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PROJECT NO. 55999

REPORTS OF THE ELECTRIC RELABILITY COUNCIL OF TEXAS	**§**	**PUBLIC UTILITY COMMISSION**
	§	
	§	**OF TEXAS**

ELECTRIC RELIABILITY COUNCIL OF TEXAS, INC.'S NOTICE OF ENDORSEMENT OF A TIER 1 TRANSMISSION PROJECT

Pursuant to Protocol Section 3.11.4.9(1), Electric Reliability Council of Texas, Inc. (ERCOT) files this Notice of ERCOT's endorsement of a Tier 1 transmission project titled the San Antonio South Reliability II Project, as reflected in Attachments A and B. CPS Energy, American Electric Power, and South Texas Electric Cooperative are the ERCOT-registered Transmission Service Providers (TSPs) responsible for the transmission project. ERCOT is prepared to provide the Commission with any additional information it may request regarding this matter.

Dated: May 1, 2024

Respectfully Submitted,

/s/ Katherine Gross

Chad V. Seely
Senior Vice President and General Counsel
Texas Bar No. 24037466
(512) 225-7035 (Phone)
chad.seely@ercot.com

Brandon Gleason
Deputy General Counsel
Texas Bar No. 24038679
(512) 275-7442 (Phone)
brandon.gleason@ercot.com

Katherine Gross
Senior Corporate Counsel
Texas Bar No. 24065610
(512) 225-7184 (Phone)
katherine.gross@ercot.com

ERCOT
8000 Metropolis Drive, Bldg. E, Suite 100
Austin, Texas 78744
(512) 225-7079 (Fax)

ATTORNEYS FOR ELECTRIC
RELIABILITY COUNCIL OF TEXAS, INC.

ercot
Your Power. Our Promise.

Taylor
2705 West Lake Drive
Taylor, TX 76574
T 512.248.3000
F 512.225.7079

Austin
8000 Metropolis Drive (Building E), Suite 100
Austin, TX 78744
T 512.225.7000
F 512.225.7079

ercot.com

May 1, 2024

Mr. George J. Tamez
Director, Transmission Planning & Operations Engineering
CPS Energy
500 McCullough Avenue
San Antonio, Texas 78215

Mr. Robert W. Bradish
Vice President, Planning & Engineering
American Electric Power
8500 Smiths Mill Road, 3rd floor
New Albany, OH 43054

Mr. Clif Lange
General Manager
South Texas Electric Cooperative
PO BOX 119
Nursery, TX 77976

RE: San Antonio South Reliability II Project

Dear Mr. Tamez, Mr. Bradish, and Mr. Lange:

On April 23, 2024, the Electric Reliability Council of Texas (ERCOT) Board of Directors endorsed the following Tier 1 transmission project in accordance with ERCOT Protocol Section 3.11.4:

San Antonio South Reliability II Project:

- Rebuild the existing Spruce to Pawnee 345-kV single circuit into a 345-kV double circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit; this transmission line will require approximately 45.8 miles of expanded Right of Way (ROW), which will be used to build one of the new circuits while the original circuit is left in service;
- Rebuild the existing Pawnee to Tango 345-kV single circuit into a 345-kV double circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit; this transmission line will require approximately 12.2 miles of expanded ROW, which will be used to build one of the new circuits while the original circuit is left in service; and
- Construct a new Eastside 345/138-kV station near Beck Rd. The Eastside 345/138-kV station includes two 345/138-kV autotransformers, each with normal and emergency ratings of at least 600 MVA, and will be interconnected as follows:

- Loop the existing Skyline to Spruce 345-kV double circuit transmission line into the new Eastside 345-kV station;
- Loop the existing Deely to Martinez 138-kV single circuit transmission line into the new Eastside 138-kV station;
- Loop the existing Deely to Walzem 138-kV single circuit transmission line into the new Eastside 138-kV station;
- Loop the existing Beck to Kirby 138-kV single circuit transmission line into the new Eastside 138-kV station; and
- Loop the existing Kirby to Sulphur 138-kV single circuit transmission line into the new Eastside 138-kV station.

Should you have any questions please contact me at any time.

Sincerely,

Kristi J Hobbs

Kristi Hobbs
Vice President, System Planning and Weatherization
Electric Reliability Council of Texas

cc:

Pablo Vegas, ERCOT
Woody Rickerson, ERCOT
Prabhu Gnanam, ERCOT
Robert Golen, ERCOT
Brandon Gleason, ERCOT

ERCOT Independent Review of the San Antonio South Reliability II Project

Document Revisions

Date	Version	Description	Author(s)
04/09/2024	1.0	Final Draft	Caleb Holland
		Reviewed by	Robert Golen, Prabhu Gnanam

Executive Summary

Brazos Electric Cooperative (BEC) submitted the San Miguel to Marion 345-kV Project to the Regional Planning Group (RPG) in October 2023. BEC proposed this project to address thermal planning criteria violations they observed in the San Antonio area, located in Guadalupe, Wilson, and Atascosa Counties in the South and South-Central (SSC) Weather Zones.

The project was submitted to address NERC TPL-001-5.1 reliability criteria thermal violations. This BEC-proposed project was classified as a Tier 1 project pursuant to ERCOT Protocol Section 3.11.4.3, with an estimated cost of approximately $258.5 million. A Certificate of Convenience and Necessity (CCN) was not required for the BEC-proposed solution. The expected in-service date (ISD) of the project as submitted was December 2027.

ERCOT performed an Independent Review and did not confirm the original project need as submitted by BEC. However, ERCOT did confirm a need for a project in the region under N-1 conditions and now designates the project as the San Antonio South Reliability II Project.

Among the 15 different transmission project options evaluated in the Independent Review, ERCOT recommends Option 14 to address the thermal overload based on the study results described in Section 5 of this report. Option 14 consists of the following:

- Rebuild the existing Spruce to Pawnee 345-kV single circuit into a 345-kV double circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit; this transmission line will require approximately 45.8 miles of expanded Right of Way (ROW), which will be used to build one of the new circuits while the original circuit is left in service;
- Rebuild the existing Pawnee to Tango 345-kV single circuit into a 345-kV double circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit; this transmission line will require approximately 12.2 miles of expanded ROW, which will be used to build one of the new circuits while the original circuit is left in service; and
- Construct a new Eastside 345/138-kV station near Beck Rd. The Eastside 345/138-kV station includes two 345/138-kV autotransformers, each with normal and emergency ratings of at least 600 MVA, and will be interconnected as follows:
    - Loop the existing Skyline to Spruce 345-kV double circuit transmission line into the new Eastside 345-kV station;
    - Loop the existing Deely to Martinez 138-kV single circuit transmission line into the new Eastside 138-kV station;
    - Loop the existing Deely to Walzem 138-kV single circuit transmission line into the new Eastside 138-kV station;
    - Loop the existing Beck to Kirby 138-kV single circuit transmission line into the new Eastside 138-kV station; and
    - Loop the existing Kirby to Sulphur 138-kV single circuit transmission line into the new Eastside 138-kV station.

The cost estimate for this Tier 1 project is approximately $435 million. A CCN will be required for the construction of the new double circuit 345-kV line from Spruce Substation to Tango Substation due to approximately 58 miles of expanded ROW. The Spruce to Pawnee 345-kV rebuild and the Pawnee to Tango 345-kV rebuild will be done without the need for extended outages. The expected ISD for the Spruce to Pawnee portion of this project is December 2028. The expected ISD for the Eastside Station portion of this project is June 2028. The expected ISD for the Pawnee to Tango portion of this project is May 2029.

ERCOT designates this project as critical to reliability of the ERCOT system based on historic line loading reflected in the recent high congestion costs, new renewable generation development, and local CPS generation reaching technical and potential end of life.

Table of Contents

1 Introduction

In October 2023, Brazos Electric Cooperative (BEC) submitted the Brazos San Miguel to Marion 345-KV Project to the Regional Planning Group (RPG) to address NERC TPL-001-5.1 reliability criteria thermal violations. This proposed project was located in the South and South-Central (SSC) Weather Zones in Guadalupe, Wilson, and Atascosa Counties.

This BEC-proposed project was classified as a Tier 1 project pursuant to ERCOT Protocol Section 3.11.4.3, with an estimated cost of approximately $258.5 million. A Certificate of Convenience and Necessity (CCN) was not required for the BEC-proposed solution. ERCOT conducted an Independent Review of this project to identify any reliability needs in the area and evaluate various transmission upgrade options. This report describes the study assumptions, methodology, and results of ERCOT Independent Review of the project.

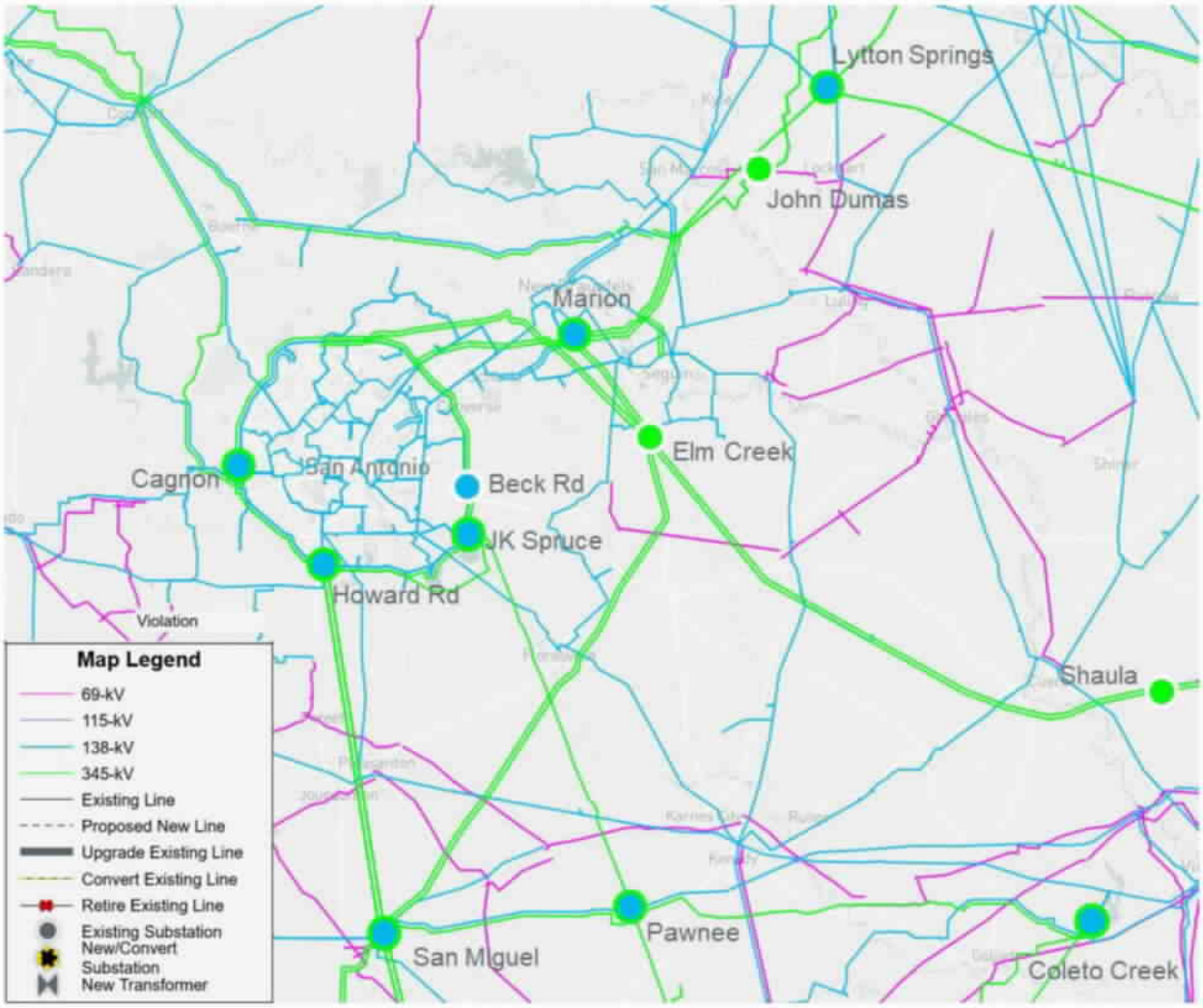

Figure 1.1: Map of Transmission System in San Antonio Area

2 Study Assumptions and Methodology

ERCOT performed studies under various system conditions to identify any reliability issues and to determine appropriate transmission upgrades, should upgrades be necessary. This section describes the study assumptions and criteria used to conduct the independent study.

2.1 Study Assumptions for Reliability Analysis

This project is in the SSC Weather Zones in Guadalupe, Wilson, and Atascosa Counties. Nearby counties that were also studied because they are electrically close include Bexar, Caldwell, Comal, Frio, Gonzales, Hays, Karnes, La Salle, Live Oak, McMullen, and Medina Counties.

2.1.1 Steady-State Study Base Case

The Final 2023 Regional Transmission Plan (RTP) cases, published on the Market Information System (MIS) on December 22, 2023, were used as reference cases in this study. Year 2029 Summer was selected for the long-term outlook. The steady-state study base case for SSC Weather Zones was constructed by updating the transmission, generation, and loads of the following 2029 Summer Peak Load case for the SSC Weather Zones:

- Case: 2023RTP_2029_SUM_SSC_12222023[1].

2.1.2 Transmission Topology

Transmission projects within the study area with In-Service Dates (ISDs) by December 2027 were added to the study base case. The ERCOT Transmission Project Information and Tracking (TPIT)[2] report posted in October 2023 was used as reference. The added TPIT projects are listed in Table 2.1.

[1] 2023 Regional Transmission Plan Postings: https://mis.ercot.com/secure/data-products/grid/regional-planning?id=PG3-3200-M
[2] TPIT Report: https://www.ercot.com/gridinfo/planning

Table 2.1: List of Transmission Projects Added to Study Base Case

TPIT No	Project Name	Tier	Project ISD	TSP	From County
67992	CPSE_345KV_Howard_Switching_Station,CPSE_Hamilton_to_MedCtr_Upgrade,CPSE_Medina_to_36th_Street_Upgrade	Tier 3	26-Jan	CPS	Bexar
71873	CPSE_Hill Country Auto# 2 Impedance Upgrade	Tier 3	25-Jun	CPS	Bexar
71917	Upgrade STEC Castroville to Pearson to 138kV	Tier 2	25-May	STEC	Medina
71935	STEC_71935_HCCastrovl138	Tier 2	25-Feb	STEC	Medina
72882	LCRA TSC_Lockhart_Luling_69kV_TL_Overhaul	Tier 4	25-Jun	LCRA TSC	Caldwell
73050	LCRA TSC_JohnDumas_Substation_Addition	Tier 4	25-Feb	LCRA TSC	Caldwell
73053	Wimberley Loop to New Substation	Tier 2	27-May	PEC	Hays
73417	LCRA TSC_Schumansville_SheriffsPosse_StormHardening	Tier 4	25-May	LCRA TSC	Guadalupe
73793	LCRA TSC_McCartyLaneEast_Zorn_TL_Storm_Hardening	Tier 4	25-May	LCRA TSC	Hays
73838	LCRA TSC_Redwood_SanMarcos_TL_Upgrade	Tier 4	25-May	LCRA TSC	Hays
75682	Add Branch between Libra and Elm Creek	Tier 4	23-Nov	CPS	Wilson
76790	Upgrade Pearsall Auto	Tier 4	27-May	STEC	Frio
73025	CPSE_NEW_SHAULA	Tier 4	24-Nov	CPS	Dewitt

Transmission projects listed in Table 2.2, identified in the 2023 RTP as placeholders within the study area, were removed from the study base case.

Table 2.2: List of Transmission Projects Removed from Study Base Case

RTP Project ID	Project Name	TSP	County
2023-SC5	Beck Road 345/138-kV Substation Expansion	CPS	Bexar
2023-SC19	South to Central Texas 345-kV Double-Circuit Line Additions	AEN, AEPSC, LCRA, ONCOR	San Patricio, Bee, Karnes, Wilson, Guadalupe, Comal, Hays, Travis, Williamson
2023-SC10	Wiseman 138-kV Substation Addition and CPS Multiple Cap Bank Additions	CPS	Bexar, Comal

2.1.3 Generation

Based on the September 2023 Generator Interconnection Status (GIS)[3] report posted on the ERCOT website on October 2, 2023, generators in the study area that met Planning Guide Section 6.9(1)

[3] GIS Report: https://www.ercot.com/misapp/GetReports.do?reportTypeId=15933

conditions with a Commercial Operations Date (COD) prior to December 31, 2027 were added to the study base case if not already present in the case. These generation additions are listed in Table 2.3. All new generation dispatches were consistent with the 2023 RTP methodology.

