



ELECTRIC RELIABILITY COUNCIL OF TEXAS

REPORT ON EXISTING AND POTENTIAL ELECTRIC SYSTEM CONSTRAINTS AND NEEDS

**Summary for
2006 Operators Training
Seminar
February 2006**

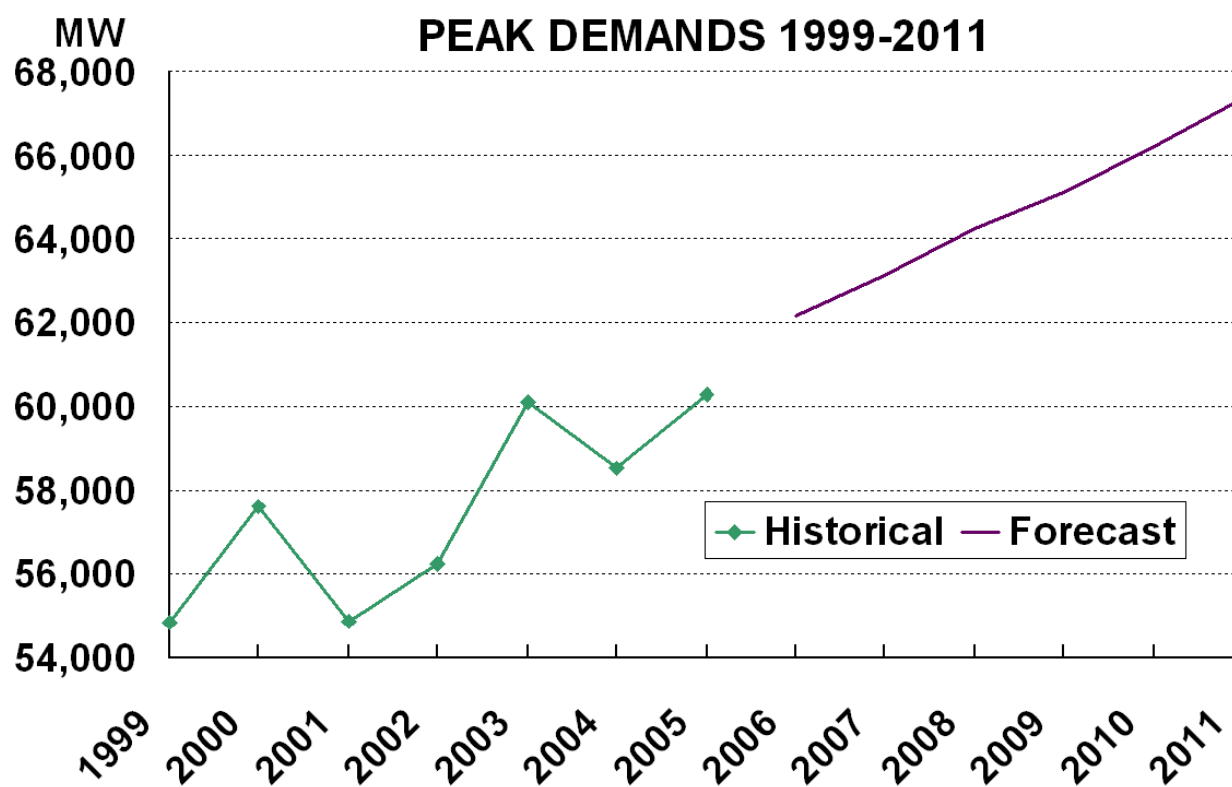
Forecasting electrical demand and energy is one of the most significant factors in determining the future infrastructure needs of the ERCOT power system. Should the forecast understate the actual load growth, facilities adequate to reliably serve the load may not be in place in a timely manner. On the other hand, if the forecast overstates the actual growth, facilities which are not necessarily needed may be built. These would result in an inefficient use of resources and higher cost to consumers.

To develop the most reasonable load projections for the system, ERCOT load forecasters consider a wide range of variables such as population, weather, land usage, general business economy, governmental policy, and societal trends in terms of both historical actuals and the best predicted future indicators available.

ERCOT develops peak demand and energy forecasts that reflect the outcome of differing economic and weather outlooks and uncertainties and, in cooperation with TSPs, selects a most probable scenario for planning purposes.

Peak Demand

Texas has experienced significant economic growth over the past several years. As a result the demand for electricity has also increased. From 1999 to 2005 the peak demand on the ERCOT system has increased approximately 1.6% per year. The current forecast for 2006 to 2011 indicates ERCOT's peak demand is expected to continue this trend with an increase of 1.6% annually, as shown below.

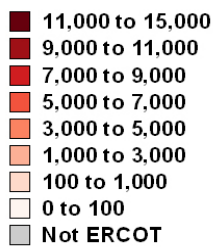


Non-Coincident Peak by County

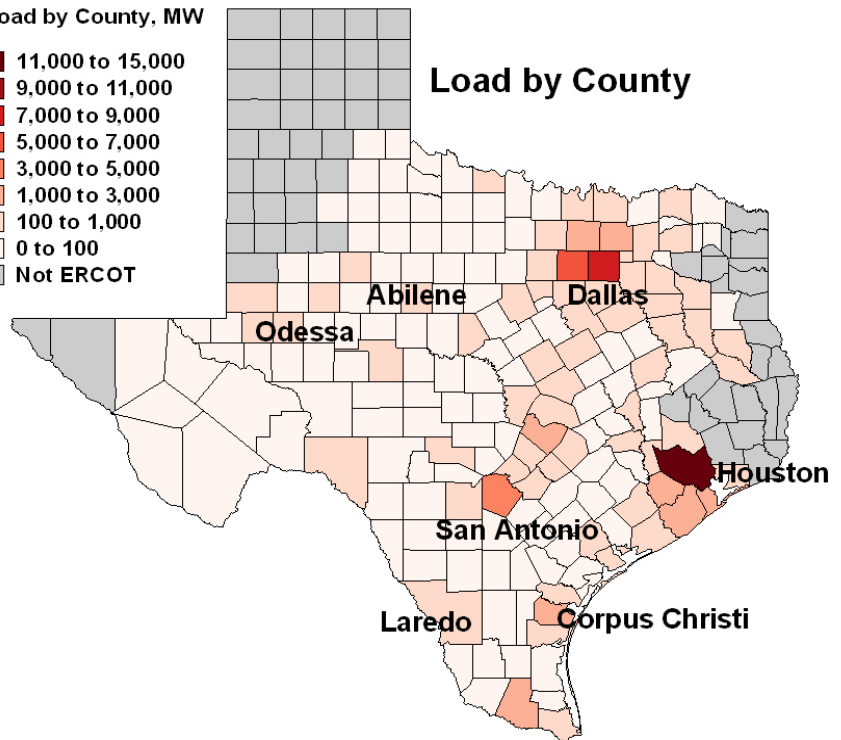
The loads by county are shown for the summer of 2005 and are non-coincident peak demand forecasts provided in the 2005 Annual Load Data Request (ALDR) by the TSPs.

The counties with the greatest peak demands are Harris, Dallas, Tarrant, and Bexar.

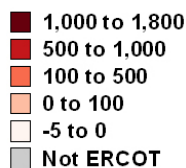
Load by County, MW



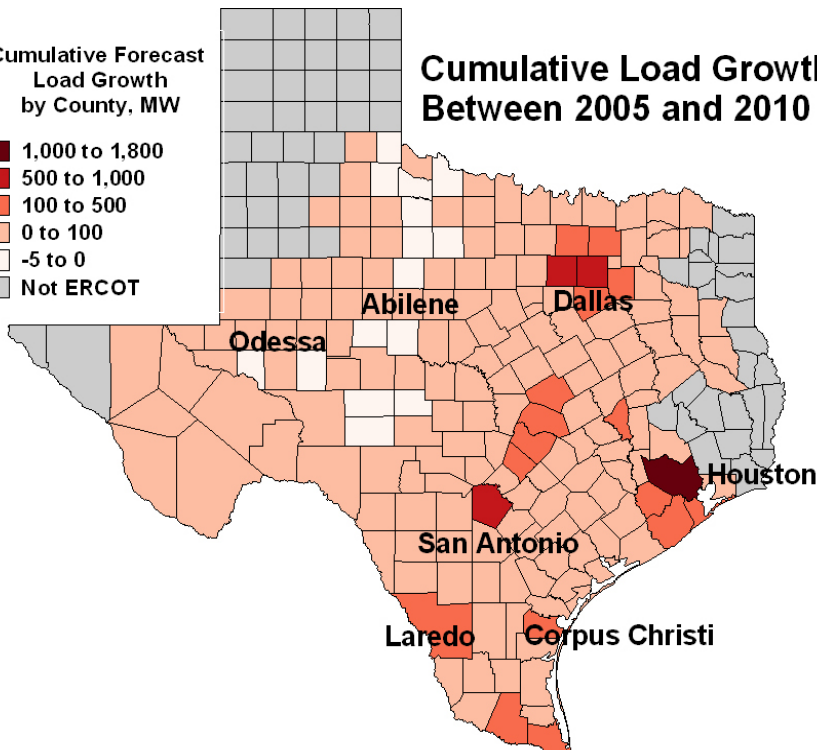
Load by County



Cumulative Forecast Load Growth by County, MW



Cumulative Load Growth Between 2005 and 2010



While ERCOT's overall peak demand forecast calls for a 1.6% annual growth rate, some areas within the state are experiencing growth as high as 6% per year. As expected, the greatest growth is in the metropolitan areas.

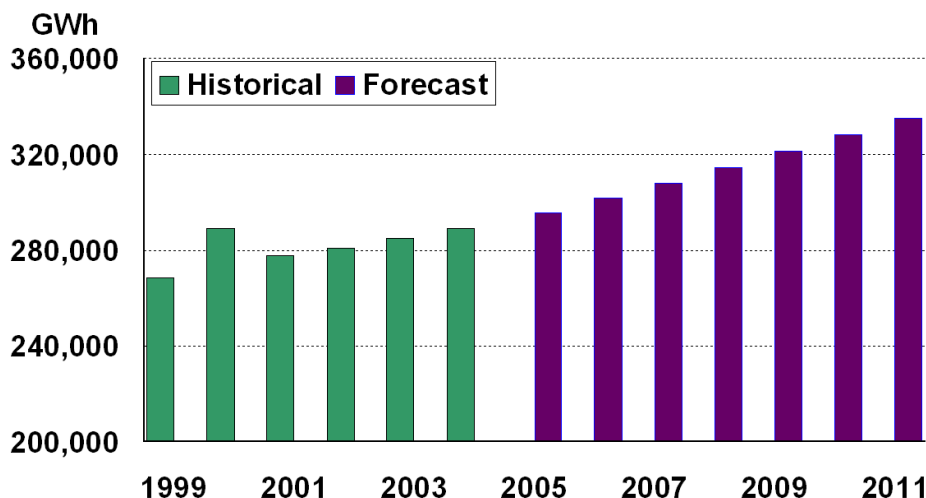
The counties with the greatest expected cumulative load growth are Harris, Dallas, Tarrant, and Bexar. Other areas expected to experience significant load growth include the Austin metro area and the lower Rio Grande border.

Energy

While the peak demand forecast provides engineers an indication of the size electrical facilities should be constructed to serve the expected peak demand (15-minute duration), the energy usage forecast assists engineers in determining the usage of these facilities over all hours of the year.

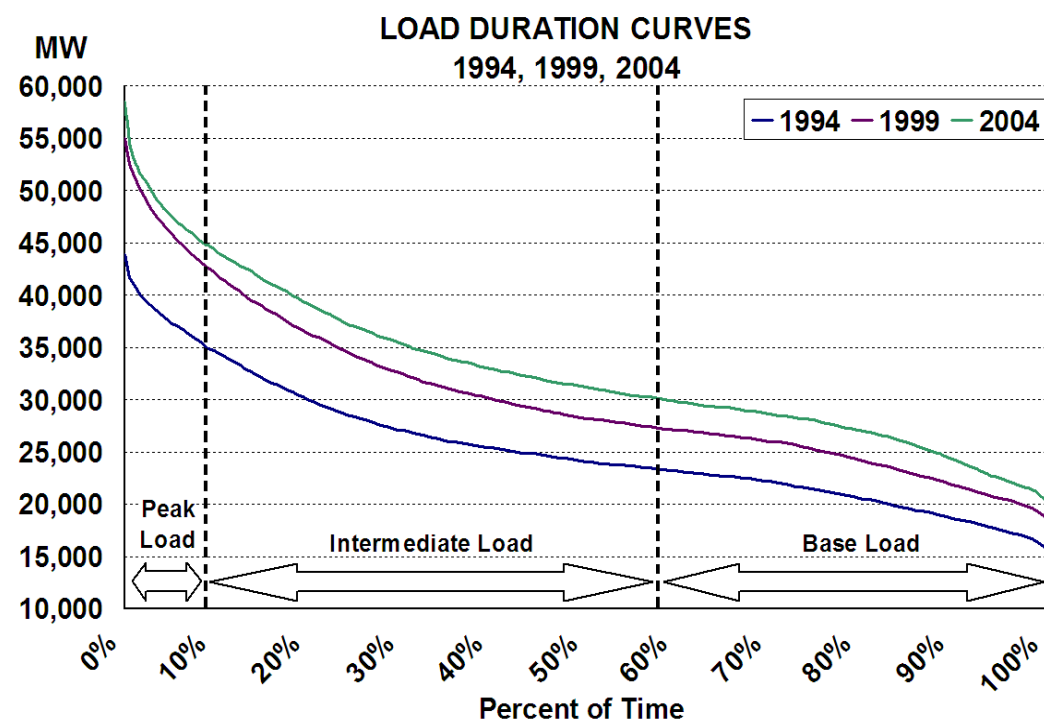
For the ERCOT system energy usage has grown approximately 1.5% per year since 1999. Current forecasts indicate this trend will increase to approximately 2.1% per year from 2005 to 2011 based on projected growth in the fundamental economic variables which have historically driven load growth in the region.

ANNUAL ENERGY USAGE 1999-2011



Load Duration Curves

A load duration curve is an extremely useful tool engineers use to understand the nature of the load being served over a specific time period. A load duration curve is produced by plotting the magnitude of load against the number of hours (or percent of time) under consideration. Load



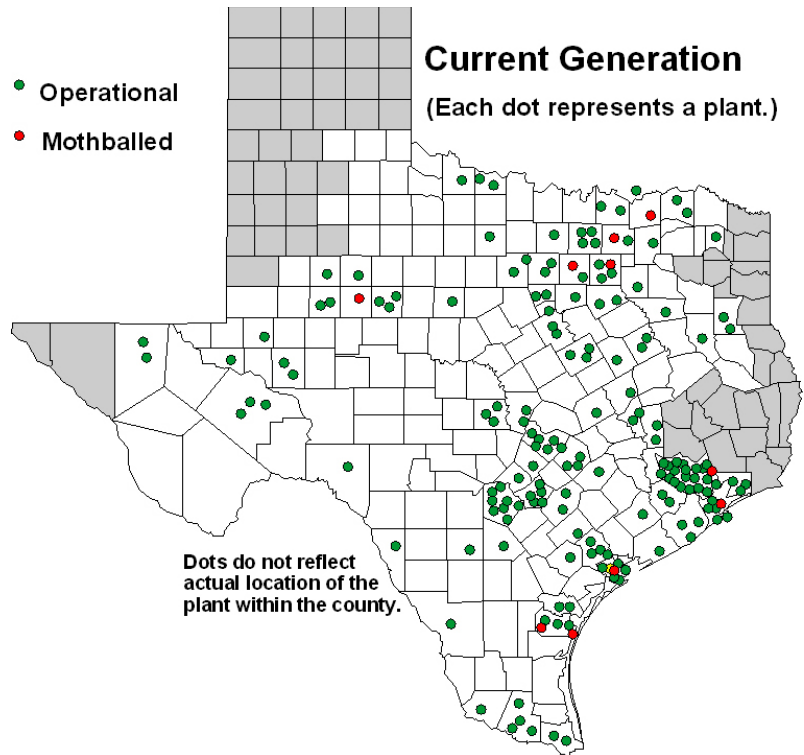
duration curves can be produced for daily, weekly, monthly, or yearly intervals.

ERCOT engineers and system operators utilize numerous load duration curves to assist in determining optimal generation and transmission requirements under various scenarios.

