

December 28, 2022

VIA HAND DELIVERY

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

Re: Docket No. 3B - The United Illuminating Company Amended Certificate of Environmental Compatibility and Public Need for replacement of a portion of the existing Derby – Shelton 115-kV electric transmission line facility. Reopening of this Certificate based on changed conditions pursuant to Connecticut General Statutes §4-181a(b)

Dear Ms. Bachman:

Condition 3 of the Connecticut Siting Council's October 27, 2022 Decision and Order provides that The United Illuminating Company ("UI" or the "Company") is to submit to the Council a Development and Management Plan ("D&M Plan") to be prepared in compliance with Sections 16-50j-60 through 16-50j-62 of the Regulations of Connecticut State Agencies. Among other things, the D&M Plan is to include a "review and consideration of double-circuit monopole configuration for Structure Nos. 17 and 18, including a cost estimate." While the D&M Plan for the project is being finalized, in response to Condition 3b, the Company submits the enclosed Review of Single Pole, Double-Circuit Monopole Configuration Structures 17 & 18 (the "Structure 17/18 Configuration") to the Council for its review. The Company is submitting the review to the Council in advance of the D&M Plan submission so any changes to the project design that may be ordered based on the Council's review of the Structure 17/18 Configuration can be included in the D&M Plan prior to submission to the Council.

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Melanie A. Bachman, Esq.  
December 28, 2022  
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An original and fifteen (15) copies of this filing will be hand delivered to the Council. Should you have any questions regarding this letter, please do not hesitate to contact me.

Very truly yours,



Bruce L. McDermott

Enclosure

cc: Mayor Richard Dziekan, City of Derby  
Mayor Mark Lauretti, City of Shelton  
Attorney General William Tong  
Senator Eric Berthel  
Senator Jorge Cabrera  
Representative Jason Perillo  
Representative Kara Rochelle

**The United Illuminating Company's  
Derby Junction to Ansonia 115-kV Transmission Line Rebuild Project  
Docket No. 3B – Petition to Reopen and Modify**

Review of Single Pole, Double-Circuit Monopole Configuration  
Structures 17 & 18

**December 28, 2022**

## **Preferred Design Structures 17 and 18 – Two Pole, Single Circuit Configuration**

### Description and Background

The preferred design submitted to the Siting Council in Docket 3B included the use of two poles, one for each circuit at locations 17 and 18 to support the replacement of the existing steel lattice towers in Ansonia (Maps 13 and 14 of 16).

This solution was selected mainly based on the construction sequence that was developed to work with the restrictive outage constraints (system requirement to maintain one energized circuit during construction) and constrained residential area that these lines traverse.

During detailed design of the Project the use of single pole, double circuit structures at locations 17 and 18 was considered, but not selected for the following reasons:

- Goal to minimize the use of temporary construction on the Project. During the preliminary analysis it was determined that temporary poles, guy wires, and conductor would be needed.
  - Utilization of guy wires at locations 17 and 18 was challenging due to the physical location of the existing conductors (i.e., 90 degree dead-end structures) and the physical constraints within the right of way such as distribution lines, proximity of existing lattice tower foundations to the proposed anchors, the driveway to the North side of existing tower 17 and the sidewalk just to the North of existing tower 18, etc.
- Goal to minimize construction steps, and therefore time, needed during outage windows as well as multiple mobilizations to these locations in residential areas.
- Maintenance of safe working clearances to the line which must remain energized during construction and removals.
- Location of the wires at locations 17 and 18 shift closer to adjacent private properties.

### Design and Construction Objectives – Preferred Design

- Maintain conductors' position, at rest, in the same location where they exist today.
- Under design conditions, ensure wire position does not cross over top of buildings (at rest or under wind conditions).
- Provide safe and efficient construction sequencing for the project (i.e., construction activities adjacent to energized conductor, minimize the need for temporary construction, minimize the number of construction steps and location mobilizations under each outage).
- Eliminate the need to reinforce existing lattice tower 20.
  - New pole and wire locations at STR 19 can accommodate the removal work at this location, so temporary wire from STR 19 to existing lattice tower 20 is not needed.

