



**Lower Rio Grande Valley Project -
Status Updates of ERCOT
Independent Review**

December 17, 2019 – RPG Meeting

Overview

- ❑ AEPSC submitted Lower Rio Grande Valley (LRGV) Import Project in January 2018 to address the Native Valley load growth beyond 2021 and the addition of potential LNG loads in Valley.
- ❑ STEC submitted LRGV Transmission Expansion Proposal Project in May 2019 to integrate potential 405 MW LNG load and the addition of potential 840 MW LNG loads in Valley.
- ❑ ERCOT combined the independent reviews for AEP and STEC Valley Import RPG projects to identify the need for serving Valley load growth and potential LNG load.

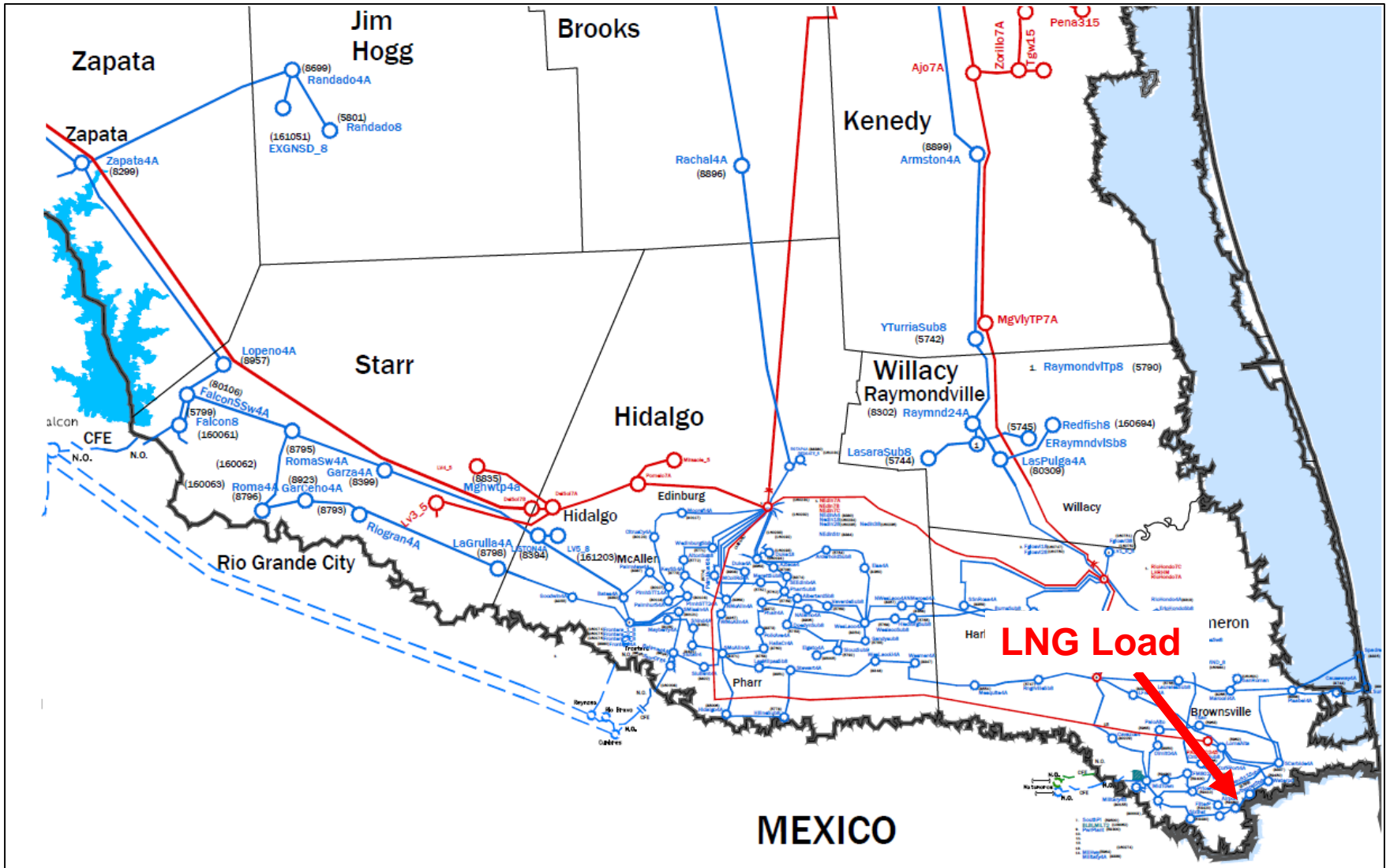
Overview

❑ ERCOT presented the following key items at the RPG meetings:

- Study scope and project need (July 16, 2019 RPG Meeting)
 - ✓ http://www.ercot.com/content/wcm/key_documents_lists/165294/Lower_Rio_Grande_Valley_Transmission_Expansion_-_July_16_RPG_Updated.pdf
- Five Valley upgrade options and two import options to address reliability issues with 405 MW LNG load (Sept. 18, 2019 RPG Meeting)
 - ✓ http://www.ercot.com/content/wcm/key_documents_lists/165302/Lower_Rio_Grande_Valley_Transmission_Expansion_-_Sep_18_RPG.pdf
- Two Valley upgrade options and three import options to address reliability issues with additional 840 MW LNG load as part of sensitivity analysis (Nov. 12, 2019 RPG Meeting)
 - ✓ http://www.ercot.com/content/wcm/key_documents_lists/165311/Lower_Rio_Grande_Valley_Transmission_Expansion_-_Nov_12_RPG.pdf

❑ ERCOT will present preferred upgrades for the Valley load growth and potential LNG load addition.

Location of Potential LNG Load in Valley



Key Findings

- ❑ The existing Valley transmission system is sufficient to reliably serve the forecasted year 2026 Valley load.
 - ERCOT identified a new Delsol – Frontera 345-kV line as a placeholder to address reliability needs if Valley load exceeds the forecasted year 2026 Valley load.

- ❑ To integrate potential 405 MW LNG, transmission upgrades listed below are identified to address both dynamic and steady-state reliability issues at the forecasted year 2024 Valley load (3,005 MW).
 - One new Valley Import EHV line will be required.
 - Upgrades inside the Valley will be required.
 - The need of the identified new Delsol-Frontera 345-kV line will be accelerated.

