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M13 & L14 115kV Line Rebuild

ISO NE PAC Meeting October 18, 2023 (Slides revised 10/23)

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Agenda



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Purpose: Discuss M13 Pottersville – Jepson 115kV line and L14 Bell Rock – Jepson 115kV line needs and proposed solution.

- Project Background
- Maps/Diagrams
- Project Drivers
- Solution Alternatives
- Summary
- Feedback and Next Steps

Project Background



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- Rhode Island Energy (RIE) manages approximately 400 miles of overhead and underground transmission lines exclusively within the state of RI and applies a proactive asset management strategy to upgrade or rebuild aging transmission facilities to improve reliability and longevity of the system while reducing maintenance costs.
- System needs are identified through a combination of data collection activities including desktop review, ground inspections, aerial inspections, 3rd party condition assessments, etc.
- The M13 Pottersville – Jepson 115kV line is a 12.3-mile line connecting Pottersville Substation (NEP owned) and Jepson Substation. The L14 Bell Rock – Jepson 115kV line is a 12.3-mile line connecting Bell Rock Substation (NEP owned) and Jepson Substation.
 - The M13 and L14 lines change ownership at the MA/RI state border. This project only covers the RIE owned portion of the lines.
- The M13 and L14 lines each have 2 taps to Tiverton (non-PTF) and Tiverton Power totaling 2.5 miles.

Project Background, cont.



- The M13 line was originally constructed in 1964 (59 years old) and contains a combination of 636 AAC, 636 ACSR and 795 ACSR conductor, 7#9 Alumoweld, 3#5 Alumoweld, and 3/8” Extra High Strength Overhead Ground Wire (EHS OHGW), and 182 total structures.
- The L14 line was originally constructed in 1964 (59 years old) and contains a combination of 636 AAC, 636 ACSR and 795 ACSR conductor, 7#9 Alumoweld, 3#5 Alumoweld, and 3/8” EHS OHGW, and 186 total structures.
- The M13 and L14 lines were extended from Dexter to Jepson in 2021, as part of the Jepson Substation Rebuild.
 - The Canonicus Switchyard situated near the MA/RI state border contains manual switches for the M13 and L14 lines. Following the Jepson rebuild in 2021 and installation of remote operated switches, the Canonicus Switchyard does not provide significant operational benefit. M13 and L14 can both be remotely sectionalized via switches at Dexter and Jepson to restore Dexter substation if either line is lost.

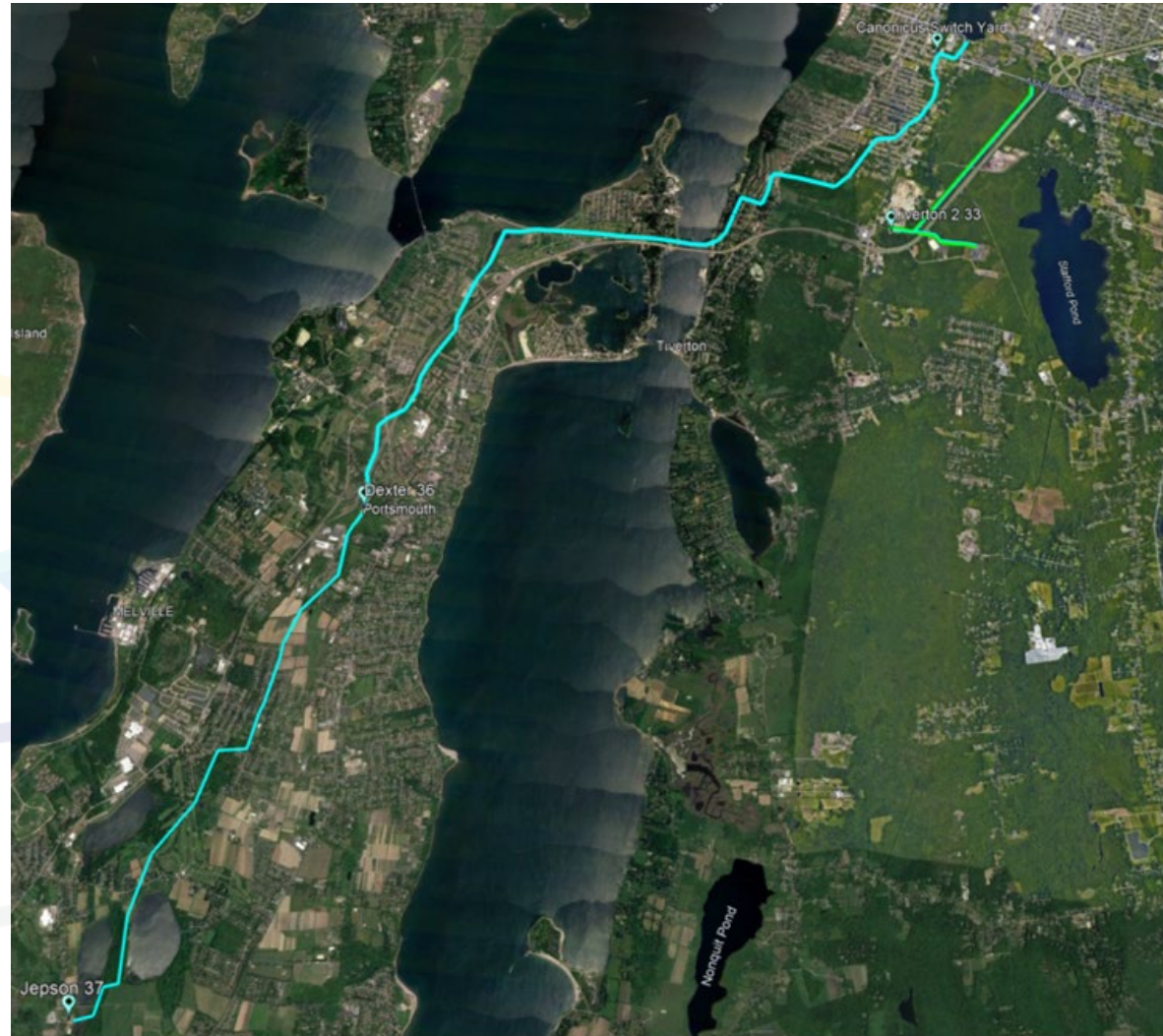
Material	PTF	Non-PTF
Lattice	2	0
Steel	54	0
Wood	123	4
Total	179	4

