



**AEPSC - Corpus Christi North Shore
Project – ERCOT Independent Review
Status**

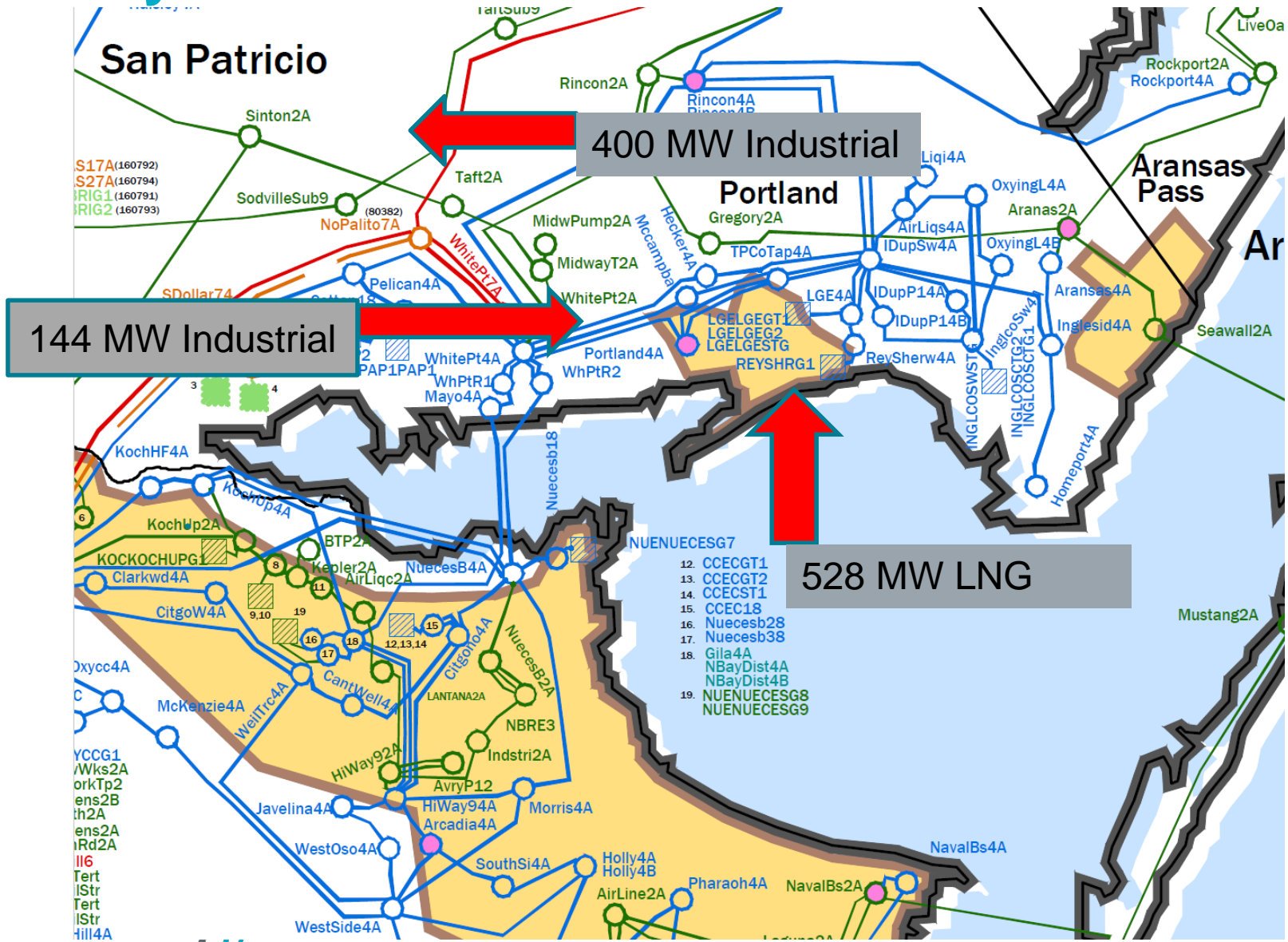
Regional Planning Group
January 21, 2020

Introduction

American Electric Power Service Corporation (AEPSC) submitted the Corpus Christi North Shore Transmission Improvement Project for Regional Planning Group review in September 2019. This is a Tier 1 project that is estimated at \$259.57 million.

