



CPS - Omicron Reliability Project ERCOT Independent Review Status Update

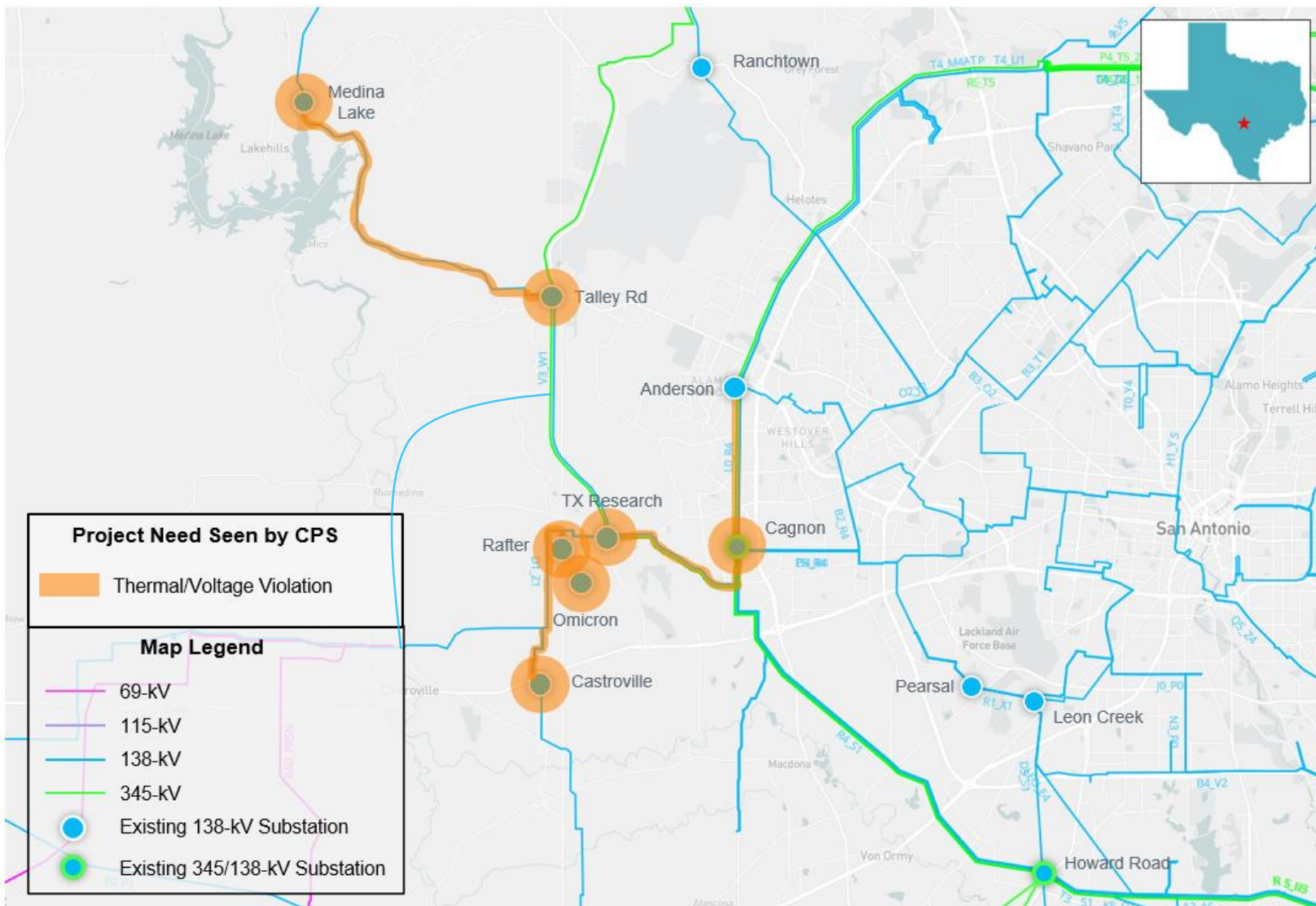
Sarah Gunasekera

RPG Meeting
July 16, 2024

Recap

- CPS Energy (CPS) submitted the Omicron Reliability Project for Regional Planning Group (RPG) review in February 2024
 - This Tier 2 project is estimated at \$42.5 million and will require a Convenience and Necessity (CCN)
 - Estimated completion date is June 2027
 - Addresses both thermal and voltage violations associated with the new customer load at Omicron 138-kV substation
- ERCOT provided a project updates at the May and June 2024 RPG Meeting
 - <https://www.ercot.com/calendar/05142024-RPG-Meeting>
 - <https://www.ercot.com/calendar/06112024-RPG-Meeting>
- This project is currently under ERCOT Independent Review (EIR)

Recap: Study Area Map with Project Need (CPS)