M13 Structure Count by Material

Material	PTF	Non-PTF
Lattice	4	0
Steel	54	0
Wood	122	4
Total	180	4

L14 Structure Count by Material

M13 & L14 Aerial View (RIE owned)



M13 Pottersville – Jepson & L14 Bell Rock – Jepson (blue) and Taps to Tiverton and Tiverton Power (green)

Project Driver



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- Wood structures account for 67% of these lines and the population is exhibiting evidence of deterioration such as discoloration, bowing, rot, and woodpecker holes observed via ground patrols.
- Aerial inspections have identified conductor deficiencies, including broken strands. The existing conductor was originally installed in 1964 (59 years old). AAC and ACSR conductor lose mechanical strength over their service life due to corrosion and annealing, leading to an increased likelihood of broken strands and eventual conductor failure.
- The Sakonnet River crossing consists of two double circuit lattice towers constructed in 1951 for 69kV operation leading to numerous issues with ice loading during winter storms.
- The physical deficiencies along these lines contribute to their poor performance.
 - The M13 line has experienced 21 outages since 2011.
 - The L14 line has experienced 15 outages since 2011.
- The Canonicus Switchyard control building is in extremely poor condition and has a leaking roof. Since Canonicus doesn't provide an operational benefit anymore, the switchyard and equipment will be removed.
- Fiber installations along this corridor provide key communication links for a future system wide fiber deployment in support of protection networks, relaying, improving grid automation, and other device communications.

Project Driver, cont.



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Hollow Pole Top M13 Str 53



**Broken Strands on M13 Span Between
Str 82 and Str 83**



Shell Rot on L14 Str 11



Structure Crack on L14 Str 19

Project Driver, cont.



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Canonicus Switchyard Building Interior



Canonicus Switchyard Building Exterior



Solution Alternatives

Option 1: Preferred Solution PTF Scope of Work- Structure Replacement, Conductor Replacement, Fiber Install

- **M13 & M13 Tap to Tiverton Power**
 - Replace 123 wood, 2 lattice, and 1 steel structures with 126 steel single circuit structures.
 - Replace approximately 9.2 miles of existing mixed conductor with 1113 ACSS. (Ratings on next slide)
 - Replace approximately 9.2 miles of existing OHGW with dual OPGW from the MA/RI State Border to Dexter and from the MA/RI State Border to the Tap To Tiverton tap point.
- **L14 & L14 Tap to Tiverton Power**
 - Replace 122 wood, 4 lattice, and 1 steel structures with 127 steel single circuit structures.
 - Replaced approximately 9.2 miles of existing mixed conductor with 1113 ACSS. (Ratings on next slide)
 - Replace approximately 9.2 miles of existing OHGW and OPGW with dual OPGW from the MA/RI State Border to Dexter and from the MA/RI State Border to the Tap To Tiverton tap point.
- Retire the Canonicus switchyard.

No feasible alternatives to adequately address all concerns along these lines.

Estimated PTF Project Cost (+50%/-25%): \$54.6M

Solution Alternatives, cont.



Option 1: Preferred Solution PTF Scope of Work- Structure Replacement, Conductor Replacement, Fiber Install

M13-7 & L14-7: Canonicus to Dexter

	Normal (MVA)	LTE (MVA)	STE (MVA)
Existing Circuit Ratings (Summer/Winter)	143/160	165/176	176/185
Existing Conductor Ratings: 795 ACSR (Summer/Winter)	235/289	290/331	324/378
Proposed Conductor Ratings: 1113 ACSS (Summer/Winter)	451/487	451/487	485/531

M13-1 & L14-1: Canonicus to RI/MA state border

	Normal (MVA)	LTE (MVA)	STE (MVA)
Existing Circuit Ratings (Summer/Winter)	195/243	210/255	221/270
Proposed Conductor Ratings: 1113 ACSS (Summer/Winter)	451/487	451/487	485/531

M13-5 & L14-5: Tiverton Tap to Tiverton

	Normal (MVA)	LTE (MVA)	STE (MVA)
Existing Circuit Ratings (Summer/Winter)	215/274	289/330	314/362
Proposed Conductor Ratings: 1113 ACSS (Summer/Winter)	451/487	451/487	485/531

Solution Alternatives, cont.