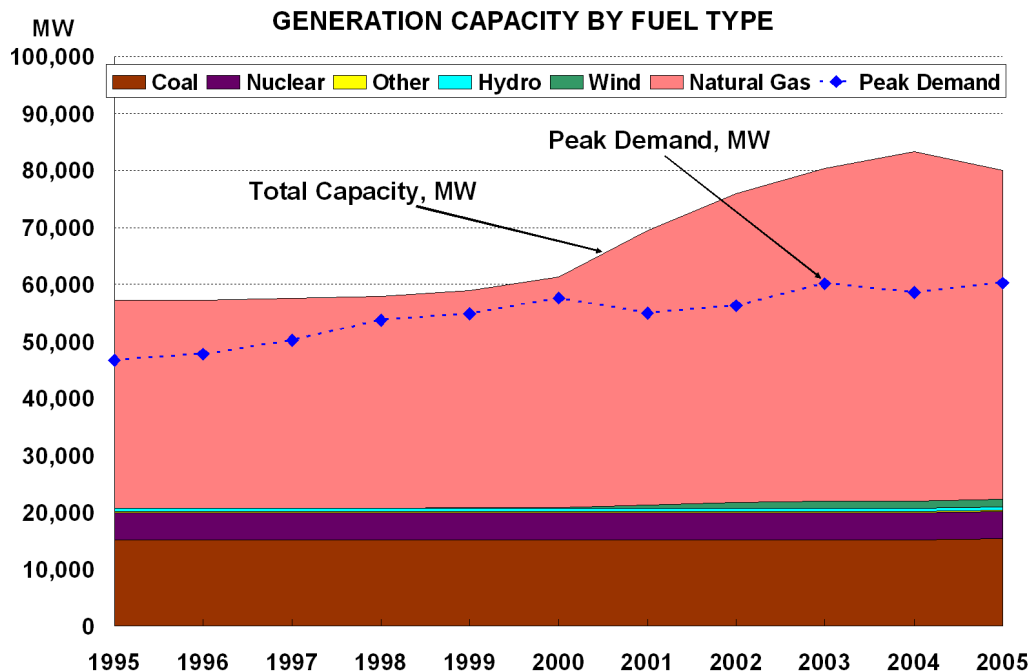
GENERATION

Current Generation

Current installed generation capacity in the ERCOT Region is about 80,000 MW, which includes 7,350 MW of generation that is “mothballed” (suspended operations from the grid for more than six months).

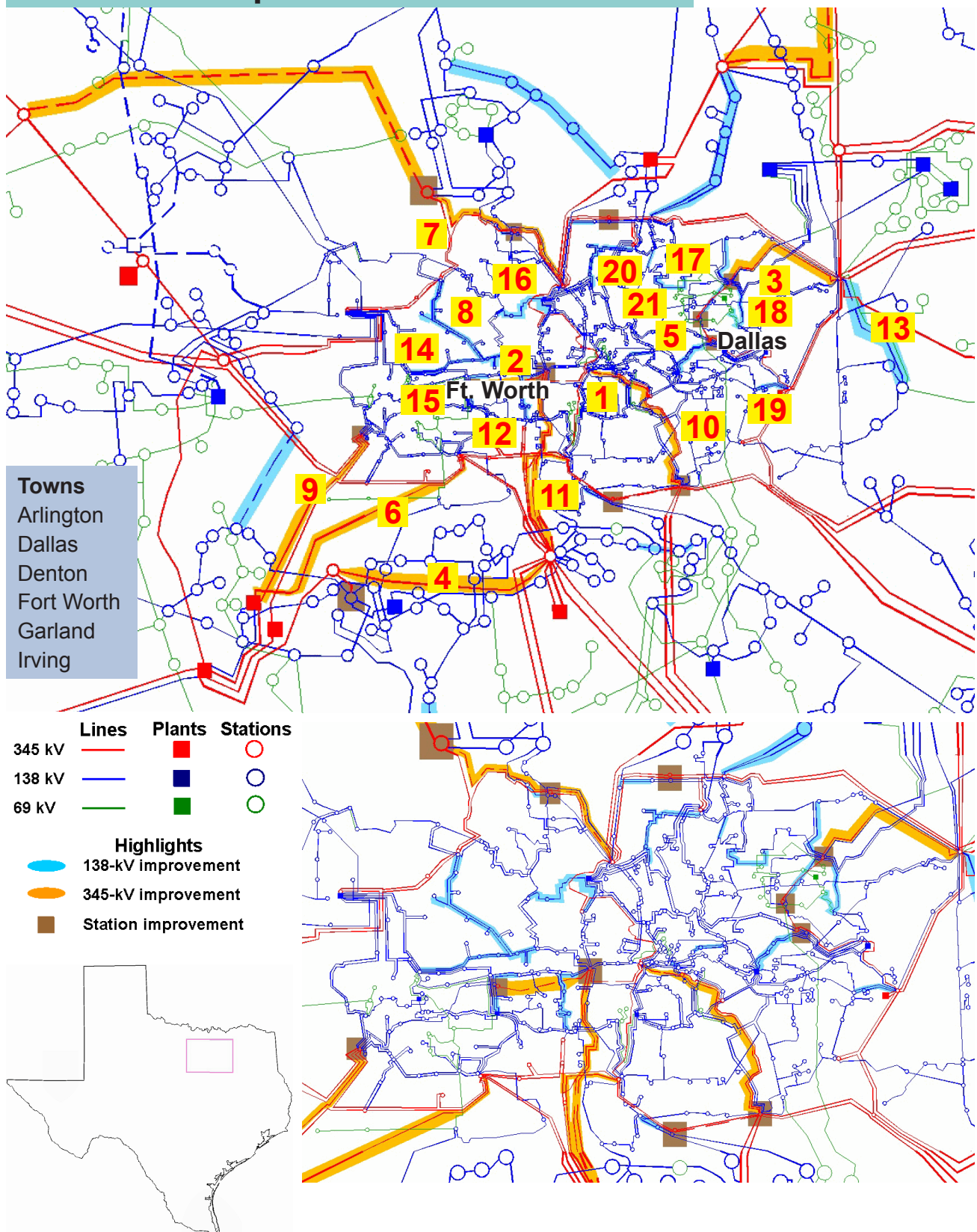


In terms of installed capacity, 72% of capacity in ERCOT is fueled by natural gas, followed by 19% by coal, and 6% by nuclear. It is important to note that nearly all new generation capacity added in the ERCOT system since 2000 is fueled by natural gas. A small portion is fueled by wind resources.



In terms of energy generated, 44% of the energy generated in ERCOT in 2004 was from natural gas, 40% from coal, and 16% from other sources including nuclear, hydro, and wind.

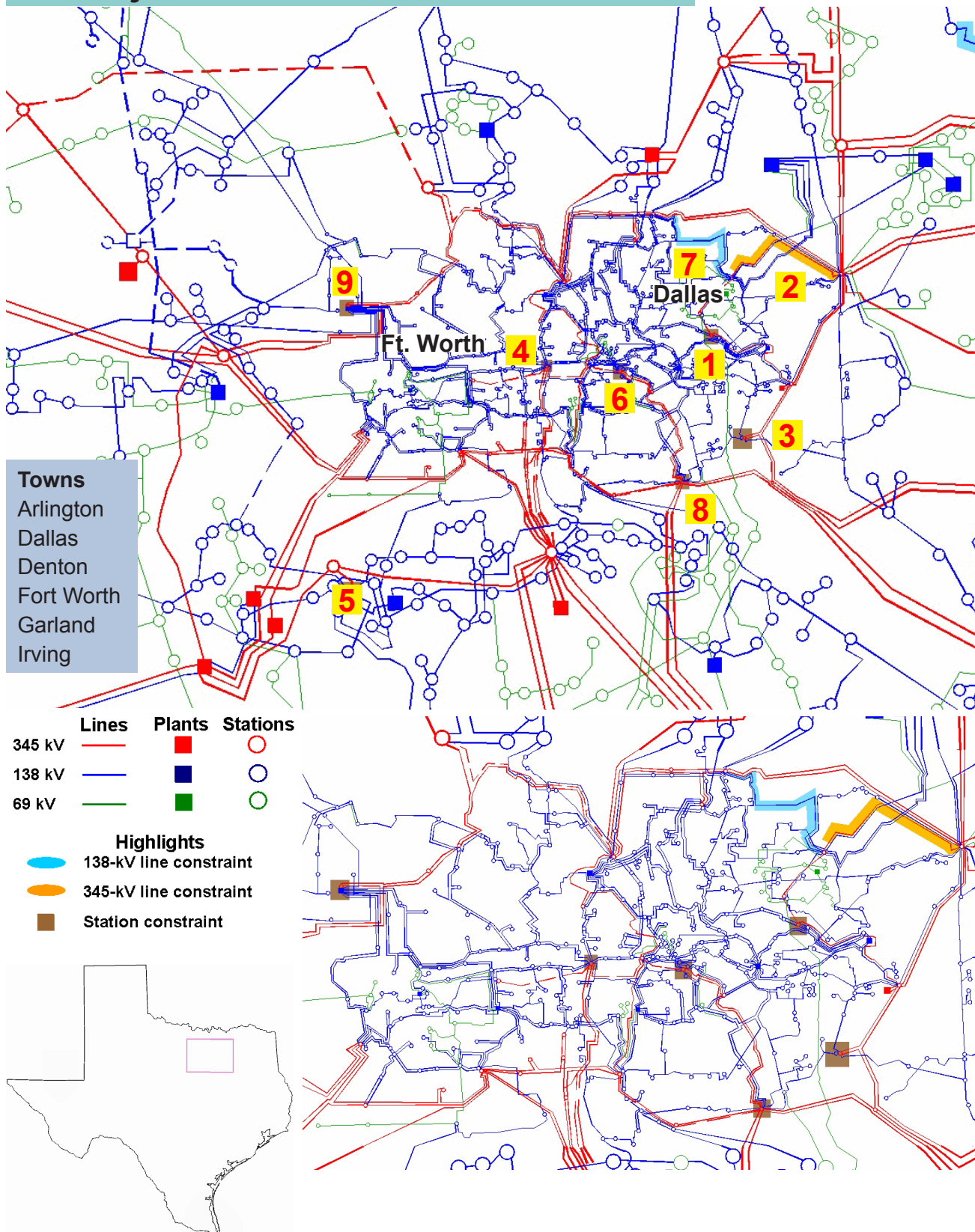
Planned Improvements 2005-2015



In late 2004 ERCOT led a joint study to recommend additional transmission improvements in the DFW area to be completed by 2006. This study recommended the following improvements: Liggett series reactor, Royse to Terrell Switch 69-kV line conversion, Allen to Plano Alma 138-kV terminal equipment upgrade, E. Levee to Reagan Street 138-kV line rebuild, Plano Tennyson 345/138-kV autotransformer installation, Ben Davis to Royse 345-kV line upgrade, Johnson Switch to Venus 345-kV line, Centerville to Parkdale 138-kV line rebuild, and the Everman to DeCordova 345-kV line upgrade. Numerous 138-kV circuits are scheduled for improvement as shown in the map and the table.

Map Index	Planned Element	Voltage Level, kV	In-Service Year	ERCOT Review
1	West Levee - Norwood	345	2006	✓
2	Liggett - Trinity	345	2010	
3	Ben Davis - Royse	345	2007	✓
4	Johnson - Venus	345	2006	✓
5	Centerville - Parkdale	138	2006	✓
6	Everman - DeCordova	345	2006	✓
7	West Denton - NW Carrollton	345	2009	
8	Keller - Euless	138	2009	
9	DeCordova - Benbrook	345	2007	
10	Watermill - W. Levee	345	2005	
11	Venus - Liggett	345	2006	✓
12	Venus - Cedar Hill	345	2007	
13	Royse - Terrell	138	2006	✓
14	Saginaw - Euless	138	2009	
15	Trinity - Handley	138	2010	
16	Hackberry - Grapevine Ball	138	2005	✓
17	Ben Davis - McCree	138	2006	
18	Ben Davis - Wynn Joyce	138	2005	
19	Forney - East Mesquite	138	2007	
20	Carrollton East - Renner	138	2012	
21	Apollo - East Richardson	138	2010	
	345/138-kV Autotransformers	345/138		✓

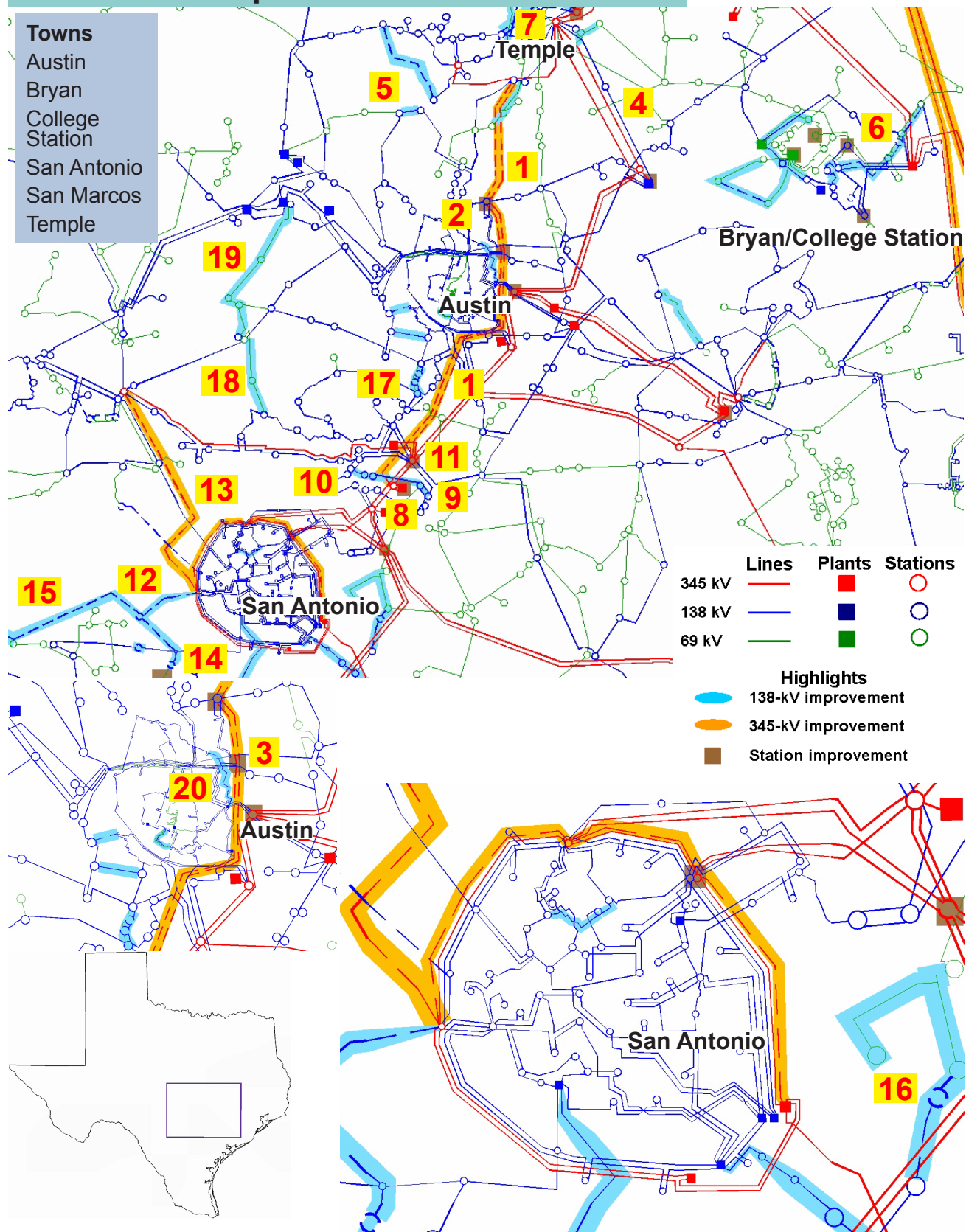
Projected Constraints 2006-2010



Certain elements of the transmission system in the DFW area are projected to cause congestion at some point in the next few years. As noted in the table, most of the congestion on transmission lines has been eliminated or reduced by the planned improvements, but some congestion remains, especially on autotransformers in the area. Several 345/138-kV autotransformers are scheduled to be installed in the DFW area during the next five years. A second 345/138-kV autotransformer is planned at Concord which will address the congestion in that area. Studies are performed throughout each year to determine the locations that provide the greatest improvement to the reliability of the transmission system as well as the most cost-effective timing for installation. Autotransformer improvements generally have a shorter lead time than transmission line upgrades. The Ben Davis to Royse South and Ben Davis to Allen constraints are projected to cause congestion only in 2006. The Ben Davis to Royse 345-kV circuit is scheduled to be upgraded by the summer of 2007. The Ben Davis to Allen 138-kV circuit is also scheduled to be upgraded.

