



Oncor – Roanoke Area Upgrades – ERCOT Independent Review Status Update

Ben Richardson

RPG Meeting
July 19, 2022

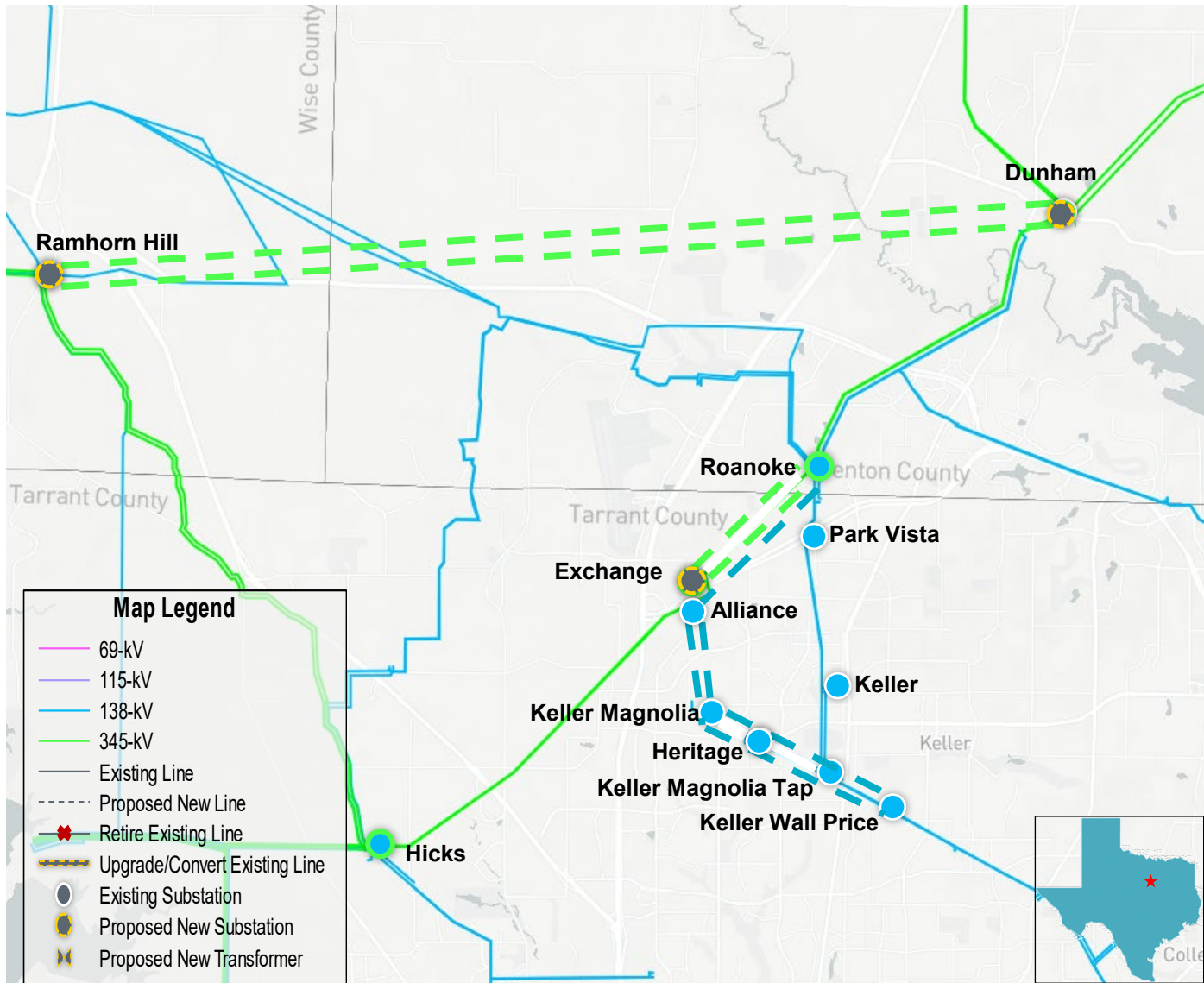
Recap

- **Oncor submitted the Roanoke Area Upgrade Project for Regional Planning Group review in February 2022. This is a Tier 1 project that is estimated to cost \$285.9 million**
 - Proposed for May 2025. Oncor has expressed a need for “critical status designation”
 - Address rapid load growth in Roanoke area, existing capacity limitations and forecasted thermal and voltage violations
 - Increase thermal capacity and operational flexibility in Roanoke area