Proposed Construction Sequence-Preferred Design

With the need to maintain one energized circuit, dual structures were selected at locations 17 and 18 along with the following construction sequence. This allows for safe working clearances next to an energized line and efficient usage of the outage duration for activities along the entire project corridor<sup>1</sup>:

1. Initial 1560-3 Outage  
Install STR 17A and 19A foundations.
  
2. 1594 Outage
  - a. Install foundations for STR 17B, 18B, and 19B.
  - b. Remove existing 1594 wires from STR 14 to Ansonia substation.
  - c. Remove the lattice tower arms on 1594-line side of the existing lattice towers from STR 14 to STR 21.
  - d. Install new poles on 1594 line from STR 14 to STR 21.
  - e. Install new conductors and OPGW from STR 14 to 21 on 1594 side.
  - f. 1594 circuit energized between Indian Well and Ansonia.
  
3. Final 1560-3-line Outage
  - a. Install foundation for STR 18A. Remove existing conductors and lattice towers from STR 14 to 21.
  - b. Install poles for STR 17A, 18A, and 19A.
  - c. Install new conductors and OHSW from STR 14 to 21 on 1560-3 side.
  - d. 1560-3 circuit energized between Indian Well and Ansonia.

Preferred Design Cost Estimate

Transmission Line and Substation Costs (A)	STR 17 to 19 Costs <i>Two Pole Preferred Design</i> (B)	Overall Project Cost (A+B)
\$54.11M	\$3.09M	\$57.2M

Cost Estimate Assumptions:

- +50% / -25% grade estimate.
- Cost for the removal of lattice tower based on assumption of being in rural/easily accessible area and one line always energized.
- Cost estimate is inclusive of work required at STR 19 because of construction sequencing (i.e., pulling wire between dead-end structures).

Preferred Solution Assumptions

- Two poles at locations 17, 18, and 19.
- Minimize construction steps required for the project.

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<sup>1</sup> This sequencing is illustrative of only for the area pertaining to STR 17 to 19

- Minimize the need for temporary construction.
- Existing lattice tower 19 deficiencies do not allow for use of the existing structure in any temporary conductor configuration during construction. Therefore, temporary construction is required at this location.

## **Alternative Design Structures 17 and 18 – Single Pole, Double Circuit Configuration**

### Description and Background

An alternative configuration, which utilizes a single pole, double circuit configuration at structure locations 17 and 18 in Ansonia (Figure 1). Because of the structural deficiencies of existing lattice tower 19, and the reconfiguration of the wire location between 17 and 18 to accommodate the new single pole, double circuit configuration, additional temporary poles and construction steps are required at structure 19.

### Construction Sequence

With the single pole, double-circuit configuration at structures 17 and 18, the construction sequence would be more complex, requiring additional temporary construction installations at structure 19 as well as an increase in overall construction steps, and number of mobilizations to structure locations 16, 17, 18, 19, and 20 during construction. Below is a conceptual outline of the anticipated construction sequencing for this alternative configuration<sup>2</sup>:

1. Initial 1560-3 Outage
  - a. Install foundations for permanent STR 17, 18, and 19A.
  - b. Erect the permanent double circuit, single monopole structures at STR 17 and 18 with davit arms installed only on 1560-3 side and permanent single circuit monopole STR 19A.
  - c. Install temporary poles (assumed 2 standard wood poles and 1 standard Light Duty steel pole) to by-pass conductors around existing lattice tower 19.
  - d. Remove existing conductors and lattice tower cross-arms on existing lattice towers 17, 18, and 19, 1560-3 side.
  - e. Reinforce existing lattice tower 20 to accommodate temporary conductor.
  - f. Install temporary conductor between existing lattice tower 16 through new STR 19A and temporary poles 19T-1, 19T-2, and 19T-3 to loop around the existing lattice tower 19, continue to existing lattice tower STR 20 on 1560-3 side.<sup>3</sup>
  
2. Initial 1594 Outage
  - a. Pour foundations for permanent poles at STR 14, 15, 16, 19B, 20, and 21 locations.
  - b. Erect the permanent poles STR 14, 15, 16, 19B, 20, and 21 with davit arms installed only on 1594 side except at STR 19B which will not require davit arms.
  - c. Install davit arms on 1594 side at already installed new STR 17 and 18.
  - d. Remove the existing 4/0 conductor on 1594 side from existing lattice tower 14 to Ansonia substation.
  - e. Remove the existing lattice crossarms on 1594 side at STR 14, 15, 16, 20, and 21.
  - f. Remove the existing lattice towers at 17, 18, and 19 locations.
  - g. Install permanent conductor and OPGW on 1594 side between new STR 14 to Ansonia substation.
  - h. New wire installation complete and circuit 1594 energized between STR 14 and Ansonia substation.