- Provide sufficient transmission capacity and address the reliability needs by
 - Adding 345 kV bus work and two 345/138 kV transformers to Resnick substation
 - Adding approximately 44 miles of double-circuit 345 kV transmission lines
 - Reconductoring approximately 1.5 miles of 138 kV transmission lines
- Scope for ERCOT independent review November 2019 RPG:
<http://www.ercot.com/calendar/2019/11/12/165310-RPG>

Study Area



Contingencies and Criteria

- **Contingencies for Study Region**

- NERC TPL-001-4 and ERCOT Planning Criteria (http://www.ercot.com/content/wcm/current_guides/53526/04_050115.doc):

- Normal system condition (P0)
- N-1 conditions (P1, P2-1, P7)
- P2, P4, and P5 (EHV only)
- X-1 + N-1 (X-1 represents 345/138 kV transformer outage)
- G-1 + N-1 (G-1 represents generator outage)

- **Criteria**

- Thermal

- Monitor all transmission lines and transformers in the study region
- Use Rate A for pre-contingency conditions
- Use Rate B for post-contingency conditions

- Voltages

- Monitor all busses 60 kV and above in the study region
- Voltages exceeding their pre-contingency and post-contingency limits
- Voltage deviations exceeding 8% on non-radial load busses

Study Case Violations - Preliminary

	Unsolved Power Flow	Thermal Overloads	Bus Voltage Violation
N-1	0	10 miles 69 kV 32 miles 138 kV	0
(G-1)(N-1)	0	10 miles 69 kV 80 miles 138 kV	32 138 kV Buses
(X-1)(N-1)	0	10 miles 69 kV 34 miles 138 kV	0
Total	0	10 miles 69 kV 80 miles 138 kV	32 138 kV Buses

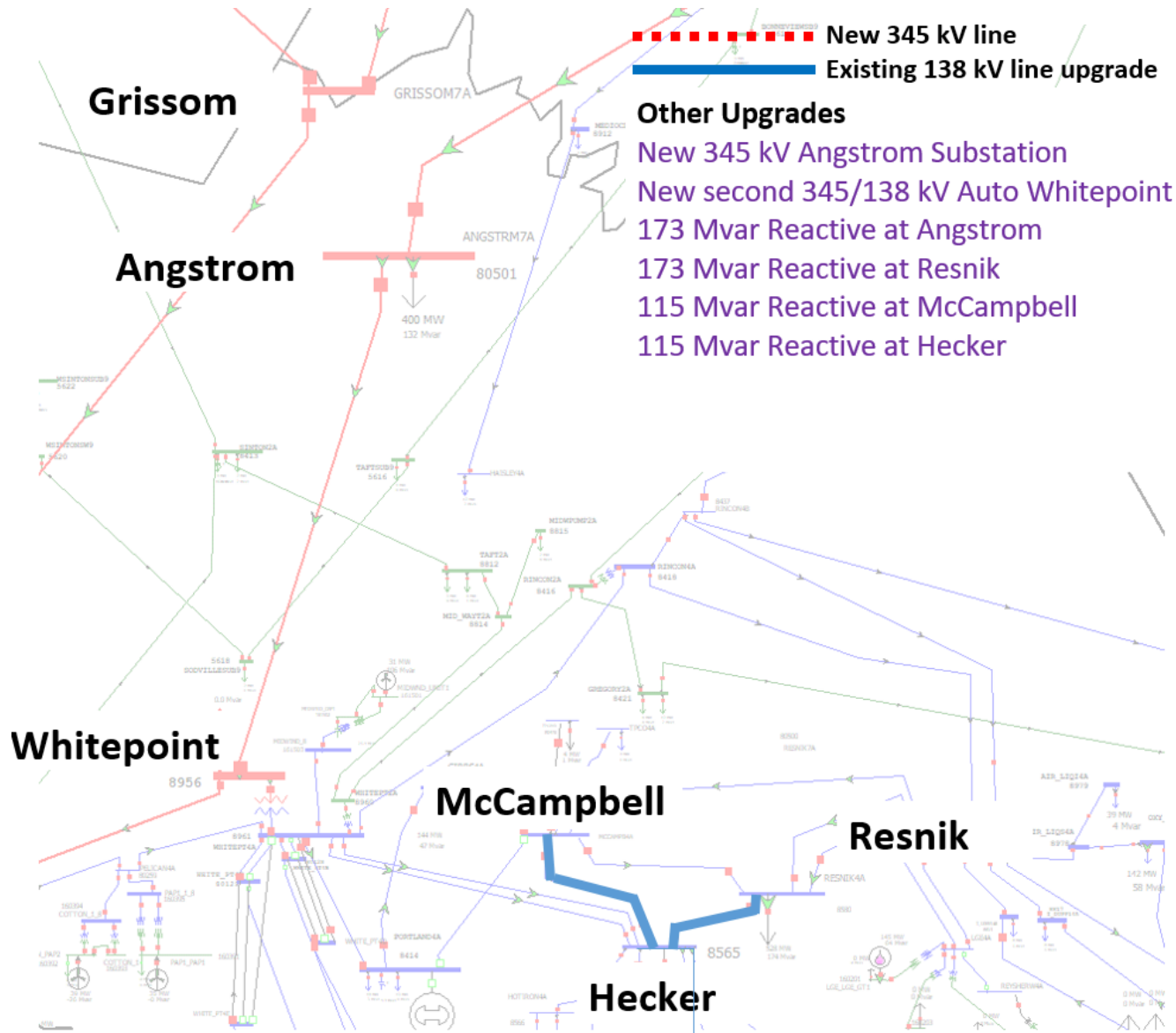
G-1 Tested: Gregory LGE CC; Nueces Bay CC; Ingleside CC

