



Oncor and LCRA TSC Hartring to Upland 138-kV Line and Benedum Autotransformer Addition Project – ERCOT Independent Review Study Status Update

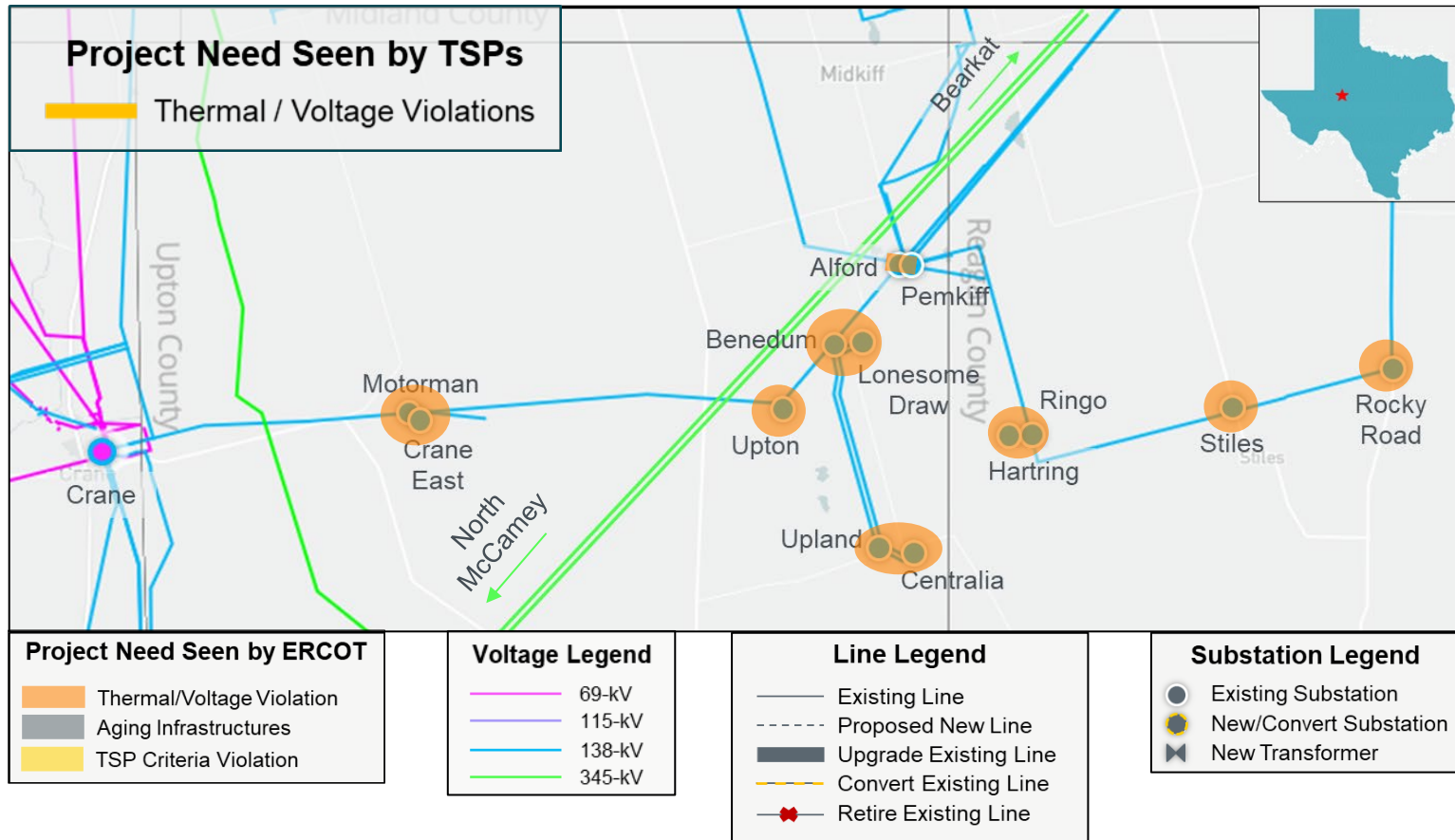
Tanzila Ahmed

RPG Meeting
March 18, 2025

Recap Introduction

- Oncor and LCRA TSC submitted the Hartring to Upland 138-kV Line and Benedum Autotransformer Addition Project for Regional Planning Group (RPG) review in August 2024
 - This Tier 2 project is estimated at \$94.0 million
 - Filing of Certificate of Convenience and Necessity (CCN) will be required
 - Expected in-service date (ISD) date are
 - Oncor: Summer 2025
 - LCRA TSC: June 2026 (coincides to the completion of the 22RPG010 Bearkat – North McCamey – Sand Lake 345-kV Transmission Line Addition Project) Iso
 - Addresses post-contingency thermal overloads and voltage violations due to significant oil and gas load growth
- ERCOT is currently conducting an ERCOT Independent Review (EIR) of this project
- Oncor and LCRA TSC presented a project overview and ERCOT presented the EIR scope at the October RPG meeting
 - <https://www.ercot.com/calendar/10162024-RPG-Meeting>

