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Oncor and Lower Colorado River Authority (LCRA TSC) - Muscovy and Voss Lake 345/138-kV Project (25RPG009) – ERCOT Independent Review (EIR) Status Update

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Regional Planning Group (RPG) Meeting
April 13, 2026

Introduction

Oncor and Lower Colorado River Authority (LCRA TSC) submitted the Muscovy and Voss Lake Project (25RPG009) for Reginal Planning Group (RPG) review in April 2025

- This is a Tier 1 project with an estimated cost of approximately $381.83 million and will require a Convenience and Necessity (CCN)
- Estimated in-service date (ISD) is December 2028
- This project is needed to addresses post-contingency and thermal overloads and voltage violations in the Williamson and Milam counties
- 2024 RTP Observed similar violations and proposed 2024-SC28 and 2024-SC29

Introduction Continued

This project is currently under ERCOT independent Review (EIR)

- Oncor presented the project overview and ERCOT provided the EIR scope at the May 2025 RPG Meeting
- ERCOT provided EIR status updates at previous RPG meetings
  - June 2025 RPG Meeting
  - July 2025 RPG Meeting
  - October 2025 RPG Meeting
  - January 2026 RPG Meeting
  - March 2026 RPG Meeting

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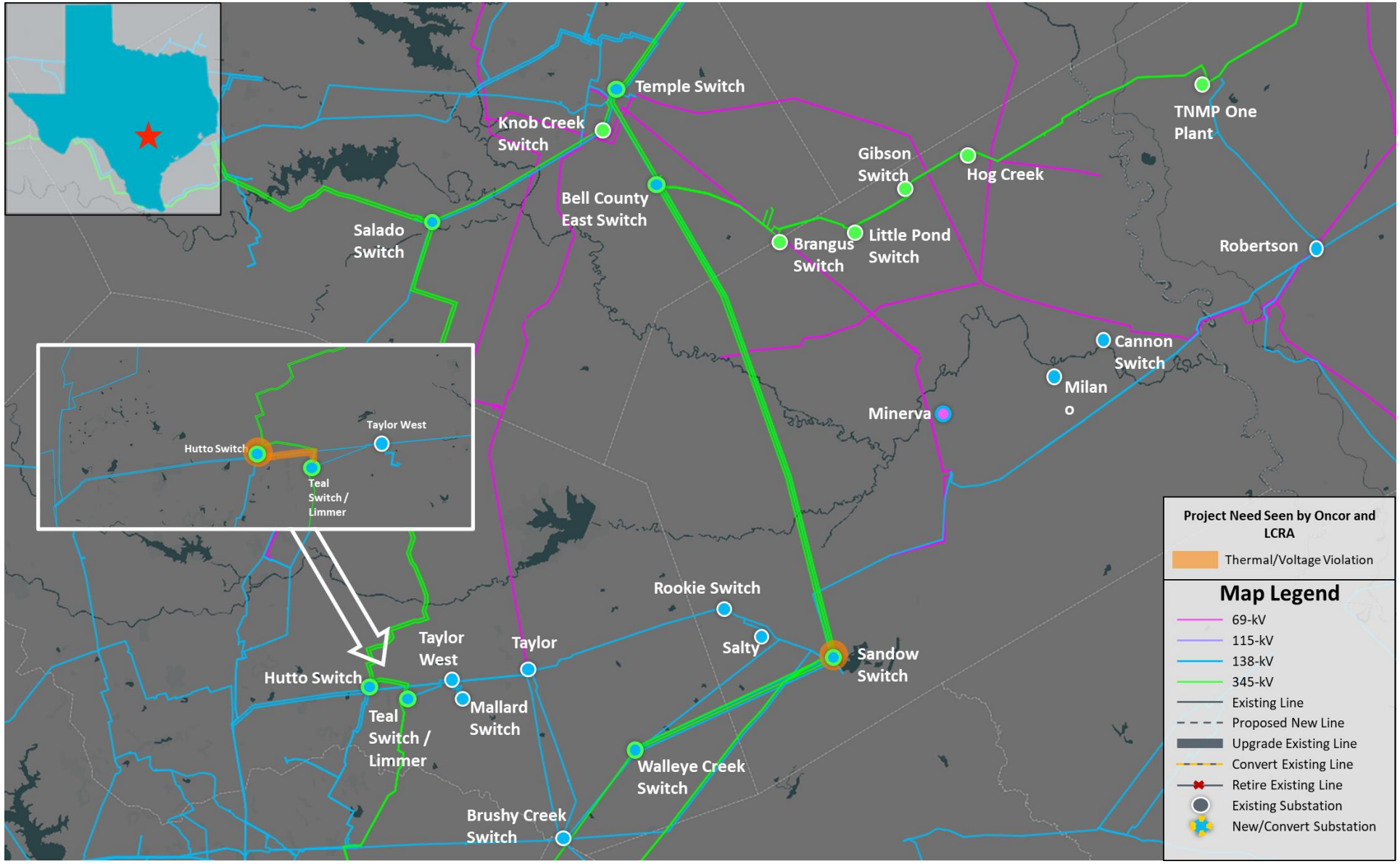
Recap – Study Area Map with Project Needs Seen by Oncor and LCRA TSC



Recap – Study Assumptions

Study Region

- The project is in Williamson, Bell, Milam and Bastrop counties in North Central, South Central and East Weather Zones and the transmission elements in counties that are electrically close will be monitored

Steady-State Base Case

- Final 2024 Regional Transmission Planning (RTP) 2029 summer peak load case, published on Market Information System (MIS) in December 2024, was updated to construct the study base case

Load Updates

- Approximately 2GW of confirmed loads in Study Region was added to create the study base case

Reserve

- The reserve will be kept consistent with the 2024 RTP

Recap – Study Assumptions (continued)

Transmission Updates

- New transmission projects (listed in Appendix A1), recently approved RPG project and/or Transmission Project and Information Tracking (TPIT) projects based on February 2025 TPIT report, will be added to the base case
- Transmission projects (listed in Appendix A2) identified in the 2024 RTP in the study area that have not been approved by RPG will be removed

Generation Updates

- New generation (listed in Appendix B) that met ERCOT Planning Guide Section 6.9(1) condition with Commercial Operation Date (COD) before the December 2028 (ISD) in the study area at the time of the study, but not already modeled in the RTP cases, will be added to the case based on April 2025 Generator Interconnection Status (GIS) report published in MIS in May 2025
- All generation will be dispatched consistent with the 2024 RTP methodology

Recap – Preliminary Results of Reliability Assessment – Base Case

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

Contingency Category	Thermal Overloads	Voltage Violations	Unsolved Power Flow
P0: N-0	16	7	None
P1, P2-1, P7: N-1	19	28	13
P3: (G-1+N-1)*	50+	50+	25
P6-2: (X-1+N-1)*	40+	50+	13

* See Appendix C for list of G-1 generators and X-1 transformers tested

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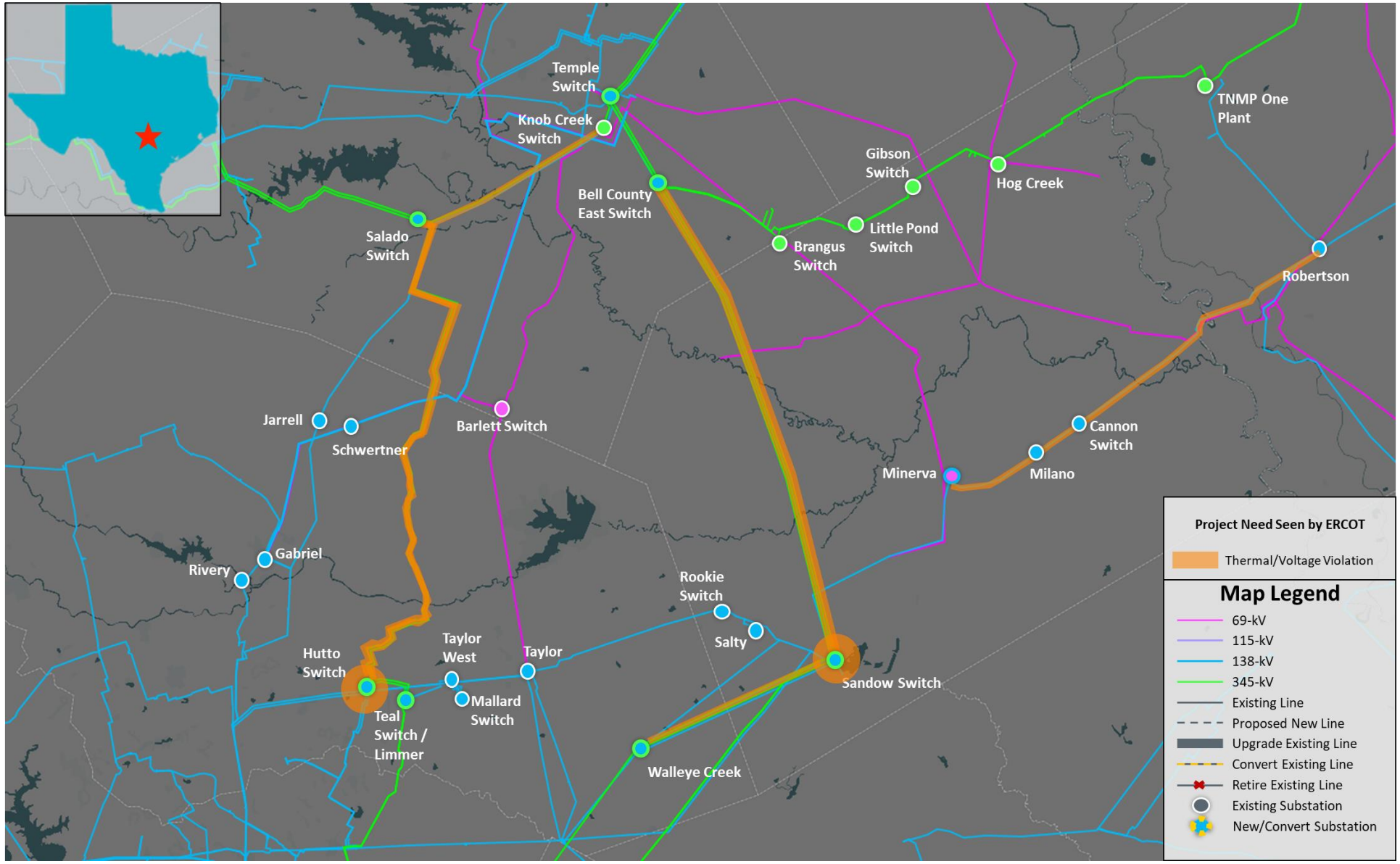
Recap – Study Area Map with Project Needs Seen by ERCOT – North of Hutto



