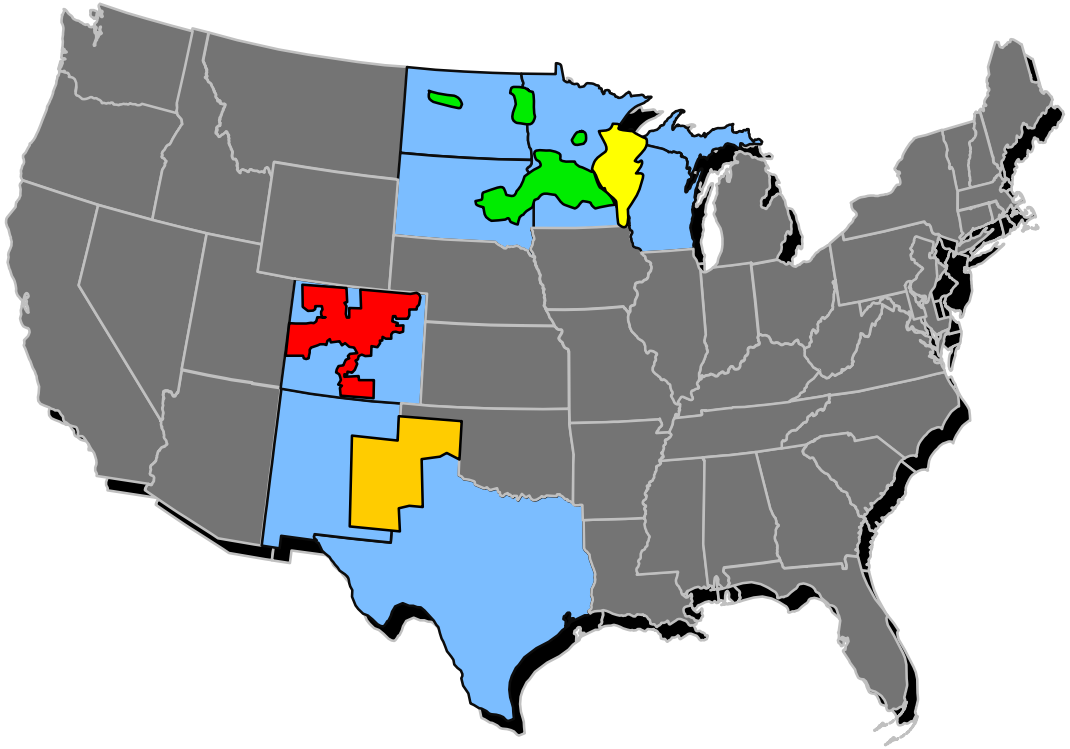
XCEL ENERGY-TX AND NM (SPS) SUB-REGIONAL TRANSMISSION PLANNING MEETING

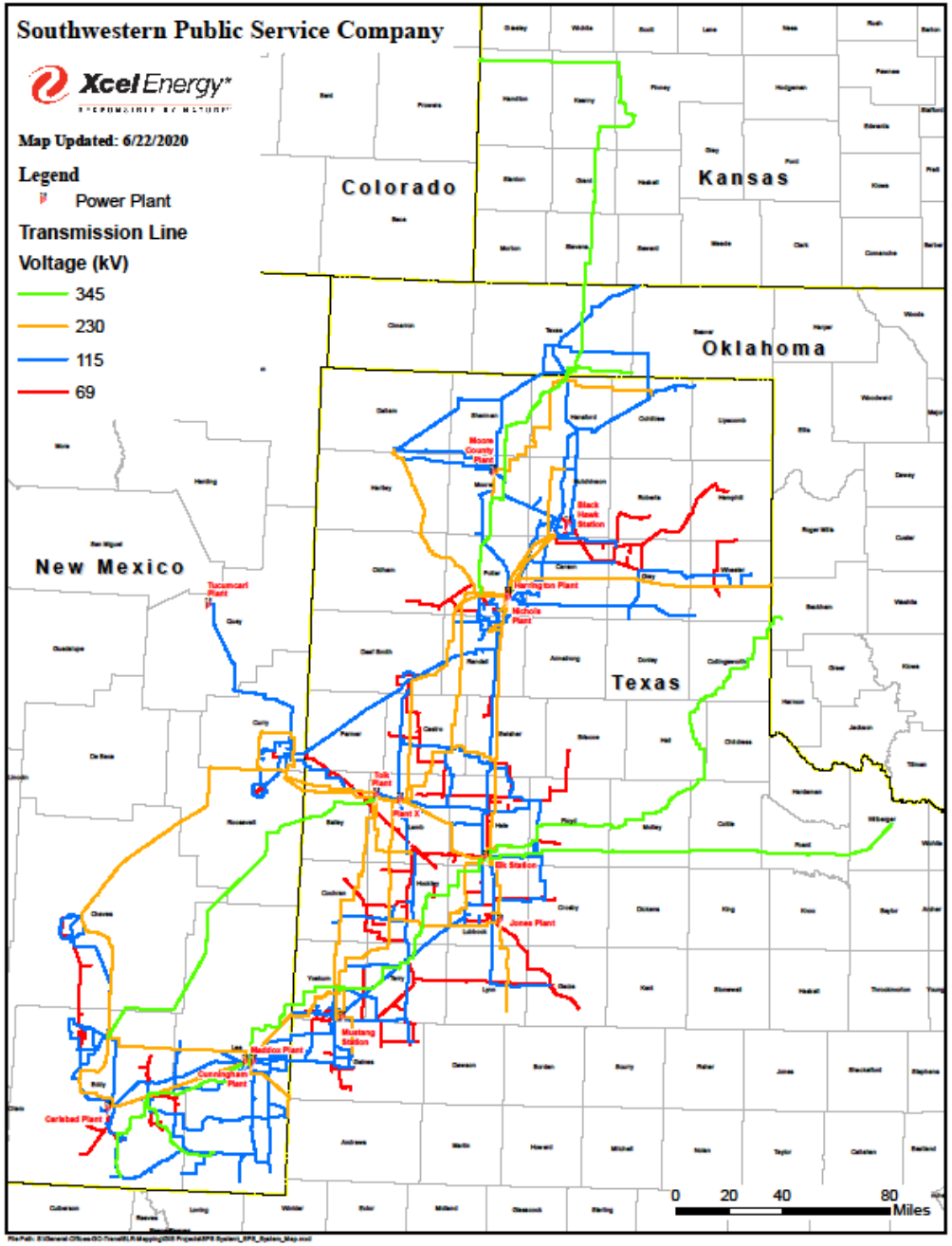
Jarred Cooley – Manager, Transmission Planning

October 5, 2020

System Maps

Xcel Energy





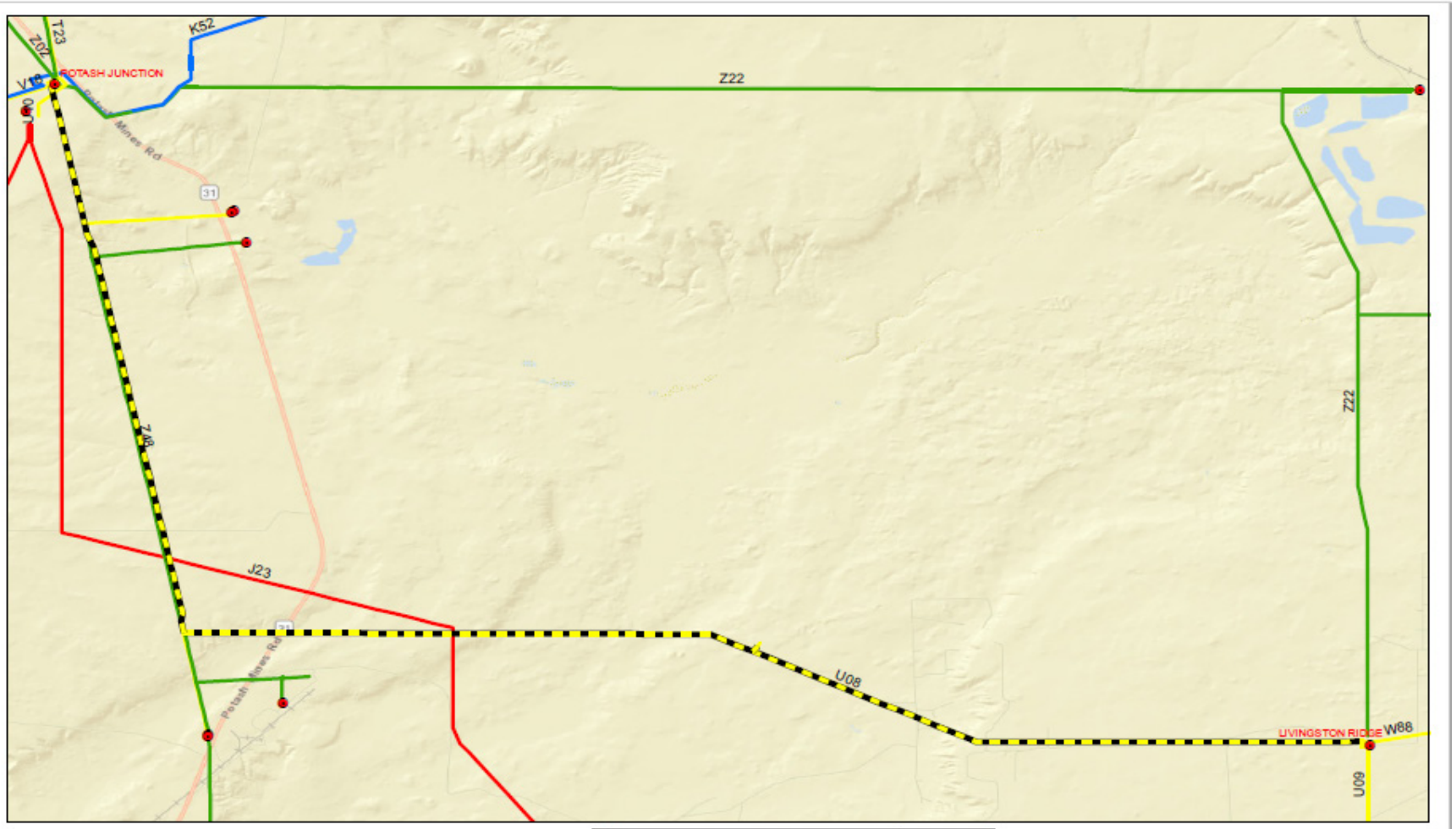
Disclaimer

- All in-service dates (ISDs) of Active or Future projects are proposed and subject to change
- All project scopes have the possibility of changing based on new / evolving information
- These are projects from a Planning perspective as required from a reliability, load or generation interconnection, asset renewal, economic, etc.
- Presentation is for informational purposes and is not inclusive of every project being completed by Xcel Energy

TRANSMISSION SYSTEM ADDITIONS

2019 – Sept 2020

Potash Junction to Livingston Ridge (Rebuild)



SPS Transmission
- 69
- 115
- 230
- 345
- SPS Existing Substation
- SPS New Substation

Project
- U08 Potash to Livingston Ridge 115kV

Potash to Livingston Ridge 115kV (Rebuild)

0 1 2 Miles

Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\Potash to Livingston Ridge 115kVmxd.mxd

Voltage: 115 kV

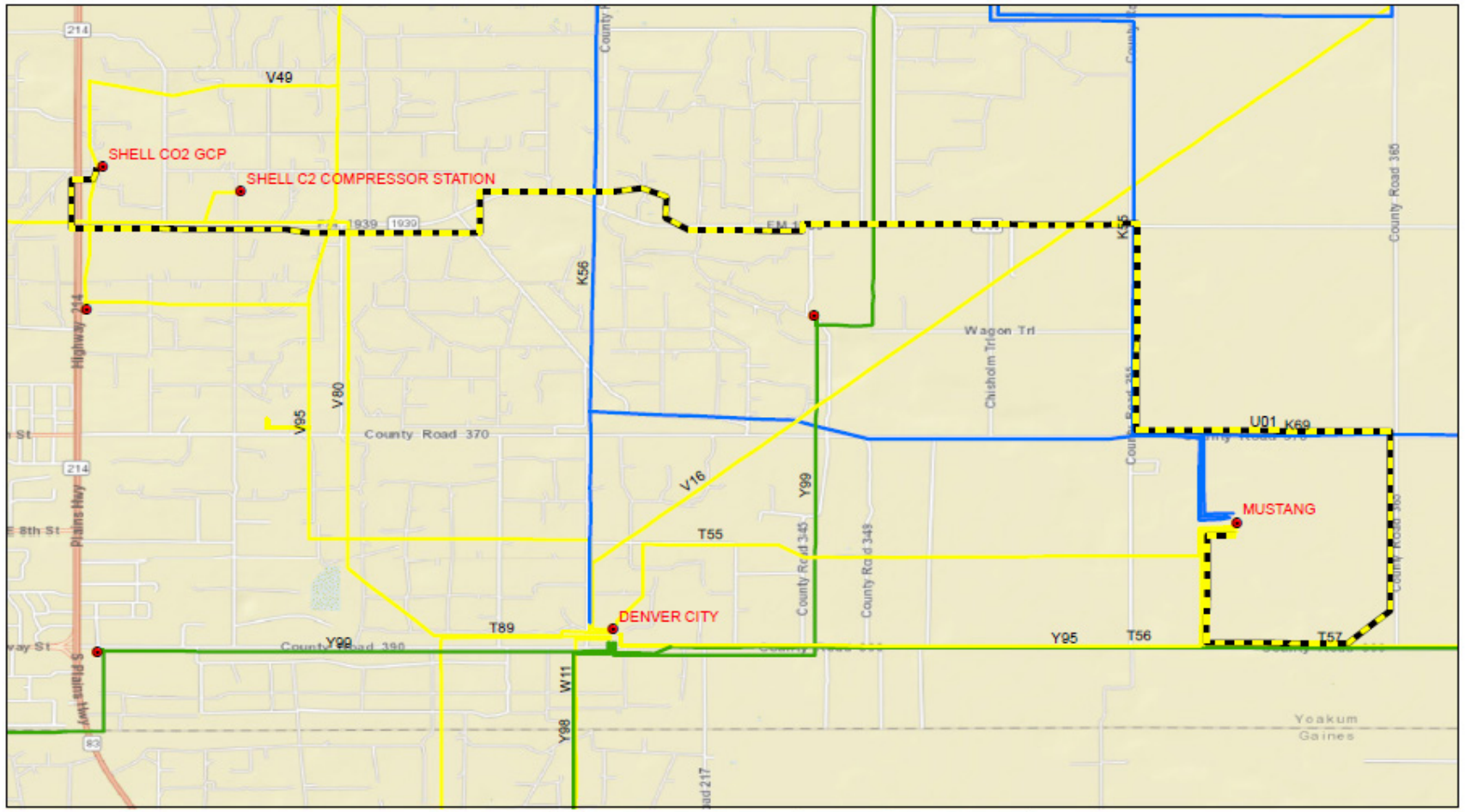
ISD: March 2019

NTC: Yes

Description: Rebuilt the existing line (~15 miles long) to a higher rated conductor

