

# Hurd State Park Corridor Rebuild

Planning Advisory Committee Meeting

January 18, 2024

# Agenda

- Project Background
- Project Location
- Project Needs
- Solution Alternatives
- Preferred Solution
- Right-of-Way Rebuild Benefits
- Project Summary
- Feedback & Next Steps

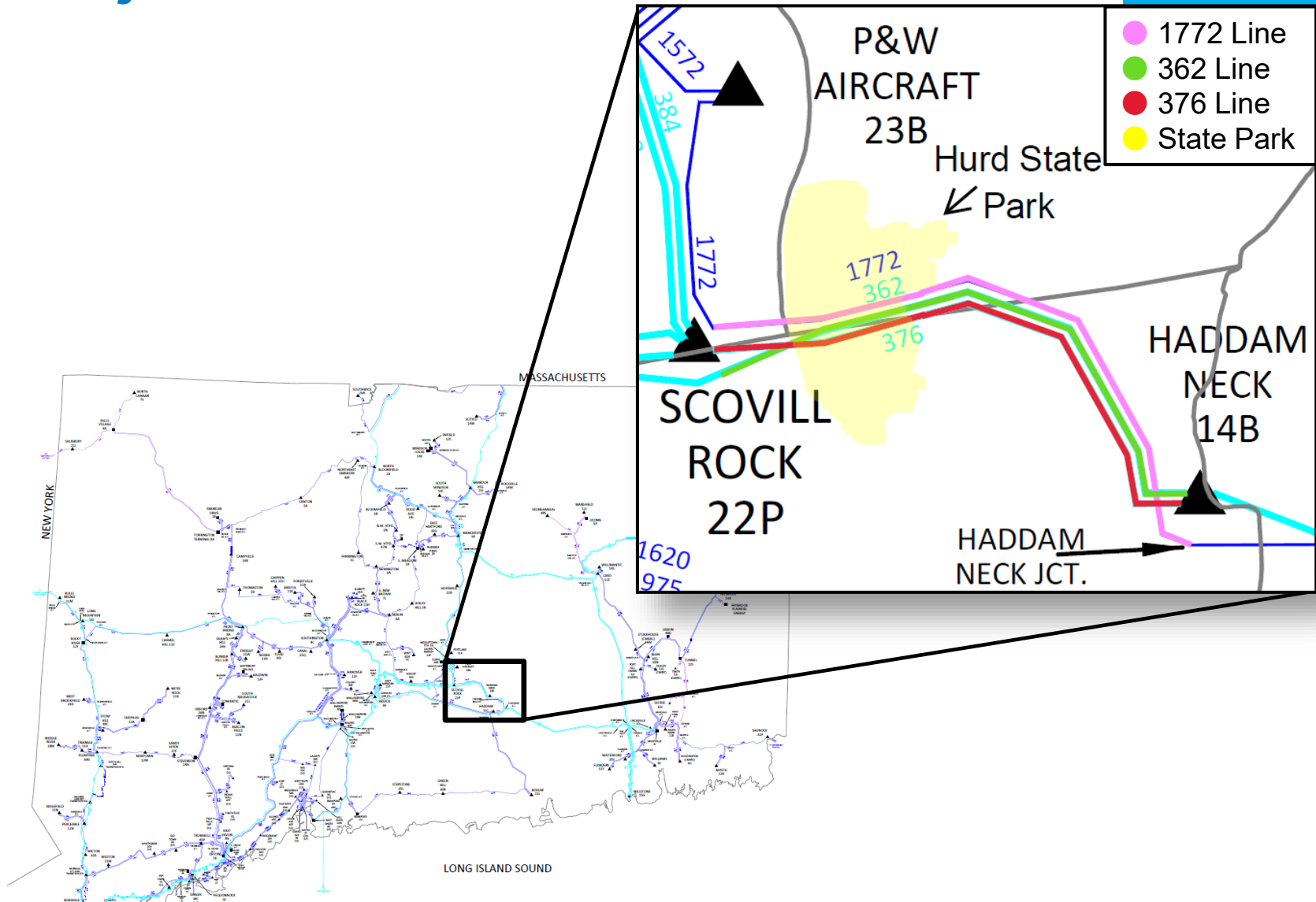
# Project Background

- Eversource manages ~4,400 circuit miles of transmission lines and ~58,000 miles of distribution lines in Connecticut, Massachusetts, and New Hampshire
- 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.)
- Lines within this project scope are in Connecticut
- This presentation will cover a rebuild of transmission lines within Hurd State Park and an expanded scope of work for spans east of the Park
  - Coordinated with work previously presented to PAC in 2022 & 2023

