



## LCRA TSC and CPS Energy Transmission System Addition – ERCOT Independent Review update

RPG Meeting  
February 27, 2015

# Status of LCRA TSC/CPS Energy RPG Project Review

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- ❑ ERCOT is conducting the Independent Review of the need to address the reliability issues that limit the power import into the San Antonio area.
  - Current status:
    - During the ERCOT Independent Review, CPS Energy notified ERCOT that it would be making revisions to its load forecast expectation in the upcoming ALDR filing
    - ERCOT re-evaluated and confirmed the reliability need based on the updated load forecast
    - ERCOT tested options and identified a potential solution to address the need

# Study Assumption

## ❑ Study Area:

- The primary focus is the system in the South Central weather zone, particularly the transmission system in Bexar, Comal, and Guadalupe Counties.

## ❑ Study Case:

- Originating case:
  - 2019 South/South Central (SSC) peak case from the 2014 Regional Transmission Plan (based on the 2014 SSWG Dataset B)
- ERCOT updated the South Central load in the originating case based on the recent updated load forecast of CPS Energy:

	New Updated CPS Energy Load	Original CPS Energy Load (2014 RTP)
CPS Energy Load (MW)	5,406	6,128
South Central Weather Zone (MW)	13,825	14,547

- Transmission projects modeled in the study case:
  - N-1 RTP projects identified during the 2014 RTP (as of 07/08/2014) except the CPS Energy/LCRA TSC proposed RPG projects.
  - Other projects in the study area based on TPIT:
    - Marion to Cibolo 2<sup>nd</sup> circuit addition (2017 ISD, Tier4\_prj\_id\_2792)
    - Zorn to York Creek to Seguin upgrade (2016 ISD, Tier4\_prj\_id\_3966)
    - Tap line between Moulton and Shiner (2019 ISD)
    - Lockhart Auto upgrade (2017, Tier4\_prj\_id\_3963)

# Study Assumption

- Status of key generators in the study base case
  - J.T. Deely 1 and 2 (~845 MW) are offline in the 2019 study base case
  - Frontera (~510 MW) is modeled offline based on the W-A072914-01 Notice of System Planning Data
    - Loads in East, Coast, North, North Central, West, and Far West weather zones are reduced to match the load and generation
  - DC Tie export from South to Mexico

	Rail Road	Laredo	Eagle Pass
DC Tie Flow from Southern into Mexico (MW)	300	100	30

- Contingencies and criteria of reliability analysis
  - All contingencies consistent with Planning Guides Section 4.1.1.2 and criteria consistent with 2014 RTP
  - For G-1+N-1, the following generator outage are tested to identify the worst G-1 condition:
    - JK Spruce JKS2 (775 MW),
    - OW Sommers OWS1 (420 MW),
    - Braunig VHB3 (412 MW)
- No transfer capability analysis was performed since the previous study results showed no steady-state voltage stability issues at a higher load level in the study region