Table 2.3: List of Generation Added to Study Base Case Based on September 2023 GIS Report

GINR	Project Name	Fuel	Project COD	Capacity (MW)	County
22INR0366	BRP Libra BESS	OTH	01/26/2024	206.2	Guadalupe
22INR0368	Padua Grid BESS	OTH	12/01/2024	51.4	Bexar
22INR0422	Ferdinand Grid BESS	OTH	05/31/2026	202.7	Bexar
23INR0027	Cachena Solar SLF	SOL	12/31/2025	600.0	Wilson
23INR0154	Ebony Energy Storage	OTH	04/01/2024	203.5	Comal
23INR0381	Soportar ESS	OTH	03/15/2025	102.1	Bexar
24INR0427	CPS AvR CT1 Rotor Replacement	GAS	01/30/2024	11.3	Bexar
25INR0223	Uhland Maxwell	GAS	04/15/2025	181.1	Caldwell
22INR0251	Shaula I Solar	SOL	10/30/2025	205.2	DeWitt
22INR0267	Shaula II Solar	SOL	05/30/2026	205.2	DeWitt

The status of each unit that was projected to be either indefinitely mothballed or retired at the time of the study were reviewed. The units listed in Table 2.4 were opened (turned off) in the study base case to reflect their mothballed/retired status.

Table 2.4: List of Generation Opened to Reflect Mothballed/Retired/Forced Outage Status

Bus No	Unit Name	Capacity (MW)	Weather Zone
110941	SL_SL_G1	65.0	Coast
110942	SL_SL_G2	65.0	Coast
110943	SL_SL_G3	30.0	Coast
110944	SL_SL_G4	30.0	Coast
130121	SGMTN_SIGNALM2	6.6	Far West

2.1.4 Loads

Loads both inside and outside of the SSC study Weather Zones were consistent with the 2023 RTP.

2.2 Long-Term Load-Serving Capability Assessment

ERCOT performed long-term load-serving capability assessments to compare the performance of the study options.

Scenario 1 assessed the capability to serve load in the San Antonio Area, and Scenario 2 assessed the same in a high Southern wind export condition. In Scenario 1, ERCOT increased load at substations within the San Antonio area and decreased conforming load outside of the SSC Weather Zones to balance power. In Scenario 2, ERCOT increased load at substations within the study area and increased the Southern wind import to balance power.

2.3 Maintenance Outage Scenario

ERCOT developed an off-peak maintenance season scenario to further evaluate the study options. The load level in the South Weather Zone was reduced to 90.1% of its summer peak load level and the load level in the South-Central Weather Zone was reduced to 83.6% of its summer peak load level in the study base case. This scaling is meant to reflect assumed off-peak season loads based on ERCOT load forecast for future years as well as historical load in the SSC Weather Zones.

2.4 Study Assumptions for Congestion Analysis

Congestion analysis was conducted to identify any new congestion in the study area with the addition of the preferred transmission upgrade option.

The 2023 RTP 2028 economic case was updated based on the January 2024 GIS[4] report and the October 2023 TPIT[5] for generation and transmission updates. The 2028 study year was selected based on the proposed ISD of the project.

New generation additions listed in Table A.1 in Appendix A were added to the economic base case. Transmission projects listed in Table A.2 in Appendix A were also added to the economic base case. All generation listed in Table 2.4 were opened in the study base case to reflect their mothballed/retired status.

2.5 Methodology

This section lists the Contingencies and Criteria used for project review along with the tools used to perform each of the various analyses.

2.5.1 Contingencies and Criteria

The reliability assessments were performed based on NERC Reliability Standard TPL-001-5.1, ERCOT Protocols, and ERCOT Planning Criteria.[6]

Contingencies[7] were updated based on the changes made to the topology as described in Section 2.1 of this document. The following steady-state contingencies were simulated for the study region:

- P0 (System Intact)
- P1, P2-1, P7 (N-1 conditions);
- P2-2, P2-3, P4, and P5 (Extra High Voltage (EHV) only);
- P3-1: G-1 + N-1 (G-1: generation outages) {Guadalupe Gen Units Gas 1, Gas 2, and Steam 5, San Miguel Unit 1, and Spruce Unit 2}; and
- P6-2: X-1 + N-1 (X-1: 345/138-kV transformers only) {Hill Country circuit 1, Marion circuit 1, San Miguel circuit 1, and Skyline circuit 1}.

[4] GIS Report: https://www.ercot.com/mp/data-products/data-product-details?id=PG7-200-ER
[5] TPIT Report: https://www.ercot.com/gridinfo/planning
[6] ERCOT Planning Criteria: http://www.ercot.com/mktrules/guides/planning/current
[7] Details of each event and contingency category is defined in the NERC reliability standard TPL-001-5.1

All 69-kV and above buses, transmission lines, and transformers in the study region were monitored (excluding generator step-up transformers) and the following thermal and voltage limits were enforced:

- Thermal
  - Rate A (normal rating) for pre-contingency conditions; and
  - Rate B (emergency rating) for post-contingency conditions.
- Voltages
  - Voltages exceeding pre-contingency and post-contingency limits; and
  - Voltage deviations exceeding 8% on non-radial load buses.

2.5.2 Study Tool

ERCOT utilized the following software tools to perform this independent study:

- PowerWorld Simulator version 23 for Security Constrained Optimal Power Flow (SCOPF) and steady-state contingency analysis and
- UPLAN version 12.3.0.29978 to perform congestion analysis.

3 Project Need

Steady-state reliability analysis was performed in accordance with NERC TPL-001-5.1 and ERCOT Planning Criteria described in Section 2.5.1 of this document. This analysis indicated thermal overload issues under N-1 and G-1 + N-1 contingency conditions in the study area. Under the P7 contingency where the 345-kV Howard Road to San Miguel double circuit transmission line is lost, the 345-kV Pawnee to Spruce transmission line becomes overloaded. These issues are summarized in Table 3.1 and visually illustrated in Figure 3.1.

Table 3.1: Thermal Overloads Observed in San Antonio Area

NERC Contingency Category	Overloaded Element	Voltage Level (kV)	Length (miles)	Loading %
P7: N-1	Spruce (5400) – Pawnee Switching Station (5725) Ckt 1	345	45.8	105
P3: G-1 N-1	Marion (7178) – Cibolo (7608) Ckt 1	138	4.8	100
P3: G-1 N-1	Marion (7178) – Cibolo (7608) Ckt 2	138	4.8	100
P3: G-1 N-1	Castle (5080) – Dresden (5130) Ckt 1	138	3.8	100

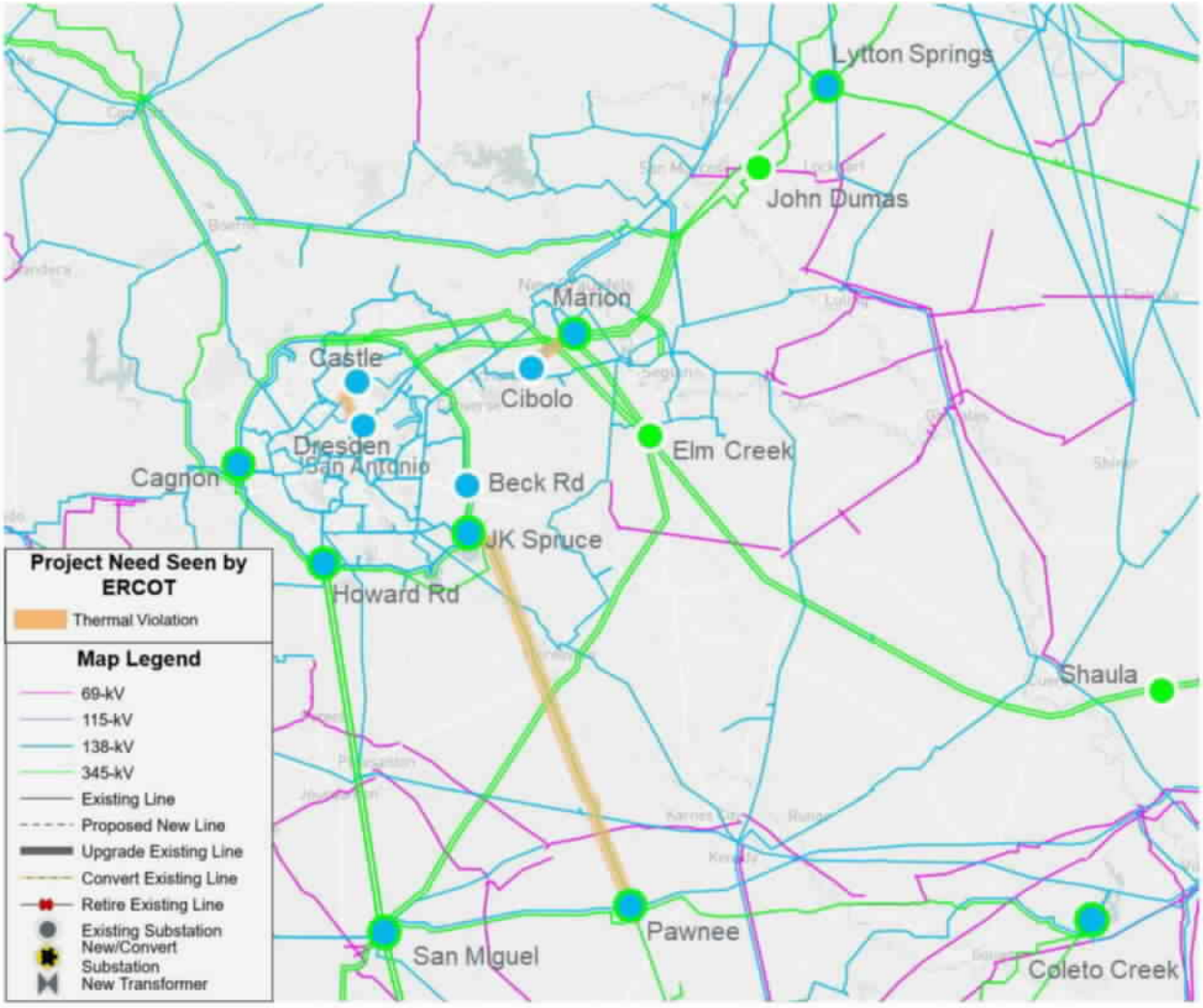

Figure 3.1: Study Area Map Showing Project Need

4 Description of Project Options

ERCOT initially evaluated 15 system improvement options to address the thermal overloads that were observed in the study base case in the San Antonio Area. Of the 15 options studied, only options 3, 6, 7, 8, 9, 10, 13, 14, and 15 resolved the thermal overload of the 345-kV Pawnee to Spruce transmission line (primary project need driver). Detailed maps of each option are provided in Appendix A.

Option 1 consists of the following:

- Rebuild the existing San Miguel to Elm Creek 345-kV double circuit transmission line with a normal and emergency rating of at least 2,620 MVA per circuit; and

- Rebuild the existing Elm Creek to Marion 345-kV double circuit transmission line with a normal and emergency rating of at least 2,620 MVA per circuit.

Option 2 consists of the following:

- Construct a new 345-kV station (Wilsco) near the intersection of the San Miguel to Elm Creek 345-kV transmission line and the Spruce to Pawnee 345-kV transmission line;
- Construct a new Eastside 345/138-kV station near Beck Rd. The Eastside 345/138-kV station includes two 345/138-kV autotransformers, each with normal and emergency ratings of at least 600 MVA, and will be interconnected as follows:
    - Loop the existing Skyline to Spruce 345-kV double circuit transmission line into the new Eastside 345-kV station;
    - Loop the existing Deely to Martinez 138-kV single circuit transmission line into the new Eastside 138-kV station;
    - Loop the existing Deely to Walzem 138-kV single circuit transmission line into the new Eastside 138-kV station;
    - Loop the existing Beck to Kirby 138-kV single circuit transmission line into the new Eastside 138-kV station; and
    - Loop the existing Kirby to Sulphur 138-kV single circuit transmission line into the new Eastside 138-kV station.
- Construct a new Beck Rd to Wilsco 345-kV double circuit transmission line; and
- Construct a new Elm Creek to Lytton Springs 345-kV double circuit transmission line.

Option 3 consists of the following:

- Construct a new 345-kV station (Wilsco) near the intersection of the San Miguel to Elm Creek 345-kV transmission line and the Spruce to Pawnee 345-kV transmission line;
- Construct a new Eastside 345/138-kV station near Beck Rd. The Eastside 345/138-kV station includes two 345/138-kV autotransformers, each with normal and emergency ratings of at least 600 MVA, and will be interconnected as follows:
    - Loop the existing Skyline to Spruce 345-kV double circuit transmission line into the new Eastside 345-kV station;
    - Loop the existing Deely to Martinez 138-kV single circuit transmission line into the new Eastside 138-kV station;
    - Loop the existing Deely to Walzem 138-kV single circuit transmission line into the new Eastside 138-kV station;
    - Loop the existing Beck to Kirby 138-kV single circuit transmission line into the new Eastside 138-kV station; and
    - Loop the existing Kirby to Sulphur 138-kV single circuit transmission line into the new Eastside 138-kV station.
- Construct a new Beck Rd to Wilsco 345-kV double circuit transmission line; and
- Construct a new Elm Creek to Lytton Springs 345-kV double circuit transmission line.

Option 4 consists of the following:

- Construct a new 345-kV station (Wilsco) near the intersection of the San Miguel to Elm Creek 345-kV transmission line and the Spruce to Pawnee 345-kV transmission line;
- Construct a new Eastside 345/138-kV station near Beck Rd. The Eastside 345/138-kV station includes two 345/138-kV autotransformers, each with normal and emergency ratings of at least 600 MVA, and will be interconnected as follows:
    - Loop the existing Skyline to Spruce 345-kV double circuit transmission line into the new Eastside 345-kV station;
    - Loop the existing Deely to Martinez 138-kV single circuit transmission line into the new Eastside 138-kV station;
    - Loop the existing Deely to Walzem 138-kV single circuit transmission line into the new Eastside 138-kV station;
    - Loop the existing Beck to Kirby 138-kV single circuit transmission line into the new Eastside 138-kV station; and
    - Loop the existing Kirby to Sulphur 138-kV single circuit transmission line into the new Eastside 138-kV station.
- Construct a new Beck Rd to Wilsco 345-kV double circuit transmission line; and
- Construct a new Elm Creek to John Dumas 345-kV double circuit transmission line.

Option 5 consists of the following:

- Construct a new Eastside 345/138-kV station near Beck Rd. The Eastside 345/138-kV station includes two 345/138-kV autotransformers, each with normal and emergency ratings of at least 600 MVA, and will be interconnected as follows:
    - Loop the existing Skyline to Spruce 345-kV double circuit transmission line into the new Eastside 345-kV station;
    - Loop the existing Deely to Martinez 138-kV single circuit transmission line into the new Eastside 138-kV station;
    - Loop the existing Deely to Walzem 138-kV single circuit transmission line into the new Eastside 138-kV station;
    - Loop the existing Beck to Kirby 138-kV single circuit transmission line into the new Eastside 138-kV station; and
    - Loop the existing Kirby to Sulphur 138-kV single circuit transmission line into the new Eastside 138-kV station.

Option 6 consists of the following:

- Construct a new Tango to Marion 345-kV double circuit transmission line.

Option 7 consists of the following:

- Construct a new 345-kV station (Wilsco) near the intersection of the San Miguel to Elm Creek 345-kV transmission line and the Spruce to Pawnee 345-kV transmission line;

- Construct a new Eastside 345/138-kV station near Beck Rd. The Eastside 345/138-kV station includes two 345/138-kV autotransformers, each with normal and emergency ratings of at least 600 MVA, and will be interconnected as follows:
    - Loop the existing Skyline to Spruce 345-kV double circuit transmission line into the new Eastside 345-kV station;
    - Loop the existing Deely to Martinez 138-kV single circuit transmission line into the new Eastside 138-kV station;
    - Loop the existing Deely to Walzem 138-kV single circuit transmission line into the new Eastside 138-kV station;
    - Loop the existing Beck to Kirby 138-kV single circuit transmission line into the new Eastside 138-kV station; and
    - Loop the existing Kirby to Sulphur 138-kV single circuit transmission line into the new Eastside 138-kV station.
- Construct a new Beck Rd to Wilsco 345-kV double circuit transmission line;
- Construct a new Elm Creek to Lytton Springs 345-kV double circuit transmission line; and
- Add a second Wilsco to Pawnee 345-kV circuit.

Option 8 consists of the following:

- Construct a new 345-kV station (Wilsco) near the intersection of the San Miguel to Elm Creek 345-kV transmission line and the Spruce to Pawnee 345-kV transmission line;
- Construct a new Eastside 345/138-kV station near Beck Rd. The Eastside 345/138-kV station includes two 345/138-kV autotransformers, each with normal and emergency ratings of at least 600 MVA, and will be interconnected as follows:
    - Loop the existing Skyline to Spruce 345-kV double circuit transmission line into the new Eastside 345-kV station;
    - Loop the existing Deely to Martinez 138-kV single circuit transmission line into the new Eastside 138-kV station;
    - Loop the existing Deely to Walzem 138-kV single circuit transmission line into the new Eastside 138-kV station;
    - Loop the existing Beck to Kirby 138-kV single circuit transmission line into the new Eastside 138-kV station; and
    - Loop the existing Kirby to Sulphur 138-kV single circuit transmission line into the new Eastside 138-kV station.
- Construct a new Beck Rd to Wilsco 345-kV double circuit transmission line;
- Construct a new Elm Creek to John Dumas 345-kV double circuit transmission line; and
- Add a second Wilsco to Pawnee 345-kV circuit.