Need: Reliability

Mustang to Shell CO2 (New)



SPS Transmission Project

- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- SPS New Substation
- U01 Mustang to Shell C02 115kV

Mustang to Shell CO2 115kV (New)

0 0.5 1 Miles

Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\Mustang to ShellC02.mxd

Voltage: 115 kV

ISD: April 2019

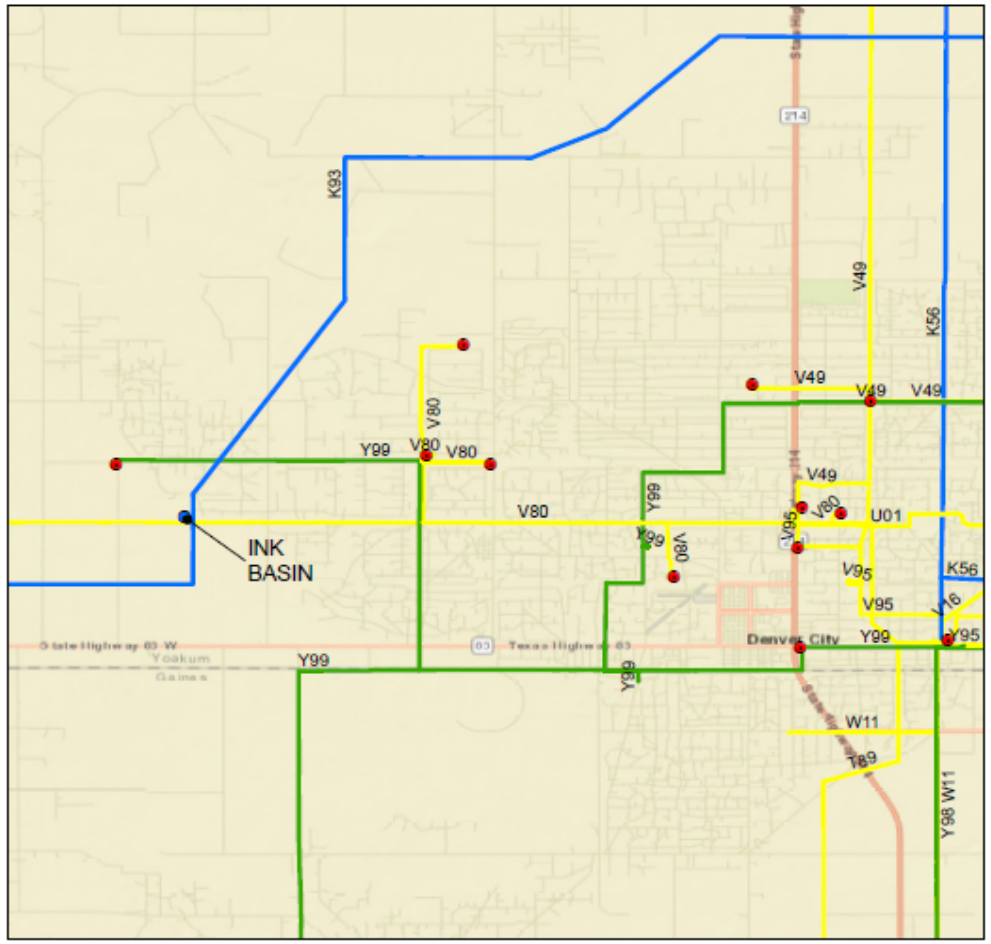
NTC: Yes

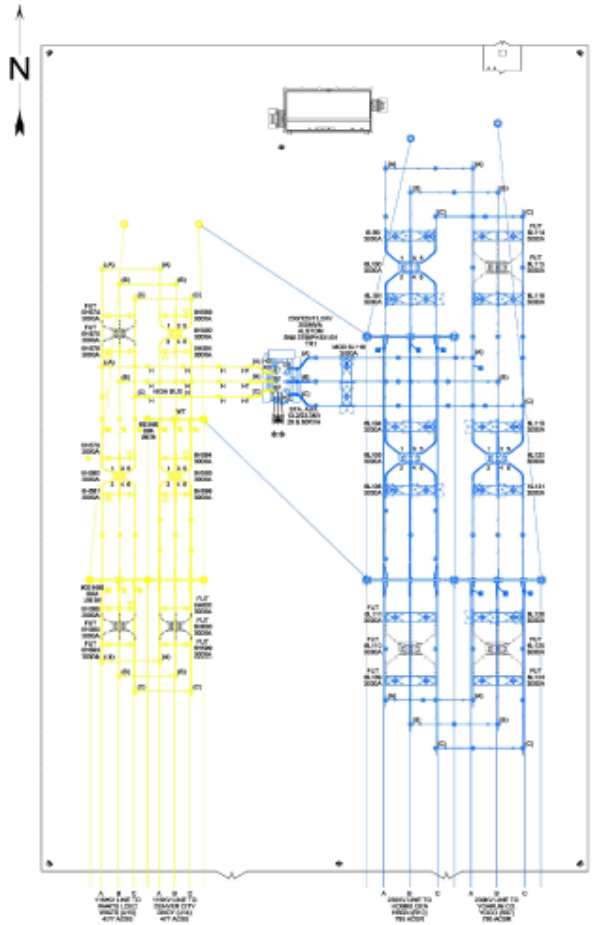
CCN: Yes

Description: Built a new line (~9 miles long). Expanded both substations

Need: Reliability

Ink Basin Substation (New)





SPS Transmission
- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- SPS New Substation

Project
- Ink Basin Substation

Ink Basin Substation (New)

0 3 6 Miles

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Voltage: 230 kV and 115 kV

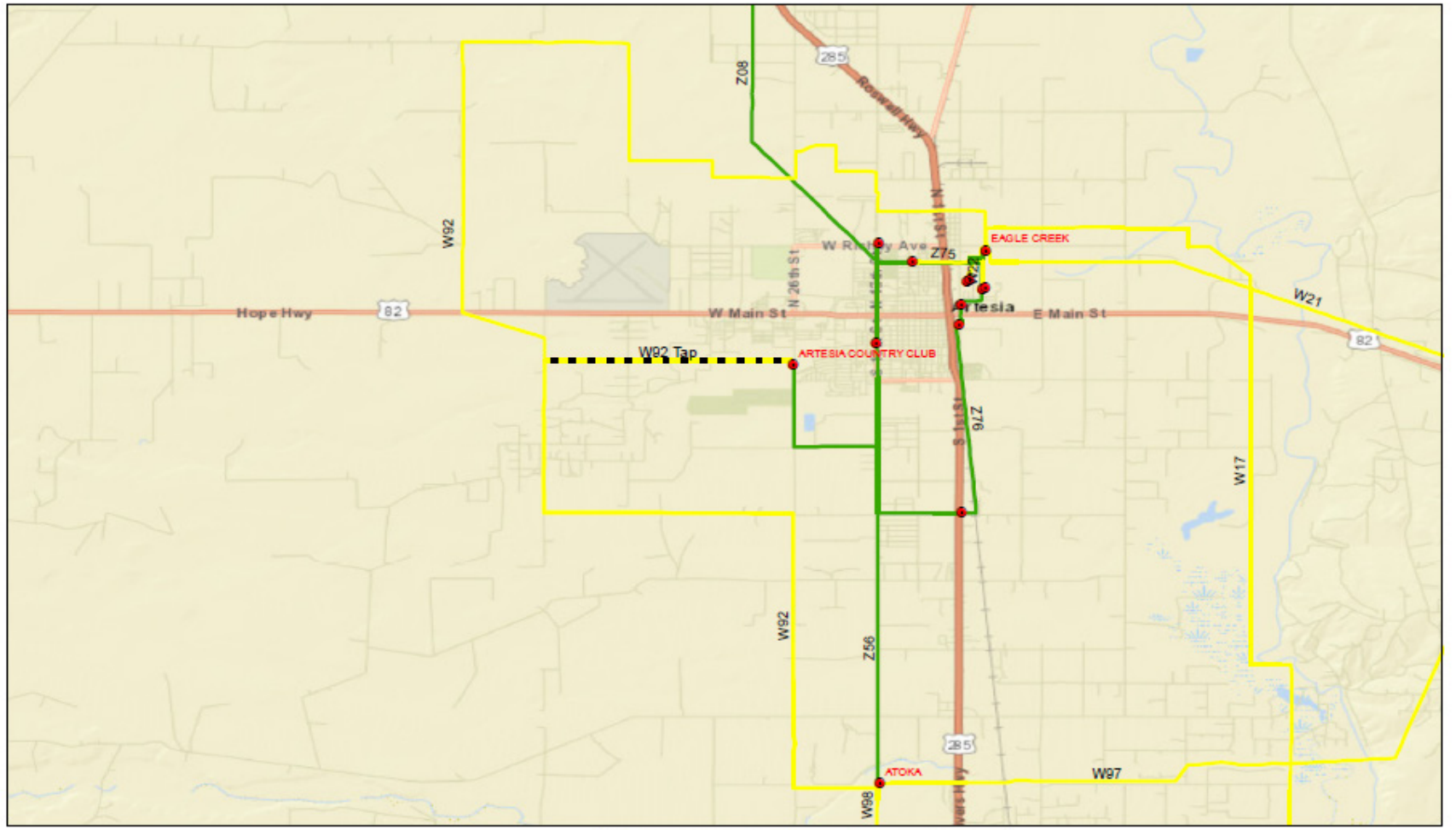
ISD: June 2019

NTC: Yes

Description: Tapped Tuco – Yoakum 230 kV line and installed a 230/115 kV transformer

Need: Reliability

Artesia Country Club 115 kV Substation (Conversion)



SPS Transmission
- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- SPS New Substation

Project
- W92 Artesia Country Club Tap 115kV

Artesia Country Club 115kV Substation (Conversion)

0 2 4 Miles

Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\Artesia Country Club Substation.mxd

Voltage: 115 kV

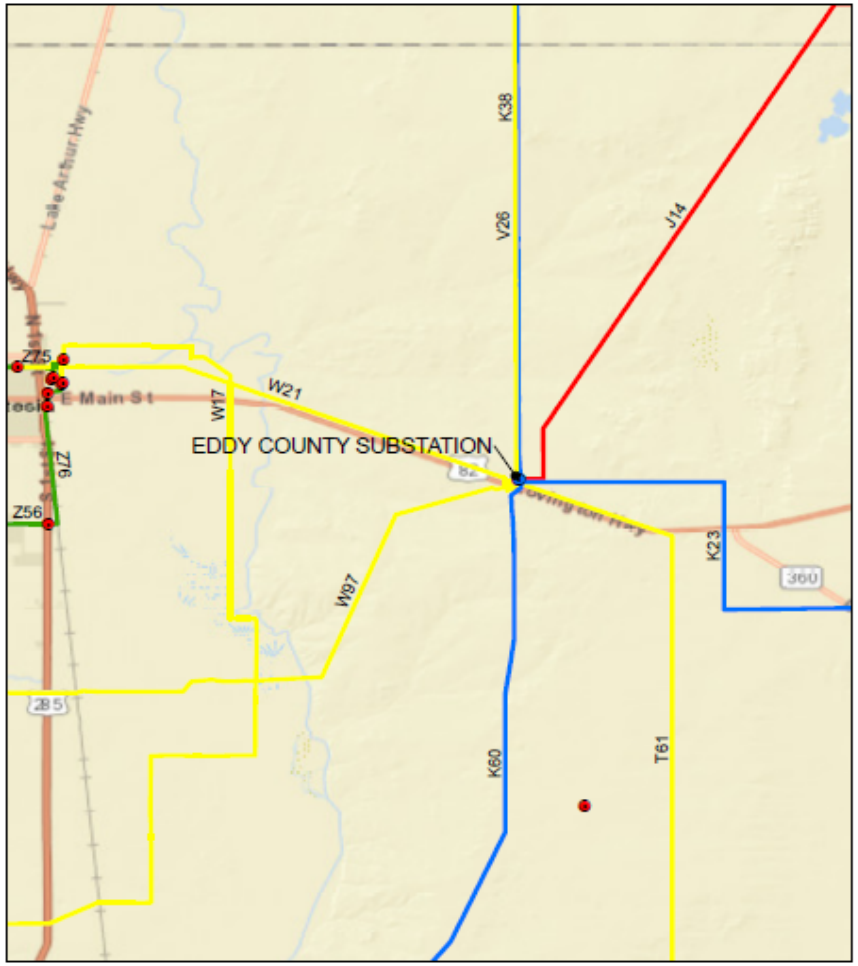
ISD: November 2019

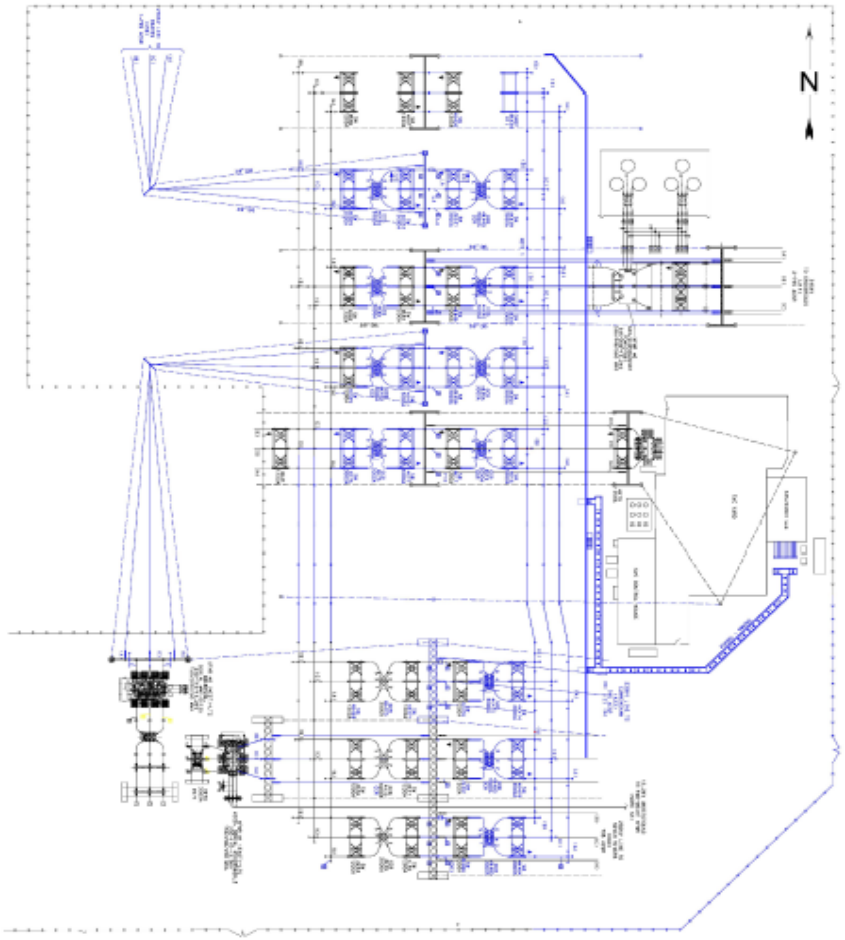
NTC: Yes

Description: Converted existing 69 kV substation to 115 kV, built new radial 115 kV line to serve substation

