foundations would be backfilled with processed gravel or other suitable backfill material.

Conductor and Shield Wire Installation Relocation

The repositioning of the conductors and shield wire would occur after the new structures have been erected. The equipment required for these activities would include cranes and bucket trucks. Conductor reels may be on-site for splicing in wire, if needed.

Restoration

Once the new structures are erected and the transmission lines are energized, the existing structures would be demolished and removed. ROW restoration activities would also include the removal of construction debris, signage, flagging, and temporary fencing, as well as the removal of construction mats and structure work pads that are designated for removal. Areas affected by construction would be re-graded as practical and stabilized using re-vegetation or other measures before removing temporary E&S controls.

Waste Management

Waste materials, such as structure components (i.e., the removed structures and associated hardware) and any other construction debris would be disposed of in accordance with Eversource's BMPs, applicable regulations or recycled consistent with applicable rules and regulations and Eversource's policies. Excess soils would be managed in accordance with the Eversource's BMPs, applicable regulations and disposal facility policies. Dewatering during construction activities would be conducted in accordance with the Connecticut Guidelines, Eversource's BMPs and applicable regulations.

## 3. COLLECTION LINES SECTIONS WITHIN THE PUBLIC ROW IN CANTERBURY

**Q. Where would these collection lines sections be located?**

A. Quinebaug Solar would construct numerous collection lines throughout the Project to convey electricity generated by the solar panels to the collector substation, which would be located directly adjacent to the Canterbury Switching Station. The main solar array would be located north of Wauregan Road and the collector substation would be located south of Wauregan Road. At least one collection line would cross Wauregan Road to reach the collector substation (other road crossings may be necessary depending on the final design of the Project).

**Q. What work would be required to install these lines in the Public ROW?**

A. Quinebaug Solar would construct the collection line(s) across Wauregan Road, and possibly other public roads, and transfer ownership of the line segment (s) located within or across public roads to Eversource. Eversource would then lease the use of the line segment(s) to Quinebaug Solar.

**Q. Who would perform this work?**

A. Quinebaug Solar or its contractors would perform this work.

**Q. What rights does Eversource possess to locate these lines within the public ROW?**

A. Eversource has franchise rights granted by the Connecticut legislature to locate its electric facilities in and across public roads.

**Q. What obligations would be the responsibility of Quinebaug Solar?**

A. Among other customary legal obligations, Quinebaug Solar would operate and maintain these lines.

**Q. What land uses are in the vicinity of the collection line across Wauregan Road?**

A. As previously described, the land in the vicinity of the collection line across Wauregan Road is primarily occupied by an active sand and gravel quarrying operation, with some seasonal croplands. Surrounding areas are generally forested.

**Q. Would there be any adverse environmental effects from these lines?**

A. Based on information provided by Quinebaug Solar, there are no substantial adverse environmental effects anticipated from the collection lines.

## 4. ADDITIONAL CONSTRUCTION INFORMATION

**Q. How would Eversource conduct the required work?**

A. All work would be designed, constructed and operated in accordance with sound engineering practices and in full compliance with Eversource's standards, the National Electrical Safety Code and good utility practices.

**Q. When does Eversource anticipate its facilities would be constructed?**

A. Eversource anticipates that construction activities would commence in the summer of 2020 and be completed by summer of 2021.

**Q. During what hours and days would the work occur?**

A. Normal work hours would be from 7:00 a.m. to 7:00 p.m. Monday through Saturday. Sunday work hours may be necessary if delays occur due to inclement weather and/or outage constraints.

## 5. OUTREACH

**Q. Please describe municipal outreach conducted by Eversource in Canterbury.**

A. Eversource contacted the First Selectman of Canterbury and informed him of Eversource's motion for party status in this proceeding and its planned construction in Canterbury. Eversource also informed the First Selectman of planned outreach to the property owners adjacent to the entrance to the proposed switching station ahead of the start of construction to alert them of increased traffic and provide Eversource contact information for any questions.

**Q. Please describe property owner and abutting property owner outreach to be conducted by Eversource in Canterbury.**

A. Eversource plans to conduct door-to-door outreach to the property owners adjacent to the entrance to the proposed site of the switching station ahead of the start of construction to alert them of increased traffic and provide contact information for any questions.

**Q. Please describe municipal outreach conducted by Eversource in Norwich.**

A. Eversource reached out to the Mayor of Norwich to inform him of Eversource's motion for party status in this proceeding and its planned construction in Norwich as part of the Project. The Mayor was also informed that outreach has been conducted to the property owner

abutting the ROW where the 1080/1000 Line work would occur and that Eversource plans to conduct door to door outreach to the property owners adjacent to the entrance to the ROW ahead of the start of construction to alert them of increased traffic and provide Eversource contact information for any questions.

**Q. Please describe property owner and abutting property owner outreach conducted to date and planned by Eversource in Norwich.**

A. Eversource has conducted outreach to the property owner abutting the ROW where the 1080/1000 Line work would occur. Eversource plans to conduct door-to-door outreach to the property owners adjacent to the entrance to the ROW ahead of the start of construction to alert them of increased traffic and provide contact information for any questions.

## 6. ELECTRIC AND MAGNETIC FIELDS

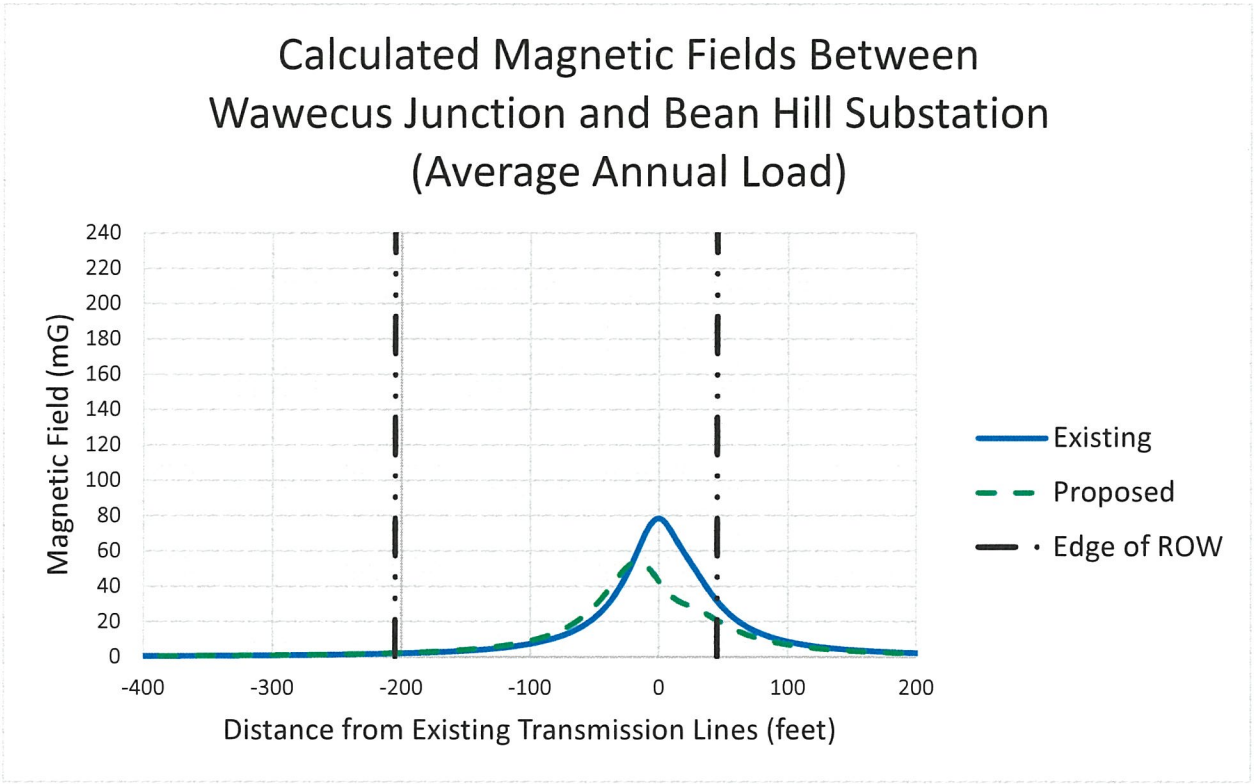
**Q. Please describe the changes to the electric and magnetic fields associated with the interconnection facilities at the proposed Canterbury Switching Station.**