Option 9 consists of the following:

- Construct a new 345-kV station (Wilsco) near the intersection of the San Miguel to Elm Creek 345-kV transmission line and the Spruce to Pawnee 345-kV transmission line;

- Construct a new Eastside 345/138-kV station near Beck Rd. The Eastside 345/138-kV station includes two 345/138-kV autotransformers, each with normal and emergency ratings of at least 600 MVA, and will be interconnected as follows:
    - Loop the existing Skyline to Spruce 345-kV double circuit transmission line into the new Eastside 345-kV station;
    - Loop the existing Deely to Martinez 138-kV single circuit transmission line into the new Eastside 138-kV station;
    - Loop the existing Deely to Walzem 138-kV single circuit transmission line into the new Eastside 138-kV station;
    - Loop the existing Beck to Kirby 138-kV single circuit transmission line into the new Eastside 138-kV station; and
    - Loop the existing Kirby to Sulphur 138-kV single circuit transmission line into the new Eastside 138-kV station.
- Construct a new Beck Rd to Wilsco 345-kV double circuit transmission line; and
- Construct a new Coleto Creek to Shaula and Shaula to John Dumas 345-kV double circuit transmission line.

Option 10 consists of the following:

- Construct a new Tango to Marion 345-kV double circuit transmission line; and
- Construct a new Eastside 345/138-kV station near Beck Rd. The Eastside 345/138-kV station includes two 345/138-kV autotransformers, each with normal and emergency ratings of at least 600 MVA, and will be interconnected as follows:
    - Loop the existing Skyline to Spruce 345-kV double circuit transmission line into the new Eastside 345-kV station;
    - Loop the existing Deely to Martinez 138-kV single circuit transmission line into the new Eastside 138-kV station;
    - Loop the existing Deely to Walzem 138-kV single circuit transmission line into the new Eastside 138-kV station;
    - Loop the existing Beck to Kirby 138-kV single circuit transmission line into the new Eastside 138-kV station; and
    - Loop the existing Kirby to Sulphur 138-kV single circuit transmission line into the new Eastside 138-kV station.

Option 11 consists of the following:

- Construct a new Eastside 345/138-kV station near Beck Rd. The Eastside 345/138-kV station includes two 345/138-kV autotransformers, each with normal and emergency ratings of at least 600 MVA, and will be interconnected as follows:
    - Loop the existing Skyline to Spruce 345-kV double circuit transmission line into the new Eastside 345-kV station;

  - Loop the existing Deely to Martinez 138-kV single circuit transmission line into the new Eastside 138-kV station;
  - Loop the existing Deely to Walzem 138-kV single circuit transmission line into the new Eastside 138-kV station;
  - Loop the existing Beck to Kirby 138-kV single circuit transmission line into the new Eastside 138-kV station; and
  - Loop the existing Kirby to Sulphur 138-kV single circuit transmission line into the new Eastside 138-kV station.
- Construct a new Beck Rd to Elm Creek 345-kV double circuit transmission line; and
- Construct a new Coleto Creek to Shaula 345-kV double circuit transmission line.

Option 12 consists of the following:

- Construct a new Eastside 345/138-kV station near Beck Rd. The Eastside 345/138-kV station includes two 345/138-kV autotransformers, each with normal and emergency ratings of at least 600 MVA, and will be interconnected as follows:
  - Loop the existing Skyline to Spruce 345-kV double circuit transmission line into the new Eastside 345-kV station;
  - Loop the existing Deely to Martinez 138-kV single circuit transmission line into the new Eastside 138-kV station;
  - Loop the existing Deely to Walzem 138-kV single circuit transmission line into the new Eastside 138-kV station;
  - Loop the existing Beck to Kirby 138-kV single circuit transmission line into the new Eastside 138-kV station; and
  - Loop the existing Kirby to Sulphur 138-kV single circuit transmission line into the new Eastside 138-kV station.
- Construct a new Coleto Creek to Shaula 345-kV double circuit transmission line; and
- Construct a new Shaula to Holman 345-kV double circuit transmission line.

Option 13 consists of the following:

- Construct a new 345-kV station (Wilsco) near the intersection of the San Miguel to Elm Creek 345-kV transmission line and the Spruce to Pawnee 345-kV transmission line;
- Construct a new Eastside 345/138-kV station near Beck Rd. The Eastside 345/138-kV station includes two 345/138-kV autotransformers, each with normal and emergency ratings of at least 600 MVA, and will be interconnected as follows:
  - Loop the existing Skyline to Spruce 345-kV double circuit transmission line into the new Eastside 345-kV station;
  - Loop the existing Deely to Martinez 138-kV single circuit transmission line into the new Eastside 138-kV station;
  - Loop the existing Deely to Walzem 138-kV single circuit transmission line into the new Eastside 138-kV station;

  - Loop the existing Beck to Kirby 138-kV single circuit transmission line into the new Eastside 138-kV station; and
  - Loop the existing Kirby to Sulphur 138-kV single circuit transmission line into the new Eastside 138-kV station.
- Construct a new Beck Rd to Wilsco 345-kV double circuit transmission line; and
- Construct a new Coleto Creek to John Dumas 345-kV double circuit transmission line.

Option 14 consists of the following:

- Rebuild the existing Spruce to Pawnee 345-kV single circuit into a 345-kV double circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit, this transmission line will require approximately 45.8 miles of expanded Right of Way (ROW), which will be used to build one of the new circuits while the original circuit is left in service;
- Rebuild the existing Pawnee to Tango 345-kV single circuit into a 345-kV double circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit, this transmission line will require approximately 12.2 miles of expanded ROW, which will be used to build one of the new circuits while the original circuit is left in service; and
- Construct a new Eastside 345/138-kV station near Beck Rd. The Eastside 345/138-kV station includes two 345/138-kV autotransformers, each with normal and emergency ratings of at least 600 MVA, and will be interconnected as follows:
  - Loop the existing Skyline to Spruce 345-kV double circuit transmission line into the new Eastside 345-kV station;
  - Loop the existing Deely to Martinez 138-kV single circuit transmission line into the new Eastside 138-kV station;
  - Loop the existing Deely to Walzem 138-kV single circuit transmission line into the new Eastside 138-kV station;
  - Loop the existing Beck to Kirby 138-kV single circuit transmission line into the new Eastside 138-kV station; and
  - Loop the existing Kirby to Sulphur 138-kV single circuit transmission line into the new Eastside 138-kV station.

Option 15 consists of the following:

- Rebuild the existing Spruce to Pawnee 345-kV single circuit into a 345-kV double circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit, this transmission line will require approximately 45.8 miles of expanded ROW, which will be used to build one of the new circuits while the original circuit is left in service.

5 Option Evaluations

ERCOT performed an N-1 reliability analysis on all 15 initial options and then created a short-list of options that addressed the primary project need and did not create new N-1 violations. ERCOT then performed X-1 + N-1 and G-1 + N-1 reliability analyses to further evaluate the short-listed options. Based on the results of these analyses, a modified short-list of options was selected for further evaluation. This section details these studies and their results and compares the short-listed options.

5.1 Results of Reliability Analysis

All 15 initial options were evaluated based on the contingencies described in the methodology section of the report, and no N-1 reliability criteria violations were identified for options 3, 7, 8, 10, 14, and 15 as shown in Table 5.1. There were no X-1 + N-1 or G-1 + N-1 violations for options 7, 8, 10, and 14, as shown in Table 5.2. Those options formed the final short-list.

Table 5.1: Results of Initial N-1 Reliability Assessment of All 15 Options

	N-1		
Option	Unsolved Power Flow	Thermal Overload	Voltage Violation
1	None	1	None
2	None	1	None
3	None	None	None
4	None	1	None
5	None	1	None
6	None	None*	None
7	None	None	None
8	None	None	None
9	None	1	None
10	None	None	None
11	None	1	None
12	None	1	None
13	None	2	None
14	None	None	None
15	None	None	None

*Very high loading observed on lines and transformers

Table 5.2: Results of Reliability Assessment of Initial Short-Listed Options

	N-1			X-1 + N-1		G-1 + N-1	
Option	Unsolved Power Flow	Thermal Overload	Voltage Violation	Thermal Overload	Voltage Violation	Thermal Overload	Voltage Violation
3	None	None	None	None	None	1	None
7	None	None	None	None	None	None	None
8	None	None	None	None	None	None	None
10	None	None	None	None	None	None	None
14	None	None	None	None	None	None	None
15	None	None	None	1	None	None	None

5.2 Short-listed Options

Based on the results shown in Section 5.1, Options 7, 8, 10, and 14 were selected as short-listed options for further evaluations. This section details these studies and their results and compares the short-listed options. These four options are illustrated in Figures 5.1, 5.2, 5.3, and 5.4.