Need: Reliability

Eddy County Substation (Conversion)





Voltage: 230 kV

ISD: December 2019

NTC: Yes

Description: Converted Eddy Co 230 kV bus from straight bus to a double bus – double breaker

Need: Reliability

SPS Transmission
- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- SPS New Substation

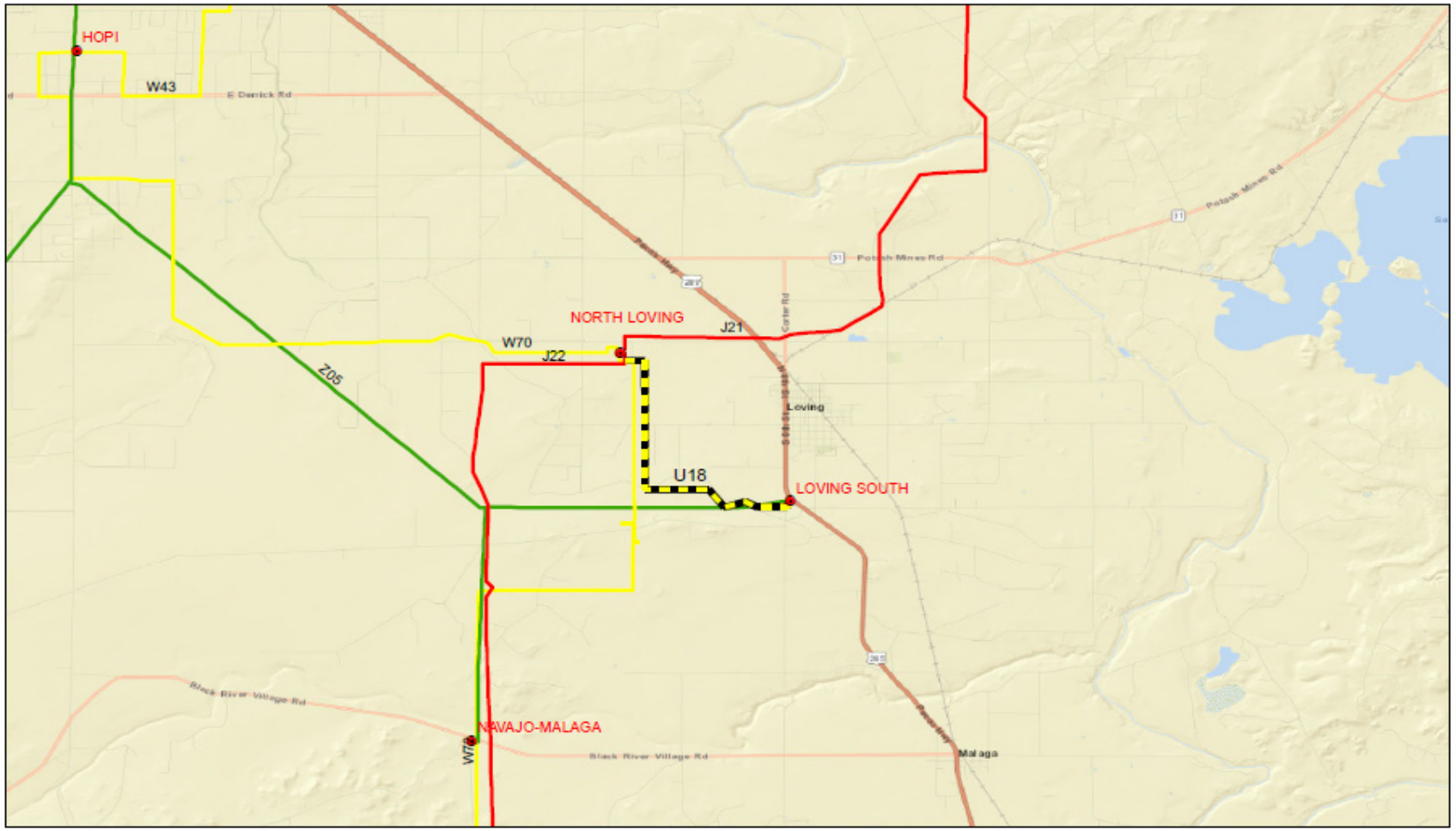
Project
- Eddy County Substation

Eddy County Substation (230kV Conversion)

0 4 8 Miles

Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\Eddy County DBDB Substation.mxd

North Loving to Loving South (Conversion)



SPS Transmission
- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- SPS New Substation

Project
- U18 North Loving to Loving South 115kV

North Loving to Loving South 115kV (Conversion)

0 2 4 Miles

Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\North Loving to Loving South 115kVmxd.mxd

Voltage: 115 kV

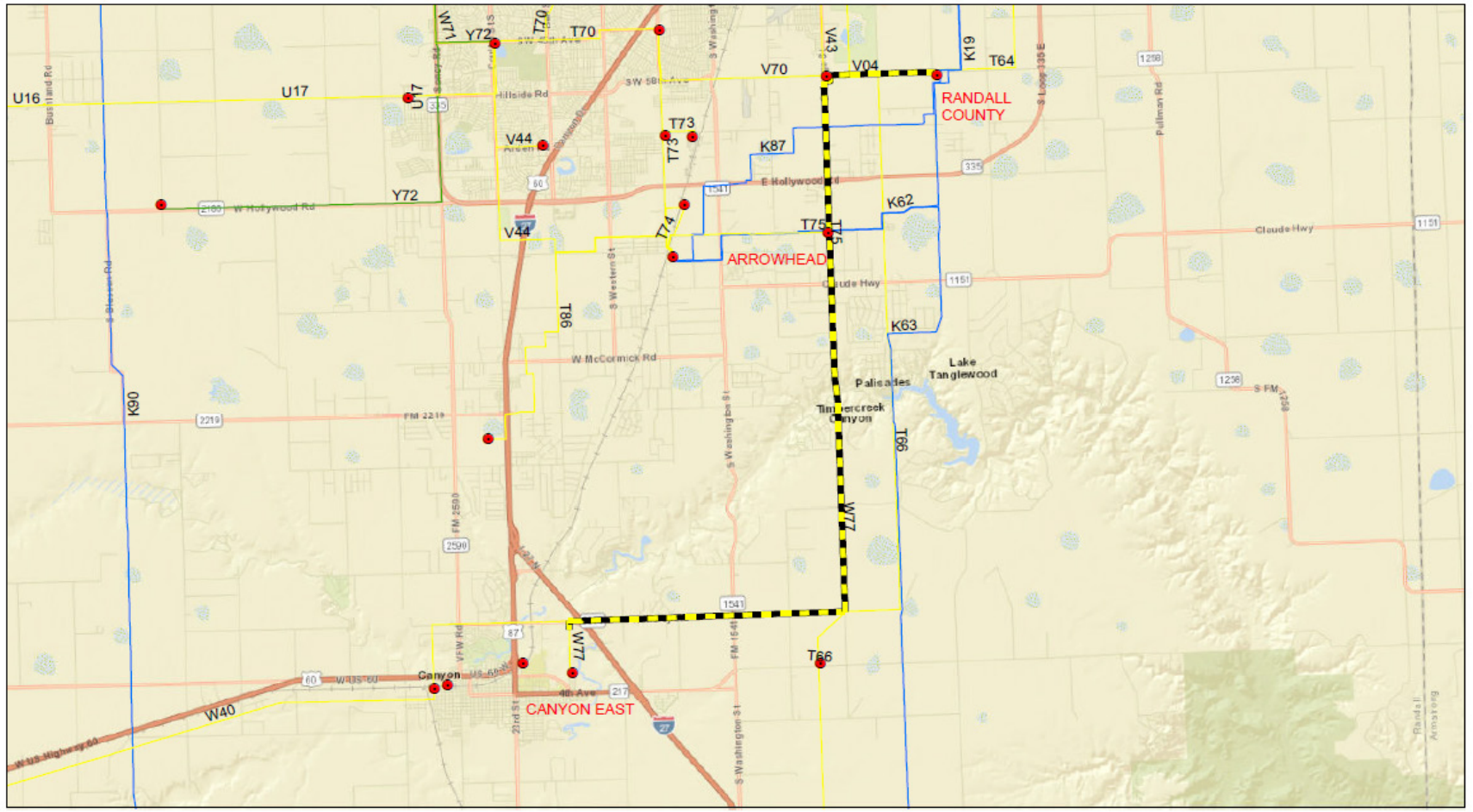
ISD: December 2019

NTC: Yes

Description: Converted existing 69 kV Loving South substation to 115 kV, built new radial 115 kV line (~4 miles long) to serve substation. Expanded North Loving substation

Need: Reliability

Canyon East Tap to Arrowhead to Randall Co (Rebuild)



SPS Transmission Project

- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- SPS New Substation

W77 CanyonE-Arrowhead-Randall 115kV

W77 Canyon East Tap to Arrowhead to Randall County 115kV (Rebuild)

0 3 6 Miles

Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\W77 Canyon E tap to Arrowhead to Randall 115kV.mxd

Voltage: 115 kV

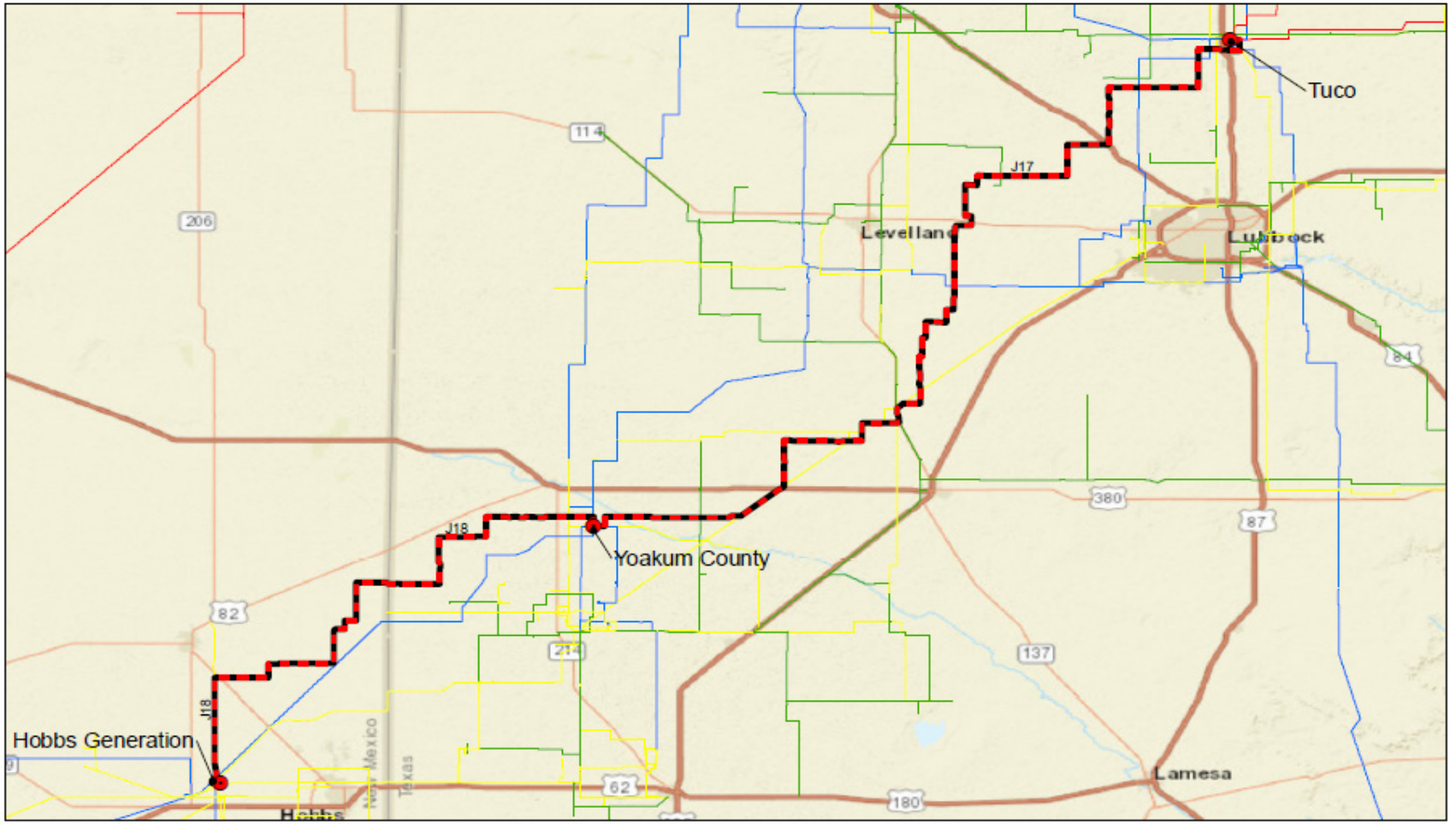
ISD: April 2020

NTC: Yes

Description: Rebuilt existing line (~16 miles long) to a higher rated conductor

Need: Reliability

Tuco to Yoakum County to Hobbs Generation (New)