X-1 345/138 kV Tested: Whitepoint; Lon Hill

Option 1

- New 345 kV Angstrom Substation
- New Second 345/138 kV Transformer at Whitepoint
- Reconductor 138 kV Hecker Resnik (2.9 Miles)
- Reconductor 138 kV Hecker McCampbell (2.2 Miles)
- 172.8 Mvar Reactive at Angstrom
- 172.8 Mvar Reactive at Resnik
- 115.2 Mvar Reactive at McCambell
- 115.2 Mvar Reactive at Hecker

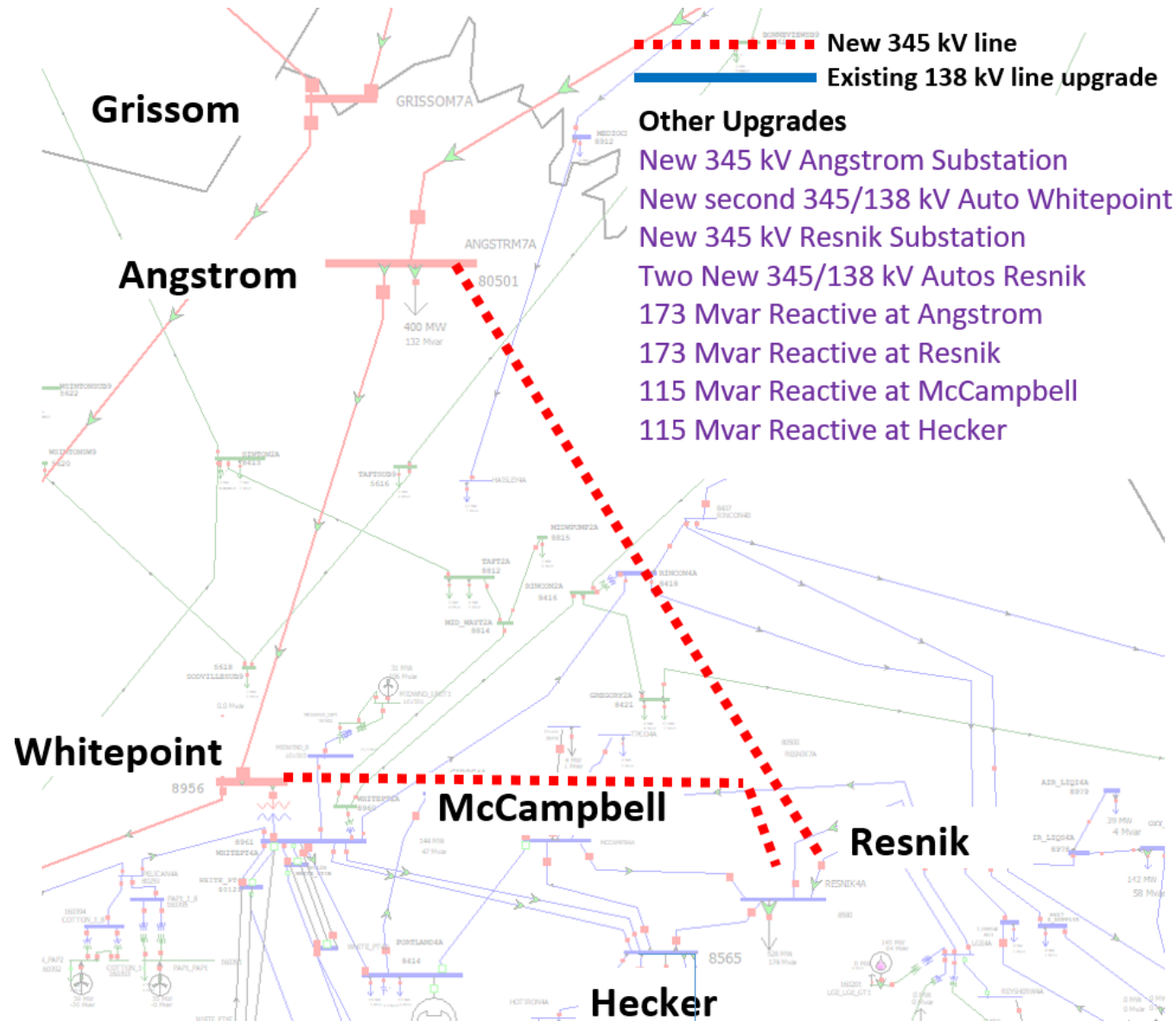
Option 1



Option 2

- New 345 kV Resnik Substation
- Two New 345/138 kV Transformers Resnik
- New 345 kV Angstrom Substation
- New 345 kV Angstrom to Resnik (17 Miles)
- Resnik to Whitepoint (8 Miles)
- New Second 345/138 kV Transformer at Whitepoint)
- 172.8 Mvar Switch Shunt at Angstrom
- 172.8 Mvar Switch Shunt at Resnik
- 115.2 Mvar Switch Shunt at McCambell
- 115.2 Mvar Switch Shunt at Hecker