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<sup>2</sup> Sequencing is illustrative of only the area pertaining to STR 17 to 19 to emphasize the differences between the preferred and alternative option.

<sup>3</sup> Wrap around required because of structural deficiencies and to allow for sufficient working clearance around existing lattice structure 19.

3. Final 1560-3-line Outage
  - a. Remove the existing 4/0 conductor and temporary conductors on 1560-3 side from existing lattice tower 14 to Ansonia substation.
  - b. Remove lattice towers at 14, 15, 16, 20, and 21 locations.
  - c. Remove temporary configuration around 19 location.
  - d. Install davit arms on 1560-3 side at already installed new STR 14, 15, 16, 20, and 21 locations.
  - e. Install permanent conductor on 1560-3 side from new STR 14 to Ansonia substation along with OHSW over 1560-3 circuit.
  - f. New wire installation complete and circuit 1560-3 energized between STR 14 and Ansonia substation.

Alternative Solution Cost Estimate

Transmission Line and Substation Costs (A)	STR 17 to 19 Costs <i>One Pole Alternative Design</i> (B)	Overall Project Cost (A+B)
\$54.11M	\$3.54M	\$57.7M

Cost Estimate Assumptions:

- Cost estimate for the reconfigured section between STR 17 and 19 is +200%/-50%.
- This estimate is based on a conceptual 10% design for the reconfigured section.
- Cost for the removal of lattice tower based on assumption of being in rural/easily accessible area and one line always energized.
- Cost estimate is inclusive of additional temporary work/easement required at STR 19
- Additional 0.2 acres of temporary easement is required.
- Cost estimate is inclusive of additional temporary wire and reinforcement needed at existing lattice tower 20.

Alternative Solution Assumptions

- Because of higher bending moments at STR 17 and 18 due to double circuit single monopole configuration, larger diameter drilled shaft foundations will likely be required at these two locations.
- Design of the alternative solution is based on conceptual 10% design.
- Slight encroachment of STR 18 foundation into sidewalk is acceptable by the City of Ansonia.
- Proposed wire shift to the North towards Nolan football fields is acceptable by the City of Ansonia.
- Chances of having additional environmental impacts because of the monopole configuration is minimal when compared with 2-pole configuration at STR 17 and 18.
- Acquire additional temporary easement to accommodate the temporary construction around existing lattice tower 19.



- Existing lattice tower 20 will need reinforcement to accommodate temporary wire between temporary structure 19 and lattice tower 20.
  - This is required to allow for working clearances at location 19.
- Additional temporary construction at location 19 to accommodate the change in wire configuration/location at structure 18.
- Temporary wire needed from STR 16 to 17 to accommodate construction sequence.

## Summary/Evaluation of the Preferred and Alternative Designs

1. Potential impacts to schedule:
  - One pole design, fabrication, and delivery to site dependent on when alternative pole designs can be released to the steel pole manufacturer, and if a manufacturing slot is available to fabricate the new design.
  - Additional engineering time required to fully design, model and finalize alternative proposal.
2. Based on conceptual design, the assumed temporary poles required around structure 19 included (1) 100ft light duty, direct embed steel pole, 88ft exposed above the ground line and (2) 90ft wood poles, 79ft exposed above the ground line.
3. Construction Sequence Impacts

Structure	Estimated # Mobilizations - two pole Design*	Estimated # Mobilizations - single pole Design*
16	2	3
17	4	7
18	4	7
19	4	7
20	2	4

\* Please note that the above mobilizations are only based on major construction activities and do not necessarily include the mobilization for minor activities such as surveying, environmental monitoring, etc. nor the timeframe/total duration of the construction activities.

4. Encroachment of STR 18 foundation by about 6 to 9 inches into the sidewalk.
5. Visual Impacts

Structure	Preferred Design		Alternative Design	
	Number of Permanent Structures	Permanent Structure Height	Number of Permanent Structures	Permanent Structure Height
17	2	105	1	105
18	2	115	1	115
19	2	105	2	105

