

April 21, 2022

Melanie A. Bachman, Esq.
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: Docket No. 508 - The United Illuminating Company Application for a Certificate of Environmental Compatibility and Public Need for the Milvon to West River Railroad Transmission Line 115-kV Rebuild Project

Dear Ms. Bachman:

Enclosed for filing with the Connecticut Siting Council ("Council") is the United Illuminating Company's ("UI" or the "Company") responses to the Council's April 1, 2022 interrogatories (Set One), Affidavit of Shawn Crosbie relating to sign posting and the Company's pre-hearing submission.

Also enclosed, as part of UI's pre-hearing submission, is pre-filed testimony from Shawn Crosbie relating to a virtual tour of the proposed project. UI will provide a copy of the video of the virtual tour to the Council electronically, via a ShareFile site, to be uploaded to the Council's website.

Lastly, the Company will provide to the Council an electronic copy of Exhibit CSC-12-1 via the abovementioned ShareFile site. Please note that only the portions relating to the Milvon to West River transmission line segment from the *Fairfield to New Haven Asset Condition Assessment* have been provided at this time.

An original and fifteen (15) copies of this filing will be hand delivered to the Council.

Should the Council have any questions regarding this filing, please do not hesitate to contact me.

Very truly yours,



Bruce L. McDermott

Enclosures

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Interrogatory CSC-1

The United Illuminating Company
Docket No. 508

Witness: Samantha Marone
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Q-CSC-1: Referencing Volume 1A of the Application, Appendix F, of the letters sent to abutting property owners, how many certified mail receipts were received? If any receipts were not returned, which owners did not receive their notice? Were any additional attempts made to contact those property owners?

A-CSC-1: UI received 68 certified mail delivery receipts. 10 receipts were not returned and the owners were mailed a second letter via first class mail after the addresses were updated. The 10 receipts that were not returned showing delivery of the notice are from the following property owners:

1. 354 Woodmont Avenue LLC
520 Success Avenue
Bridgeport, CT 06610
2. Now Entity Inc.
520 Success Avenue
Bridgeport, CT 06610
3. Incas Peruvian Restaurant LLC
333 Naugatuck Avenue #4
Milford, CT 06460
4. 2019 Realty LLC
275 Welton Street
Hamden, CT 06517
5. 583 Anderson Avenue LLC
583 Anderson Avenue
Milford, CT 06460
6. Grasso Boulevard Properties LLC
330 Ella T. Grasso Boulevard
New Haven, CT 06519
7. Grasso Boulevard Properties LLC
46 Canterbury Road
Hamden, CT 06514
8. 409 Woodmont Road LLC
409 Woodmont Road
Milford, CT 06460

Interrogatory CSC-1

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9. Stephen Colonese and Dawn E. Colonese
7 Scott Street
West Haven, CT 06516
10. Karl E. Meader
104 Clark Street
West Haven, CT 06516

Interrogatory CSC-2

The United Illuminating Company
Docket No. 508

Witness: Samantha Marone
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Q-CSC-2: Has The United Illuminating Company (UI) received any comments on the Project from abutting property owners and/or any of the municipalities since the application was submitted to the Council? If yes, please indicate what such comments were and how UI addressed such comments.

A-CSC-2: Yes, UI has received comments from property owners and/or municipalities since the application was submitted to the Council on February 28, 2022. They are as follows:

1. A Milford resident called the Outreach Hotline on February 22, 2022 to request an email with the link for the City of Milford Public Hearing. The telephone call was returned and the link for the hearing was sent the same day.

2. A resident of Pearl Hill Street in Milford received a letter from CT DOT related to encroachments onto CT DOT property. On February 24, 2022 representatives from the Company performed a site visit at the residence to discuss the status on the encroachments. UI continues to have discussions with CT DOT on how the encroachment at this location will be addressed.

3. A resident of Washington Avenue in Milford received a letter from CT DOT related to encroachments and asked for additional information in order to re-site their fence. UI continues to have discussions with CT DOT on how the encroachment at this location will be addressed.

4. An Informational Hearing was held on February 28, 2022 by the City of Milford to inform residents about the Project. The City of Milford had several questions about the Project which the UI team responded to the questions at the Informational Hearing. Additionally, a resident of Pearl Hill Street mentioned an encroachment letter they received from CT DOT. The Company said it would work with the customer on this issue. Another Pearl Hill Street resident inquired whether noise levels would increase due to the Project. The Company explained that that apart from increased noise during construction, the new lines would not generate additional noise. The Company stated that the rebuilt lines would have larger conductors which would reduce any potential noise compared to existing lines and audible noise during operation is not expected due to the relatively low voltage of the lines.

Interrogatory CSC-2

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5. An employee from Star Distributors emailed the Company on March 7, 2022 to inquire whether rail service from the spur that serves their warehouse would be interrupted. The Company responded to the call on March 7, 2022 and said UI did not expect any adverse impacts to rail service but would call if any UI Project related track outages were expected to impact the company.

6. After receiving the notice about the filing of the Application, the President of the West Haven Land Trust called the Company on March 8, 2022 for additional information about the Project. A video call between the Company and the Land Trust was held for the Company to present the Project to the Land Trust and explain the land use in West Haven. The Land Trust asked UI to look into (1) whether land trust property abuts the Project area and (2) for information on protected species. UI confirmed via email that the (1) Project does not impact any of the 45 acres of Land Trust property and (2) the species report was sent.

7. On April 7, 2022, a Clark Street, West Haven resident called the Company to inquire about an abandoned pole in her back yard. The Company called the customer on April 7 and April 14, advising them that the pole was owned by CT DOT and it was slated for removal. The Company also determined that the pole was not located on her property line as it was well into the CT DOT right-of-way and would not impact the placement of a new fence on her property.

Interrogatory CSC-3

The United Illuminating Company
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Witness: Shawn Crosbie
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Q-CSC-3: Which municipalities are within UI's service area??

A-CSC-3: UI's service area includes the following 17 municipalities: Ansonia, Bridgeport, Derby, Easton, East Haven, Fairfield, Hamden, Milford, New Haven, North Branford, North Haven, Orange, Shelton, Stratford, Trumbull, West Haven and Woodbridge.

Interrogatory CSC-4

The United Illuminating Company
Docket No. 508

Witness: Shawn Crosbie
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Q-CSC-4: Pursuant to CGS §16-50o, please submit any agreements entered into with any third party in connection with the construction or operation of the proposed project.

A-CSC-4: No agreement currently exists with any third party in connection with the construction and operation of the proposed Project.

Interrogatory CSC-5

The United Illuminating Company
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Witness: Shawn Crosbie
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Q-CSC-5: Does UI have a license agreement with Metro-North Railroad (MNR) for the proposed project?

A-CSC-5: Yes, currently UI has a lease agreement with CT DOT which commenced on May 5, 2000.

Interrogatory CSC-6

The United Illuminating Company
Docket No. 508

Witness: Aziz Chouhdery
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Q-CSC-6: Does the Project support MNR rail lines operations? Explain.

A-CSC-6: UI's transmission system supports a portion of MNR's power needs out of a substation in New Haven. Construction of the lines in the Project area will not affect operation of the trains. All construction, Project planning and design has been coordinated with CT DOT and MNR through recurring bi-weekly meetings. The coordinated Project construction schedule will accommodate MNR rail operation requirements.

Interrogatory CSC-7

The United Illuminating Company
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Witness: Aziz Chouhdery
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Q-CSC-7: Referencing page ES-1 of Volume 1 of the Application, UI notes that "...recent Federal commitments are to modernize the nation's power grid to facilitate the transmission and delivery of clean and resilient energy to consumers." Identify which recent federal commitments are being referred to. How would the Project facilitate the transmission and delivery of clean and resilient energy to customers?

A-CSC-7: Page ES-1 of the Application refers generally to the several recent federal initiatives to support the buildout of transmission facilities that are critical to achieving President Biden's goal of 100% clean electric energy by 2035. Examples of such federal initiatives are:

In January 2022, the U.S. Department of Energy launched the "Building a Better Grid" initiative to catalyze the nationwide development of new and upgraded high-capacity electric transmission lines, as enabled by the Infrastructure Investment and Jobs Act. Building a Better Grid will work with community and industry stakeholders to identify national transmission needs and support the buildout of long-distance, high voltage transmission facilities that are critical to reaching President Biden's goal of 100% clean electricity by 2035 and a zero emissions economy by 2050. This program will make the U.S. power grid more resilient to the impacts of climate change, increase access to affordable and reliable clean energy and boost transmission jobs.

https://www.energy.gov/sites/default/files/2022-01/Transmission%20NOI%20final%20for%20web_1.pdf

Similarly, in April 2021, the U.S. Department of Energy announced the availability of up to \$8.25 billion in loans from its Loan Programs Office and the Western Area Power Administration for efforts to expand and improve the nation's transmission grid, specifically facilitate the construction of high-voltage transmission lines to enhance the reach, reliability, and resilience of the nation's electricity and unlock more of the nation's clean energy resources.

<https://www.energy.gov/articles/doe-announces-825-billion-loans-enhance-electrical-transmission-nationwide>

Interrogatory CSC-7

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The Milvon-West River Project also is well-placed in the coastal Connecticut area to potentially support the transmission of clean energy from offshore wind projects, such as Avangrid Renewables' planned 804-megawatt Park City Wind, which is expected to produce the equivalent of 14% of Connecticut's electricity.

