

New Hampshire Wood Structure Replacements & OPGW Installations

Planning Advisory Committee Meeting

May 18th, 2023

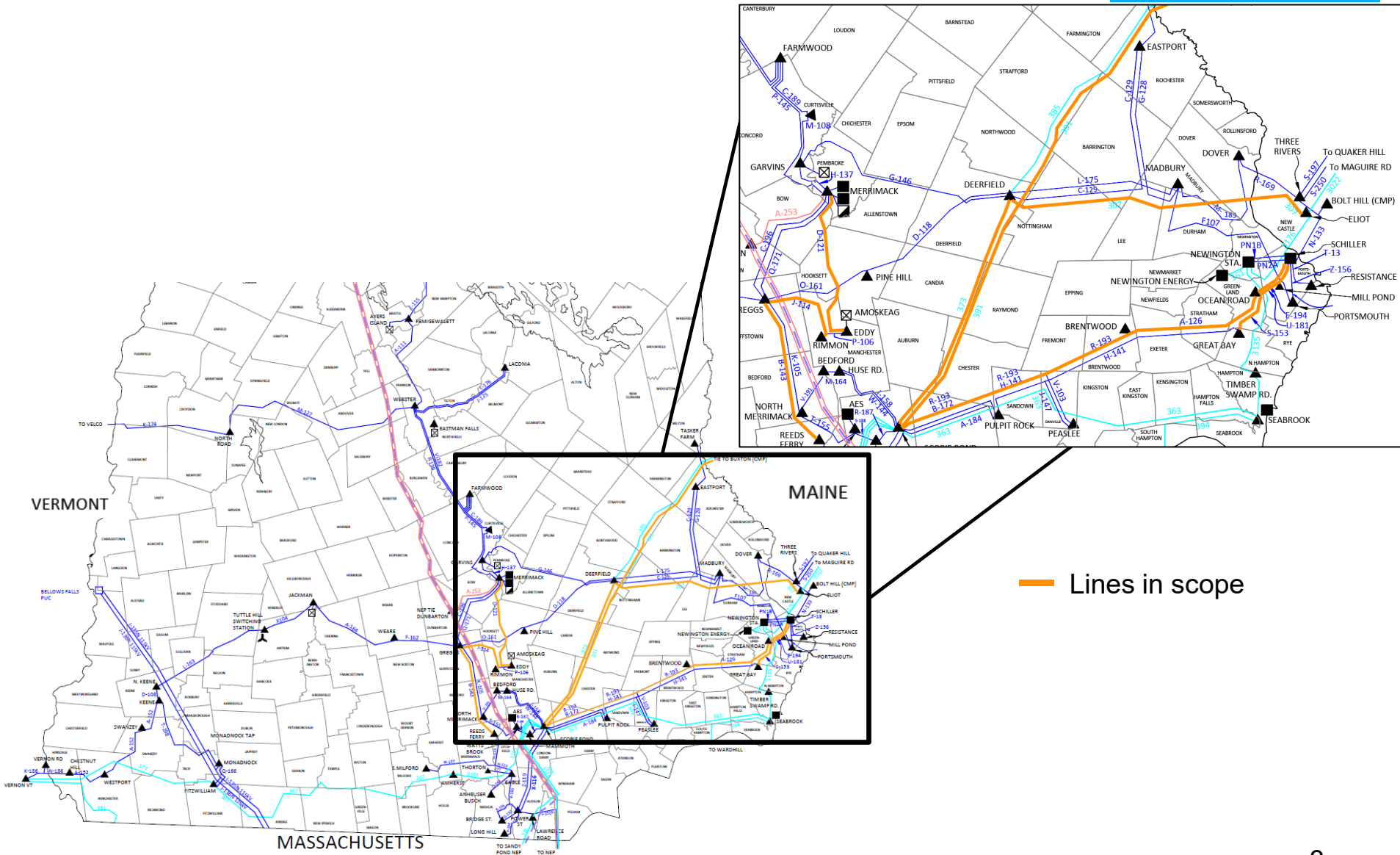
Agenda

- Project Background
- Project Locations
- Project Drivers
 - Wood Structure Asset Condition
 - Optical Ground Wire (OPGW)
- Project Scope
 - Structure Replacements
 - OPGW
- Project Summary

Project Background

- Eversource manages ~4,000 circuit miles of overhead transmission lines
 - Nearly 40% of all transmission in New England
- Eversource takes a proactive approach to maintain long-term structural integrity and continued reliability of its transmission infrastructure through regular inspections (walkdown ground inspections, structure ground line, flyovers, etc.)
 - Recent inspections show significant signs of degradation on wood poles
- Structures targeted for replacement as part of these projects are natural wood, with the exception of two laminated wood structures, one on Line E194 and one on Line J114
 - Other supporting structures on these lines were inspected and do not require any further work
- This presentation covers wood structure and shield wire replacements on Eversource 115 kV and 345 kV lines in New Hampshire

Project Locations



Project Drivers – Wood Structure

Asset Condition

- Recently completed inspections of these lines graded condition of all structures in accordance with Electric Power Research Institute (EPRI) guidelines:
 - *A: Nominal Defect – No Action Required*
 - *B: Minimal Defect – Monitor Degradation*
 - *C: Moderate Defect – Repair or Replace under next maintenance*
 - *D: Severe Defect – Repair, Reinforce, or Replace immediately*
- Grade C round wood structures showed one or more of the following age-related degradations, leading to decreased load carrying capability:
 - Woodpecker damage
 - Pole top rot
 - Cracking & splitting
 - Damaged insulators & deteriorated steel hardware
- Additional Grade B structures were identified and prioritized for replacement based on identified efficiencies in required acquiring permits and other approvals for replacing Grade C structures, as well as minimizing environmental impacts
- Of the structures being replaced, 27% are Grade C and the remaining are Grade B
- If not addressed, these issues jeopardize the long-term integrity of the transmission system and its continued reliability

