



TNMP – Pecos County Transmission Improvement Project ERCOT Independent Review Status Update

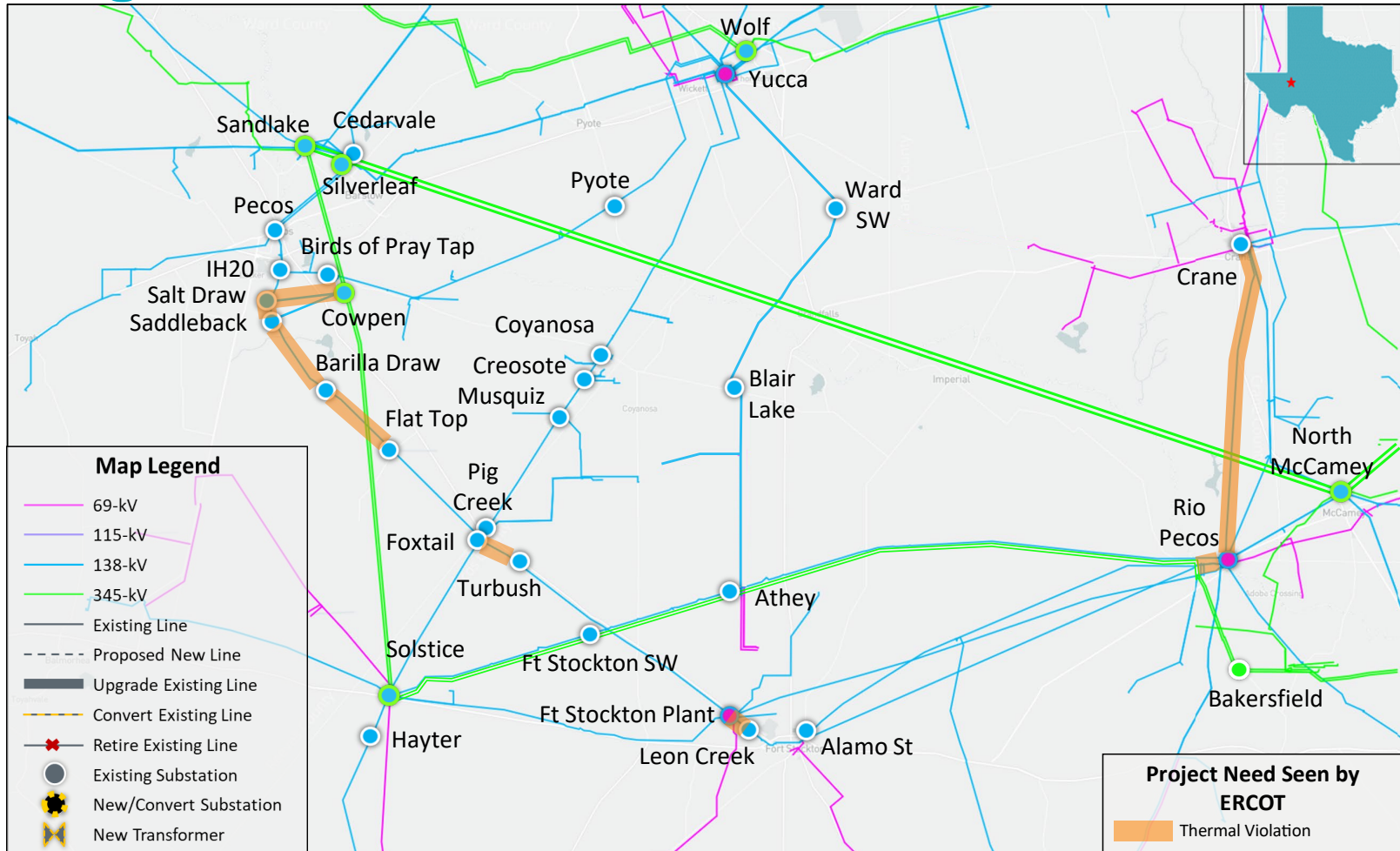
Tanzila Ahmed

RPG meeting
January 17, 2024

Recap

- TNMP submitted the Pecos County Transmission Improvement Project for Regional Planning Group (RPG) review in August 2023
 - This Tier 1 project is estimated to cost \$108.0 million and will require Certificate of Convenience and Necessity (CCN) filings
 - Estimated in-service date (ISD) is May 2026
 - Addresses both thermal overloads and voltage violations under maintenance outage conditions due to new load additions in the Pecos County in the Far West Weather Zone
 - TNMP has expressed need for “critical status designation”
- TNMP provided an overview presentation and ERCOT presented the study scope at the October RPG Meeting
 - <https://www.ercot.com/calendar/10182023-RPG-Meeting>
- ERCOT provided status update at the November and December RPG Meetings
 - <https://www.ercot.com/calendar/11142023-RPG-Meeting>
 - <https://www.ercot.com/calendar/12132023-RPG-Meeting--Webex>

Recap: Study Area Map with Project Need as Seen by ERCOT under Planned Maintenance Outage Scenarios



Recap: Short-listed Options

- ERCOT conducted planned maintenance outage analysis on nine options to determine relative performance between the options

Option	Voltage Violations	Thermal Overloads	Unsolved Power Flow
1, 1-Alternative*	12**	None	None
2	None	None	None
3	13**	16.8 miles of 138-kV lines	5 + 2 = 7
4	12**	None	5 + 8 = 13
5	None	None	None
6, 6-Alternative*	3	2.9 miles of 138-kV lines	None
7, 7-Alternative*	None	2.9 miles of 138-kV lines	None
8	3	17.3 miles of 138-kV lines	None
9, 9-Alternative*	12**	None	None

* The alternative versions involves looping in the existing Tarbush – Leon Creek 138-kV line into Ft. Stockton SW 138-kV station instead of building the new Woodhouse 138-kV station and to tie the Woodhouse to Ft. Stockton SW

** These are pre-existing off-peak voltage violations not related to the project, which can be solved by adding an 80 MVAR (2 blocks of 40 MVAR) capacitor bank at Athey or Blair Lake 138-kV substations

- Based on the results in the above table, Option 1, 2, 5, and 9 were selected for further evaluation



Recap: Long-Term Load Serving Capability Assessment

- Assumptions
 - Adjusted load up in the study area, excluding Flexible Loads in the area
 - Adjusted conforming load down outside of Far West WZ to balance power
 - Based on N-1 contingency
- Preliminary Findings
 - Options 1, 1-Alternative, and 2 provide similar performance and are 24% higher in terms of long-term load serving capability than Options 5, 9, and 9-Alternative
 - Options 5, 9, and 9-Alternative provide similar performance

Option	Incremental Load Serving Capability (MW)
Base case	52.0
1, 1-Alternative*	189.0
2	190.0
5	153.0
9, 9-Alternative*	152.0