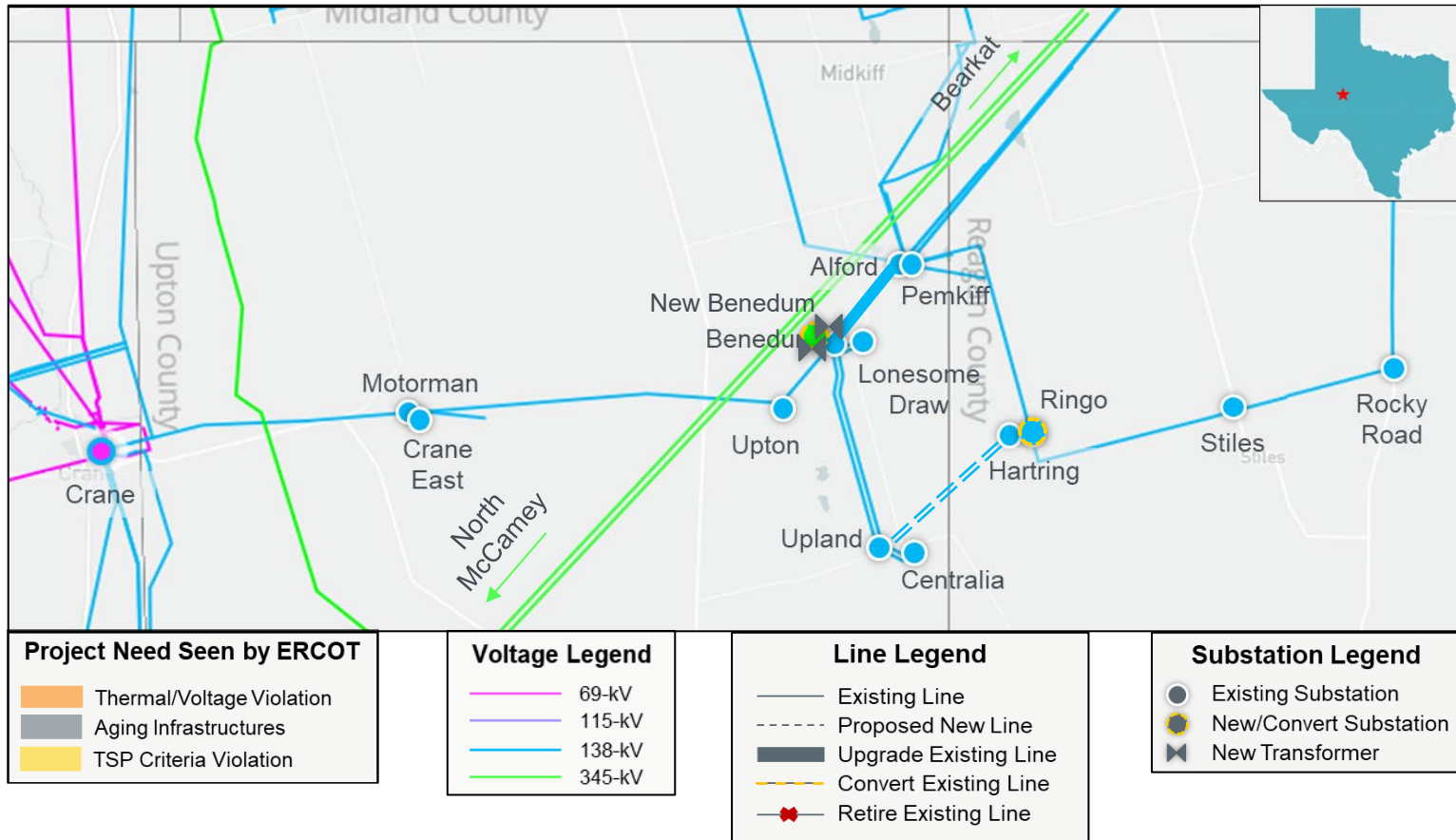
Recap Map with Violations Seen by Transmission Service Providers (TSPs)



Recap Proposed Project by TSPs

- Reconfigure the existing Ringo 138-kV substation to a 6-breaker ring bus configuration, reroute the existing Pemkiff to Ringo 138-kV transmission line and the existing Ringo to Stiles 138-kV transmission line to terminate into new breakers at the existing Ringo 138-kV substation
- Construct a new Hartring to Upland 138-kV double-circuit transmission line with normal and emergency ratings of at least 614 MVA, which will require a CCN and new right of way (ROW), approximately 9.0-mile
 - Each of these circuits will have a terminal breaker end point at the existing Ringo and Benedum substations
- Ensure all Oncor 138-kV terminal equipment associated with this project meet or exceeds ratings of 3200 A
- Install a new 345-kV yard adjacent to the existing Benedum 138-kV substation in a breaker-and-a-half configuration
 - Install two 345/138-kV transformers at Benedum with normal and emergency ratings of at least 800 MVA
 - Cut-in one circuit of the planned Bearkat to North McCamey 345-kV double-circuit transmission line into the new Benedum 345-kV yard
- Upgrade the existing Benedum to Alford 138-kV single-circuit transmission line on a double-circuit structures with normal and emergency ratings of at least 942 MVA, approximately 4.3-mile
 - Upgrade 138-kV terminal equipment at the existing Benedum 138-kV station with ratings of at least 4000 A