# Project Background (Cont'd)

- 345 kV Line 362 runs between Beseck substation in Wallingford, CT and Haddam Neck substation in Haddam, CT
  - Originally constructed in 1967 (56 years old)
  - Length: 18.24 miles
  - Structures: 140 structures; combination of steel lattice, steel monopole and natural wood
  - Conductor: Mix of bundled 954 ACSR, 1590 ACSR, and 1192 ACSR
  - Shield wire: Mix of 3/8" Alumoweld and 19#10 Alumoweld
  
- 345 kV Line 376 runs between Scovill Rock substation in Middletown, CT and Haddam Neck substation in Haddam, CT
  - Originally constructed in 1966 (57 years old)
  - Length: 5.21 miles
  - Structures: 33 structure; combination of steel lattice and steel monopole
  - Conductor: Mix of bundled 954 ACSR and 1192 ACSR
  - Shield wire: Dual 3/8" Alumoweld
  
- 115 kV Line 1772 runs between Pratt and Whitney substation in Middletown, CT and Haddam substation in Haddam, CT
  - Originally constructed in 1965 (58 years old)
  - Length: 12.42 miles
  - Structures: 95 structures; combination of steel lattice, steel monopole, and natural wood
  - Conductor: Mix of 1272 ACSR and 1192 ACSR
  - Shield wire: Mix of 3/8" Alumoweld and OPGW

# Project Locations



# Project Needs

- Recently completed inspections of these lines graded condition of structures in accordance with Electric Power Research Institute (EPRI) guidelines:
  - *A: Nominal Defect, B: Minimal Defect, C: Moderate Defect, D: Severe Defect*
  - Grade C structures showed one or more of the following age-related degradations, leading to decreased load carrying capability
    - Lattice Structures: foundation damage, rusted hardware, and rusted members
    - Wood Structure: woodpecker damage, split pole top, cracks along structure
- Conventional line inspection methods cannot be used to assess the full extent of deterioration of lattice structures and, therefore, cannot be used to accurately estimate the remaining strength of the structure
  - Lattice structures being targeted for replacement are between 56-58 years old, typical industry accepted life expectancy is 60 years
  - Not designed to current National Electrical Safety Code (NESC) standards

Line	Total Structures	Structures in Scope Area	Structures Targeting Replacement		
			Total	Priority C	Priority B
362	140	16	16	1	15
376	33	15	14	3	11
1772	95	16	4	0	4

# Project Needs

- Connecticut River Circuit Separation
  - The current crossing of the Connecticut River takes place on 2 triple circuit steel pole structures constructed in 1983
  - This configuration poses a unique risk to the 3 transmission lines; a failure on these structures would likely result in all 3 lines being taken out of service
  - The 362, 376, 1772 lines use 1192 ACSR conductor for the spans crossing the Connecticut River
    - This conductor is custom-made and no longer readily available
    - On a similar river crossing span on the 1772 and 348 lines where the 1192 ACSR was utilized, damage caused by vibration was observed in 2020
  - Separating the lines onto 3 independent crossing structures with Eversource standard fiber and conductor increases system reliability by reducing the impact if one of the existing triple circuit structures were to be compromised

# Project Needs – OPGW

- 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
- 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
- The installation of fiber on these lines will complete the fiber path from Haddam Neck substation and Scovill Rock substation, resulting in additional usable fibers along this path



# Project Needs – Photos



Structure 19095 – Foundation damage



Structure 12066 – Foundation Damage



# Project Needs – Photos



Structure 12054 – Rust on Hardware and Members

# Solution Alternatives – Hurd State Park

- Alternative 1: Replacement of C-rated structures and replacement of existing shield wire with OPGW
  - Pros
    - Moderate cost
    - Addresses the need for fiber telecommunications in corridor
  - Cons
    - Does not take advantage of available efficiencies available to a holistic approach
      - Additional projects will be needed in future as asset condition issues are identified
      - Existing conductor does not meet current Eversource design standards
  - Total estimated PTF cost: **\$10.1M** (-50/ +200%)
- Alternative 2: Full rebuild of right-of-way section with underground river crossing
  - Pros
    - Addressed deteriorating lattice towers on river crossing and removes 3 circuits from shared structures, reducing impact of tower loss
  - Cons
    - Highest cost
    - Increased siting challenge
  - Total estimated PTF cost: **\$121.2M** (-50/ +200%)