* The alternative versions involves looping in the existing Tarbush – Leon Creek 138-kV line into Ft. Stockton SW 138-kV station instead of building the new Woodhouse 138-kV station and to tie the Woodhouse to Ft. Stockton SW

Analysis Performed

- Options Evaluation
 - Cost Estimate and Feasibility Assessment
- ERCOT Preferred Option Selected
 - Congestion Analysis
 - Sensitivity Analyses Planning Guide (PG) section 3.1.3 (4))
 - Generation Addition Sensitivity Analysis
 - Load Scaling Sensitivity Analysis
 - Subsynchronous Resonance (SSR) Assessment (Nodal Protocol Section 3.22.1.3(2))

Cost Estimate and Feasibility Assessment

- Transmission Service Providers (TSPs) performed feasibility assessments and provided cost estimates for the short-listed options
 - Based on inputs from TNMP, Option 1-Alternative and Option 9-Alternative deemed infeasible due to TNMP Interconnection Requirement
 - Based on input from TNMP, Option 9 was deemed infeasible due to TNMP System Reliability Risk (below unity Post-contingency voltages)

Option	Cost Estimates (\$M)	CCN Required (Miles)	Feasibility	Estimated Completion Date
1	~ 114.8	~ 31.1	Feasible	May-26, Aug-26
1-Alternative	~ 108.6*	~ 31.1	Not Feasible	May-26, Aug-26
2	~ 114.3	~ 31.3	Feasible	May-26, Apr-27
5	~ 113.1	~ 22.0	Feasible	May-26, Apr-27, May-27
9	~ 138.6	~ 21.6	Not Feasible	May-26, 36-48 months
9-Alternative	~ 132.4*	~ 21.6	Not Feasible	May-26, 36-48 months

* The estimated cost does not include cost of the component that was deemed infeasible by TNMP

Short-listed Options Comparison

	Option		
	1	2	5
Address the project needs	Yes	Yes	Yes
Meets ERCOT and NERC Reliability Criteria	Yes	Yes	Yes
Improves Long-term Load Serving Capability	Yes (Better)	Yes (Better)	Yes
Improves Operational Flexibility	Yes (Better)	Yes	Yes
Provides Additional 138-kV Load Interconnection Point	Yes	No	No
Require CCN* (miles)	~ 31.1	~ 31.3	~ 22.0
Expected Completion Date	Aug-26	Apr-27	May-27
Cost Estimate* (\$M)	~ 114.8	~ 114.3	~ 113.1

* Cost estimates and mileages were provided by TSPs

- Options 1 and 2 provides better long-term load serving capability than Option 5
- Option 1 provides better operational flexibility, additional 138-kV load interconnection point, and has the shortest expected completion time

ERCOT Preferred Option

- ERCOT preferred Option
 - Option 1 was selected as the preferred option because it
 - Addresses reliability violations
 - Improves long-term load serving capability for future load growth in the area
 - Provides better operational flexibility
 - Provides additional 138-kV load interconnection point
 - Provides the shortest anticipated completion time of the short-listed option

Additional Analyses

- Congestion Analysis
 - Congestion analysis was performed for the preferred Option 1 using the 2022 RTP 2027 economic case
 - Option 1 did not result in any new congestion within the study area
- Subsynchronous Resonance (SSR) Assessment
 - Subsynchronous Resonance (SSR) Assessment was conducted for the preferred Option 1 per Nodal Protocol Section 3.22.1.3
 - ERCOT found no adverse SSR impacts to the existing and planned generation resources at the time of this study

Sensitivity Analyses

- Generation Addition Sensitivity Analysis

- Per Planning Guide Section 3.1.3(4)(a), ERCOT performed a generation addition sensitivity by adding the generation listed below to the preferred option case. The additional resources were modeled following the 2022 RTP methodology. ERCOT determined relevant generators do not impact the preferred option

GINR	Project Name	Fuel Type	Capacity (MW)	County
16INR0104	Big Sampson Wind	Wind	400.0	Crockett
21INR0021	Green Holly Solar	Solar	413.6	Dawson
21INR0022	Red Holly Solar	Solar	260.0	Dawson
21INR0029	Green Holly Storage	Battery	50.0	Dawson
21INR0033	Red Holly Storage	Battery	50.0	Dawson
21INR0268	Greyhound Solar	Solar	608.7	Ector
23INR0287	BRP Avila BESS	Battery	165.0	Pecos
23INR0300	Greater Bryant G Solar	Solar	41.6	Midland
23INR0340	Larkspur Energy Storage	Battery	307.5	Upton
24INR0273	Al Pastor BESS	Battery	100.8	Dawson
25INR0208	Iron Belt Energy Storage	Battery	401.9	Borden