Interrogatory CSC-8

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Q-CSC-8: What is the status of upgrades to the north of West River Substation and south of Milvon Substation?

A-CSC-8: UI does not own transmission infrastructure along the CT DOT corridor north of West River. UI's transmission line south of Milvon Substation to Congress Substation in Bridgeport were rebuilt as part of previous projects. The remaining segments owned by UI from Congress Street Substation west to near Sasco Creek (within Fairfield) are currently in the planning stages.

Interrogatory CSC-9

The United Illuminating Company
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Witness: Shawn Crosbie
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Q-CSC-9: What other existing collocated uses (ex. wireless telecommunications equipment, water and sewer lines, etc.) are within the project area? Would any have to be removed, relocated or modified, either temporarily or permanently, for construction of the proposed project?

A-CSC-9: In general, the proposed poles have been strategically placed to avoid any known active subsurface utilities. However, utilities adjacent to or crossing the project area include underground electrical, storm, water, sewer, communications, and gas lines. Based on the current design and the due diligence activities conducted to-date, in certain locations there are underground utilities which will have to be removed and relocated. In addition, abandoned utilities will be removed where they conflict with pole locations.

Interrogatory CSC-10

The United Illuminating Company
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Witness: Shawn Crosbie
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Q-CSC-10: Are the proposed monopoles capable of hosting telecommunications equipment collocations? Does UI have a policy related to telecommunications equipment collocations on its transmission line structures? If so, please provide the policy.

A-CSC-10: No, the proposed monopoles have not been designed to accommodate third party telecom equipment with the exception of the railroad communication wires. No UI policy exists.

Interrogatory CSC-11

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Witness: Shawn Crosbie
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Q-CSC-11: Is the proposed project identified in any ISO-New England, Inc. (ISO-NE) needs and solutions analyses? Is the proposed project on the ISO-NE Regional System Plan (RSP), RSP Project List and/or Asset Condition List?

A-CSC-11: UI performed the Milvon to West River needs and solutions assessment independently. ISO-NE does not perform asset condition assessments on behalf of New England Transmission Owners. This project is listed in the ISO-NE RSP Asset Condition list.

Interrogatory CSC-12

The United Illuminating Company

Witnesses: Shawn Crosbie
Aziz Chouhdery

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Q-CSC-12: Referencing page ES-3 of Volume 1 of the Application, UI notes that, “[T]he transmission lines exhibit age-related physical limitations.” Identify such age-related physical limitations/conditions. Please provide sample photos to depict such age-related conditions.

A-CSC-12: Age-related physical limitations include elements such as the loss of structural steel thickness, missing structural members, corrosion expansion, and exposed anchor bolts. These age-related physical limitations are outlined further in the Black & Veatch Condition Assessment Report, June 2018. See Exhibit CSC-12-1.



Interrogatory CSC-13

The United Illuminating Company

Witnesses: Shawn Crosbie
Aziz Chouhdery

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Q-CSC-13: Referencing page 1-7 of Volume 1 of the Application, UI notes that it conducted engineering analyses of the 115-kV lines between Milvon and West River Substations in 2018. Please provide a copy of the engineering studies.

A-CSC-13: Please see attached study – Exhibit CSC-12-1.

Interrogatory CSC-14

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Witness: Aziz Chouhdery
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Q-CSC-14: Please describe how the proposed project is consistent with the recommendations of the Federal Energy Regulatory Commission and the North American Electric Reliability Corporation Report on Transmission Facility Outages During the Northeast Snowstorm of October 29-30, 2011 – Causes and Recommendations.

A-CSC-14: UI transmission line design criteria have been updated to take into account high wind (hurricane category -3) to meet Federal Energy Regulatory Commission and the North American Electric Reliability Corporation Report requirements. UI has always included heavy ice loading in its transmission line design criteria.

Interrogatory CSC-15

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Witness: Shawn Crosbie
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Q-CSC-15: Referencing page ES-5 of Volume 1 of the Application, explain why the Milvon to Woodmont segment would be constructed before the Woodmont to Allings Crossing Segment?

A-CSC-15: Construction of the Milvon to Woodmont section ahead of the Woodmont to Allings Crossing section is due to the following:

- Outage constraints – outages on the south side lines that connect Woodmont to Milvon (89005B-1) and Woodmont to Allings Crossing (8904B) are needed to be taken back to back (i.e. the outage on Line 8904B should immediately be taken once Line 89005B-1 is put back in-service).
- Four-track crossings - to complete the connections at Woodmont Substation for both Lines 89005B-1 and 8904B, it was determined that this work had to be completed in a fifth construction season and not compressed into the end of a third or fourth construction season due to the unknowns related to MNR's approval of four-track outages and the requirement to have all 115-kV lines in-service by peak summer conditions.
- The schedule as currently set allows all construction activities to be contained between Woodmont Substation and Allings Crossing Substation during the fourth and fifth construction seasons to limit jumping back and forth between segments while minimizing the construction duration of the overall project to the extent practical.

Interrogatory CSC-16

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Witness: Shawn Crosbie
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Q-CSC-16: Referencing page ES-7 of Volume 1 of the Application, please describe any work limitations relating to working with or adjacent to MNR.

A-CSC-16: Work limitation relating to working with or adjacent to MNR are as follows:

- Any work within the CTDOT railroad corridor would require a flagger provided by MNR.
- Any work within 10 feet of the MNR signal and feeder wires would require an outage on those facilities.
- Any work that would require a person or piece of equipment to foul the tracks (meaning it would come within 4 feet of the tracks) would require a track outage.
- Any work requiring installation or removal of wires crossing the tracks would require a 4-track outage, which is limited to Friday and Saturday nights.

Interrogatory CSC-17

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Q-CSC-17: Referencing page ES-7 of Volume 1 of the Application, explain why the construction time period spans roughly six calendar years. Could any of the four segments be constructed in parallel to expedite the schedule?

A-CSC-17: Due to system outage limitations, the four segments cannot be built in parallel. The schedule as shown below is a high-level view of construction, including site restoration, completed in 5 calendar years. Further descriptions of work activities are outlined in Sections 3 and 4 of the Application.

Interrogatory CSC-18

The United Illuminating Company
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Witness: Shawn Crosbie
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Q-CSC-18: Referencing page 1-7 of Volume 1 of the Application, the 115-kV lines must be rebuilt to current National Electrical Safety Code (NESC) and UI standards. What are the NESC and UI standards?

A-CSC-18: The State of Connecticut adopts the newest version of the NESC as the minimum requirement for safe design, construction and operation of electric supply stations and associated supply and communications (i.e., electrical clearances and structure loading requirements). Many utilities across the country, including UI, have their own design standards exceeding the minimums laid out in the NESC. For example, UI standard structure loading criteria includes Category 3 wind loading, as a result of recent hurricanes and future climate change.

Interrogatory CSC-19

The United Illuminating Company
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Q-CSC-19: Would the Project comply with the 2004 Stormwater Quality Manual to the extent applicable?

A-CSC-19: Yes.

Interrogatory CSC-20

The United Illuminating Company
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Witness: Shawn Crosbie
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Q-CSC-20: Referencing page 2-3 of Volume 1 of the Application, what is the source of the 25-foot minimum clearance requirement? For example, is it due to the MNR requirements, the NESC, or vegetation management? Why would the clearance be less than 25 feet in some areas?

A-CSC-20: The 25-foot average horizontal offset between proposed monopole and catenary support column was selected as a baseline in the initial design basis. This value allows for ample clearance between the proposed 115-kV facilities and the existing Metro North owned signal and feeder wires so that these wires would not have to be supported by the new monopoles. This value also allows for future maintenance on the 115-kV facilities to be done without an outage on the Metro North signal and feeder wires.

Design basis was to use a 25-foot offset, in some cases the offset was adjusted to accommodate the following:

- Site topography
- Existing built environment
- Above ground and underground conflicts
- Avoiding conductors from spanning over buildings

Interrogatory CSC-21

The United Illuminating Company
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Witness: Shawn Crosbie
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Q-CSC-21: Referencing Drawings XS-1 of Volume 2 of the Application, would the existing distribution lines remain on the catenary structures? Are such distribution lines for MNR's use? If the catenaries were rebuilt and the 115-kV transmission lines were re-installed on the catenaries, what height would be required to meet clearance requirements?

A-CSC-21: Yes, the MNR signal and feeder wires (distribution lines) will remain on the catenary structures. These lines are owned and operated by MNR.

If the catenary structures were rebuilt, and the Metro North signal and feeder wires were to stay at their existing elevations, the bonnet structures, carrying the 115-kV lines in similar configuration as existing, would have to increase in height by 20' to 25' in order to meet today's more stringent clearance requirements.

Interrogatory CSC-22

The United Illuminating Company
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Witness: Aziz Chouhdery
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Q-CSC-22: Referencing page 2-4, Section 2.1.2 of Volume 1 of the Application, please explain in further detail what is meant by “[S]ingle-circuit monopoles and/or new monopoles...will be installed...as required to correctly align the phases of different circuits to the existing line terminal switches in each substation yard.”

A-CSC-22: In order to maintain the existing substation entrances and exits, there is a need to split the circuits from the typical double circuit configuration into two single circuit lines.

Due to the location and/or existing substation bay configuration at Milvon, Woodmont, Elmwest, and West River Substations, select poles, as noted in the table on page 2-4, need to be located on the south side of the tracks.