SPS Transmission
- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- SPS New Substation

Project
- J17 & J18 Tuco-Hobbs 345kV

Tuco to Yoakum to Hobbs 345kV (New)

0 10 20 Miles

Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\OPIE Tuco_Hobbs.mxd

Voltage: 345 kV

ISD: June 2020

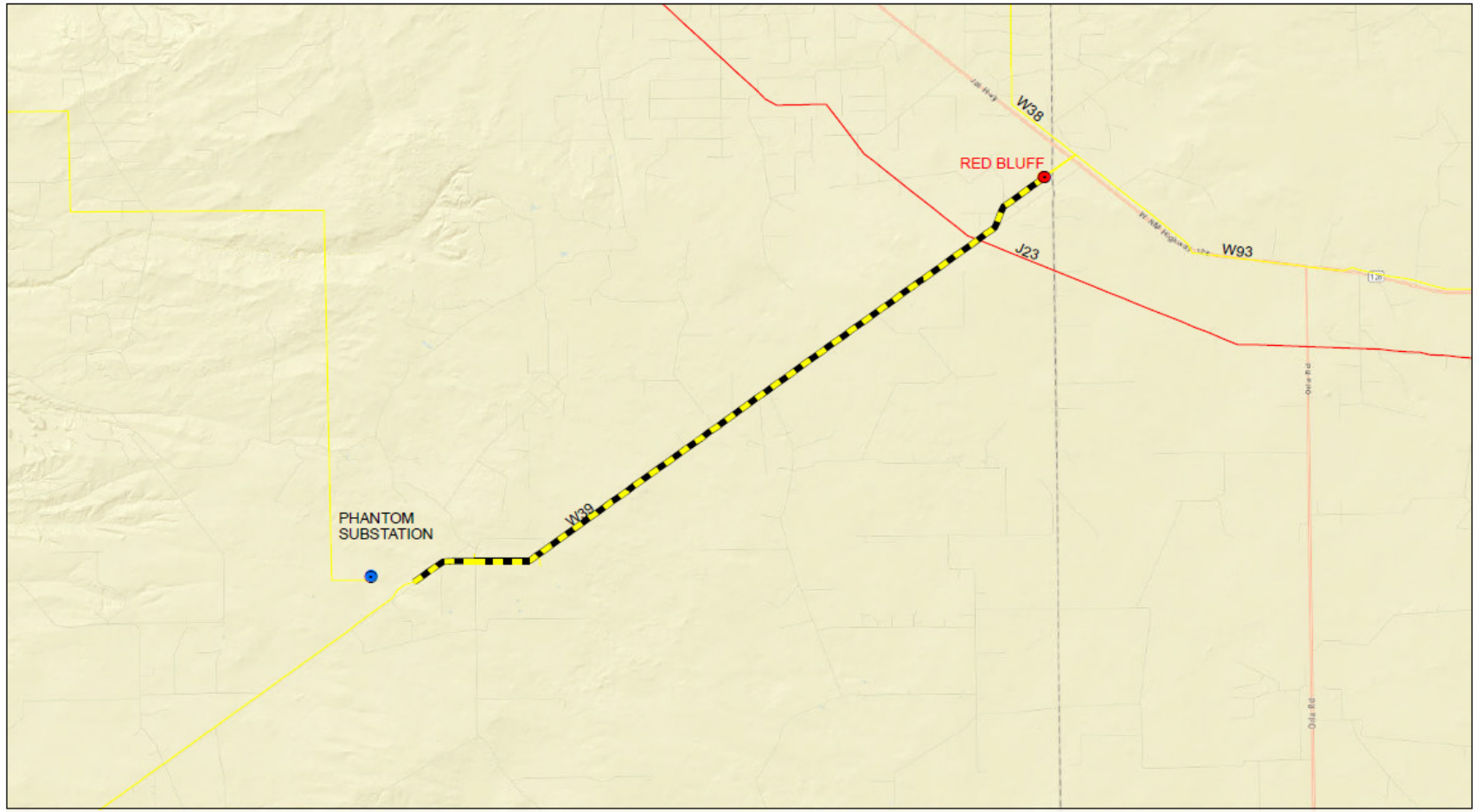
NTC: Yes

CCN: Yes

Description: Built a new 345 kV line (~160 miles long), substation expansions at Tuco and Hobbs. Built a 345 kV yard and included transformers at Yoakum Co

Need: Reliability

Red Bluff – near Phantom (Rebuild)



SPS Transmission
- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- SPS New Substation

Project
- W39 Red Bluff to Str. 88 115kV

W39 Red Bluff to Str. 88 115kV
(Rebuild)

0 2 4 Miles

Xcel Energy

Voltage: 115 kV

ISD: June 2020

NTC: No

Description: Rebuilt existing line (~8 miles long) to a higher rated conductor

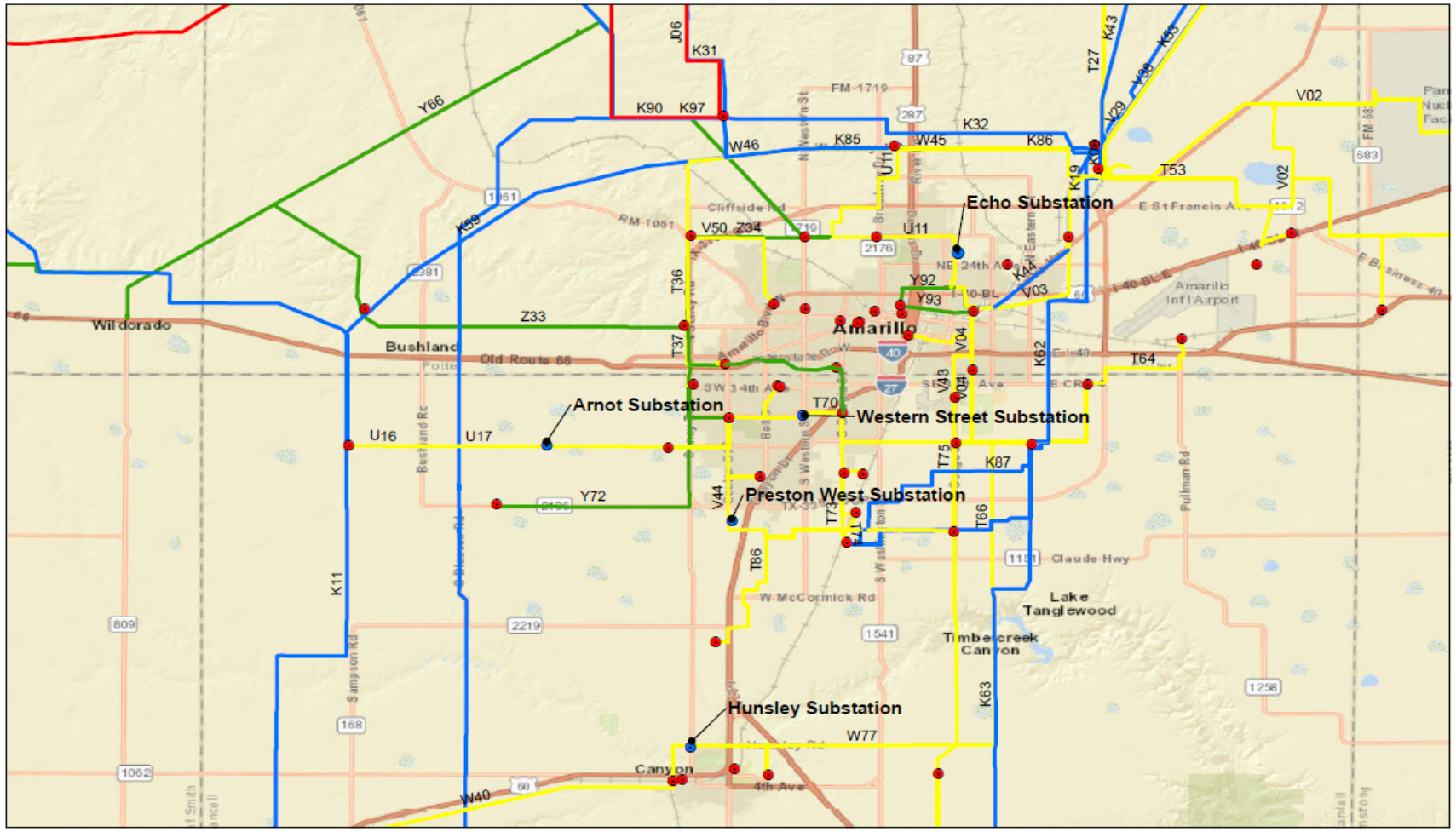
Need: Load Growth / Reliability

Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\W39 Red Bluff to Str. 88 115kV.mxd

TRANSMISSION SYSTEM ADDITIONS

Active and Future

Amarillo Distribution Additions (New)



SPS Transmission

- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- SPS New Substation

Project

- Echo Substation
- Hunsley Substation
- Arnot Substation
- Preston West Substation
- Western Street Substation

Amarillo Distribution Additions (New)

0 5 10 Miles

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Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\Hunsley_PrestonWest_Arnot_WesternStreet_Echo Substation.mxd

Voltage: 115 kV

ISD: see below

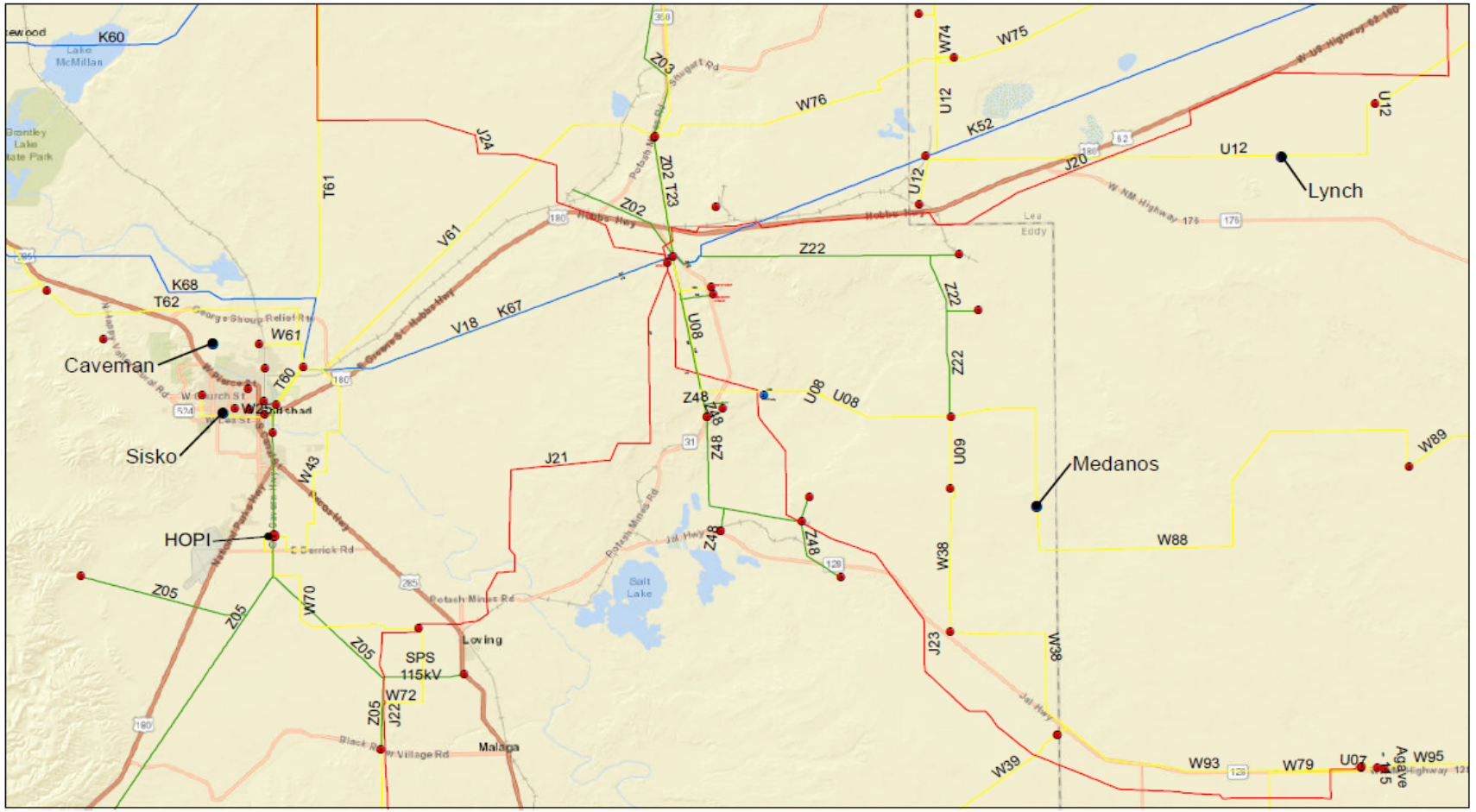
NTC: No

Description: 5 new SPS Distribution substations

- Western Street (May 2020)
- Hunsley (December 2020)
- Arnot (May 2022)
- Preston West (Dec 2022)
- Echo (April 2023)

Need: Distribution driven

SE New Mexico Distribution Additions (New)