Map with Proposed Project by TSPs



Recap Study Assumptions

- Final 2023 Regional Transmission Planning (RTP) 2026 summer peak case for West and Far West (WFW) Weather Zones was used as the start case
- Transmission Updates
 - New transmission projects, listed in the [Appendix A1](#), based on the June 2024 Transmission Project and Information Tracking (TPIT) report along with recently approved RPG projects were added to the base case
 - Transmission projects, listed in the [Appendix A2](#), identified in the 2023 RTP in the study area that have not been approved by RPG was removed from the base case
- Generation update
 - New 6.9(1) generation, listed in [Appendix B](#), were added based on the March 2024 Generator Interconnection Status (GIS) report
 - All renewable generation were dispatched consistent with the 2024 RTP methodology
 - Reserve was maintained consistent with 2024 RTP methodology

Recap Study Assumptions – Load

- Loads in study area
 - Newly approved confirmed loads in Far West (FW) will be added to the study base case
 - Oil & Gas loads in the FW Weather Zone will be updated based the S&P Global Load Forecast
 - Additional Large Loads Provided by TSPs

Loads In Far West Weather Zone	Load (~MW)
Total S&P Global Forecasted Loads added	6,435.67
Total Large Loads added	1,328.97
Total Additional Loads Provided by TSP	1,404.86
Total Loads in FW Weather Zone	15,569.19

Status Update

- Reliability Need Analysis
 - N-1
 - G-1+N-1
 - G-1: Permian Basin all five units, and Odessa Combined Cycle (CC) train 1
 - X-1+N-1
 - X-1: Einstein and North McCamey 345/138-kV transformers
- Options Sections
- Reliability Analysis on All Options
 - N-1
 - G-1+N-1
 - X-1+N-1

Preliminary Results of Reliability Assessment – Need Analysis

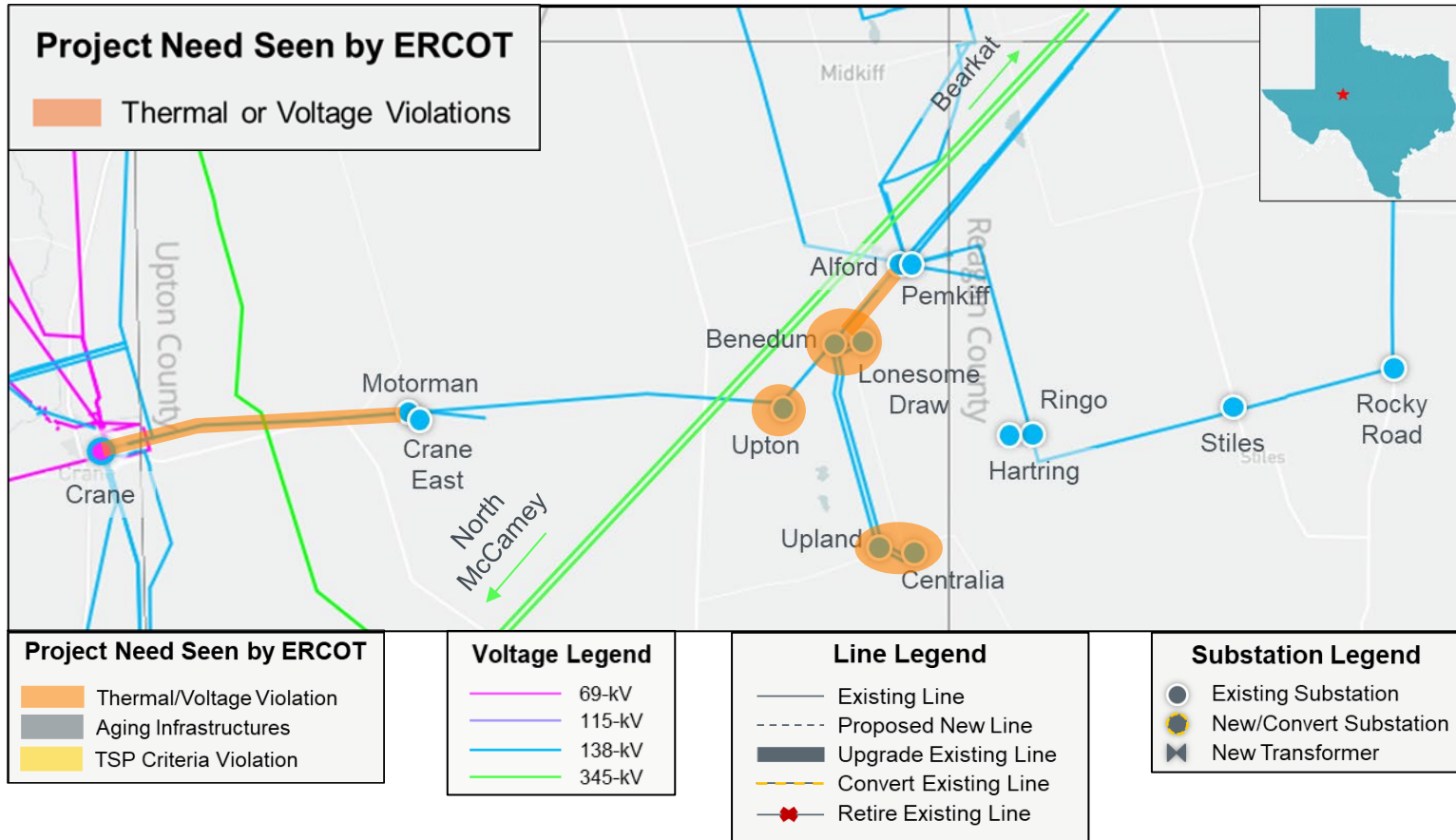
- ERCOT conducted steady-state load flow analysis for the study base case according to the NERC TPL-001-5.1 and ERCOT Planning Criteria to identify the project need