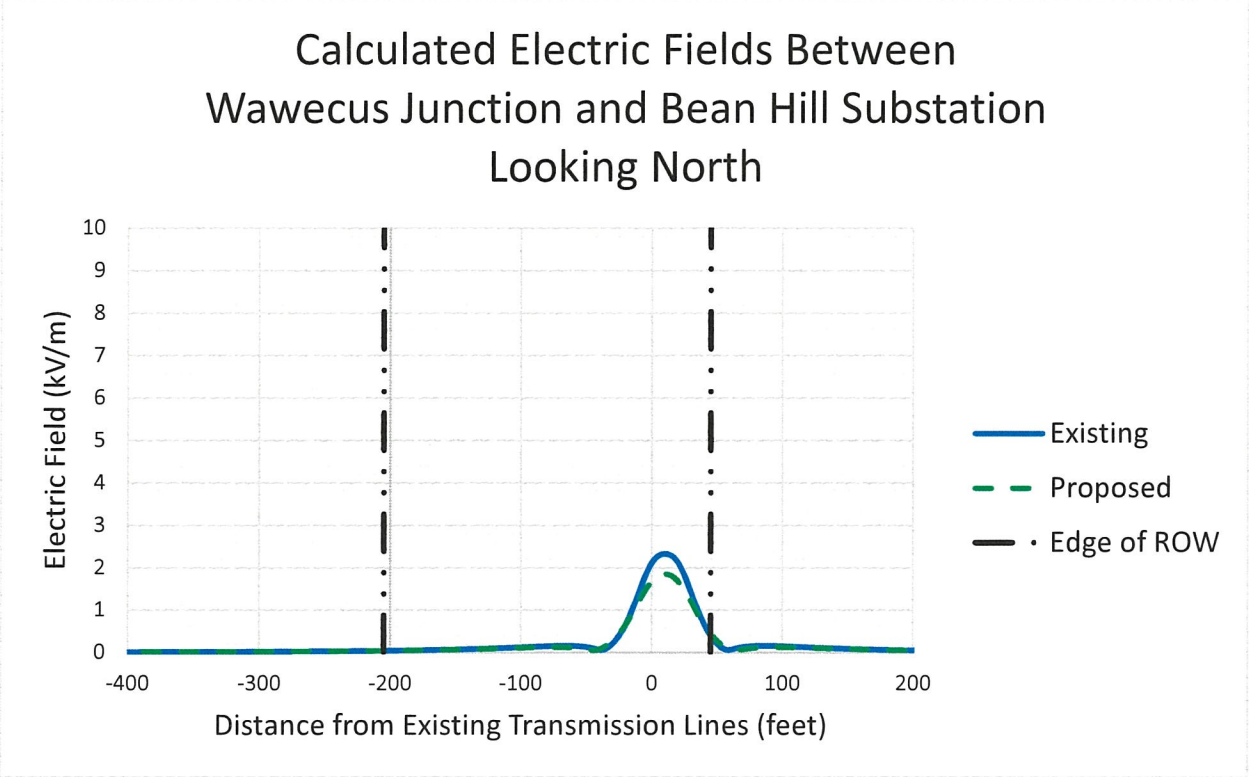
A. The primary source of electric and magnetic fields are the transmission lines. The electric and magnetic fields in the vicinity of the proposed Canterbury Switching Station would increase in the area beneath where the lines enter and interconnect to the station, which is on the west side of the existing transmission line corridor and the east side of the switching station. Away from the point of the interconnection, the changes to the fields would be negligible.

**Q. Please describe the changes to the electric and magnetic fields along the circuit separation in Norwich.**

A. Both the electric and magnetic fields directly beneath the existing transmission line would be slightly reduced as a result of the work. Edge of ROW levels would increase slightly at the western edge and decrease slightly at the eastern edge, though these changes are negligible. These modeled filed levels are summarized in the table and charts below:

| Wawecus Junction to Bean Hill Substation | | West ROW Edge | Max in ROW | East ROW Edge |
|---|---|---|---|---|
| Magnetic Fields (mG) | Existing | 2.2 | 78.4 | 24.0 |
| | Proposed | 2.5 | 53.9 | 16.8 |
| Electric Fields (kV/m) | Existing | 0.04 | 2.33 | 0.39 |
| | Proposed | 0.04 | 1.85 | 0.44 |






**Q. How do the levels associated with these transmission facilities compare with international guidelines with regards to electric and magnetic field exposures?**

A. The fields from the proposed facilities are well below the recommended maximum permissible exposure limits as recommended by the International Council on Non-Ionizing Radiation Protection ("ICNIRP") and the International Committee on Electromagnetic Safety ("ICES"). These limits are summarized in the table below:

| | Magnetic Field (mG) | Electric Field (kV/m) |
|---|---|---|
| ICNIRP | 2000 | 4.2 |
| ICES | 9040 | 5 (in General) |
| | | 10 (on ROW) |

**Q. Does this conclude your testimony?**

A. Yes.

## Attachments

A-1 Location Map – Canterbury Switching Station

A-2 Layout Sketch – Canterbury Switching Station

B-1 Cross Section XS-2 – Tunnel Substation to Killingly Substation

B-2 Cross Section XS-1 – Wawecus Junction to Bean Hill Substation

C Quinebaug Double Circuit Tower Split, Map Sheets

# Attachment A-1

## Location Map – Canterbury Switching Station


INDEX MAP

*Legend*

- Site
- Proposed Quinebaug Substation Location (by others)
- Eversource Canterbury Switching Station
- New Overhead Conductor Line
- Existing Structure
- Proposed Structure
- Existing Structure to be Modified
- Existing Right-of-Way (ROW)
- Overhead Eversource Line
- Natural Diversity Database Area (CTDEEP; 12/2019)
- Critical Habitat (CTDEEP, 2009)
- CT NE Cottontail Focus
- Eversource Owned Property*
- State-Owned Property
- Parcel Boundary
- 5' Contour Line
- Wetlands (CTDEEP)

Map Notes:
Not for Construction.
ROW and Parcel data are approximate
Base Map Source: CTECO 2019 Aerial Imagery