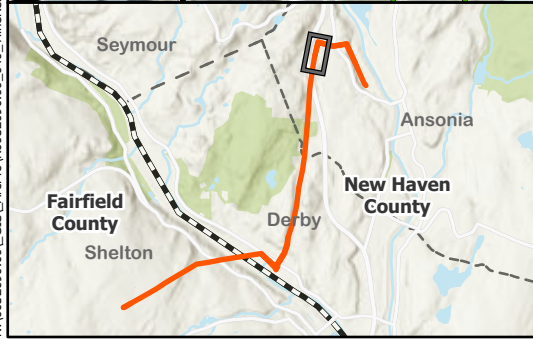
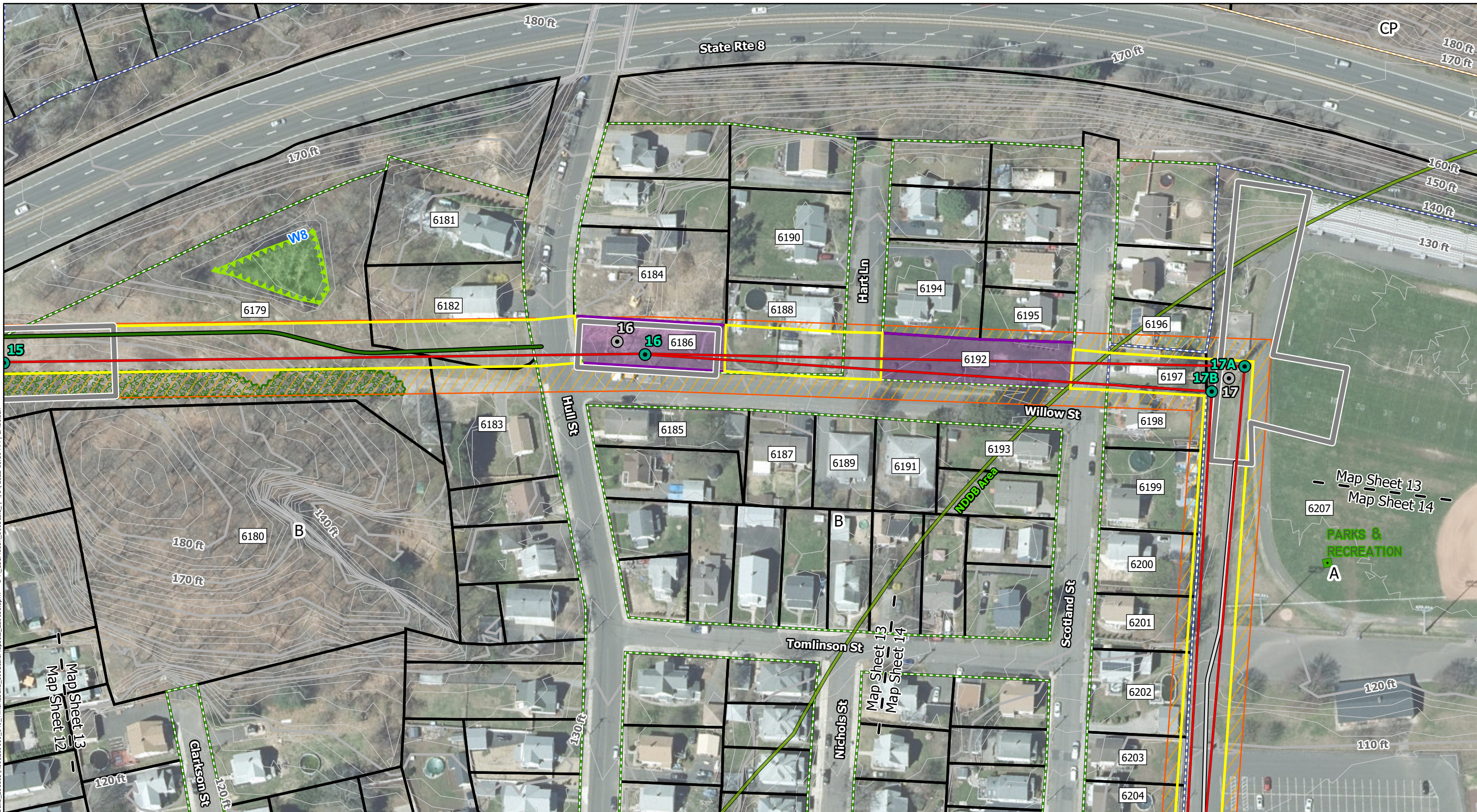
### Summary of Cost Estimate: Preferred Solution vs Alternative Solution