Recap: Preliminary Results of Reliability Assessment –Base Case

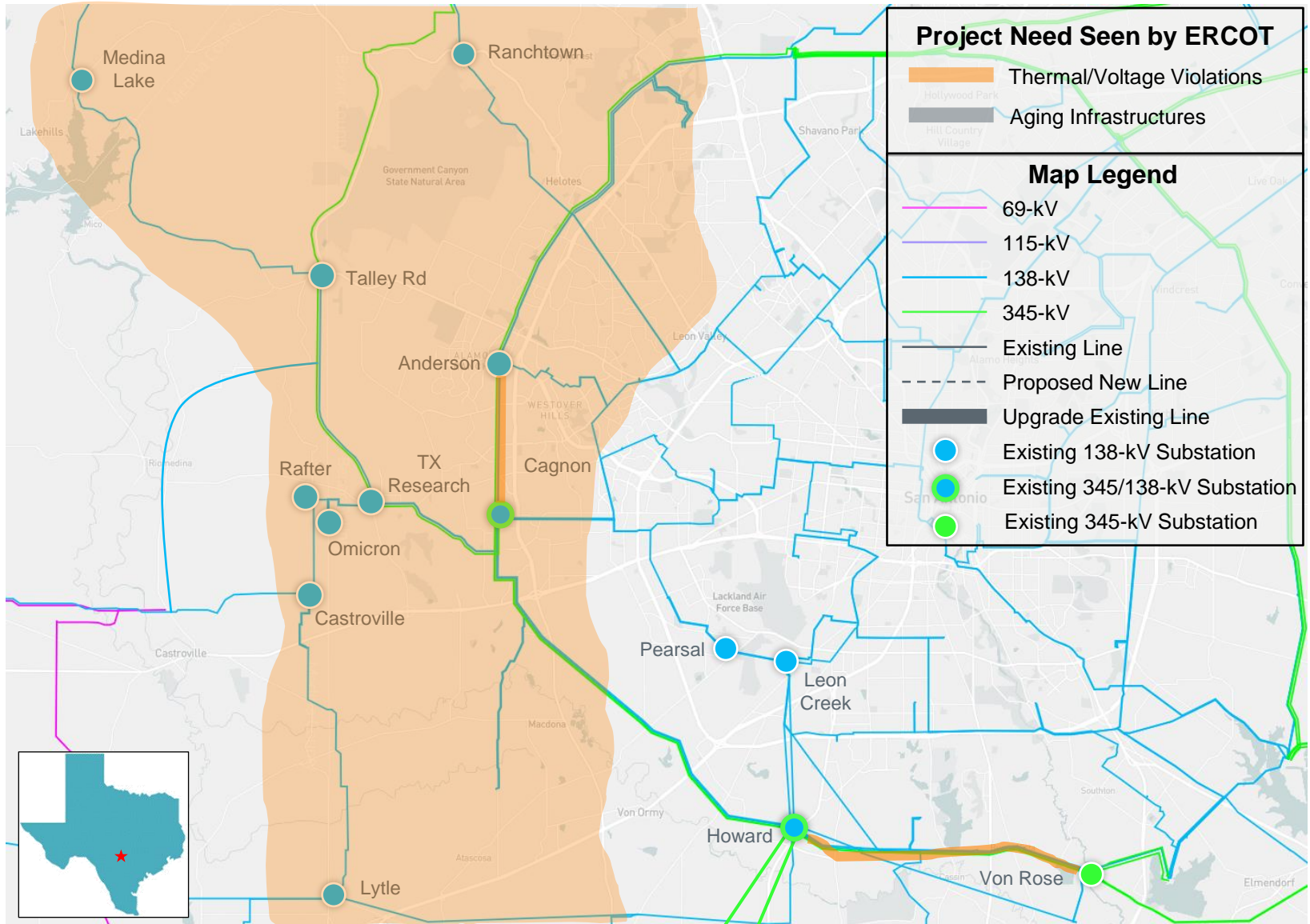
Contingency Category*	Unsolved Power Flow	Voltage Violations	Thermal Overloads
P1	None	1	None
P2, P4, P5	None	None	None
P3 (G-1+N-1)*	None	None**	None
P6.2 (X-1+N-1)*	None	None**	2
P7	None	57**	None

*G-1 Generators tested: Leon Creek U1, San Miguel U1, Sunray Solar S1, JK Spruce U2

*X-1 Transformers tested: Cagnon X1, Hill Country X1, Howard X1

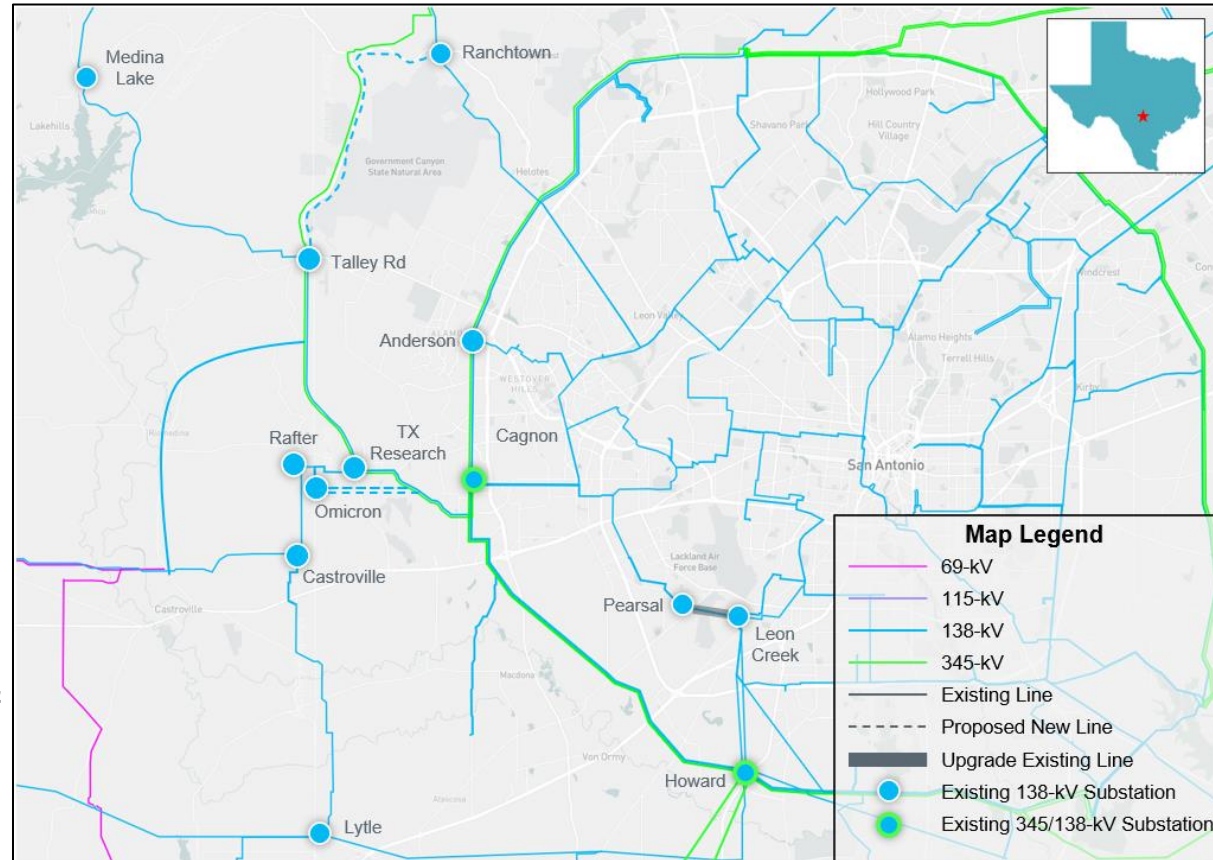
**Violations seen in the basecase under P7 events were also seen under G-1 and X-1 events