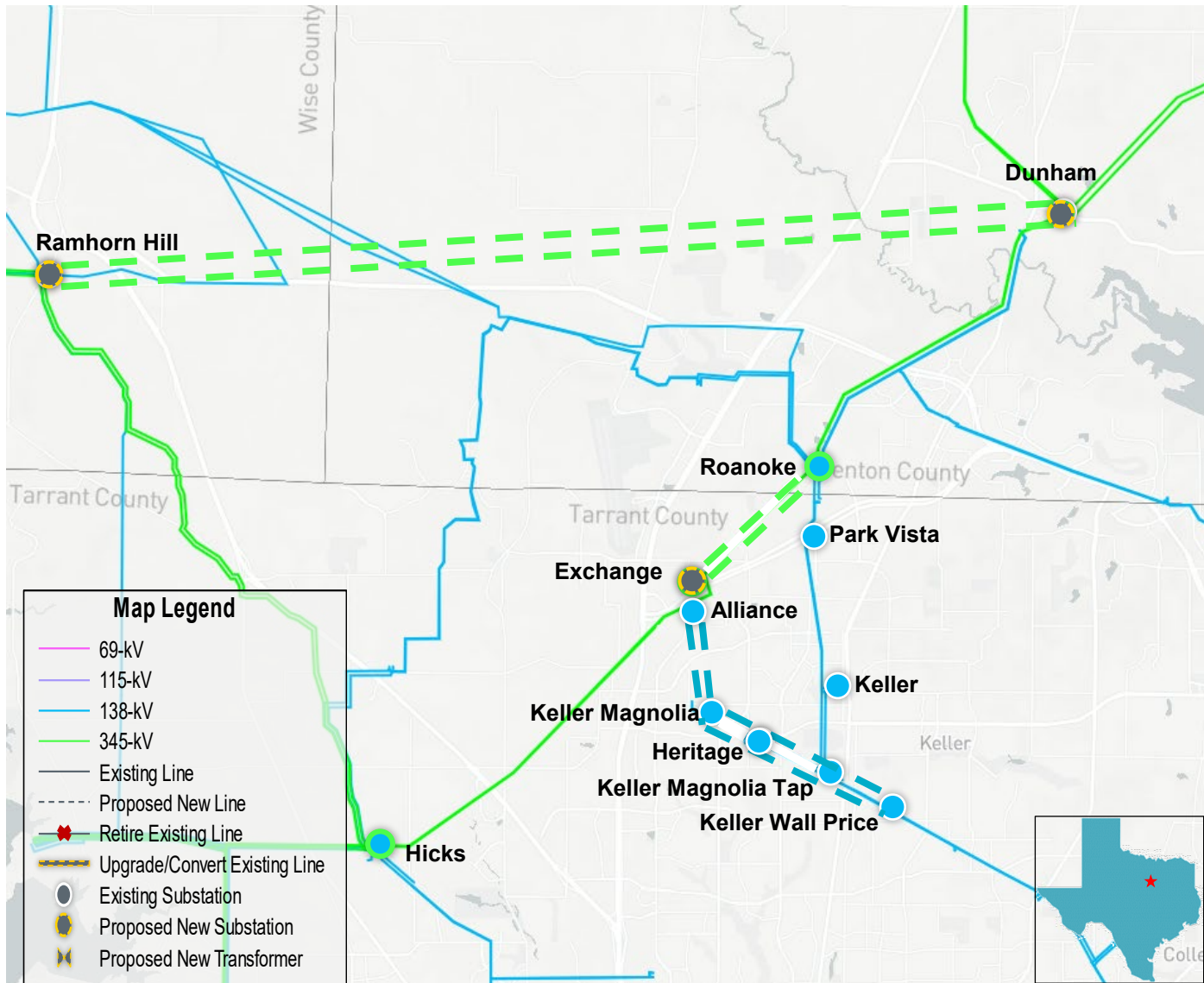
Recap - continued

- **March RPG presented Scope:**
 - https://www.ercot.com/files/docs/2022/03/11/Oncor_Roanoke_Area_Upgrades_EIR_Scope_03_15_2022.pdf
- **April RPG presented Need:**
 - https://www.ercot.com/files/docs/2022/04/07/Oncor_Roanoke_Area_Upgrades_EIR_Status.pdf
- **May RPG presented Initial Options:**
 - https://www.ercot.com/files/docs/2022/05/12/Oncor_Roanoke_Area_Upgrades_EIR_Status.pdf
- **June RPG presented Maintenance Assessment:**
 - https://www.ercot.com/files/docs/2022/06/10/Oncor_Roanoke_Area_Upgrades_EIR_Status_06_15_2022.pdf
- **July RPG presenting:**
 - Recap Short-listed Options
 - ERCOT will present the results of ERCOT Independent Review and make a recommendation during this presentation