Contingency Category	Voltage Violations	Thermal Overloads	Unsolved Power Flow
N-0 (P0)	None	None	None
N-1 (P1, P2-1, P7)	10	2	5
G-1+N-1 (P3)*	None	None	1
X-1+N-1 (P6-2)**	None	None	None
Total	10	2	6

* G-1: Odessa Ector CC Train, and Permian Basin all five units

** X-1: Einstein and North McCamey 345/138-kV transformers

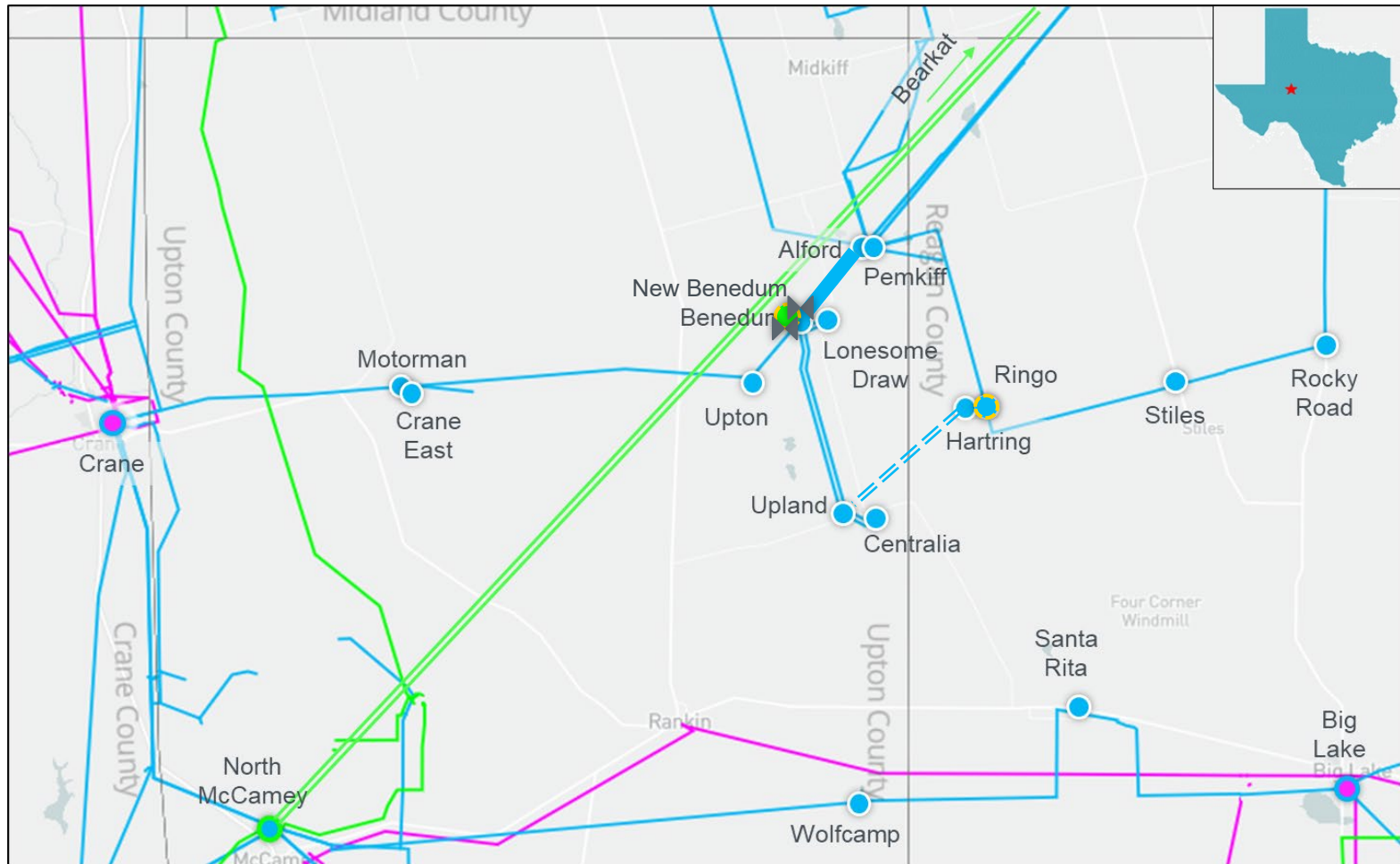
Recap Map with Violations Seen by ERCOT



Option 1 (TSP Proposed Project) Details

- Reconfigure the existing Ringo 138-kV substation to a 6-breaker ring bus configuration, reroute the existing Pemkiff to Ringo 138-kV transmission line and the existing Ringo to Stiles 138-kV transmission line to terminate into new breakers at the existing Ringo 138-kV substation
- Construct a new Hartring to Upland 138-kV double-circuit transmission line with normal and emergency ratings of at least 614 MVA, which will require a CCN and new right of way (ROW), approximately 9.0-mile
 - Each of these circuits will have a terminal breaker end point at the existing Ringo and Benedum substations
- Ensure all Oncor 138-kV terminal equipment associated with this project meet or exceeds ratings of 3200 A