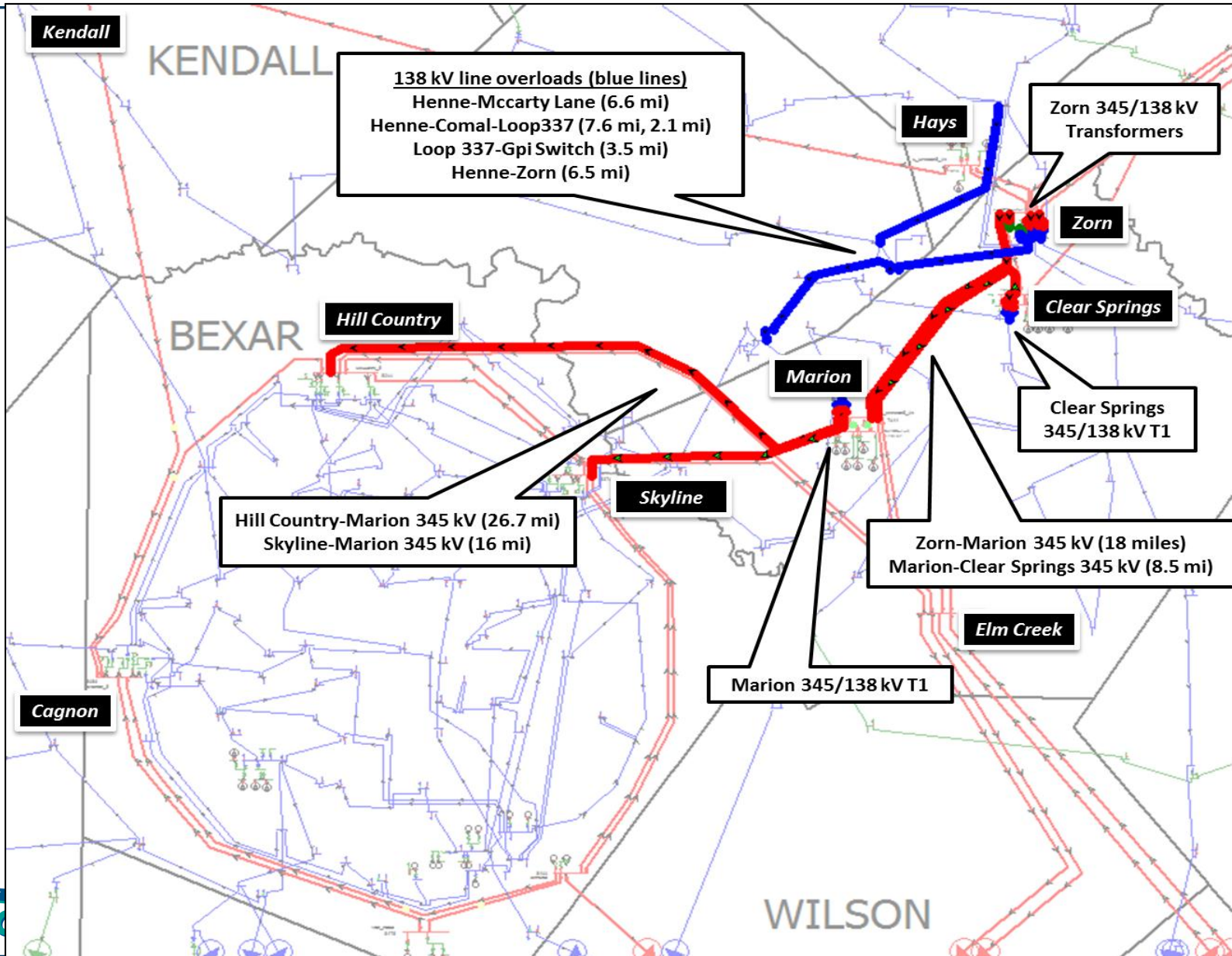
# Preliminary Result of the 2019 Base Case

- N-1 Result:
  - Overload of Skyline-Marion 345 kV line (~16 miles, 105%)
  - Overload of McCarty Ln-Henne-Comal 138 kV line (~14.2 miles, 106~109%)
  - Heavy flow on Comal-Loop 337 138 kV line (98%)
  - Heavy flow on Zorn 345/138 kV transformer T1 (99%)
  - Heavy flow on Clear Springs 345/138 kV transformer T1 (99.5%)
- G-1+N-1 Result:
  - Worst G-1: JKS2 G-1 causes the most severe impact on the system
  - Overload issues
    - Skyline-Marion 345 kV line (~16 miles, 118~ 131%)
    - Marion-Clear Springs 345 kV line (~8.5 miles, 111~123%)
    - Hill Country-Marion 345 kV line (~26.7 miles, 99~108%)
    - Zorn-Marion 345 kV line (~18 miles, 99~110%)
    - Clear Springs 345/138 kV transformer (107~111%)
    - McCarty Lane-Henne-Comal-Loop 337-Gpi Switch 138 kV lines (~19.8 miles, 118~132%)
    - Henne-Zorn 138 kV line (~6.5 miles, 101~106%)
  - Heavy flow issues
    - Zorn 345/138 kV T1 transformer (98~99%)
- No steady-state voltage issues were identified.