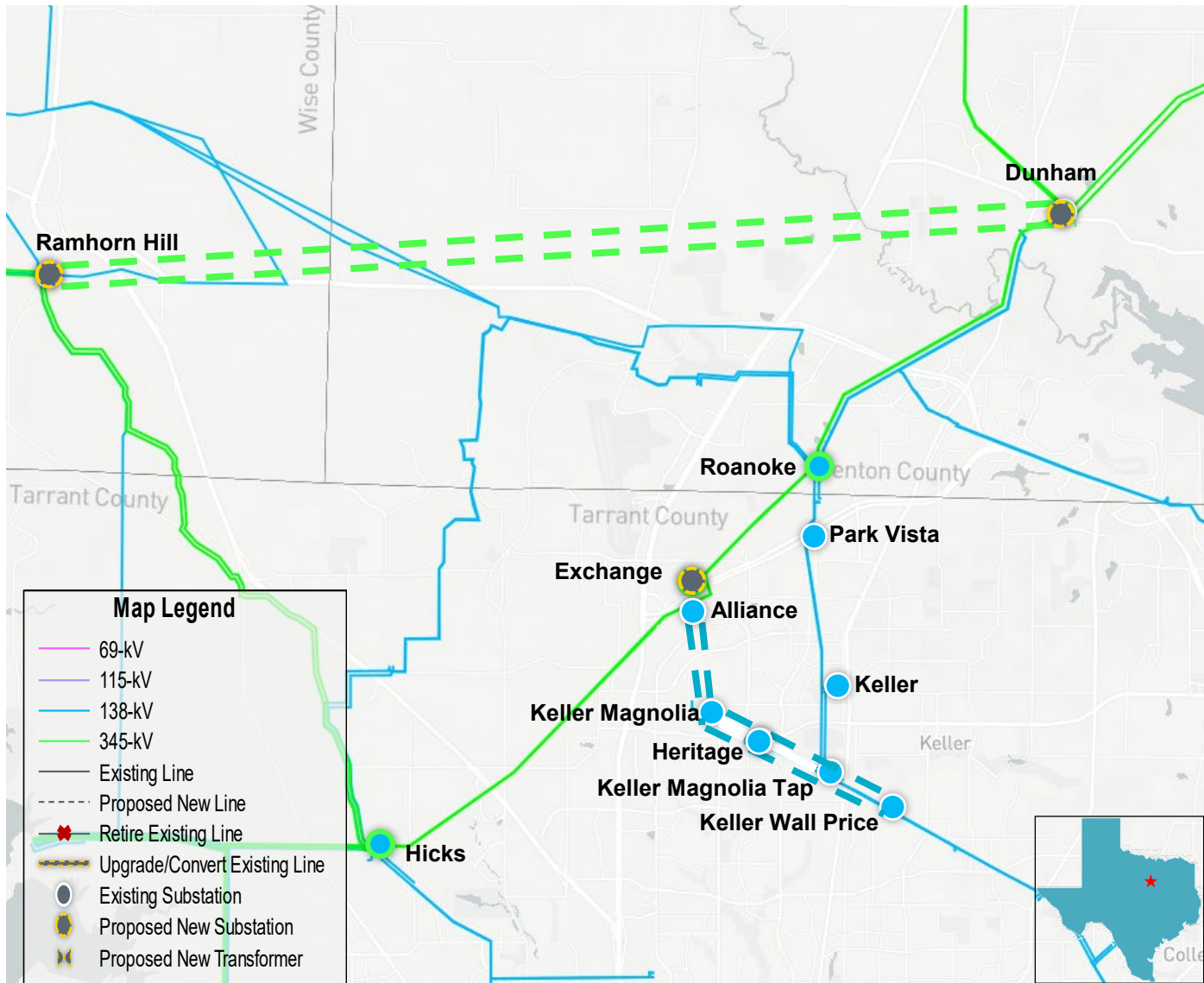
Option 2



Option 3



Option 4



Maintenance Outage Assumptions

- **Load adjusted to reflect off-peak system condition**
 - North Central weather zone load adjusted only
 - Base on review of 2019 thru 2021 historic load data
 - Adjustment set to 89.3% of North Central weather zone summer peak load
- **Prior Outages**
 - Based on input from TSP
 - Included select single circuit prior outages
 - Included select double circuit common tower prior outages
 - Total of 29 prior outages were considered
 - Security Constrained Optimal Power Flow (SCOPF) applied as post-prior outage adjustment for each individual prior outage scenario

Maintenance Assessments for short-listed Options

	Planned Maintenance Single Circuit Prior Outage Study	
	Thermal Overloads	Voltage Stability
Option 2	No	Ok
Option 3	No	Ok
Option 4	No	Ok

	Planned Maintenance Double Circuit Prior Outage Study	
	Thermal Overloads	Voltage Stability
Option 2	No*	Ok
Option 3	No*	Ok
Option 4	No*	Ok

*Note: Terminal upgrade may be needed at Argyle to Corinth 138-kV line.

Maintenance Assessments for short-listed Options – cont.

	Planned Maintenance TSP Requested Scenario (X-1)(Double-Circuit Line Segment)	
	Thermal Overloads	Voltage Stability
Option 2	No	Ok
Option 3	Yes*	Ok
Option 4	Yes*	Ok

*Roanoke 345/138-kV transformer overload

Long-term Load Serving Capability Comparison

Assumptions:

1. Adjusted load up in substations identified in “Area Load Growth Description” Section of Oncor Roanoke Area Upgrade and based on input from TSP
2. Adjusted conforming load down outside of North Central weather zone to balance power
3. Based on N-1 contingency limits

Findings:

1. Six 138-kV transmission line and one 345-kV transmission line thermal limits will need to be addressed for all short-listed Options to increase load serving capability