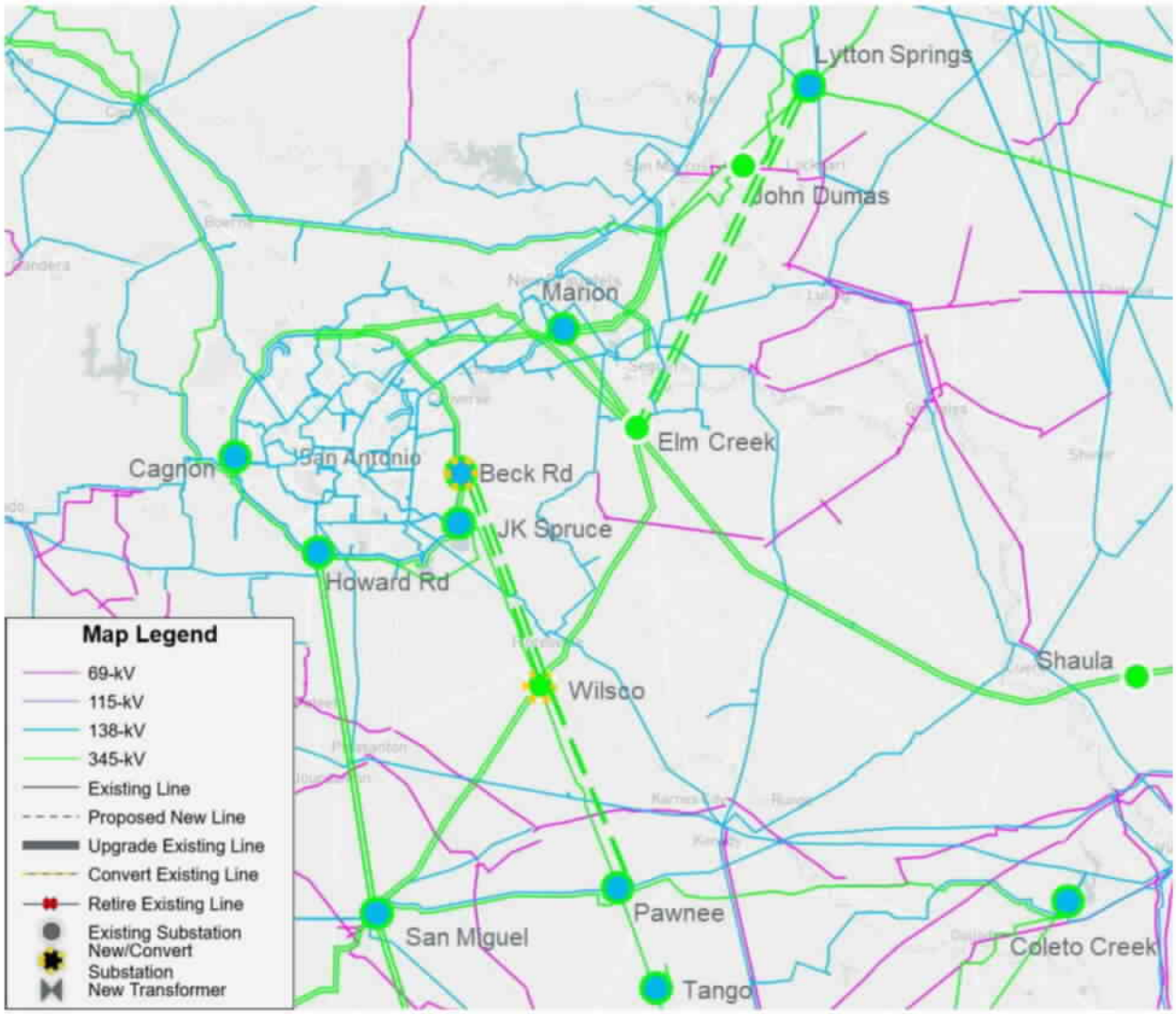

Figure 5.1: Map of Option 7

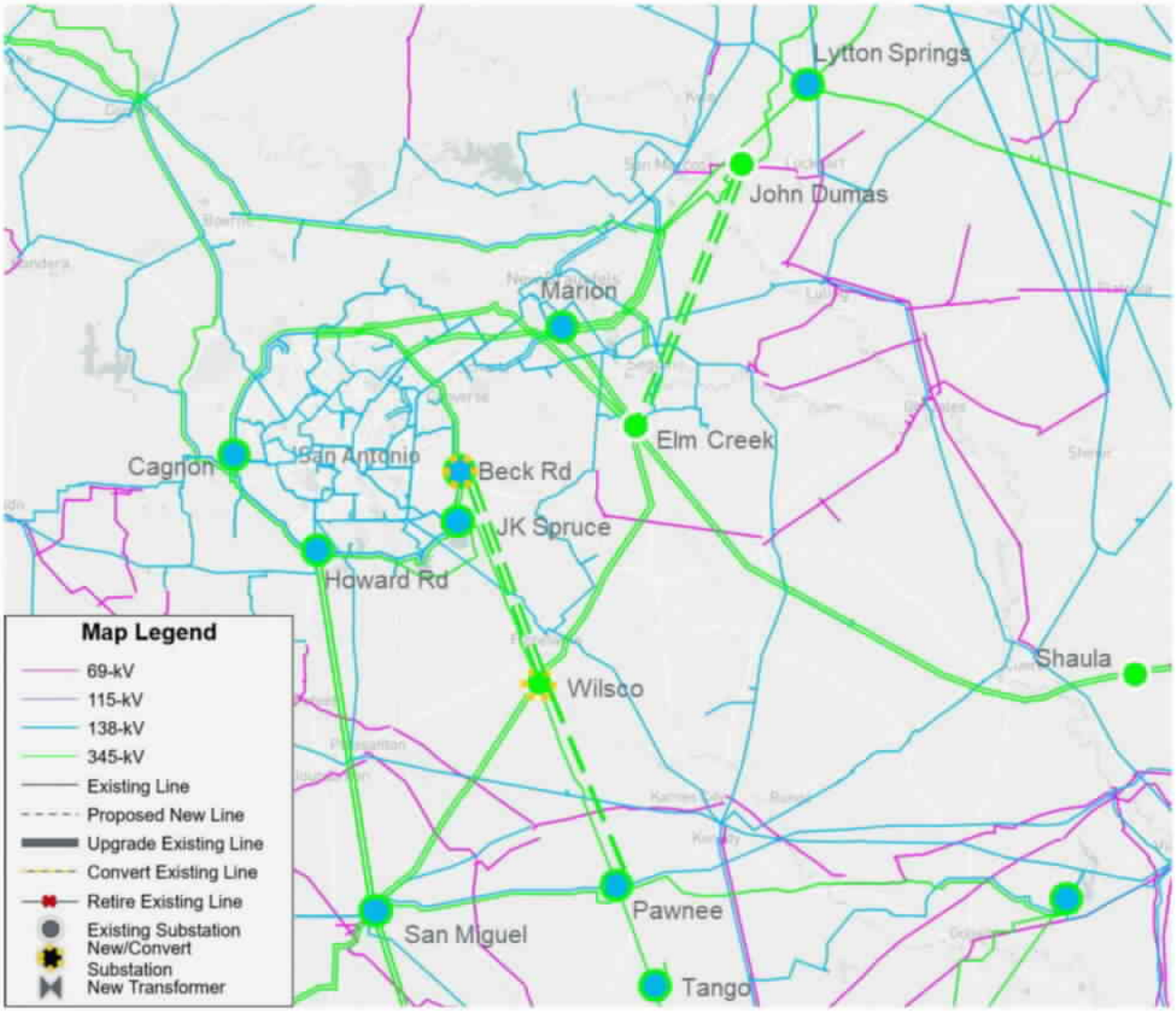

Figure 5.2: Map of Option 8

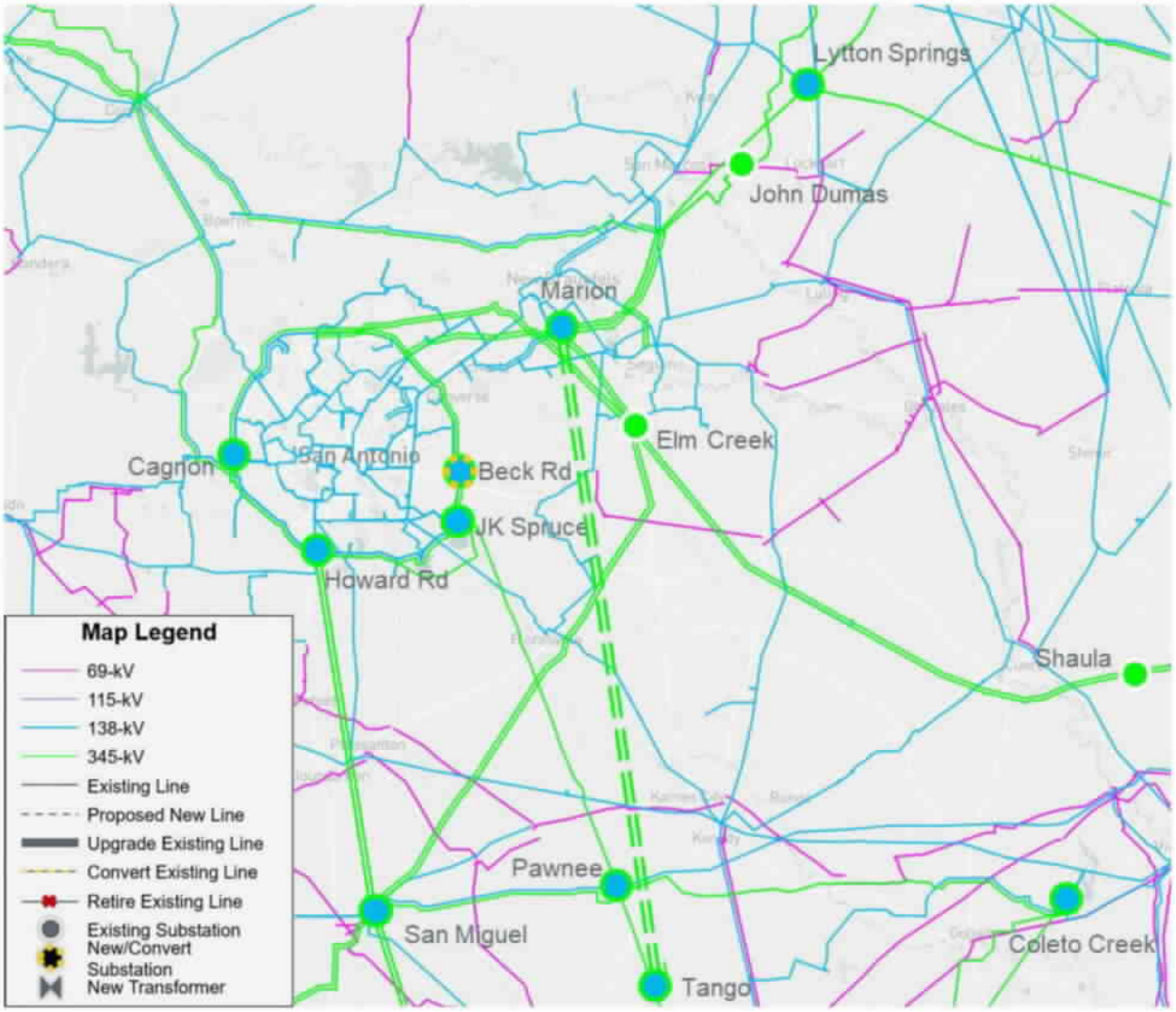

Figure 5.3: Map of Option 10

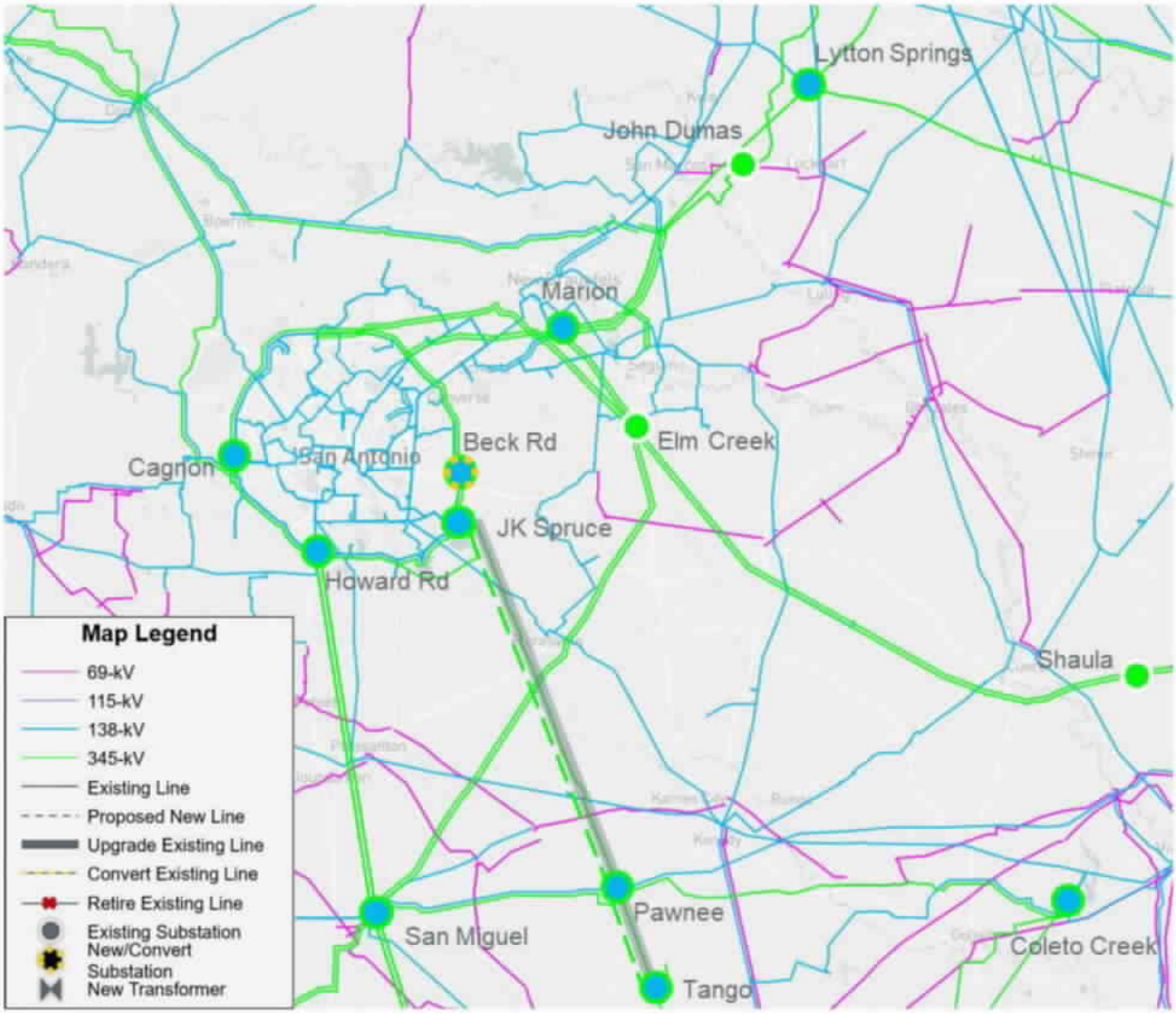

Figure 5.4: Map of Option 14

5.3 Long-Term Load-Serving Capability Analysis

ERCOT performed a long-term load-serving capability assessment on the short-listed options. Scenario 1 assesses the capability to serve load in the San Antonio Area, and Scenario 2 assess the same in a high Southern wind import condition. In Scenario 1, ERCOT increased load at substations within the San Antonio area and decreased conforming load outside of the SSC Weather Zones to balance power. In Scenario 2, ERCOT increased load at substations within the study area and increased wind generation within the South Weather Zone to balance power. The results of the long-term load-serving capability assessment are shown in Table 5.3.

The results show Option 10 performs best in the general import scenario (Scenario 1), while Option 14 performs best in the Southern wind import.

Table 5.3: Results of Long-Term Load-Serving Capability Assessment for Short-Listed Options

Option	Incremental Load-Serving Capability (MW)	
	Scenario 1	Scenario 2
Base case	151	159
7	593	670
8	570	670
10	663	884
14	582	1080

5.4 Planned Maintenance Outage Evaluation

Using the P1, P2.1, and P7 contingencies based on the review of the system topology of the San Antonio area, ERCOT conducted an N-2 contingency analysis for each short-listed option to represent system element outage(s) under planned maintenance condition (N-1-1) in the area. Then, each N-2 violation was run as an N-1-1 contingency scenario, with system adjustments between the contingencies. The transmission elements in the local area of the San Antonio South Reliability II Project were monitored in the maintenance outage evaluation.

As shown in Table 5.4, the results of this maintenance assessment indicate that all options perform satisfactorily under maintenance outage conditions.

Table 5.4: Results of Planned Maintenance Outage Evaluation for Short-Listed Options

Option	Voltage Violations	Thermal Overloads	Unsolved Power Flow
7	None	None	None
8	None	None	None
10	None	None	None
14	None	None	None

5.5 Cost Estimate and Feasibility Assessment

AEPSC, BEC, CPS, LCRA TSC, and STEC performed feasibility assessments and provided cost estimates for the four short-listed options. Table 5.5 summarizes the cost estimate, estimated mileage of CCN required, and option feasibility for the four short-listed options.

Table 5.5: Cost Estimates for Short-Listed Options

Option	Cost Estimates (~$M)	CCN Required (~Miles)	Feasible
7	631	103.2	Feasible
8	570	89.4	Feasible
10	492	87	Feasible
14	435	58	Feasible

6 Comparison of Short-listed Options

The comparison of Options 7, 8, 10, and 14 with corresponding cost estimates provided by AEPSC, BEC, CPS, LCRA TSC, and STEC are summarized in Table 6.1.

Table 6.1: Comparison of Short-Listed Options

	Option 7	Option 8	Option 10	Option 14
Meets ERCOT and NERC Reliability Criteria	Yes	Yes	Yes	Yes
Improves Long-Term Load-Serving Capability	Yes	Yes	Yes (Better)	Yes (Better)
Improves Operational Flexibility	Yes	Yes	Yes	Yes (Marginally)
Additional transfer circuits from Southern Texas	2	2	2	1
Requires CCN (miles)	~103.2	~89.4	~87.0	~58.0
Project Feasibility	Yes	Yes	Yes	Yes
Cost Estimate ($M)	~631	~570	~492	~435

ERCOT recommends Option 14 as the preferred option to address the reliability need in the San Antonio area based on the following considerations:

- Option 14 is the least expensive option
- Option 14 provides the best combined long-term load-serving capability
- Option 14 requires the least mileage of CCN and ROW

7 Additional Analysis and Assessment

The preferred option (Option 14, approximately $435 million) is categorized as a Tier 1 project, pursuant to ERCOT Protocol Section 3.11.4.3(1)(a). As required by Planning Guide Section 3.1.3(4), ERCOT performed generation and load sensitivity studies to identify the preferred option performance. Additionally, a Sub-Synchronous Resonance (SSR) Assessment was performed.

7.1 Generation Addition Sensitivity Analysis

ERCOT performed a generation addition sensitivity analysis based on Planning Guide Section 3.1.3(4)(a).

Based on a review of the January 2024 GIS[8] report, 7 units were found within the SSC Weather Zones load pocket that could have an impact on the identified reliability issues. These units are listed in Table 7.1. After the addition of the units to the Option 14 case, no new thermal or voltage violations were identified.

[8] GIS Report: https://www.ercot.com/mp/data-products/data-product-details?id=PG7-200-ER.

Table 7.1: List of Units that Could have an Impact on Identified Reliability Issues

GINR	Unit Name	Fuel Type	Capacity (~MW)	County
16INR0112	Loma Pinta Wind	WIN	197.0	La Salle
21INR0391	Grandslam Solar	SOL	121.9	Atascosa
22INR0559	Honeycomb Solar	SOL	61.1	Bee
23INR0035	Starling Solar	SOL	123.0	Gonzales
23INR0207	El Patrimonio Solar	SOL	146.9	Bexar
23INR0231	Rocinante Solar	SOL	95.0	Gonzales
25INR0503	Uhland Maxwell Expansion	GAS	188.4	Caldwell

7.2 Load Scaling Sensitivity Analysis

Planning Guide Section 3.1.3(4)(b) requires an evaluation of the potential impact of load scaling on the criteria violations seen in this ERCOT independent review. As stated in Section 2.1.1, ERCOT used the 2029 SSC summer peak case from the 2023 RTP. This study base case, which was created in accordance with the 2023 RTP Study Scope and Process document and Section 2.1 of this document, included load scaled down from the respective non-coincident peaks in the Coast, East, Far West, North, North Central, and West Weather Zones.

The Power Transfer Distribution Factors (PTDFs) of overloaded elements with respect to the load transfer for each Weather Zone (excluding SSC) were calculated using PowerWorld Simulator. The PTDFs were 2.5% or less for each of the overloaded elements—i.e., they were not significant enough to have an impact on the overloaded element. ERCOT concluded that the load scaling used to develop the base case in this study did not have a material impact on the project need, which was primarily driven by thermal overloads in the San Antonio area.

7.3 Sub-synchronous Resonance (SSR) Assessment

Pursuant to Protocol Section 3.22.1.3(2), ERCOT conducted an SSR screening assessment for the preferred option (Option 14) and found no adverse SSR impacts to the existing and planned Generation Resources in the study area.

8 Congestion Analysis

ERCOT conducted a congestion analysis to identify any potential impact on system congestion related to the addition of the recommended project, Option 14, using the 2023 RTP 2028 economic study case.

The results of the congestion analysis indicated Option 14 increased congestion on one transmission line as shown in Table 8.1.

Table 8.1: List of New and Existing Congestion Due to Transmission Upgrade of Option 14

Monitored Line	% Time of Congestion	New / Existing
Lytle to Somerset 138-kV Line	35.6	Existing

An additional test was conducted by upgrading the Lytle to Somerset 138-kV line to alleviate the increased congestion. Based on the results summarized in Table 8.2, the additional upgrade did not yield any economic benefit. Therefore, no upgrades will be recommended to solve the increased congestion as part of Option 14.

Table 8.2: Test Results with Line Upgrade

Upgrade Tested	Mileage (mi)	Passed Production Cost Savings Test	Passed Generation Revenue Reduction Test
Lytle to Somerset 138-kV Line	9.45	No	No

9 Conclusion

ERCOT evaluated the 15 transmission upgrade options to resolve the thermal overload violation in the San Antonio area. Based on the results of the independent review, ERCOT recommends Option 14 as the preferred solution because it addresses the thermal violation with no reliability issues, requires the least additional mileage of CCN and ROW, has the lowest cost, and has the highest combined load-serving capability among all options evaluated.

Option 14 consists of the following upgrades and is estimated to cost $435 million:

- Rebuild the existing Spruce to Pawnee 345-kV single circuit into a 345-kV double circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit; this transmission line will require approximately 45.8 miles of expanded ROW, which will be used to build one of the new circuits while the original circuit is left in service;
- Rebuild the existing Pawnee to Tango 345-kV single circuit into a 345-kV double circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit; this transmission line will require approximately 12.2 miles of expanded ROW, which will be used to build one of the new circuits while the original circuit is left in service; and
- Construct a new Eastside 345/138-kV station near Beck Rd. The Eastside 345/138-kV station includes two 345/138-kV autotransformers, each with normal and emergency ratings of at least 600 MVA, and will be interconnected as follows:
    - Loop the existing Skyline to Spruce 345-kV double circuit transmission line into the new Eastside 345-kV station;
    - Loop the existing Deely to Martinez 138-kV single circuit transmission line into the new Eastside 138-kV station;
    - Loop the existing Deely to Walzem 138-kV single circuit transmission line into the new Eastside 138-kV station;

- Loop the existing Beck to Kirby 138-kV single circuit transmission line into the new Eastside 138-kV station; and
- Loop the existing Kirby to Sulphur 138-kV single circuit transmission line into the new Eastside 138-kV station.