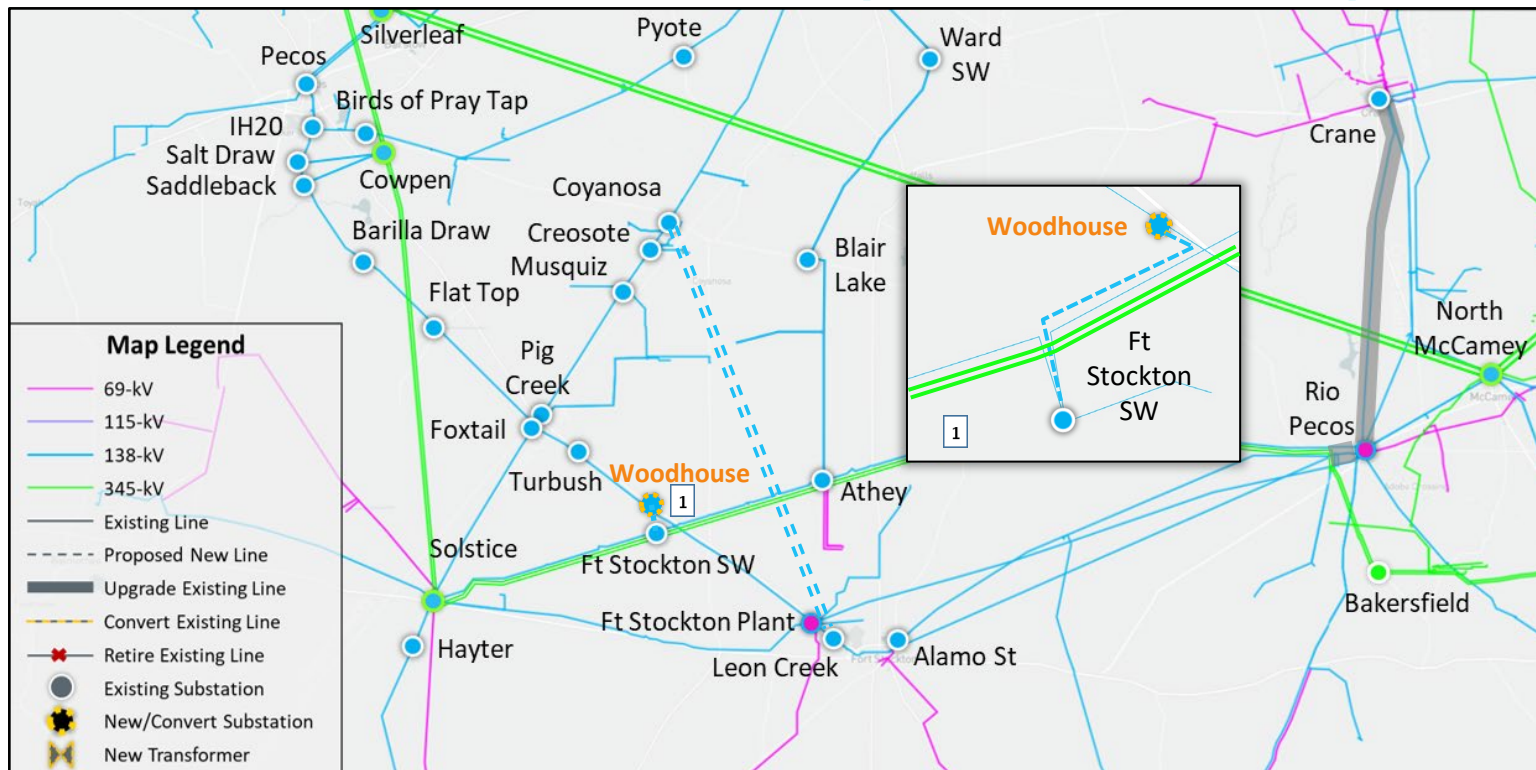
- Load Scaling Sensitivity Analysis

- Per 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 1
 - Estimated Cost: ~\$114.8 million
 - Expected In-Service Date: August 2026
 - CCN is required for
 - Construction of the new Coyanosa – Leon Creek 138-kV double-circuit transmission line, approximately 31.1-mile
 - TNMP 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, ERCOT deems this project critical to reliability

ERCOT Recommendation (Option 1 Map)



- Construct a new Coyanosa – Leon Creek 138-kV double-circuit lines with rating of 717 MVA or above, approximately 31.1-mile
- Construct a new Woodhouse 138-kV substation by cutting into Tarbush – Leon Creek 138-kV line near Ft. Stockton SW
- Create a new Woodhouse – Ft. Stockton SW 138-kV tie-line with rating of 717 MVA or above, approximately 0.1-mile
- Upgrade the existing Rio Pecos – Crane 138-kV line with rating of 717 MVA or above, approximately 23.7-mile
- Upgrade the existing second circuit Rio Pecos – Girvin 138-kV double-circuit line with rating of 717 MVA or above, approximately 0.6-mile

Next Steps and Tentative Timeline

- EIR Report to be posted in MIS
 - January 2024
- EIR recommendation to TAC
 - January 24, 2024
- EIR recommendation to R&M Committee
 - February 26, 2024
- Seek ERCOT Board of Directors endorsement
 - February 27, 2024

Thank you!

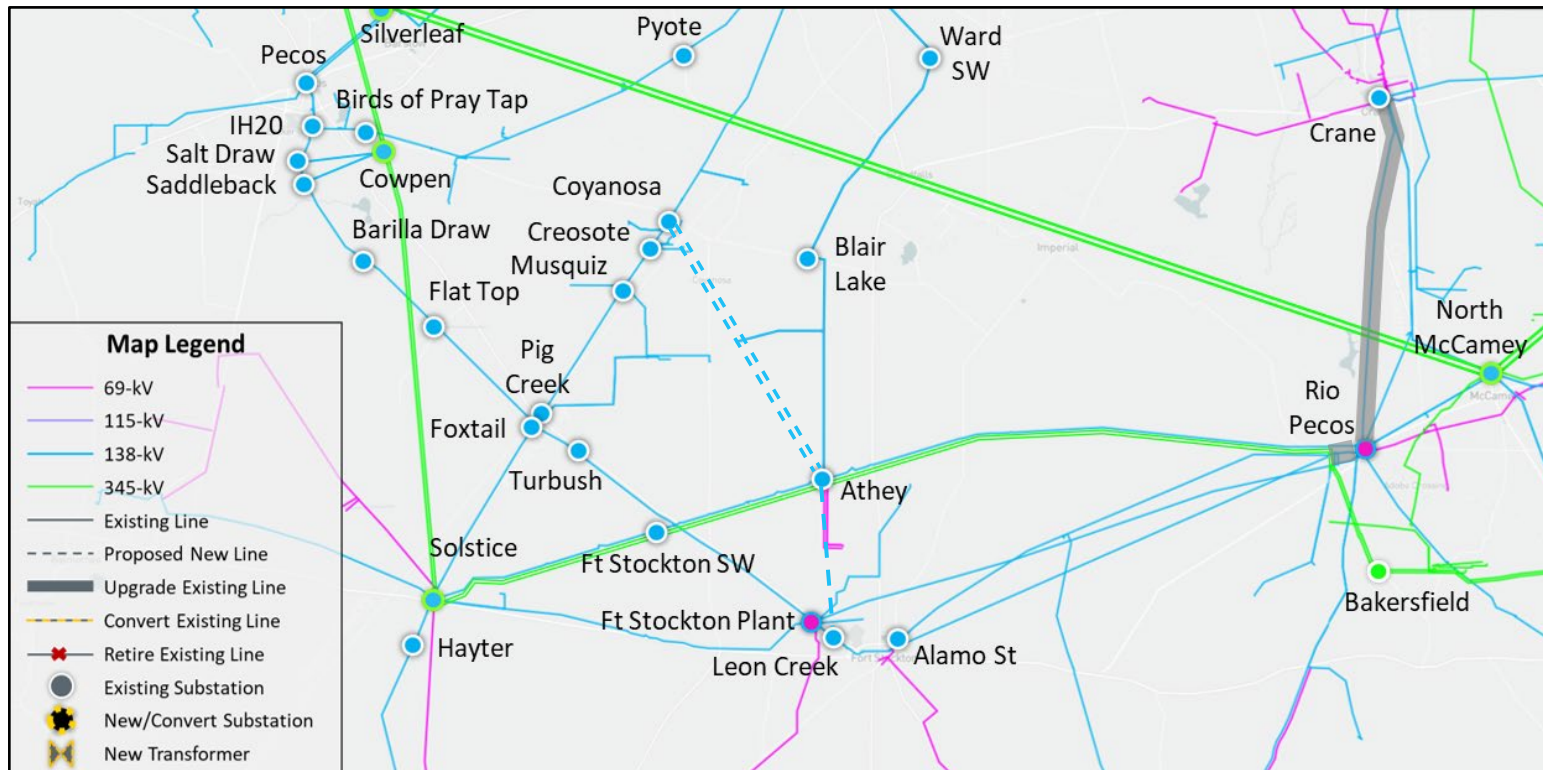


Stakeholder comments also welcomed through:

Tanzila.Ahmed@ercot.com

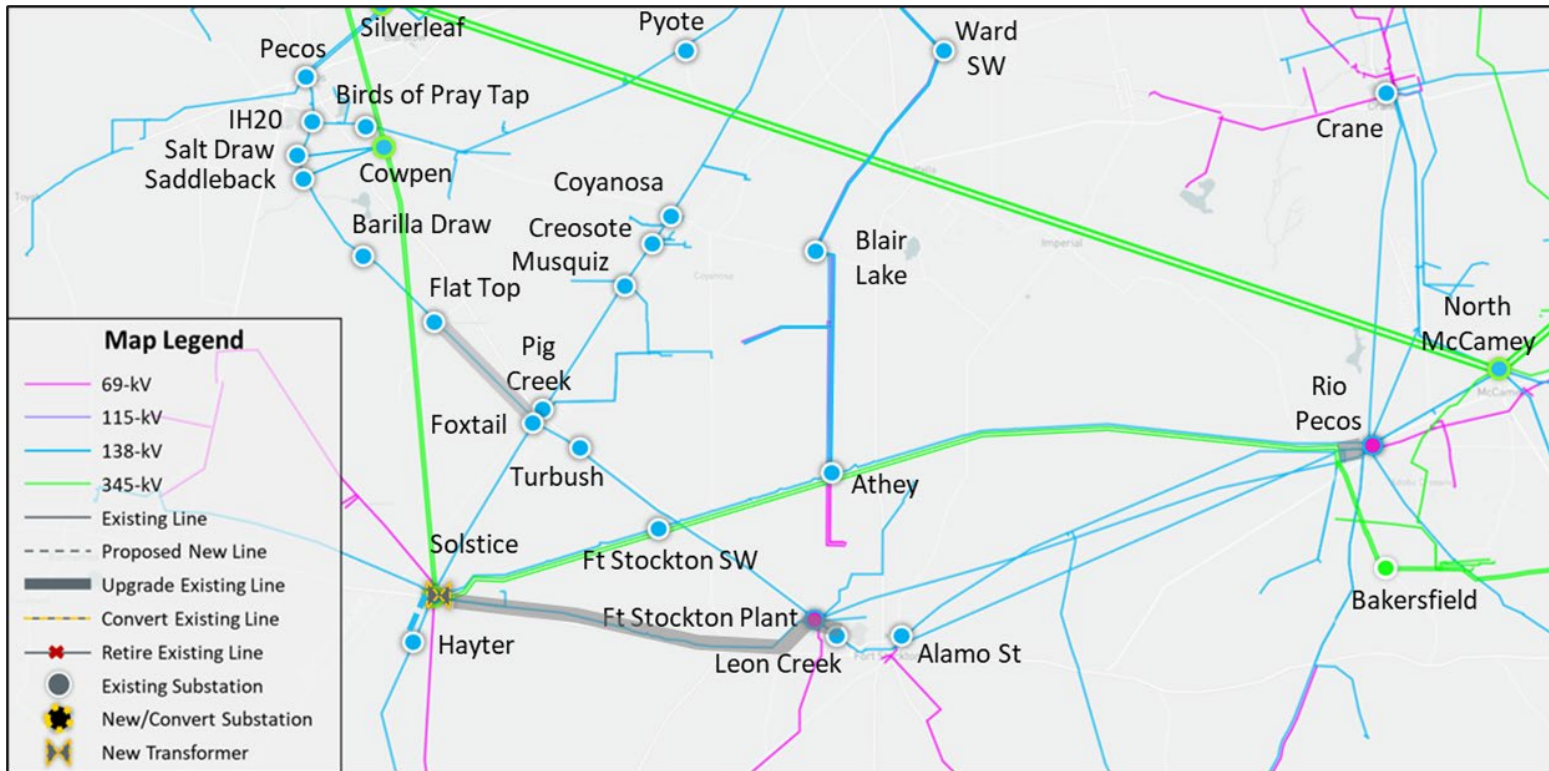
Robert.Golen@ercot.com

Recap: Option 2



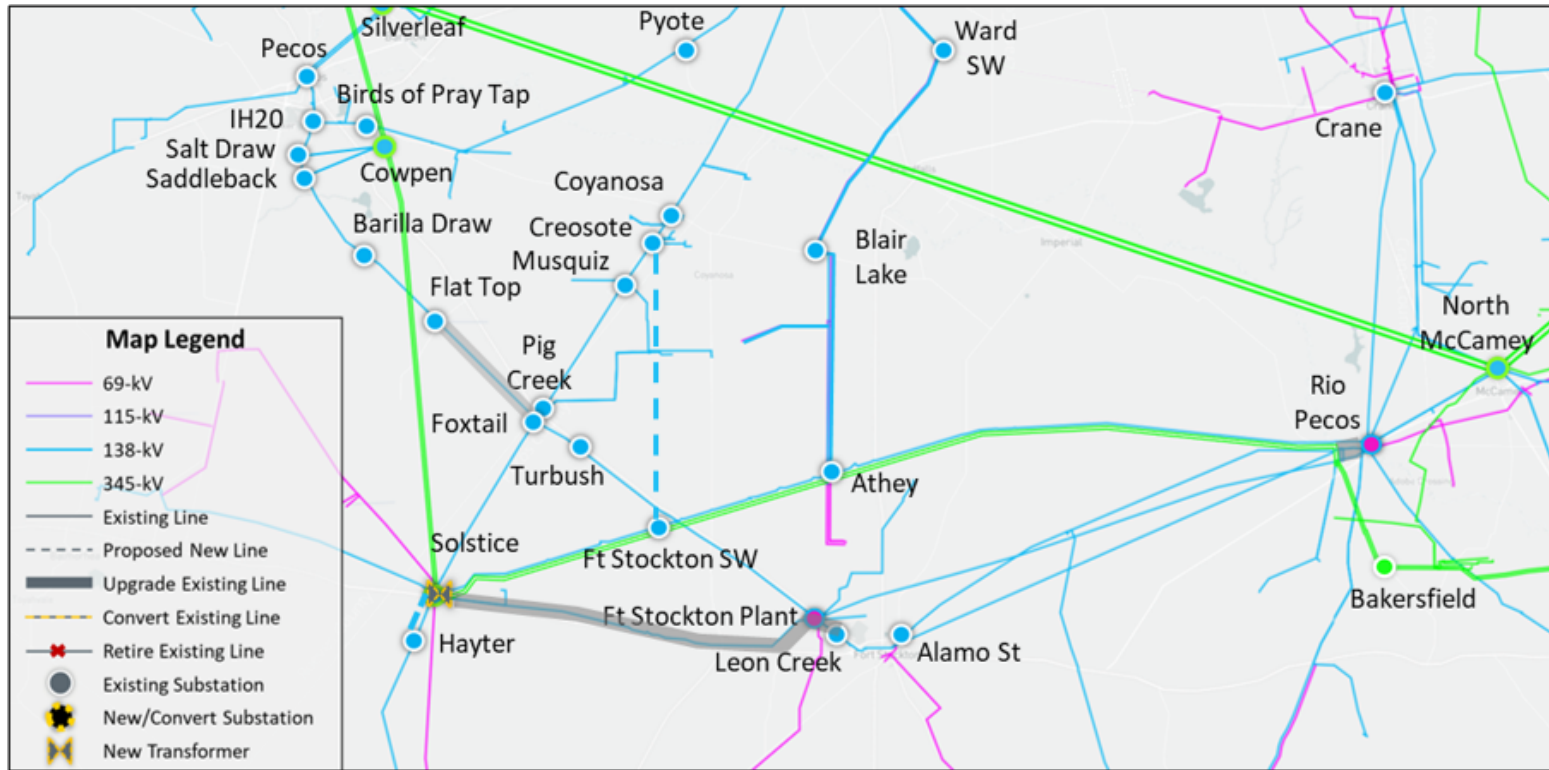
- Construct a new Coyanosa – Athey 138-kV double-circuit lines with rating of 717 MVA or above, approximately 20-mile
- Construct a new Athey – Leon Creek 138-kV line with rating of 717 MVA or above, approximately 10-mile
- Upgrade the existing Rio Pecos – Crane 138-kV line with rating of 717 MVA or above, approximately 23.7-mile
- Upgrade the existing second circuit Rio Pecos – Girvin 138-kV double-circuit line with rating of 717 MVA or above, approximately 0.6-mile