Project Drivers – Wood Structure Asset Condition (Cont'd)



Line S153 Structure 103



Line 391 Structure 114



Line U181 Structure 52



Line J114 Structure 22

Pole splitting

Woodpecker Damage & Pole Splitting

Project Drivers – Wood Structure Asset Condition (Cont'd)



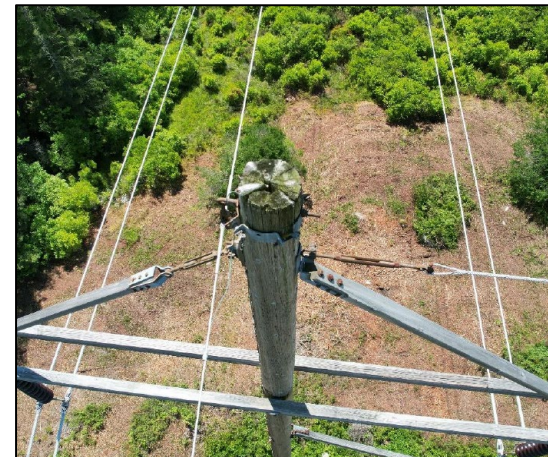
Line 373 Structure 216



Line E194 Structure 42



Line 391 Structure 114



Line 307 Structure 131 –
center hole is missing

Top Rot & Top Splits

Project Drivers – Wood Structure Asset Condition (Cont'd)



Line A126 Structure
192 – checking down
pole affecting hardware



Line D121 Structure 80
– warped pole



Line J114
Structure 5 –
broken pole top,
excessive rust on
insulators, &
splits



Line R193 Structure
261 – local buckling

Other Asset Condition Issues

Project Drivers – Optical Ground Wire

- Optical Ground Wire (OPGW) will be installed on Lines 307, B143, & J114 in conjunction with structure replacements
 - Eversource requires additional fiber capacity on Line J114
 - Spans of shield wire on Line J114 are over 60 years old
 - Additional structures were identified for replacement due to structural loading concerns and uplift that will result from OPGW installation
- OPGW installation expands a private Eversource OPGW / Synchronous Optical Networking (SONET) loop
 - Provides a controlled, alternate fiber communication path supporting the long-term buildout of the fiber optic network
 - Greatly reduces the reliance on leased services for protection, SCADA, and Phasor Measurement Unit (PMU) and Dynamic Disturbance Recorder (DDR) installations (ISO-NE OP-22)
 - A private network is segregated from third-party telecom services, improving the overall reliability and security of communications paths

Project Drivers – Optical Ground Wire (Cont'd)

- Critical Infrastructure Protection: Fiber provides the necessary bandwidth for physical security monitoring and triaging of alarms for BES Cyber Systems at medium and low impact substations
- The DOE and EPRI recommend fiber as a means to strengthen the security and resilience of critical communication infrastructure to protect against the consequences of electromagnetic pulse attacks
- Fiber optic cable is a non-propagating media for electric and magnetic fields and therefore is considered generally immune to the effects of geomagnetic disturbances

Project Scope – Structure Replacements

Line	kV	Length (miles)	Replacement Structures	Total Structures	Estimated Cost (-25% / +50%)	In-Service Date
391	345	37.30	39	335	\$12.37M	Q4 2023
373	345	18.50	34	178	\$10.28M	Q4 2023
R193	115	14.79	30	177	\$7.70M	Q4 2023
S153	115	4.62	16	51	\$5.00M	Q4 2023
A126	115	15.28	35	182	\$8.37M	Q4 2023
E194	115	5.50	21	70	\$8.67M	Q4 2023
U181	115	5.50	24	67	\$8.51M	Q4 2023
D121	115	11.31	18	154	\$5.00M	Q4 2023
Totals		112.80	217	1,214	\$65.90M	-

Project Scope – OPGW and Structure Replacements

Line	kV	Length (miles)	Replacement Structures	Total Structures	OPGW Replacement Length (miles)	Estimated Cost (-25% / +50%)	In-Service Date
307	345	19.24	15	146	19.24	\$9.42M	Q4 2023
B143	115	11.10	46*	154	22.20	\$17.28M	Q1 2024
J114	115	3.80	32	49	7.60	\$9.71M	Q4 2023
Totals		34.14	93	349	49.04	\$36.41M	-

*Project also includes the removal of one structure

ADSS Scope

- Spans of ADSS will be utilized to tie OPGW into substations

Alumoweld Shield Wire Replacement Scope

- Line 307: Replace one of two shield wires with 96F OPGW (the second shield wire is currently 64F OPGW)
- Line B143: Replace two static wires with two 11.1-mile segments of 144F OPGW and 48F OPGW
- Line J114: Replace two 3.8-mile segments of shield wire with 144F OPGW and 48F OPGW

Summary

- Inspections have indicated significant degradation of several wood structures along the lines identified in this presentation, as well as loading and uplift concerns due to OPGW installation
- Replace 310 existing wood structures with similar light duty weathering steel structures
 - New structures will provide a much greater life expectancy and a higher storm resiliency than wood
 - Supports long-term integrity and reliability of the Eversource transmission system
 - Replacement structures will be designed to meet current design criteria
- Replace 49.04 circuit miles of existing shield wire with OPGW on Lines 307, B143 & J114

Total Estimated PTF Costs: \$102.31M (-25% / +50%)

Questions