SPS Transmission

- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- SPS New Substation

Project

- Sisko Substation
- Medanos Substation
- Lynch Substation
- Caveman Substation

SE New Mexico Distribution Additions (New)

0 5 10 Miles

Xcel Energy®

Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\SE New Mexico Distribution.mxd

Voltage: 115 kV

ISD: see below

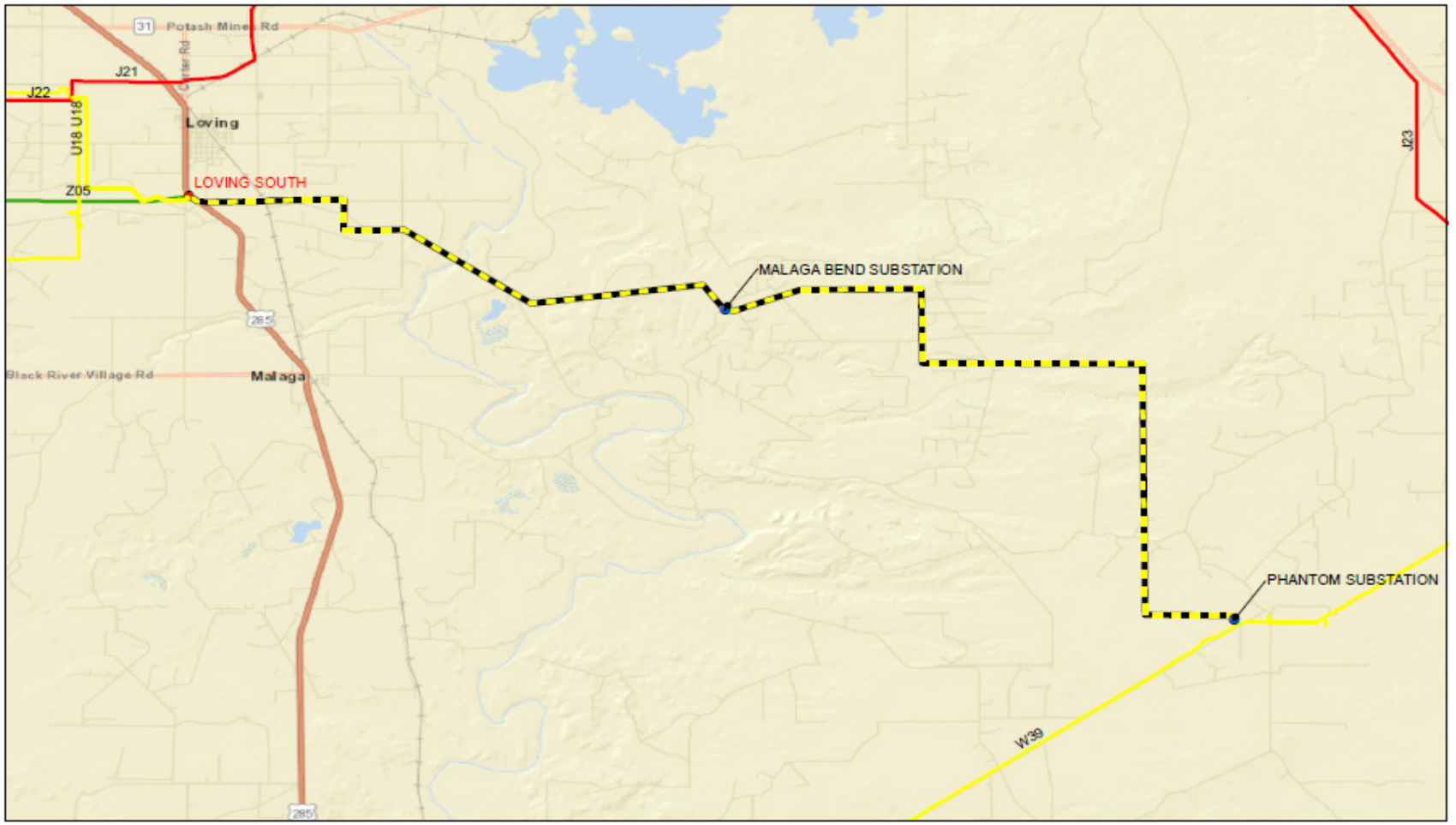
NTC: No

Description: 4 new SPS substations

- Medanos (October 2020)
- Sisko (April 2021)
- Lynch (May 2021)
- Caveman (May 2022)

Need: Distribution Driven

Loving South to Malaga Bend to Phantom (New)



SPS Transmission
- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- SPS New Substation

Project
- Loving South-Malaga Bend 115kV
- Malaga Bend-Phantom 115kV
- Malaga Bend Substation
- Phantom Substation

Loving South to Malaga Bend to Phantom 115kV (New)

0 3 6 Miles

Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\LovingSouthtoMalagaBendtoPhantom.mxd

Voltage: 115 kV

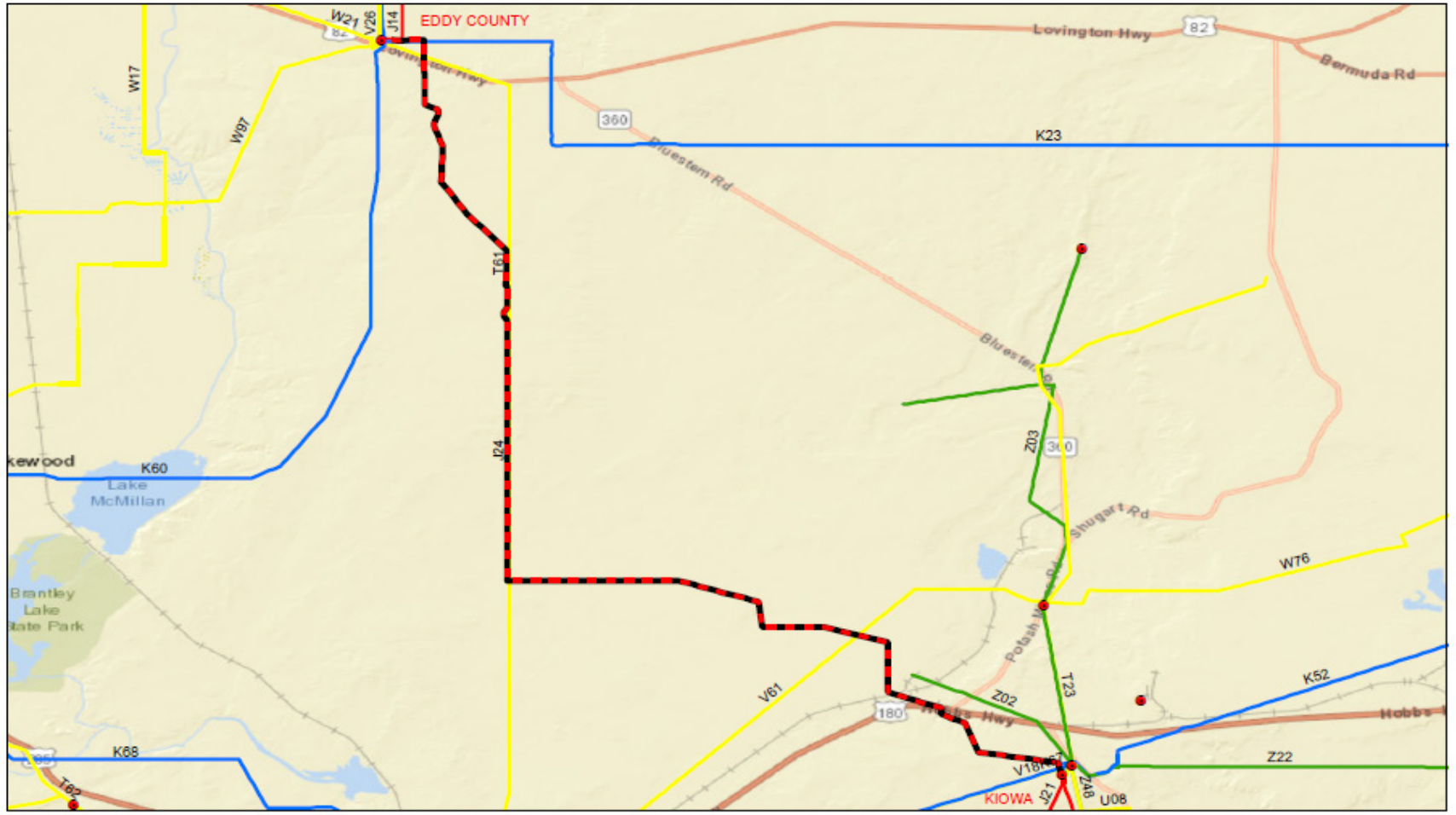
ISD: November 2020

NTC: No

Description: Build a new 115 kV line (~21 miles long) from Loving South to the new Malaga Bend Dist. sub to the new 115 kV Phantom substation. Installing 2 Dist. transformers at Malaga Bend

Need: Load Growth / Reliability

Eddy to Kiowa (New)



SPS Transmission
- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- SPS New Substation

Project
- J24 Eddy Co to Kiowa 345kV

Eddy to Kiowa 345kV (New)

0 5 10 Miles

Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\Eddy County to Kiowa.mxd

Voltage: 345 kV

ISD: November 2020

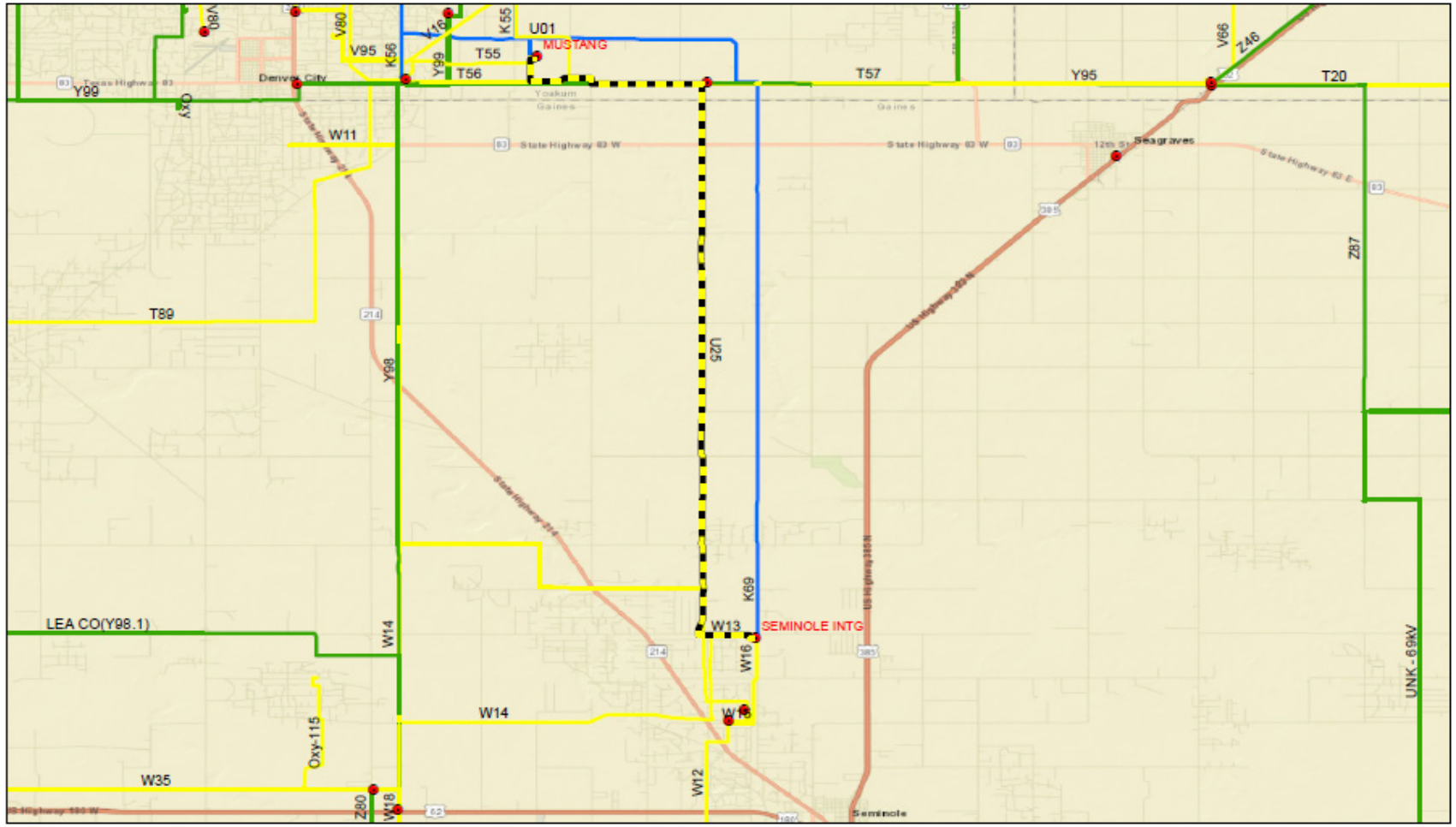
NTC: Yes

CCN: Yes

Description: Build a new 345 kV line (~34 miles long), expand substations at both ends

Need: Load Growth/Reliability

Mustang to Seminole (New)



SPS Transmission
- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- SPS New Substation

Project
- U25 Mustang to Seminole 115kV

Mustang to Seminole 115kV (New)