- ❑ To integrate additional 840 MW LNG (total 1,245 MW LNG)
 - Additional upgrades outside the Valley will be required.
 - New 345-kV lines inside the Valley will be required.

Comparison of Short-Listed Upgrade Options Inside Valley (405 MW LNG)

- ❑ ERCOT selected Options 3, 4, and 5 as short-listed options. Options 1 and 2 (138-kV options) were not selected because they do not address dynamic stability issues and do not provide operational flexibility.
- ❑ Maps of upgrade options are available in the appendix.

Inside Valley Upgrade for 405 MW LNG	Overloads under N-1-1 (Planned Maintenance Outage)	Cost Estimates (\$ Million)*	Estimated Mileage Of 345-kV New Right of Way
Option 3	18 miles**	\$ 203.5	24 miles
Option 4	15 miles***	\$ 220.3	30 miles
Option 5	None	\$ 268.2	47 miles

* These cost estimates were provided by TSPs. The cost of a new DelSol-Frontera 345-kV line is not included.

** Weslacou–Stewart 138-kV line – 15 miles, Harlin Gen–Oleander 138-kV line – 3 miles

*** Weslacou–Stewart 138-kV line – 15 miles

Comparison of Options Inside Valley for 1,245 MW LNG (Sensitivity)

- ❑ Two upgrade options inside Valley were identified to serve a total of 1,245 MW LNG load.
- ❑ Maps of upgrade options are available in the appendix.

Inside Valley Upgrade for Total 1245 MW LNG	Overloads under N-1-1 (Planned Maintenance Outage)	Cost Estimates (\$ Million)*	Estimated Mileage Of 345-kV New Right of Way
Option A	25 miles**	\$ 456.1	53 miles
Option B	None	\$ 472.6	79 miles

* These cost estimates were provided by TSPs. The cost of a new DelSol-Frontera 345-kV line is not included.

** La Palma–Villa Cavazos 138-kV line – 12 miles, Villa Cavazos–Military Sub 138-kV Line – 10 miles
 Central Ave – Coffee Port 138-kV Line – 3 miles

Preferred Upgrade Options Inside Valley

- ❑ ERCOT considers **Option 5** as the preferred short-term option for the initial 405 MW LNG load addition.
 - Option 5 provides better operational flexibility and reduces the risk of shedding the area loads under planned maintenance outage conditions.
 - In addition, Option 5 is a subset of both Option A and Option B to serve further LNG addition.

- ❑ ERCOT considers **Option B** as the preferred long-term option for the total of 1,245 MW LNG load.
 - Option B provides better operational flexibility and reduces the risk of shedding the area loads under planned maintenance outage conditions.

Comparison of Import Options for 405 MW LNG

Import Option for 405 MW LNG	Improvement of Existing GTCs ##	Cost Estimates (\$ Million)*	Estimated Mileage Of 345-kV New Right of Way
Import Option 1 (Goddard-Ajo-Bonilla)	2 GTCs	\$ 724.5**	151 miles
Import Option 2 (San Miguel-Bonilla)	1 GTC	\$ 662.9#	207 miles
Import Option 3 (San Miguel-Ajo-Bonilla)	2 GTCs	\$ 681.4#	210 miles

* The cost of a new DelSol - Frontera 345-kV line is not included in the cost estimates.

** The cost estimates were based on per-mile cost provided by AEP.

The cost estimates were based on average per-mile cost provided by AEP and STEC.

The import option 1 and 3 are expected to improve the stability constraints in both Rio Grande Valley Import and Nelson Sharpe-Rio Hondo GTC, while the import option 2 is expected to improve the stability constraint in Rio Grande Valley import, but not the Nelson Sharpe-Rio Hondo GTC..

☐ Maps of upgrade options are available in the appendix.

Comparison of Import Options for 1,245 MW LNG

Import Option for 1,245 MW LNG	Cost Estimates (\$ Million)*	Estimated Mileage Of 345-kV New Right of Way
Import Option 1 (Goddard-Ajo-Bonilla) + Additional Upgrades Outside Valley #	\$ 906.7**	151 miles
Import Option 3 (San Miguel-Ajo-Bonilla) + Additional Upgrades Outside Valley ##	\$ 720.0***	210 miles

* The cost of a new DelSol-Frontera 345-kV line is not included in the cost estimates.

** The cost estimates were based on per-mile cost provided by AEP.

*** The cost estimates were based on average per-mile cost provided by AEP and STEC.

Additional upgrades include 46 miles of 345-kV line and 49 miles of 138-kV lines.

Additional upgrades include 18 miles of 138-kV line and 25 miles of 69-kV lines.

- The import Option 2 (San Miguel-Bonilla) was not selected due to limited improvement to the existing GTCs in Valley.
- Maps of upgrade options are available in the appendix.

Economic Analysis

- ERCOT conducted economic analysis for the two selected import options (Import Option 1 and Import Option 3) combined with Valley Upgrade Options 5 for the potential 405 MW LNG load

Annual Production Cost Difference (\$M)		
Import Options + Valley Upgrade Option	Import Option 1 + Option 5	Import Option 3 + Option 5
Production Cost Savings (\$M)	Reference	3.81*

*Reference – (Import Option 3 + Option 5)

Preferred Valley Import Options

- ❑ ERCOT considers **Import Option 3** as the preferred import option for the initial 405 MW LNG load.
 - ERCOT used the average per-mile costs provided by AEP and STEC to estimate the cost of Import Options 2 and 3.
 - Both Import Option 1 and Import Option 3 are expected to improve the existing stability constraints in both Rio Grande Valley Import and NelsonSharpe-Rio Hondo GTC.
 - The cost of Import Option 3 (\$ 681.4M) is less than the cost of Import Option 1 (\$ 724.5M).

- ❑ ERCOT considers **Import Option 3 + Additional Upgrades** as the preferred long-term option for the 1,245 MW LNG load addition as it is still the least cost option compared to Import Option 1 + Additional Upgrades.

Generation Sensitivity Analysis per Planning Guide Section 3.1.3(4)(a)

- ❑ ERCOT will conduct generation sensitivity analysis when the LNG loads are confirmed.