<b>Cost Adjustment to Overall Project</b>
+\$450,000*

\*Conceptual grade estimate (-50%/+200% accuracy), 10% Engineer Design

**Maps 13 and 14**

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Map Legend			
	Proposed Structure		Proposed Temporary Access Road
	Existing Structure To Be Removed		Proposed Temporary Work Pad
	Proposed Centerline of Rebuilt 115-kV Line		Municipal Boundary
	Existing ROW		County Boundary
	Proposed Additional ROW		Tree Clearing Area
	Existing Access Road to Improve		Delineated Wetland
			Natural Diversity Database Area
			Park/Recreation Area
			10ft Contour
			2ft Contour
			Parcel Boundary
			UI Owned Property
		<b>Ansonia Zoning</b>	
			A
			B
			CP

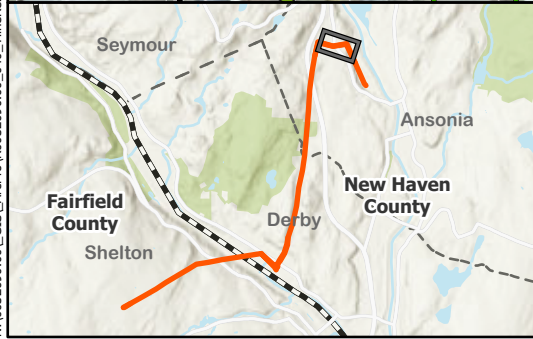
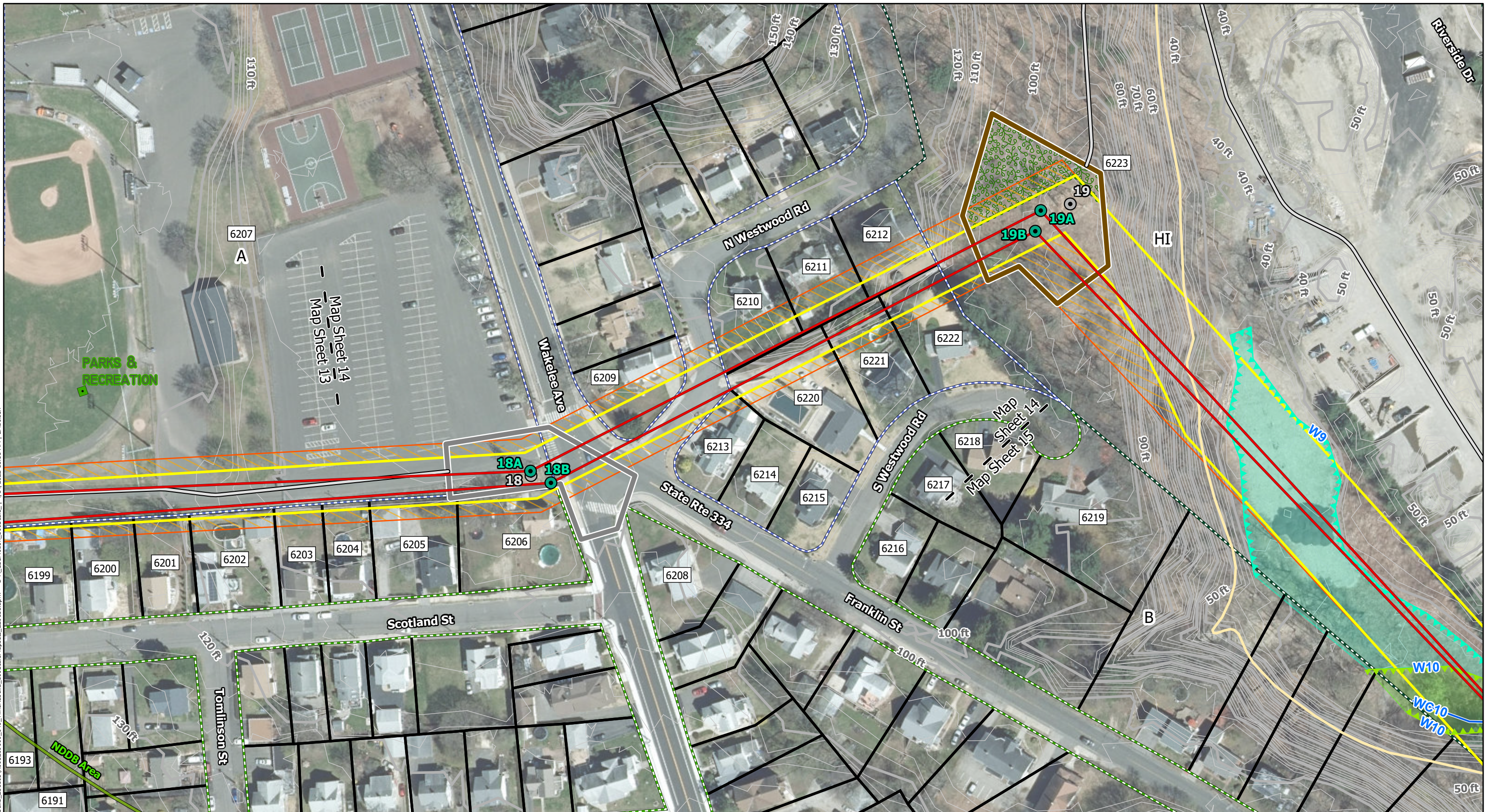
**Derby Junction to Ansonia 115-kV Transmission Line Rebuild Project**  
 CITIES OF SHELTON, DERBY, AND ANSONIA  
 Proposed Route