N

1 inch = 333.333333 feet
0 50 100 200 300 Feet

| NO. | DATE | REVISIONS | BY | CHK | APP | APP |
|---|---|---|---|---|---|---|
| | | | | | | |

EVERSOURCE ENERGY

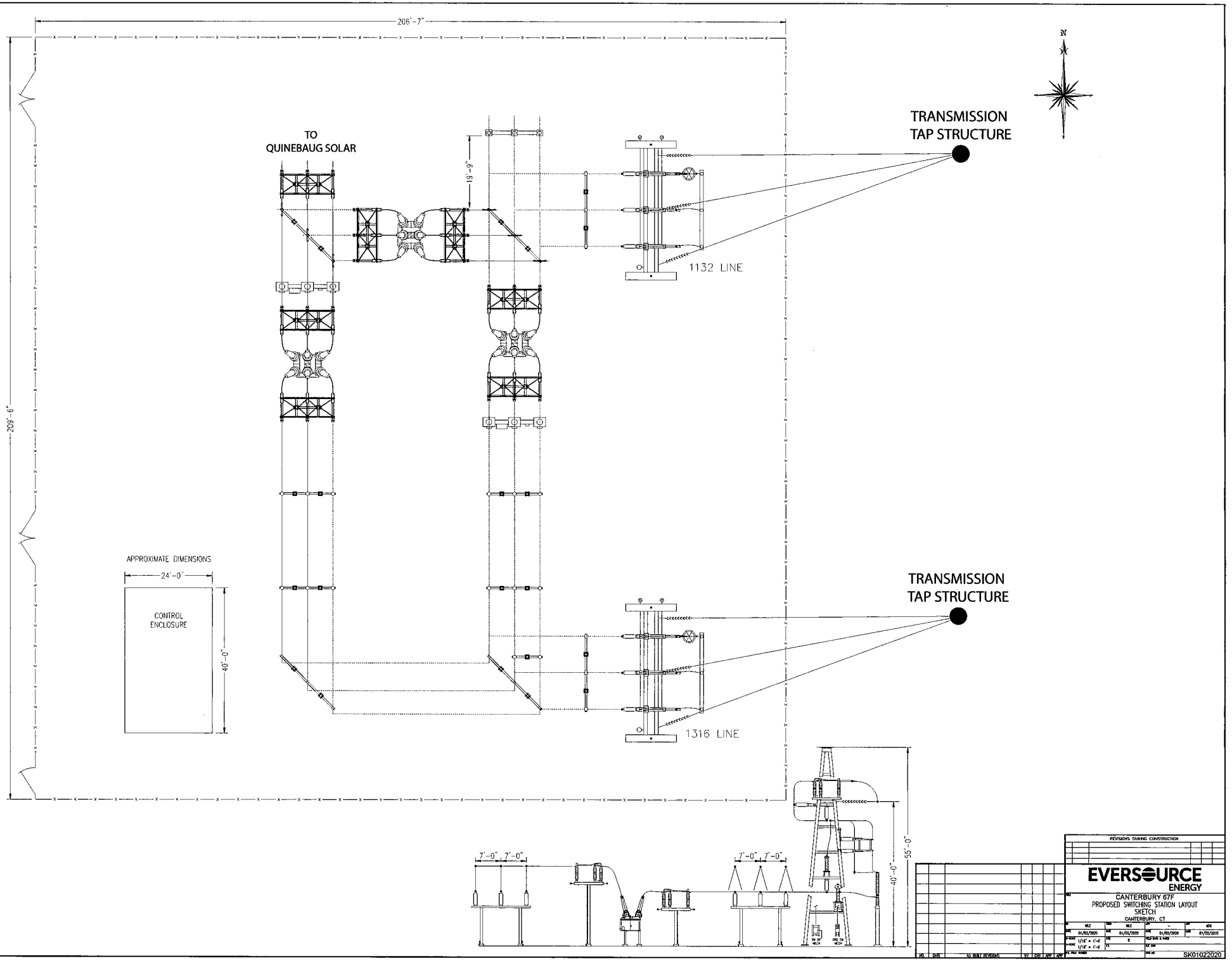
**Eversource Canterbury Switching Station**
**Canterbury, CT**

Date: January, 2020

ALL-POINTS TECHNOLOGY CORPORATION

# Attachment A-2

## Layout Sketch – Canterbury Switching Station




REVISIONS DURING CONSTRUCTION

| NO | DATE | AS BUILT REVISIONS | BY | CHKT | APP | APP'T |
|---|---|---|---|---|---|---|

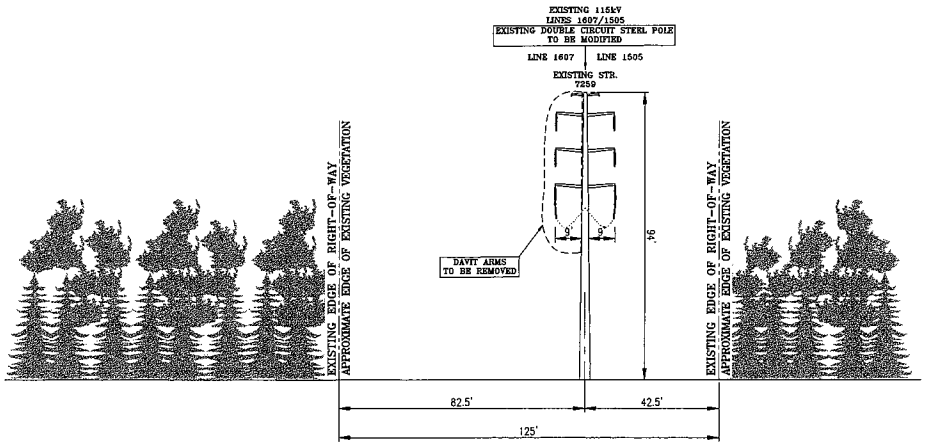
EVERSOURCE ENERGY

CANTERBURY 67F
PROPOSED SWITCHING STATION LAYOUT
SKETCH
CANTERBURY, CT

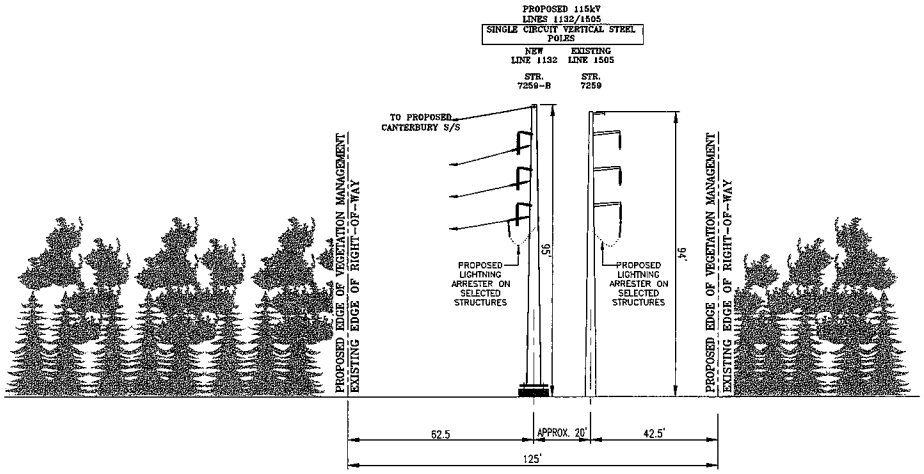
| | | | | | |
|---|---|---|---|---|---|
| | MLC | DRN | MLC | APP | MEK |
| DATE | 01/02/2020 | DATE | 01/02/2020 | DATE | 01/02/2020 |
| H-SCALE | 1/16" = 1'-0" | SCALE | 0 | FIELD BOOK & PAGES | |
| V-SCALE | 1/16" = 1'-0" | FILE | | CAT CODE | |
| P.E. PROJ NUMBER | | | | DWG NO | SK01022020 |

# Attachment B-1

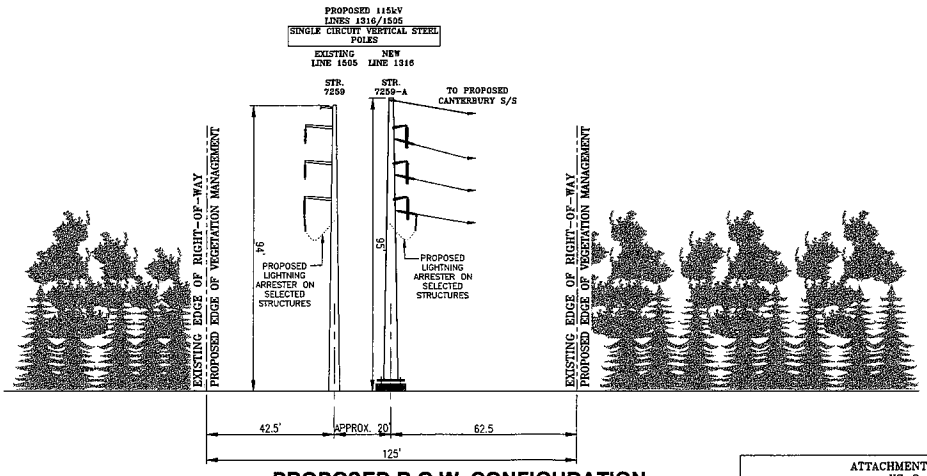
## Cross Section XS-2 – Tunnel Substation to Killingly Substation




**EXISTING R.O.W. CONFIGURATION**
**DOUBLE CIRCUIT STEEL POLE DESIGN**
**LOOKING FROM TUNNEL S/S TO KILLINGLY S/S**
**IN THE TOWN OF CANTERBURY, CT**
**STR. #7259 TO CANTERBURY S/S**




**PROPOSED R.O.W. CONFIGURATION**
**NO ADDITIONAL RIGHT-OF-WAY REQUIRED**
**SINGLE CIRCUIT STEEL POLE DESIGN**
**LOOKING FROM TUNNEL S/S TO KILLINGLY S/S**
**IN THE TOWN OF CANTERBURY, CT**
**STR. #7259 TO CANTERBURY S/S**




**PROPOSED R.O.W. CONFIGURATION**
**NO ADDITIONAL RIGHT-OF-WAY REQUIRED**
**SINGLE CIRCUIT STEEL POLE DESIGN**
**LOOKING FROM KILLINGLY S/S TO TUNNEL S/S**
**IN THE TOWN OF CANTERBURY, CT**
**STR. #7259 TO CANTERBURY S/S**