Map Index	Projected Constraining Element	Voltage Level, kV	2006	2007	2008	2009	2010
1	Centerville Autotransformer	345/138					
2	Ben Davis - Royse South	345					
3	Seagoville Autotransformer	345/138					
4	Liggett Autotransformer	345/138					
5	Concord Autotransformer	345/138					
6	West Levee Autotransformer	345/138					
7	Ben Davis - Allen	138					
8	Watermill Autotransformer	345/138					
9	Eagle Mountain Autotransformer	345/138					
Color indicates relative magnitude and timing of constraints for area.							

Planned Improvements 2005-2015

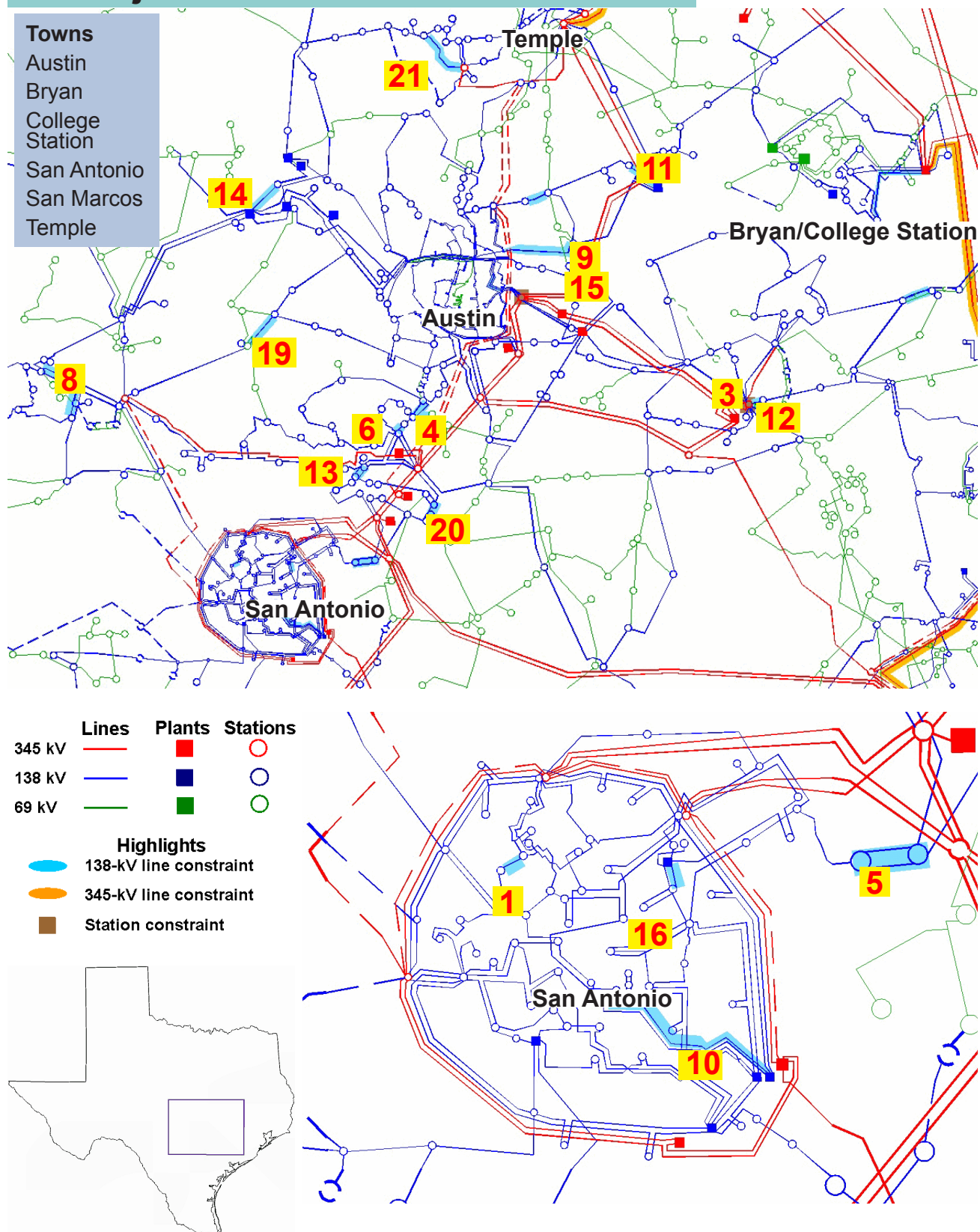


CENTRAL

Several major transmission improvements are planned for this area. Notable among these are a new 345-kV line from Clear Spring/Zorn to Salado, a 345-kV line from Cagnon to Kendall, and the Elm Creek station that connects the Marion to San Miguel 345-kV circuits to the South Texas Project (STP) to Hill Country/Skyline 345-kV circuits. The Cagnon to Kendall 345-kV line that will serve the growing load in the Hill Country north of San Antonio and the Clear Springs/Zorn to Salado double circuit will help to relieve congestion out of the generation pocket between San Antonio and Austin, relieve south to north zonal congestion, and provide support for the growing load in Austin and its suburbs. Several TSPs are involved in a project from Gibbons Creek to College Station that converts several 69-kV facilities to 138 kV and constructs a new 138-kV circuit. This project will provide a significant improvement to the Bryan/College Station area. Other upgrades are planned to support growing loads in Bryan/College Station, Temple, and other parts of the Central Texas area.

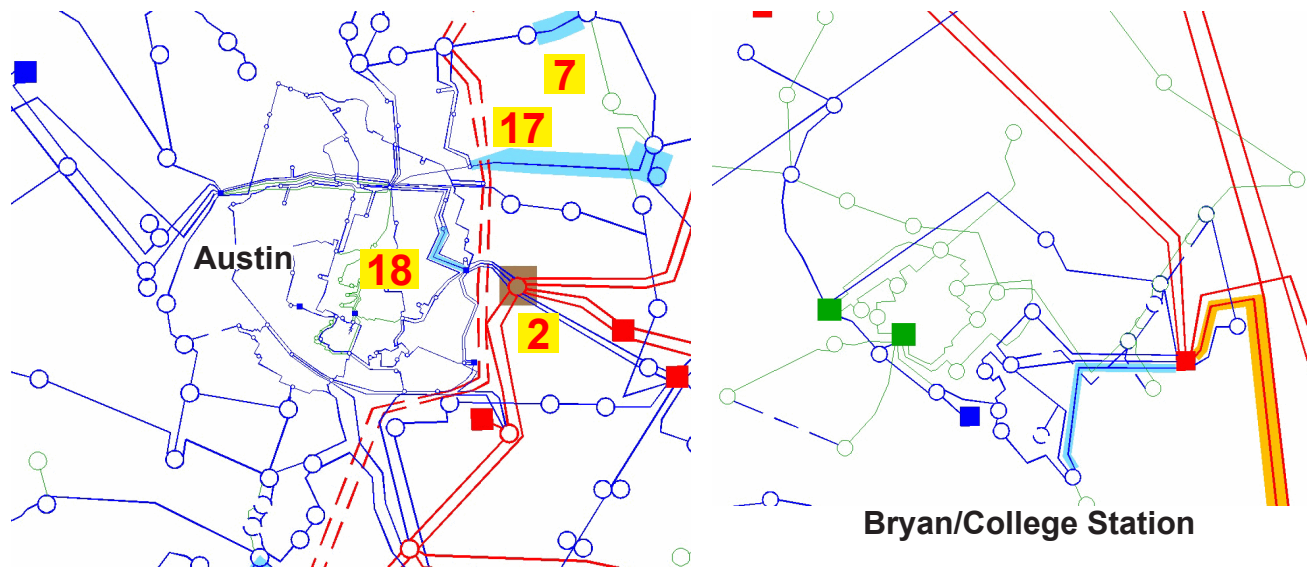
Map Index	Planned Element	Voltage Level, kV	In-Service Year	ERCOT Review
1	Clear Springs/Zorn - Salado	345	2010	✓
2	Hutto Autotransformer	345/138	2010	✓
3	Harris Branch Autotransformer	345/138	2010	✓
4	Sadow - Temple	138	2005	
5	Copperas Cove - Ding Dong	138	2007	
6	Gibbons Creek - College Station	138	2006	✓
7	Temple - Belton	138	2006	
8	Clear Springs Autotransformer	345/138	2006	✓
9	Clear Springs - Seguin	138	2006	✓
10	Clear Springs - Comal	138	2006	✓
11	Zorn Autotransformer	345/138	2005	✓
12	Cagnon - Lytle	138	2007	✓
13	Cagnon - Kendall	345	2006	✓
14	Lytle - Lytle	138	2008	
15	Uvalde - Castroville	138	2008	
16	Lavernia - Sutherland Springs	138	2009	
17	Buda - San Marcos	138	2007	
18	Mountain Top - Devil's Hill	138	2005	
19	Mountain Top - Wirtz	138	2008	
20	Decker - Techridge	138	2006	

Projected Constraints 2006-2010



CENTRAL

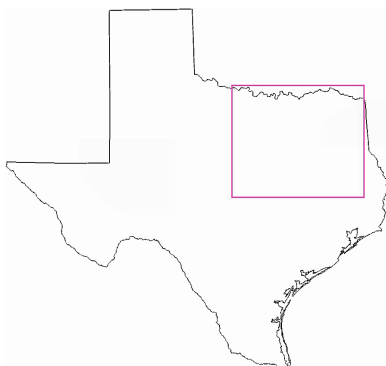
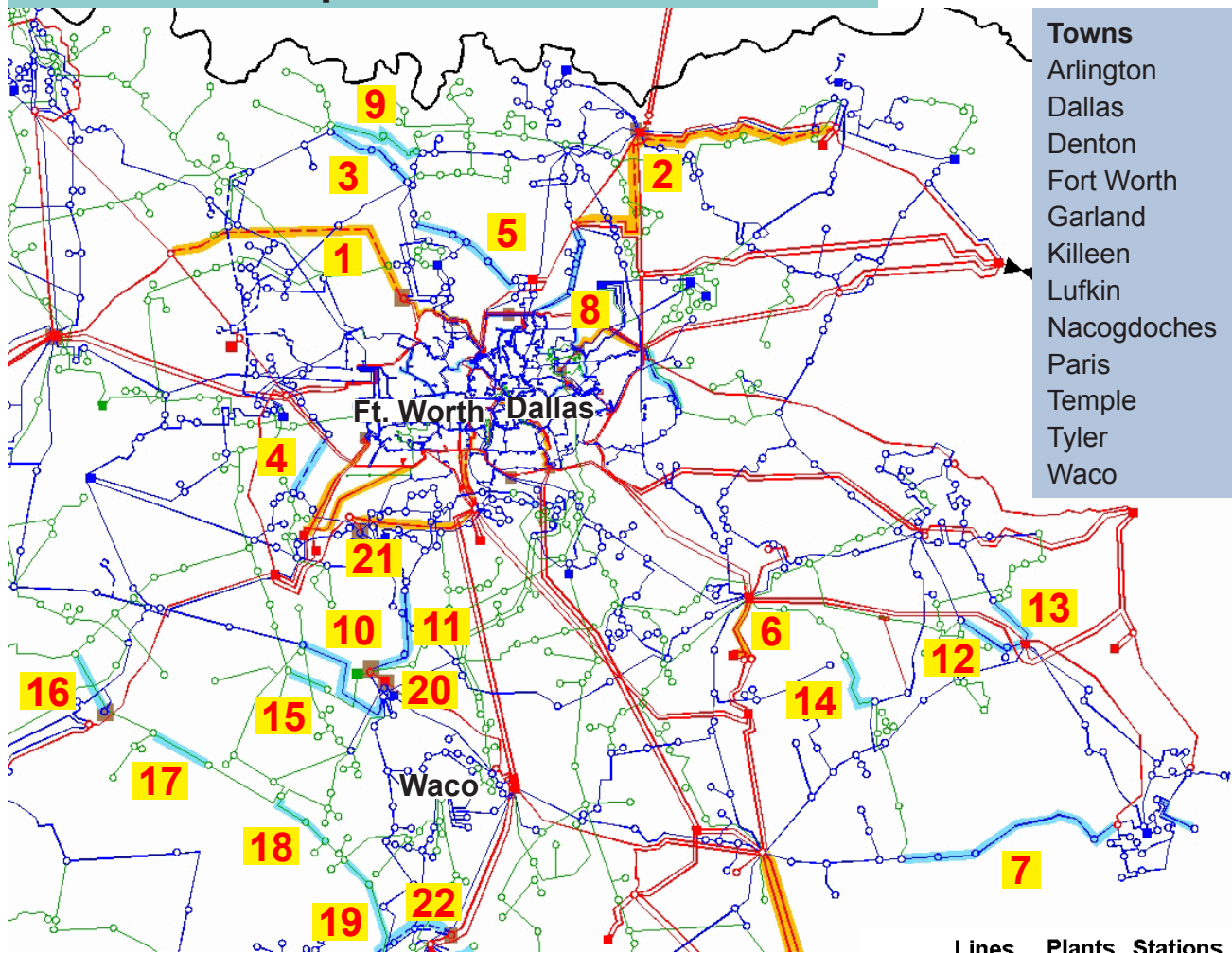
Some congestion will continue to be experienced on constraints in this area until upgrades are complete. While these upgrades generally resolve most of the projected constraints in the area, as shown in the table, future studies will focus on addressing the remaining constraints.



Map Index	Projected Constraining Element	Voltage Level, kV	2006	2007	2008	2009	2010
1	Hamilton - Medical Center	138					
2	Austrop Autotransformer	345/138					
3	Fayette Autotransformer	345/138					
4	San Marcos - Canyon	138					
5	Cibolo - Schertz	138					
6	McCarty Lane - Redwood 1	138					
7	Taylor - Taylor West	138					
8	Kerrville - Verde Creek	138					
9	Elgin - Elgin	138					
10	Ball Park - J. T. Deely	138					
11	Sandow - Salty	138					
12	Willow Springs - Fayette	138					
13	Henne - Comal	138					
14	Sherwood Shores - Ferguson	138					
15	Butler - Elgin	138					
16	Austin - W. B. Tuttle	138					
17	Elgin - Gilleland	138					
18	Decker - Sprinkle	138					
19	Mountain Top - Miller Creek	138					
20	Seguin - Seguin West	138					
21	Killeen - Killeen Fort Hood	138					

Color indicates relative magnitude and timing of constraints for area.