2. Options 3 and 4 will require additional major transmission improvements to address overloads on the two existing 345/138-kV transformers at Roanoke to further increase load serving capability
3. Option 2 offers more favorable path for increasing load serving capability

Comparison of Short-listed Options

	Option 2	Option 3	Option 4
Met ERCOT and NERC Reliability Criteria?	Yes	Yes	Yes
Long-term Load Serving Performance	Better	Yes	Yes
Improved Operational Flexibility	Better	Yes	Yes
Capital Cost Estimates*	\$286 M	\$264 M	\$254 M

* Cost estimates provided by TSP

- Although Option 2 is slightly more expensive than Option 3 and 4, Option 2 provides the following benefits over the other options:
 - Better long-term load serving capability
 - Better operational flexibility during transformer prior outage conditions
 - Eliminates 345-kV (P7) double-circuit contingency associated with transmission between Exchange and Roanoke
 - Better flexibility for future utilization associated with transmission between Exchange and Roanoke

Preferred Option

- Option 2 is selected as the preferred option because it:
 - Eliminates reliability violations
 - Provides better operational flexibility
 - Provides better long-term load serving capability for future load growth in the area

Additional Analysis

- Congestion Analysis:
 - Congestion analysis was performed for the preferred Option 2 using the 2021 RTP 2026 Starting Economic case
 - Option 2 did not result in any new congestions within the study area
- Sub-synchronous resonance (SSR) Assessment:
 - SSR assessment was performed for the preferred Option 2 per Nodal Protocol Section 3.22.1.3
 - No adverse SSR impacts were identified for Option 2