Load Scaling Sensitivity Analysis per Planning Guide Section 3.1.3(4)(b)

- ❑ ERCOT also reviewed the impact of load scaling on the reliability need driven by the LNG load addition in the Brownsville area.
- ❑ Since the reliability needs are primarily driven by the LNG load addition in the Brownsville area and the Valley area is in a remote location in ERCOT system, ERCOT concluded that the load scaling methodology would not provide any significant impact on the reliability needs.

Subsynchronous Resonance (SSR) Vulnerability Assessment

- ❑ ERCOT will conduct SSR vulnerability assessment when the LNG loads are confirmed.

Conclusion

- ❑ Currently, there is no confirmed LNG load in the Valley area. In accordance with Protocol Section 3.11.4.9(3), ERCOT will not issue the independent review recommending a project to meet needs identified for the LNG load until a customer meets the agreement, notice to proceed and financial security requirements.

- ❑ Without potential LNG addition, ERCOT identified the reliability need for the forecasted Valley load beyond year 2026. A new Delsol–Frontera 345-kV line is identified as a placeholder to improve the Valley load serving capability. This new line is expected to provide benefits to the Valley area:
 - improve the existing NorthEd_Lobo GTC, and
 - mitigate the SSCI challenges for the renewable projects connected to the Lobo-North Edinburg 345-kV series compensated line.

- ❑ Option 5 and Import Option 3 are the preferred upgrades to meet the reliability need if the potential 405 MW LNG load is confirmed.

- ❑ Option B and Import Option 3 + Additional Upgrades are the preferred upgrades to meet the reliability need if additional 840 MW LNG Loads (total 1,245 MW) are confirmed.

Conclusion

Total LNG Load Level In Valley	Transmission Upgrades Needed	Cost Estimates (\$M)	Expected Need Year
0 MW	A new Delsol-Frontera 345-kV line	\$ 142.6M	2027
405 MW	A new Delsol-Frontera 345-kV line	\$ 142.6M	Before 405 MW LNG load In-service
	Option 5 Inside Valley	\$ 268.2M	
	Import Option 3	\$ 681.4M	
1,245 MW	A new Delsol-Frontera 345-kV line	\$ 142.6M	Before 1,245 MW LNG load In-service
	Option B Inside Valley	\$ 472.6M	
	Import Option 3 + Additional Upgrades	\$ 720.0M	

Conclusion (Details of Preferred Options)

- ❑ A new Delsol-Frontera 345-kV line (\$142.6M)

- ❑ Option 5 for 405 MW LNG (\$ 268.2M)
 - A new single circuit 345-kV line from Bonilla to Palmito
 - Upgrade the existing 138-kV line from La Palma to Los Fresnos
 - Upgrade the existing 138-kV line from Los Fresnos to Stillman
 - Upgrade the existing 138-kV line from Stillman to Waterprt
 - Upgrade the existing 138-kV line from Stillman to South Carbide
 - Upgrade the existing 138-kV line from South Carbide to Portsouth

- ❑ Option B for 1245 MW LNG (\$ 472.6M)
 - Valley upgrade Option 5
 - A new 345-kV substation at South Carbide
 - Add two 345/138-kV T1 and T2 at South Carbide
 - A new single circuit 345-kV line from Palmito to South Carbide
 - A new single circuit 345-kV line from Rio Hondo to South Carbide
 - Upgrade the existing 138-kV double circuit line from Palmito to Stillman
 - Upgrade the existing 345/138-kV T1 and T2 at Palmito

Conclusion (Details of Preferred Options)

- ❑ Import Option 3 for 405 MW LNG (\$ 681.4M)
 - A new double circuit 345-kV line from San Miguel to Ajo to Bonilla to San Miguel to Bonilla

- ❑ Import Option 3 + Additional Upgrades for 1,245 MW LNG (\$ 720.0M)
 - A new double circuit 345-kV line from San Miguel to Ajo to Bonilla to San Miguel to Bonilla
 - Upgrade the existing 138-kV line from Bessel to Lon Hill
 - Upgrade the existing 69-kV line from Alice to North Ella
 - Upgrade the existing 69-kV line from North Ella to Premont

Next Step

❑ Tentative Schedule

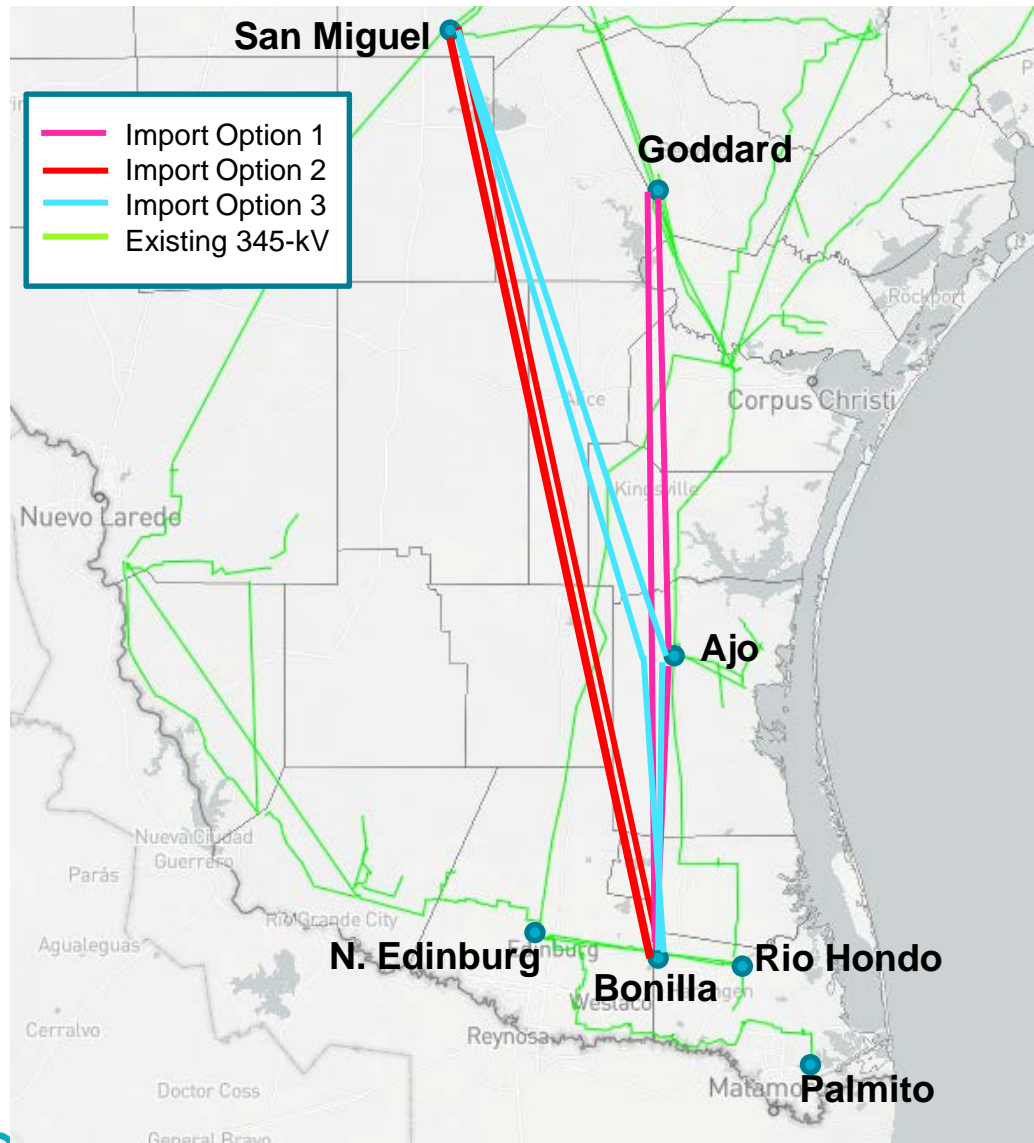
- ERCOT will further evaluate the reliability needs for the native Valley load growth.