Recap: Project Need as Seen by ERCOT



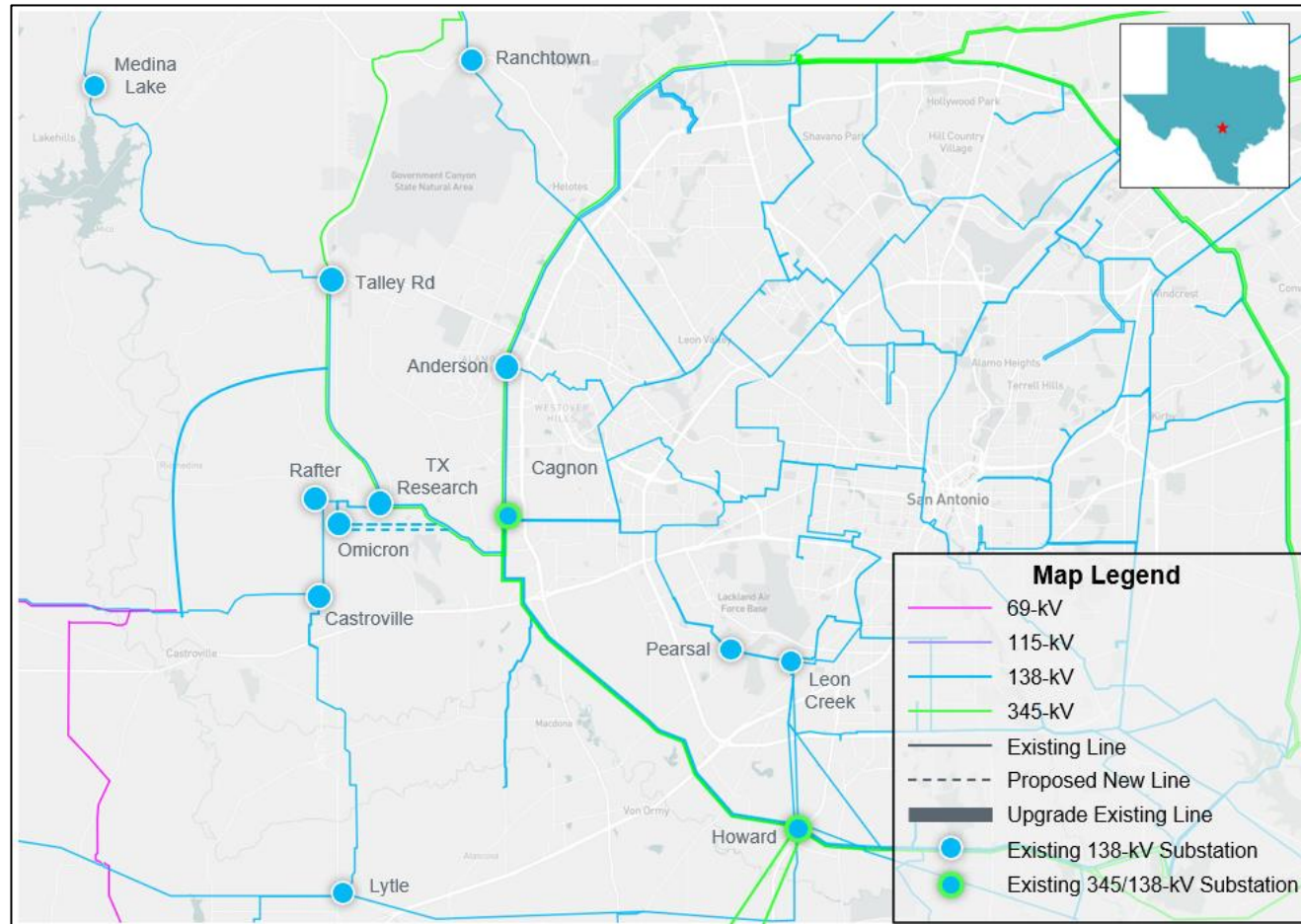
Recap: Option 1 - Project Proposed by CPS

- Construct a new approximately 5-mile line extension with ratings of 698 MVA from the new Omicron 138-kV substation to the existing Cagnon to Howard 138-kV transmission line. This creates a new Cagnon to Omicron 138-kV transmission line and a new Howard to Omicron 138-kV transmission line
- Construct a new approximately 14.3-mile Talley Rd to Ranchtown 138-kV transmission line with ratings of at least 570 MVA
- Rebuild approximately 1.7-mile Leon Creek to Pearsal 138-kV transmission line with ratings of at least 468 MVA



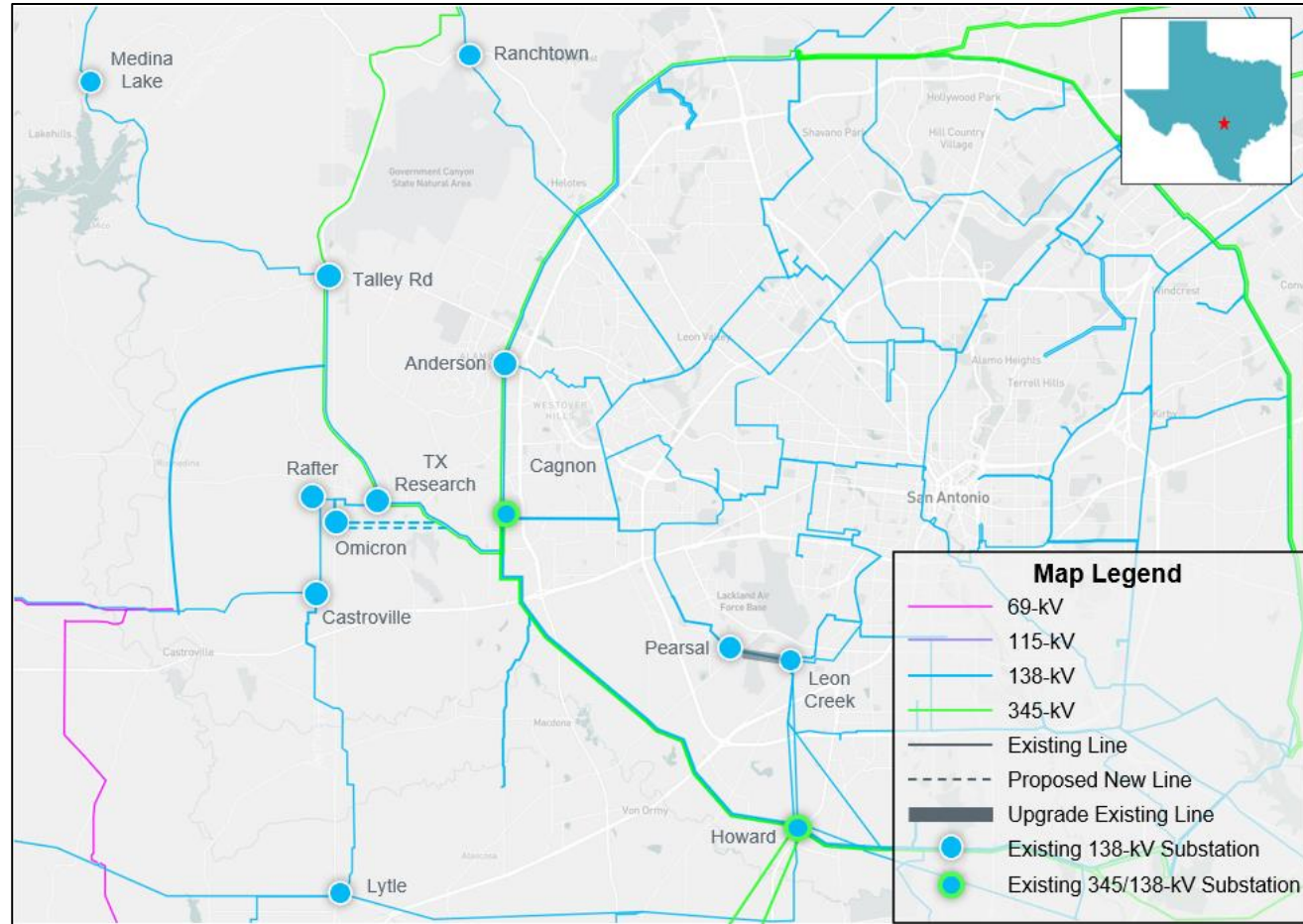
Recap: Option 1A – Modified CPS Option 1