Planned Improvements 2005-2015

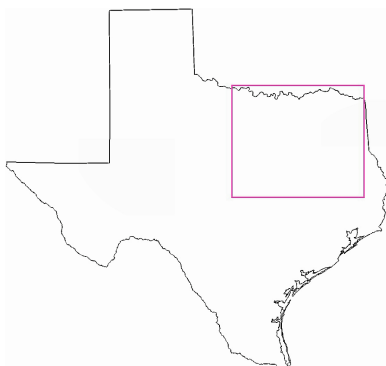
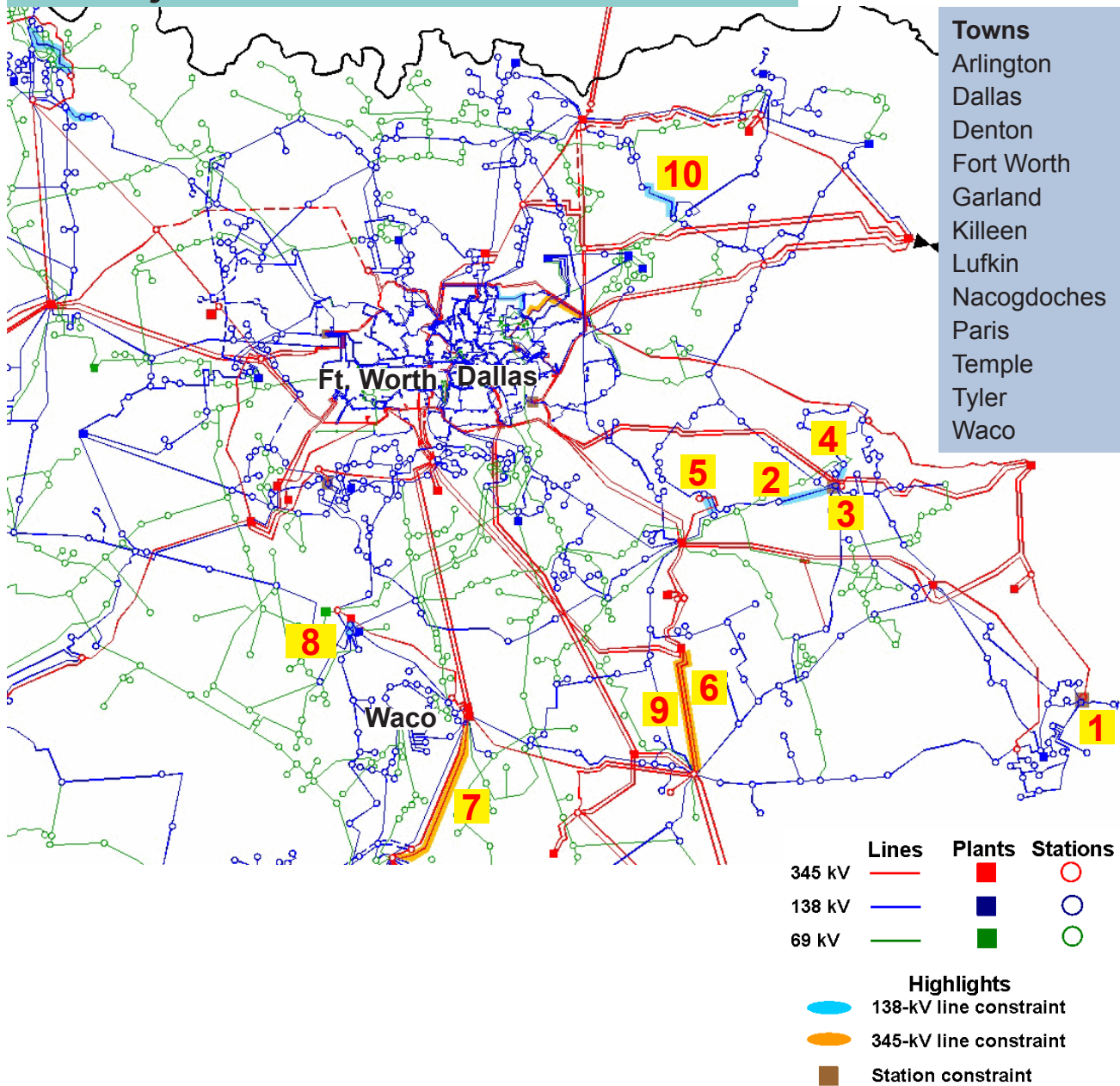


NORTH

Numerous improvements are planned for the north region, including West Denton to Jacksboro 345-kV line, Paris to Anna 345-kV line, an upgrade to the Trinidad to Richland Chambers 345-kV circuits, two 345/138 autotransformers, and upgrades to several 69-kV and 138-kV circuits.

Map Index	Planned Element	Voltage Level, kV	In-Service Year	ERCOT Review
1	West Denton - Jacksboro	345	2006	✓
2	Paris - Anna	345	2006	✓
3	Spring - St. Jo	138	2005	✓
4	Fairview - Aledo	138	2007	✓
5	Frisco - Kruggerville	138	2007	
6	Trinidad - Richland Chambers	345	2007	
7	Crockett - Lufkin	138	2010	
8	Anna - Allen	138	2006	
9	St. Jo - Gainesville	138	2007	
10	Whitney - Walnut Springs	138	2005	
11	Whitney - Covington	138	2006	✓
12	Stryker Creek - Jacksonville	138	2007	
13	Stryker Creek - Troupe	138	2007	
14	Palestine - Montalba	69	2007	
15	Powell - Meridian	69	2005	
16	Hasse - Downing	69	2008	
17	Gustine - Hamilton	69	2008	
18	Pancake - Gatesville	69	2009	
19	Poage - Leon Junction	69	2006	
20	Whitney Autotransformer	345/138	2008	
21	Concord Autotransformer	345/138	2009	
22	Temple NW - Temple Pecan Creek	138	2006	

Projected Constraints 2006-2010

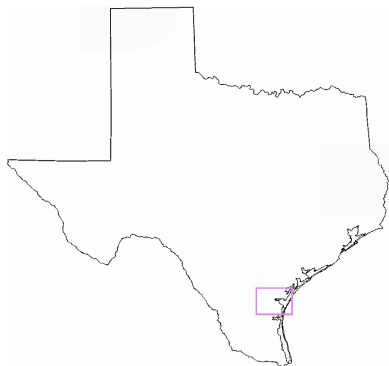
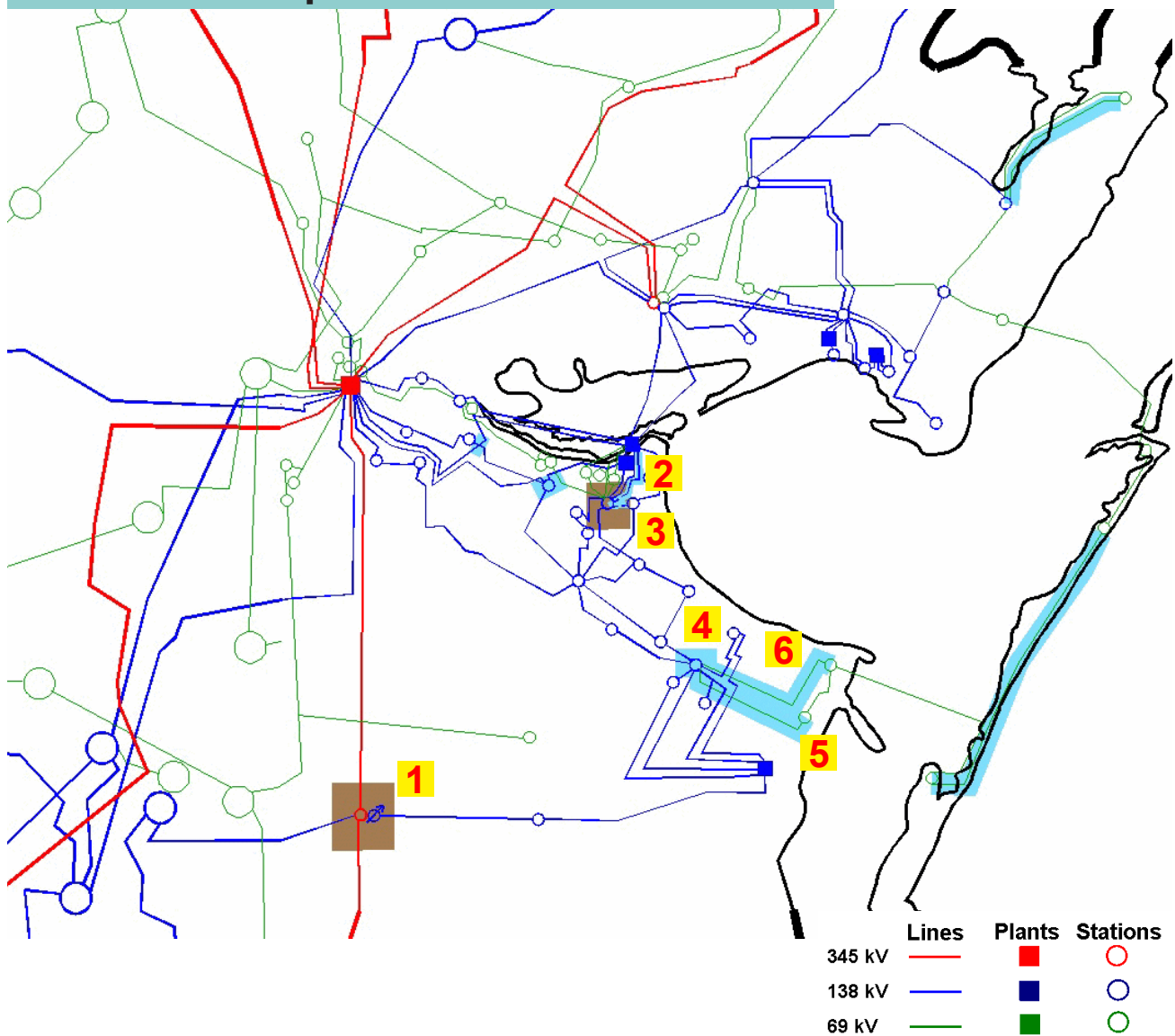


NORTH

While several of the projected constraints are alleviated after 2006, others in this area do not currently have planned solutions. The development of economic solutions to these remaining constraints is the objective of a major planning study that will be completed early next year.

Map Index	Projected Constraining Element	Voltage Level, kV	2006	2007	2008	2009	2010
1	Nacogdoches Autotransformer	345/138					
2	Elkton - Athens	138					
3	Elkton autotransformer	345/138					
4	Elkton - Tyler West	138					
5	Forrest Grove - Malakoff	138					
6	Big Brown - Jewett South	345					
7	Lake Creek - Temple	345					
8	Bosque Southwest - Lake Whitney	138					
9	Big Brown - Jewett North	345					
10	Wolf City - Commerce	138					
Color indicates relative magnitude and timing of constraints for area.							

Planned Improvements 2005-2015



CORPUS CHRISTI

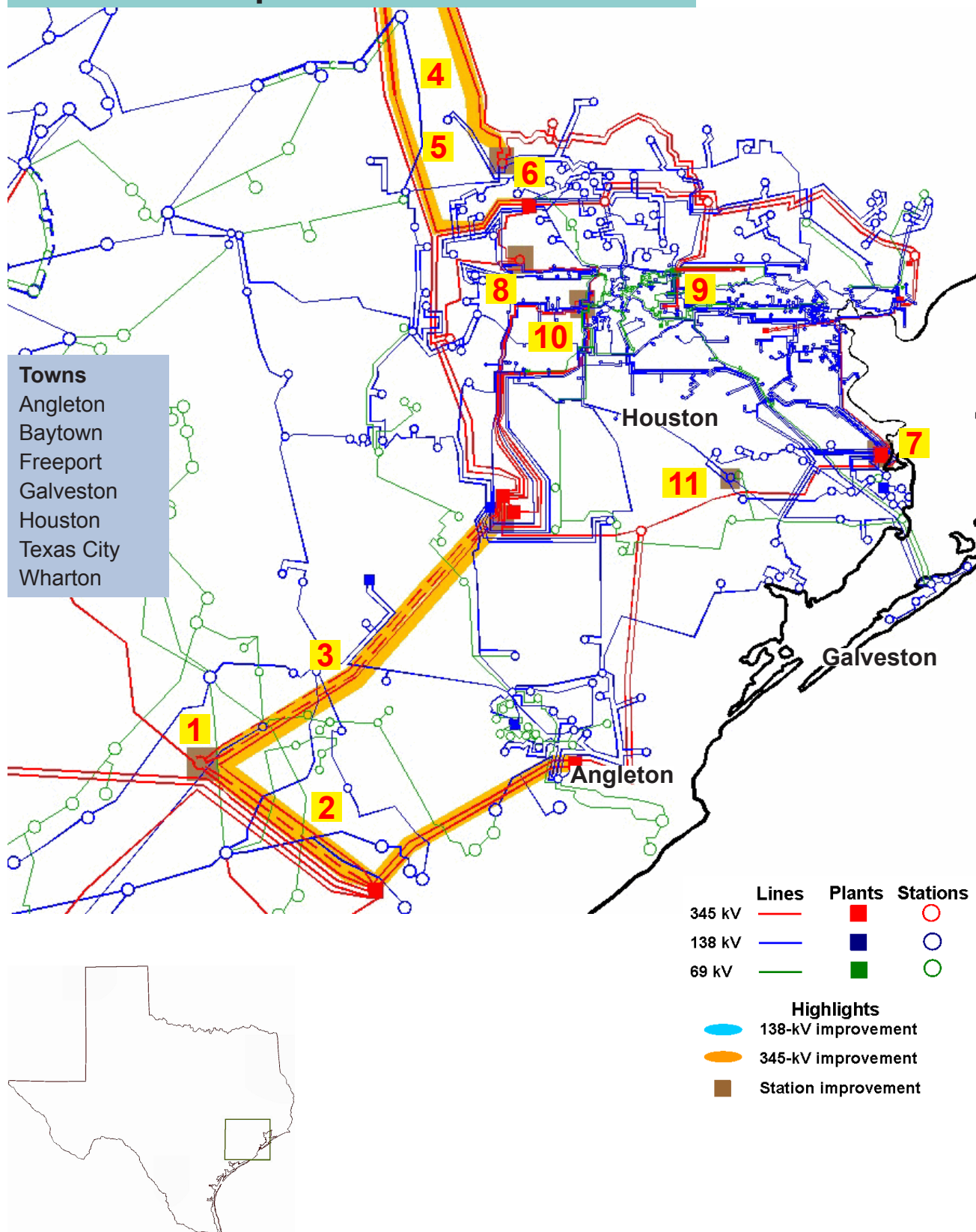
The second phase of additions, including the new 345/138-kV Nelson Sharpe station to serve the south Corpus Christi area, will be completed by the summer peak of 2006. These additions should eliminate the need for the RMR contract with the Barney Davis unit. The Nelson Sharpe station will be located approximately 10 miles south of the existing 345-kV Lon Hill substation on the Rio Hondo line and will alleviate long-term 138-kV constraints.

There are no additional elements in the Corpus Christi area that are expected to cause congestion for the projected period.

Map Index	Planned Element	Voltage Level, kV	In-Service Year	ERCOT Review
1	Nelson Sharpe Station	345/138	2006	✓
2	Nueces Bay Cut-in Hwy 9 - Morris	138	2006	✓
3	Weil Tract Station	138	2006	✓
4	Airline -40/+50 Static VAR Compensator	138	2006	✓
5	Airline - Naval Base	69	2006	
6	Airline - Laguna	69	2006	