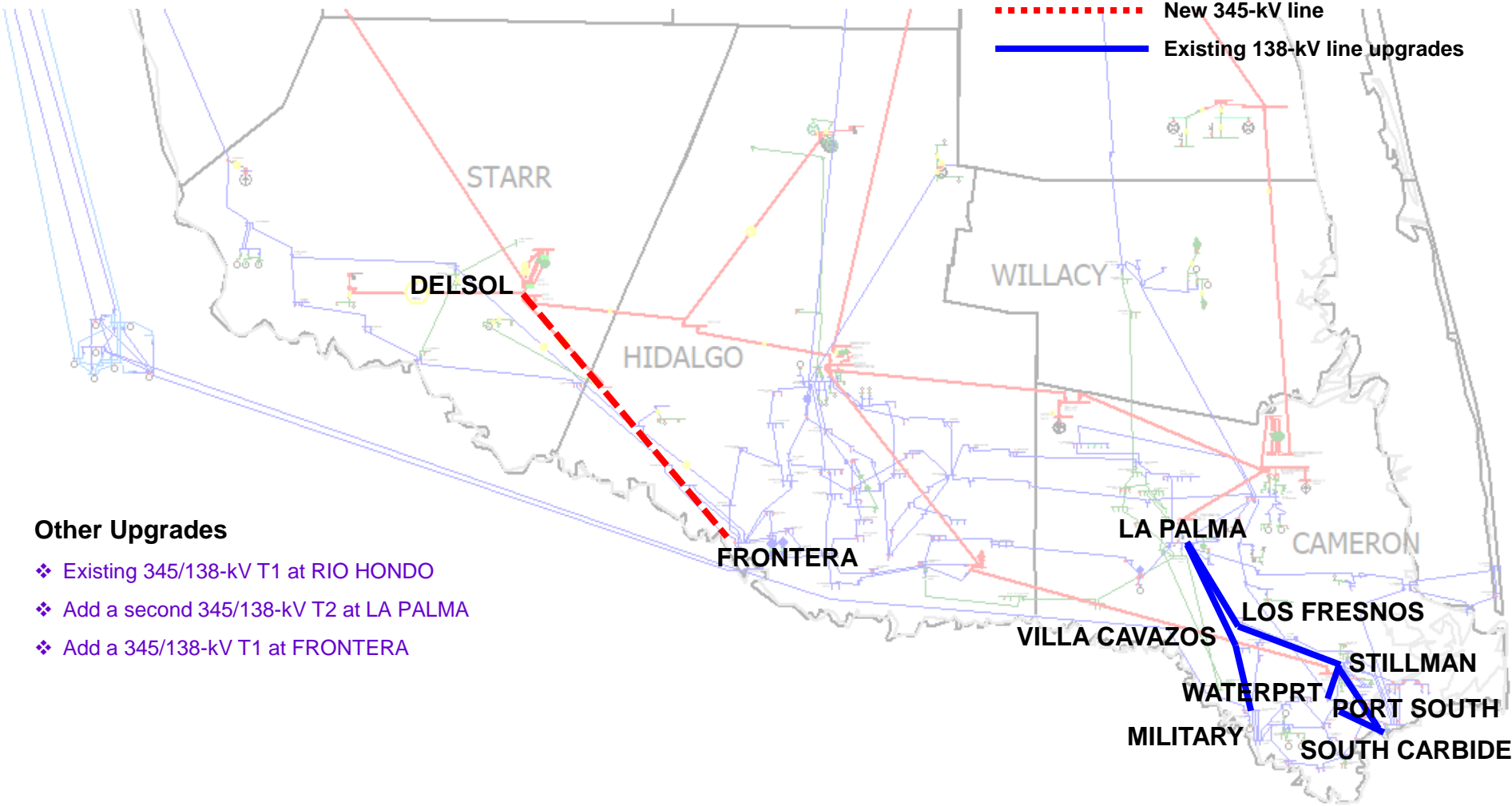
Stakeholder Comments Also Welcomed Through:

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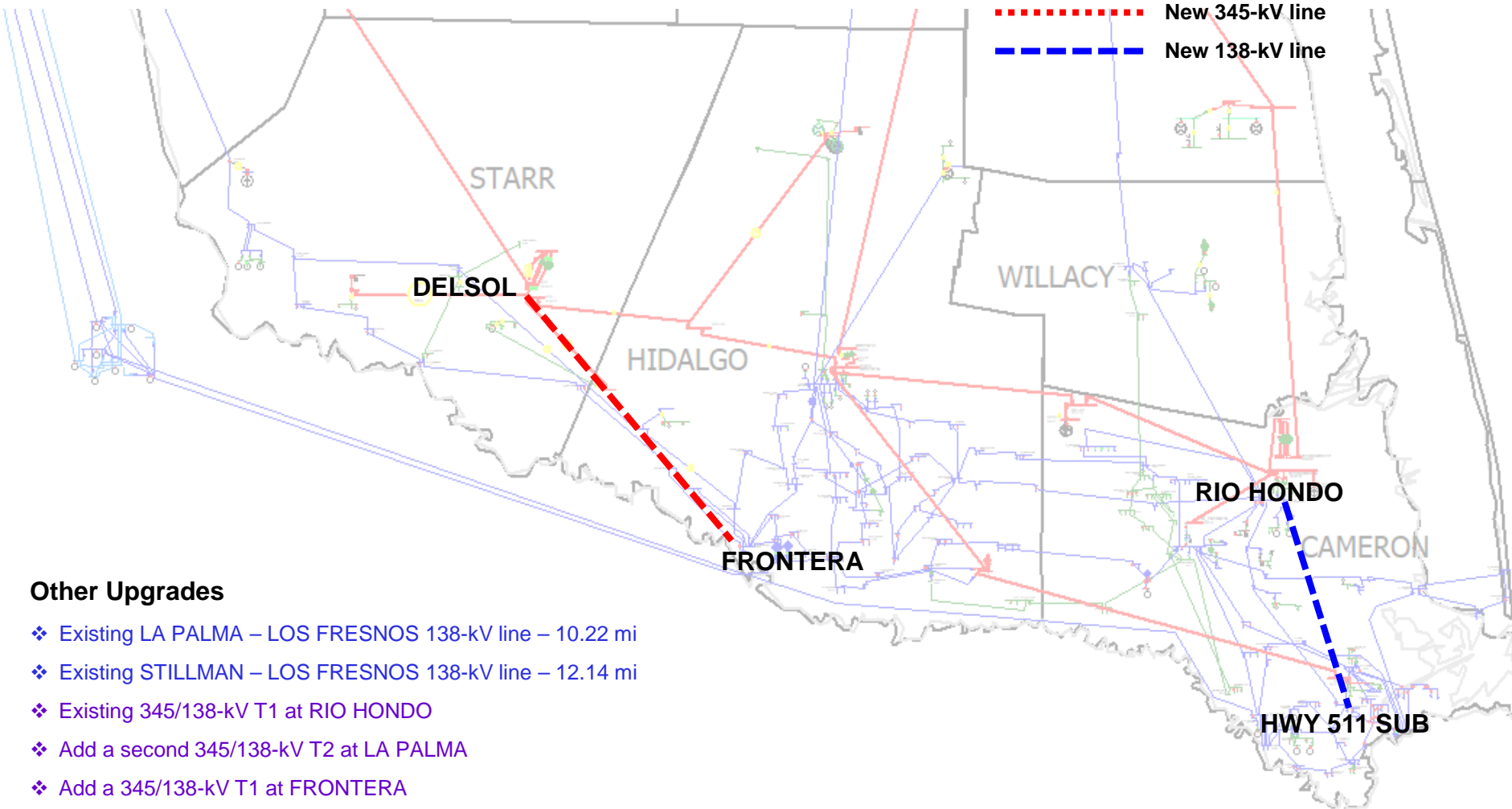
Appendix: Map for Valley Import Options



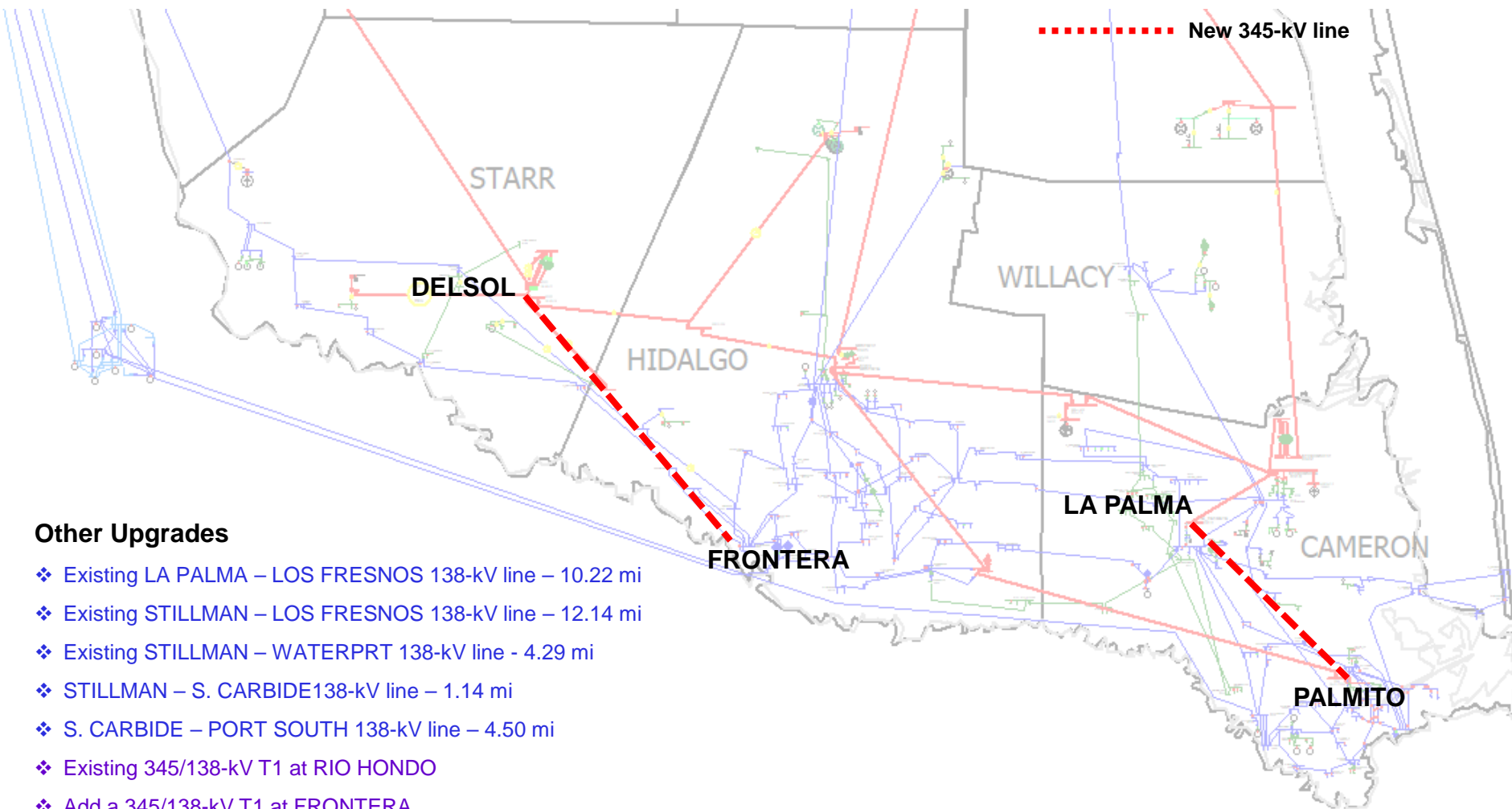
Appendix: Valley Upgrade Option 1 for 405 MW