0 3 6 Miles

Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\Mustang to Seminole.mxd

Voltage: 115 kV

ISD: December 2020

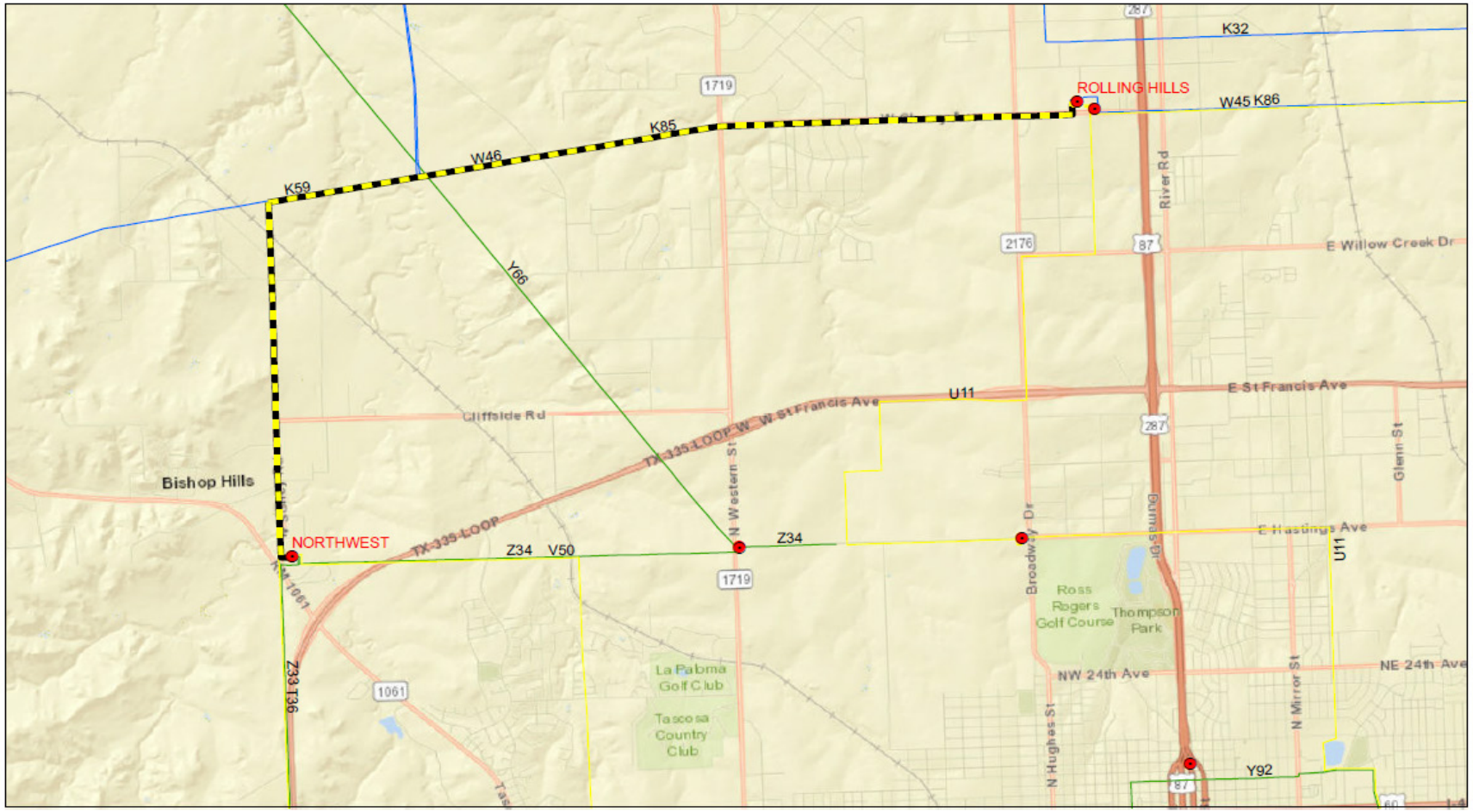
NTC: Yes

CCN: Yes

Description: Build a new line (~20 miles long), substation expansion at both ends

Need: Reliability

Rolling Hills to Northwest Interchange (Rebuild)



Voltage: 115 kV

ISD: March 2021

NTC: Yes

Description: Rebuild existing line (~8.3 miles long) to higher rated conductor

Need: Reliability

SPS Transmission
- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- SPS New Substation

Project
- W46 Rolling Hills to Northwest Intg.115kV

W39 Rolling Hills to Northwest Intg.115kV (Rebuild)

0 1 2 Miles

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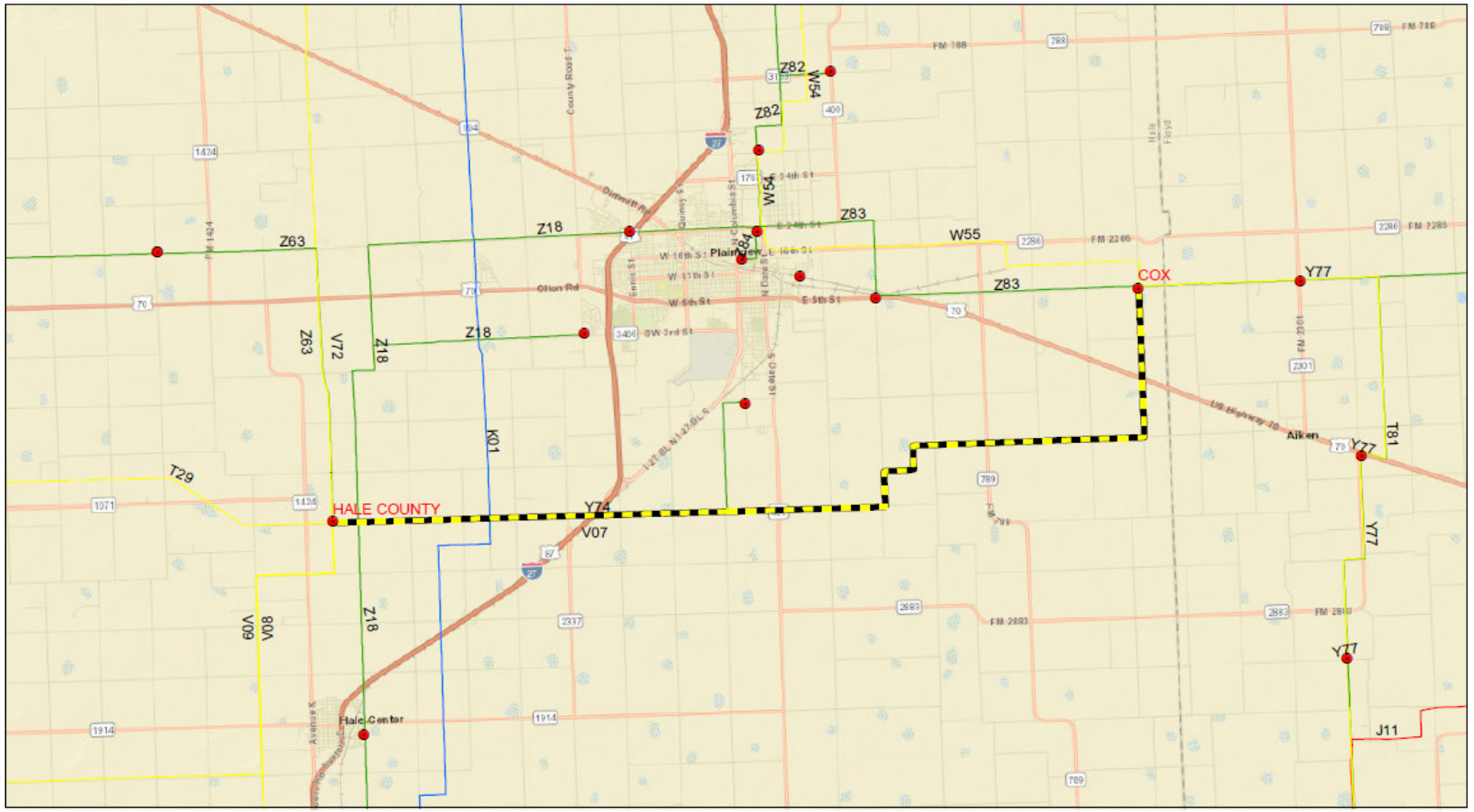
Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\W46 Rolling Hills to Northwest Intg. 115kV.mxd

Hale County to Cox (Rebuild)



Voltage: 115 kV

ISD: April 2021

NTC: Yes

Description: Rebuild existing line (~20 miles long) to a higher rated conductor

Need: Reliability

SPS Transmission

- SPS Existing Substation
- 69kV
- 115kV
- 230kV
- 345kV

Project

- V07 Hale County to Cox 115kV

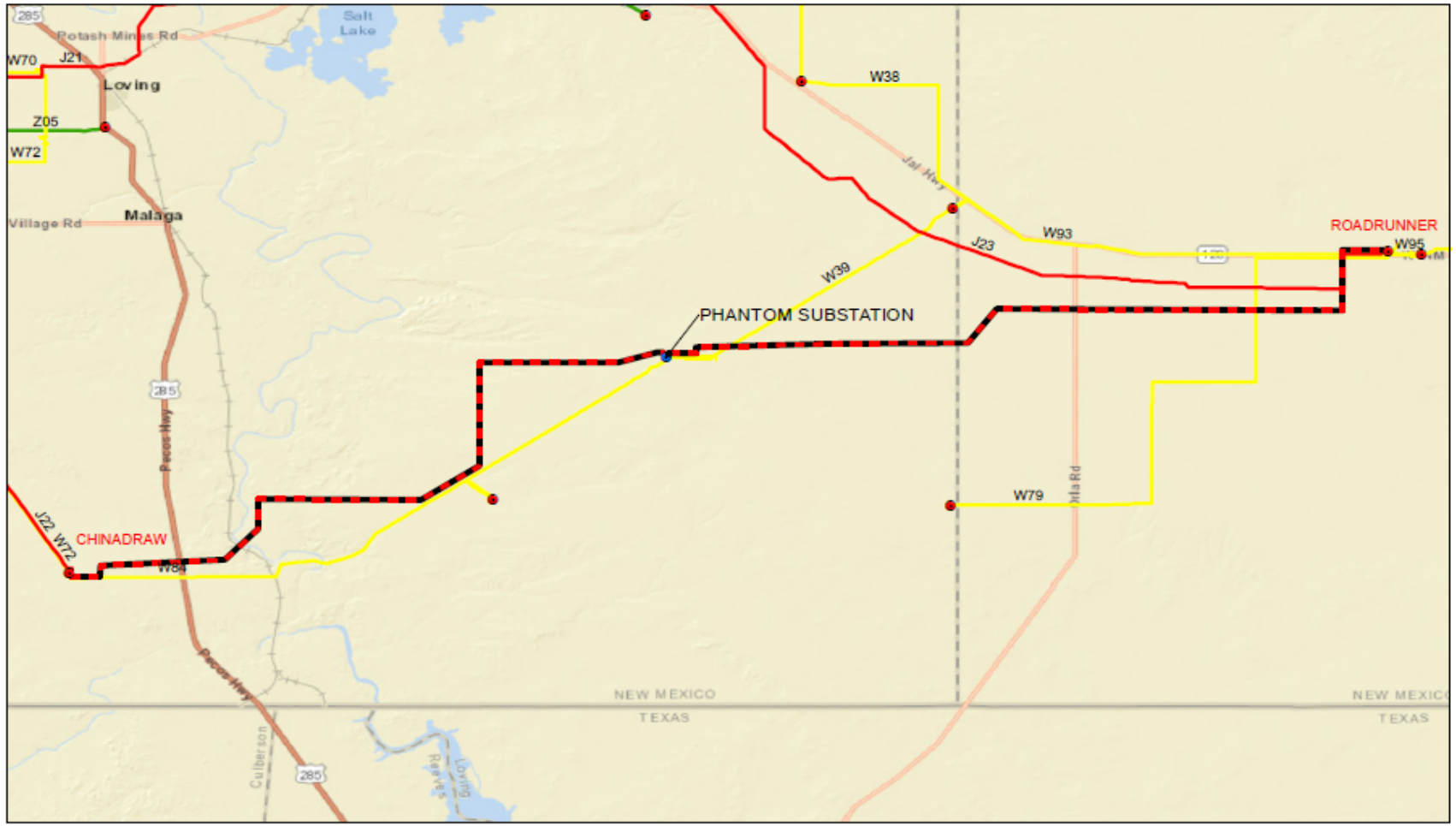
V07 Hale County to Cox115kV (Rebuild)

0 2.5 5 Miles

Xcel Energy®

Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\Hale County to Cox 115kV.mxd

China Draw to Phantom to Roadrunner (New)

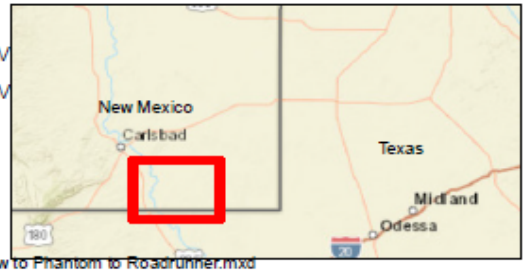


SPS Transmission

- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- SPS New Substation

Project

- China Draw to Phantom 345kV
- Phantom to Roadrunner 345kV
- Phantom Substation



China Draw to Phantom to Roadrunner 345kV (New)

0 5 10 Miles

Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\China draw to Phantom to Roadrunner.mxd