Recap: Option 3



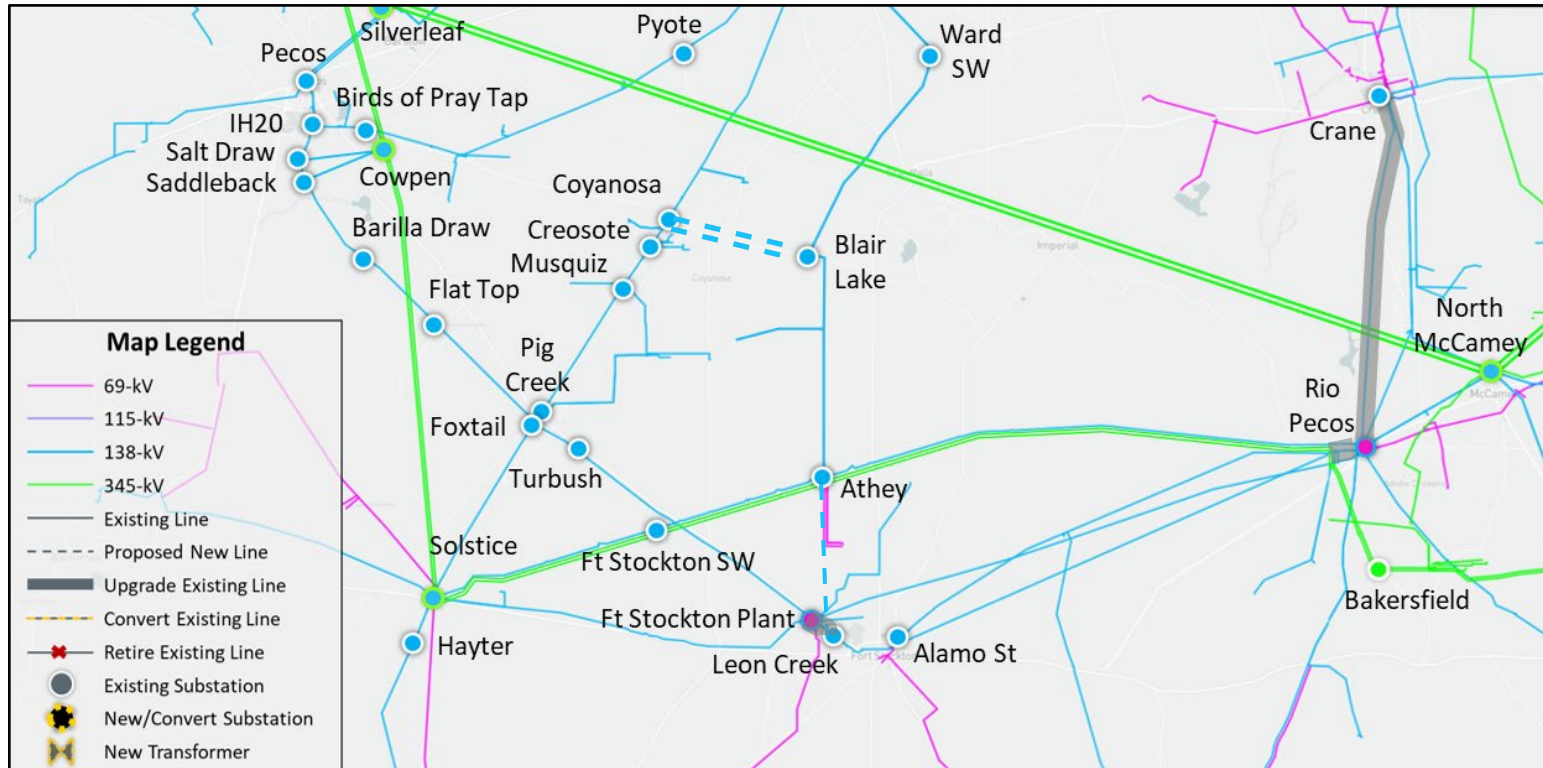
- Upgrade the existing Flattop – Foxtail 138-kV line with rating of 717 MVA or above, approximately 8.6-mile
- Add a second circuit to the existing Hayter – Solstice 138-kV line with rating of 717 MVA or above, approximately 1.7-mile
- Upgrade the two existing Solstice Transformers to 800 MVA rating & Bypass the PST at Solstice substation
- Upgrade the existing Solstice – Ft. Stockton Plant – Leon Creek 138-kV line with rating of 717 MVA or above, approximately 25.6-mile
- Upgrade the existing second circuit Rio Pecos – Girvin 138-kV double-circuit line with rating of 717 MVA or above, approximately 0.6-mile