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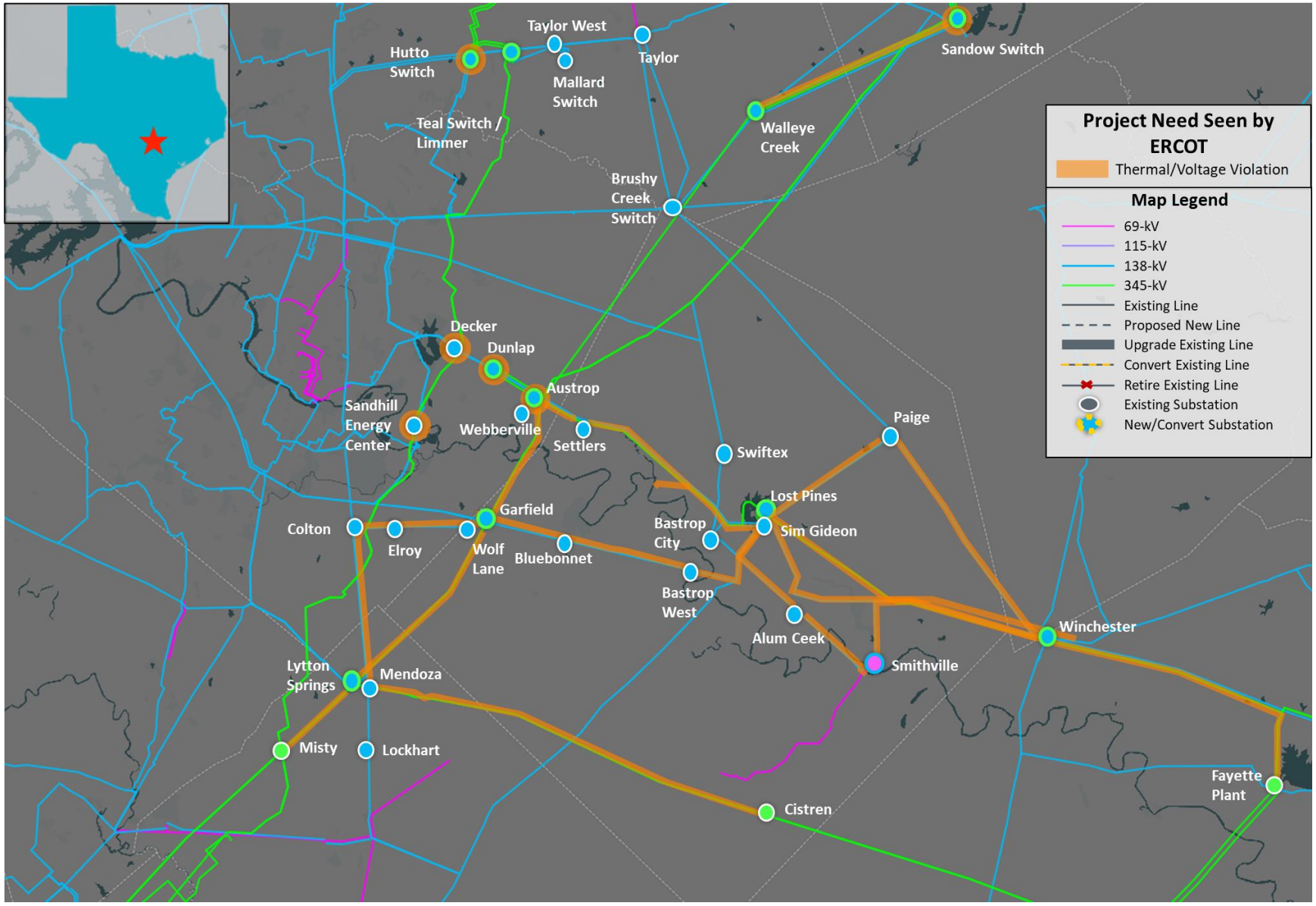
Recap – Study Area Map with Project Needs Seen by ERCOT – South of Hutto



Recap – Phased Approach Evaluation

- The ongoing Oncor and LCRA TSC Muscovy and Voss Lake 345/138-kV Project EIR was separated into two Phases
- Phase 1 of the EIR
  - To address the violations identified in Study area 1 – North of Hutto
- Phase 2 of the EIR
  - To address the violations identified in study area 2 – South of Hutto
  - Include upgrades identified in Phase 1
  - ERCOT anticipates the completion of phase 2 EIR study after phase 1 EIR Study

Options Evaluated

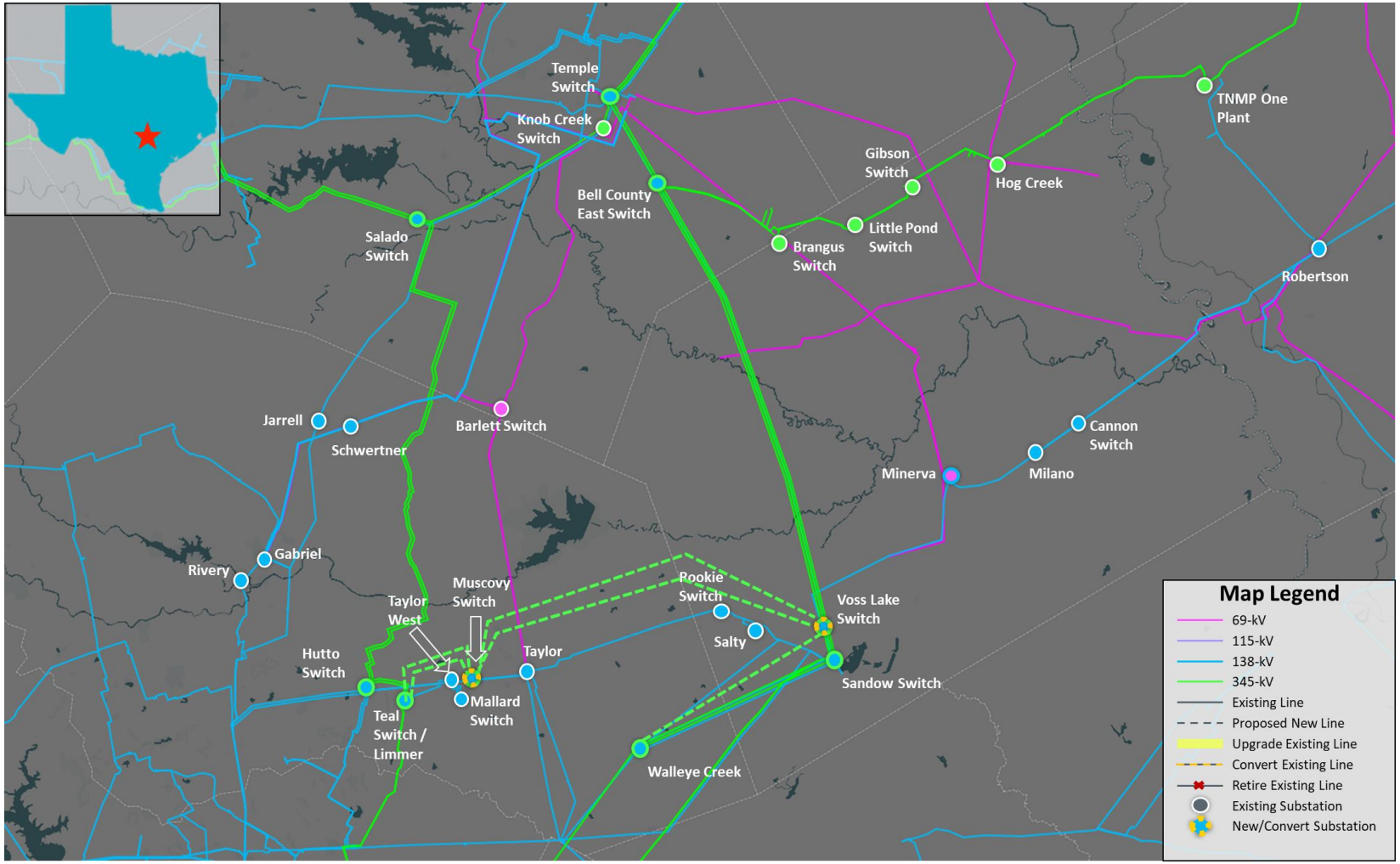
ERCOT developed 10 options to resolve the reliability violation seen by ERCOT

- Option 1 – Oncor & LCRA TSC Proposed Project
- Option 2 – ERCOT Alternative Option
- Option 3 – ERCOT Alternative Option
- Option 4 – Oncor Alternative Option
- Option 4A – Oncor Alternative Option plus additional 138-kV upgrades
- Option 5 – ERCOT Alternative Option
- Option 6 – Brazos Alternative Option
- Option 7 – LCRA TSC Alternative Option
- Option 7A – LCRA TSC Alternative Option plus additional 138-kV upgrades
- Option 8 – No Muscovy Voss Lake Project

Option 1 – Oncor Proposed Project

Option 1 Summary of Upgrades

- Establish Muscovy 345-kV Switch
- Install two 345/138-kV auto transformers at Muscovy Switch
- Establish Voss Lake 345-kV Switch
- Install 345/138-kV auto transformer at Voss Lake Switch
- Install new Limmer to Muscovy 345-kV double circuit line
- Install new Muscovy to Voss Lake 345-kV double circuit line



Option 2 – Alternative ERCOT Option

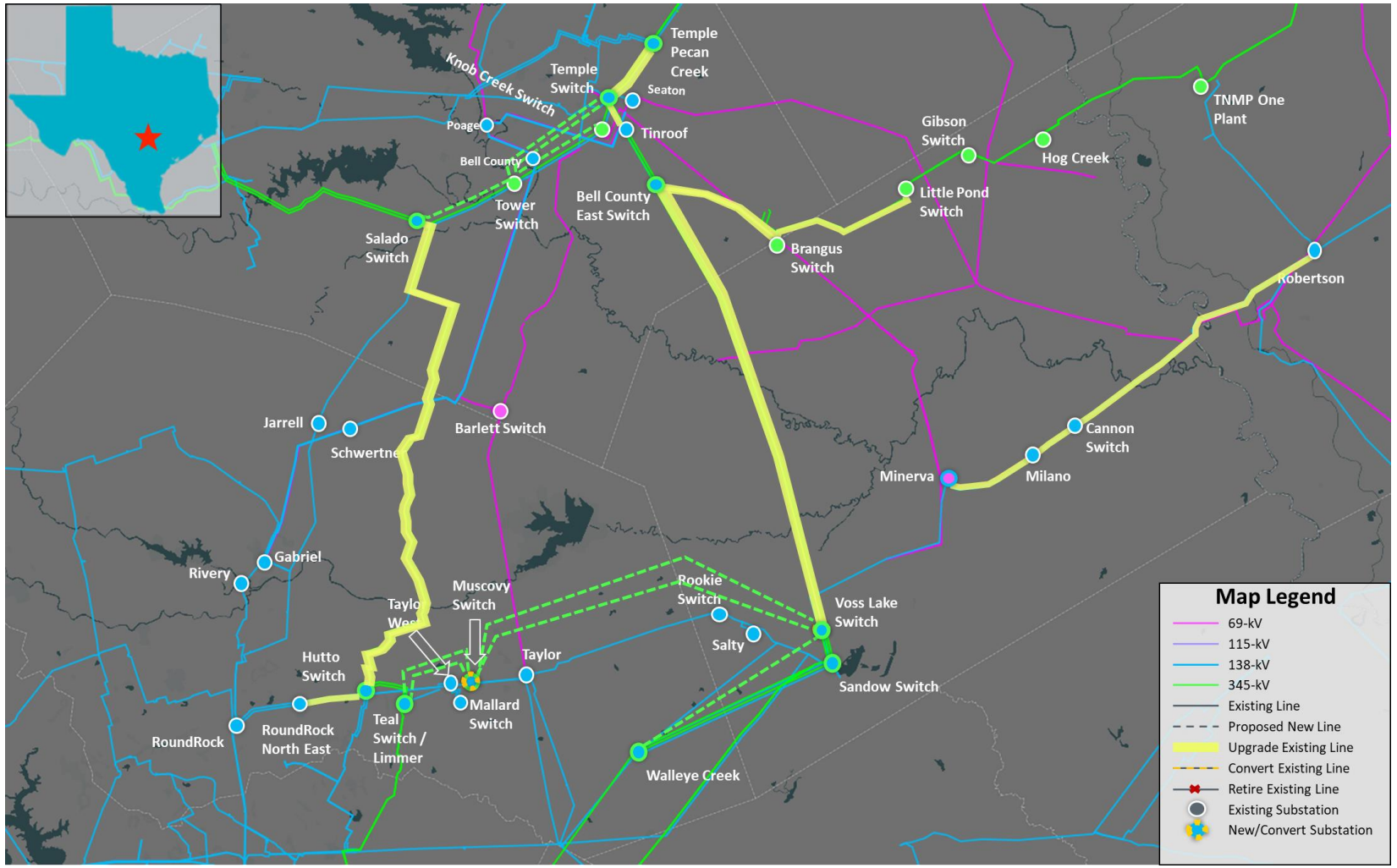
Option 2 Summary of Upgrades

- Option 1 upgrades
- Upgrade Temple to Tinroof 138-kV Line
- Upgrade Bell County East Switch to Voss Lake Switch double circuit 345-kV lines
- Upgrade Minerva to Milano to Cannon Switch to Robertson 138-kV line