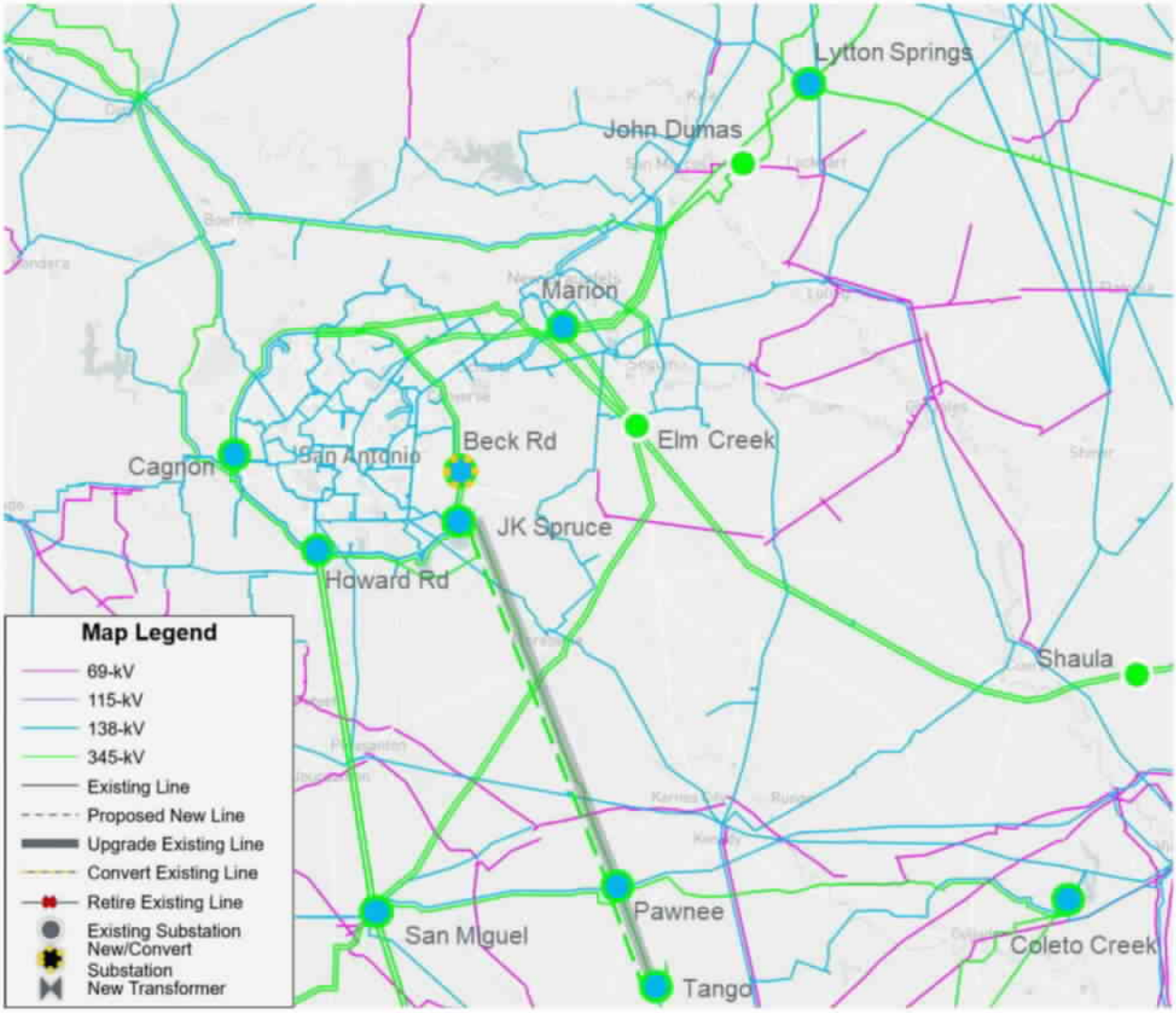

Figure 9.1: Map of Option 14

This project will require an updated CCN for the new 345-kV double circuit transmission line from the Spruce 345-kV substation to the Pawnee 345-kV substation and from the Pawnee 345-kV substation to the Tango 345-kV substation. The Spruce to Pawnee 345-kV rebuild and the Pawnee to Tango 345-kV rebuild will be done without the need for extended outages. The expected ISD for the Spruce to Pawnee portion of this project is December 2028. The expected ISD for the Eastside Station portion of this project is June 2028. The expected ISD for the Pawnee to Tango portion of this project is May 2029.

Appendix

Table A.1: List of Generation Added to Economic Base Case Based on January 2024 GIS Report

GINR	Project Name	Fuel	Project COD	Capacity (~MW)	County
20INR0248	Second Division Solar	SOL	September-24	100.3	Brazoria
23INR0026	Baker Branch Solar	SOL	August-24	469.4	Lamar
23INR0525	Pyron Wind Repower	WND	February-24	19.9	Nolan
24INR0070	Sypert Branch Solar Project	SOL	June-25	261.8	Milam
25INR0223	Uhland Maxwell	NG	April-25	188.4	Caldwell
25INR0232	Isaac Solar	SOL	March-26	51.6	Matagorda
22INR0555	Guevara Storage	BAT	July-25	125.4	Rockwall
24INR0100	Sheep Creek Storage	BAT	July-24	142.0	Callahan
24INR0138	Midpoint Storage	BAT	August-25	52.2	Hill
24INR0140	Gaia Storage	BAT	July-25	76.8	Navarro
24INR0273	Al Pastor BESS	BAT	September-24	100.8	Dawson
24INR0295	Lucky Bluff BESS	BAT	May-25	100.8	Erath
23INR0349	Tokio Solar	SOL	August-25	177.6	McLennan
24INR0010	Pinnington Solar	SOL	October-25	666.1	Jack
24INR0139	Midpoint Solar	SOL	August-25	103.8	Hill
24INR0141	Gaia Solar	SOL	July-25	152.7	Navarro
25INR0105	Diver Solar	SOL	June-26	228.2	Limestone
23INR0091	Cascade Solar	SOL	December-24	254.2	Brazoria
23INR0114	True North Solar	SOL	June-24	238.3	Falls
24INR0312	Wigeon Whistle BESS	BAT	September-24	122.9	Collin
24INR0337	Eldora Solar	SOL	June-26	200.9	Matagorda
24INR0338	Eldora BESS	BAT	June-26	201.3	Matagorda
25INR0328	Longbow BESS	BAT	November-24	180.8	Brazoria
19INR0203	Angelo Solar	SOL	May-24	195.4	Tom Green
23INR0418	Angelo Storage	BAT	May-24	103.0	Tom Green
22INR0366	BRP Libra BESS	BAT	November-23	202.4	Guadalupe
19INR0134	Cottonwood Bayou Solar U1	SOL	June-24	175.0	Brazoria
19INR0134	Cottonwood Bayou Solar U2	SOL	June-24	175.0	Brazoria
23INR0154	Ebony Energy Storage	BAT	April-24	205.0	Comal
21INR0368	Eliza Solar	SOL	November-24	151.9	Kaufman
22INR0260	Eliza Storage	BAT	November-24	100.2	Kaufman
24INR0015	Five Wells Solar U1	SOL	December-23	193.7	Bell
24INR0015	Five Wells Solar U2	SOL	December-23	129.1	Bell
23INR0159	Five Wells Storage	BAT	December-23	220.8	Bell
23INR0239	Giga Texas Energy Storage	BAT	December-23	131.1	Travis
23INR0637	Goodnight Wind II U3	WND	December-23	127.6	Armstrong
23INR0637	Goodnight Wind II U4	WND	December-23	83.4	Armstrong
23INR0637	Goodnight Wind II U5	WND	December-23	48.2	Armstrong

GINR	Project Name	Fuel	Project COD	Capacity (~MW)	County
14INR0033	Goodnight Wind U1	WND	December-23	121.0	Armstrong
14INR0033	Goodnight Wind U2	WND	December-23	137.1	Armstrong
23INR0460	GULF STAR STORAGE B1	BAT	February-24	150.5	Wharton
23INR0460	GULF STAR STORAGE B2	BAT	February-24	150.5	Wharton
20INR0210	Hopkins Solar U1	SOL	December-23	174.3	Hopkins
20INR0210	Hopkins Solar U2	SOL	December-23	75.7	Hopkins
23INR0062	Noria Storage	BAT	September-25	75.0	Nueces
23INR0387	Pioneer DJ Wind	WND	April-24	140.3	Midland
21INR0389	Red Tailed Hawk Solar	SOL	June-24	353.4	Wharton
21INR0515	Roadrunner Crossing Wind II U1	WND	December-23	98.7	Eastland
21INR0515	Roadrunner Crossing Wind II U2	WND	December-23	27.7	Eastland
22INR0502	Shamrock Wind U1	WND	July-24	203.0	Crockett
22INR0502	Shamrock Wind U2	WND	July-24	20.9	Crockett
22INR0251	Shaula I Solar	SOL	October-25	205.2	DeWitt
22INR0267	Shaula II Solar	SOL	May-26	205.2	DeWitt
21INR0325	Sheep Creek Wind	WND	December-23	153.0	Callahan
20INR0208	Signal Solar	SOL	March-25	51.8	Hunt
23INR0331	Talitha BESS	BAT	June-24	61.4	Jim Wells
23INR0054	Tanglewood Solar	SOL	January-25	257.0	Brazoria
20INR0040	Montgomery Ranch Wind	WND	July-23	200.2	Foard
22INR0261	Dorado Solar	SOL	July-23	406.3	Callahan
21INR0424	Tierra Bonita Solar	SOL	July-23	309.7	Pecos
23INR0296	Trojan Solar	SOL	July-23	151.3	Cooke
23INR0470	BoCo BESS	BAT	June-24	155.5	Borden
22INR0353	BRP Carina BESS	BAT	December-24	151.9	Nueces
21INR0450	Danish Fields Storage	BAT	February-24	152.4	Wharton
21INR0505	Ramsey Storage	BAT	June-24	510.4	Wharton
22INR0422	Ferdinand Grid BESS	BAT	May-26	202.7	Bexar
23INR0219	Dogfish BESS	BAT	December-24	75.0	Pecos
23INR0381	Soportar ESS	BAT	March-25	102.1	Bexar
24INR0039	SP Jaguar BESS	BAT	June-25	300.0	McLennan
24INR0109	Oriana BESS	BAT	July-25	60.3	Victoria
24INR0265	Ironman BESS	BAT	November-24	304.2	Brazoria
24INR0281	Red Egret BESS	BAT	June-25	309.0	Galveston
24INR0436	Carambola BESS	BAT	May-26	97.4	Hidalgo
25INR0162	SOHO II BESS	BAT	January-25	206.3	Brazoria
21INR0302	Aureola Solar	SOL	June-24	203.0	Milam
21INR0303	Mandorla Solar	SOL	January-24	254.0	Milam
21INR0304	Halo Solar	SOL	June-24	254.0	Bell
22INR0354	XE MURAT Solar	SOL	May-24	60.4	Harris
23INR0367	Fewell Solar	SOL	September-25	203.5	Limestone
24INR0038	SP Jaguar Solar	SOL	June-25	300.0	McLennan

GINR	Project Name	Fuel	Project COD	Capacity (~MW)	County
19INR0054	Monte Cristo 1 Wind	WND	December-24	236.9	Hidalgo

Table A.2: List of Transmission Projects Added to Economic Base Case Based on October 2023 TPIT Report

TPIT No	Project Name	Tier	Project ISD	TSP	From County
23RPG024	BigFoot to DileySwitch 138-kV Conversion Project	Tier 3	8/30/2026	AEPSC	Frio
73063	Big Foot to Lytle Conversion	Tier 4	9/1/2025	AEPSC	Medina
67915	AEPSC_TCC_Asherton-West Batesville138kVLineRebuild	Tier 3	12/1/2026	BEC	Dimmit
67992	CPSE_345KV_Howard_Switching_Station_ALL	Tier 3	2/1/2024	CPS	Bexar
71871	CPSE_Cagnon to Shepherd Rd Rebuild Phase A	Tier 4	5/1/2023	CPS	Bexar
67329	STEC_67329_Cruce-SanMiguel	Tier 1	6/1/2027	STEC	Bexar, Atascosa
23RPG024	Big Foot to Dilley Switch 138-kV Conversion Project	Tier 4	8/30/2026	AEPSC	Frio
73063	AEPSC_TCC_BigFoot_LytleConversion	Tier 4	9/20/2025	AEPSC	Medina, Frio
67915	AEPSC_TCC_Asherton-West Batesville138kVLineRebuild	Tier 3	12/30/2028	AEPSC	Dimmit, Zavala