- Construct a new approximately 5-mile line extension with ratings of 698 MVA from the new Omicron 138-kV substation to the existing Cagnon to Howard 138-kV transmission line. This creates a new Cagnon to Omicron 138-kV transmission line and a new Howard to Omicron 138-kV transmission line



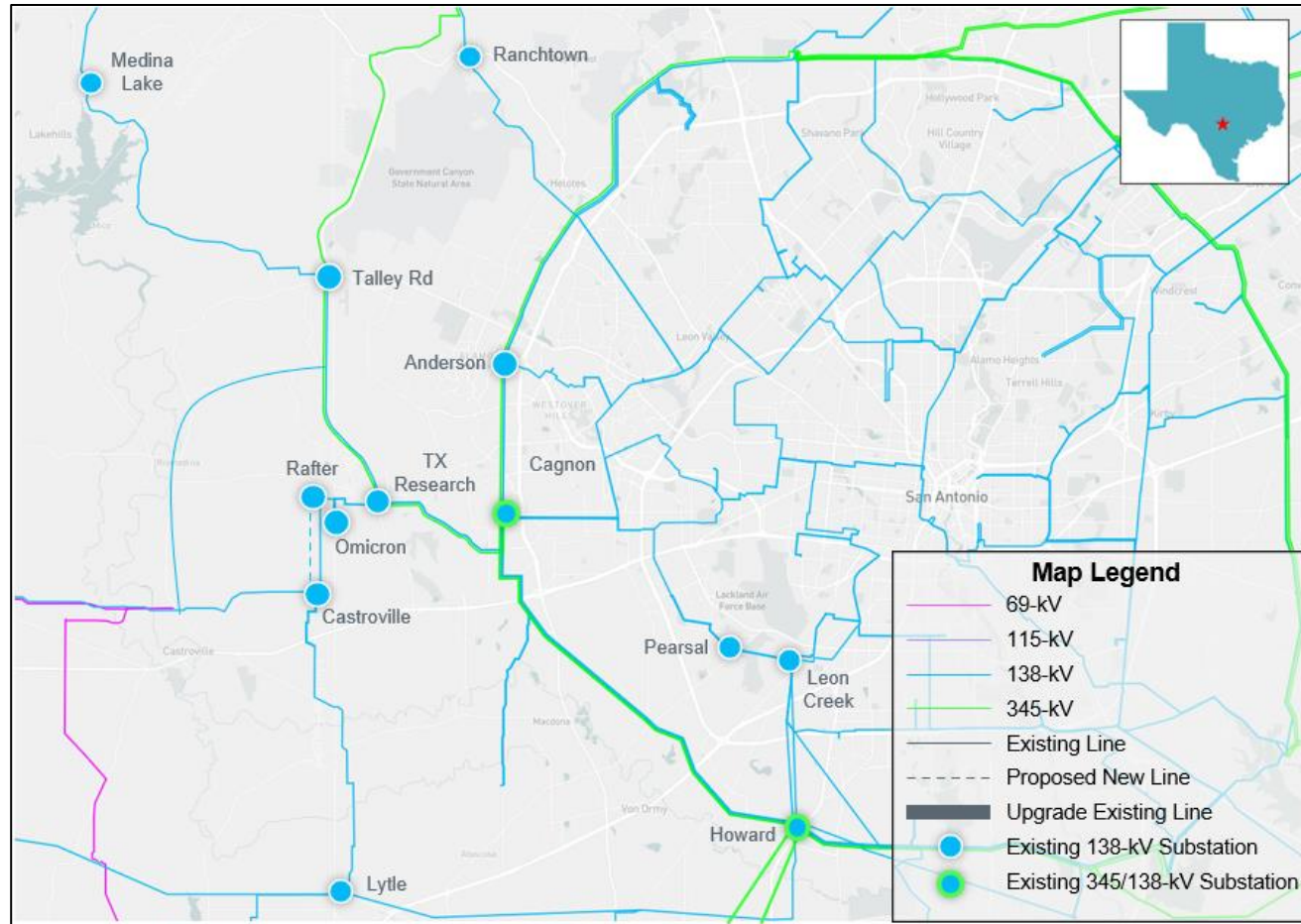
Option 1B – Modified CPS Option 1

- Construct a new approximately 5-mile line extension with ratings of 698 MVA from the new Omicron 138-kV substation to the existing Cagnon to Howard 138-kV transmission line. This creates a new Cagnon to Omicron 138-kV transmission line and a new Howard to Omicron 138-kV transmission line
- Rebuild approximately 1.7-mile Leon Creek to Pearsal 138-kV transmission line with ratings of at least 468 MVA