Option 3 – Alternative ERCOT Option

Option 3 Summary of Upgrades

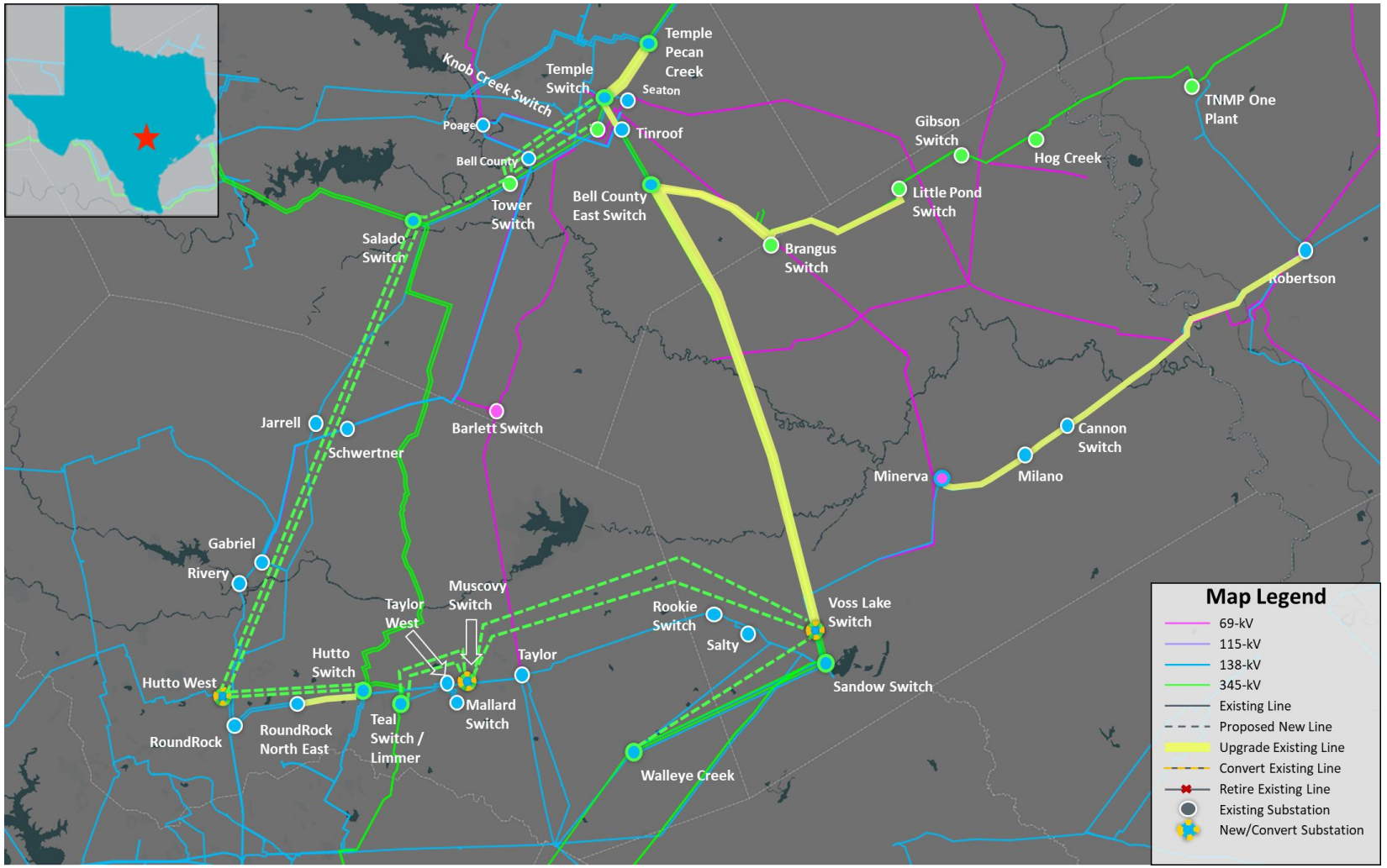
- Option 2 Upgrades
- Bell County East Switch to Brangus Switch 345-kV line
- Bell County East Switch to Little Pond Switch 345-kV line
- Upgrade Temple to Temple pecan 345-kV double circuit line and build on separate structures
- Upgrade Hutto Switch to Round Rock North East 138-kV line
- Rebuild Salado to Hutto Switch 345-kV double circuit lines



Option 4 – Alternative Oncor Option

Option 4 Summary of Upgrades

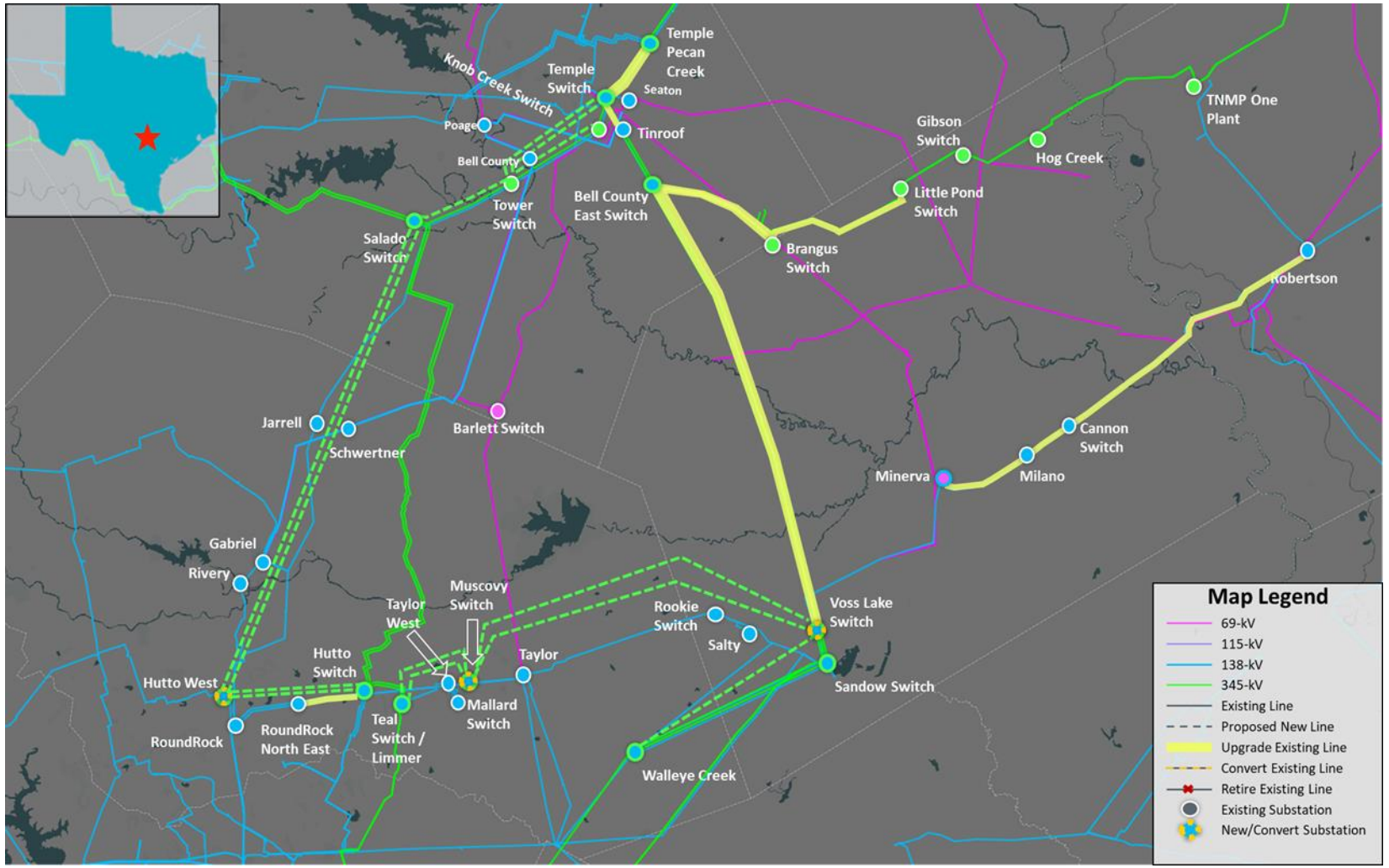
- Option 3 Upgrades except for Salado to Hutto Switch 345-kV double circuit line
- Establish new Hutto West 345-kV Switch
- Install two new 345/138-kV auto transformers
- Build new Salado Switch to Hutto West double circuit 345-kV line
- Build new Hutto West to Hutto Switch double circuit 345-kV line



Option 4A – Alternative Oncor Option plus additional 138-kV upgrades

Option 4A Summary of Upgrades

- Option 4 Upgrades
- Loop Spanish Oak to RoundRock 138-kV line into Hutto West
- Loop Chief Brady to RoundRock 138-Kv line into Hutto West



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Option 4A – Alternative Oncor Option plus additional 138-kV upgrades – Hutto West Zoomed-in