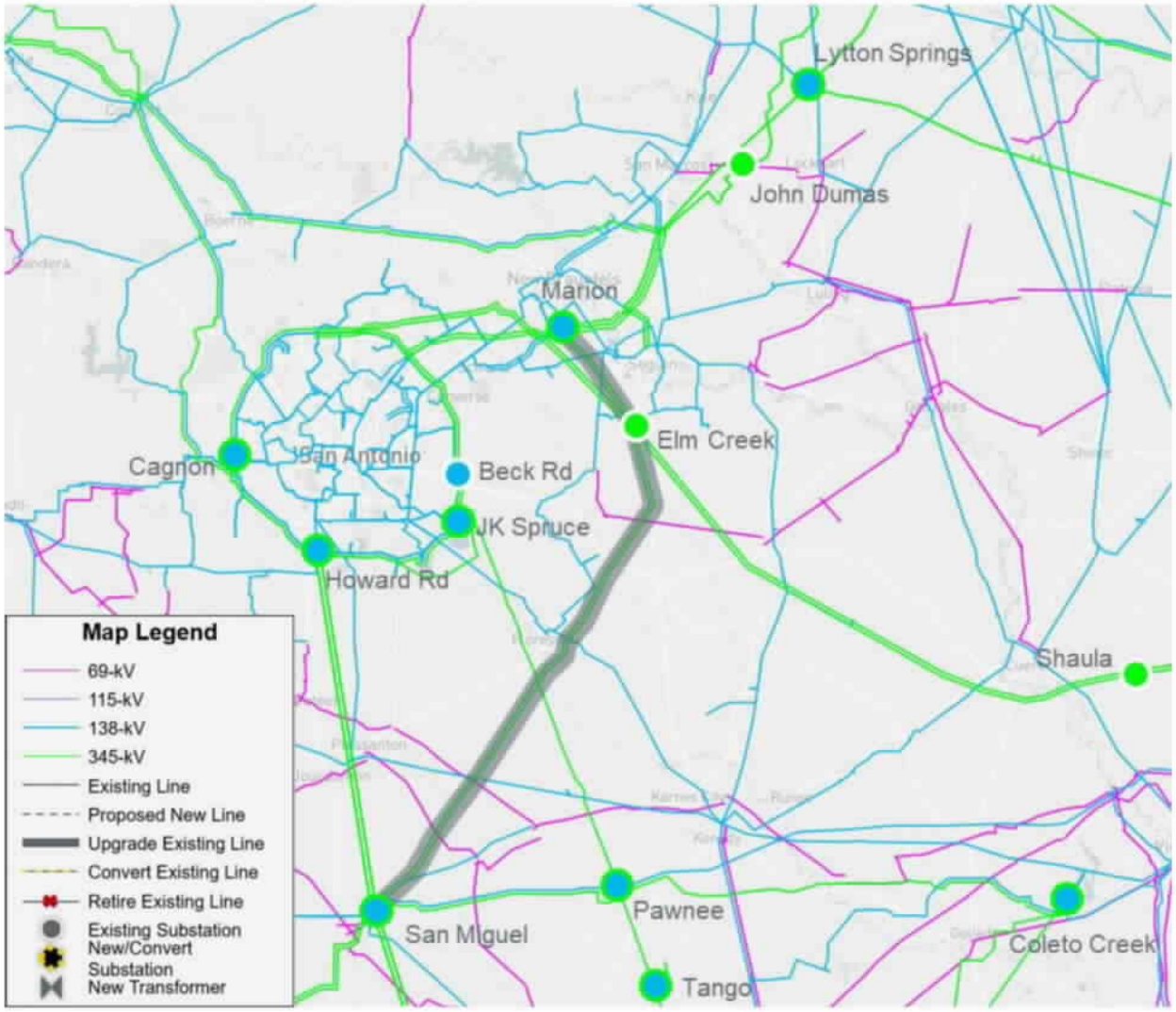

Figure A.1: Map of Option 1

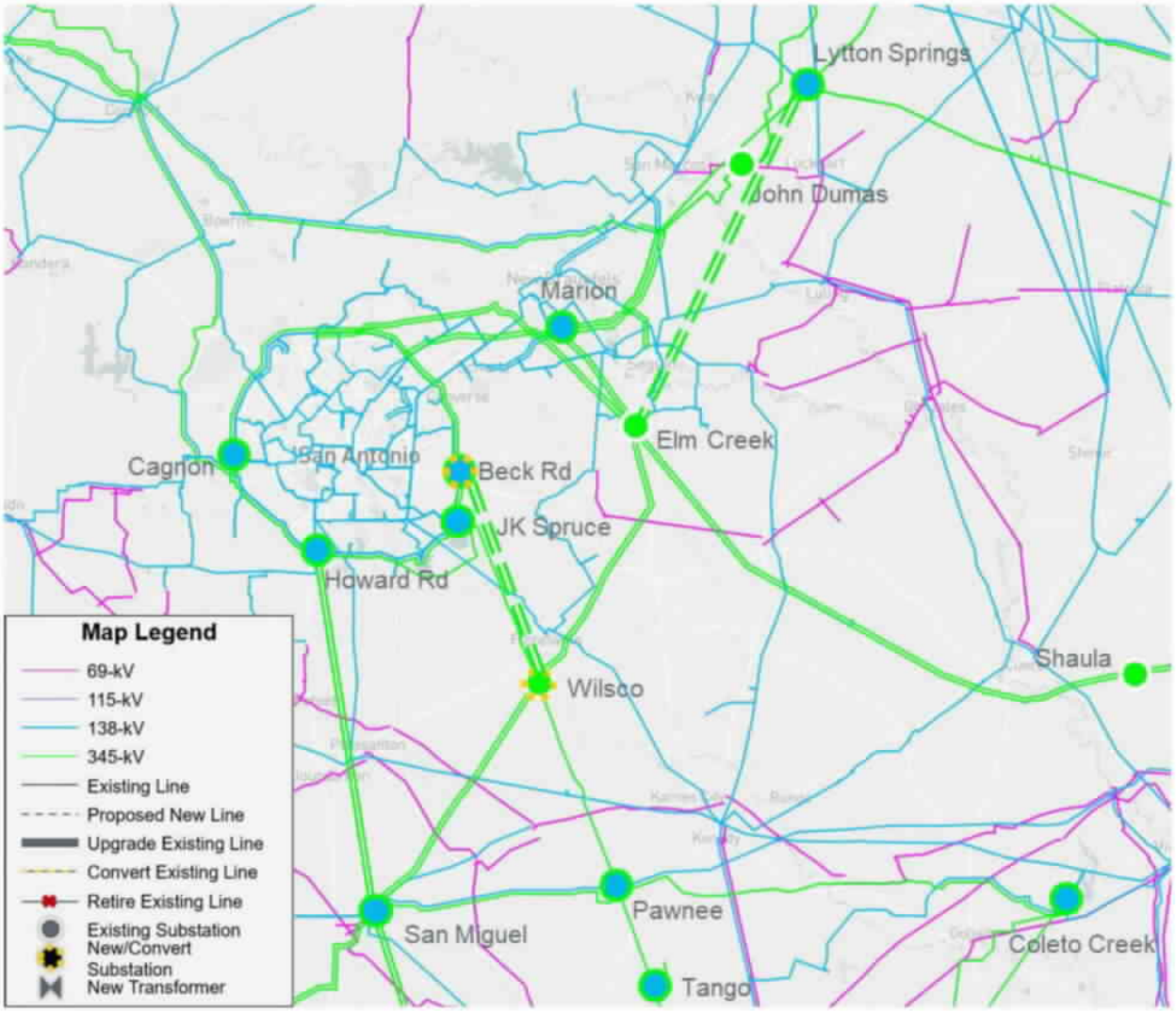

Figure A.2: Map of Option 2

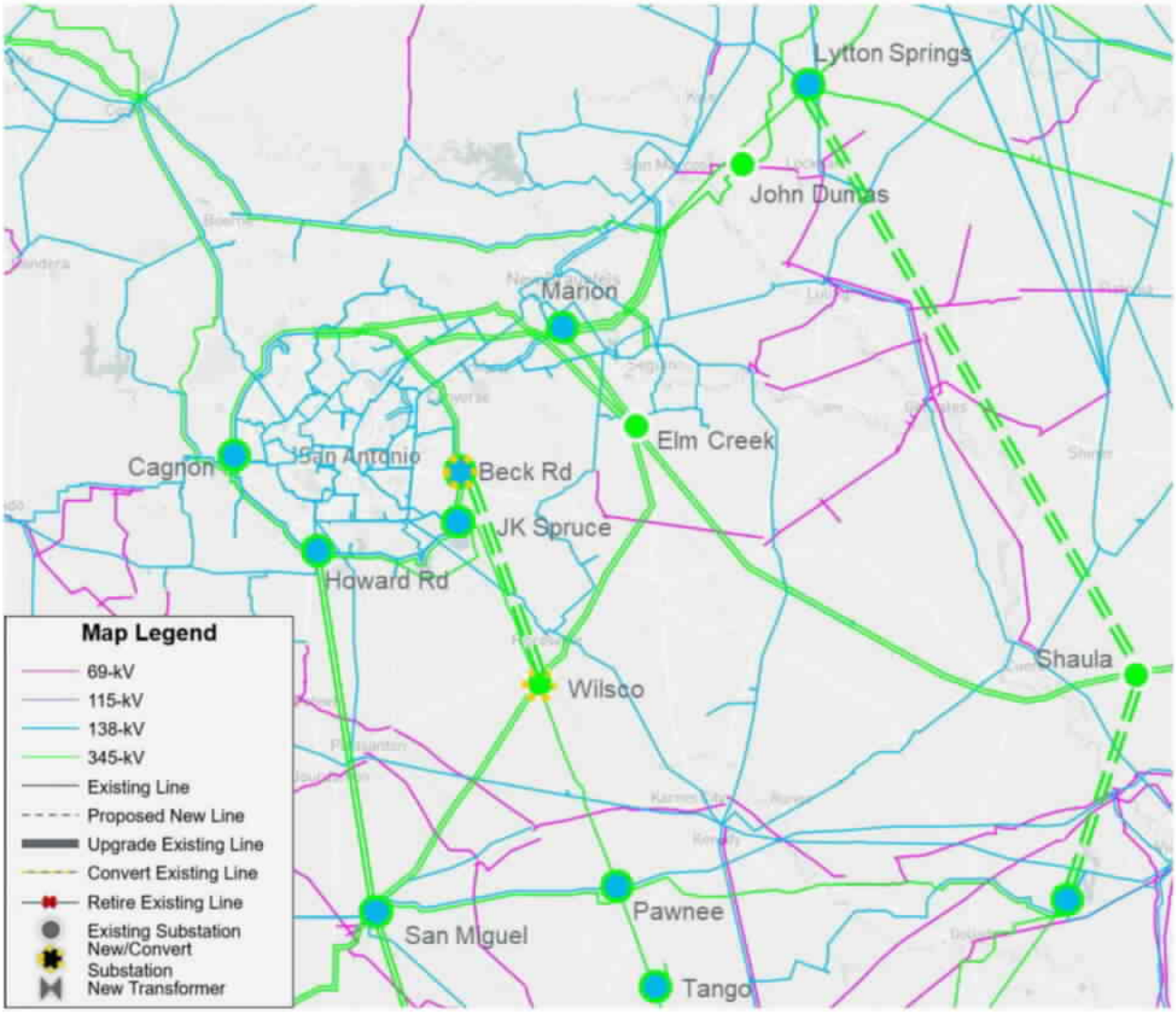

Figure A.3: Map of Option 3

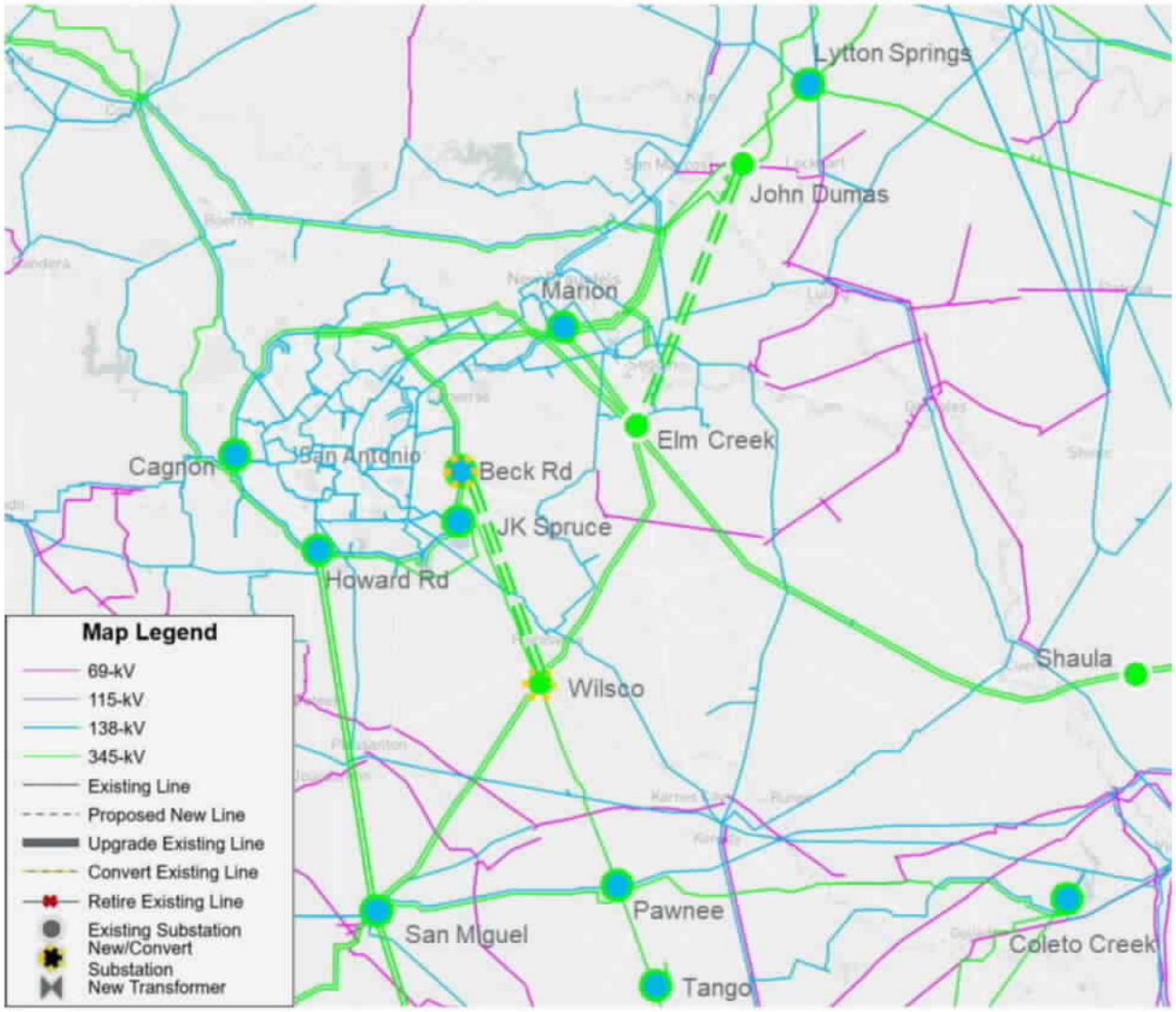

Figure A.4: Map of Option 4

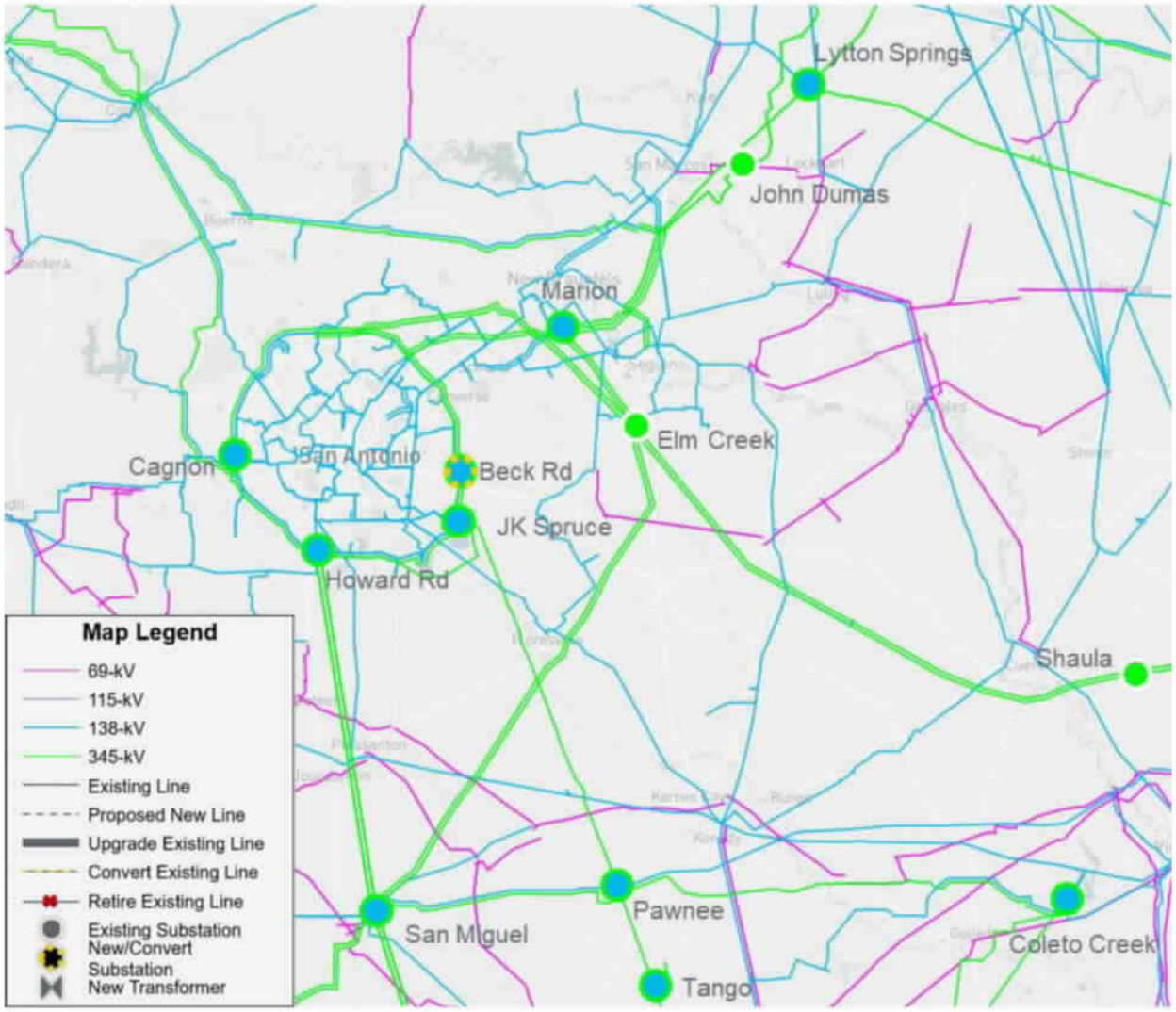

Figure A.5: Map of Option 5