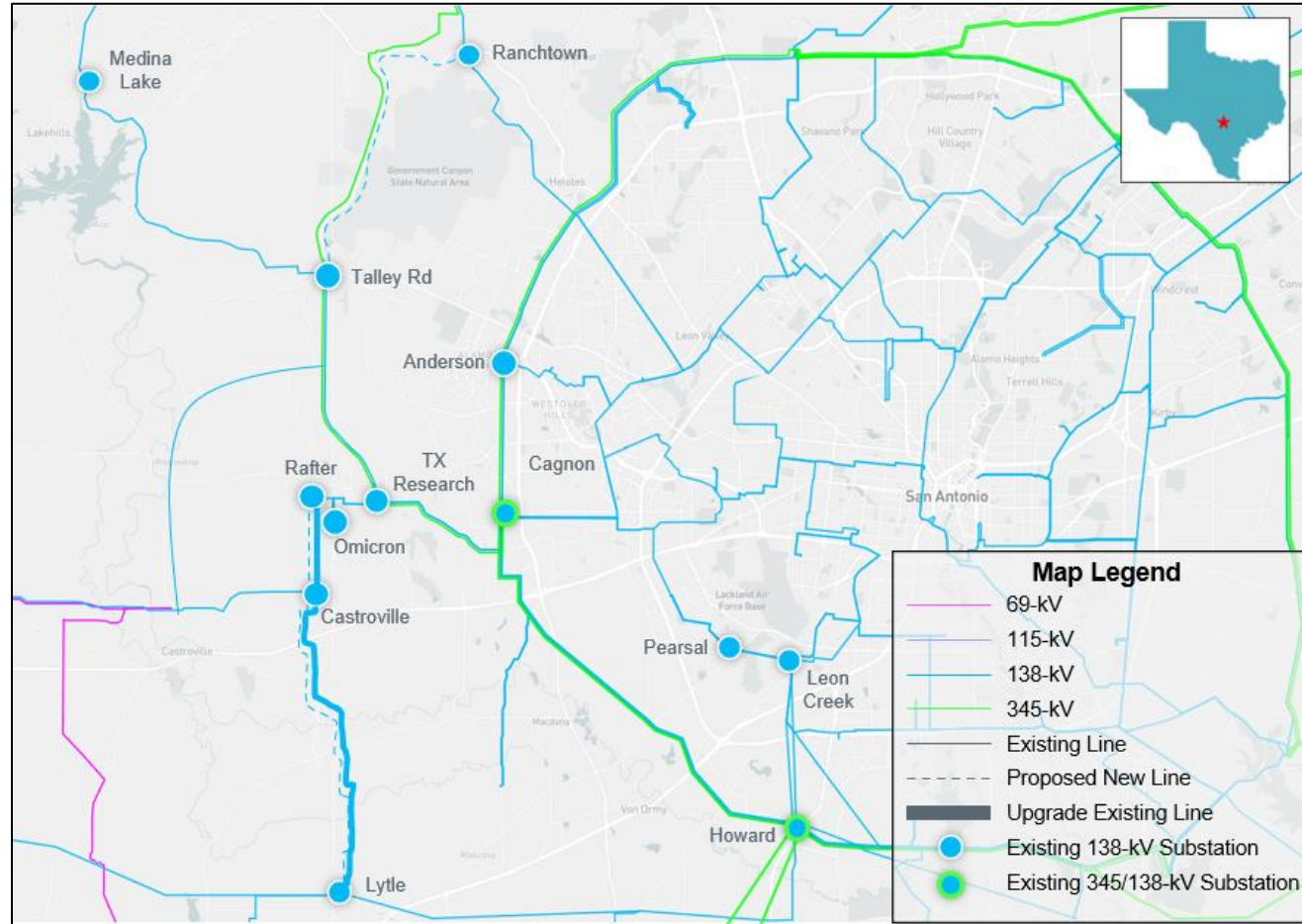
Recap: Option 2 – Alternative Proposed by CPS

- Rebuild approximately 6.1-mile Castroville to Rafter single circuit 138-kV transmission line as a double circuit 138-kV transmission line with ratings of at least 570 MVA



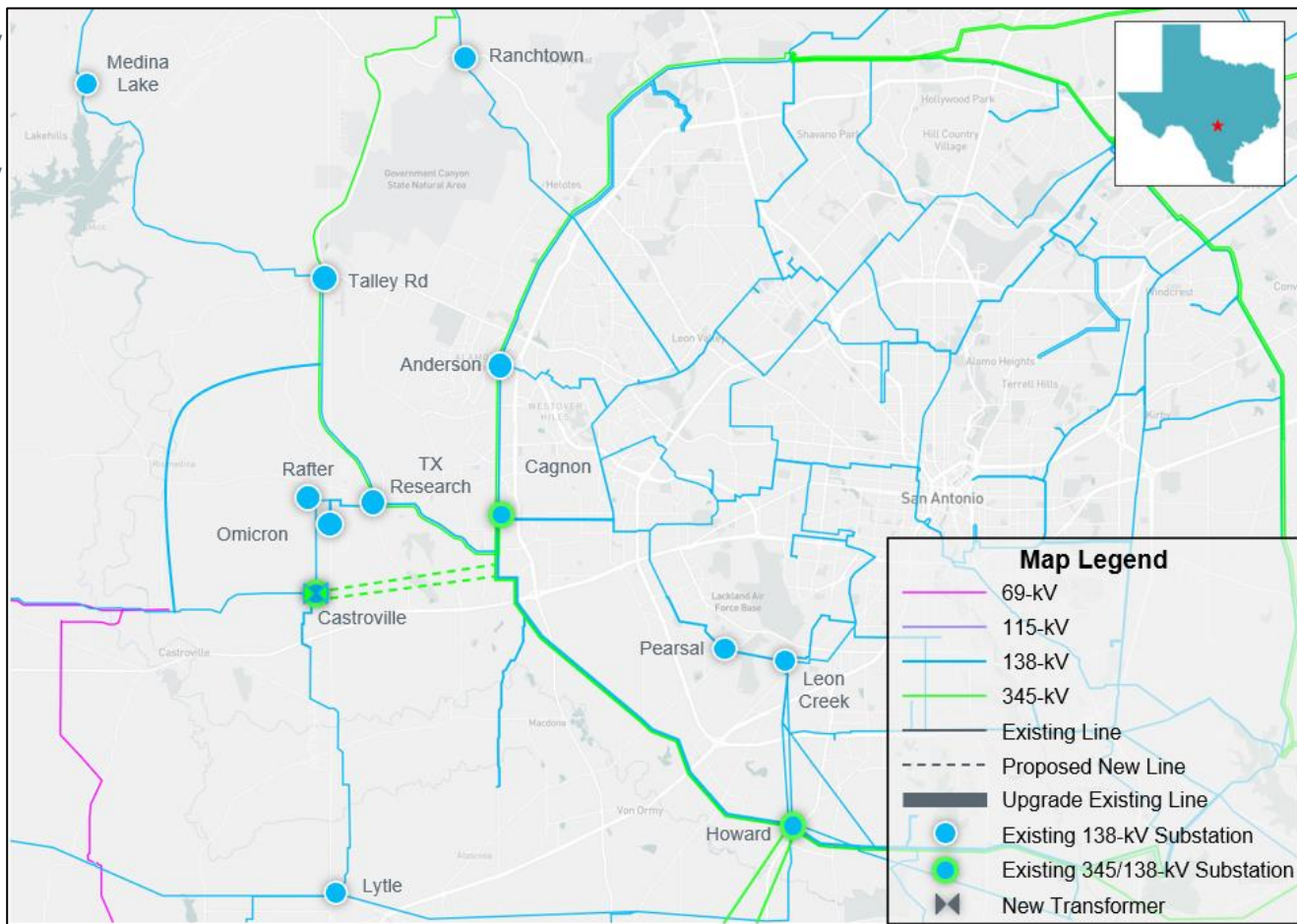
Recap: Option 3 – Alternative Proposed by CPS