Recap: Option 4 – Similar to Option 3



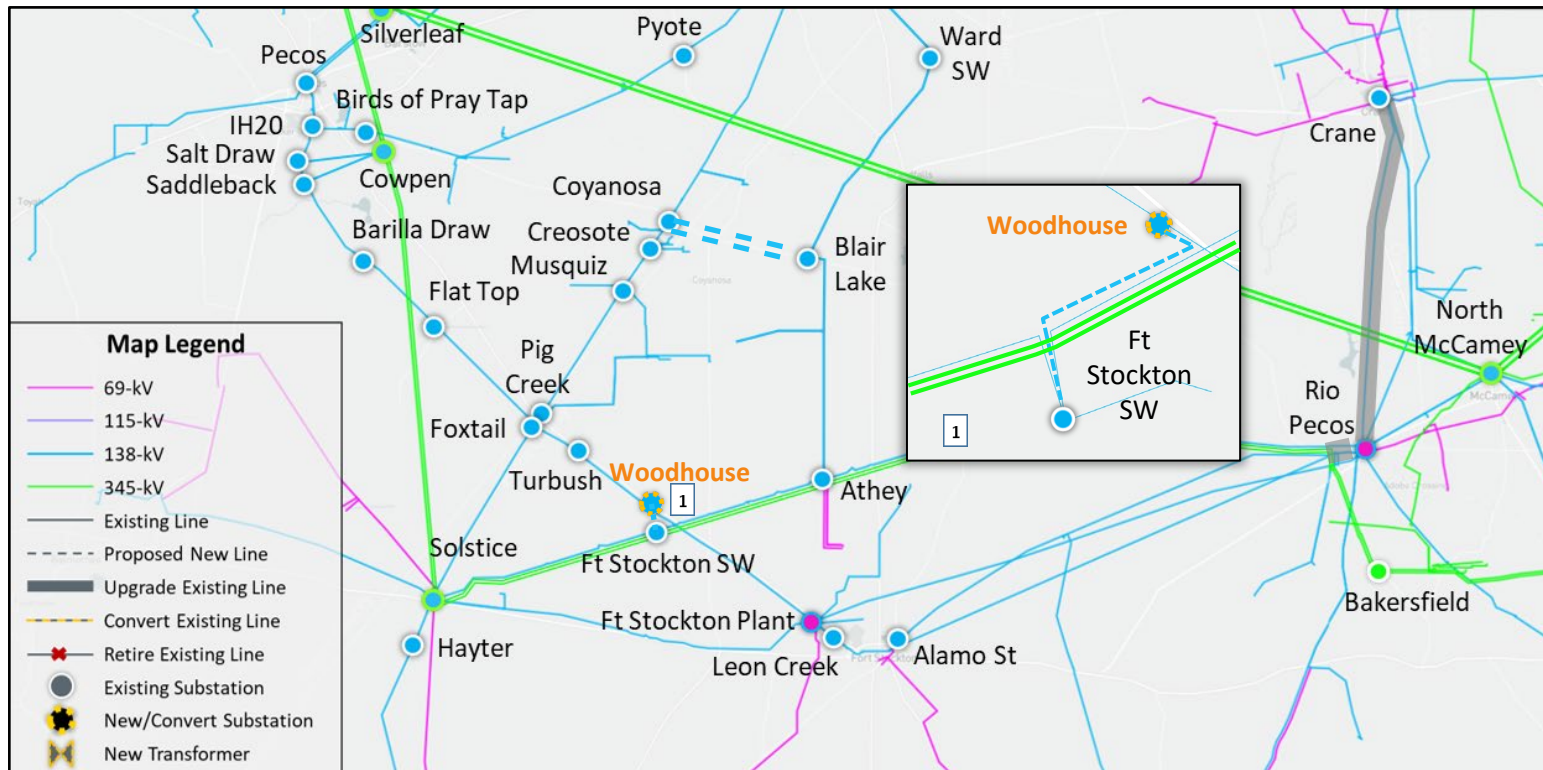
- Upgrade the existing Flattop – Foxtail 138-kV line with rating of 717 MVA or above, approximately 8.6-mile
- Add a new second circuit to the existing Hayter – Solstice 138-kV line with rating of 717 MVA or above, approximately 1.7-mile
- Upgrade the two existing Solstice Transformers to 800 MVA rating & Bypass the PST at Solstice substation
- Upgrade the existing Solstice – Ft. Stockton Plant – Leon Creek 138-kV line with rating of 717 MVA or above, approximately 25.6-mile
- Upgrade the existing second circuit Rio Pecos – Girvin 138-kV double-circuit line with rating of 717 MVA or above, approximately 0.6-mile
- Construct a new Creosote – Fort Stockton Switch 138-kV line with rating of 717 MVA or above, approximately 21.6-mile

Recap: Option 5



- Construct a new Coyanosa – Blair Lake 138-kV double-circuit line with rating of 717 MVA or above, approximately 12.2-mile
- Construct a new Athey – Leon Creek 138-kV line with rating of 717 MVA or above, approximately 10-mile
- Upgrade the existing Ft. Stockton Plant – Leon Creek 138-kV line with rating of 717 MVA or above, approximately 0.1-mile
- Upgrade the existing Rio Pecos – Crane 138-kV line with rating of 717 MVA or above, approximately 23.7-mile
- Upgrade the existing second circuit Rio Pecos – Girvin 138-kV double-circuit line with rating of 717 MVA or above, approximately 0.6-mile