Interrogatory CSC-23

The United Illuminating Company
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Witness: Shawn Crosbie
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Q-CSC-23: Referencing page 2-9 of Volume 1 of the Application, when does UI anticipate a future conductor upgrade to 2156 ACSS conductors?

A-CSC-23: There are no immediate future upgrade planned for the 2156 ACSS conductors.

Interrogatory CSC-24

The United Illuminating Company
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Witness: Shawn Crosbie
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Q-CSC-24: Referencing page 2-9 of Volume 1 of the Application, explain why galvanized steel finish was selected for the proposed monopoles versus, for example, weathering steel? What is the cost difference among these two structure types?

A-CSC-24: Galvanized steel poles have a longer lifecycle than weathering steel. Galvanized steel is about 5-10% less expensive than weathering steel.

Interrogatory CSC-25

The United Illuminating Company
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Witness: Shawn Crosbie
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- Q-CSC-25: Referencing Page 2-10 of Volume I of the Application, would the existing catenary support columns from which MNR electrical facilities would be transferred remain in place or would they be removed? If they remain in place, which entity would own the columns? If removed, which entity would be responsible for decommissioning the columns and how would the columns be decommissioned?
- A-CSC-25: The catenary support columns from which the MNR electrical facilities would be transferred would remain in place to support the bridge component of the structure spanning the tracks and supporting the trolley wires. The catenary support structures/columns are currently owned by CT DOT and will remain as such.

Interrogatory CSC-26

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Witness: Shawn Crosbie
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Q-CSC-26: Referencing Table 2-2 on page 2-2 of Volume I of the Application, would UI replace the estimated 14 bonnets to support a shield wire to protect MNR signal and feeder wires? Why would 43 remaining bonnets support UI shield wire?

A-CSC-26: At certain road crossings, an aerial ground wire owned by Metro North for shielding of their signal and feeder wires does not exist. At these locations, UI will install an aerial ground wire for Metro North so that their facilities can continue to be shielded once UI removes their existing shield wire. At these locations, the aerial ground wire will be supported by a shorter 4-foot bonnet.

The 43 bonnets were based on prior design information, which has since been updated to only be nine bonnets. These bonnets are located on the south side of the tracks between First Avenue and the West River in West Haven. In this section, the catenary structures are unique, and Metro North does not currently have their own shield wire in this section. The bonnets will be kept to support the existing UI shield wire which will continue to shield the Metro North signal and feeder wires.

The ownership of the bonnets and shield wire will be transferred to Metro North/CT DOT.

Interrogatory CSC-27

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Witness: Shawn Crosbie
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Q-CSC-27: Page 2-10 of Volume I of the Application states there are some locations where MNR electrical facilities will be transferred from the existing catenary support columns and underbuilt on the new UI-owned monopoles. Please respond to the following:

- a) What type of MNR electrical facilities would be transferred?
- b) At what height would the MNR electrical facilities be underbuilt on the monopoles?
- c) Which entity is responsible for the costs associated with the transfer of the MNR electrical facilities?
- d) If UI is responsible for the costs, what are the costs, are the costs included in the total project cost and would the costs be recovered from UI ratepayers?

A-CSC-27: a) The aerial ground wire, signal wires and feeder wires owned by Metro North would be transferred from the existing catenary support columns and underbuilt on the new UI-owned monopoles.

- b) The height of the underbuilt facilities will vary per structure, but will range between 37' and 66' above ground with a few outliers based on current design as further described below:

- At the two proposed structures adjacent to I-95 (P1041N and P1042N), the underbuilt will be higher to span over the I-95 overpass and will range between 65' and 74' above ground.

- At the two proposed structures adjacent to the proposed parking garage at the West Haven Train Station (P1018N and P1019N), the underbuilt will be higher to meet required electrical clearances from both the proposed parking garage and the existing train station building. The underbuilt at this location will range between 80' and 100' above ground.

- c) UI is responsible.
- d) Estimated costs would be approximately \$365,000 for all materials and labor related to transferring or installing new MNR hardware, insulators and wire, and would be recovered from ratepayers.

Interrogatory CSC-28

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Witness: Shawn Crosbie
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Q-CSC-28: Referencing page 2-11 of Volume I of the Application, how many new monopoles would be required directly adjacent to the existing catenary support columns? At what height?

A-CSC-28: If structures were placed adjacent to every catenary support column, an additional 22 structures would be required for a total of 180 poles. Average pole heights would be expected to be approximately 95 feet but could vary due to surrounding terrain, environment, and required clearances.

The approach of placing a new monopole directly adjacent to the existing catenary support columns was the initial/baseline design approach. However, as part of UI's due diligence, this approach was deviated in order to minimize impacts to the surrounding built environment, existing land uses, wetlands, watercourses, and cultural resources. Site grading and ease of construction was also evaluated during the design process which also led to deviations of the initial/baseline design approach.

If the above scenario were to occur, there would be significantly more construction and site grading challenges, along with additional impacts to the surrounding built environment, existing land uses, wetlands, watercourses, and cultural resources.

Interrogatory CSC-29

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Q-CSC-29: Referencing page ES-10 of Volume 1 of the Application, what are the major components driving the total cost for the Project?

A-CSC-29: The major components driving the total cost are as follows:

- 1) Construction
- 2) Allowance for Funds Used During Construction & Overheads
- 3) Land Rights
- 4) Materials
- 5) Engineering Design & Permitting

Interrogatory CSC-30

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Q-CSC-30: Referencing page ES-10, of the \$295M total capital cost, approximately how much is associated with transmission line upgrades, and how much is associated with the substation upgrades?

A-CSC-30: Based on current design and cost estimation, allocation of total Project estimated cost are as follows: transmission line upgrades = 95% and substation upgrades = 5%.

Interrogatory CSC-31

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Witness: Shawn Crosbie
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Q-CSC-31: Of the approximately \$295M cost total, what costs would be regionalized, and what costs would be localized? Estimate the percentages of the total cost that would be borne by UI ratepayers, Connecticut ratepayers and the remainder of New England (excluding Connecticut) ratepayers, as applicable.

A-CSC-31: The entire scope of work is to upgrade the 115 kV transmission lines which are pool-transmission facilities, and therefore, UI can expect the entire project cost to be regionalized.

Interrogatory CSC-32

The United Illuminating Company
Docket No. 508

Witness: Shawn Crosbie
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Q-CSC-32: What methodology does UI use to determine an acceptable delta between estimated project costs and actual project costs? What is the acceptable delta?

A-CSC-32: UI follows the rules outlined in ISO-NE Planning Procedure 4 (PP4) to determine the level of accuracy required at various stages of a project. A “proposed project” requires the level of accuracy to be within a +50/-25% range while a “final project design” requires a +10/-10% range.

Interrogatory CSC-33

The United Illuminating Company
Docket No. 508

Witness: Aziz Chouhdery
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Q-CSC-33: Referencing page 9-2 of Volume 1 of the Application, UI notes that Overhead Alternatives 3 and 4 would involve significantly higher costs (approximately 200% more than the proposed Project). Page 9-10 indicates \$315 million and \$291 million for Overhead Alternatives 3 and 4, respectively, which does not appear to be consistent with a 200% increase. Please reconcile. Also, estimate the costs of Alternatives 3 and 4 in 2022 dollars.

A-CSC-33: In Appendix E, the general assumptions for conceptual estimates #3 and #4 state that the estimates do not include AFUDC, CSC permitting, or material management. When these costs are added, the difference is consistent with a 200% increase.

The estimated cost in 2022 dollars (with a +200/-50% accuracy range) are:

- Alternative 3: \$593M
- Alternative 4: \$609M

Interrogatory CSC-34

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Witness: Aziz Chouhdery
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Q-CSC-34: Referencing page 9-14 of Volume 1 of the Application, the estimated cost of Overhead Alternative 2 was approximately \$245M based on a 2018 study. Estimate the cost of Overhead Alternative 2 in 2022 dollars.

A-CSC-34: The estimated cost of Alternative 2 in 2022 dollars is \$357M which now includes the AFUDC, CSC permitting, and material management.

Interrogatory CSC-35

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Q-CSC-35: Referencing pages 9-5 through 9-8 of Volume 1 of the Application, estimate total cost of the Underground Alternative with the CT DOT Corridor and the Underground Alternative within public road ROWs as compared to the \$295M for the proposed configuration.

A-CSC-35: As described in Section 9.2.2, UI assessed the economic and environmental feasibility of rebuilding the 115-kV circuits underground, either within the CT DOT corridor or along public road ROWs.

Underground Cable System along CT DOT Corridor. UI estimates that the cost of installing the double-circuit 115-kV lines underground (using cross-linked polyethylene cable) for an estimated 9.5 miles along the CT DOT would be approximately \$2.7B or 8-10 times more expensive than the proposed overhead configuration. Assuming UI could acquire underground rights from CT DOT to construct and operate/maintain the XLPE cable system, underground construction would be extremely difficult to execute and would result in substantial impacts.

Underground Cable System within Public Road ROWs. As discussed on pages 9-8 to 9-9 of the Application, there are no direct routes along public roads along which an underground cable system could be aligned between Milvon and West River substations. Moreover, any underground cable system must necessarily be aligned to allow connections to all five of UI's substations. UI's analyses determined that an underground alignment along various State and local roads that generally parallel the CT DOT corridor and would allow connections to the five substations would be approximately 11.5 miles in length.