ATTACHMENT B-1
XS-2
QUINEBAUG - CANTERBURY 67F SWITCHING STATION
TRANSMISSION LINE TAP SECTION

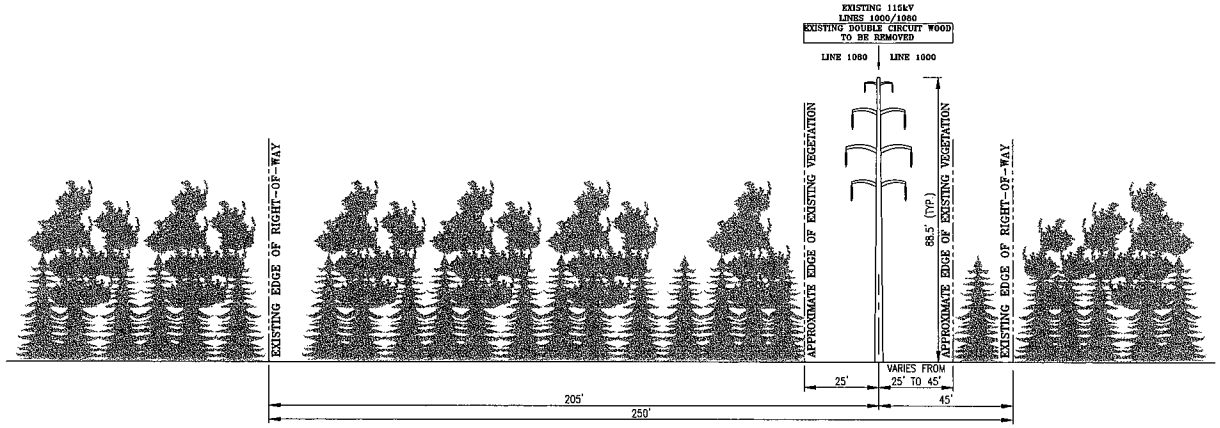
EVERSOURCE ENERGY

TITLE
TUNNELL S/S TO KILLINGLY S/S
115-kV TRANSMISSION LINE
RIGHT OF WAY CROSS SECTION
CANTERBURY, CT

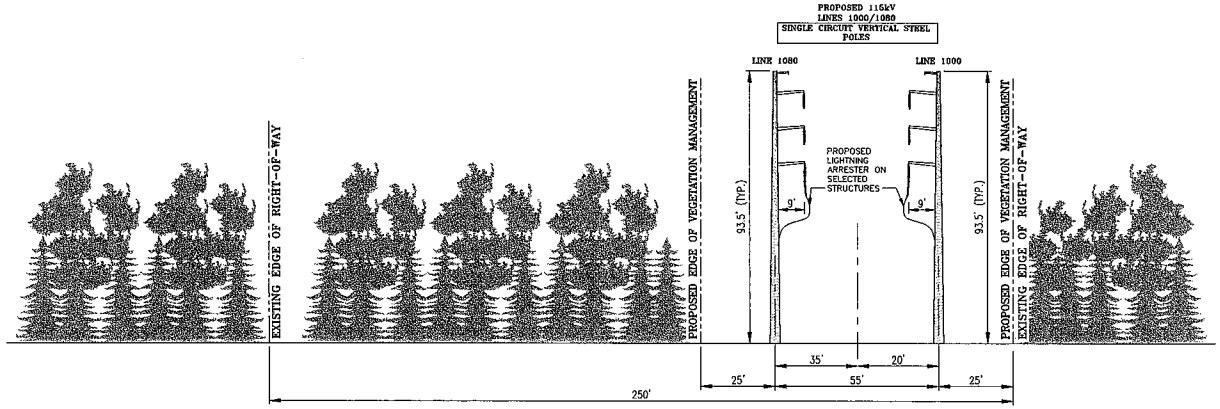
| BY | NEB | CHKD | MEB | APP | GEL | APP |
|---|---|---|---|---|---|---|
| DATE | 12/06/19 | DATE | 12/06/19 | DATE | 12/06/19 | DATE |
| H-SCALE | N.T.S. | SIZE | D | FIELD BOOK & PAGES | | |
| V-SCALE | N.T.S. | Y.S. | | E.C. ENG | | |
| E.C. PROJ NUMBER | 345979 | | | DWG NO | 345979-T0002-1607-1505-SH01 | |

# Attachment B-2

## Cross Section XS-1 – Wawecus Junction to Bean Hill Substation




**EXISTING R.O.W. CONFIGURATION**
**DOUBLE CIRCUIT WOOD POLE DESIGN**
**LOOKING FROM WAWECUS JCT TO BEAN HILL SUBSTATION**
**IN THE CITY OF NORWICH, CT**
**0.75 MILES BETWEEN WAWECUS JCT - BEAN HILL SUBSTATION**




**PROPOSED R.O.W. CONFIGURATION**
**NO ADDITIONAL RIGHT-OF-WAY REQUIRED**
**SINGLE CIRCUIT STEEL POLE DESIGN**
**LOOKING FROM WAWECUS JCT TO BEAN HILL SUBSTATION**
**IN THE CITY OF NORWICH, CT**
**0.75 MILES BETWEEN WAWECUS JCT - BEAN HILL SUBSTATION**

ATTACHMENT B-2
XS-1
QUINEBAUG DOUBLE CIRCUIT TOWER SPLIT

EVERSOURCE ENERGY

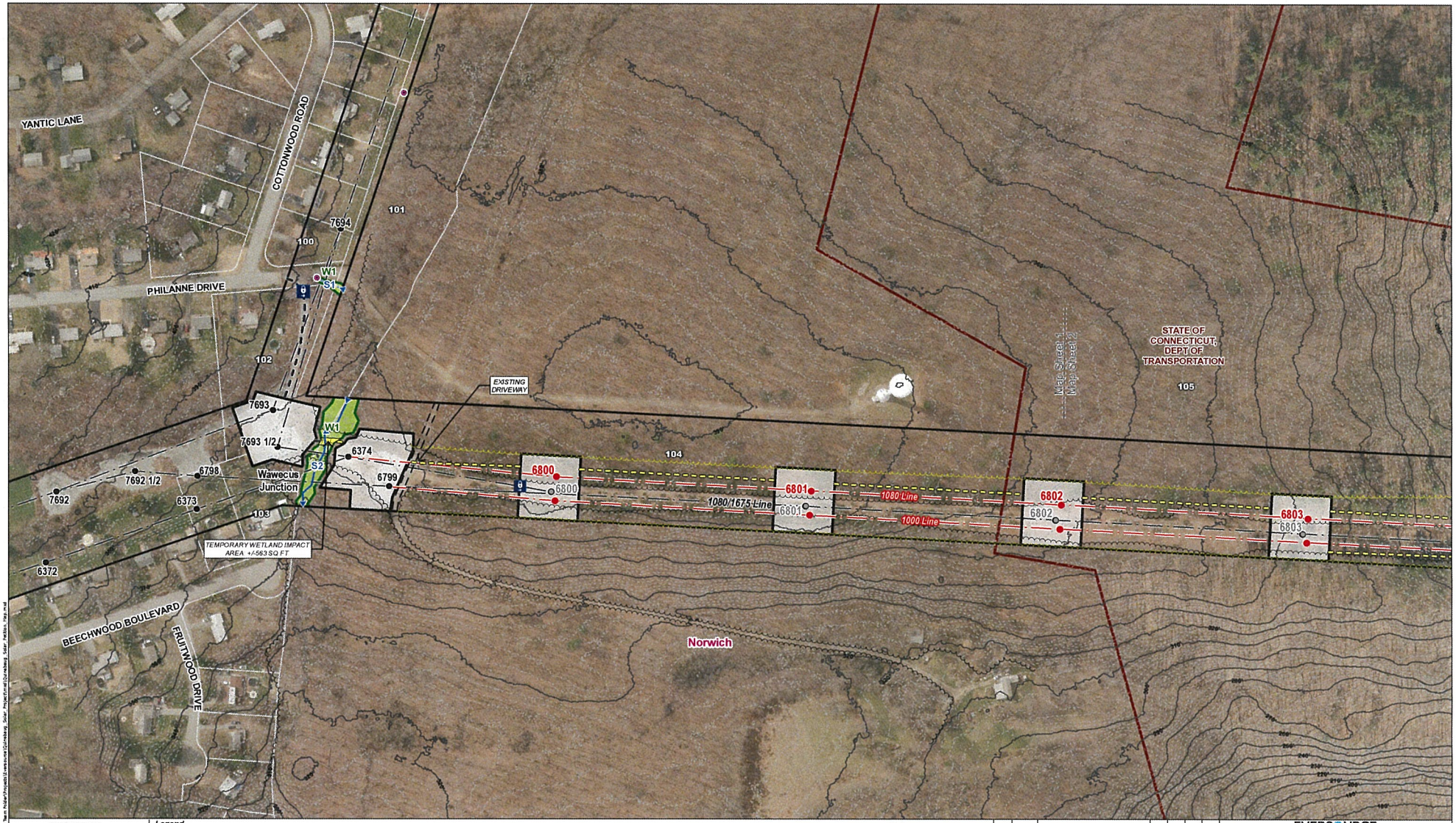
WAWECUS JCT TO BEAN HILL SUBSTATION
115-kV TRANSMISSION LINE
RIGHT OF WAY CROSS SECTION
NORWICH, CONNECTICUT