- Install a new 345-kV yard adjacent to the existing Benedum 138-kV substation in a breaker-and-a-half configuration
 - Install two 345/138-kV transformers at Benedum with normal and emergency ratings of at least 800 MVA
 - Cut-in one circuit of the planned Bearkat to North McCamey 345-kV double-circuit transmission line into the new Benedum 345-kV yard
- Upgrade the existing Benedum to Alford 138-kV single-circuit transmission line on a double-circuit structures with normal and emergency ratings of at least 942 MVA, approximately 4.3-mile
 - Upgrade 138-kV terminal equipment at the existing Benedum 138-kV station with ratings of at least 4000 A

Option 1 (TSP Proposed Project) Map



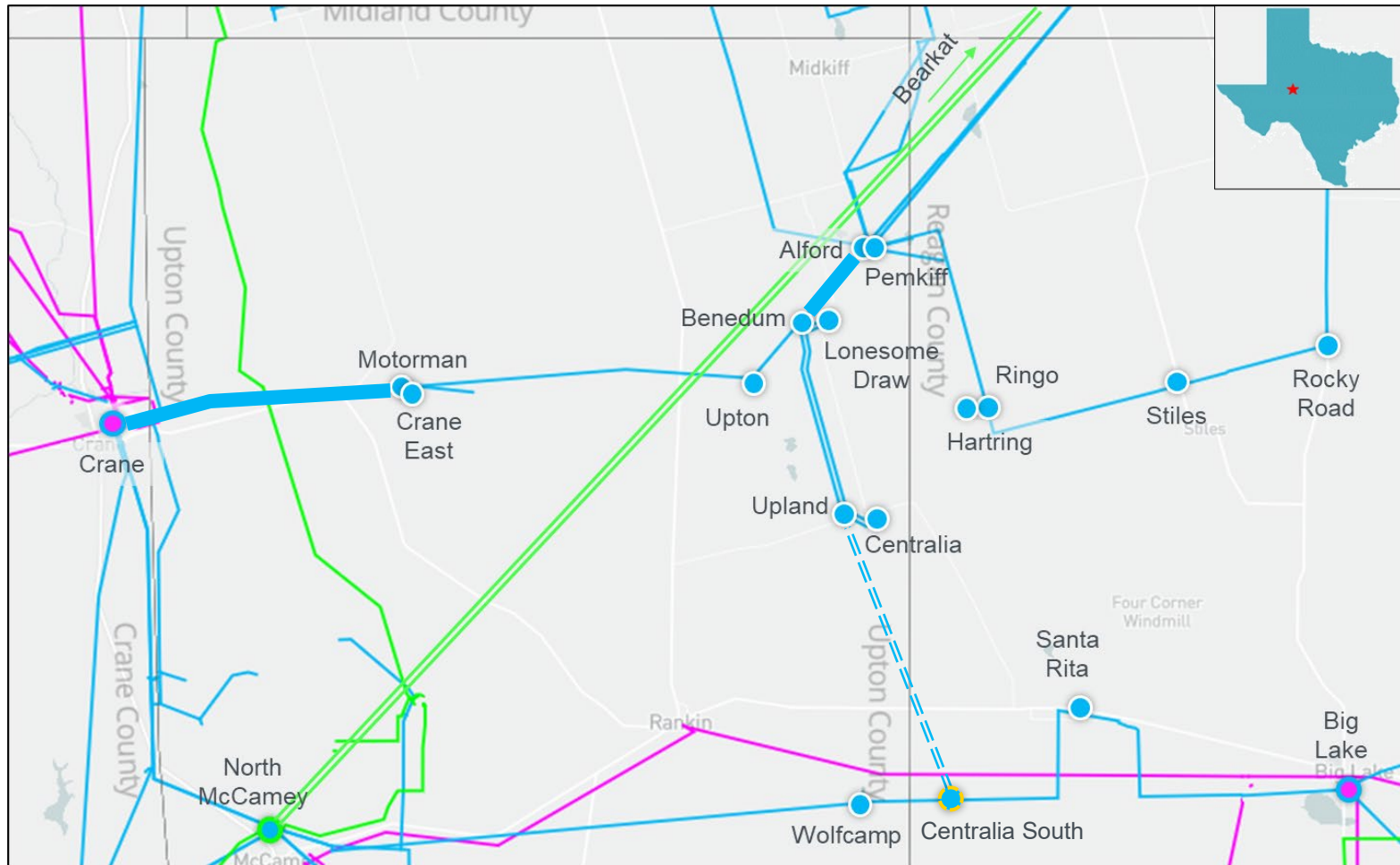
Project Need Seen by ERCOT	Voltage Legend	Line Legend	Substation Legend
<ul style="list-style-type: none"> Thermal/Voltage Violation Aging Infrastructures TSP Criteria Violation 	<ul style="list-style-type: none"> 69-kV 115-kV 138-kV 345-kV 	<ul style="list-style-type: none"> Existing Line Proposed New Line Upgrade Existing Line Convert Existing Line Retire Existing Line 	<ul style="list-style-type: none"> Existing Substation New/Convert Substation New Transformer



