Pedernales Electric Cooperative, Inc. (PEC) – Wimberley Loop Transmission
ERCOT Independent Review Scope and Status Update

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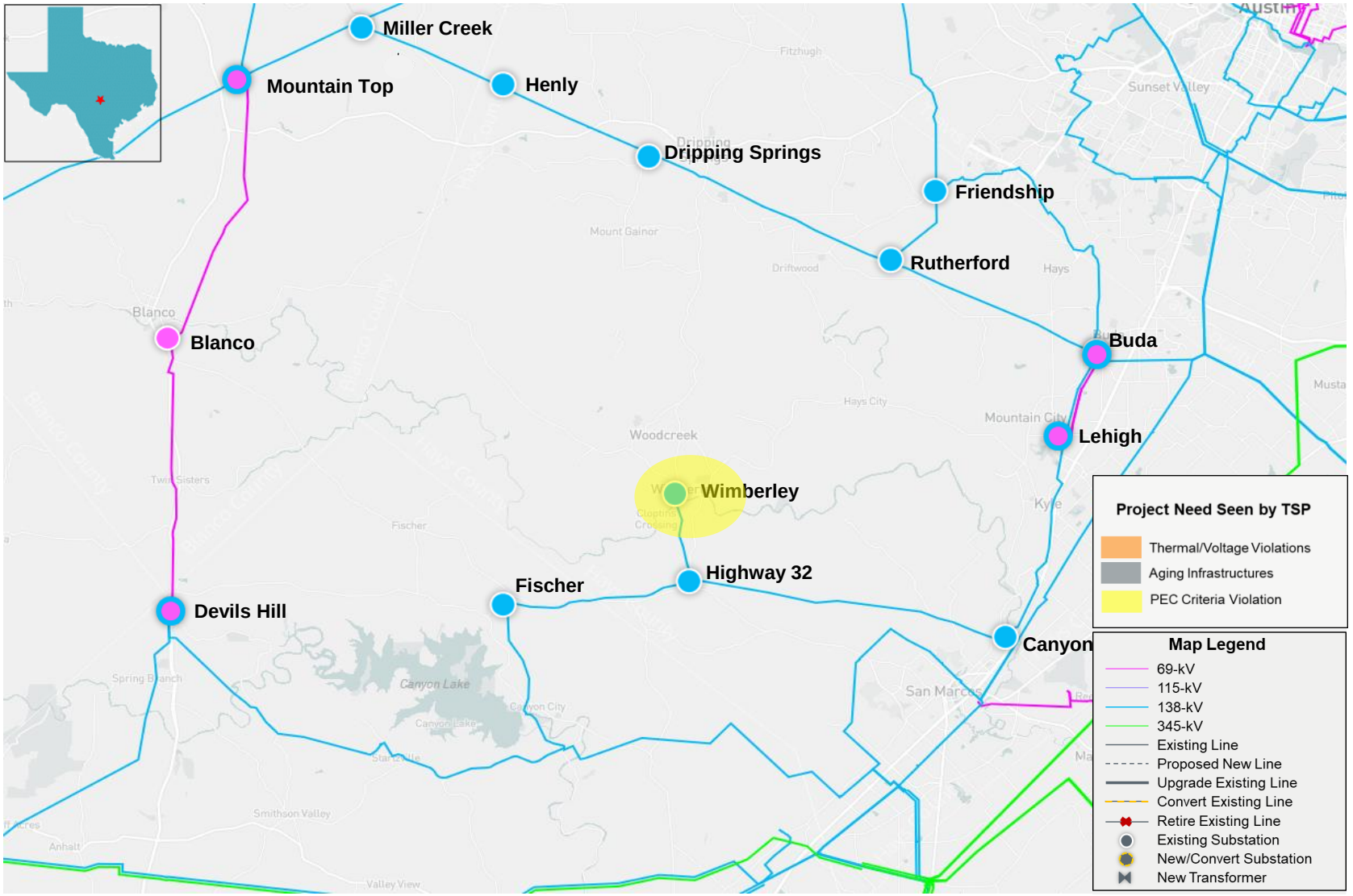
RPG Meeting
October 19, 2022