Sensitivity Analyses

- Generation Addition Sensitivity Analysis
 - Per Planning Guide Section 3.1.3(4)(a), ERCOT performed a generation addition sensitivity and determined relevant generators are not able to resolve reliability criteria violations

INR	Project Name	Capacity*	County
20INR0208	Signal Solar	50.00	Hunt
21INR0362	Oystercatcher Solar	220.33	Ellis
21INR0421	Armadillo Solar	204	Navarro
21INR0458	Porter Solar	245	Denton
22INR0327	Hummingbird Storage	103.8	Denton
22INR0335	Estonian Solar Farm	204.47	Delta
22INR0336	Estonian Energy Storage	102.5	Delta
22INR0552	Sowers Storage	203	Kaufman
22INR0598	Noble Storage Phase II	62.5	Denton

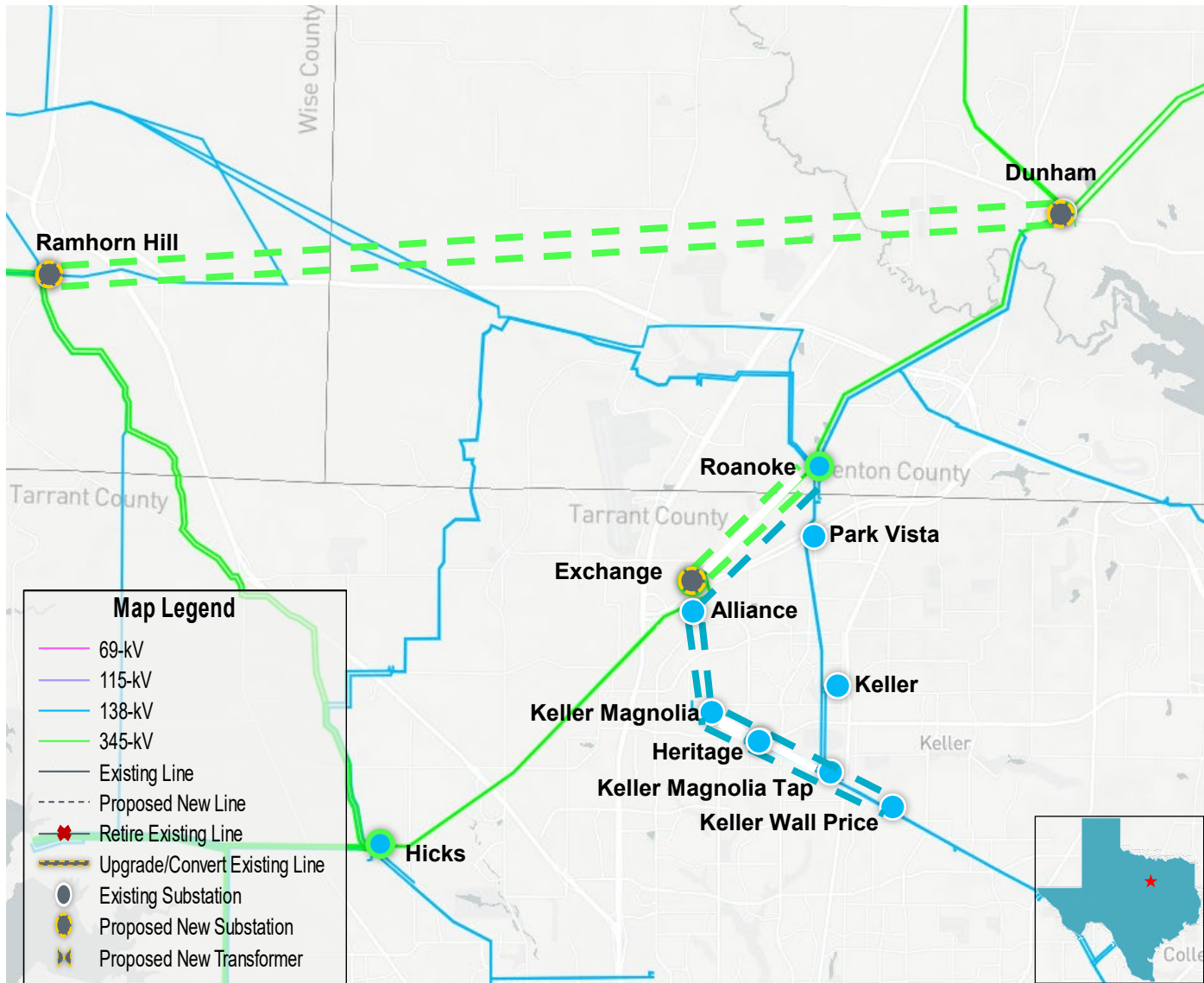
* Resource additions modeled consistent with 2021 RTP Assumptions