Coordinate System:  
 NAD 1983 StatePlane Connecticut FIPS 0600 Feet

1" = 100ft  
 Revised: 2022-04-14

Map 13 of 16

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Map Legend			
	Proposed Structure		Proposed Permanent Work Pad
	Existing Structure To Be Removed		Municipal Boundary
	Proposed Centerline of Rebuilt 115-kV Line		County Boundary
	Existing ROW		Tree Clearing Area
	Proposed Additional ROW		Delineated Stream
	Existing Access Road to Improve		CT Wetland (Soils Only)
	Proposed Temporary Work Pad		Delineated Wetland
			FEMA Floodway
			FEMA 500-Year Floodplain
		<b>Ansonia Zoning</b>	
			A
			B
			HI
			Natural Diversity Database Area
			Park/Recreation Area
			10ft Contour
			2ft Contour
			Parcel Boundary

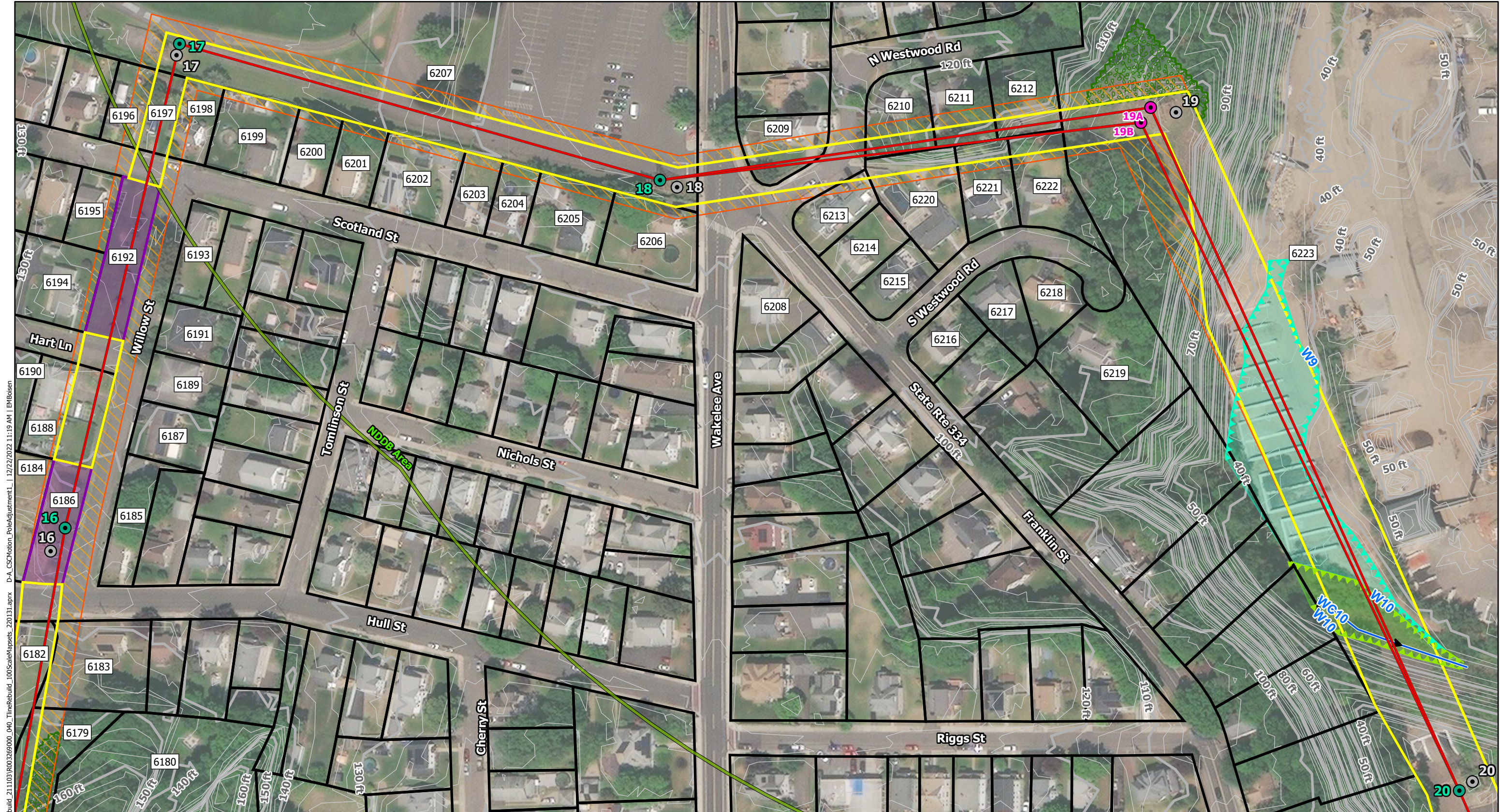
**Derby Junction to Ansonia 115-kV Transmission Line Rebuild Project**  
 CITIES OF SHELTON, DERBY, AND ANSONIA  
 Proposed Route