Overview

- Pedernales Electric Cooperative, Inc. (PEC) submitted the Wimberley Loop Transmission Study for Reginal Planning Group (RPG) review in August 2022
  - This Tier 2 project is estimated at $77.3 million and will require a Certificate of Convenience and Necessity (CCN)
  - Estimated completion date is May 2027
- The project addresses PEC's transmission planning criteria violation
  - Wimberley substation currently radially serving load that exceeds 20 MW
  - Distribution load switching options becoming exhausted
- This project is currently under ERCOT Independent Review (EIR)

Study Area Map with Project Need



PEC Proposed Project: New Wimberley to Blanco 138-KV

Note: Devils Hill to Blanco to Mountain Top 69-kV to 138-kV conversion (TPIT 70367A, 70367B) to be completed independent of and prior to Wimberley Loop Project according to PEC

Study Assumptions – Base Case

- Study area
  - South Central weather zone
  - West weather zone electrically close to project location
- Steady-state base case
  - The final 2021 Regional Transmission Planning (RTP) 2027 South and South Central (SSC) summer peak case was updated to construct the study base case.
  - The final 2021 RTP case is available in Market Information System (MIS)
    - Case: 2021RTP_2027_SUM_SSC_12232021
    - Link: https://mis.ercot.com/secure/data-products/grid/regional-planning?id=PG3-2178-M

Study Assumptions – Transmission

- New projects added
  - Devils Hill to Blanco to Mountain Top 69-kV to 138-kV conversion (TPIT 70367A, 70367B) based on input from PEC and the RPG submittal
  - Tier 4 and approved RPG projects within the study area were added to the study base case if not already modeled in the case based on the Transmission Project and Information Tracking (TPIT) published on MIS in June 2022
    - Link: https://www.ercot.com/files/docs/2021/10/22/Archived%20Transmission%20Project%20and%20Information%20Tracking.zip
    - See Appendix for the list of added projects based on June 2022 TPIT
- Updated transformer ratings
  - The ratings of the three transformers at Zorn were updated

Study Assumptions – Generation

- New generation that met the Planning Guide Section 6.9(1) condition with Commercial Operation Date (COD) before May 2027 in the study area at the time of the study was reviewed. No changes were made based on the August 2022 Generator Interconnection Status (GIS) report published in MIS
  - Link: https://www.ercot.com/misdownload/servlets/mirDownload?doclookupId=861601058

GINR	Project Name	Fuel	Project COD	Capacity (MW)	County
	None				

- All recent retired/indefinitely mothballed units were reviewed and turned off, if not already reflected in the 2021 RTP Final cases

Study Assumptions – Load & Reserve

- Loads in the study area
  - Loads in the study area were updated to match the 2022 RTP cases posted in May
- Reserve
  - Load outside of South, South Central and West weather zones was adjusted to make the reserve consistent with the RTP methodology

Contingencies & Criteria

- Contingencies for study region
  - NERC TPL-001-5 and ERCOT Planning Criteria
  - Link: http://www.ercot.com/mktrules/guides/planning/current
    - P0 (System Intact)
    - P1, P2-1, P7 (N-1 conditions)
    - P2-2, P2-3, P4, and P5 (EHV only)
    - P3-1: G-1 + N-1 (none for this study)
    - P6-2: X-1 + N-1 (X-1:Bergheim, Zorn 345/138-kV transformers)
- Criteria
  - Monitor all 60 kV and above buses, transmission lines, and transformers in the study region (excluding generator step-up transformers)
  - Thermal
    - Use Rate A for normal conditions
    - Use Rate B for emergency conditions
  - Voltage
    - Voltages exceeding their pre-contingency and post-contingency limits
    - Voltage deviations exceeding 8% on non-radial load buses

PEC Criteria

- PEC's transmission planning criteria calls for reliability to a radial-supplied station serving more than 20 MW of load to be addressed by one or more of the following mitigation strategies
  - Looped transmission service to the radial station by a separate transmission circuit on separate transmission towers
  - Looped transmission service on common towers from the same source provided the transmission circuits are terminated at a station with an improved bus configuration and do not share a common breaker and distribution backup has the capacity to pick up the entire station load without violating the Distribution Planning Criteria
  - Limit load served by the substation to less than 20 MW and provide the added capacity requirements from available area stations