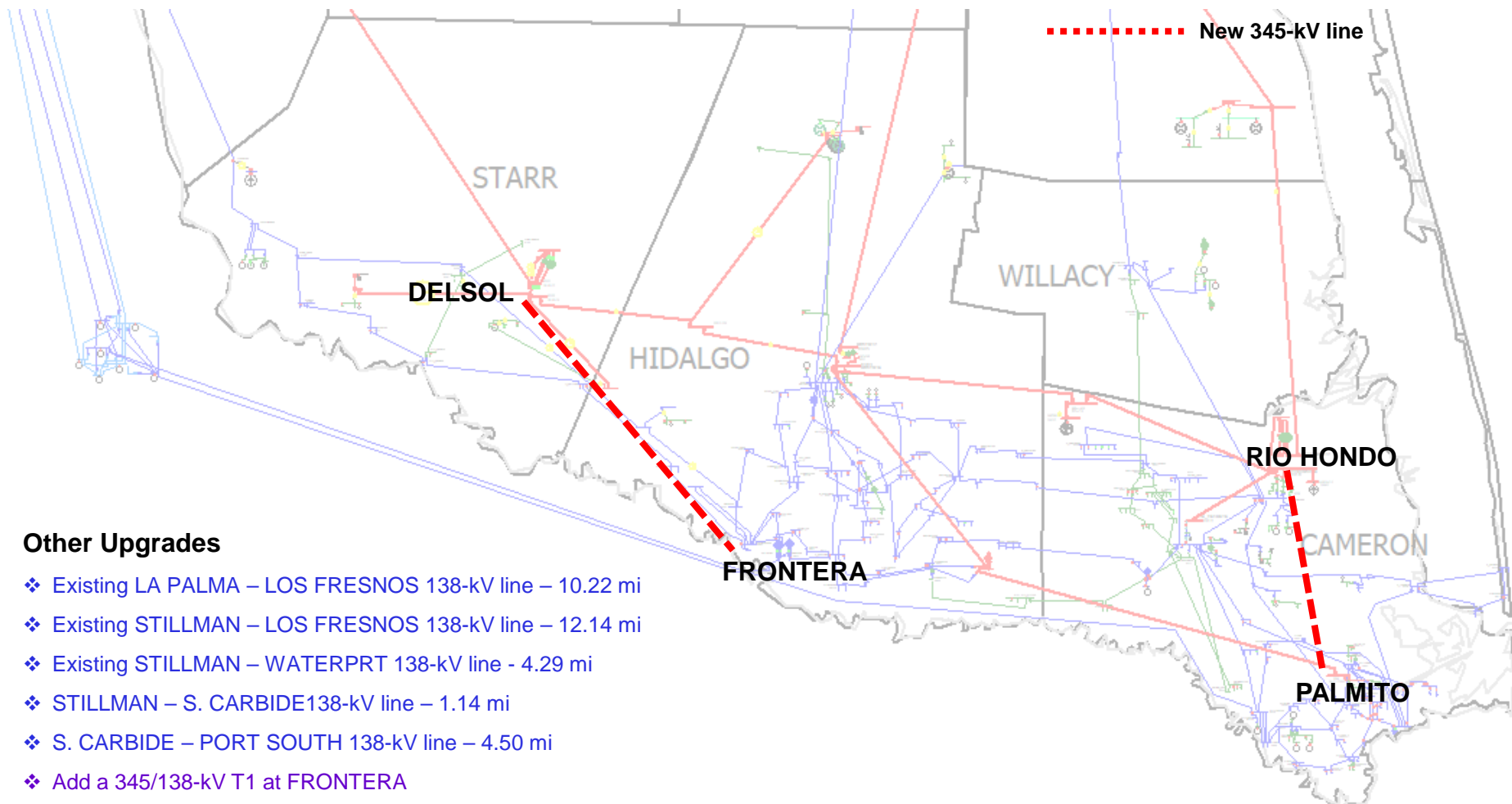
Appendix: Valley Upgrade Option 2 for 405 MW