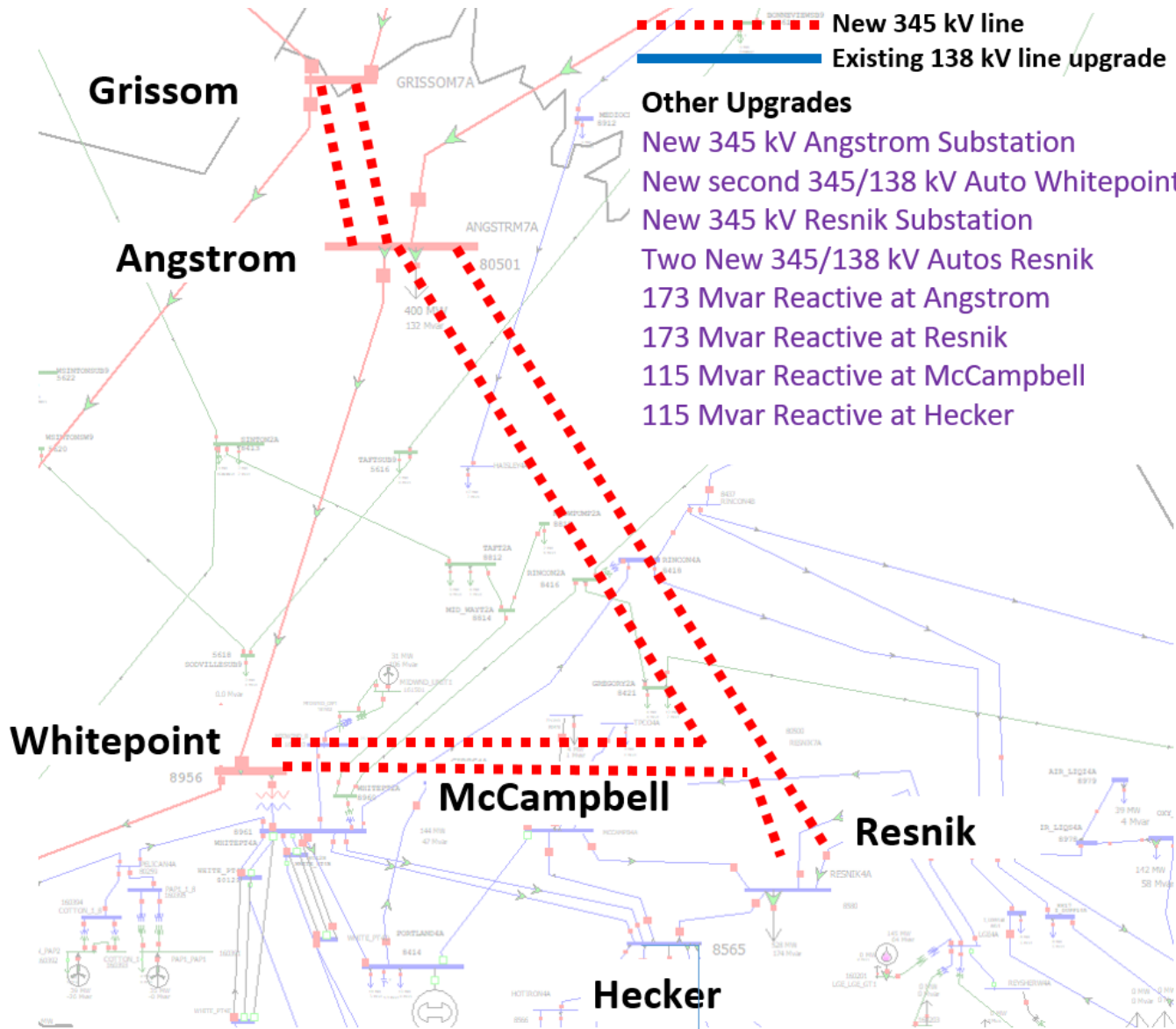
Option 2



Option 3

- New 345 kV Resnik Substation
- Two New 345/138 kV Transformers Resnik
- New 345 kV Angstrom Substation
- New Double Ckt 345 kV Angstrom to Grissom (17 Miles)
- New 345 kV Angstrom to Resnik (17 Miles) on Dbl Ckt Tower with New (2nd) 345 kV Angstrom to Whitepoint (25 Miles)
- New 345 kV Resnik to Whitepoint (8 Miles) on Dbl Ckt Tower with remainder of New (2nd) 345 kV Angstrom to Whitepoint (25 Miles)
- New Second 345/138 kV Transformer at Whitepoint
- 172.8 Mvar Switch Shunt at Angstrom
- 172.8 Mvar Switch Shunt at Resnik
- 115.2 Mvar Switch Shunt at McCambell
- 115.2 Mvar Switch Shunt at Hecker