Option 2 Details

- Construct a new Centralia South 138-kV substation in the existing Wolfcamp to Santa Rita 138-kV line
- Construct a new Upland to Centralia South 138-kV double-circuit transmission line with normal and emergency ratings of at least 614 MVA, which will require new ROW, approximately 12.0-mile
- Upgrade the existing Crane to Motorman 138-kV single-circuit transmission line with normal and emergency ratings of at least 942 MVA, approximately 12.1-mile
- Upgrade the existing Benedum to Alford 138-kV single-circuit transmission line on a double-circuit structures with normal and emergency ratings of at least 942 MVA, approximately 4.3-mile

Option 2 Map



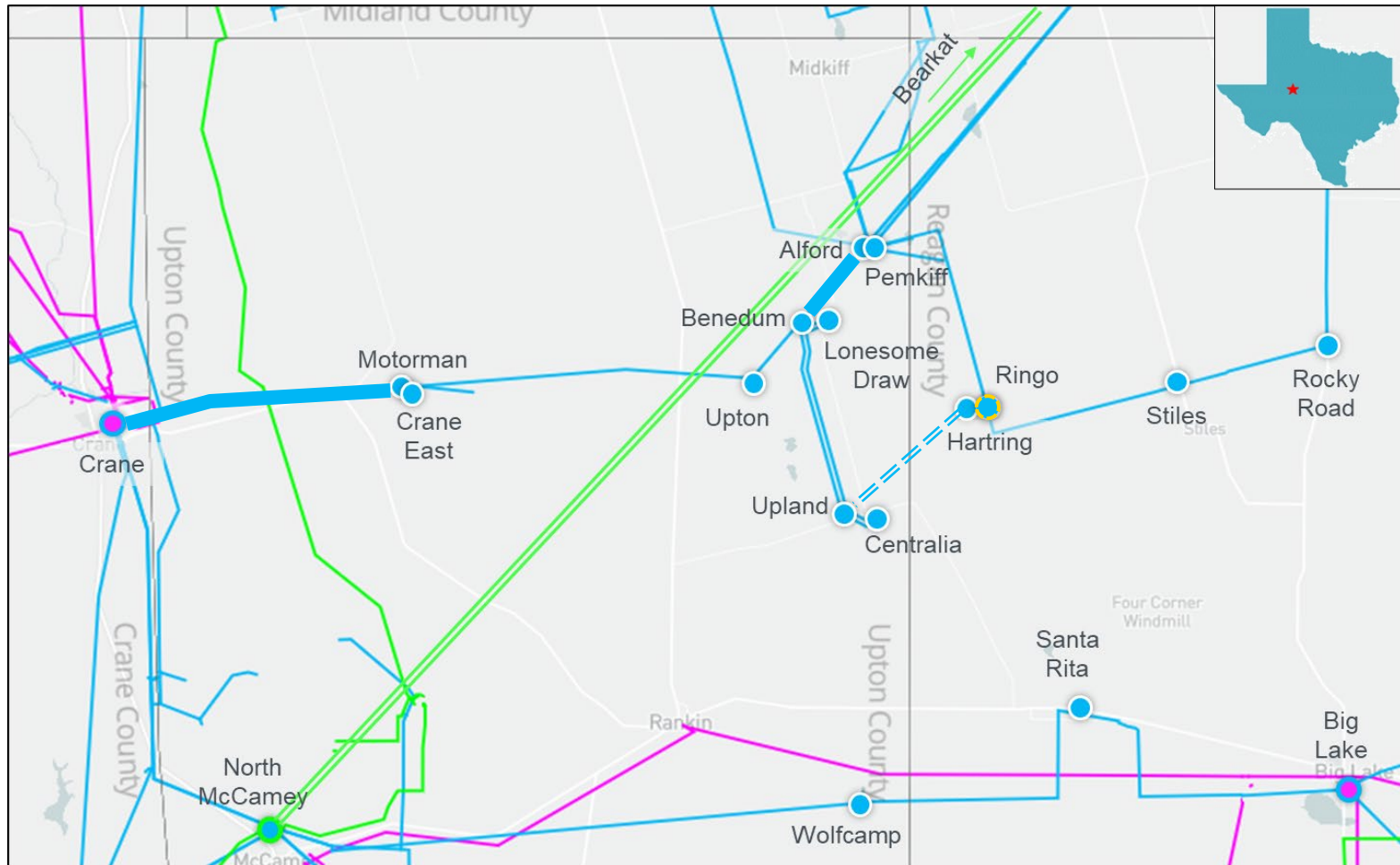
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Option 3 Details