Given the longer cable route along State and local road ROWs, UI estimates that the cost of this underground alternative would be approximately \$3.4B.

Interrogatory CSC-36

The United Illuminating Company
Docket No. 508

Witness: Shawn Crosbie
Page 1 of 1

Q-CSC-36: Referencing the March 16, 2022 correspondence from the City of Milford, what is the technical feasibility and costs associated with the following:

- a) an underground configuration between Beardsley Avenue and River Street; and
- b) an overhead configuration of the structures identified in City recommendation #3 with structure heights of 120 feet.

A-CSC-36: The technical feasibility and costs for (a) an underground configuration between Beardsley Ave and River Street are \$66M. This is a conceptual grade estimate and does not include any relocation of underground utilities or other engineering studies needed to formalize the design and (b) an overhead configuration of the structures identified in the City of Milford's recommendation #3 with structure heights of 120 feet is approximately \$5.7M. Please note that due to vertical clearances from existing features, structures 912N and 914N can only be brought down to 130 feet.

Interrogatory CSC-37

The United Illuminating Company
Docket No. 508

Witness: Aziz Chouhdery
Page 1 of 1

Q-CSC-37: Referencing page 3-22 of Volume 1 of the Application, UI notes that, at the five substations, "The relay/control enclosures are equipped with fire extinguishers." Are they manual fire extinguishers, or are they part of an automatic fire suppression system? Explain.

A-CSC-37: Fire protection at each of the five substations associated with the Project have both manual and automatic fire suppression systems and methods. These are as follows:

- The control house is provided with manual Haltron (11 lb. agent weight) clean agent portable fire extinguishers meeting or exceeding the requirements contained in NFPA 10 *Standard for Portable Fire Extinguishers* as referenced by the *International Fire Code* (IFC). The manual fire extinguishers are electronically monitored by the substation control house fire alarm system in accordance with NFPA 10, section 7.6.
- The control house is protected by a fire alarm system meeting or exceeding the requirements of NFPA 72 *National Fire Alarm and Signaling Code*, as referenced by the *International Fire Code* (IFC). The fire alarm system reports all alarm, trouble and supervisory conditions to the Energy Control Center via SCADA connections to provide constant system monitoring.

Interrogatory CSC-38

The United Illuminating Company
Docket No. 508

Witness: Shawn Crosbie
Page 1 of 1

Q-CSC-38: Referencing Volume 1A of the Application, Appendix A, Federal Aviation Administration (FAA) consultation, prior to commencement of construction, would UI file with the FAA for review of its temporary structures (e.g. cranes)?

A-CSC-38: Yes.

Interrogatory CSC-39

The United Illuminating Company
Docket No. 508

Witness: Shawn Crosbie
Page 1 of 1

Q-CSC-39: Referencing page 5-14 of Volume 1 of the Application, have any flood mitigation measures been installed at Milvon Substation? If no, are any proposed as part of the Project?

A-CSC-39: No, the Project does not have any associated flood mitigation measures being proposed at Milvon Substation.

Interrogatory CSC-40

The United Illuminating Company
Docket No. 508

Witness: Shawn Crosbie
Page 1 of 1

Q-CSC-40: Referencing page 6-12 of Volume 1 of the Application, what protection measures will be utilized in the flood zones?

A-CSC-40: Increased foundation reveal heights will be utilized in flood zones. In general, the top of concrete will be located at least 1' above the 100-year flood elevation. In areas where sea level rise is a concern, these elevation differences were increased from 1' to 2'-10" following the projections of the Connecticut Institute for Resilience and Climate Adaptation (CIRCA).

Interrogatory CSC-41

The United Illuminating Company
Docket No. 508

Witness: Shawn Crosbie
Page 1 of 1

Q-CSC-41: Referencing the July 5, 2017 correspondence from the Connecticut Department of Transportation (CDOT) Rail Administrator to Kenneth Bowes of Eversource from Council Docket No. 461A available at this link: https://portal.ct.gov/-/media/CSC/1_Dockets-medialibrary/Docket_461A/Pre-filed_Exhibits/Eversource/461A20170710SupplementalTestimonyBowespdf.pdf Please explain how the proposed project would not impact the New Haven Line service as described in each numbered paragraph of the DOT Rail Administrator correspondence.

A-CSC-41: UI has an active and long-standing relationship with CT DOT/MNR in coordinating Project or maintenance activities along the CT DOT corridor. The proposed UI Project would use the following tools to ensure the operation of the New Haven Line are not impacted:

- a) Ongoing and for the foreseeable future biweekly or as-needed meetings and feedback from CT DOT and MNR on Project design.
- b) Ongoing and for the foreseeable future biweekly or as-needed meetings and feedback from UI on CT DOT and MNR Project(s).
- c) Communication with CT DOT on the bi-weekly or as-needed meetings relative to Project activities such as:
 1. Scope
 2. Schedule
 3. Staff Resources
 4. CT DOT/MNR Projects

Interrogatory CSC-42

The United Illuminating Company
Docket No. 508

Witness: Aziz Chouhdery
Page 1 of 1

Q-CSC-42: Referencing Page 5-38 and 5-39 of Volume I of the Application, how do the future CDOT Plans impact the design, construction or schedule for the rebuilding of the electric transmission line? Please explain.

A-CSC-42: Through on-going discussions with UI and CT DOT representatives, detailed designs are being coordinated so appropriate clearances and Project needs are accommodated.

Construction activities in this area (Elmwest to West River section) are currently planned such that UI activity, with exception to restoration and removals on the south side of the tracks, should be complete in the area prior to the replacement of the CT DOT bridge. The teams will continue to work closely together as the Project progresses toward final design and construction.

MNR track improvement projects described in this section will not affect the UI rebuild design or construction activities. The Project team continues to coordinate with MNR and CT DOT on these projects through reoccurring, bi-weekly meetings.

Interrogatory CSC-43

The United Illuminating Company
Docket No. 508

Witness: Correne Auer
Page 1 of 2

Q-CSC-43: Referencing the December 22, 2021 State Historic Preservation Office (SHPO) letter in Volume 1A – Appendix A of the Application, please respond to the following:

- a) Where is Charles Island located? Please provide a map.
- b) What is the closest distance between the proposed project and Charles Island?
- c) Would the proposed project be visible from Charles Island? Please characterize any visibility.
- d) How does SHPO's recommendation for historic research of Charles Island and installation of interpretive signage on Charles Island mitigate the indirect visual impacts of the proposed project from the 5 identified historic properties?
- e) Does UI have an in-house historian?
- f) Would the costs of performing SHPO's recommended historic research of Charles Island and installation of interpretive signage on Charles Island be recovered from the ratepayers?

A-CSC-43: a) Charles Island is located approximately 0.5 mile off the coast of Milford. Please see the attached figure. CSC-43-1.

b) The closest distance between the proposed Project and Charles Island is 1.95 miles.

c) Charles Island at its closet point is approximately 2 miles south of the railroad corridor in Milford. At that distance, any possible views of the proposed structures would include intervening infrastructure and natural features, rendering any proposed structures to not be discernable to the naked eye from the island.

Interrogatory CSC-43

The United Illuminating Company
Docket No. 508

Witness: Correne Auer
Page 2 of 2

d) UI worked in coordination with the Connecticut State Historic Preservation Office (CT-SHPO) to identify an appropriate mitigation to compensate for indirect visual impacts to the five historic resources located along the Project corridor. UI and CT-SHPO worked with local preservation partners to identify several mitigation options that were considered appropriate in type and scale to the historic impact. The recommendation to conduct historical research on Charles Island and to create and install signage regarding its history was considered by the CT-SHPO as a suitable mitigation measure for several reasons. The island is located in the same community as the proposed impact and it is a threatened resource because of sea level rise. The mitigation is an opportunity to document the island's history and cultural features to assist the State of Connecticut with its resources management and to avoid loss. The proposed mitigation effort also will provide an opportunity to share the history of this important resource with the community and its visitors.

e) No, UI relies on qualified cultural resource consultants. For this Project UI retained Heritage Consultants, LLC.

f) Yes, the costs relative to performing SHPO's recommended historic research of Charles Island will be regionalized.

Interrogatory CSC-44

The United Illuminating Company
Docket No. 508

Witness: Correne Auer
Page 1 of 1

Q-CSC-44: Please describe how the proposed project is consistent with the Federal Energy Regulatory Commission Guidelines for the Protection of Natural, Historic, Scenic and Recreational Values in the Design and Location of Rights-of-Way and Transmission Facilities.

A-CSC-44: The Project parallels the highly urbanized CT DOT railroad corridor. The locations of monopoles and access were proposed to largely be within or adjacent to the railroad corridor thus, remaining consistent with the existing developed land use. By remaining in or adjacent to the urbanized existing railroad corridor, natural, historic, scenic, and recreational values of the pertinent municipalities are protected.

Interrogatory CSC-45

The United Illuminating Company
Docket No. 508

Witness: Correne Auer
Page 1 of 1

Q-CSC-45: Please describe how the proposed project is consistent with the DEEP Long Island Sound Blue Plan.