Study Procedure

- Need analysis
  - A reliability analysis was performed to identify any reliability needs in the area including the PEC project need to limit load served by radial substations to 20 MW using the study base case
  - Project need based on TSP's criteria **(Protocol Section 3.11.4.9(4))**
    - ERCOT's independent review shall consider whether a reliability need exists under the TSP's criteria
    - ERCOT shall recommend a project that would address the need under TSP's criteria as well as any reliability need identified under NERC or ERCOT criteria
    - ERCOT or the ERCOT board will endorse such a project if ERCOT determines that it is justified in part under ERCOT or NERC criteria
    - Neither ERCOT nor the ERCOT Board shall endorse a project that is determined to be needed solely to meet a TSP's criteria
- Project evaluation
  - Project alternatives have been tested to satisfy the NERC, ERCOT and PEC reliability requirements

Preliminary Results of Reliability Assessment – Base Case

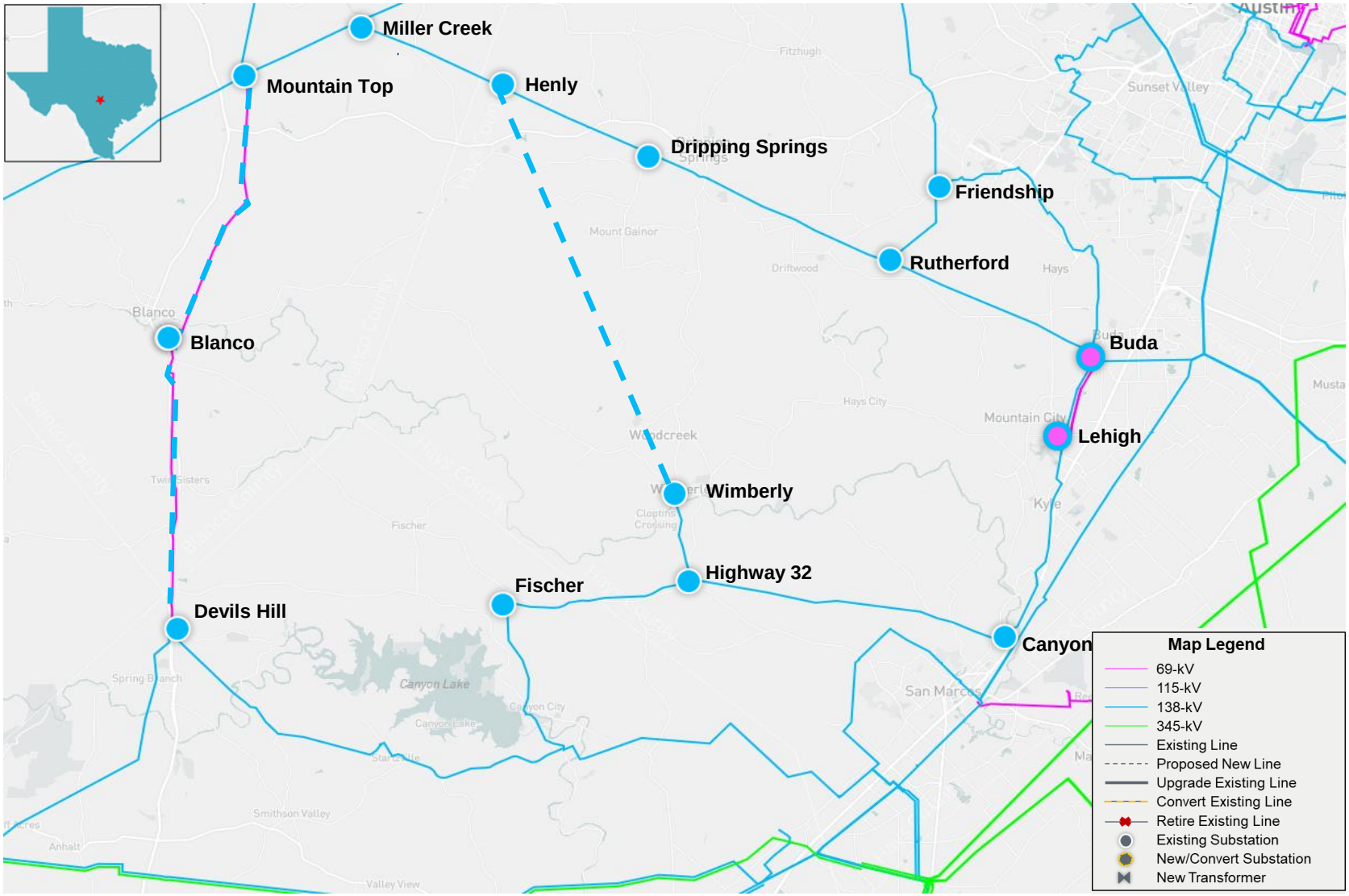
- ERCOT has confirmed PEC planning criteria violation
- No NERC or ERCOT criteria violations were found