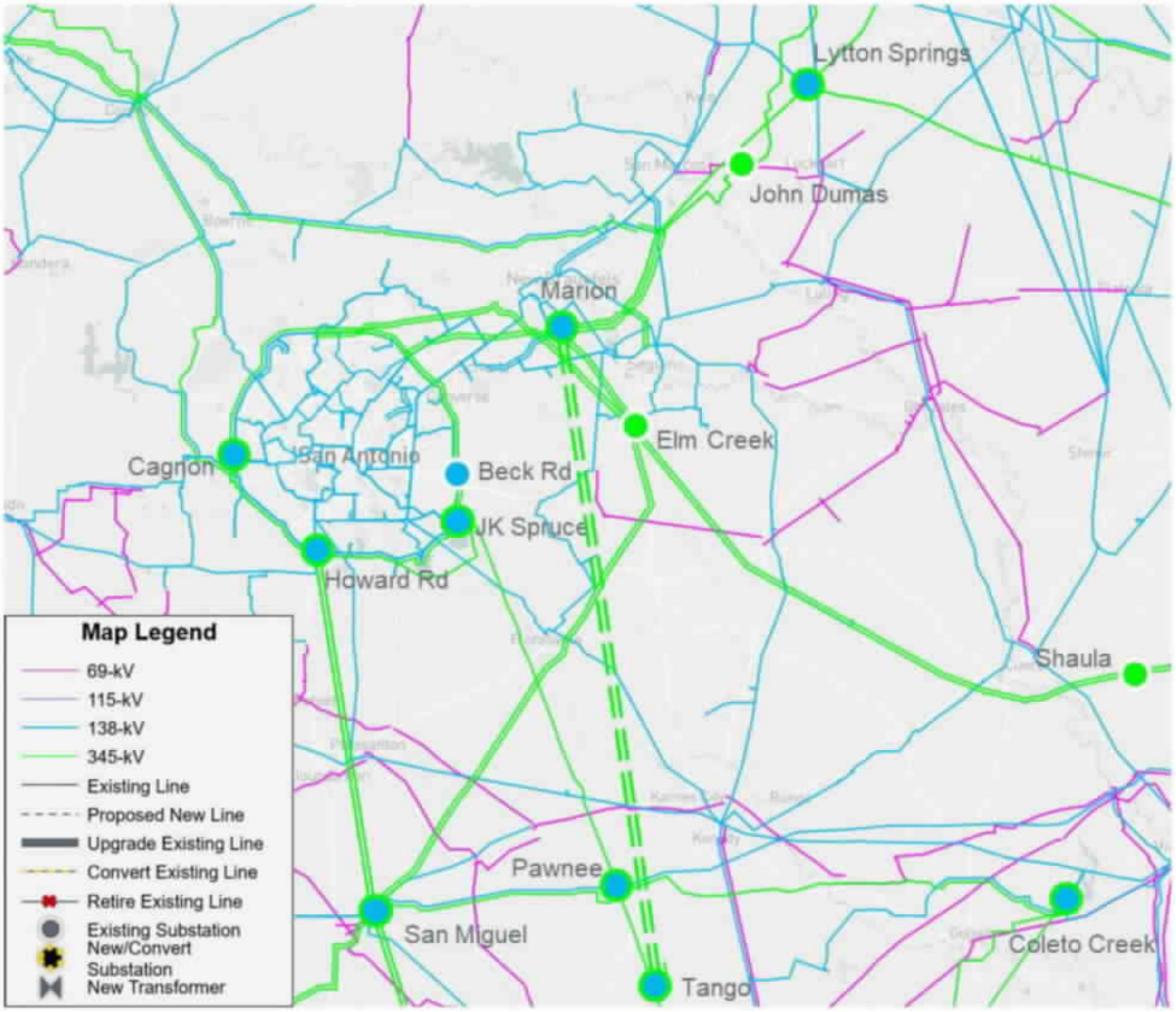

Figure A.6: Map of Option 6

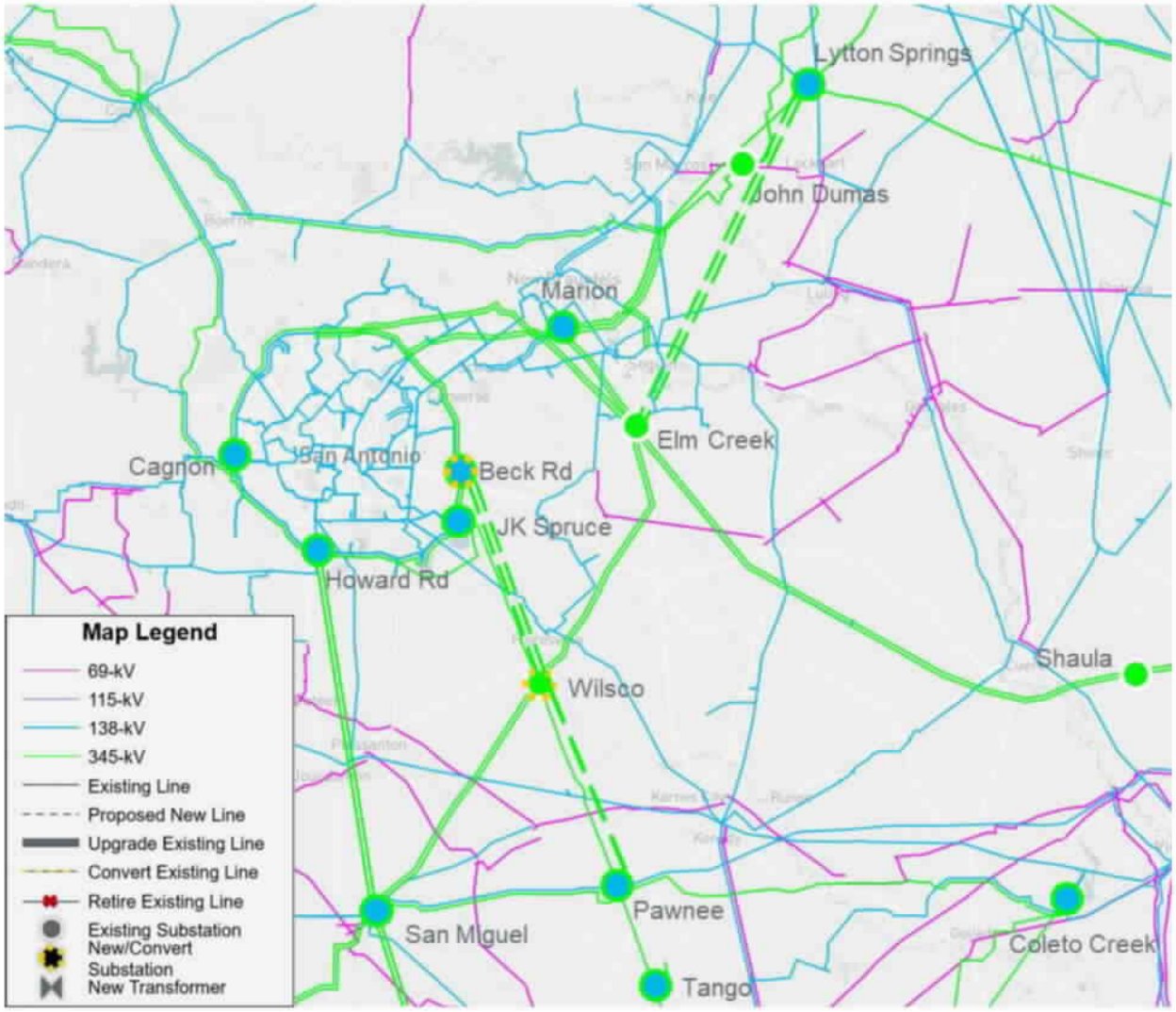

Figure A.7: Map of Option 7

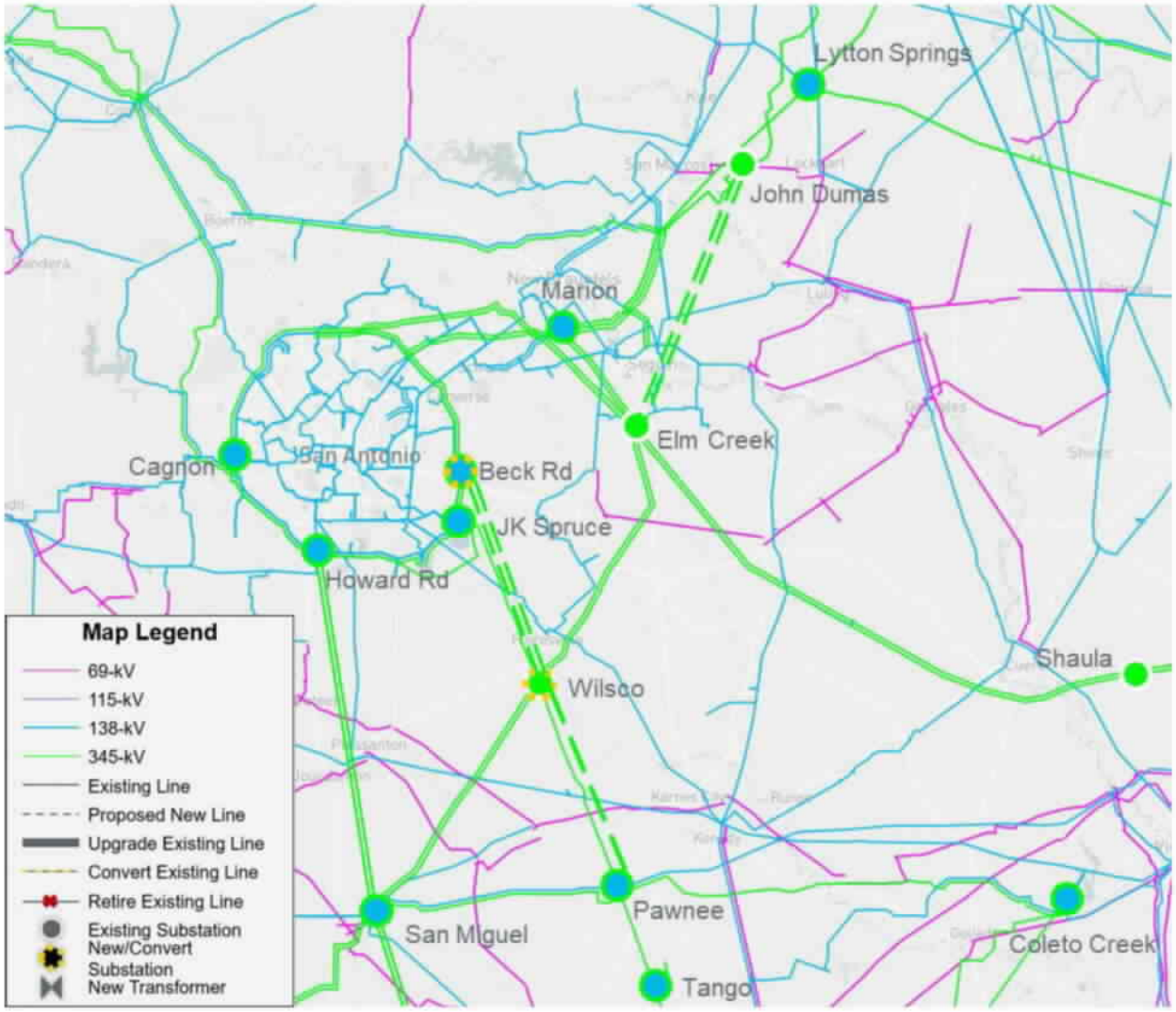

Figure A.8: Map of Option 8

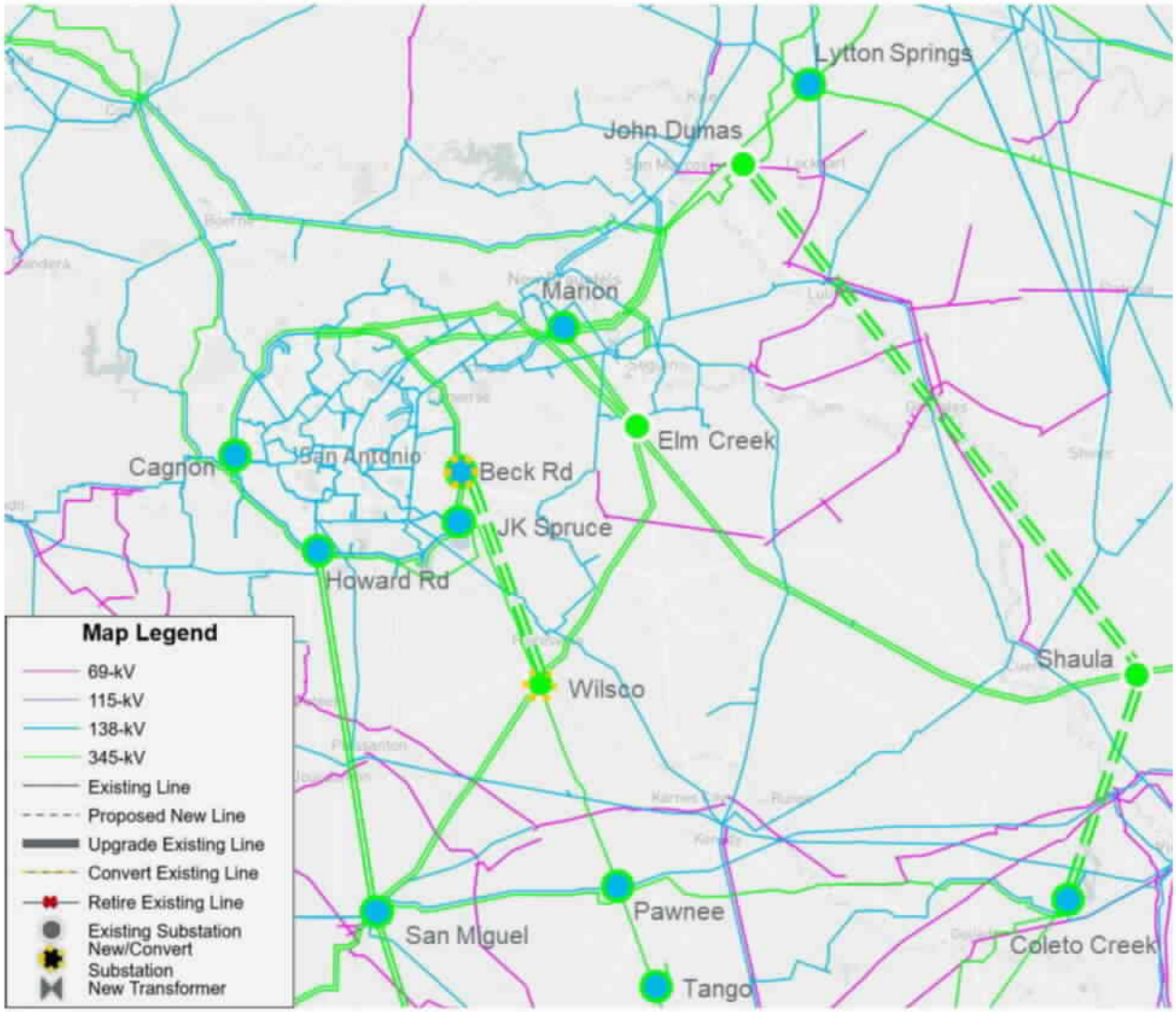

Figure A.9: Map of Option 9

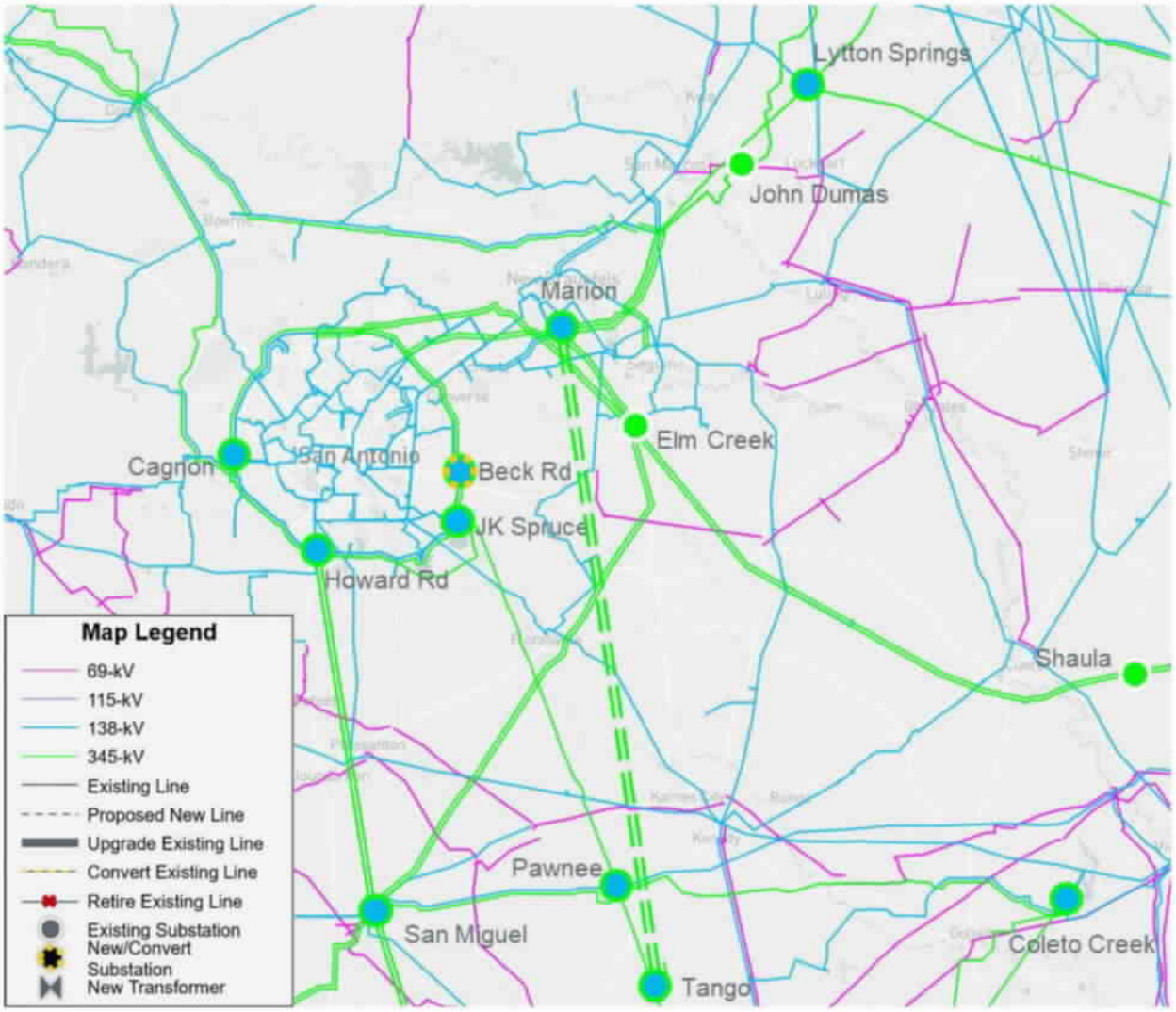

Figure A.10: Map of Option 10