A-CSC-45: According to the *Long Island Sound Blue Plan 2019*, “Under the legislation mandating the creation of the Blue Plan (CGS § 25-157t), its policies are meant to apply to activities taking place in waters seaward of a 10’ depth line...As a result, the Blue Plan does not apply, and was never intended to apply, to a large number of regulated coastal activities such as private docks or protection of salt marshes already managed under the existing Coastal Management Program.” Based on the Blue Plan Viewer mapping, the Project does not include any activities within the Blue Plan Policy Area and the Project activities involving water resources will be regulated via CT DEEP Land and Water Resource Division and US Army Corp of Engineers permits.

Interrogatory CSC-46

The United Illuminating Company
Docket No. 508

Witness: Correne Auer
Page 1 of 1

Q-CSC-46: Referencing Appendix C of Volume 1A of the Application, Viewshed Analysis Maps 1 through 3, of the approximately 14,015-acre (or one-mile radius) study area, approximately how many acres would have year-round views of the Project, and how many acres would have seasonal views of the Project?

A-CSC-46: Derived from the Appendix C Viewshed Analysis Maps, approximately 3,715 acres (26.5% of the Study Area) of surrounding area will feature year-round views of the proposed Project, and approximately 1,176 acres (8.4% of the Study Area) of surrounding area will feature seasonal views of the proposed Project.

Interrogatory CSC-47

The United Illuminating Company
Docket No. 508

Witness: Correne Auer
Page 1 of 1

- Q-CSC-47: Referencing Appendix C of Volume 1A of the Application, Viewshed Analysis Maps 1 through 3, as a comparison, provide similar viewshed maps based on the existing catenaries only. Of the approximately 14,015-acre (or one-mile radius) study area, about how many acres have year-round views of the existing catenaries, and how many acres have seasonal views of existing catenaries?
- A-CSC-47: Viewshed maps depicting visibility associated with existing catenaries with the UI facilities (bonnets, hardware and 115 kV conductor) are provided and attached. See CSC-47-1. Approximately 1,673 acres (12% of the Study Area) have year-round views of the existing catenaries and UI facilities approximately 477 acres (3.4% of the Study Area) have seasonal views of the existing catenaries. These acreages are approximately half that of the proposed project upgrades since existing catenaries are substantially lower than the new monopoles. Please note that this response does not include the heights of the 21 existing UI structures listed in Table 2-2 of the Application.

Interrogatory CSC-48

The United Illuminating Company
Docket No. 508

Witness: Correne Auer
Page 1 of 1

Q-CSC-48: Please identify the types of acceptable low growth vegetative species referenced on page 6-15 of Volume I of the Application.

A-CSC-48: Two tables (*Trees with Short Mature Heights* and *Selected shrubs suitable for planting near utilities*) produced by the State of Connecticut Vegetation Management Task Force are attached. See CSC-48-1. While not all inclusive, this list is an indicator of the types of trees and shrubs that will be allowed along the Transmission line corridor. Invasive plants encountered will be removed by vegetation management, including invasive vines, where possible.

Interrogatory CSC-49

The United Illuminating Company
Docket No. 508

Witness: Shawn Crosbie
Page 1 of 1

Q-CSC-49: Referencing the footnote on page 2-8 of Volume I of the Application, what are UI's standards relative to the width of the permanent easement for transmission vegetation management? What are the mandated electric transmission line standards?

A-CSC-49: UI complies with NERC Reliability Standard FAC-003 to maintain Minimum Vegetation Clearance Distance (MVCD), as outlined in the "Transmission and Vegetation Management Operating Procedure." Transmission line MVCD is maintained to prevent vegetation-related outages under different weather and operating conditions.

For this particular right-of-way, a minimum of 25' from the conductors at rest was calculated based on UI's Operating Procedure.

UI's Transmission and Vegetation Management Operating Procedure is based on the following Industry Standards and Practices:

- OSHA 29 CFR 1910.269 Electric Power Generation, Transmission and Distribution
- ANSI Z133.3 "Pruning, Trimming, Repairing, Maintaining, and Removing Trees, and Cutting Brush Requirements"
- ANSI A300 Part 1 "Tree, Shrub, and other Woody Plant Maintenance – Standard Practices"
- ANSI A300 Part 7 "Integrated Vegetation Management, Electric Utility Rights-of-Way"
- NESC Rule 218

Interrogatory CSC-50

The United Illuminating Company
Docket No. 508

Witness: Shawn Crosbie
Page 1 of 1

Q-CSC-50: Page 3-6 of Volume I of the Application mentions hazard trees outside easement areas would be removed in coordination with the landowner. Is landowner permission required? What if the landowner denies the request?

A-CSC-50: In accordance with the easements that will be obtained as part of this Project, permission from a landowner will not be required. Where no new easements have been obtained, vegetation clearing will be coordinated with local tree wardens and other community officials to inform them of hazardous tree conditions that threaten electric reliability and public safety. However, in all cases UI coordinates with the landowner for the removal of vegetation.

Interrogatory CSC-51

The United Illuminating Company
Docket No. 508

Witness: Correne Auer
Page 1 of 1

Q-CSC-51: Referencing pages 6-12 and 6-13 of Volume 1 of the Application, the square footage numbers in paragraph 4 on page 6-13 do not appear to match the numbers on Table 6-3 on page 6-12. Please reconcile.

A-CSC-51: Floodplains impacts on the Project are described in various sections of the Application. Impact numbers are shown correctly in Table 6-3 on page 6-12 and within paragraph 4 on page 6-13 but presented differently to provide context.

For example, Table 6-3 presents proposed detailed impacts to flood zones along the Project, broken down by floodplain and impact type (monopole and permanent access). The text on page 6-13 provides information by specific floodplain (e.g. Beaver Brook, West River) along with 100-year and 500-year floodplain total impacts. These totals are the sums of the pertinent quantities within Table 6-3.

Interrogatory CSC-52

The United Illuminating Company
Docket No. 508

Witness: Correne Auer
Page 1 of 1

Q-CSC-52: Referring to the Wetland Report Volume 1A, Appendix B, in the Application, what precautions would be taken in the area identified as “prohibited” on wetland maps?

A-CSC-52: The areas identified as “prohibited” within the Wetland Report Volume 1A, Appendix B refer to shellfish classification. Those areas identified are prohibited from shellfish harvesting due to contamination concerns of the corresponding water resource. This classification will not impact the Project, and therefore no precautions are necessary.

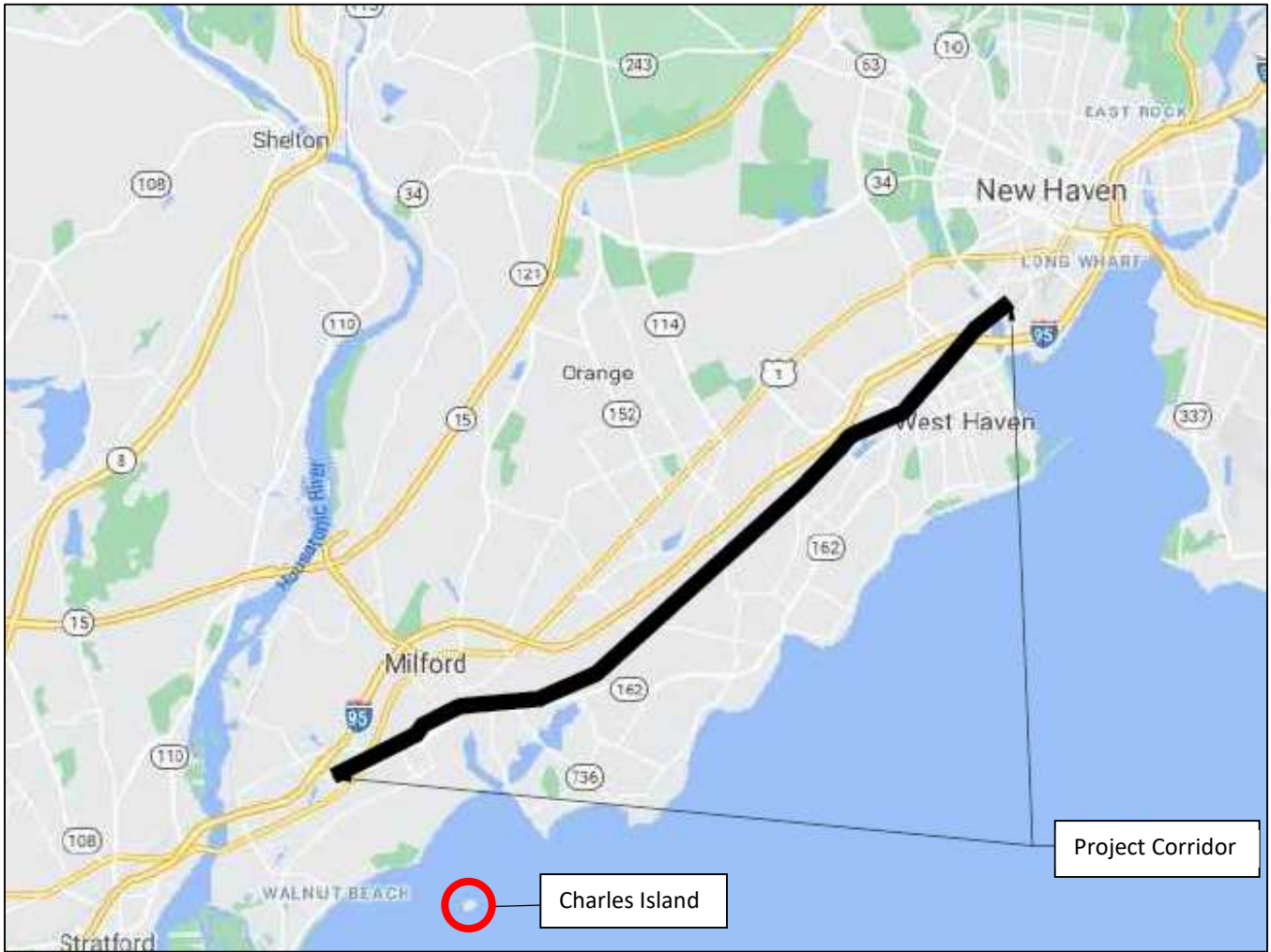
Interrogatory CSC-53

The United Illuminating Company
Docket No. 508

Witness: Correne Auer
Page 1 of 1

Q-CSC-53: Referencing page 5-5 of Volume 1 of the Application, provide the total number of acres of prime farmland soils within the project area, and indicate how many acres of prime farmland soils within the project area would be impacted by the Project.