Contingency Category*	Unsolved Power Flow	Voltage Violations	Thermal Overloads
P1	None	None	None
P2.1	None	None	None
P3 (G-1+N-1)*	None	None	None
P6.2 (X-1+N-1)*	None	None	None
P7	None	None	None

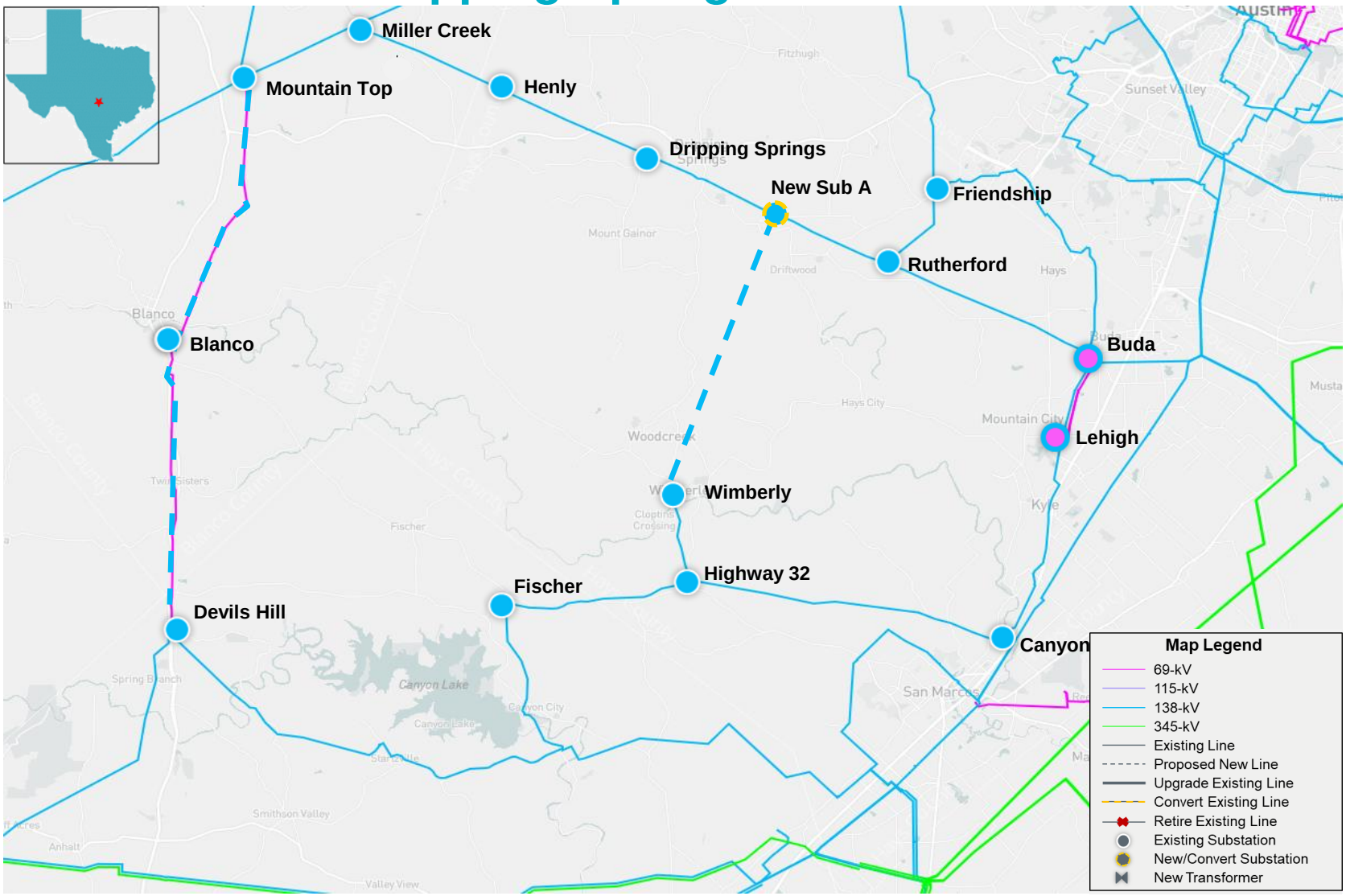
*See slide 9 for list of G-1 generators and X-1 transformers tested