Voltage: 345 kV

ISD: November 2021

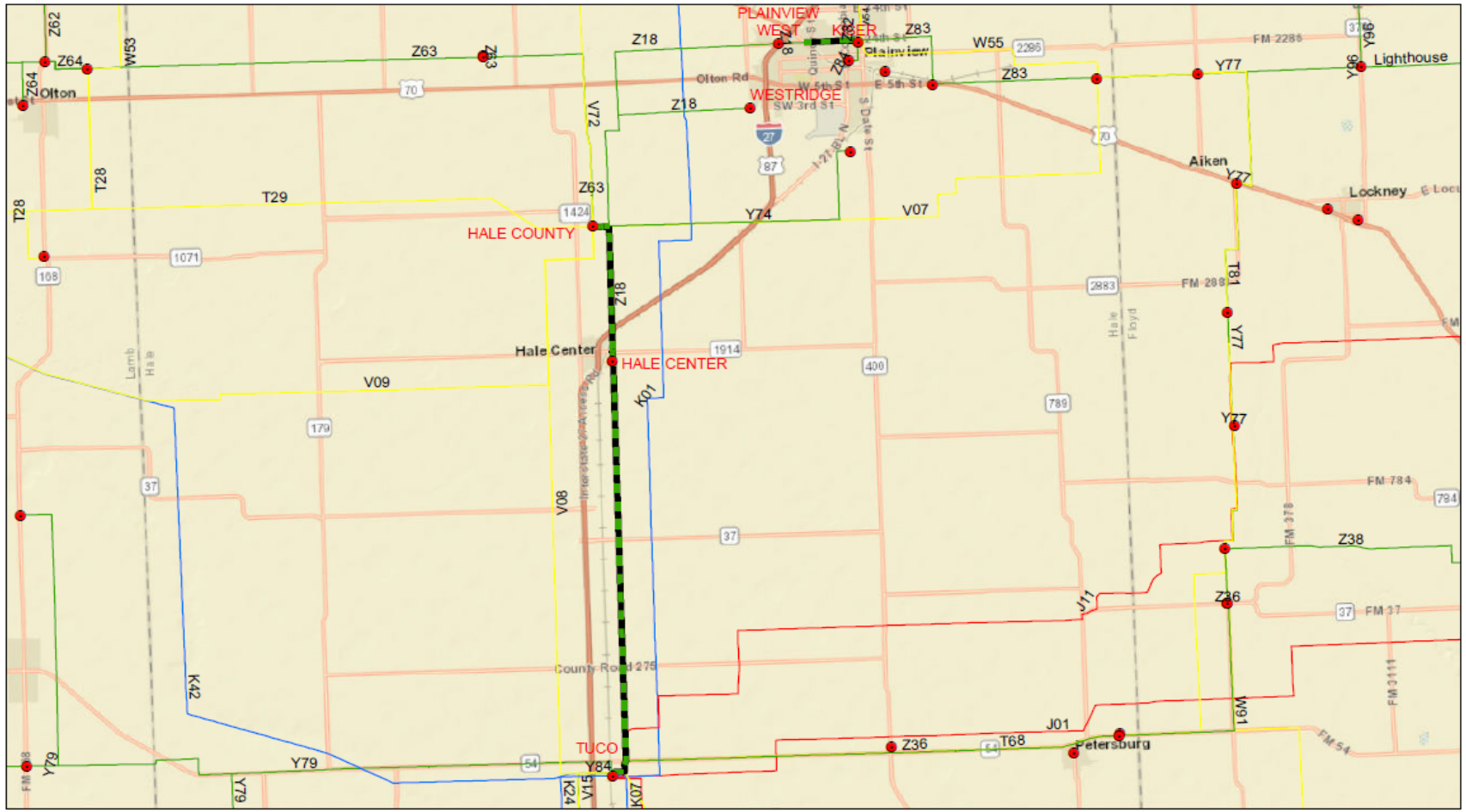
NTC: Yes

CCN: Awaiting NMPRC Approval

Description: Build a new 345 kV line (~42 miles long), expand China Draw and Roadrunner substations, and build a new Phantom 345/115 kV substation with two transformers

Need: Load Growth/Reliability

Tuco to Hale County to Plainview (Rebuild)



SPS Transmission Project

- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- Z18 Tuco to Hale County to Plainview 69kV

Z18 Tuco to Hale County to Plainview 69kV (Rebuild)

0 5 10 Miles

Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\Z18 Phase1-4 115kV.mxd

Voltage: 69 kV

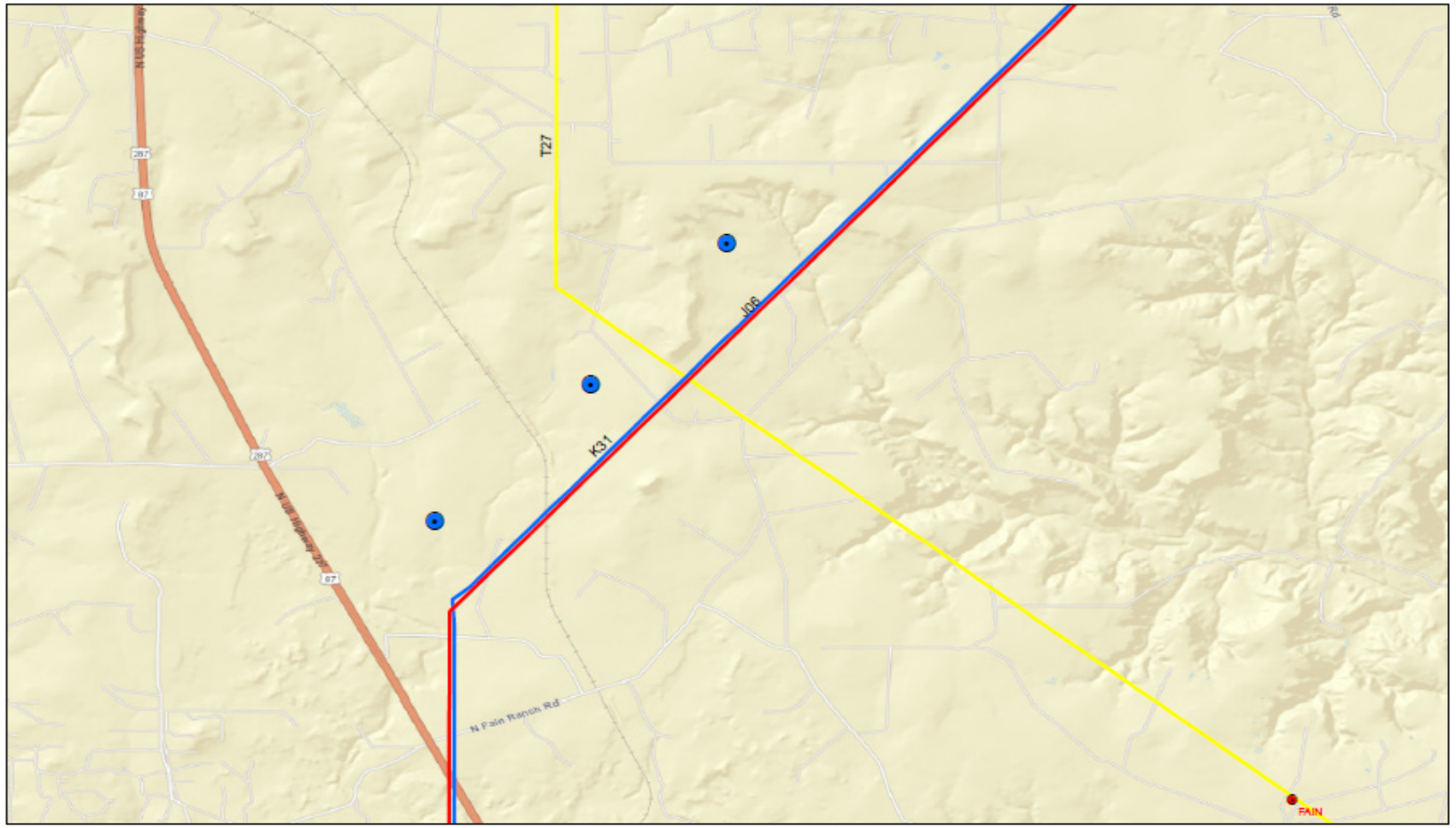
ISD: March 2022

NTC: No

Description: Spaced out across 4 stages, rebuild 69 kV line

Need: Asset Renewal

McDowell Creek Substation (New)



SPS Transmission
- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- SPS New Substation

Project
- McDowell Creek Substation sites

McDowell Creek Substation Sites 23-115kV (New)

0 0.5 1 Miles

Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\McDowell Creek.mxd

Voltage: 230 kV and 115 kV

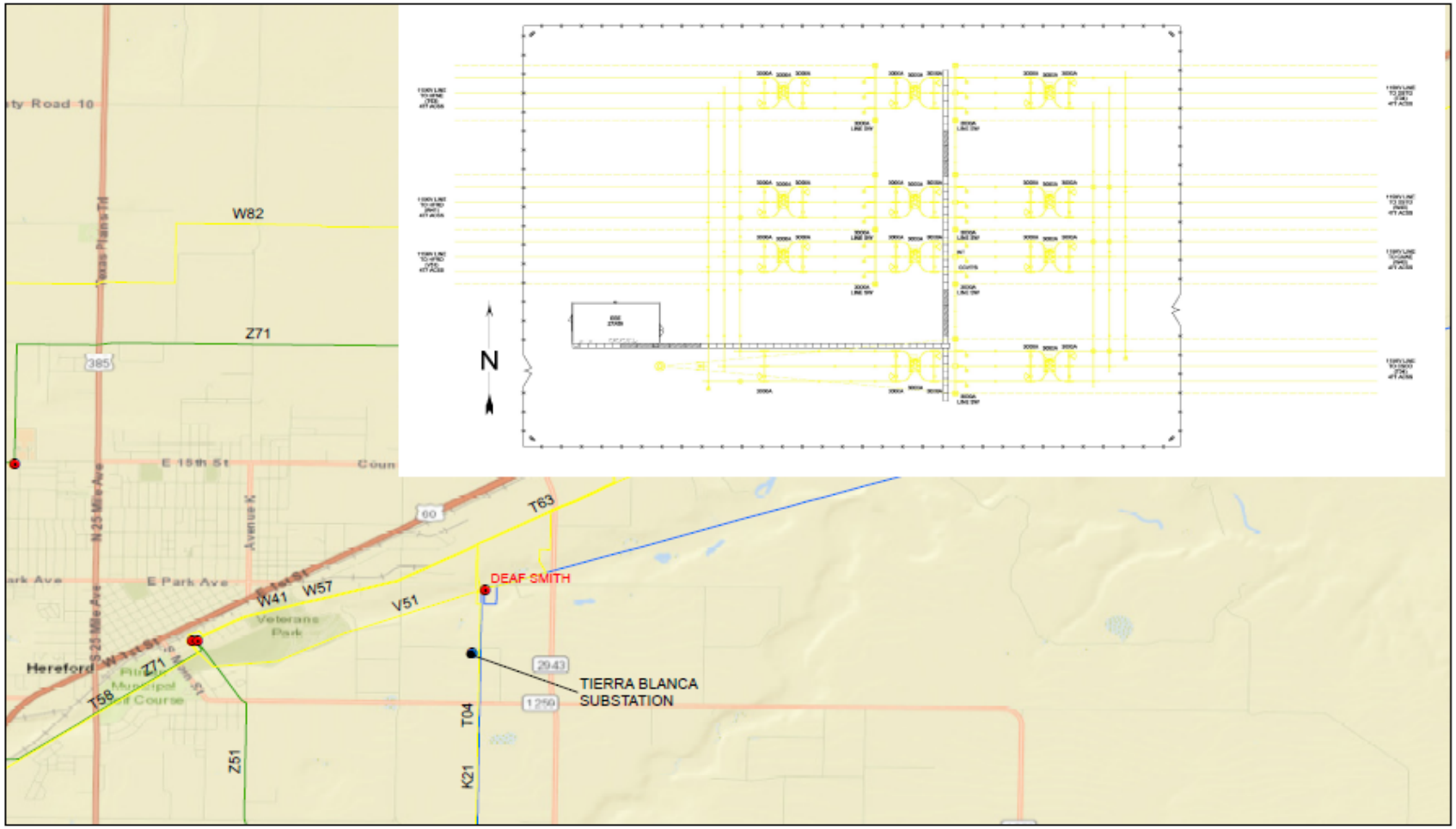
ISD: April 2022

NTC: Yes

Description: Tap Moore Co – Potter Co 230 kV line and install a 230/115 kV transformer connecting to the 115 kV line from Nichols to Dumas

Need: Reliability

Tierra Blanca Substation (New)



Voltage: 115 kV

ISD: April 2022

NTC: No

Description: Build a new breaker and a half substation and reterminate five 115 kV lines from the SPS Deaf Smith substation (existing straight bus) to address bus fault concerns

Need: Reliability

SPS Transmission
- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- SPS New Substation

Project
- Tierra Blanca Substation

Tierra Blanca Substation (New)

0 1 2 Miles

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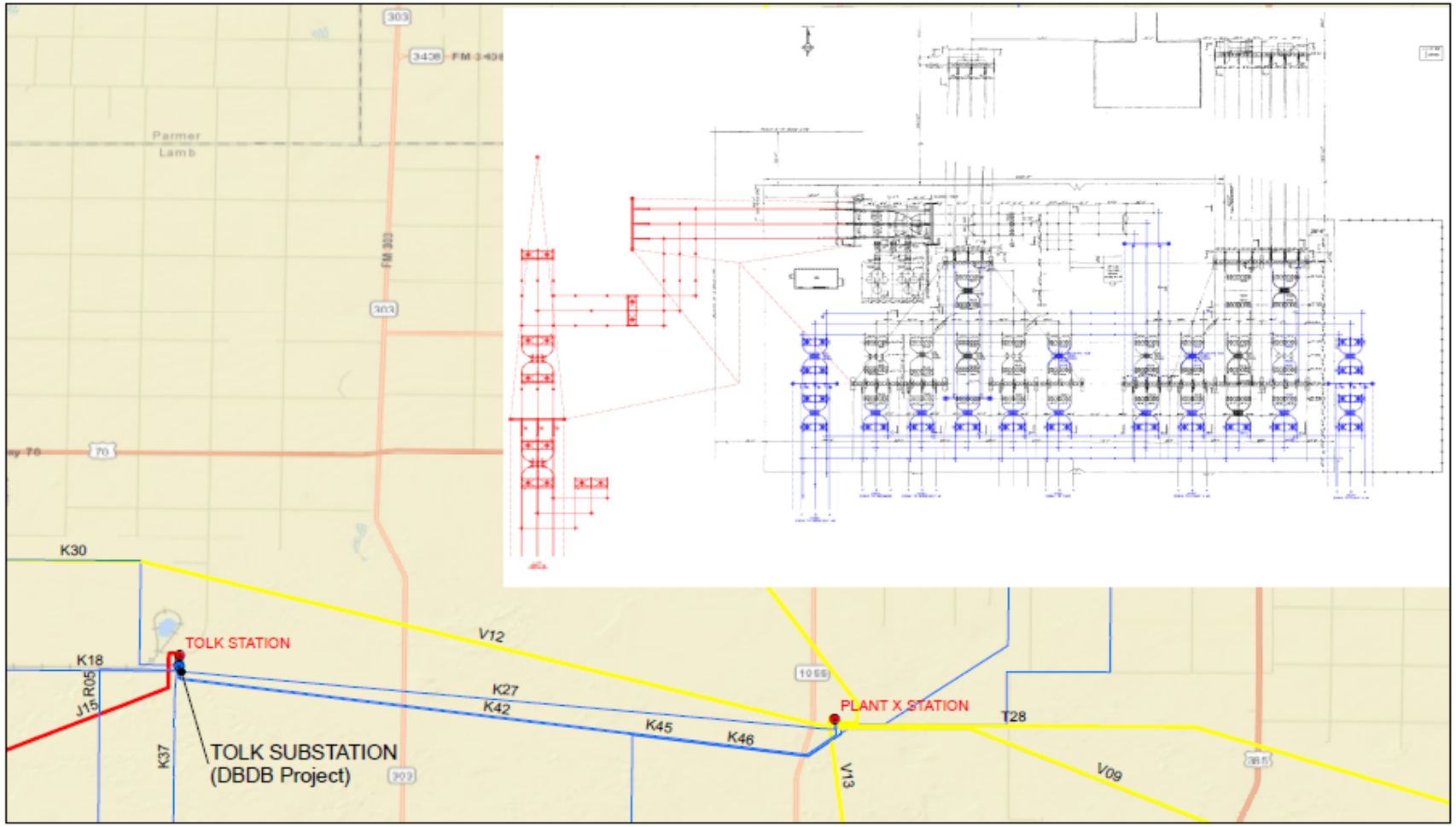
Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\Tierra Blanca Substation.mxd