- Rebuild approximately 14.8-mile Castroville to Rafter 138-kV single circuit transmission line and Castroville to Lytle 138-kV single circuit transmission line as a double circuit transmission line with circuits Castroville to Rafter, Castroville to Lytle, and Rafter to Lytle with ratings of at least 570 MVA per circuit
- Construct a new approximately 14.3-mile Talley Rd to Ranchtown 138-kV transmission line with ratings of at least 570 MVA



Recap: Option 4 – ERCOT Option

- Construct a new 345-kV bus at the existing 138-kV Castroville substation
- Construct two 345/138-kV autotransformers at the Castroville substation
- Construct a new approximately 7-mile line extension with ratings of at least 1746 MVA from the new Castroville 345-kV substation to the existing Cagnon to Howard 345-kV transmission line. This creates a new Cagnon to Castroville 345-kV transmission line and a new Howard to Castroville 345-kV transmission line



Preliminary Results of Reliability Assessment – Options

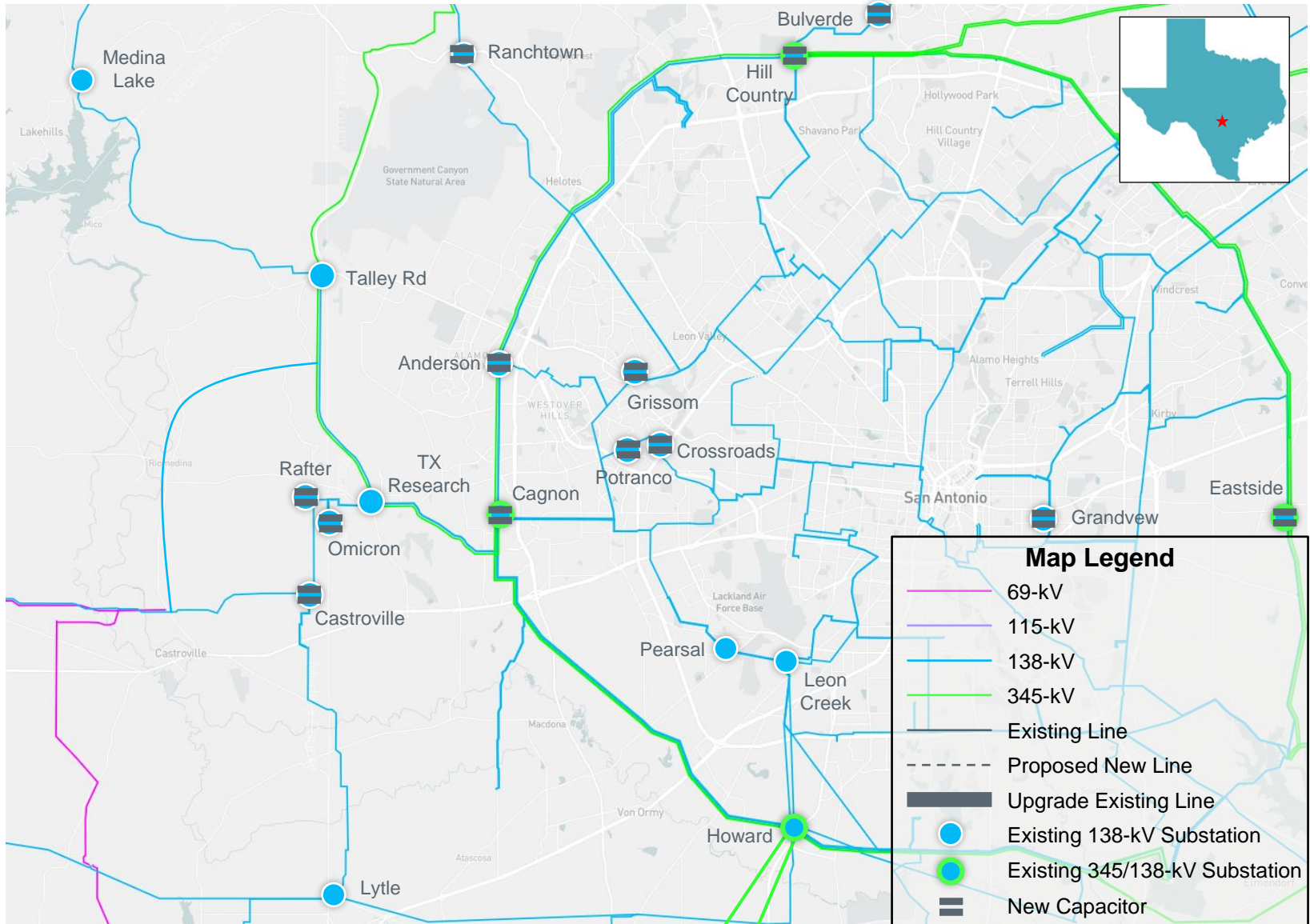
- No thermal violations were seen under any initial Option
- Several voltage violations were seen in the study area

	N-1		
	Thermal Violations	Voltage Violations	Unsolved
Option 1	None	51	None
Option 1A	None	51	None
Option 1B	None	51	None
Option 2	None	51	None
Option 3	None	51	None
Option 4	None	18	None

Recap: Adding Capacitance to Options

Substation	MVAR
Rafter	28.57
Cagnon Rd	50.00
Hill Country	50.00
Potranco	28.57
Ranchtown	28.57
Anderson	50.00
Grissom Rd	50.00
Castroville	28.57
Bulverde	14.3
Grandview	28.57
Omicron	42.85
Eastside	50.00
Crossroads	28.57

Recap: Adding Capacitors to Options



Results of Reliability Assessment – Options with Capacitors Added

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

Cost Estimate and Feasibility from CPS

	Cost Estimate (\$M)**	Feasibility
Option 1	\$59.9*	Yes
Option 1A	\$38.0	Yes
Option 1B	\$44.3	Yes
Option 2	\$36.2	Yes
Option 3	\$96.3*	Yes
Option 4	\$135.9	Yes