| BY | MEB | CHKD | MEB | APP | GEL |
|---|---|---|---|---|---|
| DATE | 10/17/19 | DES. | 10/17/19 | DATE | 10/17/19 |
| H-SCALE | N.T.S. | SEC. | D | FIELD BOOK & PAGES | |
| V-SCALE | N.T.S. | P.S. | | R.E. ENG. | |
| R.E. FIELD MEMBER | | 345979 | | DRG No. | 345979-T0002-1000-1080-SH01 |

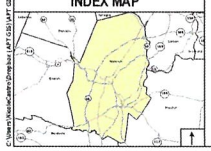
1/7/2020 9:18 AM - DEADP - K:\Engineering\Transmission Engineering\TNAS\PROJECTS\GENERATOR INTERCONNECTS\CT GENERATORS\Quinebaug Solar Farm\1697 Loop into Canterbury Project\STNAS\CSC\1000-1080-SH01.dwg - 345979-T0002-1000-1080-SH01
13 VER: 35/2015

# Attachment C

## Quinebaug Double Circuit Tower Split, Map Sheets




INDEX MAP



*Legend*

- Proposed Structure
- Existing Structure to be Removed
- Existing Structure
- Existing Right-of-Way (ROW)
- Overhead Eversource Line
- New 1000-1080 Transmission Line Split
- 2' Contour Line
- 10' Contour Line
- Approximate Existing Tree Line
- Proposed Tree Line
- Gate
- Existing Access
- Proposed Access
- Driveway
- Stone Work Pad
- Temporary Construction Matting
- Culvert
- Delineated Perennial Watercourse
- Delineated Intermittent Watercourse
- Delineated Wetland Boundary Outline
- Field Delineated Wetland
- Natural Diversity Database Area (CTDEEP, June 2019; Nearest NDDB Area +/-1.88 Miles NE)*
- Critical Habitat (CTDEEP, 2009)*
- CT NE Cottontail Focus Area*
- Eversource Owned Property*
- State-Owned Property
- Parcel Boundary
- FEMA 100-Year Flood Zone
- Floodway

Map Notes:
*indicates layer with no data in mapped extent
Wetlands Inspected by Matt Gustafson, Soil Scientist, 8/22/2019
Not for Construction.
ROW and Parcel data are approximate
Base Map Source: CTECO 2016 Aerial Imagery

1 inch = 200 feet
0 50 100 200 Feet

| NO. | DATE | REVISIONS | BY | CHK | APP | APP |
|---|---|---|---|---|---|---|
| | | | | | | |

EVERSOURCE ENERGY

# Quinebaug Double Circuit Tower Split Petition Map

Norwich, CT

Map Sheet 1 of 2

Date: December, 2019

ALL-POINTS TECHNOLOGY CORPORATION


INDEX MAP

*Legend*

- Proposed Structure
- Existing Structure to be Removed
- Existing Structure
- Existing Right-of-Way (ROW)
- Overhead Eversource Line
- New 1000-1080 Transmission Line Split
- 2' Contour Line
- 10' Contour Line
- Approximate Existing Tree Line
- Proposed Tree Line
- Gate
- Existing Access
- Proposed Access
- Driveway
- Stone Work Pad
- Temporary Construction Matting
- Culvert
- Delineated Perennial Watercourse
- Delineated Intermittent Watercourse
- Delineated Wetland Boundary Outline
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- Natural Diversity Database Area (CTDEEP, June 2019; Nearest NDDB Area +/-1.88 Miles NE)*
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- State-Owned Property
- Parcel Boundary
- FEMA 100-Year Flood Zone
- Floodway

Map Notes:
*Indicates layer with no data in mapped extent
Wetlands Inspected by Matt Gustafson, Soil Scientist, 8/22/2019
Not for Construction.
ROW and Parcel data are approximate
Base Map Source: CTECO 2016 Aerial Imagery

1 inch = 200 feet
0 50 100 200 Feet

| NO. | DATE | REVISIONS | BY | CHK | APP | APP |
|---|---|---|---|---|---|---|
| | | | | | | |

EVERSOURCE ENERGY

**Quinebaug Double Circuit Tower Split Petition Map**
**Norwich, CT**

Map Sheet 2 of 2

Date: December, 2019

ALL-POINTS TECHNOLOGY CORPORATION

Resumes

Stephen A. Marien, P.E.

Ali R. Karimi

Anuj Mathur, PMP

Michael Libertine, LEP

Christopher Paul Soderman, P.E.

# STEPHEN A. MARIEN, P.E.

Eversource Energy
56 Prospect Street, 56P-1
Hartford, CT 06103
Work: 860-728-6144
*Email: stephen.marien@eversource.com*

## QUALIFICATIONS SUMMARY

An accomplished engineering professional with over 10 years of experience in Eversource Transmission Line and Civil Engineering. Extensive experience in diverse departmental roles, project and program engineering, with a proven ability to lead engineering teams and mentor engineering colleagues.

## AREAS OF EXPERTISE

- Transmission Line Design
- Structural Design and Analysis of Steel, Wood, Towers, Frames
- Structural Concrete and Foundation Design
- Project Engineering, Planning and Development
- Engineering Program Management, Budget Tracking, Estimating
- Construction Support, Emergency Support
- Substation Civil Engineering Design and Analysis

## TECHNICAL SKILLS

- PLS-CADD and suite packages
- LPILE
- RISA
- Mathcad
- AutoCAD
- Microsoft Word, Excel, PowerPoint

## EMPLOYMENT HISTORY & WORK EXPERIENCE

**Eversource Energy, Hartford, CT**
***Lead Engineer, Transmission Line and Civil Engineering*** ***2019 – Present***

Lead a team of engineers and designers to support Connecticut & Western Massachusetts Transmission Line major projects. Providing engineering support for design of new transmission line facilities and construction support for the maintenance and operation of existing facilities. Manage project engineering assignments, supervise schedule adherence, standardization, sharing of best practices to improve efficiency of capital program, and ensure projects are reviewed for compliance. Develop overhead transmission line scope for capital projects, system planning studies, and transmission interconnection projects. Provide technical expertise for engineered structures, light duty steel structures, foundations, transmission line thermal ratings, and overhead transmission installation procedures.

**Eversource Energy, Hartford, CT**
***Senior Engineer, Transmission Line and Civil Engineering*** ***2018 – 2019***

Transmission Line Project Engineer responsible for internal engineering support and vendor supervision for Capital and Maintenance projects and programs. Established the Double Circuit Steel Pole standard structure family. Developed scope for Planning studies and Interconnection projects, attended scoping meetings with customers, ISO, and Transmission Owners. Provided estimating support to Transmission Line projects. Developed, updated, and reviewed standard drawings and OTRMs to ensure compliance with Eversource standards. Collaborated to align standards in Transmission Line and Civil Engineering across all service territories. Trained and mentored new engineers and interns in the Transmission Line and Civil Engineering Department. Provided engineering deliverables and extensive construction support. Established strong relationships across Eversource.