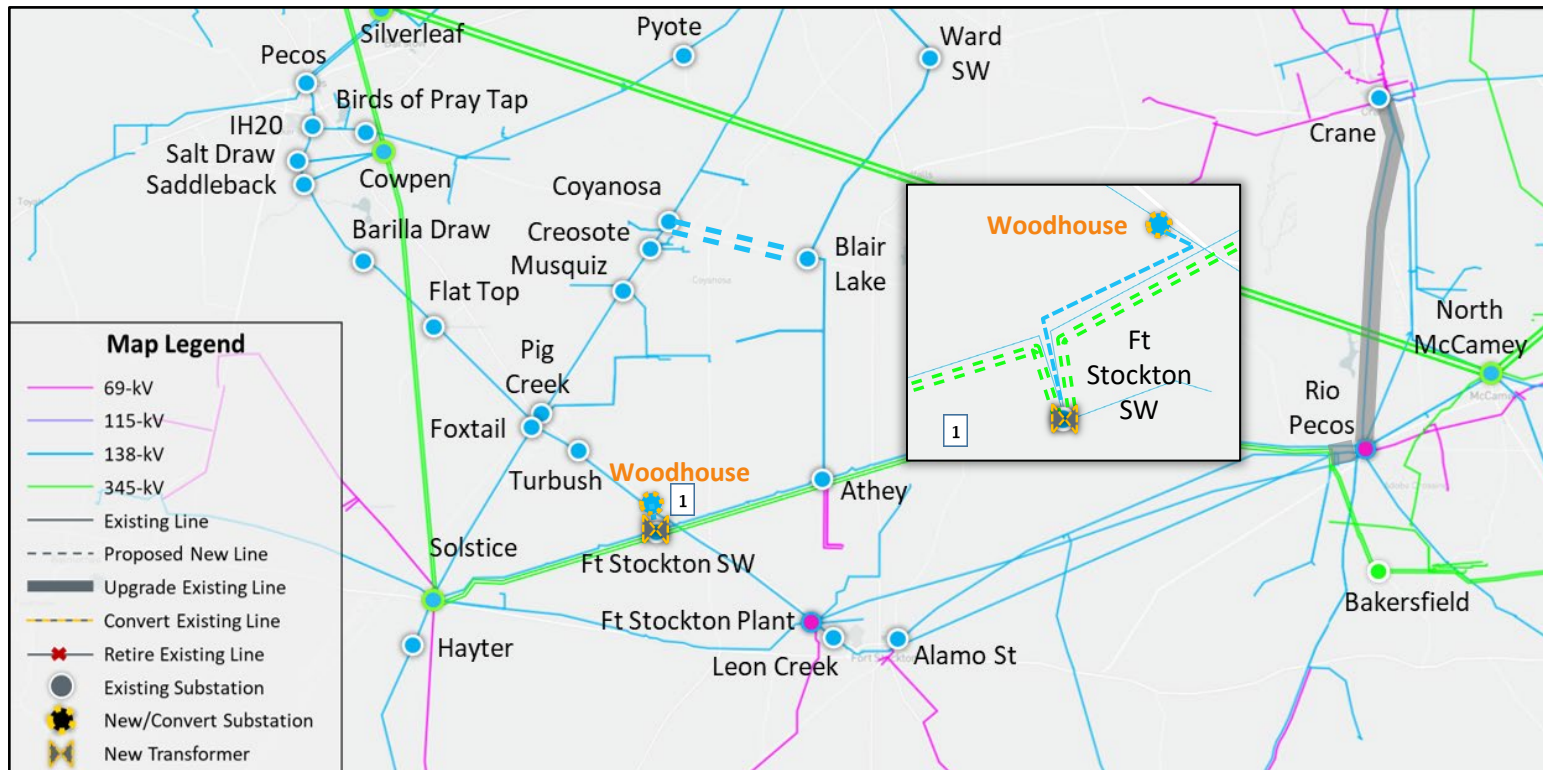
Recap: Option 6



- Construct a new Coyanosa – Blair Lake 138-kV double-circuit line with rating of 717 MVA or above, approximately 12.2-mile
- Construct a new Woodhouse 138-kV station by cutting into Tarbush – Leon Creek 138-kV line near Ft. Stockton SW
- Create a new Woodhouse – Ft. Stockton SW 138-kV tie-line with rating of 717 MVA or above, approximately 0.1-mile
- Upgrade the existing Rio Pecos – Crane 138-kV line with rating of 717 MVA or above, approximately 23.7-mile
- Upgrade the existing second circuit Rio Pecos – Girvin 138-kV double-circuit line with rating of 717 MVA or above, approximately 0.6-mile

NOTE: An alternative version of this option was tested where the existing Tarbush – Leon Creek 138-kV line was looped into Ft. Stockton SW 138-kV station instead of building the new Woodhouse 138-kV station and tie the Woodhouse to Ft. Stockton SW station

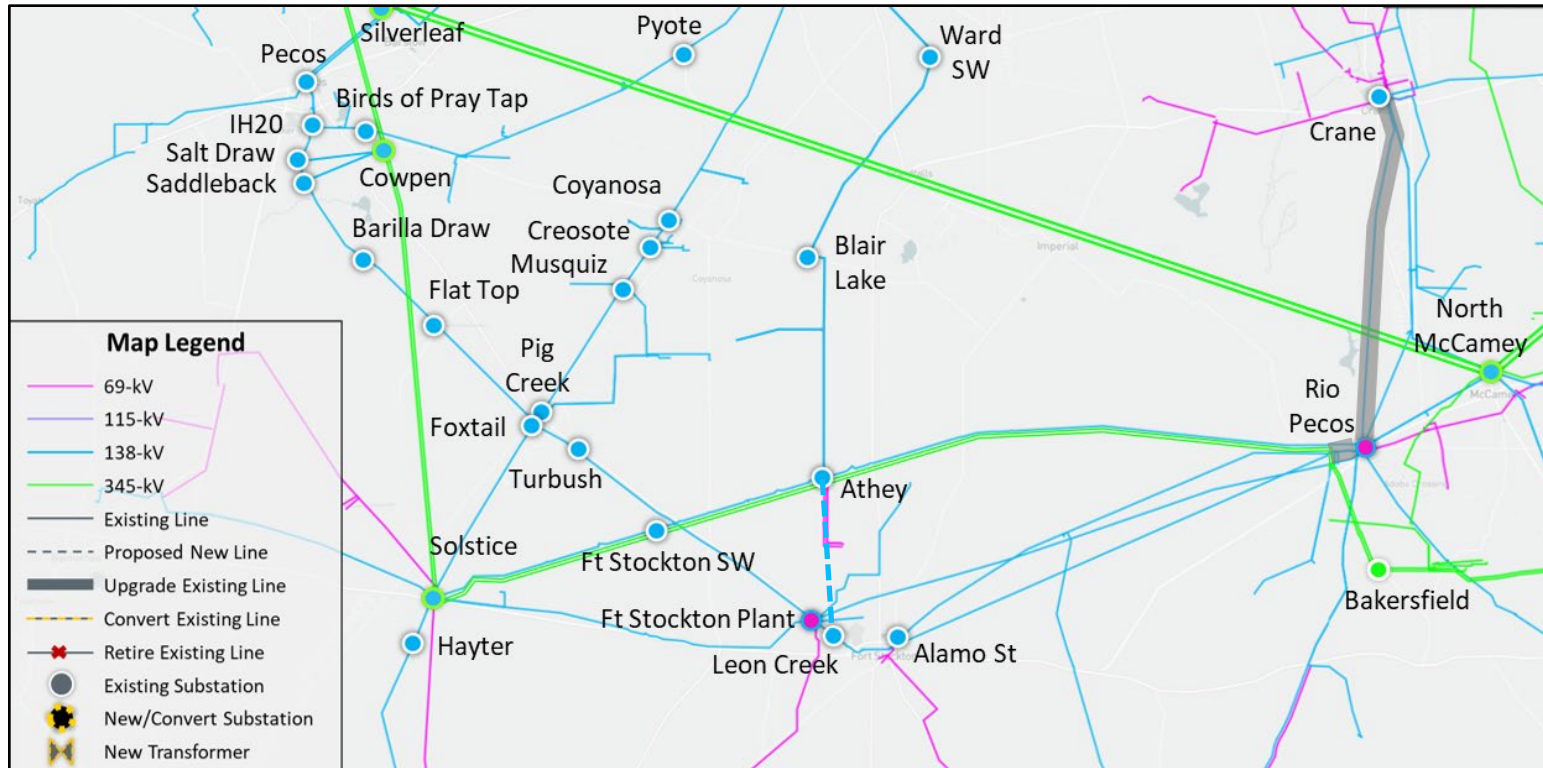
Option 7 – Similar to Option 6



- Construct a new Coyanosa – Blair Lake 138-kV double-circuit line with rating of 717 MVA or above, approximately 12.2-mile
- Construct a new Woodhouse 138-kV station by cutting into Tarbush – Leon Creek 138-kV line near Ft. Stockton SW
- Create a new Woodhouse – Ft. Stockton SW 138-kV tie-line with rating of 717 MVA or above, approximately 0.1-mile
- Upgrade the existing Rio Pecos – Crane 138-kV line with rating of 717 MVA or above, approximately 23.7-mile
- Upgrade the existing second circuit Rio Pecos – Girvin 138-kV double-circuit line with rating of 717 MVA or above, approximately 0.6-mile
- Install two new 345/138-kV transformers with 800 MVA rating at the existing Ft. Stockton SW 138-kV substation and cut into the existing Solstice – Bakersfield 345-kV double-circuit lines