Coordinate System:  
 NAD 1983 StatePlane Connecticut FIPS 0600 Feet

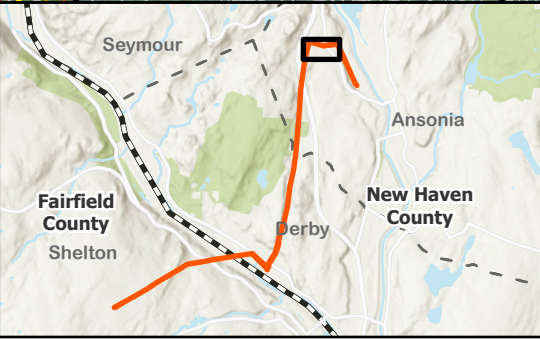
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 1" = 100ft  
 Revised: 2022-04-14

Map 14 of 16

**Figures 1 and 2**



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Map Legend			
	Proposed Double Circuit Structure		Proposed Centerline of Rebuilt 115kV Line
	Proposed Single Circuit Structure		Existing ROW
	Existing Structure To Be Removed		Proposed Additional ROW
	Delineated Wetland		Natural Diversity Database Area
	Natural Diversity Database Area		10ft Contour
	Natural Diversity Database Area		2ft Contour
	Natural Diversity Database Area		Parcel Boundary
	Natural Diversity Database Area		UI Owned Property
	Natural Diversity Database Area		Tree Clearing Area
	Delineated Stream		CT Wetland (Soils Only)

**Derby Junction to Ansonia 115-kV Transmission Line Rebuild Project**  
 Docket No. 3B - Petition to Reopen and Modify  
 Alternative Design Structures 17 and 18 - Single Pole, Double Circuit Configuration