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Option 1: Preferred Solution non-PTF Scope of Work- Structure Replacement, Conductor Replacement, Fiber Install

- M13 Tap to Tiverton
 - Replace 4 wood structures along M13 Tap to Tiverton with 4 steel single circuit structures.
 - Replace approximately 0.2 miles of original conductor with 1113 ACSS.
 - Replace approximately 0.2 miles of OHGW with dual OPGW from the Tap to Tiverton Power to Tiverton substation.
- L14 Tap to Tiverton
 - Replace 4 wood structures along L14 Tap to Tiverton with 4 steel single circuit structures.
 - Replace approximately 0.2 miles of original conductor with 1113 ACSS.
 - Replace approximately 0.2 miles of OHGW with dual OPGW from the Tap to Tiverton Power to Tiverton substation.

Estimated non-PTF Project Cost (+50%/-25%): \$1.9M

Summary



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- Rebuild approximately 7.4 miles of the M13 115kV mainline from the MA/RI State Border to Dexter Substation, including the Sakonnet River crossing structures, and the M13 Tap to Tiverton Power, approximately 2 miles, with steel monopoles, new 1113 ACSS conductor, and dual OPGW (PTF).
.Rebuild approximately 0.2 miles of the M13 Tap to Tiverton (non-PTF).
- Rebuild approximately 7.4 miles of the L14 115kV mainline from the MA/RI State Border to Dexter Substation, including the Sakonnet River crossing structures, and the L14 Tap to Tiverton Power, approximately 2 miles, with steel monopoles, new 1113 ACSS conductor, and dual OPGW (PTF).
Rebuild approximately 0.2 miles of the L14 Tap to Tiverton (non-PTF).
- Retire the Canonicus switchyard.

Estimated PTF Project Cost (+50%/-25%): \$54.6M

Estimated non-PTF Project Cost (+50%/-25%): \$1.9M

Estimated Project Cost (+50%/-25%): \$56.5M

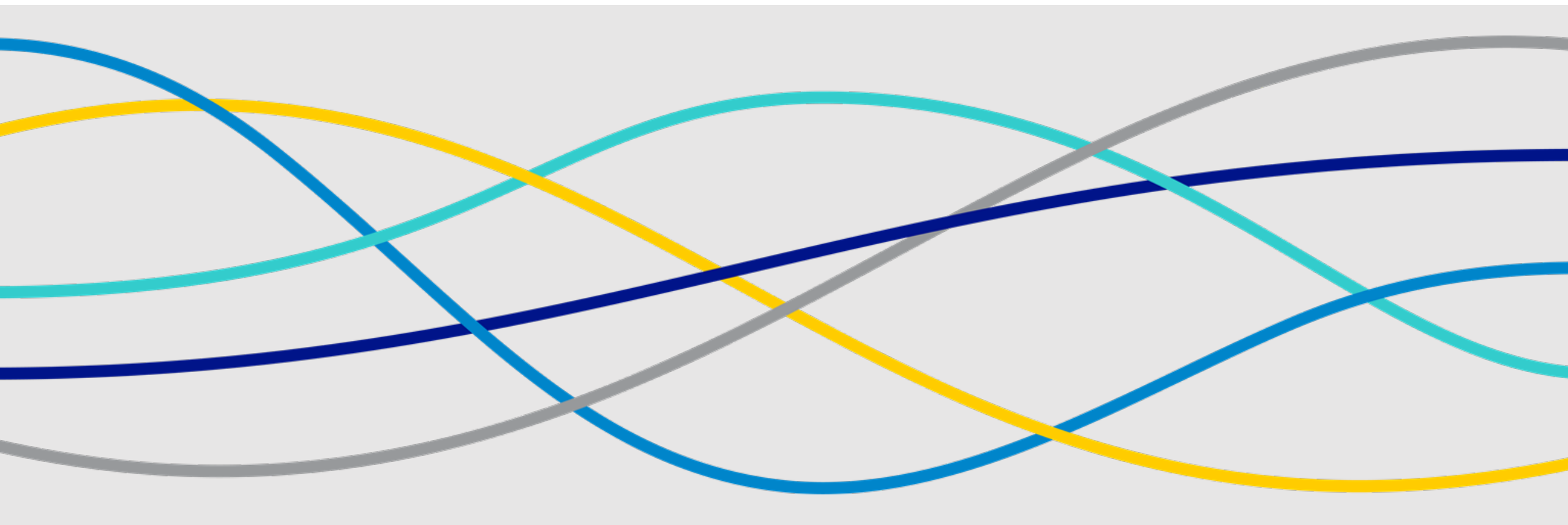
Estimated Construction Start: Q3 2024

Project IS Date: Q4 2025



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Please submit any written comments or feedback by November 2, 2023