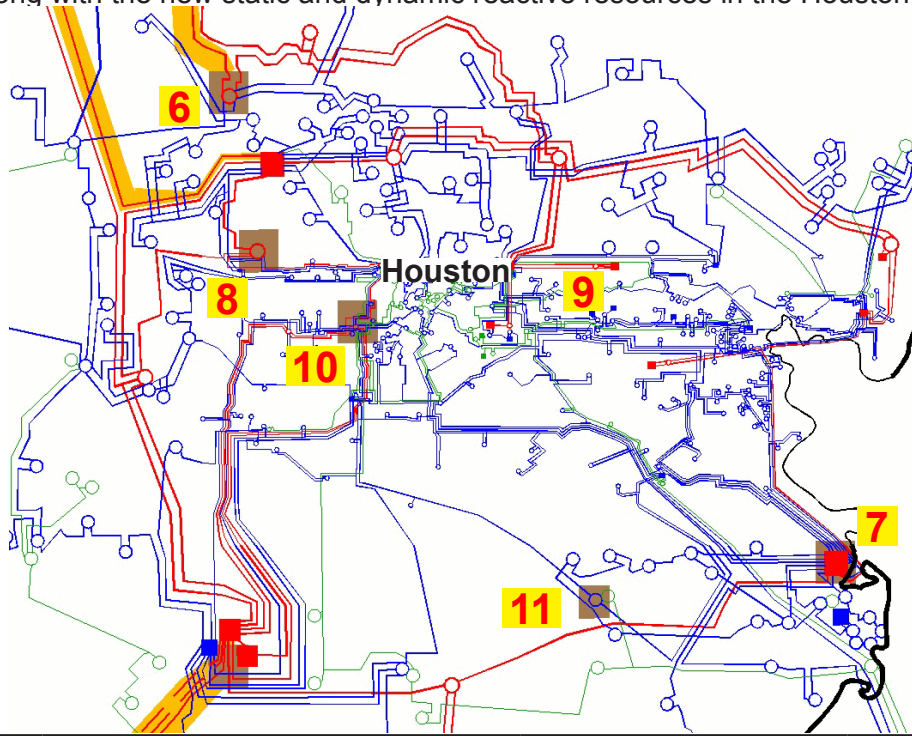
HOUSTON

Planned Improvements 2005-2015



HOUSTON

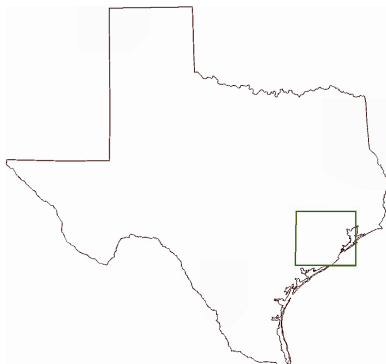
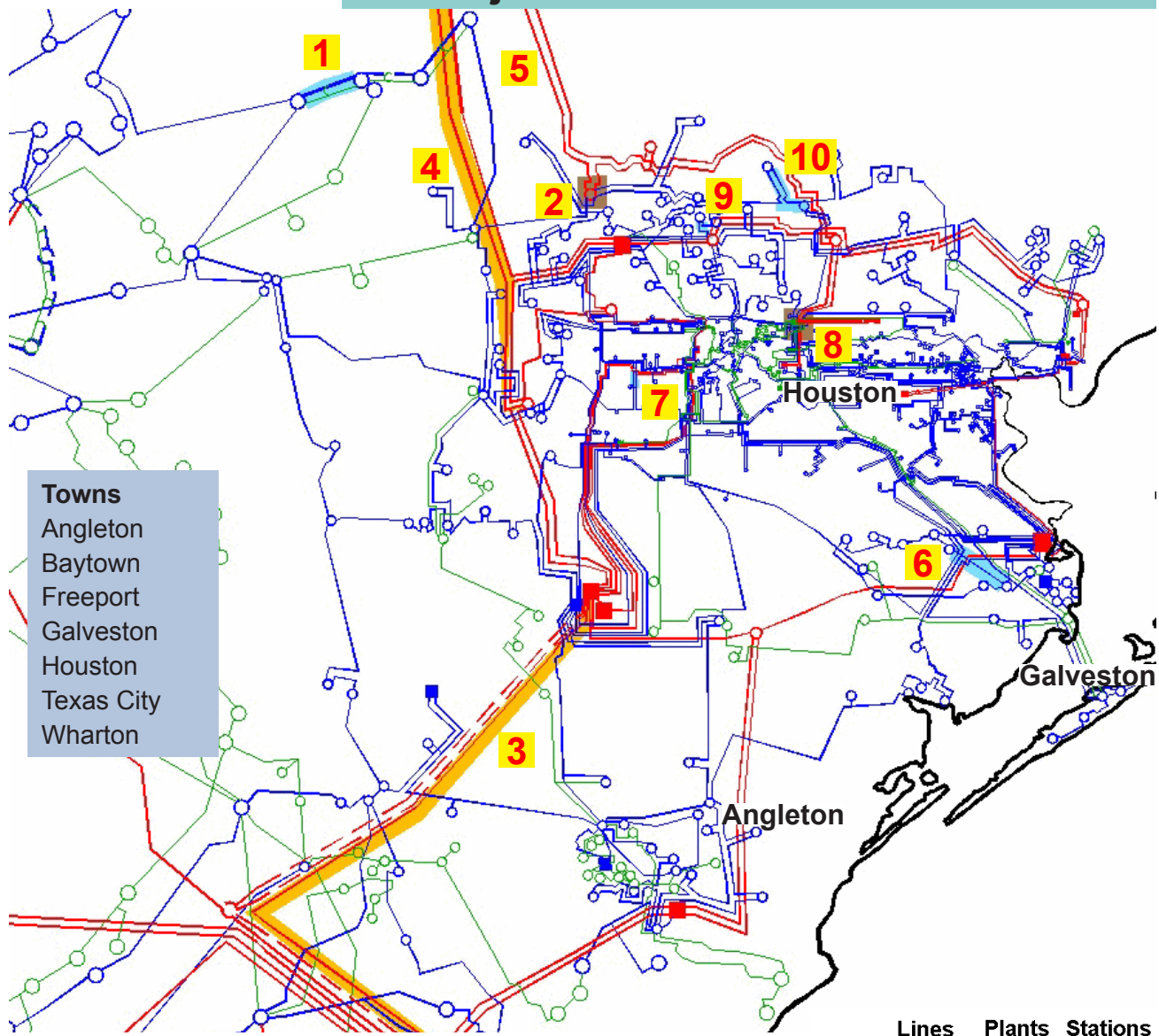
While the transmission upgrades have helped reduce congestion and improve reliability, imports into Houston are still constrained due to thermal and voltage stability limitations. Relatively low-cost, short-lead-time upgrades have largely been exhausted, and import limitations continue to pose significant economic and reliability concerns. The TSP submitted a proposal, the Houston Import Project, to address these import limitations. The proposal has been approved by the ERCOT board and has been given “critical” status. The major components of the proposed projects include a new 345-kV Hillje station looped into the existing STP to Holman 345-kV circuit, a new 345-kV double circuit from the new Hillje station to WAP, a new 345-kV circuit from the new Hillje station to STP, upgrade of the Tomball to Jewett 345-kV circuit, and an upgrade of the T. H. Wharton to Jewett 345-kV circuit. Upgrades of several underlying facilities in various parts of ERCOT will also be necessary, along with the new static and dynamic reactive resources in the Houston area.



Map Index	Planned Element	Voltage Level, kV	In-Service Year	ERCOT Review
1	Hillje Station	345	2007	✓
2	STP - Hillje	345	2007	✓
3	Hillje - WAP Double Circuit	345	2007	✓
4	Jewett - Tomball	345	2006	✓
5	Jewett - T.H. Wharton	345	2006	✓
6	Tomball Autotransformer Upgrade	345/138	2006	✓
7	P.H. Robinson Autotransformer	345/138	2006	
8	Addicks Autotransformer	345/138	2006	✓
9	Greens Bayou Autotransformer	345/138	2006	✓
10	Bellaire Autotransformer	345/138	2005	
11	Alvin Autotransformer	345/138	2007	

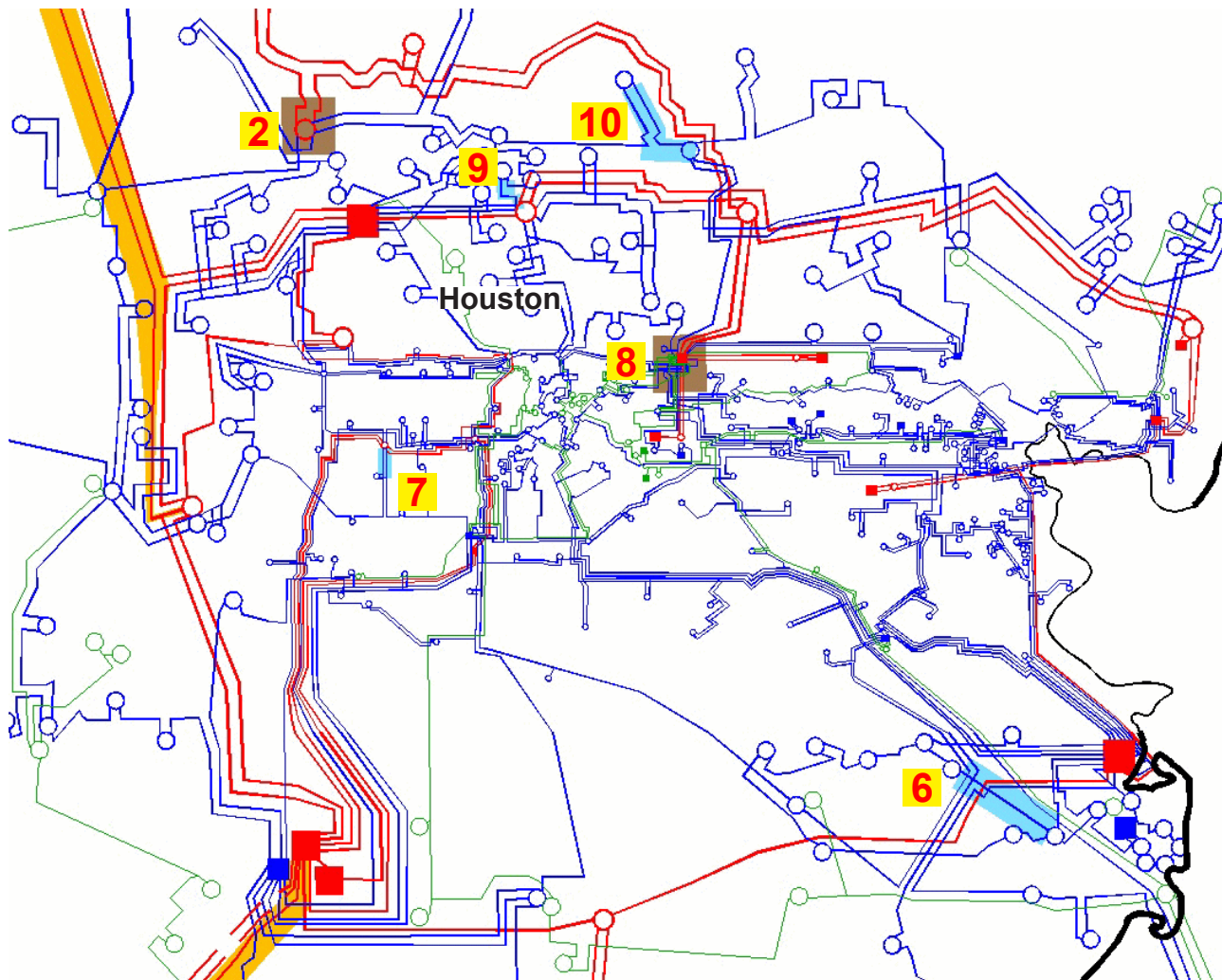
HOUSTON

Projected Constraints 2006-2010



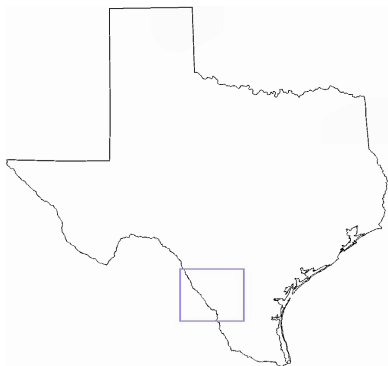
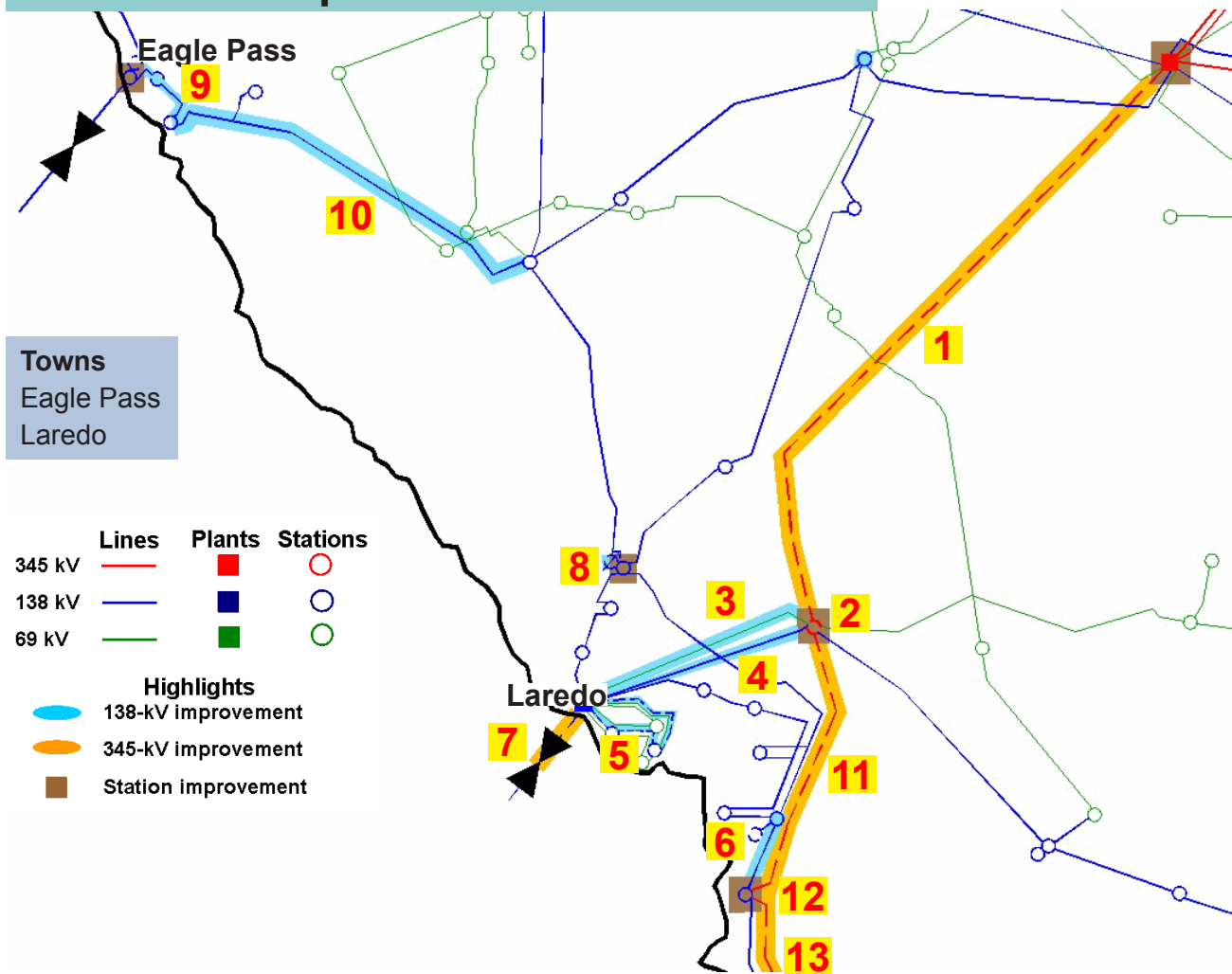
HOUSTON

The import into the Houston area is expected to be congested until the Houston Import Project is completed. However, as shown in the table, the most significant congestion in the Houston area is relieved as that project is implemented in 2007 and 2008. The remaining constraints will be addressed in the study to be completed in 2006.



Map Index	Projected Constraining Element	Voltage Level, kV	2006	2007	2008	2009	2010
1	Waller - Prairie View	138					
2	Tomball Autotransformer	345/138					
3	South Texas Project - W. A. Parish	345					
4	Gibbons Creek - Obrien	345					
5	Jewett North - Tomball	345					
6	Freeway Park - Dickinson	138					
7	Jeanetta - Westwood	138					
8	Greens Bayou Autotransformer	345/138					
9	Drilco - North Belt	138					
10	Humble - Treaschwig	138					
Color indicates relative magnitude and timing of constraint for area.							