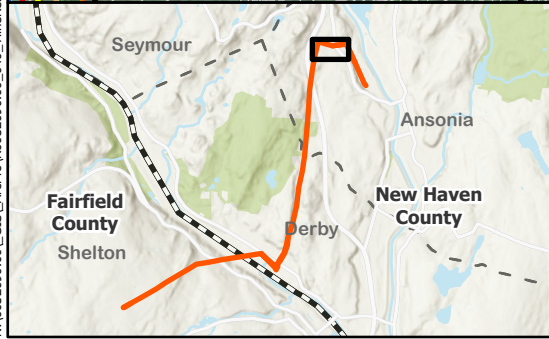
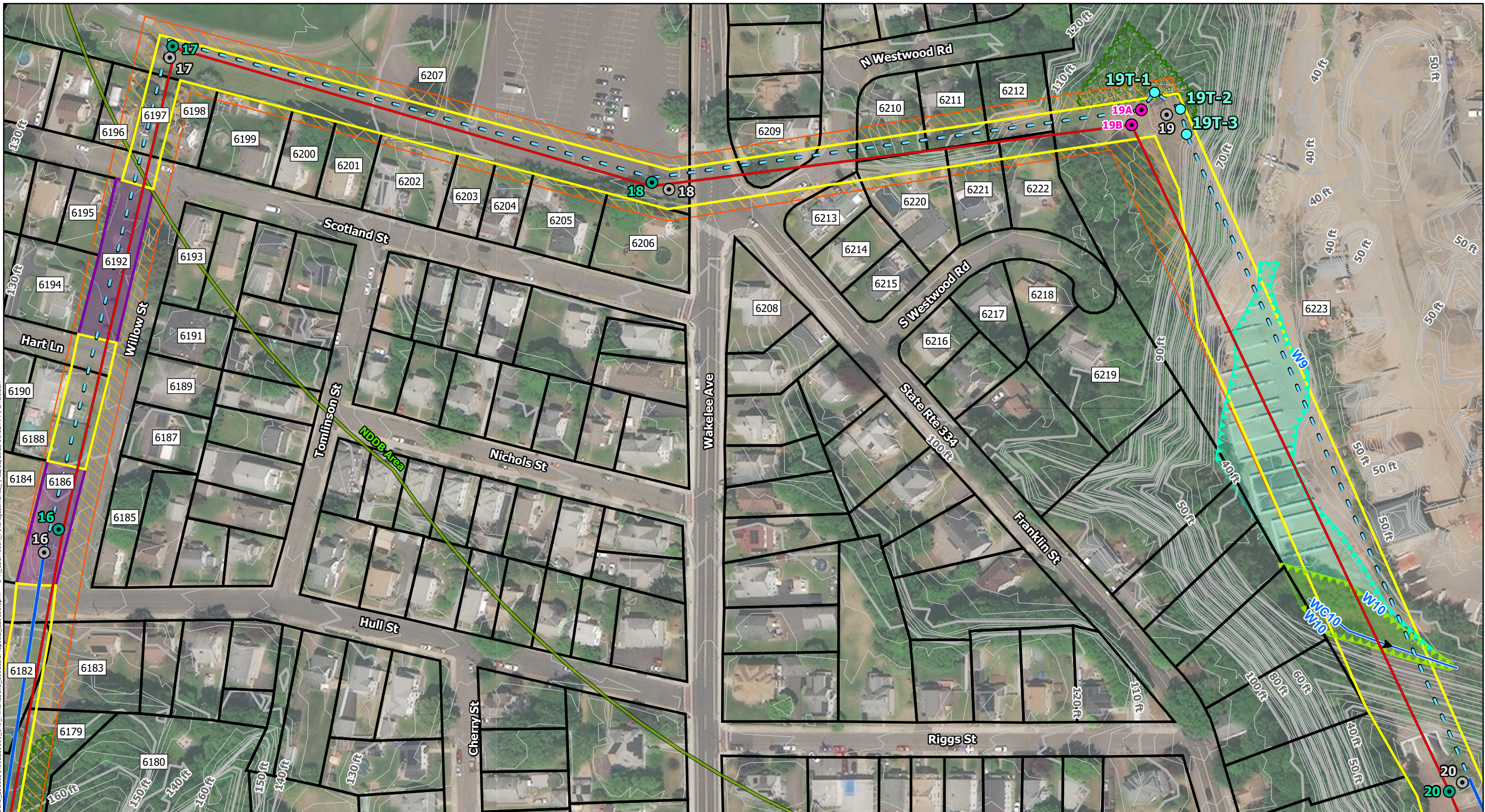
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0 120 Feet  
 1" = 120'

Revised: 2022-12-22

Figure 1

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Map Legend	
	Proposed Double Circuit Structure
	Proposed Single Circuit Structure
	Temporary Single Circuit Structure
	Existing Structure To Be Removed
	Proposed Alignment of Rebuilt 115kV Circuit 1594
	Proposed Alignment of Temporary 115kV Circuit 1560-3
	Approximate Alignment of Existing 115kV Circuit 1560-3
	Existing ROW
	Proposed Additional ROW
	Tree Clearing Area
	Delineated Stream
	CT Wetland (Soils Only)
	Delineated Wetland
	Natural Diversity Database Area
	10ft Contour
	2ft Contour
	Parcel Boundary
	UI Owned Property

**Derby Junction to Ansonia 115-kV Transmission Line Rebuild Project**  
 CITIES OF SHELTON, DERBY, AND ANSONIA  
 Alternative Design Structures 17 and 18 - Single Pole, Double Circuit Temporary Configuration During Construction

Coordinate System:  
 NAD 1983 StatePlane Connecticut FIPS 0600 Feet

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 1" = 120'

Revised: 2022-12-22

Figure 2