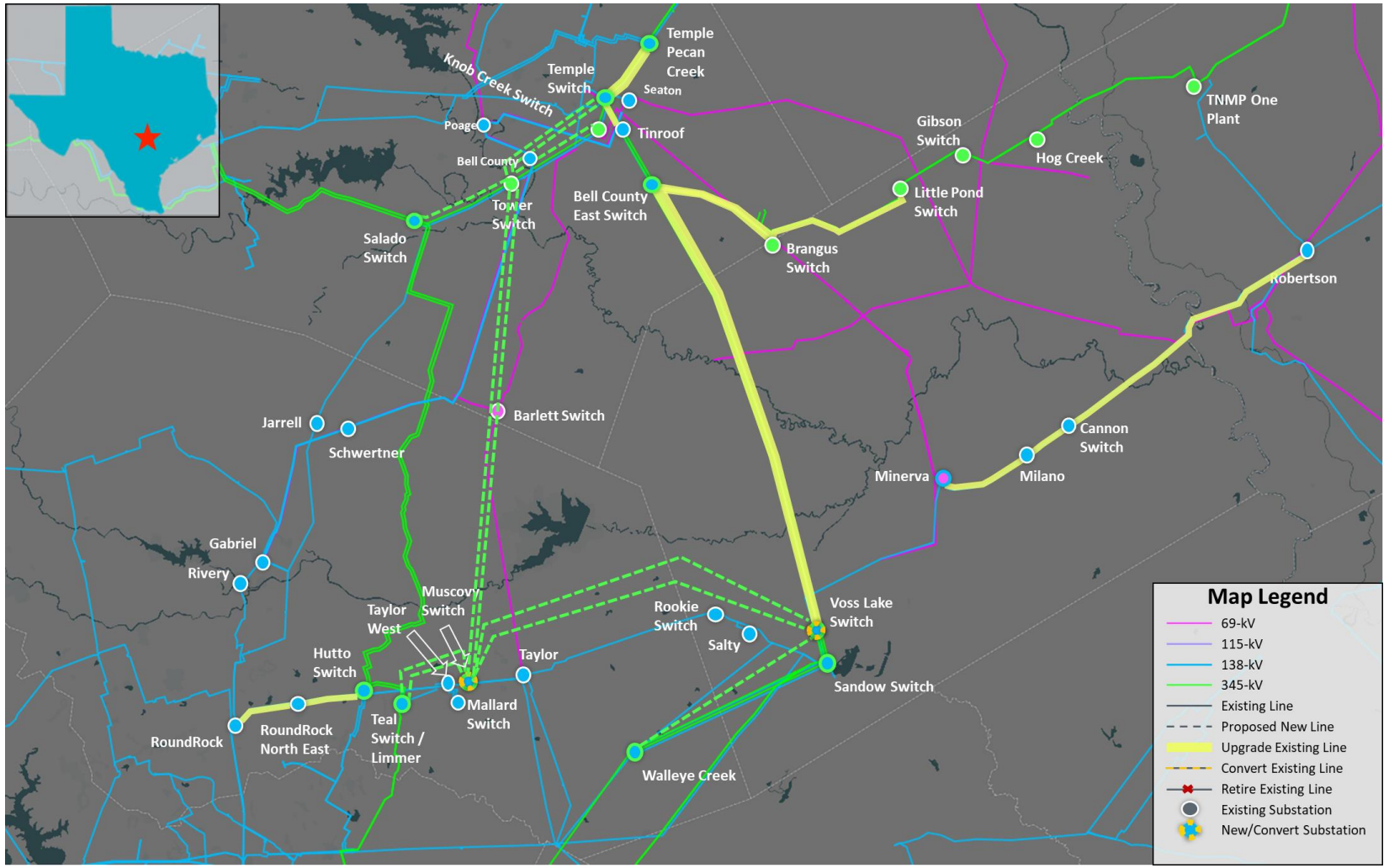
Option 4A Summary of Upgrades

- Option 4 Upgrades
- Loop Spanish Oak to RoundRock 138-kV line into Hutto West
- Loop Chief Brady to RoundRock 138-Kv line into Hutto West

Option 5 – Alternative ERCOT Option

Option 5 Summary of Upgrades

- Option 3 Upgrades except for Salado to Hutto Switch 345-kV double circuit line
- Build Muscovy to Limmer double circuit 345-kV lines on separate structures
- Build new 345-kV double circuit lines from Tower Switch to Muscovy Switch.
- Upgrade RoundRock North East to RoundRock 138-kV line



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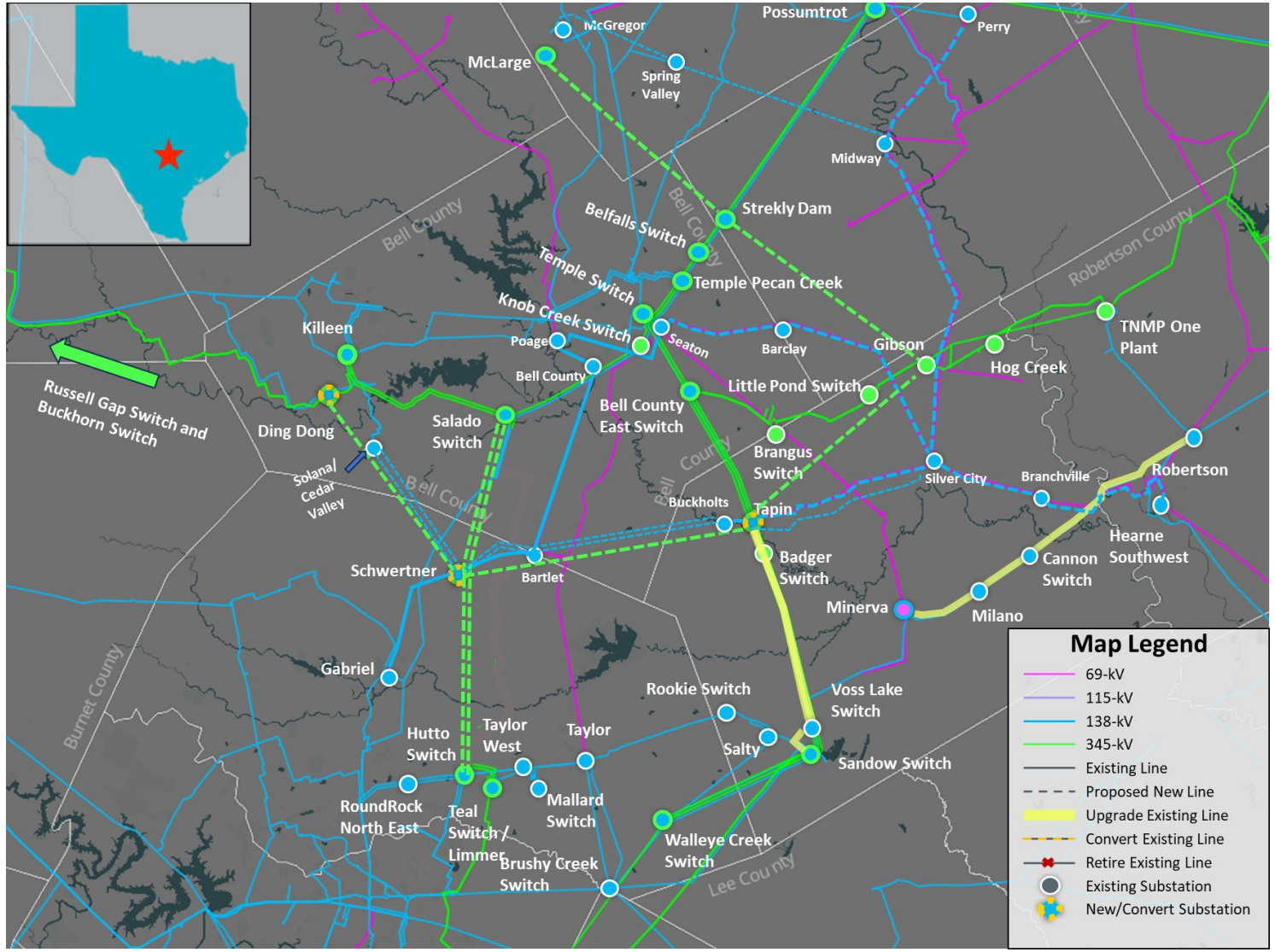
Option 6 – Brazos Suggested Option

Option 6 Summary of Upgrades

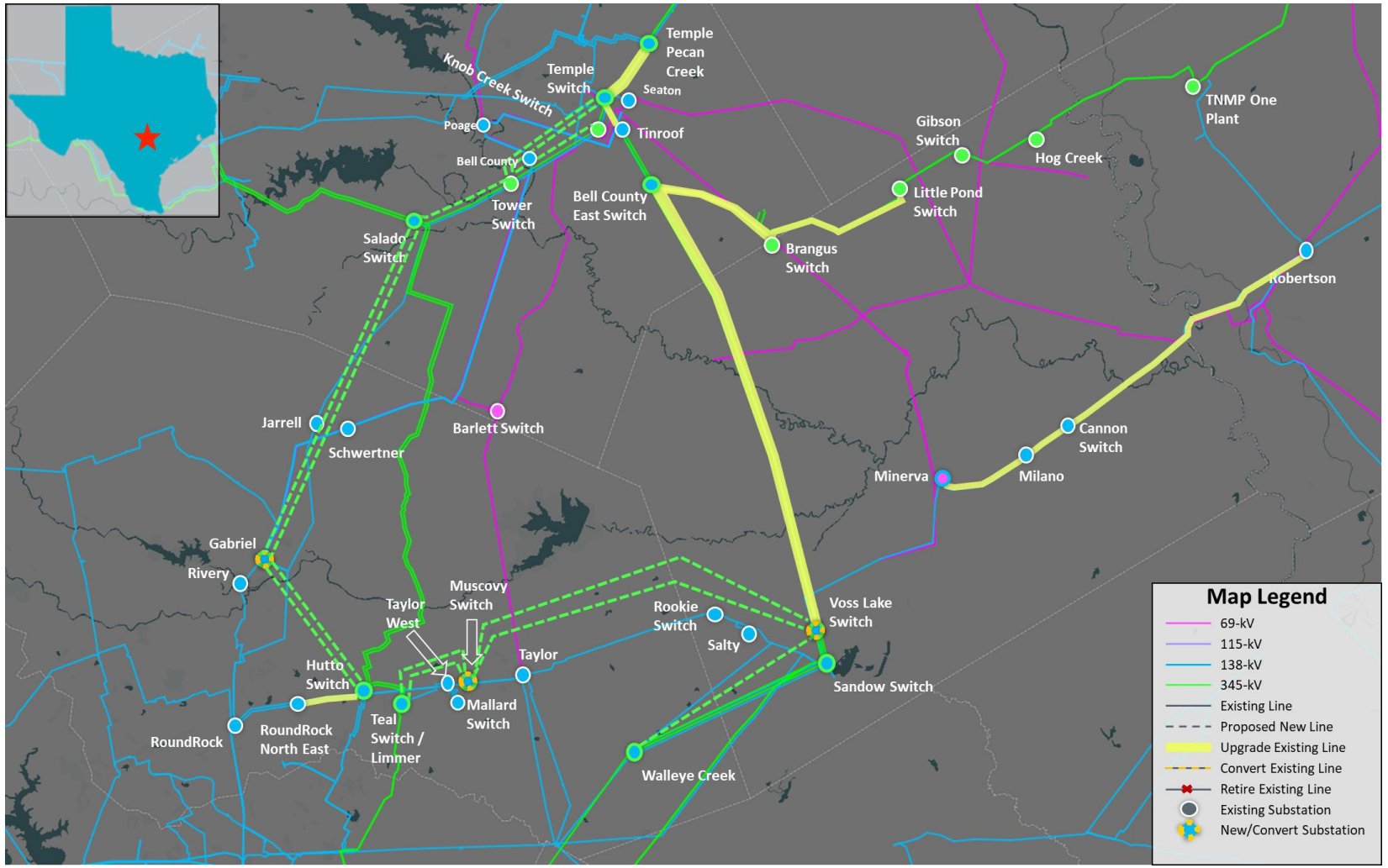
- Establish a 345-kV and 138-kV Loop Around the Temple Switch
- Establish new Dindong, Schwertner, Taping and Mclarge 345-kV Stations
- Build a new 345-kV Single circuit from Dingdong to Schwertner to Taping to Gibson to Strekly Dam to Mclarge stations
- Additional new 138-kV transmission lines
- Additional rebuilds of existing 138-kV transmission lines