Planned Improvements 2005-2015

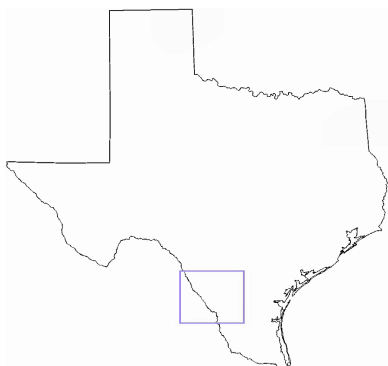
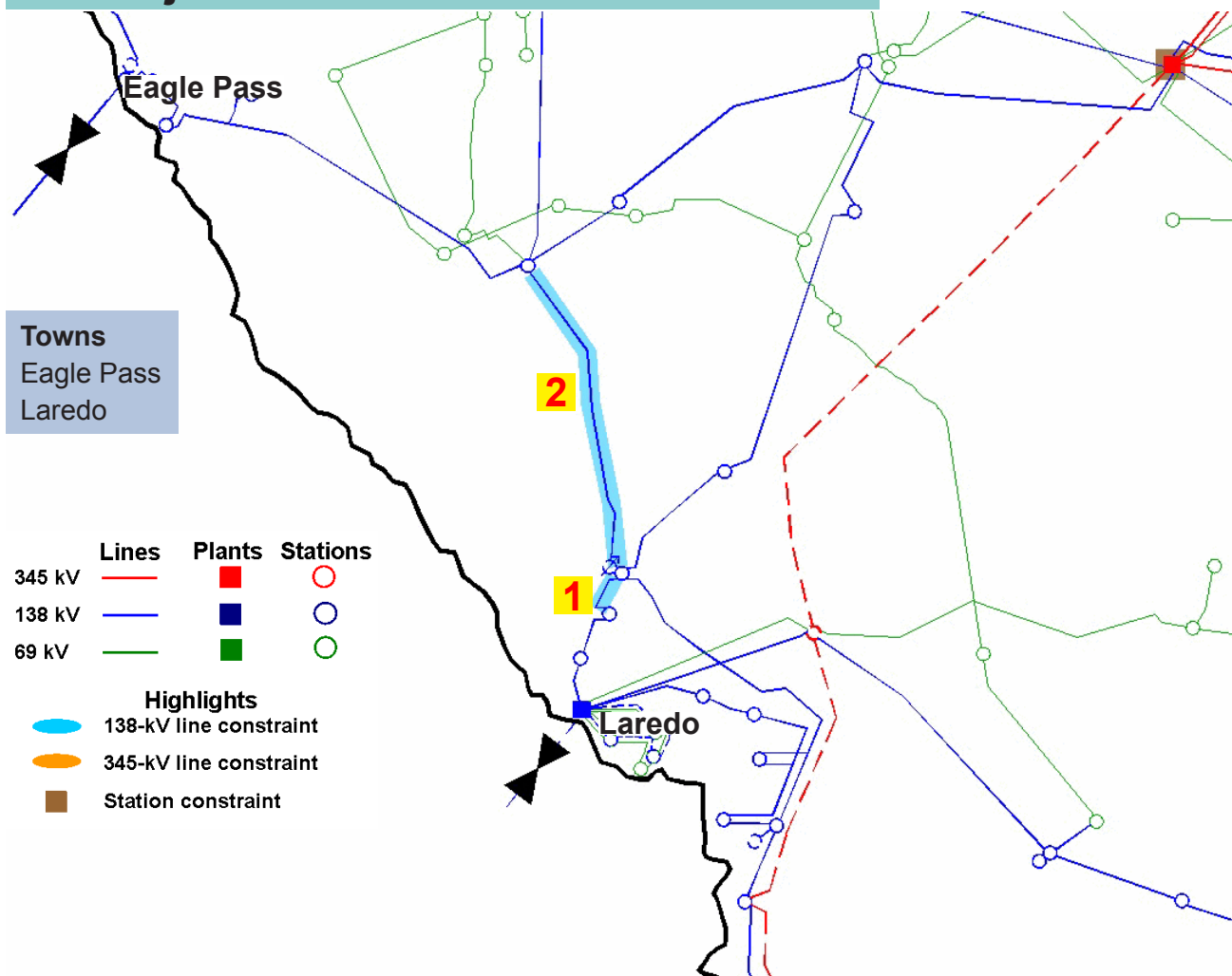


LAREDO

In March 2004 the ERCOT board endorsed a plan that provides for a back-to-back asynchronous interconnection (BtB tie) with the Mexican transmission system at Nuevo Laredo. This tie will secure the area to meet ERCOT Planning Criteria until a new 345-kV line can be constructed between the San Miguel plant and the local transmission system at Laredo. The BtB tie is to be in service by the summer peak of 2007, when the capacity of the Laredo plant is inadequate to maintain compliance with the reliability criteria. The 345-kV line (San Miguel to Laredo Lobo in discussion of the south area) is to be in service by the summer peak of 2011 in order to relieve the need for the Laredo plant RMR contract. The combined benefit of the Laredo 345-kv line and the BtB tie achieves compliance with reliability criteria. In addition to these transmission upgrades, many underlying improvements, including phase-shifting transformers at the North Laredo and Del Rio Hamilton Road stations, are necessary.

Map Index	Planned Element	Voltage Level, kV	In-Service Year	ERCOT Review
1	San Miguel - Laredo Lobo	345	2011	✓
2	Laredo Lobo Station	345/138	2011	✓
3	Laredo - Laredo Lobo 69 to 138	138	2009	✓
4	Laredo - Laredo Lobo	138	2009	✓
5	69 to 138 Conversion Projects	138	2006	✓
6	Rio Bravo - Wormser	138		
7	Laredo BtB CFE Tie	138	2007	✓
8	N. Laredo Phase-Shifting Transformer	138	2006	✓
9	Eagle Pass Escondido Station	138	2006	✓
10	Asherton-Eagle Pass	138	2005	✓
11	Laredo Lobo - Rio Bravo	345		
12	Rio Bravo Station	345/138		
13	Rio Bravo - Frontera	345		

Projected Constraints 2006-2010

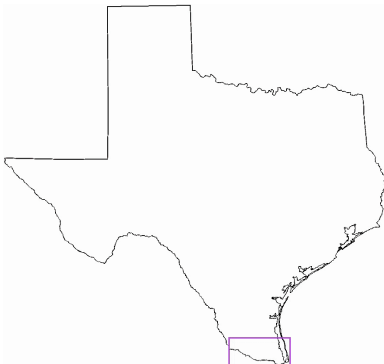
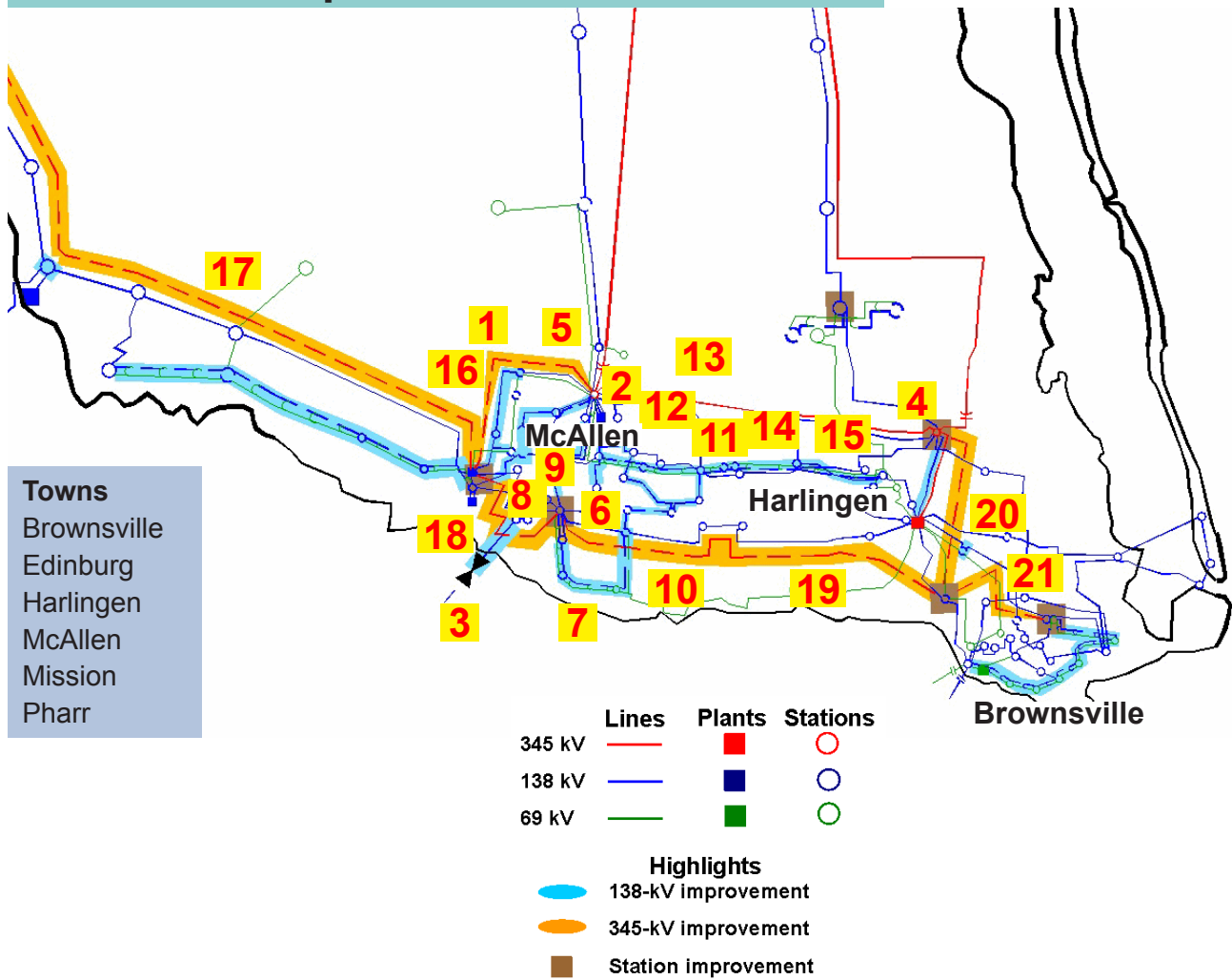


LAREDO

Congestion on the projected constraints in the Laredo area is the result of the need to run the Laredo RMR units to mitigate the constraints. The use of the RMR units is expected to be lower due to planned upgrades and is expected to be eliminated by 2010.

Map Index	Projected Constraining Element	Voltage Level, kV	2006	2007	2008	2009	2010
1	Mines Road - North Laredo	138					
2	Asherton - North Laredo	138					
Color indicates relative magnitude and timing of constraint in area.							

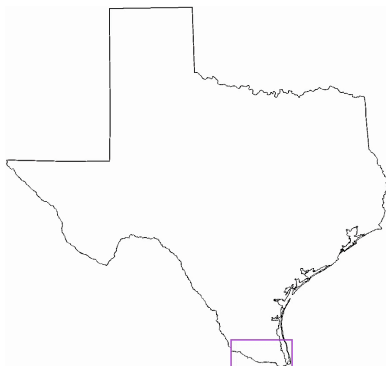
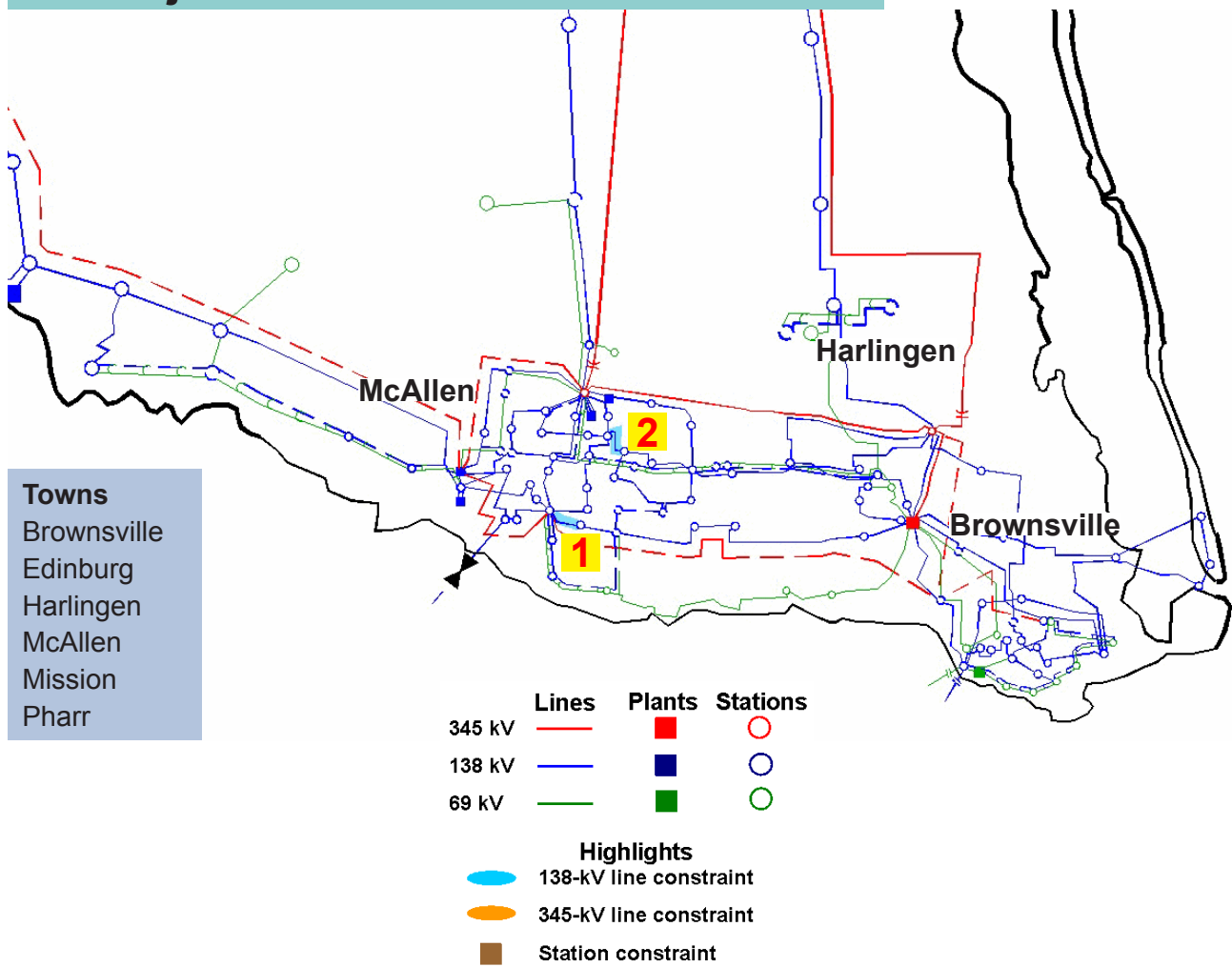
Planned Improvements 2005-2015



Additional planned upgrades that have not yet been completed are shown on the Planned Improvements 2005-2015 map. These upgrades of the underlying 138-kV system on both the east and west sides of the Valley will relieve local contingency overloads and eliminate the need for the Bates RMR units by early 2006 and the La Palma RMR units by summer peak of 2007.

Map Index	Planned Element	Voltage Level, kV	In-service Year	ERCOT Review
1	Key Station	138	2005	✓
2	Stewart Rd Station	138	2007	✓
3	Sharyland Tie	138	2007	✓
4	Rio Hondo Autotransformer	345/138	2006	✓
5	McColl Rd - N. McAllen	138	2005	✓
	N. McAllen - Alton	138	2005	✓
	N. McAllen - W. McAllen	138	2006	✓
6	W. McAllen - S. McAllen	138	2006	✓
	N. Pharr - Polk	138	2005	✓
7	N. Pharr - N. Alamo	138	2006	✓
	Pharr - Merett	138	2007	✓
8	S. McAllen - Hidalgo	138	2007	✓
9	Hi-line - Stewart Rd	138	2007	✓
10	Stewart Rd - Rio Rico	69	2007	✓
11	N. Mercedes - N. Weslaco	138	2007	✓
12	N. Weslaco - Weslaco	138	2006	✓
13	Weslaco - N. Alamo	138	2006	✓
14	Santa Rosa - N. Mercedes	138	2006	✓
15	Santa Rosa - Harlingen	138	2006	✓
	N. Edinburg - W Edinburg	138	2006	✓
	W. Edinburg - Alton	138	2006	✓
	W. Edinburg - Palmhurst	138	2006	✓
16	N. Edinburg - Frontera	345		
17	Rio Bravo - Frontera	345		
18	Frontera - S. McAllen	345		
19	S. McAllen - Ranchito	345		
20	Ranchito - Rio Hondo	345		
21	Loma Alto - Ranchito	345		

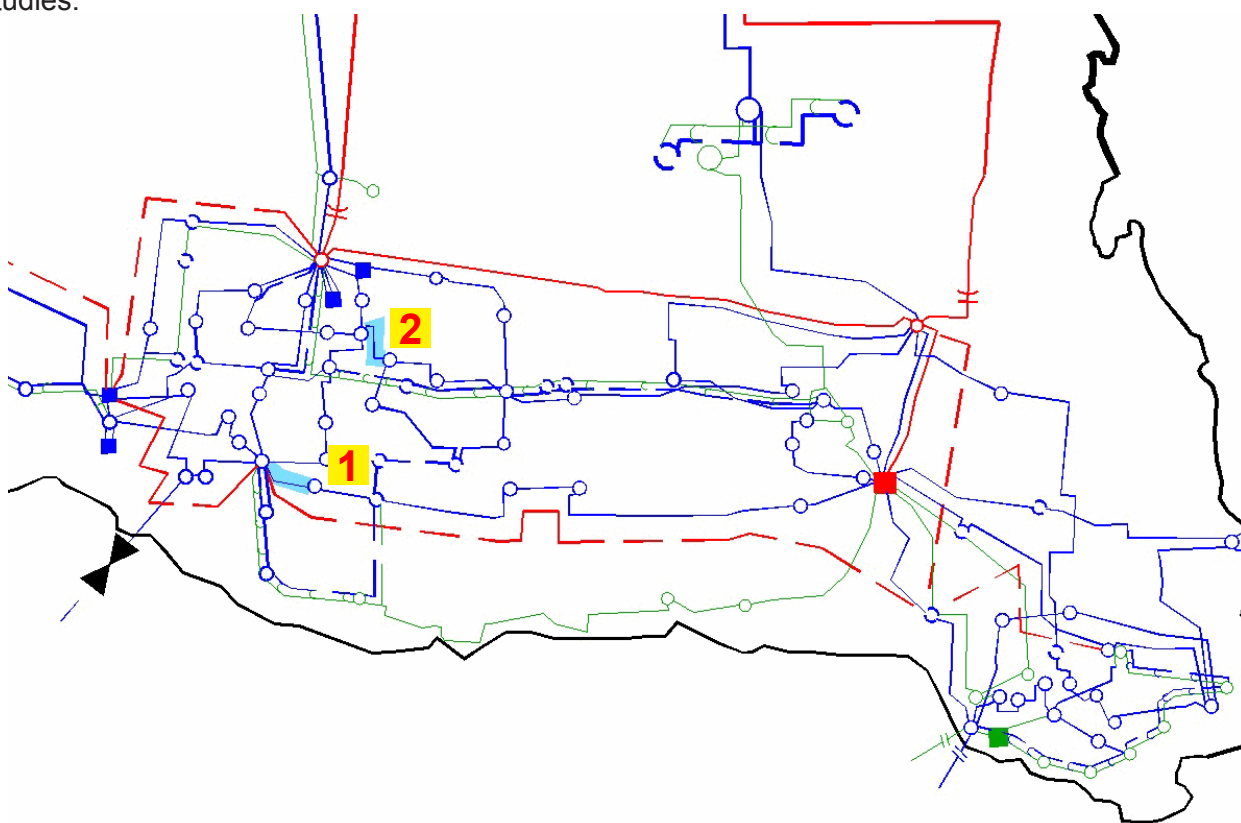
Projected Constraints 2006-2010



VALLEY

The map shows the location of the elements which are expected to cause some level of congestion cost during the next five years. But as shown in the table, the remaining congested elements are alleviated by the end of the planning period.