Option 1 - New Wimberley to Blanco 138-kV

Option 2 - New Wimberley to Henly 138-kV



Option 3 – New Wimberley to New Sub A Between Rutherford and Dripping Springs 138-kV



Option 4 – New Wimberley to New Sub B Between Rutherford and Buda 138-kV

Preliminary Results of Reliability Assessment – Options

	N-1		X-1 + N-1	
	Thermal Violations	Voltage Violations	Thermal Violations	Voltage Violations
Option 1	None	None	None	None
Option 2	None	None	None	None
Option 3	None	None	None	None
Option 4	None	None	None	None

Next Steps and Tentative Timeline

- ERCOT will continue to evaluate options and provide status updates at future RPG meetings
  - ERCOT may perform the following studies
    - Planned maintenance outage
    - Long-term load serving capability assessment
  - Cost estimates and feasibility assessment
  - Congestion 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
  - Final recommendation - Q4 2022

Thank you!

Stakeholder comments also welcomed through:

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Appendix - Projects Added

TPIT No	Project Name	Tier	Project ISD	TSP	County
61356	Hays Energy-Henne Split Transmission Line Upgrade	4	May 2024	LCRA	Hays, Comal
61362	Henne-River Oaks Transmission Line Upgrade	4	May 2024	LCRA	Comal
61402	Boerne-Esperanza Transmission Line Upgrade	4	May 2024	LCRA	Kendall
61400	Esperanza-Fair Oaks Transmission Line Upgrade	4	May 2024	LCRA	Kendall
61404	Boerne Split-Welfare Transmission Line Upgrade	4	May 2024	LCRA	Kendall
61234	Antler-Bergheim Transmission Line Upgrade	4	May 2025	LCRA	Comal
61350	Antler-Highway 46 Transmission Line Upgrade	4	May 2025	LCRA	Comal
61358	Highway 46-River Oaks Transmission Line Upgrade	4	May 2025	LCRA	Comal
61406	Kendall-Welfare Transmission Line Upgrade	4	May 2025	LCRA	Kendall
61262A	Hunter to McCarty Lane Storm Hardening	4	Apr 2023	PEC,LCRA	Hays
54080	Lockhart - Lulig Transmission Line Overhaul	4	May 2023	LCRA	Caldwell
54082	Lockhart - Red Rock Transmission Line Overhaul	4	May 2023	LCRA	Caldwell, Bastrop
54103	Hilltop - Strahan Transmission Line Upgrade	4	May 2023	LCRA	Hays
61392	Bergheim-Fair Oaks Ranch Transmission Line Upgrade	4	May 2025	LCRA	Comal, Kendall
61264B	Marshall Ford to Trading Post Storm Hardening	4	Dec 2022	PEC	Travis
61264A	Marshall Ford to Trading Post Storm Hardening	4	Mar 2023	PEC	Travis
61266	Trading Post to Cedar Valley Storm Hardening	4	Apr 2024	PEC	Travis

Appendix - Projects Added (continued)

TPIT No	Project Name	Tier	Project ISD	TSP	County
61279	Nameless to Leander Transmission Line Upgrade	4	Apr-24	PEC	Travis
61274A	PEC_MarshallFord_Paleface_StormHardening	4	May-24	PEC	Travis
61274B	PEC_MarshallFord_Paleface_StormHardening	4	Nov-24	PEC	Travis
61268	Cedar Valley to Friendship Storm Hardening	4	Apr-25	PEC	Travis
61277	Lago Vista to Nameless Transmission Line Upgrade	4	Apr-25	PEC	Travis
61270	Friendship to Rutherford Storm Hardening	4	Apr-26	PEC	Travis