# Preliminary Result of the 2019 Base Case

- X-1+N-1 Study:
  - X-1 conditions considered:
    - Hill Country T1 and T3, Cagnon T1 and T3, Skyline T3, Clear Springs T1, Zorn T2 and Marion T1 345/138 kV autotransformers
  - Summary of the X-1+N-1 result:
    - Skyline-Marion and Marion-Clear Springs 345 kV lines were overloaded, but less severe than that of G-1+N-1 condition
    - Similar 138 kV line overloads under G-1+N-1 were identified again, but less severe than that of G-1+N-1 condition
    - Clear Springs or Zorn X-1 conditions appears to provide the most severe impact
    - Overloads of Clear Springs 345/138 kV transformer (101~109%) under various X-1+N-1 conditions
    - Overloads of Zorn 345/138 kV transformers (100~112%) under Clear Springs, Zorn, Marion or Skyline X-1+N-1 condition
    - Overload of Marion 345/138 kV transformer (104%) under Clear Springs X-1+N-1 condition

# Map of System Overloads



# Options Evaluated

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## ❑ Options

- Two options were evaluated, based on the TSP's RPG submittal and the reliability issues identified:
  - Option A: mostly the subset of Option 3 (submitter's preferred option)
  - Option B: Upgrading the existing transmission facilities



# Details of Each Option

## ❑ Option A

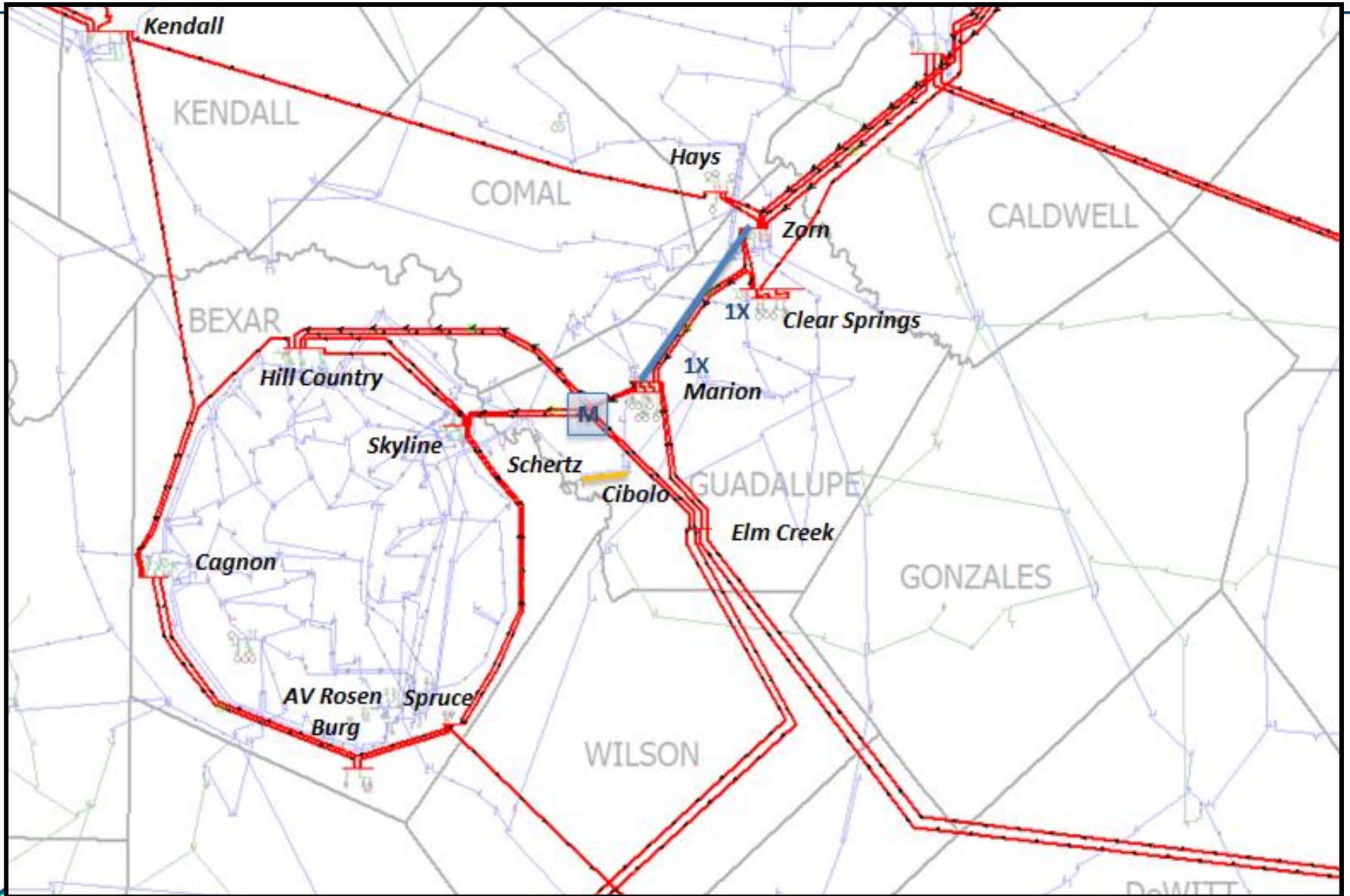
- Reconfigure the existing Hill Country-Elm Creek/Marion and Skyline- Marion/Elm Creek 345 kV double-circuit lines to form Hill Country-Marion double circuit and Skyline-Elm Creek double circuit
- Construct a new Zorn-Marion 345 kV line (~21 miles)
- Add a second 345/138 kV 478/525 MVA (minimum rating) transformer at Clear Springs
- Add a second 345/138 kV 478/525 MVA (minimum rating) transformer at Marion
- Upgrade the existing Cibolo-Schertz 138 kV line (~ 3.6 miles) to 477 MVA (minimum rating)
- Estimated Cost: Approximately \$ 86 million