A-CSC-53: The Project encompasses a total of approximately 9.4 acres of prime farmland soil. These soils identified as prime farmland are not located in areas of agricultural zoning nor are they actively being farmed. Within the 9.4 acres, approximately 0.6 acres will be impacted due to proposed permanent roads, work pads and seven monopole foundations, and approximately 3.6 acres will be impacted temporarily from matting and/or clearing.



Map showing the location of Charles Island relative to the Project Corridor

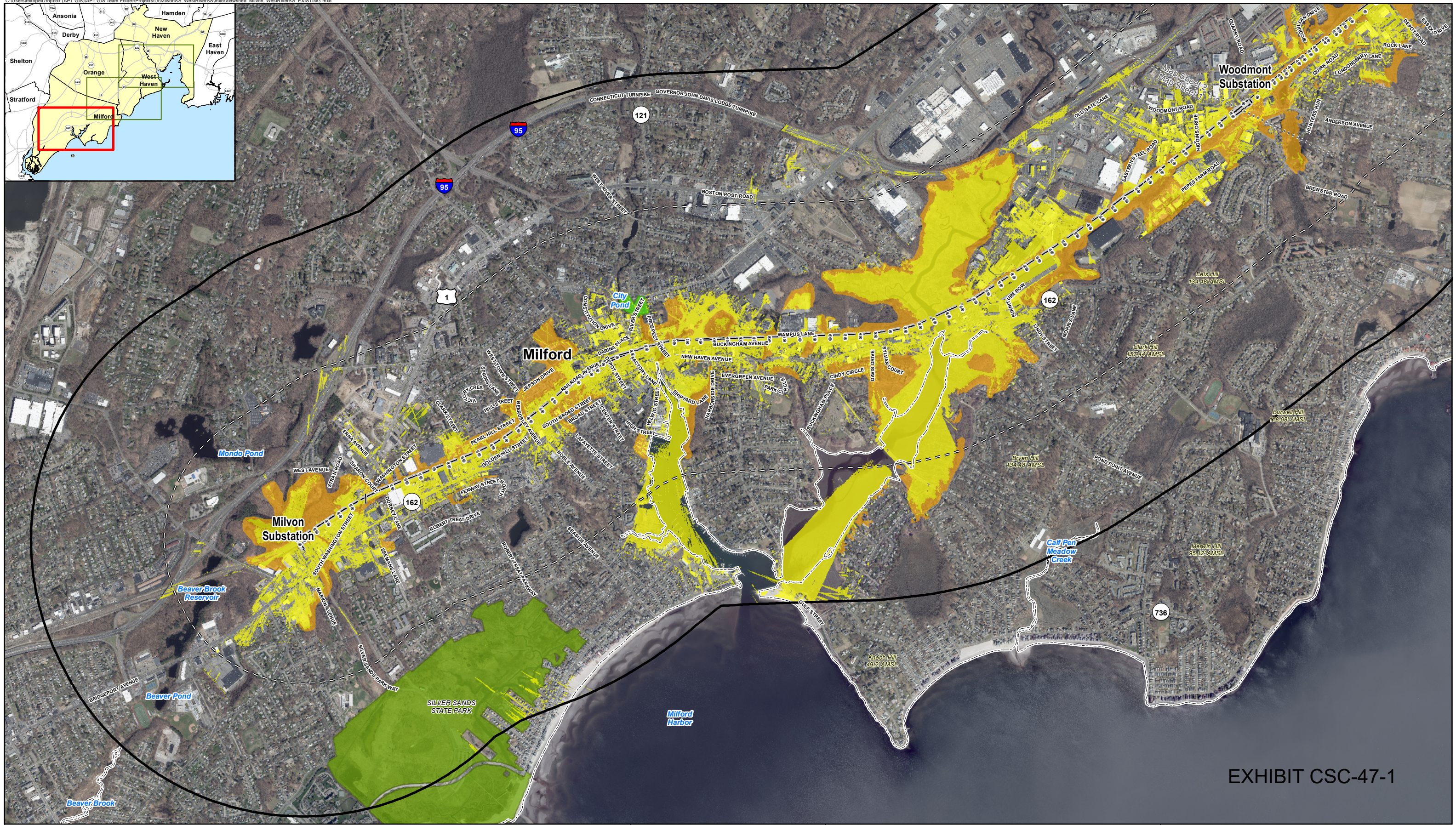


EXHIBIT CSC-47-1

Legend

- Existing Catenary
- Project Transmission Line
- Year-Round Visibility (1,673 Acres)
- Areas of Potential Seasonal Visibility (477 Acres)
- Study Area (1 Mile Radius)
- Half Mile Radius
- Municipal Boundary
- Scenic Highway*
- Trail*
- DEEP Boat Launches*
- Municipal and Private Open Space Property
- State Forest/Park

Protected Open Space Property

- Federal*
- Land Trust*
- Municipal*
- Private*
- State*

Scale: 1,000 500 0 1,000 Feet

Limitations

This map depicts areas where existing catenary infrastructure may potentially be visible to the human eye without the aid of magnification based on a viewer eye-height of 5 feet above the ground and intervening topography, tree canopy, and existing structures. This analysis is based on a combination of computer modeling, incorporating the DSM, and 2019 digital aerial photographs.

This analysis does not necessarily depict all locations where views may occur. It is intended to provide a representation of those areas where at least a portion of the existing electrical facilities may be seen, but may actually over-predict visibility in some locations.

Physical Geography / Background Data

Study area encompasses a 1-mile radius surrounding the existing catenaries and includes 14,015 acres. A digital surface model (DSM) was created from the State of Connecticut 2016 LIDAR LAS data points. The DSM captures the natural and built features on the Earth's surface. Forest canopy height derived from LIDAR data.

Map Sources

*Not all data layers appear on map sheet.
 Ortho Base Map: State of Connecticut 2019 aerial imagery (CTECO Map Service)
 CTDEEP's data library (<http://www.ct.gov/deep>)
 Data layers are maintained and updated by CTDEEP and represent the most recent publications.
 Scenic Roads: CTDOT State Scenic Highways (2015)
 Connecticut Forest and Parks Association, Connecticut Walk Books East and West

Map Date: April 2022

Docket 508
Response to Interrogatory 47
Existing Conditions Viewshed Analysis Map
Milvon-West River Railroad Transmission
Line 115-kV Rebuild Project