*Cost estimate includes Tally Rd to Ranchtown 138-kV transmission line addition; this was captured in the STEC Rio Medina project (23RPG028) and endorsed by ERCOT in May 2024

**Cost estimate includes the thirteen (13) capacitor bank additions

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 the South and South-Central weather zones to balance power
 - Based on N-1 contingency
- Findings
 - Options 1 and 1B provide a significantly higher additional transfer capability than other options

	Incremental Load Serving Capability(MW)
Option 1	891.48
Option 1A	390.37
Option 1B	891.48
Option 2	320.96
Option 3	328.85
Option 4	649.64

Maintenance Outage Scenario Analysis

- ERCOT conducted planned maintenance outage analysis on all short-listed options to compare relative performance of the options
 - Load levels in the South and South-Central Weather zones were scaled down based on the historical non-summer peak data, 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)
- The following thermal or voltage constraints were observed in the N-1-1 analysis

	Thermal Violation	Voltage Violation
Option 1	None	None
Option 1A	1	None
Option 1B	None	None
Option 2	1	None
Option 3	1	None
Option 4	None	None

Comparison of Short-listed Options

	Option 1	Option 1B	Option 4
Meets ERCOT and NERC Reliability Criteria	Yes	Yes	Yes
Improves Long-Term Load Serving Capability	Yes (Better)	Yes(Better)	Yes
Improves Operational Flexibility (Planned Maintenance Outages)	Yes	Yes	Yes
CCN Needed (miles)	Yes (~19.3)	Yes (~5.0)	Yes (~7.0)
Project Feasibility	Yes	Yes	Yes
Capital Cost Estimate** (\$M)	~59.9*	~44.3	~135.9

*Cost estimate includes Tally Rd to Ranchtown 138-kV transmission line addition; this was captured in the STEC Rio Medina project (23RPG028) and endorsed by ERCOT in May 2024

**Cost estimate includes the thirteen (13) capacitor bank additions

ERCOT Preferred Option

- Option 1B was selected as the ERCOT preferred option because it
 - Addressed the project need in the West San Antonio Area
 - Is the least expensive option
 - Provides better long-term load-serving capability compared to Option 4
 - Requires the least mileage of CCN

Congestion Analysis on Preferred Option

- Congestion analysis was performed for the preferred Option 1B using the 2023 RTP 2028 Final Economic case
- Option 1B caused one new congestion as shown below within the study area

Monitored Line	% Time of Congestion	New / Existing
Omicron to Rafter 138-kV Line	2.07	New

- Upgrading the new congested line did yield economic benefit and therefore will be recommended for upgrade as part of this project

Upgrade Tested	Mileage (mi)	Passed Production Cost Savings Test	Passed Generation Revenue Reduction Test
Omicron to Rafter 138-kV Line Upgrade	1.68	Yes	Yes

ERCOT Recommended Option

- ERCOT recommends Option 1B
 - Estimated Cost: approximately \$44.3 million
 - Cost estimate includes the thirteen (13) capacitor bank additions
 - Cost estimate for the Tally Rd to Ranchtown 138-kV transmission line addition was captured in the STEC Rio Medina project (23RPG028) and endorsed by ERCOT in May 2024
 - Cost estimate does not include the economic upgrade of the Omicron to Rafter 138-kV transmission line
 - Expected ISD: June 2027
 - CCN filing will be required to
 - Construct a new approximately 5-mile line extension with ratings of 698 MVA from the new Omicron 138-kV substation to the existing Cagnon to Howard 138-kV transmission line. This creates a new Cagnon to Omicron 138-kV transmission line and a new Howard to Omicron 138-kV transmission line