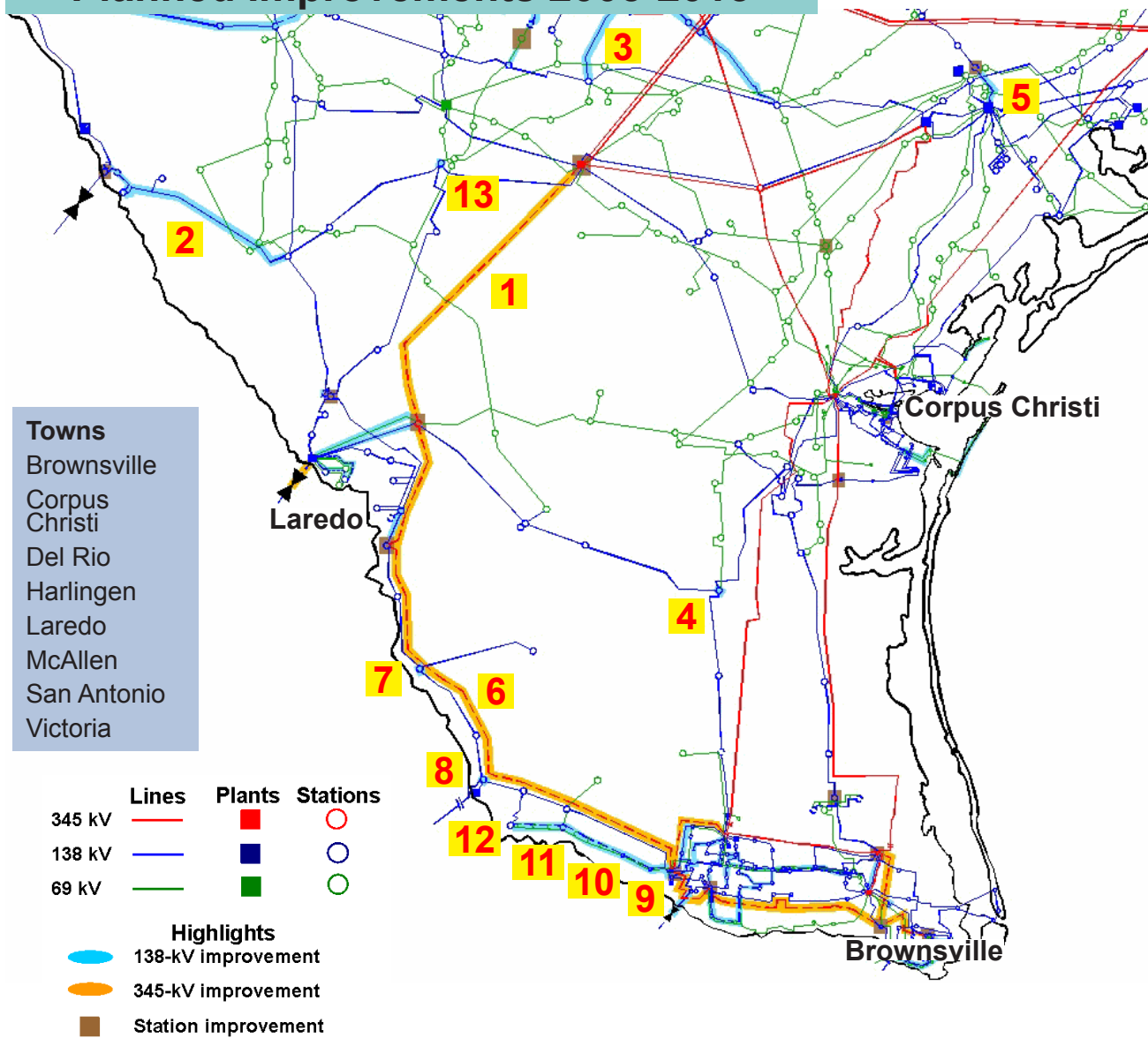
Generation levels in the Valley are currently believed to be adequate through 2010; however, long-term requirements are still under consideration. Constraints due to aggressive load growth will impact not only the local need to transport power within the Valley, but also the need to import bulk power to the Valley if additional generation is not built in the Valley area. Because of the availability of generation in the San Antonio area and the need to improve reliability and security to Laredo, the ERCOT board endorsed extension of the 345-kV system south from the San Antonio area (San Miguel plant) to Laredo. This extension could serve as the first part of a 345-kV line that could ultimately terminate on the west side of the Valley and provide a third 345-kV path into the Valley. In order to transport power delivered by this third 345-kV line, a 345-kV loop from North Edinburg to Frontera and then to La Palma will be necessary. This loop would effectively tie the South McAllen and the Brownsville areas together and provide a 345-kV line paralleling the U.S. and Mexico border and provide long-term transmission capacity to serve expected load growth. The 345-kV extension would also open opportunities for transactions with Mexico that could reduce energy costs in both countries. These additional 345-kV transmission facilities will be considered in future studies.



Map Index	Projected Constraining Element	Voltage Level, kV	2006	2007	2008	2009	2010
1	South McAllen - Las Milpas	138					
2	Alberta - Pharr	138					

Color indicates relative magnitude and timing of constraint for area.

Planned Improvements 2005-2015



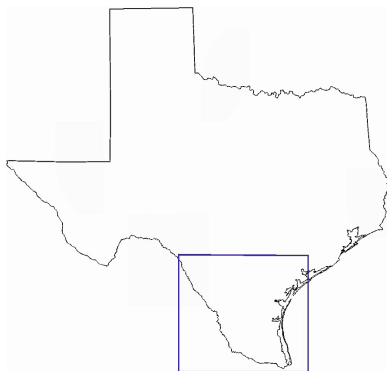
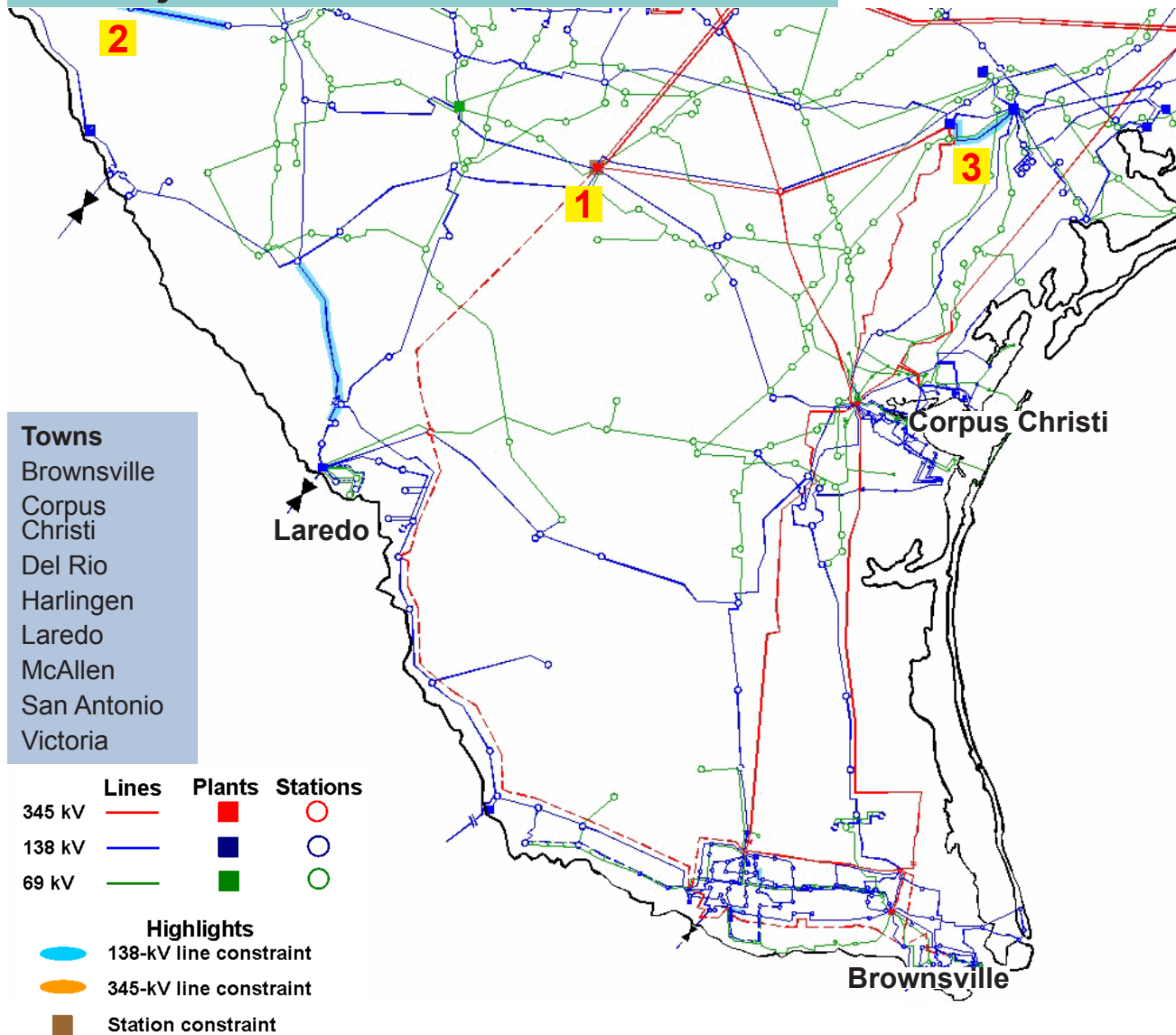
SOUTH

The future 345-kV line from the San Miguel plant to Laredo will divert power flows to Laredo and bypass the Uvalde/Del Rio area; however, the loss of the new 345-kV circuit will still adversely impact this area. Several 138-kV line upgrades to prevent this adverse impact are underway, including Leon Creek to Pleasanton, Pearsall to Dilley, Uvalde to Castroville to Lytle, and Eagle Pass to Asherton.

A new 138-kV line is proposed from Cagnon to Castroville to Lytle, and a later project will extend this line from Castroville to Uvalde. The 138-kV line from Braunig to Kenedy, which has been partially rebuilt, will be completed in early 2006 and will provide a stronger 138-kV path south from San Antonio to the upper part of the south area.

Map Index	Planned Element	Voltage Level, kV	In-Service Year	ERCOT Review
1	San Miguel - Laredo Lobo	345	2011	✓
2	Asherton to Eagle Pass	138	2006	
	Asphalt Mines - Brackettville	138	2008	
	Uvalde - Castroville	138	2008	✓
3	Leon Creek - Pleasanton	138	2005	✓
4	Falfurrias Dynamic Reactive Control System	138	2006	✓
5	Victoria - Magruder	138	2007	
6	Rio Bravo - Frontera	345	2011	
	Lytle - Lytle	138	2008	
7	Zapata Dynamic Reactive Control System	138	2006	✓
8	Falcon Station	138	2005	✓
9	Frontera - Goodwin	138	2006	✓
10	Goodwin - LaGrulla	138	2006	✓
11	LaGrulla - Rio Grande City	138	2005	✓
12	Rio Grande - Roma	138	2005	✓
13	Dilley -40/+50 Static VAR Compensator	138	2006	✓

Projected Constraints 2006-2010

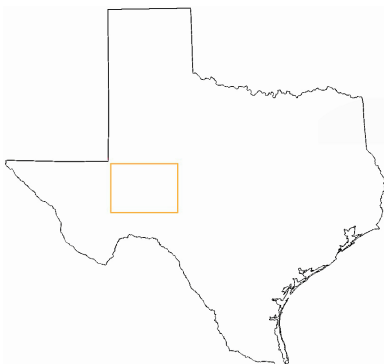
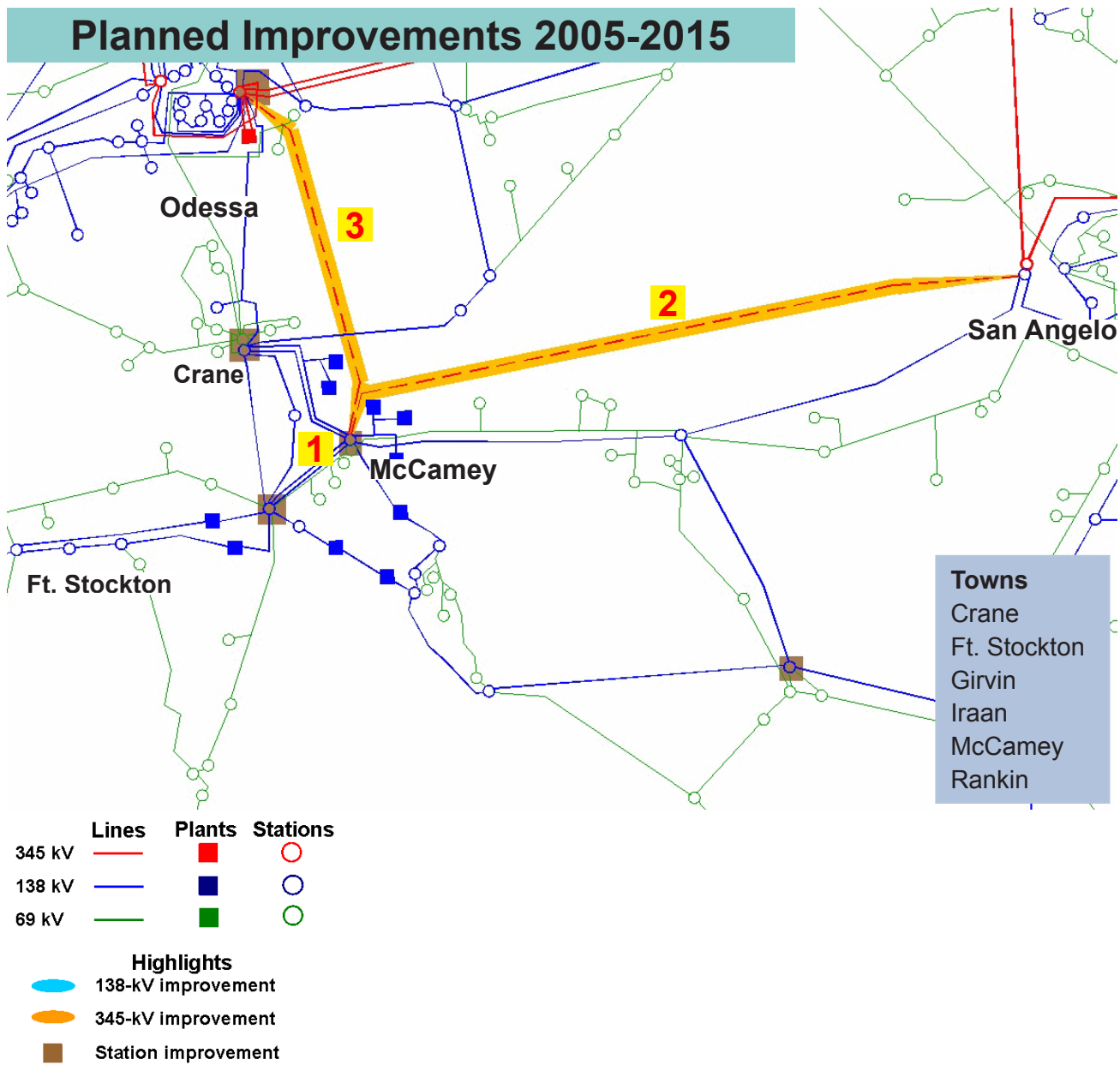


SOUTH

Some congestion is expected in this area as new facilities are completed, but this congestion is expected to be mitigated by the planned improvements, as shown on the table.