**Project Experience:**

- Asset Condition Structure Replacement Capital Maintenance Program (2018-present) Project Engineer
- Laminated Wood Structure Replacement Program (2017-present) Project/T-Line Engineer
- Card Montville Tunnel Structure Replacement and OPGW Project (2017-present) Project Engineer
- Cricket Valley Interconnection Project (2018 – present) T-Line Engineer
- Eastern Connecticut 2029 Reliability Study (2017-present) Project Engineer

**Eversource Energy/Northeast Utilities Service Co., Hartford, CT**
***Engineer, Transmission Line and Civil Engineering*** ***2014 – 2018***

Transmission Line Project Engineer responsible for internal engineering support and vendor supervision for Capital and Maintenance projects and programs. Verified LiDAR models, reviewed clearance outliers, identified appropriate structural remediation or replacements. Provided review of alternatives to ensure the selection of economical project solutions. Monitored engineering performance and budget. Developed steel pole specifications, construction specifications. Developed deliverables for regulatory filings. Developed and updated standard drawings and OTRM standards. Mentored new engineers. Provided engineering deliverables and extensive construction support. Civil Engineering design support for site development, insulator and bus, structural steel, foundation, and transformer oil containment.

**Project Experience:**

- Asset Condition Structure Replacement Capital Maintenance program (2015-2018) Project Engineer
- Storm Hardening Program (2016-2017) Project Engineer
- 115kV NERC Program and Non BPS Thermal Rating Program (2013-2016) T-Line/Project Engineer
- Eversource Energy Transmission Ventures, Inc. Clean Energy Connect RFP (2016) T-Line Engineer
- No. Bloomfield S/S to Bloomfield Jct. Line Separation Project GHCC (2015-2017). T-Line Engineer
- 900 Line Partial Rebuild Project (2016-2017) Project Engineer
- Sandy Hook Substation Expansion Project (2015-2016) Civil Engineer
- Barbour Hill Autotransformer Project (2015) Civil Engineer

**Northeast Utilities Service Co., Berlin, CT**
***Associate Engineer, Transmission Line and Civil Engineering*** ***2012 – 2014***
***Assistant Engineer, Transmission Line and Civil Engineering*** ***2009 – 2012***
***Student Technician, Transmission Line and Civil Engineering*** ***part time: 2007, 2008, 2009***

Civil and Transmission Line Project Engineer responsible for supporting Capital and Maintenance projects. Developed standards, guidelines, tutorials, and engineering design tools for transmission line design and foundations. Provided extensive support designing and reviewing Transmission Line structure foundations and providing guidance on installation procedures. Expert in field review of foundations and provided repair or replacement direction. Proficient in existing substation structure reinforcement to allow installation of upgraded electrical equipment. Developed and reviewed Substation site designs, insulator and bus analysis, structural steel designs, and foundation designs.

**Project Experience:**

- 1238/1813 Transmission Line Lightning Arrester Project (2013) T-Line Engineer
- New England East West Solutions Project Transmission Line Foundation reviews (2011) Civil Engineer
- Greater Springfield Reliability Project T-Line Foundation reviews (2010-2012) Civil Engineer
- 1990 Line Foundation designs (2012) Civil Engineer
- New England East West Solutions Project, Fairmont S/S Project (2011-2013) Civil Engineer
- 1410 Line Uprate Project (2011) T-Line Engineer
- Sherwood New Substation Project (2011) Civil Engineer
- 310/368 Line Foundation designs (2010) Civil Engineer
- Obsolete Equipment Replacement Program (2009-2014) Civil Engineer

## EDUCATION

| | | |
|---|---|---|
| **M.E. Civil Engineering, Structural** | University of Hartford, West Hartford, CT | 2013 |
| **B.S. Civil Engineering** | University of Connecticut, Storrs, CT | 2009 |

## PROFESSIONAL LICENSE

Professional Engineer License No. 030065 State of Connecticut

Name: Ali R. Karimi

Address: 77 Silo Hill Rd.
Madison, CT 06443
Phone: (203) 421-5814 (home)
(860) 665-2190 (work)
E-mail: ali.karimi@eversource.com

# Education:

BS Electrical Engineering 1968-1972 Sharif University of Technology (Tehran Iran)
MS Electrical Engineering 1975-1978 University of Missouri-Columbia

# Professional Experience:

## Link Simulation System Division, Singer Company
**Silver Spring, Maryland 1980-1985**

Senior System Engineer - Led the team for development of real time simulation software for Monticello and Vermont Yankee nuclear power plant operator training simulators.

## Northeast Utilities
**Millstone Station, Waterford Connecticut 1985-2000**

Nuclear Training Department 1985-1991:

System Engineer - Responsible for software development for the nuclear plant operator training simulators, and maintenance and certification of the integrity of the system software and hardware for the 4 Connecticut Nuclear plants.

Project Services and Design Engineering Department 1991-2000:

Project Engineer - Responsible for projects involving plant modifications including planning, scheduling, vendor interface, specification development, evaluation of proposals, negotiating contracts, implementation, testing and turnover to Operations Department.

Transmission System Interface Program Engineer - Responsible for protection relaying design, plant-switchyard electrical interface and Station Blackout contingency planning.

**Northeast Generation Services Company** 2000-2002

Consulting Services Department

Project Engineer - Responsible for design and implementation of power transmission and generation projects such as State of Connecticut Department of Public Works Connecticut Juvenile Training School, City of Springfield Public Water system Cobble Mountain project and Newington new Hampshire Newington Station switchyard expansion.

**Northeast Utilities/ Eversource Energy Transmission Business** 2002-Present

Substation Design and Engineering Department

Project Engineer - Responsible for projects involving expansion and modification of existing 115 and 345 kV substations. Design and development plans for new substations, switching stations and independent power producer generator interconnection facilities in Connecticut and Western Massachusetts.

# ANUJ MATHUR, PMP

**116 Halleran Drive, Newington, CT 06111**

**Phone: 860-728-4813** **E-mail: anuj.mathur@eversource.com**


## CAREER OBJECTIVE

Strategically lead a team of Project Management professionals to exceed department and capital program goals.

## QUALIFICATIONS SUMMARY

| | | |
|---|---|---|
| Project Management | Supply Chain Management | Information Systems Management |
| Risk Management | Contract Administration | Project Scheduling |
| Management Consulting | Mentorship | Financial Portfolio Analysis |
| Construction Management | Regulatory and Non-Regulatory Compliance | Forecasting and Capital Budgeting |

## PROFESSIONAL EXPERIENCE

EVERSOURCE ENERGY, Hartford, CT June, 2008 – Present

- **Senior Project Manager**: ($20M) Southwest Connecticut Reliability Project – Directing and leading team through the design, construction and commissioning of a new 3.4 mile, 115-kV overhead line crossing three towns.
- **Senior Project Manager**: ($18M) 1555 Line Rebuild Project – Proactively managing all aspects of a 6.6 mile, 115-kV complete line rebuild in New Milford, CT.
- **Project Manager**: ($46M) GHCC: Manchester to Barbour Hill Project – Leading project team to design, site, construct and commission a new 345- 115-kV Autotransformer and re-conductor 7.6 miles of 345-kV overhead transmission line.
- **Project Manager**: ($37M) Stamford Reliability Cable Project – Successfully constructed new 115-kV, 1.5 mile underground transmission line project. Overall accountable for project plan, scope, budget, schedule, regulatory approvals, environmental permitting, engineering, system outage coordination, construction, and commissioning.
- **Project Manager**: ($6M) South End Ring Bus Project – Lead substation reconfiguration to five circuit breaker ring
- **Program Manager**: IEC 61850 Program – Develop, execute and ensure organizational 'readiness' for Configuration Control, Training and Development, Communication & Outreach, Information Technology and Implementation.
- **Program Manager**: ($15M) Cap & Pin & Obsolete Component Replacement Program - Strategize, monitor and execute multi-year projects to alleviate safety concern and to enhance overall system reliability.

BANK OF AMERICA, Providence, RI February – May, 2008

**Business Analyst / Supply Chain Consultant**

- Review, evaluate, analyze, and improve supply chain process documentation in accordance with corporate policies.

POWER ADVOCATE, INC., Boston, MA 2007

**Manager, Supply Chain Consultant**

- Gathered, analyzed and translated procurement requirements into strategic sourcing / supply chain solutions for client engagements that resulted in significant corporate savings.