- Reconfigure the existing Ringo 138-kV substation to a 6-breaker ring bus configuration, reroute the existing Pemkiff to Ringo 138-kV transmission line and the existing Ringo to Stiles 138-kV transmission line to terminate into new breakers at the existing Ringo 138-kV substation
- Construct a new Hartring to Upland 138-kV double-circuit transmission line with normal and emergency ratings of at least 614 MVA, which will require a CCN and new right of way (ROW), approximately 9.0-mile
 - Each of these circuits will have a terminal breaker end point at the existing Ringo and Benedum substations
- Ensure all Oncor 138-kV terminal equipment associated with this project meet or exceeds ratings of 3200 A
- Upgrade the existing Crane to Motorman 138-kV single-circuit transmission line with normal and emergency ratings of at least 942 MVA, approximately 12.1-mile
- Upgrade the existing Benedum to Alford 138-kV single-circuit transmission line on a double-circuit structures with normal and emergency ratings of at least 942 MVA, approximately 4.3-mile

Option 3 Map



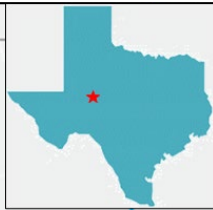
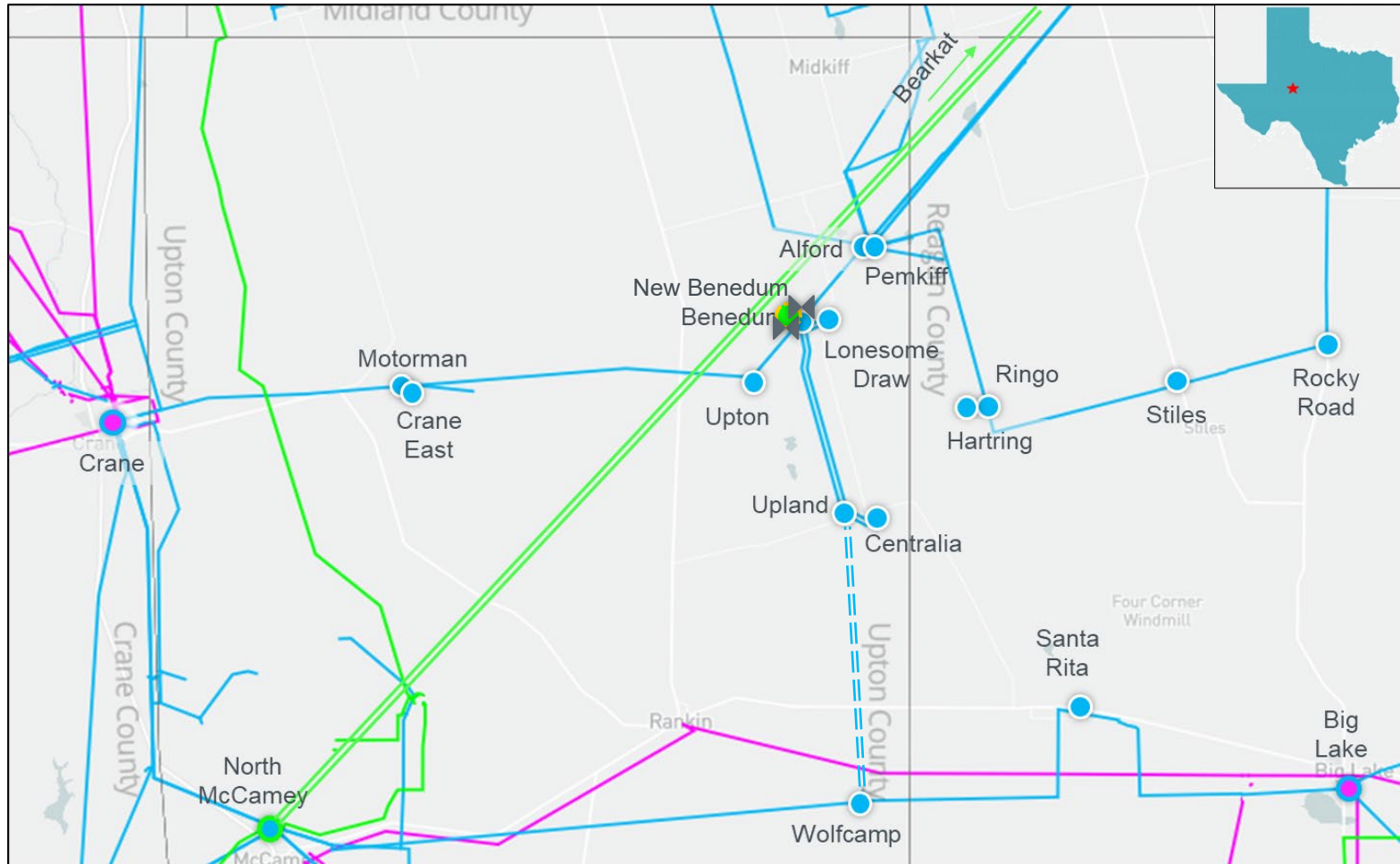
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Option 4 Details

- Construct a new Upland to Wolfcamp 138-kV double-circuit transmission line with normal and emergency ratings of at least 614 MVA, which will require new ROW, approximately 14.35-mile
- Install a new 345-kV yard adjacent to the existing Benedum 138-kV substation in a breaker-and-a-half configuration
 - Install two 345/138-kV transformers at Benedum with normal and emergency ratings of at least 800 MVA
 - Cut-in one circuit of the planned Bearkat to North McCamey 345-kV double-circuit transmission line into the new Benedum 345-kV yard