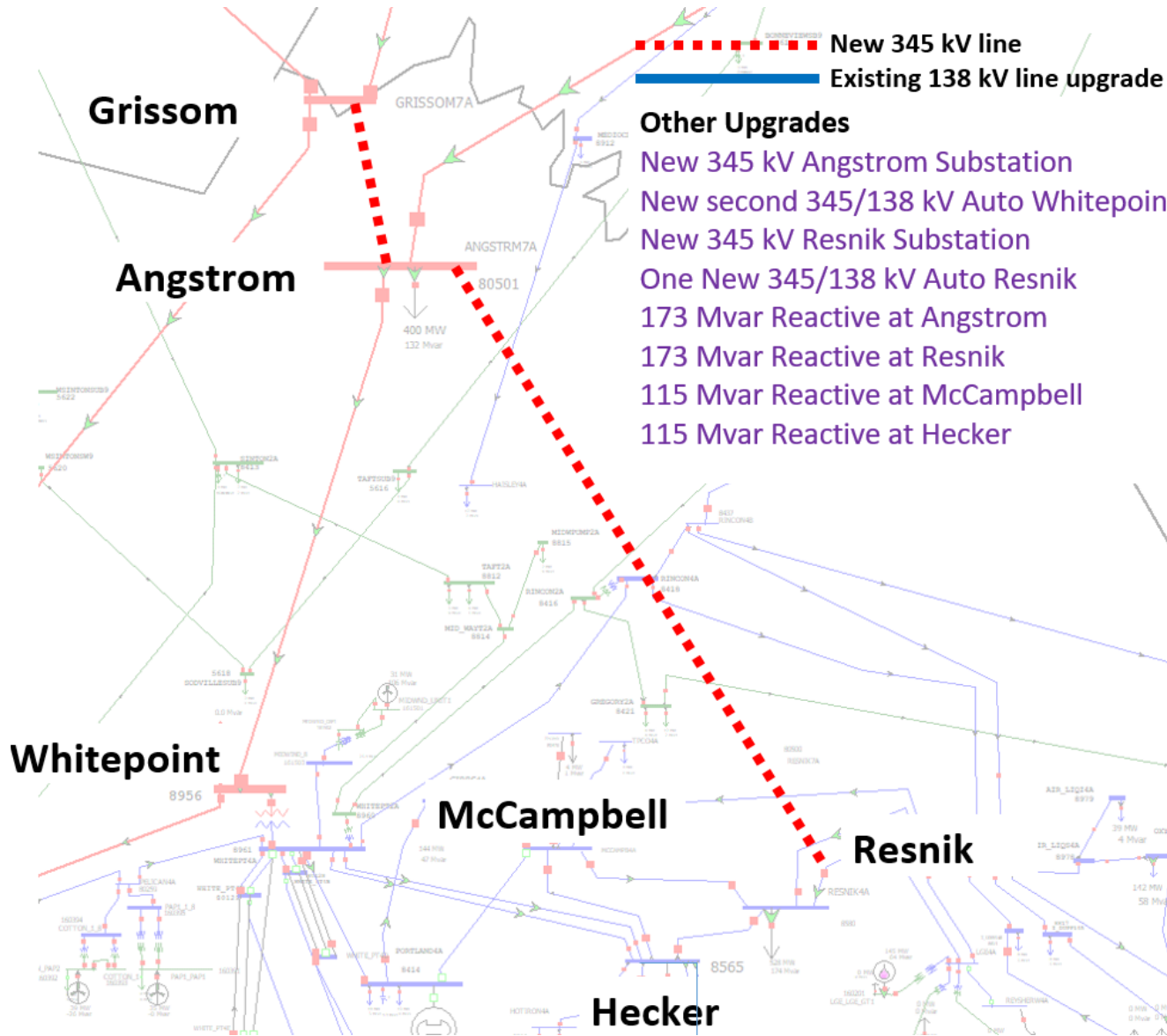
Option 3



Option 4

- New 345 kV Resnik Substation
- One New 345/138 kV Transformers Resnik
- New 345 kV Angstrom Substation
- New 345 kV Grissom to Angstrom (17 Miles)
- New 345 kV Angstrom to Resnik (17 Miles)
- New Second 345/138 kV Transformer at Whitepoint
- 172.8 Mvar Switch Shunt at Angstrom
- 172.8 Mvar Switch Shunt at Resnik
- 115.2 Mvar Switch Shunt at McCambell
- 115.2 Mvar Switch Shunt at Hecker

Option 4



New 345 kV line
Existing 138 kV line upgrade

Other Upgrades
 New 345 kV Angstrom Substation
 New second 345/138 kV Auto Whitepoint
 New 345 kV Resnik Substation
 One New 345/138 kV Auto Resnik
 173 Mvar Reactive at Angstrom
 173 Mvar Reactive at Resnik
 115 Mvar Reactive at McCampbell
 115 Mvar Reactive at Hecker



Results

	N-1		X-1 N-1		G-1 N-1	
	Thermal	Voltage	Thermal	Voltage	Thermal	Voltage
Option 1	Ok	Ok	Ok	Ok	Ok	Ok
Option 2	Ok	Ok	Ok	Ok	Ok	Ok
Option 3	Ok	Ok	Ok	Ok	Ok	Ok
Option 4	Ok	Ok	Ok	Ok	Ok	Ok

Next Steps

- **Project Evaluation**

- ERCOT may perform the following studies
 - Corpus Christi North Shore Import limits to account for “known prospective” (potential) load
 - Planned maintenance outage
 - Brownsville area LNG load impact
 - Dynamic stability impact
 - Refine options
- SSR vulnerability assessment per Protocol Section 3.22.1.3(2)
- Generation sensitivity analysis per Planning Guide Section 3.1.3(4)(a)
- Load scaling sensitivity analysis per Planning Guide Section 3.1.3(4)(b)

- **Congestion Analysis**

- Congestion analysis will be performed to ensure that the identified transmission upgrades do not result in new congestion within the study area

Deliverables

- **Tentative Timeline**

- Status updates

- February 2020

- Complete the ERCOT Independent Review by Q1 2020



Stakeholder Comments Also Welcomed to Sun Wook Kang:
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