Milford, CT
 Map Sheet 1 of 3

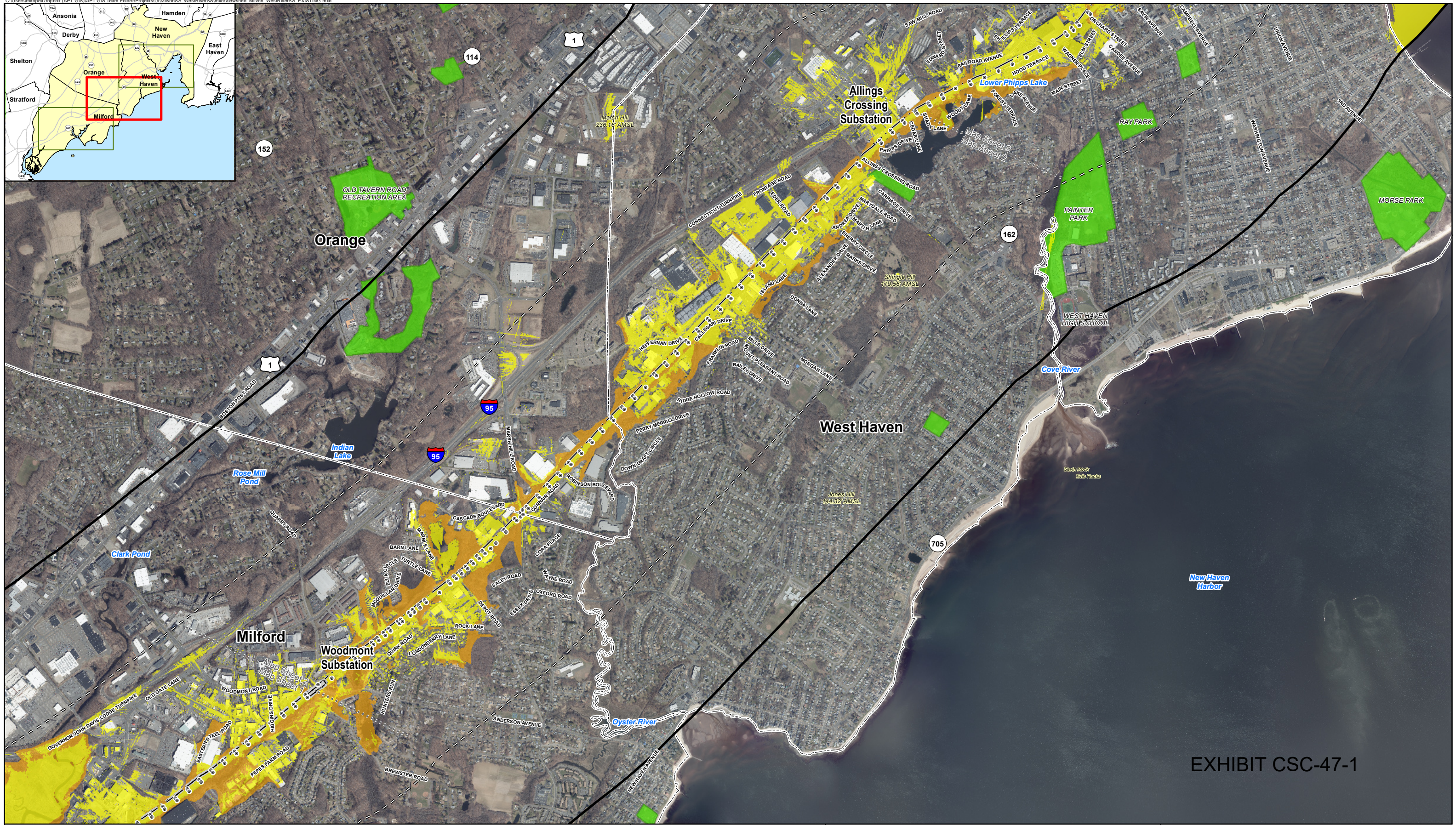


EXHIBIT CSC-47-1

Legend

- Existing Catenary
- Project Transmission Line
- Year-Round Visibility (1,673 Acres)
- Areas of Potential Seasonal Visibility (477 Acres)
- Study Area (1 Mile Radius)
- Half Mile Radius
- Municipal Boundary

- Scenic Highway*
- Trail*
- DEEP Boat Launches*
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Scale: 1,000 500 0 1,000 Feet

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This analysis does not necessarily depict all locations where views may occur. It is intended to provide a representation of those areas where at least a portion of the existing electrical facilities may be seen, but may actually over-predict visibility in some locations.

Physical Geography / Background Data

Study area encompasses a 1-mile radius surrounding the existing catenaries and includes 14,015 acres. A digital surface model (DSM) was created from the State of Connecticut 2016 LIDAR LAS data points. The DSM captures the natural and built features on the Earth's surface. Forest canopy height derived from LIDAR data.

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 CTDEEP's data library (<http://www.ct.gov/deep>)
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 Scenic Roads: CTDOT State Scenic Highways (2015)
 Connecticut Forest and Parks Association, Connecticut Walk Books East and West

Map Date: April 2022

Docket 508
Response to Interrogatory 47
Existing Conditions Viewshed Analysis Map
Milvon-West River Railroad Transmission
Line 115-kV Rebuild Project
 Milford, Orange, and West Haven, CT
 Map Sheet 2 of 3

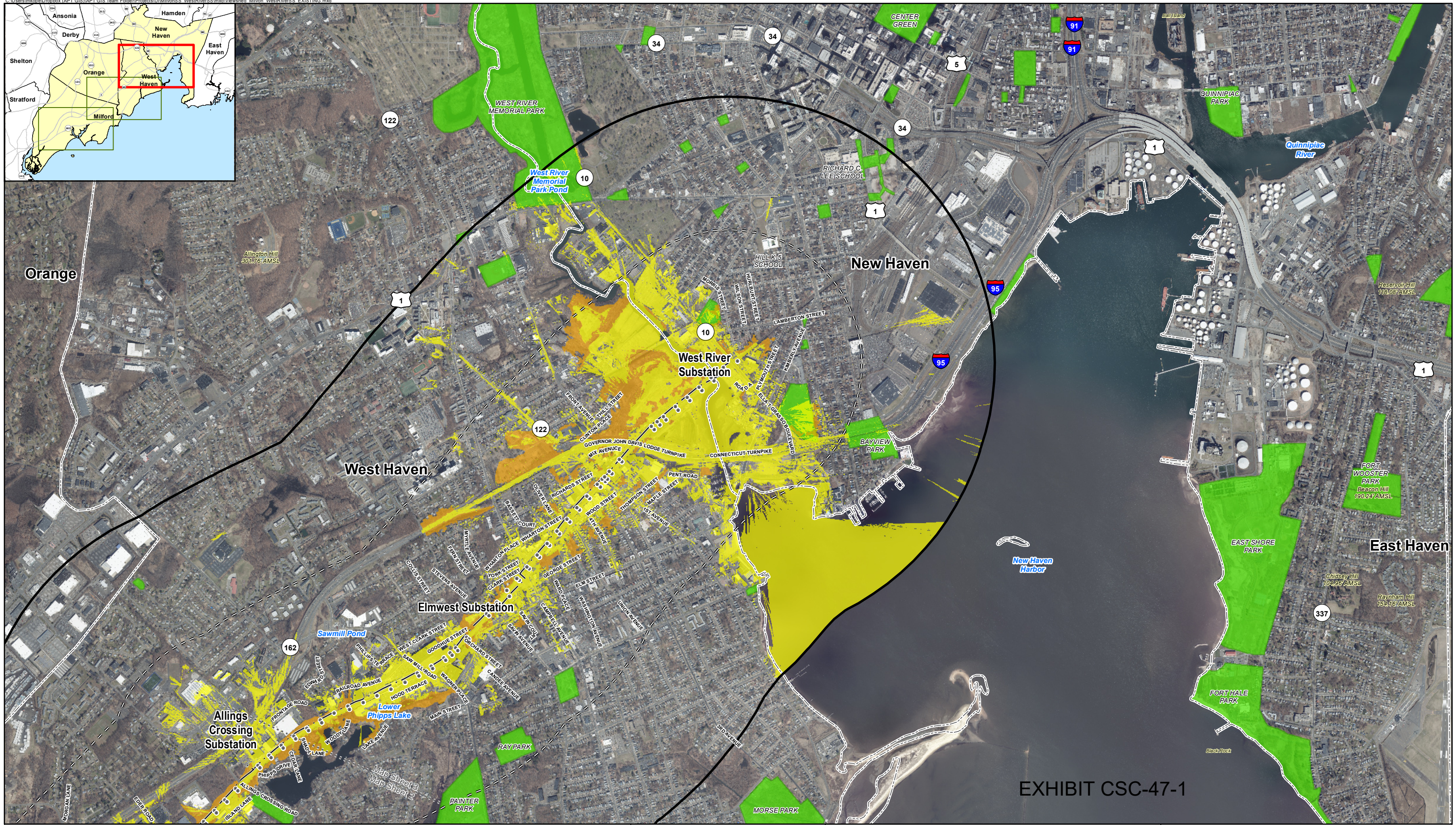
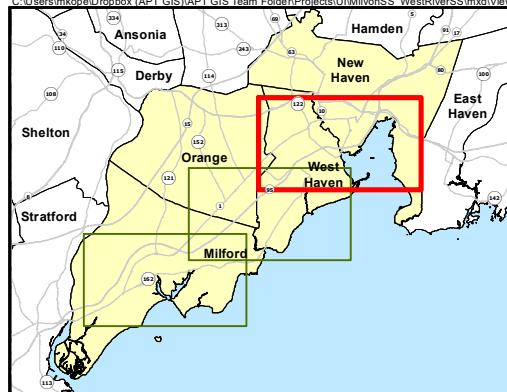


EXHIBIT CSC-47-1

Legend

- Existing Catenary
- Project Transmission Line
- Year-Round Visibility (1,673 Acres)
- Areas of Potential Seasonal Visibility (477 Acres)
- Study Area (1 Mile Radius)
- Half Mile Radius
- Municipal Boundary
- Scenic Highway*
- Trail*
- DEEP Boat Launches*

Protected Open Space Property

- Federal*
- Land Trust*
- Municipal*
- Private*
- State*
- Municipal and Private Open Space Property
- State Forest/Park

Map Scale: 1,000 500 0 1,000 Feet

Limitations

This map depicts areas where existing catenary infrastructure may potentially be visible to the human eye without the aid of magnification based on a viewer eye-height of 5 feet above the ground and intervening topography, tree canopy, and existing structures. This analysis is based on a combination of computer modeling, incorporating the DSM, and 2019 digital aerial photographs.

This analysis does not necessarily depict all locations where views may occur. It is intended to provide a representation of those areas where at least a portion of the existing electrical facilities may be seen, but may actually over-predict visibility in some locations.

Physical Geography / Background Data

Study area encompasses a 1-mile radius surrounding the existing catenaries and includes 14,015 acres. A digital surface model (DSM) was created from the State of Connecticut 2016 LIDAR LAS data points. The DSM captures the natural and built features on the Earth's surface. Forest canopy height derived from LIDAR data.