Option 4 Map



<p>Project Need Seen by ERCOT</p> <ul style="list-style-type: none"> Thermal/Voltage Violation Aging Infrastructures TSP Criteria Violation 	<p>Voltage Legend</p> <ul style="list-style-type: none"> 69-kV 115-kV 138-kV 345-kV 	<p>Line Legend</p> <ul style="list-style-type: none"> Existing Line Proposed New Line Upgrade Existing Line Convert Existing Line Retire Existing Line 	<p>Substation Legend</p> <ul style="list-style-type: none"> Existing Substation New/Convert Substation New Transformer
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Preliminary Results of Reliability Assessment – Options Evaluation

- ERCOT conducted steady-state load flow analysis for the study base case according to the NERC TPL-001-5.1 and ERCOT Planning Criteria to evaluate and compare options

Option	N-1		G-1*+N-1		X-1**+N-1		Unsolved Powerflow
	Thermal Violations	Voltage Violations	Thermal Violations	Voltage Violations	Thermal Violations	Voltage Violations	
1	None	None	None	None	None	None	None
2	None	None	None	None	2	None	None
3	None	None	None	None	None	None	None
4	None	None	None	None	None	None	None

* G-1: Odessa Ector CC Train, and Permian Basin all five units

** X-1: Einstein and North McCamey 345/138-kV transformers

- Options 1, 3, and 4 were selected as short-listed option for further evaluation

Next Steps and Tentative Timeline

- ERCOT will continue with project evaluation and perform the following
 - Conduct Planned Maintenance Outage Evaluation
 - Conduct Long-Term Load-Serving Capability Assessment
 - Request TSPs to conduct Cost Estimate and Feasibility Assessment
- Additional Analysis
 - Congestion analysis may be performed based on the recommended transmission upgrades to ensure that the identified transmission upgrades do not result in new congestion within the study area
- Tentative Timelines
 - Status updates at the future RPG meetings
 - Final recommendation – Q2 2025

Thank you!



Stakeholder comments also welcomed through:

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Appendix A1 – Transmission Projects Added

TPIT/RPG Or MOD No	Project Name	Tier	Project ISD	County(s)
66532	Grey Well Draw - Pronghorn 138 kV Line Rebuild	Tier 4	5/31/2025	Midland
70964	WETT 345 kV Volta witch	Tier 3	7/31/2025	Howard
73043	Peck - Driver 138 kV Line	Tier 2	12/15/2024	Glasscock
73368	Grey Well Draw - Buffalo 138 kV Second Circuit	Tier 3	12/15/2024	Midland
73434	Shaw 138 kV POD	Tier 4	9/30/2025	Reagan
76680	Add Capacitor Bank at East Stiles	Tier 4	2/1/2026	Reagan
76686	Add Hog Mountain 138 kV POD	Tier 4	10/30/2024	Reeves
76705	Prairieland 345/138 kV Switch and 138 kV Line	Tier 2	5/15/2025	Glasscock
76710	Oncor_FW_NOTPIT_Hartring_SUB	NON-TPIT	5/15/2025	Reagan
76714	Oncor_FW_NOTPIT_Upland_Sub	NON-TPIT	3/1/2025	Upton
76719	Establish Blue Mountain 138 kV Switch	Tier 4	12/15/2024	Reagan
78374	Rockhound 345/138 kV Switch	Tier 4	10/31/2024	0
80858	Sterling City: Upgrade 69 kV Relays	Tier 4	4/30/2025	Sterling
80913	Sloan 138 kV Switch	Tier 4	5/15/2025	Midland
23RPG019	Stanton Loop South Dynamic Reactive Power Project	Tier 3	6/1/2025	Reagan, Upton

Appendix A2 – Transmission Projects Removed

RTP Project ID	Project Name	County(s)
2021-FW4	Rio Pecos - Rankin - Texon Tap - Atlantic Best Tap - Kemper Tap - Big Lake 69-kV to 138-kV Line Conversion	Pecos, Upton, Reagan
2023-FW9	East Stiles 138-kV Cap Banks Addition	Reagan

Appendix B – Generation Added

GINR	Project Name	Fuel	Project COD	Capacity (~MW)	County
19INR0203	Angelo Solar	SOL	8/01/2024	195.4	Tom Green
22INR0502	Shamrock Wind SLF	WIN	9/15/2024	223.9	Crockett
23INR0372	Cross Trails Storage	OTH	4/25/2025	58.3	Scurry
23INR0387	Pioneer DJ Wind	WIN	9/15/2024	140.3	Midland
23INR0418	Angelo Storage	OTH	8/10/2024	103.0	Tom Green
24INR0273	AI Pastor BESS	OTH	9/10/2024	103.1	Dawson
24INR0421	Swift Air Solar	SOL	3/31/2025	146.5	Ector
24INR0568	Shamrock Energy Storage (SLF)	OTH	7/1/2025	99.3	Crockett
24INR0578	Panther Creek 1 Repower	WIN	12/31/2024	11.0	Glasscock
24INR0582	Panther Creek 2 Repower	WIN	12/31/2024	8.0	Glasscock
24INR0629	Jade Storage SLF	OTH	9/30/2024	160.0	Scurry
24INR0630	Andromeda Storage SLF	OTH	12/31/2024	160.0	Scurry