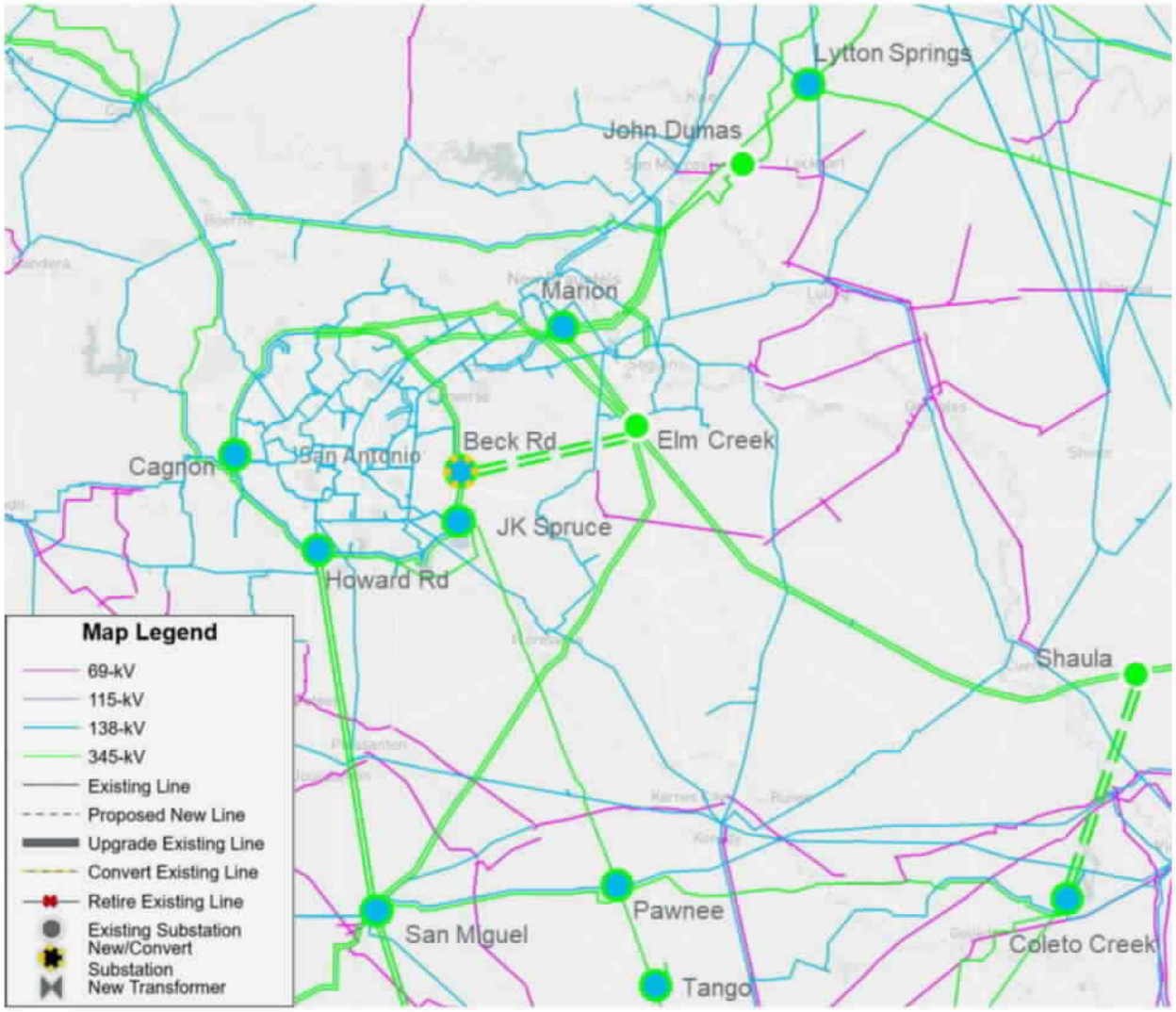

Figure A.11: Map of Option 11

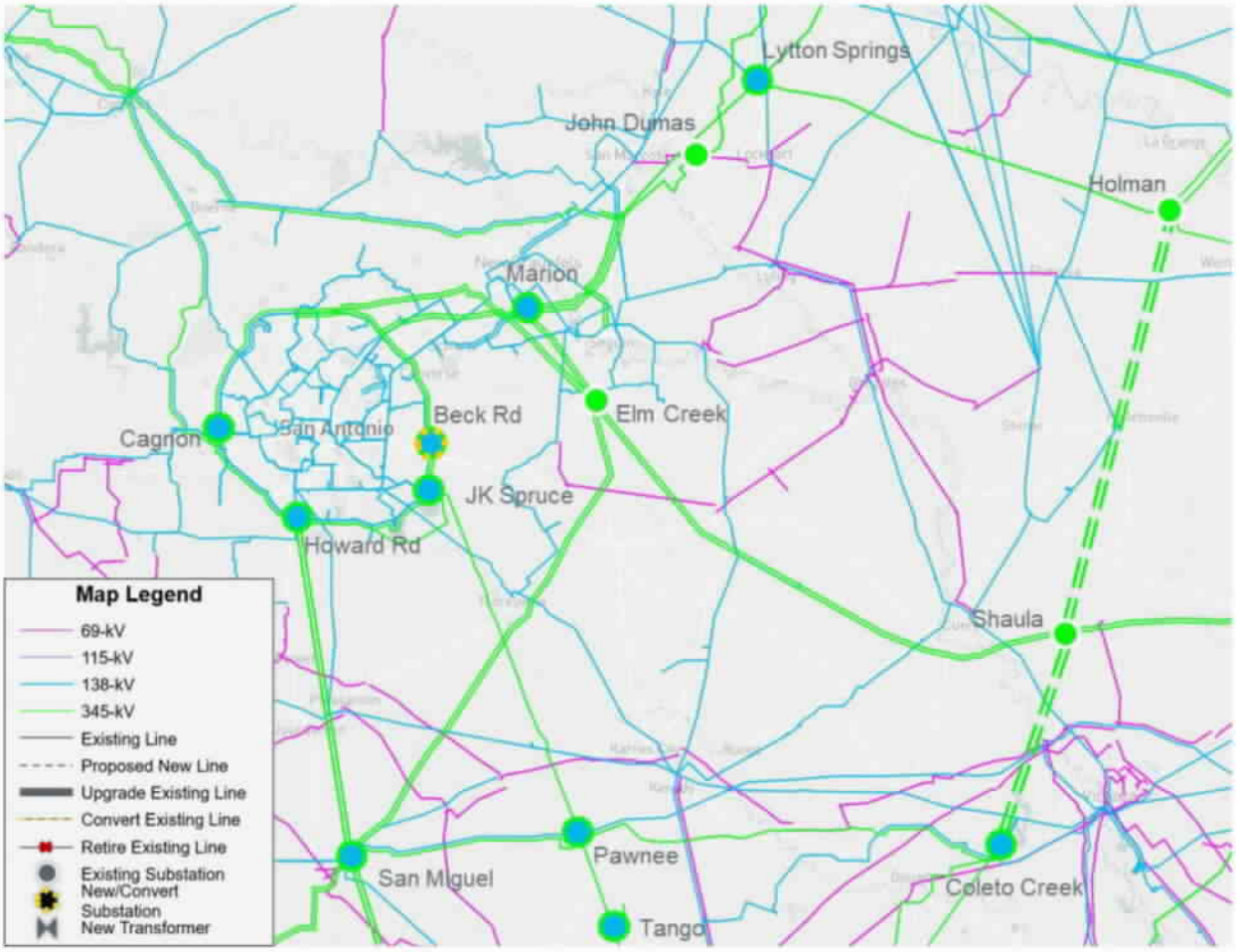

Figure A.12: Map of Option 12

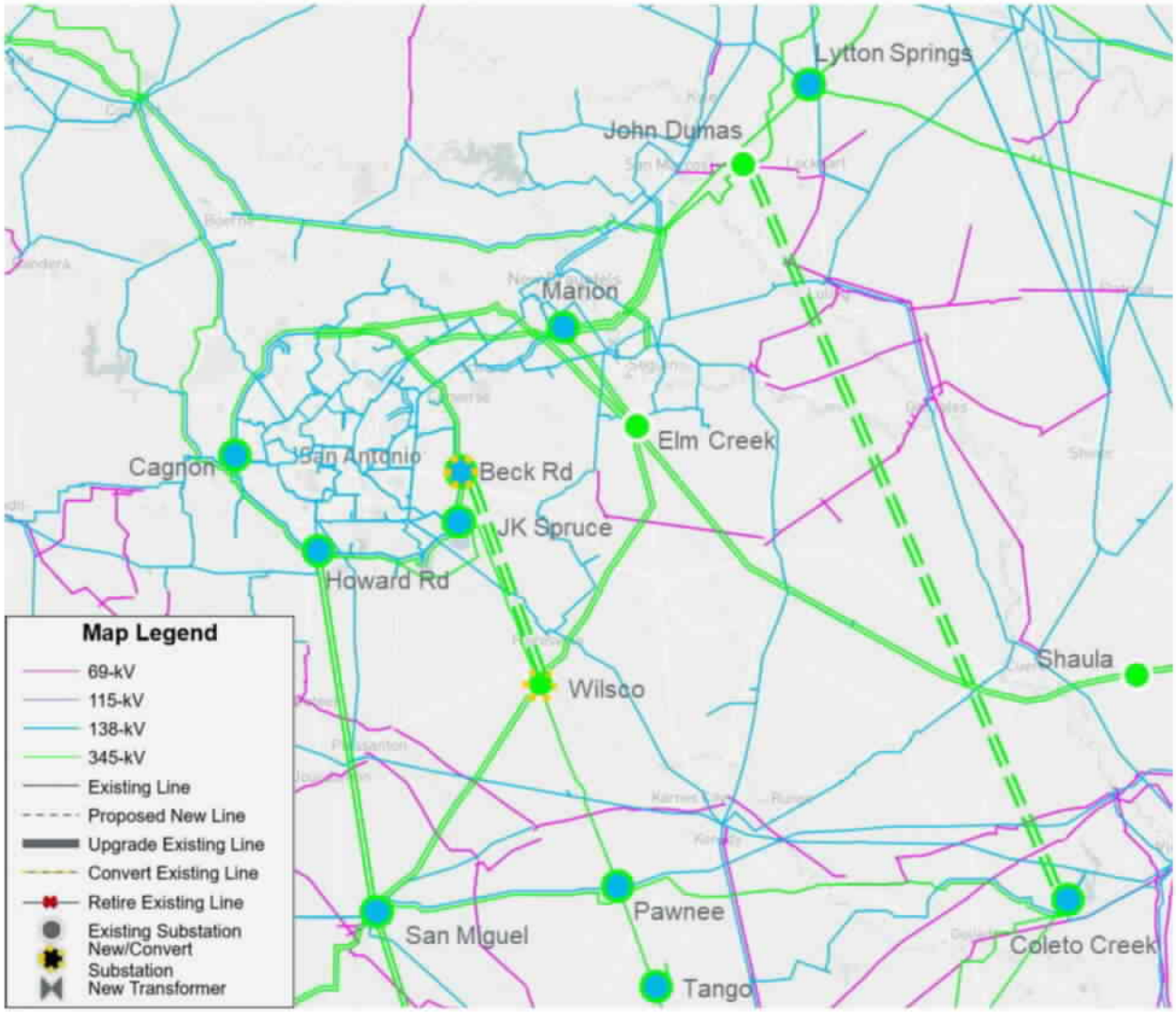

Figure A.13: Map of Option 13

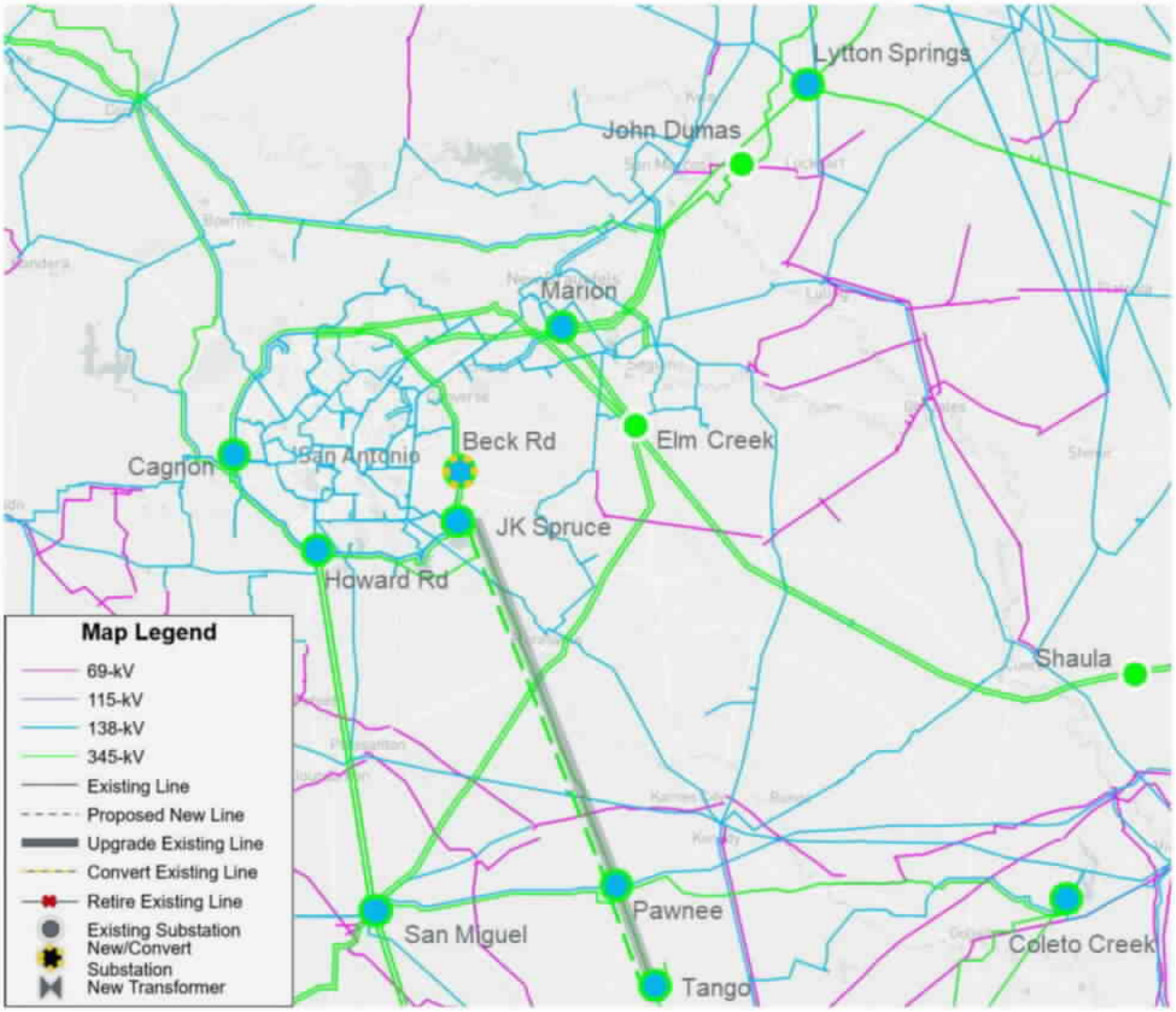

Figure A.14: Map of Option 14

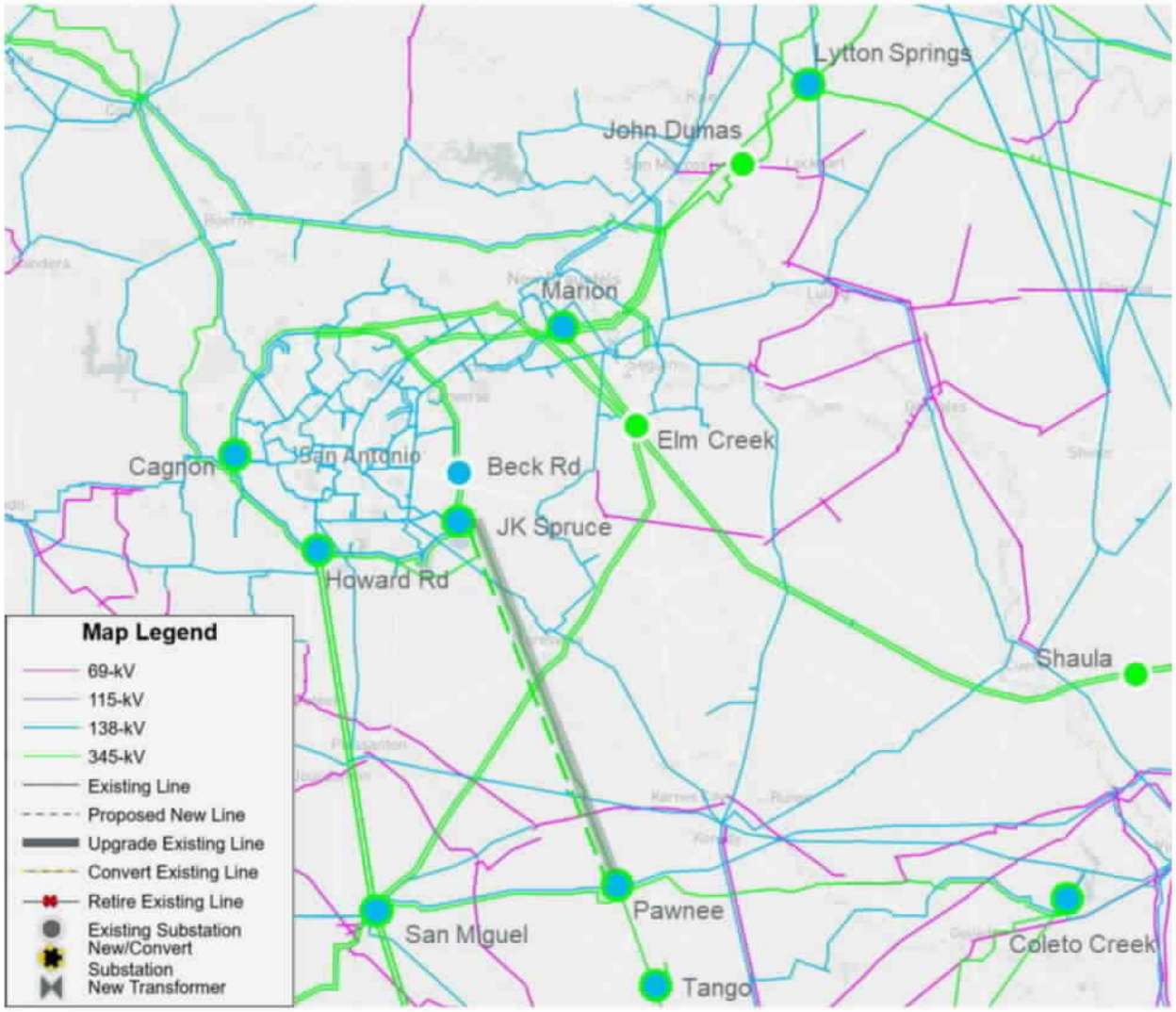

Figure A.15: Map of Option 15