# Preferred Solution – Hurd State Park

- Alternative 3 (**Preferred Solution**): Full rebuild of right-of-way section with overhead river crossing
  - Line 362
    - Replace 14 single circuit lattice towers with combination of 14 single circuit H-frame structures and three pole structures
    - Replace 2 triple circuit steel structures with 2 single circuit steel monopoles
    - Replace 2 existing 2.5 mi runs of 3/8" Alumoweld shield wire with 2 runs of OPGW
    - Replace existing 2.3 mi of 954 45/7 ACSR and 1192 30/19 ACSR with bundled 1590 ACSS conductor
  - Line 376
    - Replace 14 single circuit lattice towers with combination of 14 single circuit H-frame structures and three pole structures
    - Install 2 new single circuit steel monopole structures
    - Replace 2 existing 2.5 mi runs of 3/8" Alumoweld shield wire with 2 runs of OPGW
    - Replace existing 2.3 mi of bundled 954 45/7 ACSR and bundled 1192 30/19 ACSR with bundled 1590 ACSS conductor
  - Line 1772
    - Replace 3 single circuit lattice towers and 1 single circuit wood structure with combination of 4 single circuit H-frame structures
    - Install 2 new single circuit steel monopoles
    - Replace 1 existing 2.5 mi run of 3/8" Alumoweld shield wire with 1 run of OPGW & transfer existing 2.5 mi run of OPGW to new structures
    - Replace existing 2.3 mi of bundled 1272 45/7 ACSR and 1192 30/19 ACSR with bundled 1590 ACSS conductor
  - Total estimated PTF cost: **\$43.6M** (-25/ +50%)

## Scope Expansion – East of Hurd to Haddam Neck

- Projects were previously presented targeting asset condition structure replacements and OPGW installation between Hurd State Park and Haddam Neck substation
  - [September 21, 2022](#), ACR and OPGW on 1772 line between Pratt & Whitney and Haddam Neck
  - [November 15<sup>th</sup>, 2022](#), ACR and OPGW on 362 line between Beseck and Haddam Neck
  - [March 16<sup>th</sup>, 2023](#), ACR and OPGW on 376 line between Scovill Rock and Haddam Neck
- Structure replacements create opportunity to also replace aging conductor on these line spans with minimized additional impact
  - Current conductors are over 50 years old
  - No additional structure replacements required
  - Mitigates long-term / multiple disruptions to abutters by coordinating efforts with other ongoing project work in the same transmission corridor
  - Maximize efficiencies by coordinating engineering, permitting, access and construction management
  - Will bring lines up to current design standards
- Additional Scope - Reconductoring
  - Line 362
    - Replace existing 2.4 mi of 954 45/7 ACSR with bundled 1590 ACSS conductor
  - Line 376
    - Replace existing 2.3 mi of bundled 954 45/7 ACSR and bundled 1192 30/19 ACSR with bundled 1590 ACSS conductor
  - Line 1772
    - Replace existing 2.3 mi of bundled 1272 45/7 ACSR and 1192 30/19 ACSR with bundled 1590 ACSS conductor
  - Total estimated PTF cost: **\$13.3M** (-25/ +50%)

# Right-of-Way Rebuild Benefits

- A holistic approach to asset condition issues within and adjacent to Hurd State Park facilitates savings in long-term cost, siting, permitting and mitigates environmental impacts of working on protected state land
  - Replacing aging lattice structures, shield wire and conductor with current Eversource-standard equipment provides efficiencies in ordering materials and project execution
  - Takes a proactive approach to system reliability by addressing additional asset condition issues that will arise in the near future
  - Rebuilding lines at the river crossing onto 3 independent crossing structures with 3 fiber paths and upgraded conductor sizes aligns with current Eversource design standards and increase system reliability by reducing the impacts if one of the triple circuit structures were to be compromised
- Siting and outreach for projects within protected areas such as state parks and river crossings have additional complexities and requires extra care to perform safely and with minimal environmental impact
  - A holistic approach avoids repeated disturbances to highly sensitive environmental resources in the area

# Summary

- Lines 362, 376, 1772 Hurd State Park Rebuild
  - Replace 33 lattice towers and 1 wood structure with a combination of single circuit H-frame structures, single circuit three pole structures, and steel monopoles
    - Separates lines onto 3 independent crossing structures
  - Install 4 new single circuit steel monopoles
  - Replace 12.5 of Alumoweld shield wire with OPGW
  - Replace 6.9 circuit miles of conductor
  - Total estimated PTF cost: **\$43.6M** (-25/ +50%)
  - In-service date: **Q4 2024**
  
- Lines 362, 376, 1772 reconductoring East of Hurd State Park to Haddam Neck
  - Replace 7 circuit miles of conductor
  - Total estimated PTF cost: **\$13.3M** (-25/ +50%)
  - In-service date: **Q2 2025**

# Feedback and Next Steps

- Please submit any written comments on these projects to:
  - [robin.lafayette@eversource.com](mailto:robin.lafayette@eversource.com)
  - [pacmatters@iso-ne.com](mailto:pacmatters@iso-ne.com)

Presentation	Date	Description
Initial Presentation	January 18 <sup>th</sup> , 2024	Presentation on rebuild of transmission line spans within Hurd State Park in Connecticut and re-conductoring of adjacent transmission line spans
Follow-Up Presentation	April 18 <sup>th</sup> , 2024	Follow-up presentation
Questions/Feedback	February 2 <sup>nd</sup> , 2024	Comment deadline



# Questions