Option 7 – Alternative LCRA TSC Option

Option 7 Summary of Upgrades

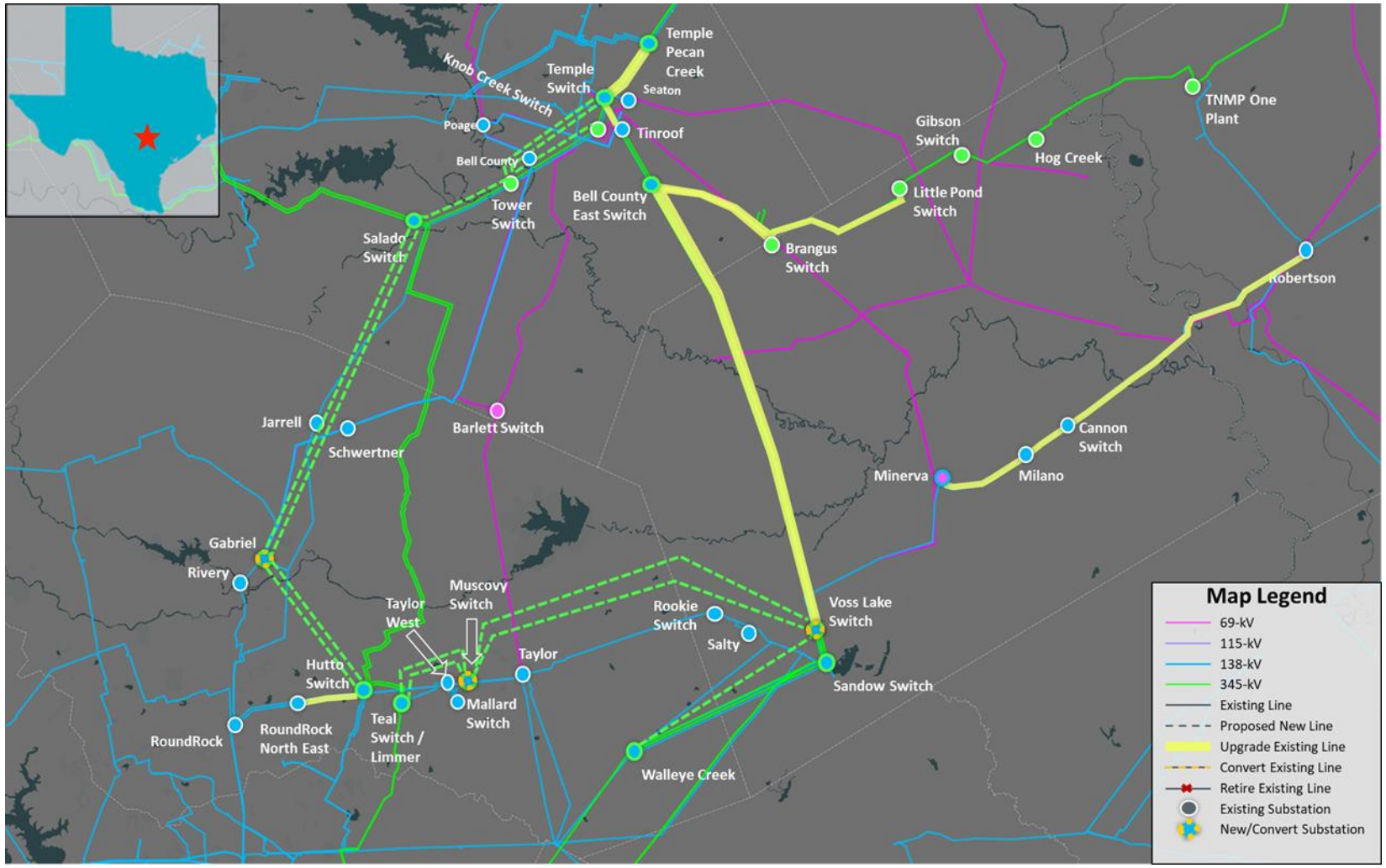
- Option 3 Upgrades except for Salado to Hutto Switch 345-kV double circuit line
- Establish Gabriel 345-kV station
- Install two 345/138-kV autotransformers
- Build double circuit 345-kV lines from Salado Switch to Gabriel
- Build new double circuit 345-kV line from Gabriel to Hutto Switch



Option 7A – Alternative LCRA TSC Option plus additional 138-kV upgrades

Option 7A Summary of Upgrades

- Option 7 upgrades
- Upgrade Gabriel to Glasscock 138-kV line
- Upgrade Garbriel to Rivery 138-kV line



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Option 7A – Alternative LCRA TSC Option plus additional 138-kV upgrades – Gabriel Zoomed-in

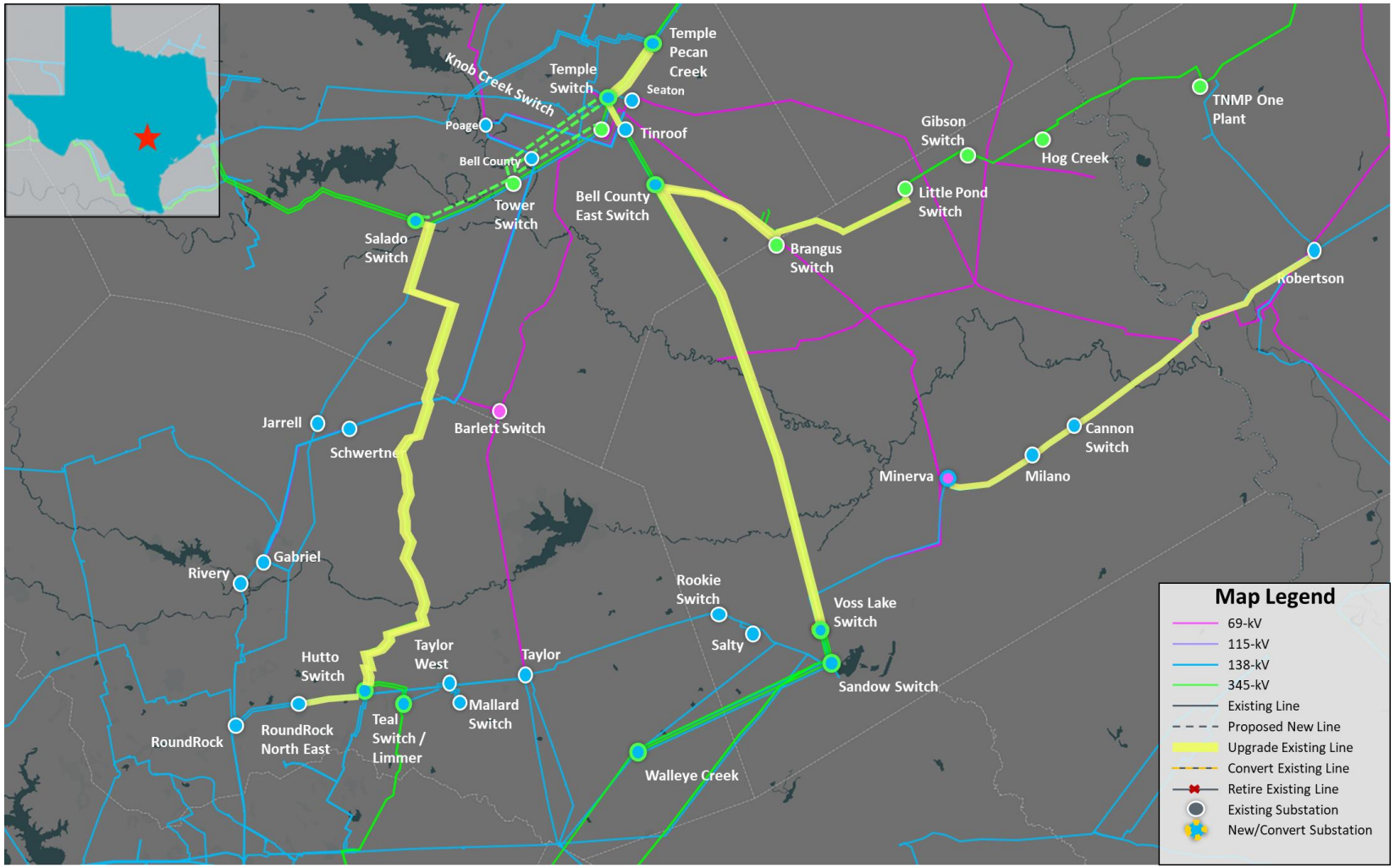
Option 7A Summary of Upgrades

- Option 7 upgrades
- Upgrade Gabriel to Glasscock 138-kV line
- Upgrade Garbriel to Rivery 138-kV line

Option 8 – No Muscovy Voss Lake Project

Option 8 Summary of Upgrades

- Option 3 Upgrades
- Remove Muscovy Voss Lake Project



Preliminary Results of Reliability Assessment – Options

ERCOT conducted steady-state load flow analysis for the all the option cases according to the NERC Reliability Standard TPL-001-5.1 and ERCOT Planning Criteria to evaluate the proposed option and alternatives

Option	Unsolved Power Flow	N-0		N-1		G-1+N-1*		X-1+N-1*	
		Thermal Violations	Voltage Violations	Thermal Violations	Voltage Violations	Thermal Violations	Voltage Violations	Thermal Violations	Voltage Violations
1	None	4	None	6	None	3	None	3	None
2	None	None	None	5	None	None	None	4	None
3	None	None	None	None	None	None	None	None	None
4	None	None	None	2	None	None	None	None	None
4A	None	None	None	None	None	None	None	None	None
5	None	None	None	None	None	None	None	None	None
6	1	None	None	4	None	7	3	10	3
7	None	None	None	2	None	None	None	None	None
7A	None	None	None	None	None	None	None	None	None
8	1	None	None	6	2	2	1	5	2

Key Takeaway: Option 3, Option4A, Option 5 and Option 7A observed no reliability violations and were short-listed for further evaluation

* See Appendix C for list of G-1 generators and X-1 transformers tested

Preliminary Results of Maintenance Outage Evaluation

ERCOT conducted maintenance outage analyses on all four short-listed options to compare relative performance of the options

- Load levels the East, North Central, South Central Weather zone(s) were scaled down based on the historical non-summer peak data to 75.6%, 82% and 80.3%, in order to mimic the non-summer peak load condition
- Based on the review of system topology of the area, ERCOT tested N-2 contingency combinations, and then tested all applicable contingency violations with system adjustments (N-1-1)

Option	Thermal Violation	Voltage Violation	Unsolved Power Flow
3	None	None	None
4A	None	None	None
5	None	None	None
7A	None	None	None

Key Takeaway: No reliability violations were observed in the N-1-1 analysis for all four short-listed Options

Long-Term Load-Serving Capability Assessment

Assumptions

- Adjusted load up in Williamson County area, excluding non-scalable loads in the area
- Adjusted conforming load down outside of the North Central, South Central and East Weather Zones to balance power
- Based on N-1 contingency

Option	Incremental Load-Serving Capability (~MW)
3	350
4A	550
5	450
7A	1000

Key Takeaway: Option 7A provides significantly more incremental load-serving capability than Option 3, Option 4A and Option 5

Cost Estimate and Feasibility Assessment

Oncor and LCRA TSC performed feasibility assessments and provided cost estimates for the four options short-listed options

Option	Cost Estimates (~$B)	CCN Required (~miles)	Feasibility	Expected ISD
3	$1.272	Yes (~37 miles)	Yes	LCRA TSC: August 2031 Oncor: May 2031
4A	$1.575	Yes (~87 miles)	Yes	LCRA TSC: August 2031 Oncor: December 2032
5	$1.336	Yes (~82 miles)	Yes	LCRA TSC: August 2031 Oncor: December 2032
7A	$1.457	Yes (~78 miles)	Yes	LCRA TSC: November 2033 Oncor: December 2031

Key Takeaway:

All Short-Listed options are feasible options

Option 3 is the least cost option and Option 4A is expensive option

Comparison of Short-Listed Options

	Option 3	Option 4A	Option 5	Option 7A
Meets ERCOT and NERC Reliability Criteria	Yes	Yes	Yes	Yes
Improves Long-Term Load-Serving Capability (~MW)	350	550	450	1000
Requires CCN (~miles)	Yes (~37 miles)	Yes (~87 miles)	Yes (~82 miles)	Yes (~78 miles)
Cost Estimate (~$B)	$1.272	$1.549	$1.336	$1.457
Feasible	Yes	Yes	Yes	Yes
Expected ISD	LCRA TSC: August 2031 Oncor: May 2031	LCRA TSC: August 2031 Oncor: December 2032	LCRA TSC: August 2031 Oncor: December 2032	LCRA TSC: November 2033 Oncor: December 2031

Key Takeaway:

All short-listed options meet ERCOT and NERC Reliability Criteria

Option 7A provides the highest Long-Term Load-Serving Capability

ERCOT Preferred Option

Option 7A was selected as the ERCOT preferred option because it

- Addresses the project need in the study area
- Meets both ERCOT and NERC reliability criteria
- Highest long-term load-serving capability for future load growth in the area
- Improves operational flexibility

Deliverables and Next Step

Tentative Timelines

- ERCOT may conduct additional analyses as needed for the ERCOT preferred option
  - Generation Addition and Load Scaling Sensitivity Analyses
    - Planning Guide Section 3.1.3(4)
  - Subsynchronous Oscillations (SSO) Assessment
    - Nodal Protocol Section 3.22.1.3(2)
  - 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
- ERCOT recommendation in May 2026 RPG meeting
- ERCOT will start Phase 2 EIR followed by the completion of Phase 1 EIR

Key Takeaway: ERCOT recommendation in May 2026 RPG Meeting

Deliverables or Next Step

Tentative Timelines

- EIR report to be posted in the Market Information Service (MIS) in May 2026
- EIR recommendation to Technical Advisory Committee (TAC) in May 2026
  - Post TAC material on May 12, 2026
  - Collect and consolidate questions on May 14, 2026
  - Post consolidated questions and ERCOT responses on May 15, 2026
- Seek ERCOT Board of Directors (BOD) endorsement in June 2026

Key Takeaway: Seek ERCOT BOD endorsement in June 2026

Thank you!
Questions/Comments?