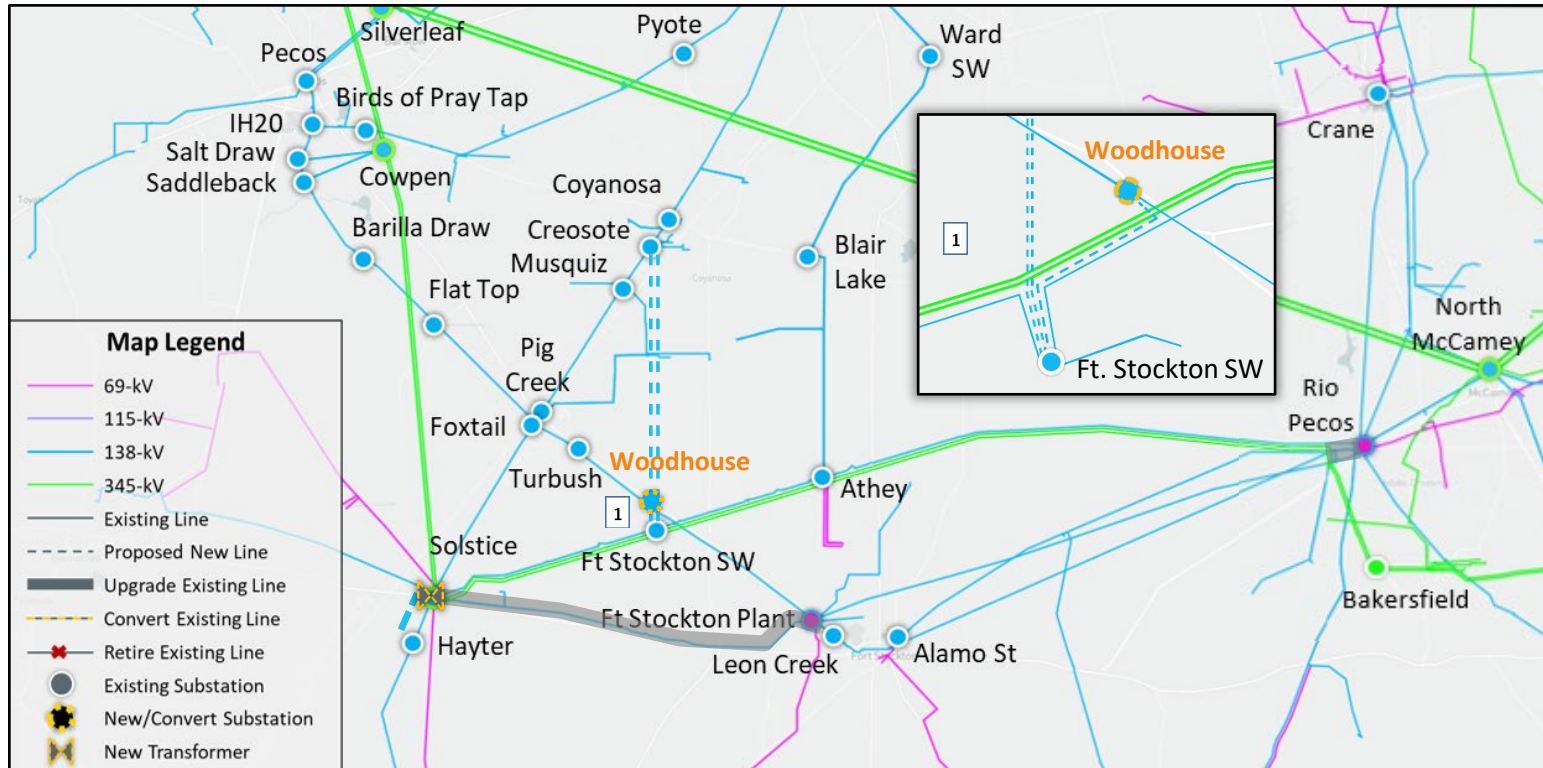
NOTE: An alternative version of this option was tested where the existing Tarbush – Leon Creek 138-kV line was looped into Ft. Stockton SW 138-kV station instead of building the new Woodhouse 138-kV station and tie the Woodhouse to Ft. Stockton SW station

Recap: Option 8



- Construct a new Athey – Leon Creek 138-kV line with rating of 717 MVA or above, approximately 10.0-mile
- Upgrade the existing Rio Pecos – Crane 138-kV line with rating of 717 MVA or above, approximately 23.7-mile
- Upgrade the existing second circuit Rio Pecos – Girvin 138-kV double-circuit line with rating of 717 MVA or above, approximately 0.6-mile

Recap: Option 9 – Similar to Option 4



- Add a new second circuit to the existing Hayter – Solstice 138-kV line with rating of 717 MVA or above, approximately 1.7-mile
- Upgrade the two existing Solstice Transformers to 800 MVA rating & Bypass the PST at Solstice
- Upgrade the existing Rio Pecos – Crane 138-kV line with rating of 717 MVA or above, approximately 23.7-mile
- Upgrade the existing second circuit Rio Pecos – Girvin 138-kV double-circuit line with rating of 717 MVA or above, approximately 0.6-mile
- Construct a new Creosote – Fort Stockton Switch 138-kV double-circuit lines with rating of 717 MVA or above, approximately 21.6-mile
- Construct a new Woodhouse 138-kV by cutting into the existing Tarbush – Leon Creek 138-kV line and tie into Ft. Stockton SW 138-kV station

NOTE: An alternative version of this option was tested where the existing Tarbush – Leon Creek 138-kV line was looped into Ft. Stockton SW 138-kV station instead of building the new Woodhouse 138-kV station and tie the Woodhouse to Ft. Stockton SW station

Recap: Updates Included for All Options

- Reactive support
 - 160 MVAR capacitor banks (modeled as 4 blocks of 40 MVAR) at Airport (38340) and Coyanosa (38380) substations were split into two separate 80 MVAR capacitor banks (modeled as 2 blocks 40 MVAR) at each substation