## ❑ Option B

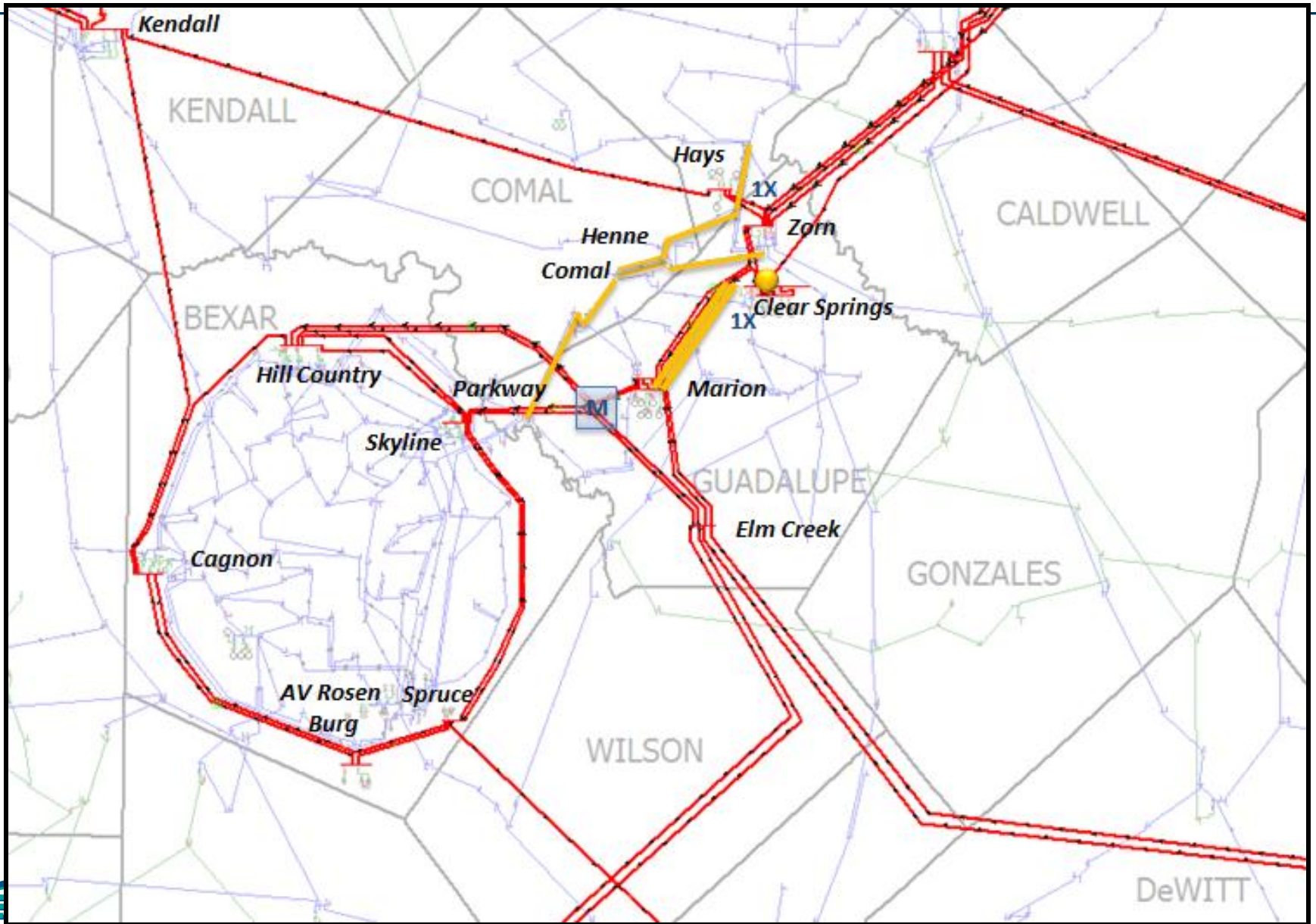
- Reconfigure the existing Hill Country-Elm Creek/Marion and Skyline- Marion/Elm Creek 345 kV double-circuit lines to form Hill Country-Marion double circuit and Skyline-Elm Creek double circuit
- Loop the existing Marion-Zorn 345 kV line into Clear Springs and upgrade the Marion-Clear Springs double circuit 345 kV (8.5 miles)
- Upgrade the several existing 138 kV lines; McCarty Ln-Henne (6.6 miles), Henne-Comal double circuit (7.6 miles), Comal-Loop337-Gpi Switch-EC Mornhinweg-Parkway (16.2 miles), Henne-Zorn 138 kV lines (6.5 miles)
- Add a new (fourth) 345/138 kV transformer at Zorn
- Add a new (second) 345/138 kV transformer at Clear Springs
- Estimated Cost: \$ 130 million\*

\* Option B does not include cost related to construction outages

# Option A



# Option B



# Result of Option Evaluation and Other Consideration

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- ❑ ERCOT performed the G-1+N-1 and X-1+N-1 analyses for the two options.
  
- ❑ Result of the Option Evaluation:
  - Both Option A and Option B address the reliability needs
  - The current planning-level cost estimate for Option B (~\$130 million) is significantly higher than Option A (~\$80 million). In addition, Option B would likely result in higher real-time congestion cost due to outages required on existing circuits
  
- ❑ Multiple and Extreme contingency analysis (on-going analysis):
  - ERCOT is testing 193 multi-element contingencies

# Next Steps

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- ERCOT anticipates completing the EIR and report on or before March 18<sup>th</sup>
- Present the ERCOT recommendation to TAC on March 26<sup>th</sup> and to ERCOT Board of Directors on April 14<sup>th</sup>

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Questions?