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Appendix

- Appendix A1 – Transmission Projects Added
- Appendix A2 – Transmission Backed Out
- Appendix B – Generation Added
- Appendix C – G-1 Generators and X-1 Transformers List
- Appendix D – Option Description

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Appendix A1 – Transmission Projects Added

TPIT	Project Name	Tier	Project ISD	TSP
24RPG001	Temple Area Project	Tier 1	Dec-28	Oncor
24RPG013	FPP Yard 2 to Lytton Springs Transmission Line Overhaul Project	Tier 4	May-26	LCRA TSC, AEN
24RPG014	Sim Gideon to Cedar Hill Transmission Line Upgrade Project	Tier 3	May-27	LCRA TSC
24RPG018	Salado Switch to Hutto Switch 138-kV Line Project	Tier 3	May-27	Oncor
25RPG006	Resubmission for Salado Switch to Hutto Switch 138-kV Line Project	Tier 3	May-27	Oncor, LCRA TSC
72588A	Trading Post to Cedar Valley Storm Hardening	Tier 4	May-25	PEC
86319	AEN_Garfield_HiCross_CKT_963_Reconductor	Tier 4	Jun-25	AEN
86325	AEN_McNeil_Magnesium_Plant_Ckt_977_RECONDUCTOR	Tier 4	Jun-25	AEN
87758	Badger 345 kV Switch	Tier 4	Dec-25	ONCOR
87395	Caldwell Substation Addition	Tier 4	Mar-26	LCRATSC
86323	AEN_MagnesiumPlant_Northland_Ckt_979_RECONDUCTOR	Tier 4	Jun-26	AEN
86912	BEPC_TPIT_86912_Gabriel_Schwertner	Tier 4	Mar-27	BEPC

Appendix A1 – Transmission Projects Added

TPIT	Project Name	Tier	Project ISD	TSP
87673	Rebuild the Salado - Bell County 138 kV Line	Tier 1	May-27	ONCOR
87770	Establish a 110.4 MVAR Capacitor Bank at Midnight 138 kV Substation	Tier 4	May-27	ONCOR
87768	Establish a 110.4 MVAR Capacitor Bank at Pintail 138 kV Switch	Tier 4	May-27	ONCOR
87677	Rebuild the Fryers Creek - Temple 138 kV Line	Tier 1	May-27	ONCOR
87675	Rebuild the Bell County - Fryers Creek 138 kV Line	Tier 1	May-27	ONCOR
85973	Georgetown - Rivery Transmission Line Upgrade	Tier 4	May-26	LCRATSC
80546C	Upgrade the Hutto & Round Rock - Salado 138 kV Line	Tier 3	May-26	ONCOR
80546E	Upgrade the Hutto & Round Rock - Salado 138 kV Line	Tier 3	May-27	ONCOR
86331	AEN_Wheless_Mueller_Ckt_1016_Reconductor	Tier 4	Jun-27	AEN
86321	AEN_Lakeshore_Northland_Ckt_916_Reconductor	Tier 4	Jun-27	AEN
86327	AEN_New_138kV_Southshore_Substation_Addition	Tier 4	Sep-27	AEN
86317	AEN_DP_OnionCreek_Ckt_924_Reconductor	Tier 4	Sep-27	AEN

Appendix A1 – Transmission Projects Added

TPIT	Project Name	Tier	Project ISD	TSP
86333	AEN_OnionCreek_StoneyRidge_Ckt_1026_Reconductor	Tier 4	Sep-27	AEN
87367	BEPC_TPIT_87367_TempleAreaImprovements	Tier 1	Oct-27	BEPC
87699	Belton - Killeen 138 kV Line via Belton Southwest	Tier 1	Dec-27	ONCOR
80546D	Upgrade the Hutto & Round Rock - Salado 138 kV Line	Tier 3	Dec-27	ONCOR
87707	Salado 345/138 kV Autotransformer #1 and #2	Tier 1	Dec-27	ONCOR
87701	Establish the Watercrest 138 kV Switch	Tier 1	May-28	ONCOR
86838	AEN_JustinLane_KoenigLane_Ckt__conversion_to_138kV	Tier 4	Jun-28	AEN
86315	AEN_Barton_Vega_Ckt_928_Reconductor	Tier 4	Jun-28	AEN
72588B	Trading Post to Cedar Valley Storm Hardening	Tier 4	Sep-24	PEC

Appendix A2 – Transmission Backed Out

RTP Project ID	Project Name	County
2022-SC7	Decker (9188) 138-kV Bus Tie Breaker Upgrade	Travis
2023-SC3	Dessau (9193) to McNeil AEN (9076) 138-kV Circuit 2 Upgrade	Travis
2023-SC15	Sim Gideon Area 138-kV Line Upgrades	Bastrop, Fayette, Williamson
2023-SC17	Georgetown Area 138-kV Line Upgrades	Williamson
2024-SC2	Trading Post (70505) 138-kV Cap Bank Addition	Travis
2024-SC8	Milano (64) to Minerva (3683) and Cannon (3707) 138-kV Line Upgrades	Milam
2024-SC11	Vega (9285) to Barton (9158) 138-kV Line Upgrade	Travis
2024-SC14	Elroy (7209) 138-kV Cap Bank Addition	Travis
2024-SC16	Limmer (7341) 345-kV Cap Bank Addition	Williamson
2024-SC17	SLR AMLC (3740) 138-kV Cap Bank Addition	Milam
2024-SC19	Hillje (44200) to Zorn (7042) 345-kV Line Upgrades	Wharton, Fayette, Bastrop, Caldwell, Guadalupe
2024-SC20	Lytton Area 138-kV Line Upgrades	Caldwell, Travis, Bastrop

Appendix A2 – Transmission Backed Out

RTP Project ID	Project Name	County
2024-SC21	Austrop (9328) to Dunlap (9045) 138-kV Double Circuit Line Addition	Travis
2024-SC22	Austrop 345/138-kV Transformer Addition	Travis
2024-SC23	Dunlap 345/138-kV Transformer Addition	Travis
2024-SC24	Gillelend Creek (7340) 345-kV Cap Bank Addition	Travis
2024-SC27	Lytton Springs (9074) to Garfield (7048) to Austrop (7040) 345-kV Line Upgrades	Caldwell, Bastrop, Travis
2024-SC28	Voss Lake 345/138-kV Substation Expansion and Bell County East (3687) to Voss Lake (3751) 345-kV Double Circuit Line Upgrade	Milam
2024-SC29	Muscovy 345/138-kV Substation Addition and Salado (3699) to Muscovy (3700) to Voss Lake (3751) 345-kV Double Circuit Addition	Bell, Williamson, Milam
2024-SC32	McNeil AEN (9076) 138-kV Bus Tie Breaker Upgrade	Travis
2024-E4	Bryan Area Project	Brazos, Burleson, Robertson
2024-E4	Knob Creek Switch (3413) to Salado Switch (3699) 345-kV Line Upgrade	Bell
2024-NC23	Bale (3711) to St Johns Switch (3384) to Lake Creek SES (3409) 345-kV Line Upgrades	Falls, McLennan
2024-NC24	Lake Creek SES (3410) to Riesel Switch (3702) 138-kV Line Upgrade	Falls, McLennan
2024-NC37	Bell East (3687) to Salado (3699) 345-kV Line Addition	Bell, Williamson

Appendix A2 – Transmission Backed Out

RTP Project ID	Project Name	County
2024-NC43	Temple Switch (3415) to Belton (3610) 138-kV Line Upgrades	Bell
2024-NC60	Bell County East Switch (3687) to Littlepond (3377) , and Bell County East Switch (3687) to Brangus Switch (3705) 345-kV Line Upgrades	Milam, Bell

Appendix B – Generation Added

GINR	Project Name	Fuel	Project COD	Max Capacity (~MW)	County
22INR0503	Tidwell Prairie II Batt	OTH	03/01/2026	203.6	Robertson
22INR0504	Barton Branch IA	OTH	03/01/2026	203.6	Robertson
23INR0079	Chillingham Storage	OTH	07/15/2025	153.9	Bell
23INR0118	Blevins Solar	SOL	10/30/2025	271.6	Falls
23INR0119	Blevins Storage	OTH	07/28/2025	181.3	Falls
23INR0235	Hoyte Solar	SOL	12/15/2026	206.8	Milam
23INR0249	Limewood Solar	SOL	12/31/2025	204.6	Bell
23INR0344	Hermes Solar	SOL	09/30/2025	100.4	Bell
24INR0031	Stoneridge Solar	SOL	04/30/2025	201.6	Milam
24INR0166	Stillhouse Solar	SOL	09/02/2025	210.8	Bell
24INR0169	Yaupon Storage SLF	OTH	07/01/2028	102.0	Milam
24INR0365	Hermes Storage	OTH	09/30/2025	100.4	Bell
25INR0389	Stoneridge BESS	OTH	09/01/2025	101.9	Milam
22INR0605	Camino Santiago Solar	SOL	02/18/2027	196.3	Milam
24INR0476	DOS RIOS ENERGY STORAGE SLF	OTH	03/15/2027	164.5	Milam
25INR0281	Cosper Solar	SOL	11/12/2027	148.2	Bell

Appendix C – G-1 Generators and X-1 Transformers List

Generator	Transformer
Bastrop Energy Center	Sandow – Ckt 1 345/138-kV
Giga Energy Storage	Hutto – Ckt 1 345/138-kV
East Backland Solar	Teal – Ckt 1 345/138-kV
Garfield Generator	Austrop –Ckt 1 345/138-kV
LostPines Generator	Dunlap –Ckt 1 345/138-kV
	Gilleland Creek –Ckt 1 345/138-kV
	Muscovy–Ckt 1 345/138-kV
	Lytton–Ckt 1 345/138-kV
	Salado–Ckt 1 345/138-kV
	Temple–Ckt 1 345/138-kV
	Temple Pecan–Ckt 1 345/138-kV
	Voss Lake–Ckt 1 345/138-kV

Appendix D – Option Description

Details of Option 1 - LCRA & Oncor Option

- Establish the new Muscovy 345/138-kV Switch by installing ten 345-kV, 5000 A and twelve 138-kV, 3200 A breakers in a breaker-and-a-half bus arrangement, approximately 3.3 miles east of the co-located 345-kV Limmer Substation (LCRA TSC) and 138-kV Teal Switch (Oncor);
  - Install two 345/138-kV autotransformers with normal rating of 700 MVA and emergency rating of 750 MVA
  - Install three 36.8 MVAr capacitor banks
  - Ensure all line terminal and associated equipment elements are rated to meet or exceed 5000 A for 345-kV and 3200 A for 138-kV
- Construct a new 345-kV double-circuit transmission line which will require a CCN from Limmer Substation (LCRA TSC) to Muscovy Switch with a normal and emergency ratings of at least 2987 MVA or greater, approximately 4 miles;
- Construct a loop of the existing Teal Switch to Pintail Switch 138-kV double-circuit transmission line with a normal and emergency ratings of at least 614 MVA into the new Muscovy 138-kV Switch, approximately 0.1 miles;
- Establish the new Voss Lake 345/138-kV Switch by installing ten 345-kV, 5000 A and nine 138-kV, 3200 A breakers in a breaker-and-a-half bus arrangement, approximately 1.9 miles north of Sandow 345/138-kV Switch;
  - Install one 345/138-kV autotransformer with normal ratings of at least 700 MVA and emergency ratings of at least 750 MVA
  - Ensure all line terminal and associated equipment elements are rated to meet or exceed 5000 A for 345-kV and 3200 A for 138-kV