- Load Scaling Sensitivity Analysis
 - Per to Planning Guide Section 3.1.3(4)(b), ERCOT performed a load scaling sensitivity and concluded that the load scaling did not have a material impact on project need

ERCOT Recommendation

- ERCOT recommends Option 2 as the preferred option
 - Estimated Cost: \$286 Million
 - CCNs will be required
 - Oncor has requested ERCOT designate the recommended project “critical” to the reliability of the system per PUCT Substantive Rule 25.101(b)(3)(D). Since there is a reliability need to have the project in place as soon as possible and to limit the duration of any necessary Constraint Management Plans, ERCOT deems this project critical to reliability.

ERCOT Recommendation



Next Steps

- Tentative Timeline
 - ERCOT Independent Review Report to be posted in the MIS
 - July 2022
 - ERCOT Independent Review recommendation to TAC
 - July 2022
 - Seek ERCOT Board of Directors endorsement
 - August 2022



Stakeholder Comments Also Welcomed to Sun Wook Kang:
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Appendix

Description of ERCOT Recommended Option

- Option 2 consists of the following system improvements:
 - Construct a new Ramhorn Hill 345-kV switching station in a 10-breaker breaker-and-a-half arrangement tapped into existing double-circuit Hicks to Willow Creek 345-kV lines
 - Construct a new Dunham 345-kV switching station in a 10-breaker breaker-and-a-half arrangement tapped into existing Lewisville to Krum West and Lewisville to Roanoke 345-kV lines
 - Construct two new Ramhorn Hill to Dunham 345-kV transmission lines, with conductor rated to at least 2987 MVA, in a new (estimated 18.4-mile) right-of-way installed on new triple-circuit towers leaving one 138-kV vacant position
 - Rebuild Exchange to Roanoke 345-kV double-circuit lines, upgrading both with conductors rated to at least 2987 MVA, using separate double-circuit capable structures for each line (Lines rating limited to 1912/1912 MVA by terminal equipment at Roanoke)
 - Construct a new Exchange to Roanoke 138-kV circuit, with conductor rated to at least 764 MVA, using one of the Exchange to Roanoke 345-kV line double-circuit capable structures
 - Construct a new Exchange 345/138-kV Switching Station, adjacent to Alliance 345-kV substation, with two new 600 MVA (nameplate) transformers in an 8-breaker 345-kV breaker-and-a-half bus arrangement and a 9-breaker 138-kV breaker-and-a-half arrangement. Transformer Normal/Emergency ratings will be 700/750 MVA
 - Convert the existing Alliance 345-kV load serving substation to 138-kV load serving operation
 - Construct a new Exchange to Alliance 138-kV double-circuit line with conductors rated to at least 746 MVA

Description of ERCOT Recommended Option – cont.

- Construct a new Alliance to Keller Magnolia and Alliance to Heritage 138-kV double-circuit line with conductors rated to at least 746 MVA in a new (estimated 1.4-mile) right-of-way
- Upgrade the existing Keller Magnolia to Heritage 138-kV line with conductor rated to at least 746 MVA to be installed on Alliance to Keller Magnolia and Alliance to Heritage 138-kV double-circuit towers
- Upgrade the existing Heritage to Keller Magnolia Tap double-circuit lines with conductors rated to at least 746 MVA
- Construct a new 138-kV switching station at Keller Wall Price in a 6-breaker ring bus arrangement
- Disconnect the double-circuit Heritage to Keller Magnolia Tap lines at Keller Magnolia Tap and terminate both at Keller Wall Price by constructing two new 0.3-mile 138-kV transmission lines added to the existing Keller Magnolia Tap to Keller Wall Price right-of-way with both new line conductors rated to at least 746 MVA
- Retire Keller Magnolia Tap