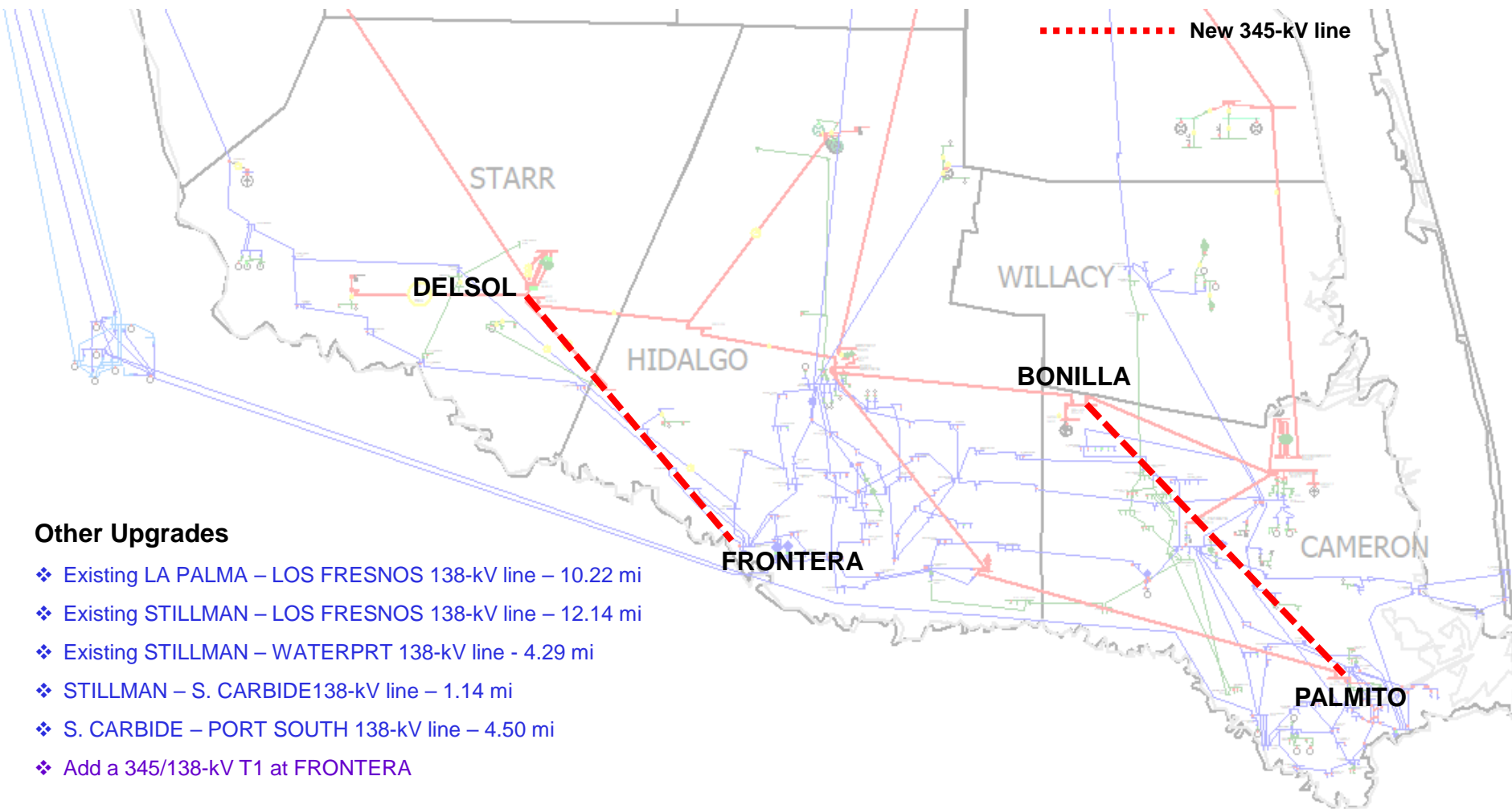
Appendix: Valley Upgrade Option 3 for 405 MW



Appendix: Valley Upgrade Option 4 for 405 MW



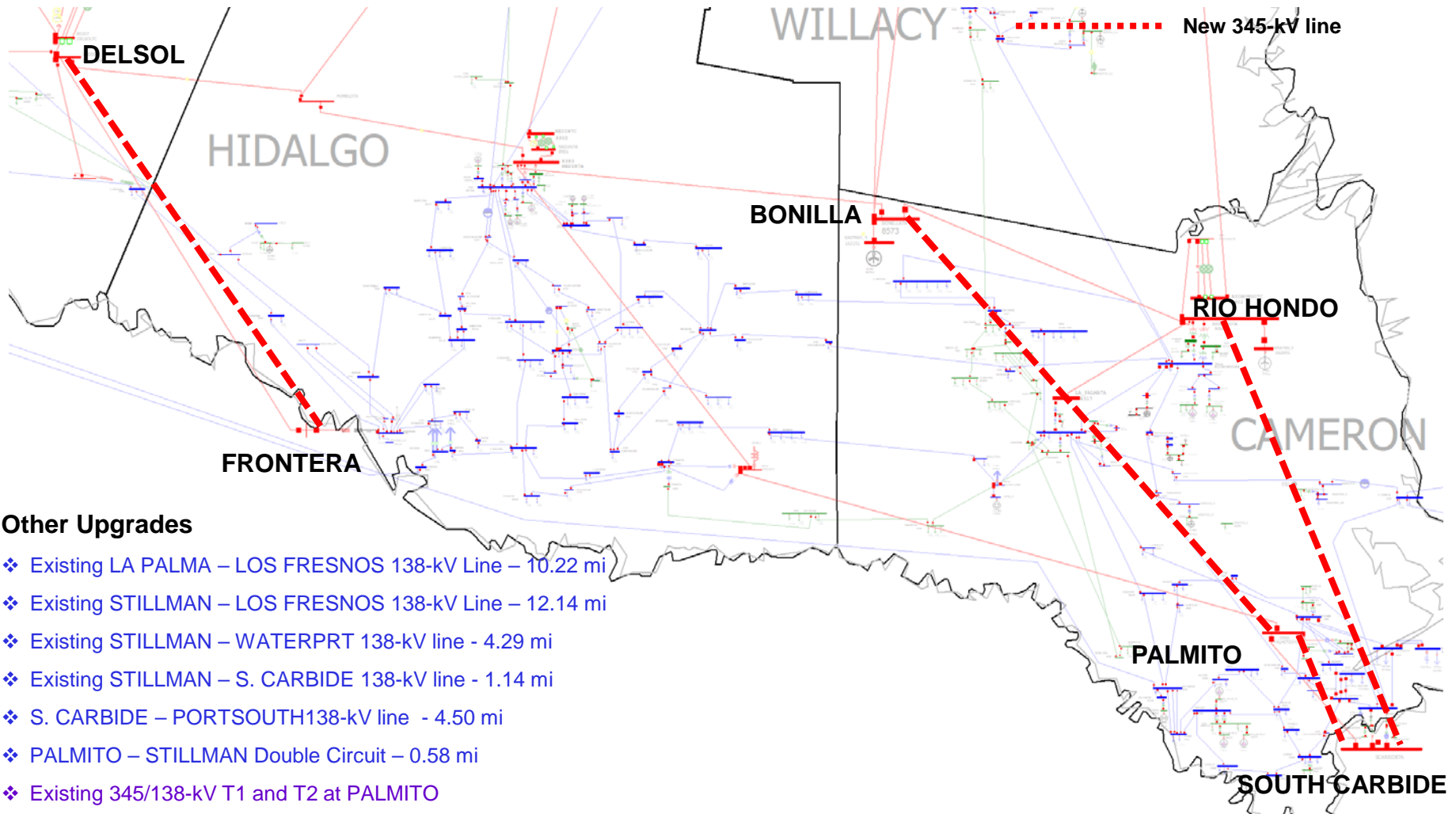
Appendix: Valley Upgrade Option 5 for 405 MW