GILBANE BUILDING COMPANY, Providence, RI 2004 – 2007

**Project Superintendent** 2006 – 2007

- $55M, 3-Floor New Courthouse. Directed and monitored contractor work on-site.

**Project Construction Lead** 2005 – 2006

- $4M, 12-Floor sprinkler & fire alarm life safety upgrade renovation. Supervised team of 15-20 contractors on-site
- Actively led progress meetings, provided status up-dates, and communicated with cross-functional team members that resulted in a successfully completed project on - schedule and within budget.

**Senior Project Office Engineer** 2004 – 2005

- $168M, 3.5-mile wastewater tunnel project. Created RFI, processed submittals, prepared daily & weekly progress reports, and meeting minutes.

THE MATHWORKS, INC., Natick, MA 2004

**Business Applications Consultant**

- Coordinated performance load, regression, data validation, and user acceptance tests, with Business Operations

## PROFESSIONAL EXPERIENCE CON'T

ATOMIC ENERGY OF CANADA LIMITED, Mississauga, ON, Canada 1999 – 2003
**Electrical Engineer**
- Designed component specification sheets, wiring drawings, and generated Bill of Materials (BOM) from Process / Instrumentation Drawings (P&ID) through the utilization of IntEC software application.

STONE & WEBSTER CANADA LIMITED, Toronto, ON, Canada 1998 – 1999
**Electrical Engineer**
- Provided software coordination and information technology support for Cable & Wire Management System (Oracle DB) and Intergraph product INtools (Informix DB).

IRIS POWER ENGINEERING LIMITED, Toronto, ON, Canada 1997 – 1998
**Sales Engineer**
- Authored detailed project proposals to market predictive maintenance technology for rotating machines.
- Delivered technical sales presentations at client sites that promoted partial discharge products and services.

## EDUCATION

**MASTER OF BUSINESS ADMINISTRATION** (MBA) 2006
University of Phoenix, Westborough, MA

**BACHELOR OF SCIENCE, ELECTRICAL ENGINEERING** (BSEE) 1997
University of Western Ontario, London, ON, Canada

## CONTINUING EDUCATION

**CERTIFICATE – PROJECT MANAGEMENT** 2011
Boston University, Berlin, CT

**CERTIFICATE – BUSINESS MANAGEMENT** 2004
University of Massachusetts, Westborough, MA

**CERTIFICATE – INFORMATION SYSTEMS MANAGEMENT** 2003
Ryerson University, Toronto, ON, Canada

**CERTIFICATE – CONTINUING ENGINEERING EDUCATION** 1998
University of Toronto, Toronto, ON, Canada

## SOFTWARE SKILLS

**BUSINESS APPLICATIONS**

| | |
|---|---|
| MS Office Professional | Maximo |
| Spend Analysis Tool (BIQ) | Visio |

**ENGINEERING APPLICATIONS**

| | | |
|---|---|---|
| INtools | SmartSketch | Cable and Wire Management System |
| Electrical/Controls (IntEC) | MatLab | Transmission Outage Application (TOA) |

## AFFILIATIONS

**PROJECT MANAGEMENT INSTITUTE,** Boston, MA 2006 – 2008
**PROFESSIONAL ENGINEERS ONTARIO**, Toronto, ON, Canada 2002 – 2004
**INSTITUTE OF ELECTRICAL ENGINEERS**, Toronto, ON, Canada 1999 – 2002

**Michael Libertine, LEP**
**Vice President**
**Director of Siting and Permitting**

**All-Points Technology Corporation, P.C.**
**567 Vauxhall Street Extension**
**Suite 311**
**Waterford, CT 06320**
**860-552-2238**
**mlibertine@allpointstech.com**

## General Background

Mr. Libertine joined All-Points Technology Corporation in 2012 as an owner of the firm. He has over 28 years of professional experience in the environmental field. His expertise includes regulatory siting and permitting consulting; environmental assessments/impact statements; NEPA compliance; visibility and aesthetic evaluations; site assessments and field investigations for property transfers; remedial strategy development; environmental due diligence; and Brownfields redevelopment projects.

Mike has assisted clients in the siting and permitting of new and modified telecommunication facilities, renewable energy projects, bulk power substations, and transmission line corridors. Mike is a Licensed Environmental Professional in Connecticut and has completed/supervised over 2,100 environmental site assessments and field investigations throughout New England. He has represented clients and provided expert testimony in front of state and local commissions, including the Connecticut Siting Council, on more than 500 projects.

## Representative Projects

### Environmental Land Planning, Siting and Permitting – Electric Utilities

Since 2004, Mike has served as the Program Manager for the siting and permitting of numerous electric utility projects in Connecticut and Massachusetts involving the assessment, siting and permitting of: new bulk power substations; modifications to existing substations; upgrades to transmission line corridors; replacement/installation of electrical system infrastructure; and, other support facilities. These projects require extensive coordination with numerous team members, including client's in-house discipline managers and engineers, outside consultants, legal counsel, staff, and subcontractors. Project-related services include overseeing civil engineering feasibility studies, pre-acquisition due diligence evaluations, natural resources inventories and wetland delineations, habitat evaluations, noise analysis, hazardous waste investigations, site survey, landscape architecture, visual analyses, preparation of technical documents and regulatory applications, coordination with federal, state and local agencies, permitting, public outreach, and expert witness testimony. Mike and his team also have provided environmental monitoring to meet regulatory requirements and those set forth in contract documents and specifications.

### Visibility and Aesthetic Assessments

Over nearly 20 years, Mike has been involved in evaluating visual effects of small and large-scale projects on the environment. He developed a technique that uses the combination of predictive computer modeling and in-field analysis to assess visibility on both a quantitative and qualitative basis. The predictive model provides a measurable assessment of visibility throughout a pre-defined study area, including private properties and other areas inaccessible for direct observations. The field review includes a balloon float and field reconnaissance to record existing conditions, verify results of the model, inventory visible locations, and provide photographic documentation from publicly accessible areas. Photographic simulations are prepared to depict scaled renderings of a proposed development project in its setting. Mike has completed more than 500 visual evaluations for electrical and renewable resource utilities, telecommunication service provides, and developers.

**Environmental Siting and Permitting Services, Commercial Solar Facilities, Connecticut**
Mike has served as Project Manager on numerous approved commercial solar projects ranging in size from less than 1 MW to 20 MW. Mike was responsible for the preparation of environmental assessments to support Petition filings to the Connecticut Siting Council and applications to municipalities. Services included: environmental due diligence and feasibility investigations; site/civil engineering design; wetland delineations; vernal pool studies and impact evaluations; habitat and wildlife assessments; breeding bird surveys; noise analyses, visibility assessments; archaeological surveys; consults and coordination with state agencies; development of protective measures for natural resources; and, securing stormwater permits. Mike and his team have also provided environmental compliance monitoring during construction of these facilities.

**Environmental Permitting Services for Wireless Telecommunications Clients, New England & NY**
Mike has been providing environmental siting, land planning and permitting services on behalf of various telecommunications service providers and tower builders throughout New England and New York since 1997. He has testified on behalf of numerous clients regarding environmental and aesthetic considerations in front of local municipalities, the CT Siting Council and state and federal agencies. Representative services include: due diligence and land use evaluations; preliminary site screenings; preparation of environmental compliance documentation, environmental assessments to fulfill NEPA requirements; Phase I ESAs and Phase II field investigations; remedial planning and oversight; wetlands and vernal pool assessments; vegetative/biological surveys; noise analyses; visibility analyses; graphic support; securing regulatory permits; and, environmental monitoring during and post-construction.

**Environmental Siting and Permitting Services, Proposed Fuel Cell Installations, South Windsor and Colchester, CT**
The siting process for these fuel cell generation facilities required the preparation of an environmental assessment to document existing conditions and evaluate the project's potential impacts on the surrounding area. The environmental study included assessments of water resources, vegetation and wildlife, rare species, historic and cultural resources, noise, air quality, scenic and recreational areas, and other natural resources. Mike also coordinated the site design activities and Development and Management Plan efforts.