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Map Date: April 2022

Docket 508
Response to Interrogatory 47
Existing Conditions Viewshed Analysis Map
Milvov-West River Railroad Transmission
Line 115-kV Rebuild Project
 Orange, New Haven, and West Haven, CT
 Map Sheet 3 of 3

Trees with Short Mature Heights

Connecticut State Vegetation Management Task Force

Glenn Dreyer¹ (Connecticut College)

Jeffrey Ward² (The Connecticut Agricultural Experiment Station)

Common name	Scientific name ³	Origin ⁴	Height (ft) ⁵		Not for Urban Sites	Notes
			Typical	CT max		
Trident Maple	<i>Acer buergerianum</i>	NE Asia	20-25	57		
Hedge maple	<i>Acer campestre</i>	Europe	30+	60		Tolerates urban conditions well. No fall color.
Paperbark maple	<i>Acer griseum</i>	China	30	40		Beautiful shiny copper-colored bark
Japanese maple	<i>Acer palmatum</i>	NE Asia	15-30	48		Is spreading from planted locations; Invasive in nearby states
Tatarian maple	<i>Acer tataricum</i>	Europe	20-25			Is spreading from planted locations; Invasive in nearby states
Horsechestnut hybrids	<i>Aesculus hybrids</i>	Hybrid	30-35	45-55	?	
Common serviceberry	<i>Amelanchier arborea</i>	Native	<30	55		White flowers in late April; edible fruit in July
Allegheny serviceberry	<i>Amelanchier laevis</i>	Native	<30	50		White flowers in late April; tasty fruit in July
European hornbeam	<i>Carpinus betulus</i>	Europe	30-40	72		
American hornbeam	<i>Carpinus caroliniana</i>	Native	30+	37		Smooth, gray bark
Eastern redbud	<i>Cercis canadensis</i>	Native	25	45	?	Purple-pink spring flowers and heart-shaped leaves
Chinese Fringetree	<i>Chionanthus retusus</i>	NE Asia	15-25	17	?	Weak wood, bushy habit
Flowering dogwood	<i>Cornus florida</i>	Native	30	47	?	Showy white flowers in mid-May; (may be listed as <i>Benthamidia florida</i>)
Dogwood hybrids	<i>Cornus hybrids</i>					Dogwood hybrids

Common name	Scientific name ³	Origin ⁴	Height (ft) ⁵		Not for Urban Sites	Notes
			Typical	CT max		
Kousa dogwood	<i>Cornus kousa</i>	NE Asia	30	36		Showy white flowers in late May; (may be listed as <i>Benthamidia japonica</i>)
Cornelian cherry dogwood	<i>Cornus mas</i>	NE Asia	15-25	28		
Smokebush	<i>Cotinus coggygria</i>	Europe	15	20	?	
American smoketree	<i>Cotinus obovatus</i>	Native	30	51	?	
Hawthorn hybrids	<i>Crataegus</i> sp.	Native	25			All have some level of susceptibility to rust and a few have some resistance to leaf spot, some have thorns
Redvein Enkianthus	<i>Enkianthus campanulatus</i>	Japan	15		?	Bushy habit
Seven-son flower	<i>Heptacodium miconioides</i>	China	12	25		Fragrant, late summer flowers
American holly	<i>Ilex opaca</i>	Native	30+	47	X	
Long stalk holly	<i>Ilex pedunculosa</i>		15-20	26	X	
Eastern redcedar	<i>Juniperus virginiana</i>	Native	30+	64	X	Evergreen
Amur maackia	<i>Maackia amurensis</i>	NE Asia	30	41		Clusters of yellow flowers in July
Star magnolia	<i>Magnolia stellata</i>	Japan	20	40		Upright shrub with large white flowers
Sweetbay magnolia	<i>Magnolia virginiana</i>	Native	25	28		Creamy flowers have a sweet fragrance
Saucer magnolia	<i>Magnolia x soulangiana</i>	China	30	44		Large white or pink flowers early spring
Crabapples	<i>Malus</i> sp.	Mixed	25	55		Showy flowers in spring and persistent fruit
Hophornbeam	<i>Ostrya virginiana</i>	Native	30+	67		Rough bark
Sourwood	<i>Oxydendrum arboreum</i>	Native	25	87	?	Showy white flowers in July
Persian parrotia	<i>Parrotia persica</i>	SW Asia	20-40	28		Interesting mottled bark

Common name	Scientific name ³	Origin ⁴	Height (ft) ^{5,6}		Not for Urban Site	Notes
			Typical	CT max		
American red plum	<i>Prunus americana</i>	Native	20		?	
Cherry plum	<i>Prunus cerasifera</i>	NE Asia	25	29		White flowers in spring; purple leaved forms popular
Cherry hybrids	<i>Prunus hybrids</i>					
Sargent cherry	<i>Prunus sargentii</i>	Japan	35-40	42		
Japanese flowering cherry	<i>Prunus serrulata</i>	NE Asia	25	33		Pink early spring flowers; 'Kwanzan' a popular type
Higan cherry	<i>Prunus subhirtella</i>	Japan	30+	67		Pink spring flowers; weeping forms available
Bosc (common) pear	<i>Pyrus communis</i>	Europe	30	59	?	White spring flowers; fruit could be a problem
Pussy willow	<i>Salix discolor</i>	Native	30		?	Appreciated for its small, fuzzy early flowers
Japanese stewartia	<i>Stewartia peuedocamellia</i>	Japan	30	39		Large showy June flowers and colorful mottled bark
Japanese snowbell	<i>Styrax japonicus</i>	Japan	25	28		White bell shaped flowers in June
Japanese tree lilac	<i>Syringa reticulata</i>	Japan	25	51		Creamy flower clusters in June, very adaptable
English yew	<i>Taxus baccata</i>	Europe	30+	47	X	Evergreen
Arborvitae	<i>Thuja occidentalis</i>	Native	30	70	X	Good evergreen screen: susceptible to deer damage

³Common and scientific names from USDA Plants database (<http://plants.usda.gov>)

⁴Native refers to eastern North America

⁵Typical height from personal observation and Dirr (1998) Manual of woody landscape plants, 5th edition

⁶Maximum Connecticut height from database of Connecticut

Notable Tree Project

Selected shrubs suitable for planting near utilities

Connecticut State Vegetation Management Task Force

Glenn Dreyer¹ (Connecticut College)

Jeffrey Ward² (The Connecticut Agricultural Experiment Station)

Common name	Scientific name ³	Origin ⁴	Height (ft) ⁵	Root suckers ⁵	Notes
Canadian serviceberry	<i>Amelanchier canadensis</i>	Native	15	n	White flowers in late April; edible fruit in July
Red chokeberry	<i>Aronia arbutifolia</i>	Native	6	Yes	Good flowers and fall color (may be listed as <i>Photinia pyrifolia</i>),
Black chokeberry	<i>Aronia melanocarpa</i>	Native	6	Yes	Conspicuous white flowers, formerly (may be listed as <i>Photinia melanocarpa</i>)
Carolina allspice	<i>Calycanthus floridus</i>	Native	8	n	Fragrant flowers
Chinese fringetree	<i>Chionanthus retusus</i>	NE Asia	15	n	
White fringetree	<i>Chionanthus virginicus</i>	Native	20	n	Large clusters of white flowers in June
Japanese clethra	<i>Clethra barbinervis</i>	Japan	15	n	White flowers in summer, attractive bark
Alternate-leaved dogwood	<i>Cornus alternifolia</i>	Native	20	n	Large shrub with small clusters of creamy white flowers
Redosier dogwood	<i>Cornus sericea</i>	Native	10	Yes	Bright red stems maintained by cutting older stems
American hazelnut	<i>Corylus americana</i>	Native	12	n	Edible nuts are commercially cultivated
Redvein enkianthus	<i>Enkianthus campanulatus</i>	Japan	15		Great fall color follows midsummer flowers that attract bees
Chinese witchhazel	<i>Hamamelis mollis</i>	China	15	n	Flowers in early spring
Witchhazel	<i>Hamamelis virginiana</i>	Native	15	n	Small yellow flowers in October

Common name	Scientific name ³	Origin ⁴	Height (ft) ⁵	Root suckers ⁵	Notes
Rose-of-Sharon	<i>Hibiscus syriacus</i>	SW Asia	12	n	Summer flowers in various colors
Panicked hydrangea	<i>Hydrangea paniculata</i>	Asia	10	n	Needs constant pruning
Winterberry	<i>Ilex verticillata</i>	Native	10	n	Shrub with abundant red berries
Beach plum	<i>Prunus maritima</i>	Native	12	n	White flowers in spring; edible fruit
Winged sumac	<i>Rhus copallinum</i>	Native	15	Yes	Suckering shrub with brilliant red fall foliage
Smooth sumac	<i>Rhus glabra</i>	Native	15	Yes	Suckering shrub with brilliant red fall foliage
Arrowwood	<i>Viburnum dentatum</i>	Native	6	n	Small white flowers clusters in spring
Nannyberry	<i>Viburnum lentago</i>	Native	15	n	Creamy white flower clusters in June
Withe-rod	<i>Viburnum nudum</i> var. <i>cassinoides</i>	Native	12	n	Flower clusters in June, multi-colored fruit in fall
Blackhaw viburnum	<i>Viburnum prunifolium</i>	Native	12	n	Creamy white flower clusters in June
Cranberry viburnum	<i>Viburnum trilobum</i>	Native	6	n	Edible red fruit persists into winter

³Common and scientific names from USDA Plants database (<http://plants.usda.gov>)

⁴Native refers to eastern North America

⁵Typical height and root suckering from personal observation and Dirr (1998) Manual of woody landscape plants, 5th edition