Other Upgrades

- ❖ Existing LA PALMA – LOS FRESNOS 138-kV line – 10.22 mi
- ❖ Existing STILLMAN – LOS FRESNOS 138-kV line – 12.14 mi
- ❖ Existing STILLMAN – WATERPRT 138-kV line - 4.29 mi
- ❖ STILLMAN – S. CARBIDE 138-kV line – 1.14 mi
- ❖ S. CARBIDE – PORT SOUTH 138-kV line – 4.50 mi
- ❖ Add a 345/138-kV T1 at FRONTERA

Appendix: Valley Upgrade Option B for 1245 MW

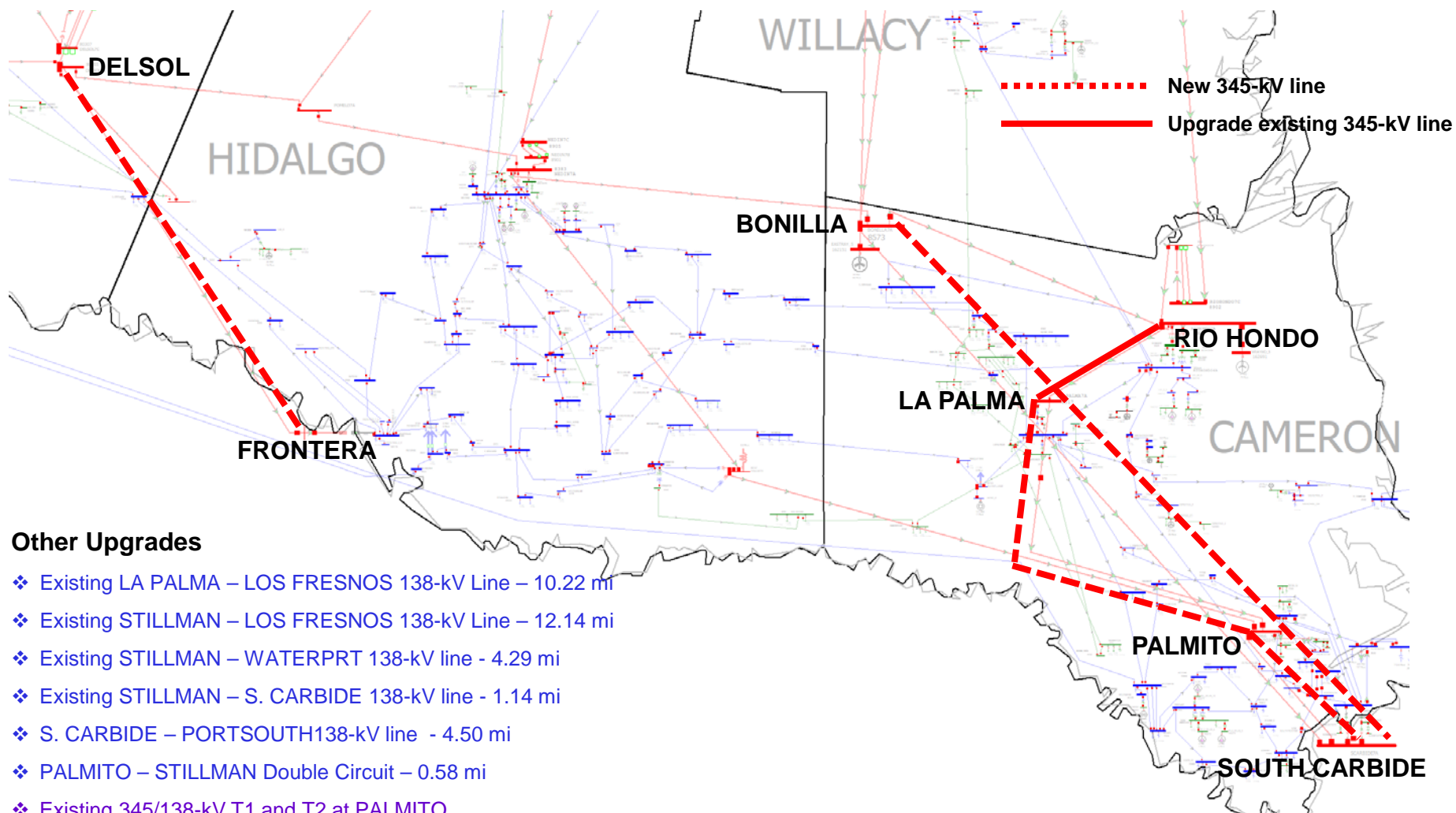


Other Upgrades

- ❖ Existing LA PALMA – LOS FRESNOS 138-kV Line – 10.22 mi
- ❖ Existing STILLMAN – LOS FRESNOS 138-kV Line – 12.14 mi
- ❖ Existing STILLMAN – WATERPRT 138-kV line - 4.29 mi
- ❖ Existing STILLMAN – S. CARBIDE 138-kV line - 1.14 mi
- ❖ S. CARBIDE – PORTSOUTH 138-kV line - 4.50 mi
- ❖ PALMITO – STILLMAN Double Circuit – 0.58 mi
- ❖ Existing 345/138-kV T1 and T2 at PALMITO
- ❖ Add 345/138-kV T1 and T2 at S. CARBIDE
- ❖ Add a 345/138-kV T1 at FRONTERA



Appendix: Valley Upgrade Option A for 1245 MW



Other Upgrades

- ❖ Existing LA PALMA – LOS FRESNOS 138-kV Line – 10.22 mi
- ❖ Existing STILLMAN – LOS FRESNOS 138-kV Line – 12.14 mi
- ❖ Existing STILLMAN – WATERPRT 138-kV line - 4.29 mi
- ❖ Existing STILLMAN – S. CARBIDE 138-kV line - 1.14 mi
- ❖ S. CARBIDE – PORTSOUTH138-kV line - 4.50 mi
- ❖ PALMITO – STILLMAN Double Circuit – 0.58 mi
- ❖ Existing 345/138-kV T1 and T2 at PALMITO
- ❖ Add 345/138-kV T1 and T2 at S. CARBIDE
- ❖ Add a 345/138-kV T1 at FRONTERA