**Environmental Evaluations and Regulatory Permitting, Wind Farm Colebrook, Connecticut**
Mike served as the Project Manager for environmental evaluations associated with the development of Connecticut's first commercial wind farm. He supervised due diligence investigations, natural resource studies and environmental permitting activities, including the evaluation of: wetlands and watercourses; flora and fauna; potential noise impacts and flicker phenomena; and, visual/aesthetic considerations. Mike provided expert testimony at local and state public hearings and assisted in preparing the Development and Management Plan and pre-construction coordination efforts of the 3.2 MW project.

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| **Education** | University of Connecticut, B.S. Natural Resources Management, December 1990<br>Stonehill College, B.A. Marketing, May 1981 |
| **Licenses** | Licensed Environmental Professional, State of Connecticut, LEP No. 345 |

Last Updated 10/9/2019

Work (860) 728-6172
Email: christopher.soderman@eversource.com

# Christopher Paul Soderman, P.E.*

## Education:

Rensselaer Polytechnic Institute (Troy, NY)
Bachelor of Science in Mechanical Engineering

Worcester Polytechnic Institute (Worcester, MA)
Master of Science in Electrical Engineering

University of Hartford (West Hartford, CT)
Master of Engineering (Civil Engineering)

University of Hartford (West Hartford, CT)
Master of Business Administration

## Special Skills:

**Team Leadership:** I can lead and develop technical teams including development of indoctrination into new processes and technical capabilities. This includes annual performance reviews, special coaching, classroom style lectures and more.

**Critical Analytical Thinking:** I am constantly on the hunt for new ways of doing things, trying to challenge how things are done and drive more efficiencies and better accuracy. This includes development of new standards that allow for quick and easy design work that is understandable and production savvy.

**Strategic Thinking:** I look at projects and problems from different perspectives to see not just immediate consequences, but secondary and tertiary effects of important decisions. This helps me to be prepared to deliver long-term success.

**Expert Testimony:** I can and have provided expert testimony on behalf of Eversource. This includes expertise in Transmission Line Engineering, Construction and Electric and Magnetic Fields.

## Relevant Work Experience:

**10-2019-Present Eversource Energy Service Company**
**Interim Director – Transmission Line Engineering:** Lead multiple teams across three states in the execution of Transmission Line Engineering goals and the technical support for Eversource Energy.

**Duties Include:**

- Coordinating with area managers and lead engineers on staffing levels.
- Briefing upper management on emergent project issues
- Developing solutions in cooperation with other function engineering groups.
- Drive consistency among three state engineering departments.
- Evaluate new technologies for implementation on the Eveersource Transmission System

**2/2018-Present Eversource Energy Service Company**
**Manager – Transmission Line & Civil Engineering CT & WMA:** Manage a department of engineers and designers providing engineering support for the design of new transmission line facilities and operation and maintenance of existing facilities.

**Duties include:**

- Balance workload among engineers and designers in support of Transmission Capitol and Maintenance Programs
- Develop Training for engineering staff
- Conduct performance reviews for employees providing mentoring and professional development
- Draft and review engineering and construction standards
- Provide Expert Testimony in front of regulatory agencies in support of the Transmission Business
- Provide guidance and technical support for strategic project development

**2/2003-2/2018 Eversource Energy Service Company**
**Lead Engineer – Transmission Line & Civil Engineering:** Engineering and support for design of new transmission lines and operation and maintenance of existing transmission lines.

**Engineering Assignments:**

- Team Lead – Transmission Line Engineering
- PLS-CADD Subject Matter Expert
- Wind Induced Conductor Motion Subject Matter Expert
- Direct Embedded Pole Design Subject Matter Expert
- Electric and Magnetic Fields Subject Matter Expert
- Grounding and Lightning design for Transmission Lines Subject Matter Expert
- Electromagnetic Compatibility/Interference Subject Matter Expert

**EMF Project Experience:**

- Seacoast Reliability Project (2014-2017; Madbury-Newington, NH)
- Southwest Connecticut Reliability Project (2016; Bethel/Brookfield, CT)
- Greenwich Substation and Line Project (2014-Present, Greenwich, CT)
- Stamford Reliability Cable Project (2013; Stamford, CT)
- 1990 Line Structure Replacement Project (2013: Monroe-Watertown, CT)
- Maine Power Reliability Project (2011; Eliot, ME)

**Selected Transmission Project Experience:**

- 1975 Line – Royal Oaks Rebuild Project (2016)
- Interstate Reliability Project (2004-2014, AC/Electromagnetic Interference Study)
- 1990 Line Rebuild (2010-2014 – Project Engineer)
- Greater Springfield Reliability Project (2006-2013 – T-Line Engineer)
- Middletown-Norwalk 345-kV Transmission Line Project (2003-2008 – Transmission Line Engineer (T-Line Engineer), CT)
- 1466 Line Rebuild between Carpenter Lane Junction and North Wallingford S/S (2/2007-8/2007 – Project Engineer, T-Line Engineer)
- Mansfield 69-kV Terminal Uprate (5/2006-9/2006 – Proj Engineer, T-Line Engineer, CT)
- University of Connecticut Interconnection 69-kV (2005 – Project Engineer, CT)

## 2/2002-2/2003 Tech-Aid Corporation for ESCO

**Project Coordinating Engineer (Contract):** For Transmission Business supporting Middletown-Norwalk 345-kV Transmission Line Project.

## 5/2001-2/2002 Tech-Aid Corporation for ESCO

**Mechanical Engineer (Contract):** Conservation & Load Management for Connecticut Light & Power

# Publications:

Chisholm, W. A., Martin-Sturmey, K., Soderman, C.P., Bologna, F; *"Results of Transient Resistivity Testing On Steel Lattice, Wood and Steel Pole Towers"*, International Conference on Grounding and Earthing & 7th International Conference on Lightning Physics and Effects, Porto de Galinhas, Brazil, June 2016.

Chisholm, W. A., Martin-Sturmey, K., Soderman, C. P., Beske, B. D., Bologna, F.; *"Measured Effects of Adjacent Towers on Transient Earthing Impedance"*, Earthing Africa Symposium, Johannesburg, South Africa, June 2017.

## Testifying Experience:

- Connecticut Siting Council
  - Docket 426 – Third Taxing District of Norwalk: Fitch St Substation (6/14/2012)
  - Docket 431 – South Norwalk Electric Works: SONO Substation (12/11/2012)
  - Docket 435 – Connecticut Light & Power Co.: Stamford Reliability Project (3/28/2013)
  - Docket 466 – Connecticut Light & Power Co.: Frost Bridge – Campville 115-kV Line (2/23/2016)
  - Docket 468 – Connecticut Light & Power Co.: Southwest CT Reliability Project (9/22/2016)
  - Docket 461A – CL&P d/b/a Eversource Energy: Motion to Reconsider Greenwich Substation & Line Project (July-September, 2017)
  - Docket 474 – CL&P d/b/a Eversource Energy: Greater Hartford/Central Connecticut Reliability Project (8/22/2017)
- Maine Public Utilities Commission
  - Docket 2008-255 – Public Service of New Hampshire – Maine Power Reliability Project (1/11/2012)
- Massachusetts Electric Facilities Siting Board
  - Docket EFSB 16-02/DPU 16-77 – Eversource Energy West Roxbury to Needham Reliability Project (6/27/2017)
  - Docket EFSB 17-02/DPU 17-82 – Eversource Energy Sudbury to Hudson Project (11/7/2017)
  - Docket EFSB 18-03 – Eversource Energy Certificate Woburn to Wakefield Project (10/25/2018)
  - Docket DPU 18-21 – Westfield Reliability Project (11/14-5/2018)
  - Docket DPU 18-155 – Eversource Energy Martha's Vineyard Energy Storage System (6/18/2019)
  - Docket EFSB14-4A/DPU 14-153A/14-154 – Eversource East Eagle Substation Location Approval (7/25/2019)

## Professional Registrations:

- Licensed Professional Engineer in the State of Connecticut (Lic. # PEN.24928)
- Licensed Professional Engineer in the Commonwealth of Massachusetts (Lic. # 53835)
- Licensed Professional Engineer in the State of New Hampshire (Lic. # 15541)
- Certified Level II User of CDEGS Specializing in Electromagnetic Interference from Transmission Lines (http://www.sestech.com/Training/CertifiedUsersII.htm)

* Professional Engineer's Licenses in Connecticut, Massachusetts and New Hampshire