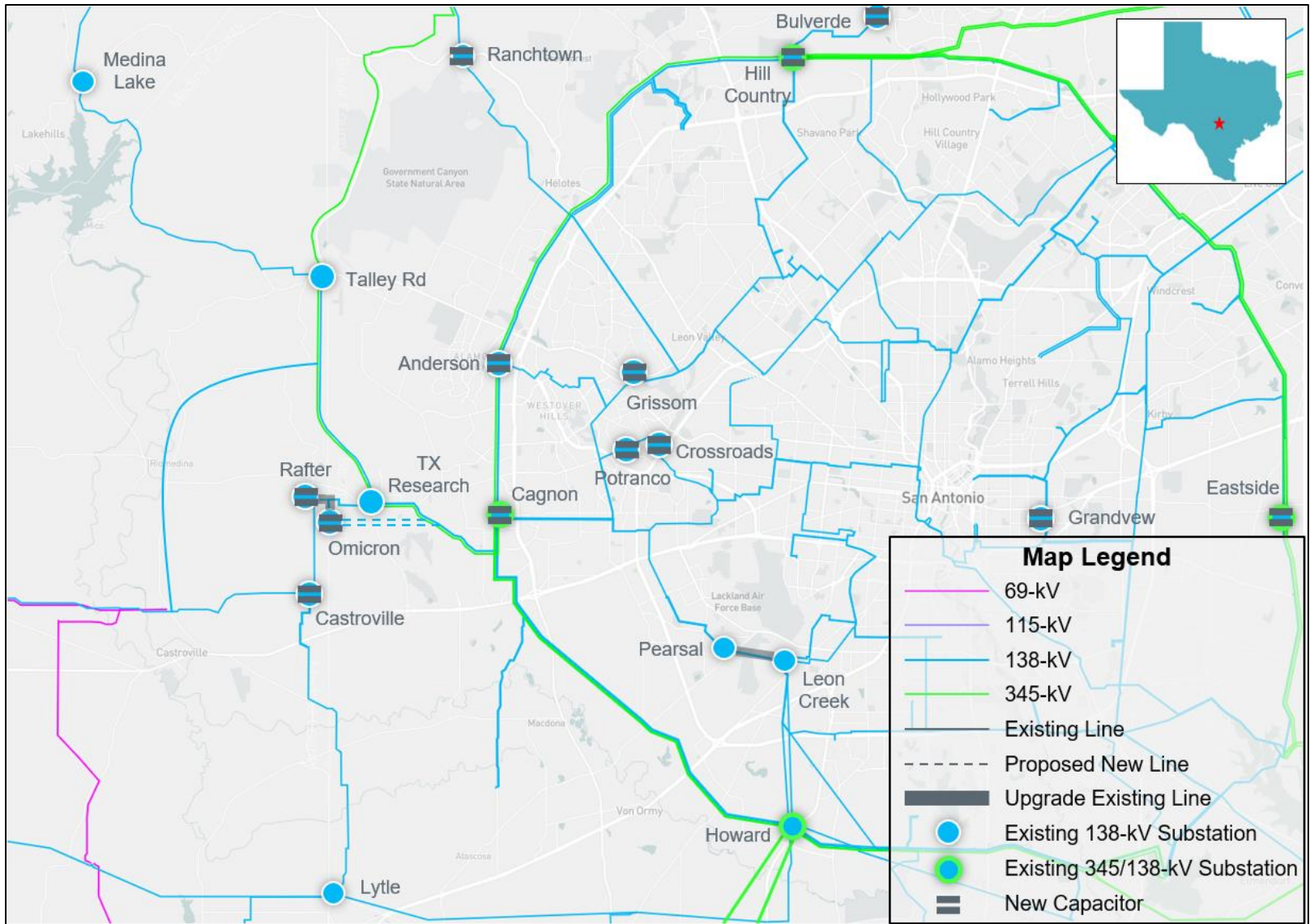
ERCOT Recommendation Option 1B

- Construct a new approximately 5-mile line extension with ratings of 698 MVA from the new Omicron 138-kV substation to the existing Cagnon to Howard 138-kV transmission line. This creates a new Cagnon to Omicron 138-kV transmission line and a new Howard to Omicron 138-kV transmission line
- Rebuild approximately 1.7-mile Leon Creek to Pearsal 138-kV transmission line with ratings of at least 468 MVA
- Rebuild approximately 1.7-mile Omicron to Rafter 138-kV transmission line with ratings of at least 570 MVA

ERCOT Recommendation Option 1B (continued)

- Install the following sized capacitor banks at the following locations
 - 28.57 MVAR, Rafter
 - 50.00 MVAR, Cagnon Road
 - 50.00 MVAR, Hill Country
 - 28.57 MVAR, Potranco
 - 28.57 MVAR, Ranchtown
 - 50.00 MVAR, Anderson
 - 50.00 MVAR, Grissom Road
 - 28.57 MVAR, Castroville
 - 14.30 MVAR, Bulverde
 - 28.57 MVAR, Grandview
 - 42.85 MVAR, Omicron
 - 50.00 MVAR, Eastside
 - 28.57 MVAR, Crossroads

ERCOT Recommended Option 1B



Next Steps and Tentative Timeline

- Tentative Timelines
 - EIR will be posted July 2024

Thank you!



Stakeholder comments also welcomed through:

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Appendix A – Transmission Projects Added

TPIT/RPG No	Project Name	Tier	Project ISD	TSP	County(s)
22RPG026	Wimberley Loop project	Tier 2	5/1/2027	PEC	Blanco, Hays
23RPG003	Eagle Ford Large Load Interconnection Project	Tier 3	12/4/2025	GVEC	DeWitt
23RPG004	Lockhart to Luling 69-kV Transmission Line Overhaul Project	Tier 4	6/30/2025	LCRA	Caldwell
23RPG015	Cuero Substation Upgrade Project	Tier 4	5/15/2024	LCRA	DeWitt
23RPG028	Rio Medina Project	Tier 2	1/1/2027	STEC	Medina
23RPG032	San Antonio South Reliability II Project	Tier 1	05/01/2029	CPS, AEP, STEC	Guadalupe, Wilson, Atascosa
72500	Rio Lago - New 138kV Substation	Tier 4	11/30/2024	BEC	Bandera
72268	CPSE_New Ingram Rd Substation	Tier 4	5/1/2025	CPS	Bexar
73098	Castroville Cut-in 138 kV	Tier 2	5/30/2025	ETT TCC	Medina
71873	CPSE_Hill Country Auto# 2 Impedance Upgrade	Tier 3	6/1/2025	CPS	Bexar
73063	Big Foot to Lytle: Convert to 138 kV	Tier 4	9/20/2025	AEP TCC	Medina, Frio
76242	Lytle: Build new 138 kV terminal	Tier 4	9/20/2025	AEP TCC	Medina
76768	Upgrade Pearson -Pearsall	Tier 4	12/1/2025	STEC	Frio, Medina
67992D	CPSE_345KV_Howard_Switching_Station,CPSE_Hamilton_to_MedCtr_Upgrade,CPSE_Medina_to_36th_Street_Upgr ade	Tier 3	1/31/2026	CPS	Bexar
72502	Tarpley Substation Upgrades	Tier 4	12/30/2026	BEC	Bandera
76790	Upgrade Pearsall Auto	Tier 4	5/1/2027	STEC	Frio
73417	LCRATSC_Schumansville_SheriffsPosse_StormHardening	Tier 4	15/5/2025	LCRA	Guadalupe, Comal
73793	LCRATSC_McCartyLaneEast_Zorn_TL_Storm_Hardening	Tier 4	15/5/2025	LCRA	Hays, Guadalupe

Appendix B – Transmission Backed Out

RTP Project ID	Project Name	TSP	County(s)
2023-SC10	Wiseman 138-kV Substation Addition and CPS Multiple Cap Bank Additions	CPS	Bexar, Comal
2023-SC16	Hondo to Hondo Creek Switching Station 138-kV Line Upgrade	CPS, STEC	Medina
2023-SC19	South to Central Texas 345-kV Double-Circuit Line Additions	AEN, AEP, LCRA, ONCOR	San Patricio, Bee, Karnes, Wilson, Guadalupe, Comal, Hays, Travis, Williamson
2023-SC20	Pearson - Natalia - Devine - Moore - Pearsall 69-kV Line Rebuild	STEC	Frio, Medina
2023-SC21	Big Foot to Lytle 69-kV to 138-kV Line Conversion	AEP	Frio, Medina
2022-S3	Pearsall 138/69-kV Transformer Upgrade	STEC	Frio
2023-S3	Oaks Sub 138/69-kV Transformer Upgrade	STEC	Atascosa
2023-S4	Poteet Sub to Oaks Sub 69-kV Line Upgrade	STEC	Atascosa
2023-S5	Poteet Sub to Pearsall Switching Station 69-kV Line Upgrade	STEC	Atascosa, Frio
2023-S6	Rossville Substation Cap Bank Addition	STEC	Atascosa

Appendix C – Generation Added

GINR	Project Name	Fuel	Project COD	Capacity (MW)	County
22INR0366	LIBRA BESS	Other	3/30/2024	206.21	Guadalupe
22INR0422	Ferdinand Grid BESS	Other	5/31/2026	202.65	Bexar
23INR0154	Ebony Energy Storage	Other	4/30/2024	203.50	Comal
23INR0381	Soportar ESS	Other	3/15/2025	102.11	Bexar
23INR0483	Rio Nogales CT1 Rotor Replacement	Gas	6/8/2023	3.10	Guadalupe
24INR0427	CPS AvR CT1 Rotor Replacement	Gas	2/15/2024	11.30	Bexar