Map Index	Projected Constraining Element	Voltage Level, kV	2006	2007	2008	2009	2010
1	San Miguel Autotransformer	345/138					
	Brackettville - Hamilton	138					
2	Asphalt - Brackettville	138					
3	Coleto Creek - Victoria	138					
Color indicates relative magnitude and timing of constraint for area.							

Planned Improvements 2005-2015



In May 2003 the ERCOT Board of Directors approved two 345-kV transmission projects to be built when the completed generation interconnection agreements in the McCamey area totals 1,500 MW and 2,000 MW (discussed in the west section).

On January 26, 2005, the West Regional Planning Group met to discuss the McCamey area and possible 345-kV additions to improve the service. ERCOT studies indicate that 755 MW of installed wind generation capability can be exported from the McCamey area without additional transmission system upgrades. This includes the application of additional reactive resources along with application of temperature-adjusted line ratings (dynamic ratings). Installation of the static and dynamic reactive resources to adequately control voltage is proceeding.

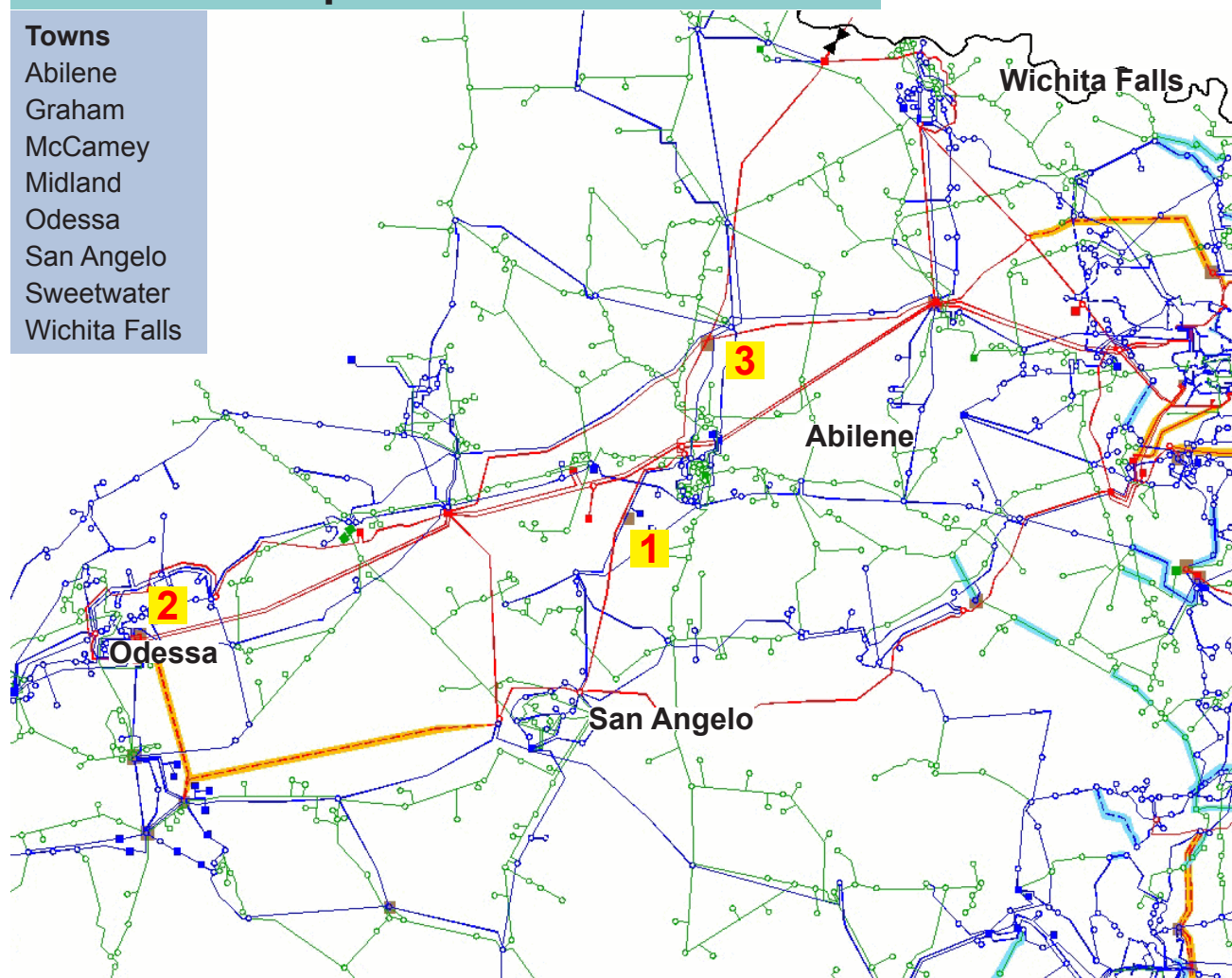
ERCOT will continue to review the need for 345-kV lines and other alternatives for the McCamey area as additional generators request interconnection.

Map Index	Planned Element	Voltage Level, kV	In-Service Year	ERCOT Review
	Crane Dynamic Reactive Support Device	69	2005	✓
	Rio Pecos Dynamic Reactive Support Device	69	2005	✓
	Friend Ranch Dynamic Reactive Support Device	69	2005	✓
	Crane Dynamic Reactive Support Device Upgrade	69	2006	✓
1	North McCamey Autotransformers	345/138		✓
2	North McCamey - Twin Buttes	345		✓
3	North McCamey - Odessa	345		✓
	Friend Ranch Capacitor		2005	
	Crane Capacitor		2005	
	Sonora Capacitor		2005	
	McElroy Capacitor		2005	
	Cienaga Capacitor		2006	

Planned Improvements 2005-2015

Towns

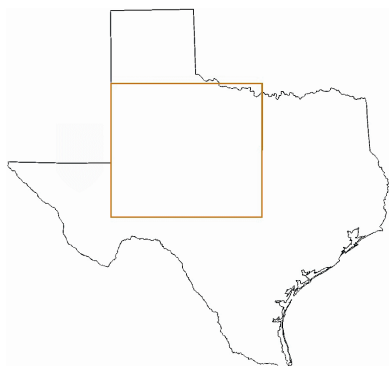
Abilene
Graham
McCamey
Midland
Odessa
San Angelo
Sweetwater
Wichita Falls



Lines	Plants	Stations
345 kV	■	○
138 kV	■	○
69 kV	■	○

Highlights

- 138-kV improvement
- 345-kV improvement
- Station improvement

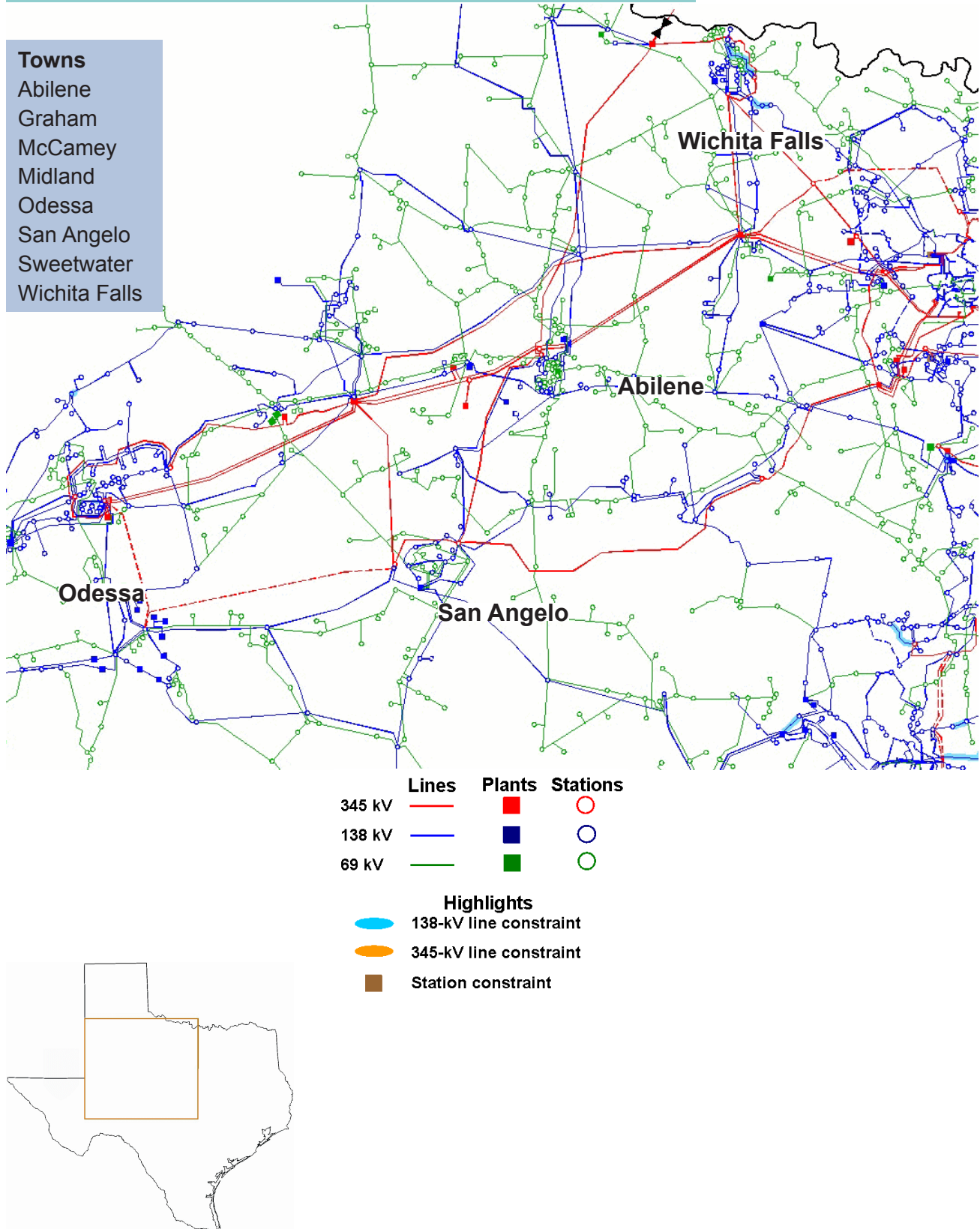


WEST

The most significant planned transmission improvements in the west area are two additional 345-kV lines that, according to the direction of the ERCOT Board of Directors, would be built from McCamey to Twin Buttes when the sum of generation interconnection agreements in the McCamey area reaches 1,500 MW and from McCamey to Odessa when the sum of generation interconnection agreements in the McCamey area reaches 2,000 MW. However, no new generation interconnection agreements have been signed in the McCamey area in the past two years. Additional planned transmission projects include Bluff Creek station near Abilene.

Map Index	Planned Element	Voltage Level, kV	In-Service Year	ERCOT Review
1	Bluff Creek Station and Autotransformers	345/138	2006	✓
2	Odessa Autotransformer Replacement	345/138	2006	
3	Bill Station	345		
	Fort Phantom Capacitor	138	2005	✓
	Putnam Capacitor	138	2005	✓
	Northwest Abilene Capacitor	138	2005	✓
	Presidio Capacitor	69	2005	✓
	Fort Davis Capacitor	69	2005	✓

Projected Constraints 2006-2010

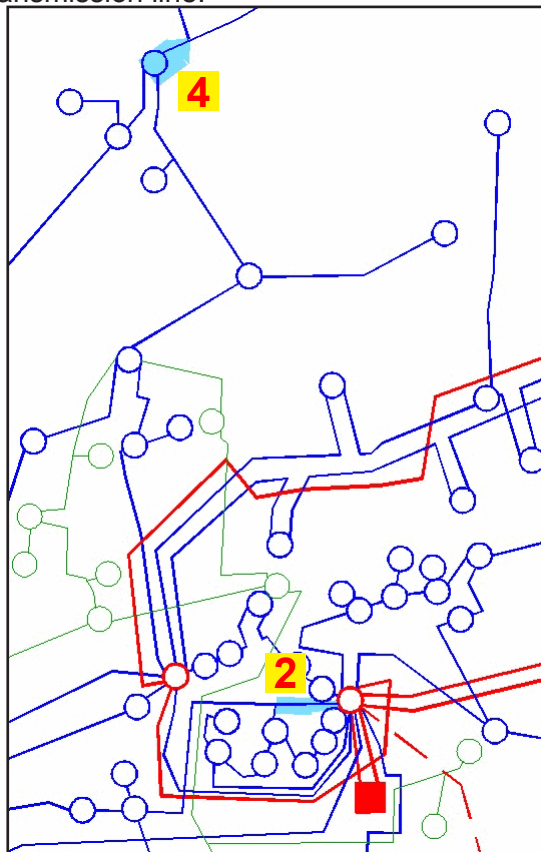


WEST

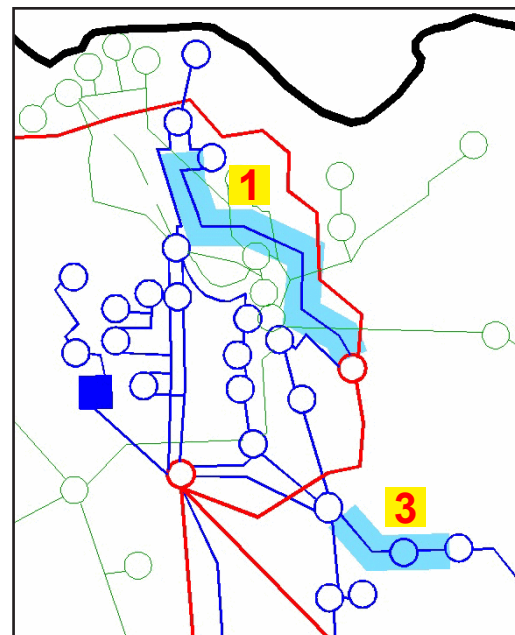
A few localized constraints are expected in the west area based on the level of generation modeled for this report. However, additional constraints are expected because additional wind-powered generation is anticipated to meet the expanded renewable portfolio standard of Senate Bill 20 (SB 20). These additional constraints will be evaluated and solutions developed as a part of the studies mandated by SB 20.

The other challenges to maintaining reliability in the west region are the west to north thermal and stability transfer limits and uncertainty about the competitive renewable energy zones that will be established.

Stability (transient and voltage) refers to the network's ability to return to normal operating limits even after there is a sudden change to the system, such as the outage of a generator or a transmission line.



Odessa



Wichita Falls

Map Index	Projected Constraining Element	Voltage Level, kV	2006	2007	2008	2009	2010
1	Pittsburg Plate Glass - Hemmerd	138					
1	Cityview - Pittsburg Plate Glass	138					
2	Odessa - Big Three Odessa	138					
3	South Wichita Falls - Arrowhead	138					
4	North Andrews - Exxon Means	138					
Color indicates relative magnitude and timing of constraint for area.							