Appendix D – Option Description - Continued

Details of Option 1 - LCRA & Oncor Option

- Construct a loop of the existing Sandow Switch to Bell County East Switch 345-kV double-circuit transmission line into the Voss Lake 345-kV Switch with a normal and emergency ratings of at least 2987 MVA or greater, approximately 0.1 miles;
- Construct a loop of the existing Sandow Switch to Temple Switch 138-kV transmission line into the Voss Lake 138-kV Switch with a normal and emergency ratings of at least 614 MVA or greater, approximately 0.1 miles;
- Construct a loop of the existing Sandow Switch to Minerva Switch 138-kV line into the Voss Lake 138-kV Switch with a normal and emergency ratings of at least 614 MVA or greater, approximately 0.1 miles;
- Construct a new 345-kV transmission line which will require a CCN from Voss Lake Switch to Walleye Creek Switch with a normal and emergency ratings of at least 2987 MVA or greater on double-circuit structures with one circuit installed initially, approximately 2 miles; and
- Construct a new, 345-kV double-circuit line which will require a CCN from Muscovy Switch to Voss Lake Switch with a normal and emergency ratings of at least 2987 MVA or greater, approximately 25 miles.
- Install terminal equipment in existing bays at Limmer Substation to connect both circuits of the new 345-kV double-circuit transmission lines to Muscovy Switch, including two circuit breakers, two switches, six CCVTs, and six surge arrestors, as well as two A-frame structures. All associated terminal equipment will have a minimum rating of 5000 A.

Appendix D – Option Description - Continued

Details of Option 2 - Alternative ERCOT Option

- All of Option 1 Upgrades
- Establish the Tower 345-kV Switch by installing ten 345-kV, 5000 A circuit breakers in a breaker-and-a-half bus arrangement.
    - Loop the existing Salado Switch to Knob Creek Switch 345-kV Line into Tower 345-kV Switch to create the new 12.4 miles Salado Switch – Tower Switch 345-kV Line and 2.9 miles Tower Switch to Temple Switch 345-kV Line
    - Construct two new approximately 1.2 miles 345-kV single circuit lines from Tower Switch to Knob Creek Switch on independent, single circuit structures using a conductor rated 5000 A or greater (normal and emergency rating 2987 MVA), this upgrade will require a CCN
    - Ensure all associated terminal equipment to meet or exceed 5000 A (2987 MVA)
- Rebuild the 12.4 miles Salado Switch to Tower Switch 345-kV Line using double-circuit capable structures with one circuit installed, using a conductor rated 5000 A or greater (normal and emergency rating 2987 MVA), and ensure all associated terminal equipment to meet or exceed 5000 A (2987 MVA), this upgrade will require a CCN
- Rebuild the 29.6 miles Bell County East Switch to Voss Lake Switch 345-kV Double-Circuit Line using a conductor rated 5000 A or greater (due to the existing 3200 A terminal equipment, this line will be operated at a normal and emergency rating 1912 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (1912 MVA)

Appendix D – Option Description - Continued

Details of Option 2 - Alternative ERCOT Option

- Rebuild the 9.9 miles Minerva Switch to Robertson 138-kV Line using double-circuit capable structures with one circuit installed and a conductor rated 2569 A or greater (normal and emergency rating 614 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (764 MVA)
- Rebuild the 1.85 miles Temple Switch to Tinroof 138-kV line using double-circuit capable structures with one circuit installed and a conductor rated 2569 A or greater (normal and emergency rating 614 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (764 MVA)

Appendix D – Option Description - Continued

Details of Option 3 - Alternative ERCOT Option

- All Option 2 upgrades
- Rebuild the 17.75 miles Bell County East Switch to Little Pond 345-kV Line using a conductor rated 5000 A or greater (due to the existing 3200 A terminal equipment, this line will be operated at a normal and emergency rating 1912 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (1912 MVA)
- Rebuild the 8.8 miles Bell County East Switch to Brangus 345-kV Line using a conductor rated 5000 A or greater (due to the existing 3200 A terminal equipment, this line will be operated at a normal and emergency rating 1912 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (1912 MVA)
- Rebuild the 4.5 miles Temple Switch to Temple Pecan Creek Switch 345 kV Double-Circuit Line using a conductor rated 5000 A or greater (normal and emergency rating 2987 MVA) on separate structures, and ensure all associated terminal equipment to meet or exceed 5000 A (2987 MVA)
- Rebuild the 5.3 miles Hutto to Round Rock NorthEast 138-kV line using double-circuit capable structures with one circuit installed and a conductor rated 2569 A or greater (normal and emergency rating 614 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (764 MVA)
- Rebuild the 36.9 miles Hutto to Salado 345 kV Double-Circuit Line using a conductor rated 5000 A or greater (normal and emergency rating 2987 MVA), and ensure all associated terminal equipment to meet or exceed 5000 A (2987 MVA)
- Rebuild the 3 miles Hutto to Limmer 345 kV double-circuit Line on separate structures

Appendix D – Option Description - Continued

Details of Option 4 - Alternative ERCOT Option

- All Option 2 upgrades
- Rebuild the 17.75 miles Bell County East Switch to Little Pond 345-kV Line using a conductor rated 5000 A or greater (due to the existing 3200 A terminal equipment, this line will be operated at a normal and emergency rating 1912 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (1912 MVA)
- Rebuild the 8.8 miles Bell County East Switch to Brangus 345-kV Line using a conductor rated 5000 A or greater (due to the existing 3200 A terminal equipment, this line will be operated at a normal and emergency rating 1912 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (1912 MVA)
- Rebuild the 4.5 miles Temple Switch to Temple Pecan Creek Switch 345 kV Double-Circuit Line using a conductor rated 5000 A or greater (normal and emergency rating 2987 MVA) on separate structures, and ensure all associated terminal equipment to meet or exceed 5000 A (2987 MVA)
- Rebuild the 5.3 miles Hutto to Round Rock NorthEast 138-kV line using double-circuit capable structures with one circuit installed and a conductor rated 2569 A or greater (normal and emergency rating 614 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (764 MVA)
- Rebuild the 3 miles Hutto to Limmer 345 kV double-circuit Line on separate structures

Appendix D – Option Description - Continued

Details of Option 4 - Alternative ERCOT Option

- Establish a new Hutto West 345-kV Switch by installing ten 345-kV, 5000 A circuit breakers in a breaker-and-a-half bus arrangement.
  - Install two 345/138-kV autotransformers with normal rating of 700 MVA and emergency rating of 750 MVA
  - Construct new approximately 38.9 miles 345-kV double circuit lines from Salado to Hutto West Switch using a conductor rated 5000 A or greater (normal and emergency rating 2987 MVA), this upgrade will require a CCN
  - Construct new approximately 10.25 miles 345-kV double circuit lines from Hutto West to Hutto Switch using a conductor rated 5000 A or greater (normal and emergency rating 2987 MVA), this upgrade will require a CCN
  - Construct a loop of the existing Round Rock Westing House to Round Rock 138-kV line into the Hutto West 138-kV Switch with a normal and emergency ratings of at least 614 MVA or greater, approximately 0.1 miles;
  - Construct a loop of the existing Round Rock Westing House to Midnight 138-kV line into the Hutto West 138-kV Switch with a normal and emergency ratings of at least 614 MVA or greater, approximately 0.1 miles;
  - Ensure all line terminal and associated equipment elements are rated to meet or exceed 5000 A for 345-kV and 3200 A for 138-kV

Appendix D – Option Description - Continued

Details of Option 4A - Alternative ERCOT Option

- All Option 4 upgrades
- Loop the existing Spanish Oak to Round Rock 138-kV line into the Hutto West 138-kV Switch; and
- Loop the existing Chief Brady to Round Rock 138-kV line into the Hutto West 138-kV Switch.

Appendix D – Option Description - Continued

Details of Option 5 - Alternative ERCOT Option

- All Option 2 upgrades
- Rebuild the 17.75 miles Bell County East Switch to Little Pond 345-kV Line using a conductor rated 5000 A or greater (due to the existing 3200 A terminal equipment, this line will be operated at a normal and emergency rating 1912 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (1912 MVA)
- Rebuild the 8.8 miles Bell County East Switch to Brangus 345-kV Line using a conductor rated 5000 A or greater (due to the existing 3200 A terminal equipment, this line will be operated at a normal and emergency rating 1912 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (1912 MVA)
- Rebuild the 4.5 miles Temple Switch to Temple Pecan Creek Switch 345 kV Double-Circuit Line using a conductor rated 5000 A or greater (normal and emergency rating 2987 MVA) on separate structures, and ensure all associated terminal equipment to meet or exceed 5000 A (2987 MVA)
- Rebuild the 5.3 miles Hutto to Round Rock NorthEast 138-kV line using double-circuit capable structures with one circuit installed and a conductor rated 2569 A or greater (normal and emergency rating 614 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (764 MVA)
- Rebuild the 3.8 miles Round Rock Northeast to Round Rock 138-kV line using double-circuit capable structures with one circuit installed and a conductor rated 2569 A or greater (normal and emergency rating 614 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (764 MVA)
- Rebuild the 3 miles Hutto to Limmer 345 kV double-circuit Line on separate structures

Appendix D – Option Description - Continued

Details of Option 5 - Alternative ERCOT Option

- Construct two new approximately 36 miles 345-kV double circuit lines from Tower Switch to Muscovy double circuit structures using a conductor rated 5000 A or greater (normal and emergency rating 2987 MVA), this upgrade will require a Certificate of Convenience and Necessity (CCN)
- Rebuild the 3.5 miles Muscovy to Limmer 345 kV Double-Circuit Line on separate structures

Appendix D – Option Description - Continued

Details of Option 6 – Brazos Suggested Option

- Establish the new Ding Dong Station 345/138-kV Station
  - Install two 345/138-kV autotransformers with normal rating of 700 MVA and emergency rating of 750 MVA
  - Loop the existing Kill Switch to Buck House 345-kV line into the new Ding Dong Station.
  - Loop the existing Russell Gap station to Kill Switch 345-kV line into the new Ding Dong Station.
  - Remove the existing Solana to Cedar Valley double circuit 138-kV transmission lines, Cedar Valley to DingDong 138-kV transmission line and Dingdong to Trimmer 138-kV Transmission line
  - Construct the following new 138-kV transmission lines
    - DingDong to Solana 138-kV transmission line, approximately 12.7-mile and Normal and emergency ratings of 418 MVA or greater
    - Solana to Cedar Valley, approximately 1.9-mile and Normal and emergency ratings of 418 MVA or greater
    - Dingdong to Trimmer, approximately 5.8-mile and Normal and emergency ratings of 418 MVA or greater
  - Construct new Double Circuit lines from Solana to Schwertner 138-kV, approximately 15.7-mile with a normal and emergency ratings of 837 MVA or greater

Appendix D – Option Description - Continued

Details of Option 6 – Brazos Suggested Option

- Establish the new Schwertner Station 345/138-kV Switch
  - Install two 345/138-kV autotransformers with normal rating of 700 MVA and emergency rating of 750 MVA
  - Loop the existing Double circuit transmission lines from Salado Substation to Hutto Station into the new Schwertner Station
  - Construct a new Single circuit 345-kV transmission line on a Double circuit capable structures which will require a CCN from Ding Dong Substation to Schwertner with a normal and emergency ratings of at least 2980 MVA or greater, approximately 25.9 miles;
  - Construct the following new 138-kV transmission lines
    - Schwertner Switch to Schwertner 138-kV transmission line, which will require a CCN, approximately 5.81 miles, with a normal and emergency ratings of at least 837 MVA or greater
    - Schwertner Switch to Bartlett switch double circuit 138-kV transmission lines, which will require a CCN, approximately 5.81 miles, with a normal and emergency ratings of at least 837 MVA or greater
    - Bartlett switch to Bartlett double circuit 138-kV transmission lines, which will require a CCN, approximately 2.52 miles, with a normal and emergency ratings of at least 837 MVA or greater
    - Schwertner switch to Solana double circuit 138-kV transmission lines, which will require a CCN, approximately 15.7 miles, with a normal and emergency ratings of at least 837 MVA or greater

Appendix D – Option Description - Continued

Details of Option 6 – Brazos Suggested Option

- Establish the new Taplin Station 345/138-kV Switch
  - Install two 345/138-kV autotransformers with normal rating of 700 MVA and emergency rating of 750 MVA
  - Loop the existing Badger to Sandow switch double circuit 345-kV line into the new Taplin Station
  - Construct a new Single circuit 345-kV transmission line on a Double circuit capable structures which will require a CCN from Schwertner Substation to Taplin with a normal and emergency ratings of at least 2980 MVA or greater, approximately 19.4 miles;
  - Construct a new Single circuit 345-kV transmission line on a Double circuit capable structures which will require a CCN from Taplin to Gibson with a normal and emergency ratings of at least 2980 MVA or greater, approximately 23.6 miles;
  - Construct a new Single circuit 345-kV transmission line on a Double circuit capable structures which will require a CCN from Gibson to Steckly Dam with a normal and emergency ratings of at least 2980 MVA or greater, approximately 27 miles;
  - Loop the existing Rodgers to Voss Lake 138-kV transmission line into the new Taplin 138-kV station
- Convert the existing Buck Holts 69-kV station and Silver City 69-kV Station into 138-kV station

Appendix D – Option Description - Continued

Details of Option 6 – Brazos Suggested Option

- Construct the following new 138-kV Transmission lines
  - A new double circuit 138-kV transmission lines from Taplin 138-kV station to Buck Holts, approximately 1.2 miles, with a normal and emergency ratings of at least 524 MVA or greater
  - A new double circuit 138-kV transmission lines from Taplin 138-kV station to Silver City, approximately 14.3 miles, with a normal and emergency ratings of at least 837 MVA or greater
  - A new double circuit 138-kV transmission lines from Bartlett 138-kV station to Buck Holts, approximately 14.4 miles, with a normal and emergency ratings of at least 837 MVA or greater
- Convert existing Branchville, Baggins,Barclay, Calvert switch, Calvert, Baileyville, Pleasant grove, Midway 69-kV Stations to 138-kV Stations
- Decommission the existing 138/69-kV Auto at Seaton station
- Move the existing BranchVille 69-kV Station to Hearne 69-kV station transmission line to BranchVille 138-kV station to Hearne 138-kV station transmission line

Appendix D – Option Description - Continued

Details of Option 6 – Brazos Suggested Option

- Move the Barclay 69-kV Station to Seaton 69-kV station line to Barclay 138-kV station to Seaton 138-kV station transmission line
- Convert the following existing 69-kV transmission lines to 138-kV transmission lines
    - Branchville to Silver City, approximately 10.18 miles, with a normal and emergency ratings of at least 237 MVA or greater
    - Barclays to Baggins, approximately 8.7 miles, with a normal and emergency ratings of at least 237 MVA or greater
    - Baggins to Silver City, approximately 8.2 miles, with a normal and emergency ratings of at least 237 MVA or greater
    - Silver City to Calvert Switch, approximately 7.3 miles, with a normal and emergency ratings of at least 418 MVA or greater
    - Calvert Switch to Calvert, approximately 6.9 miles, with a normal and emergency ratings of at least 144 MVA or greater
    - Calvert to BaileyVille, approximately 0.02 miles, with a normal and emergency ratings of at least 88 MVA or greater
    - Clavert Switch to Pleasant Grove, approximately 7.95 miles, with a normal and emergency ratings of at least 418 MVA or greater
    - Pleasant Grove to Midway approximately 12.45 miles, with a normal and emergency ratings of at least 418 MVA or greater

Appendix D – Option Description - Continued

Details of Option 6 – Brazos Suggested Option

- Move the Midway 69-kV Station to Perry 69-kV station line to Midway 138-kV station to Perry 138-kV station transmission line
- Construct a new 138-kV transmission line from Midway to Spring Valley, which will require a CCN, approximately 18.5 miles, with a normal and emergency ratings of at least 837 MVA or greater
- Install two 345/138-kV autotransformers at Gibson 345-kV station with the secondary terminal at Calvert Switch 138-kV station with normal rating of 700 MVA and emergency rating of 750 MVA
- Establish the new Mclarge Station 345/138-kV Switch
    - Install two 345/138-kV autotransformers with normal rating of 700 MVA and emergency rating of 750 MVA
    - Construct a new single circuit 345-kV transmission line on a double circuit capable structures which will require a CCN from Steckly Dam Station to new Mclarge Station with a normal and emergency ratings of at least 2980 MVA or greater, approximately 19.3 miles;
    - Loop the existing Judith to McGregor 138-kV line into the McLarge 138-kV station
    - Construct a new line from Bewley 138-kV station to Mclarge 138-kV station, approximately 0.1 miles, with a normal and emergency ratings of at least 837 MVA or greater
    - Move the existing Spring Valley station to Spring Valley tap 138-kV transmission line to Spring Valley to Mclarge 138-kV transmission line

Appendix D – Option Description - Continued

Details of Option 7 - Alternative ERCOT Option

- All Option 2 upgrades
- Rebuild the 17.75 miles Bell County East Switch to Little Pond 345-kV Line using a conductor rated 5000 A or greater (due to the existing 3200 A terminal equipment, this line will be operated at a normal and emergency rating 1912 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (1912 MVA)
- Rebuild the 8.8 miles Bell County East Switch to Brangus 345-kV Line using a conductor rated 5000 A or greater (due to the existing 3200 A terminal equipment, this line will be operated at a normal and emergency rating 1912 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (1912 MVA)
- Rebuild the 4.5 miles Temple Switch to Temple Pecan Creek Switch 345 kV Double-Circuit Line using a conductor rated 5000 A or greater (normal and emergency rating 2987 MVA) on separate structures, and ensure all associated terminal equipment to meet or exceed 5000 A (2987 MVA)
- Rebuild the 5.3 miles Hutto to Round Rock NorthEast 138-kV line using double-circuit capable structures with one circuit installed and a conductor rated 2569 A or greater (normal and emergency rating 614 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (764 MVA)
- Rebuild the 3 miles Hutto to Limmer 345 kV double-circuit Line on separate structures

Appendix D – Option Description - Continued

Details of Option 7 - Alternative ERCOT Option

- Establish a new Gabriel 345-kV Switch by installing ten 345-kV, 5000 A circuit breakers in a breaker-and-a-half bus arrangement.
  - Install two 345/138-kV autotransformers with normal rating of 700 MVA and emergency rating of 750 MVA
  - Construct new approximately 28.5 miles 345-kV double circuit lines from Salado to Gabriel Switch using a conductor rated 5000 A or greater (normal and emergency rating 2987 MVA), this upgrade will require a CCN
  - Construct new approximately 12.6 miles 345-kV double circuit lines from Gabriel to Hutto Switch using a conductor rated 5000 A or greater (normal and emergency rating 2987 MVA), this upgrade will require a CCN

Appendix D – Option Description - Continued

Details of Option 7A - Alternative ERCOT Option

- All Option 7 upgrades
- Rebuild the 2.5 miles Gabriel to Rivery 138-kV line using double-circuit capable structures with one circuit installed and a conductor rated 2569 A or greater (normal and emergency rating 614 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (764 MVA); and
- Rebuild the 6.6 miles Gabriel to Glasscock 138-kV line using double-circuit capable structures with one circuit installed and a conductor rated 2569 A or greater (normal and emergency rating 614 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (764 MVA);

Appendix D – Option Description - Continued

Details of Option 8 – No Muscovy Voss Lake

- Establish the Tower 345-kV Switch by installing ten 345-kV, 5000 A circuit breakers in a breaker-and-a-half bus arrangement.
  - Loop the existing Salado Switch to Knob Creek Switch 345-kV Line into Tower 345-kV Switch to create the new 12.4 miles Salado Switch – Tower Switch 345-kV Line and 2.9 miles Tower Switch to Temple Switch 345-kV Line
  - Construct two new approximately 1.2 miles 345-kV single circuit lines from Tower Switch to Knob Creek Switch on independent, single circuit structures using a conductor rated 5000 A or greater (normal and emergency rating 2987 MVA), this upgrade will require a CCN
  - Ensure all associated terminal equipment to meet or exceed 5000 A (2987 MVA)
- Rebuild the 12.4 miles Salado Switch to Tower Switch 345-kV Line using double-circuit capable structures with one circuit installed, using a conductor rated 5000 A or greater (normal and emergency rating 2987 MVA), and ensure all associated terminal equipment to meet or exceed 5000 A (2987 MVA), this upgrade will require a CCN
- Rebuild the 29.6 miles Bell County East Switch to Voss Lake Switch 345-kV Double-Circuit Line using a conductor rated 5000 A or greater (due to the existing 3200 A terminal equipment, this line will be operated at a normal and emergency rating 1912 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (1912 MVA)

Appendix D – Option Description - Continued

Details of Option 8 – No Muscovy Voss Lake

- Rebuild the 9.9 miles Minerva Switch to Robertson 138-kV Line using double-circuit capable structures with one circuit installed and a conductor rated 2569 A or greater (normal and emergency rating 614 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (764 MVA)
- Rebuild the 1.85 miles Temple Switch to Tinroof 138-kV line using double-circuit capable structures with one circuit installed and a conductor rated 2569 A or greater (normal and emergency rating 614 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (764 MVA)
- Rebuild the 17.75 miles Bell County East Switch to Little Pond 345-kV Line using a conductor rated 5000 A or greater (due to the existing 3200 A terminal equipment, this line will be operated at a normal and emergency rating 1912 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (1912 MVA)
- Rebuild the 8.8 miles Bell County East Switch to Brangus 345-kV Line using a conductor rated 5000 A or greater (due to the existing 3200 A terminal equipment, this line will be operated at a normal and emergency rating 1912 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (1912 MVA)
- Rebuild the 4.5 miles Temple Switch to Temple Pecan Creek Switch 345 kV Double-Circuit Line using a conductor rated 5000 A or greater (normal and emergency rating 2987 MVA) on separate structures, and ensure all associated terminal equipment to meet or exceed 5000 A (2987 MVA)

Appendix D – Option Description - Continued

Details of Option 8 – No Muscovy Voss Lake

- Rebuild the 5.3 miles Hutto to Round Rock NorthEast 138-kV line using double-circuit capable structures with one circuit installed and a conductor rated 2569 A or greater (normal and emergency rating 614 MVA), and ensure all associated terminal equipment to meet or exceed 3200 A (764 MVA)
- Rebuild the 36.9 miles Hutto to Salado 345 kV Double-Circuit Line using a conductor rated 5000 A or greater (normal and emergency rating 2987 MVA), and ensure all associated terminal equipment to meet or exceed 5000 A (2987 MVA)