Tolk Substation (Conversion)



Voltage: 230 kV

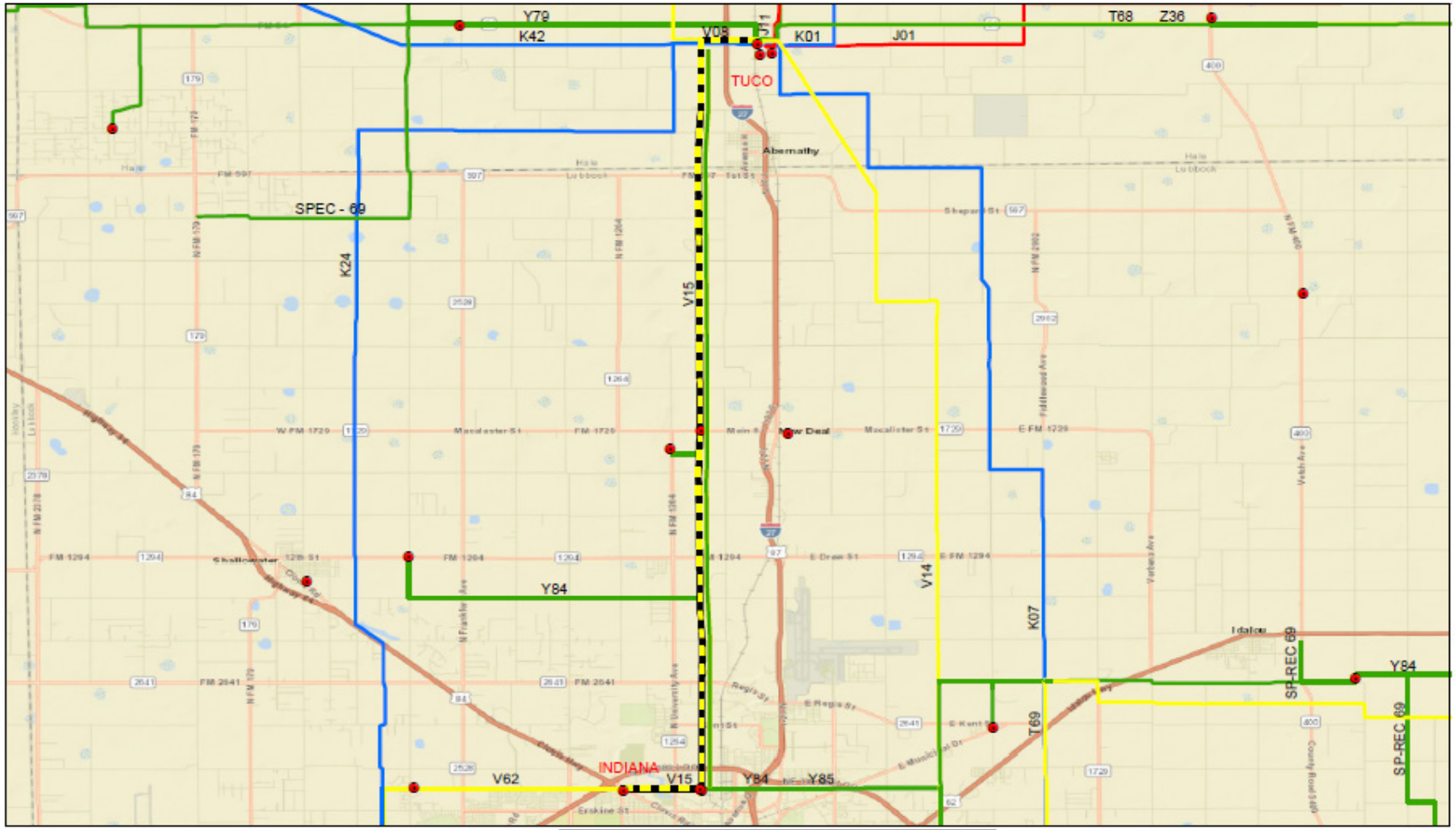
ISD: May 2022

NTC: No

Description: Convert the existing 230 kV straight bus at Tolk to a double breaker - double bus configuration to address bus fault concerns

Need: Reliability

Tuco to Indiana (Rebuild)



SPS Transmission
- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- SPS New Substation

Project
- V15 Tuco-Indiana 115kV

Tuco to Indiana 115kV (Rebuild)

0 3 6 Miles

Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\Tuco to Indiana Rebuild.mxd

Voltage: 115 kV

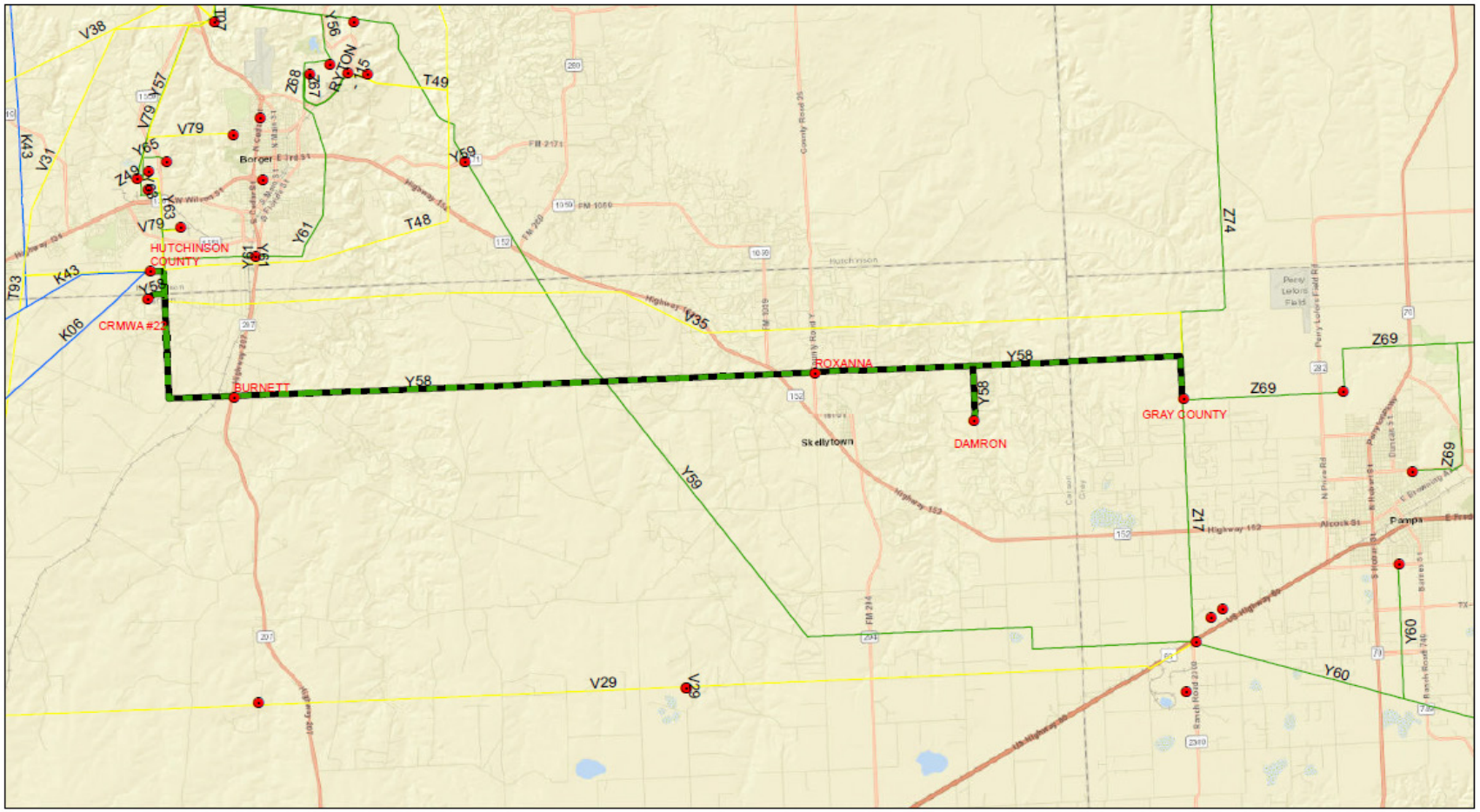
ISD: Oct 2022

NTC: No

Description: Rebuild the double circuit 115/69 kV line (~19 miles)

Need: Asset Renewal

Y58 Hutchinson County to Gray County (Rebuild)



Voltage: 69 kV

ISD: November 2022

NTC: No

Description: Rebuild existing 69 kV line (~26 miles long)

Need: Asset Renewal

SPS Transmission Project

- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- Y58 Hutchinson County to Gray County 69Kv

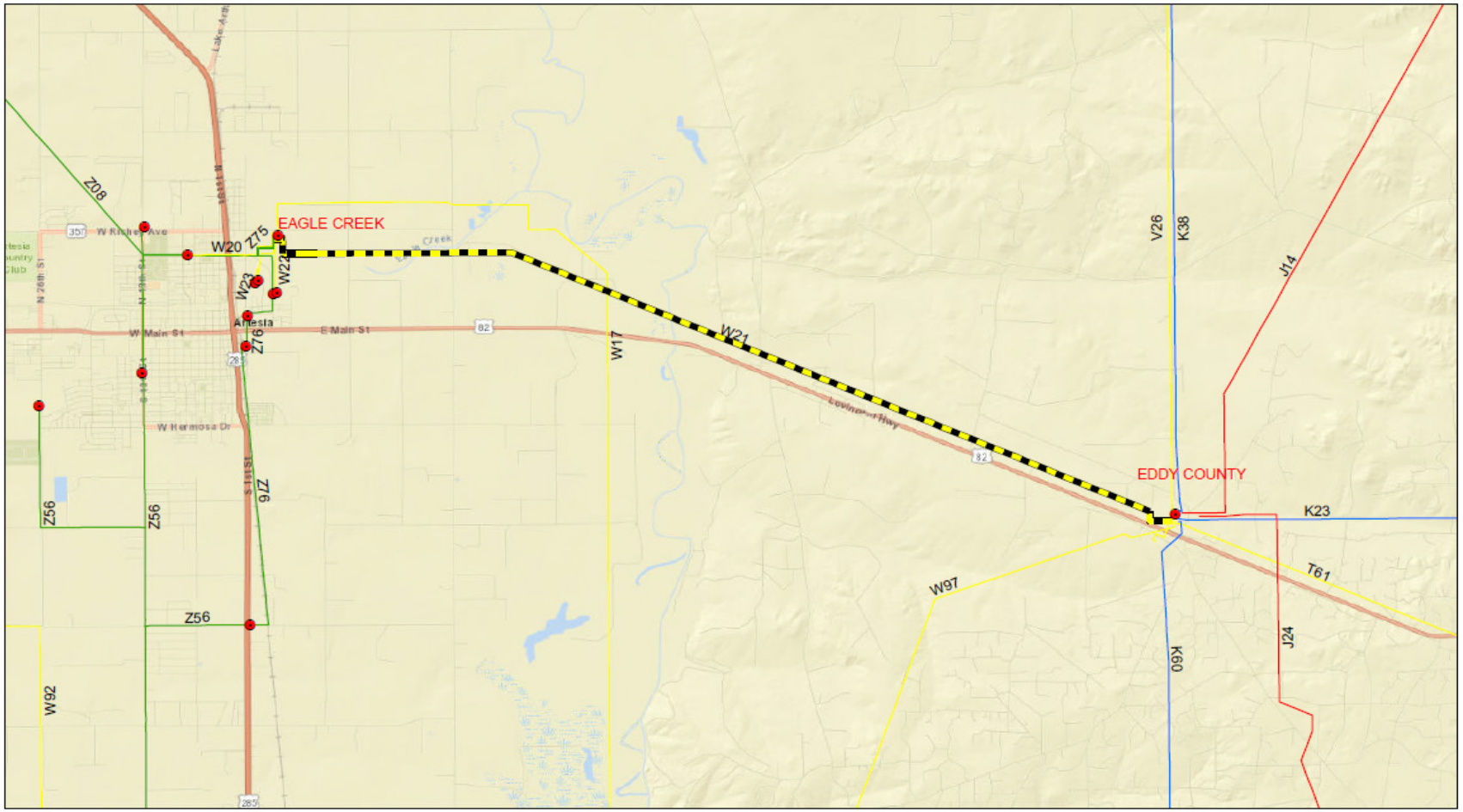
Y58 Hutchison County to Gray County 69kV (Rebuild)

0 3 6 Miles

Xcel Energy

Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\Y58HutchinsonCounty to Gray County 69kV.mxd

W21 Eagle Creek to Eddy County (Rebuild)



Voltage: 115 kV

ISD: November 2022

NTC: No

Description: Rebuild existing 115 kV line (~9 mile long)

Need: Asset Renewal

SPS Transmission Project

- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- W21 Eagle Creek to Eddy County 115kV

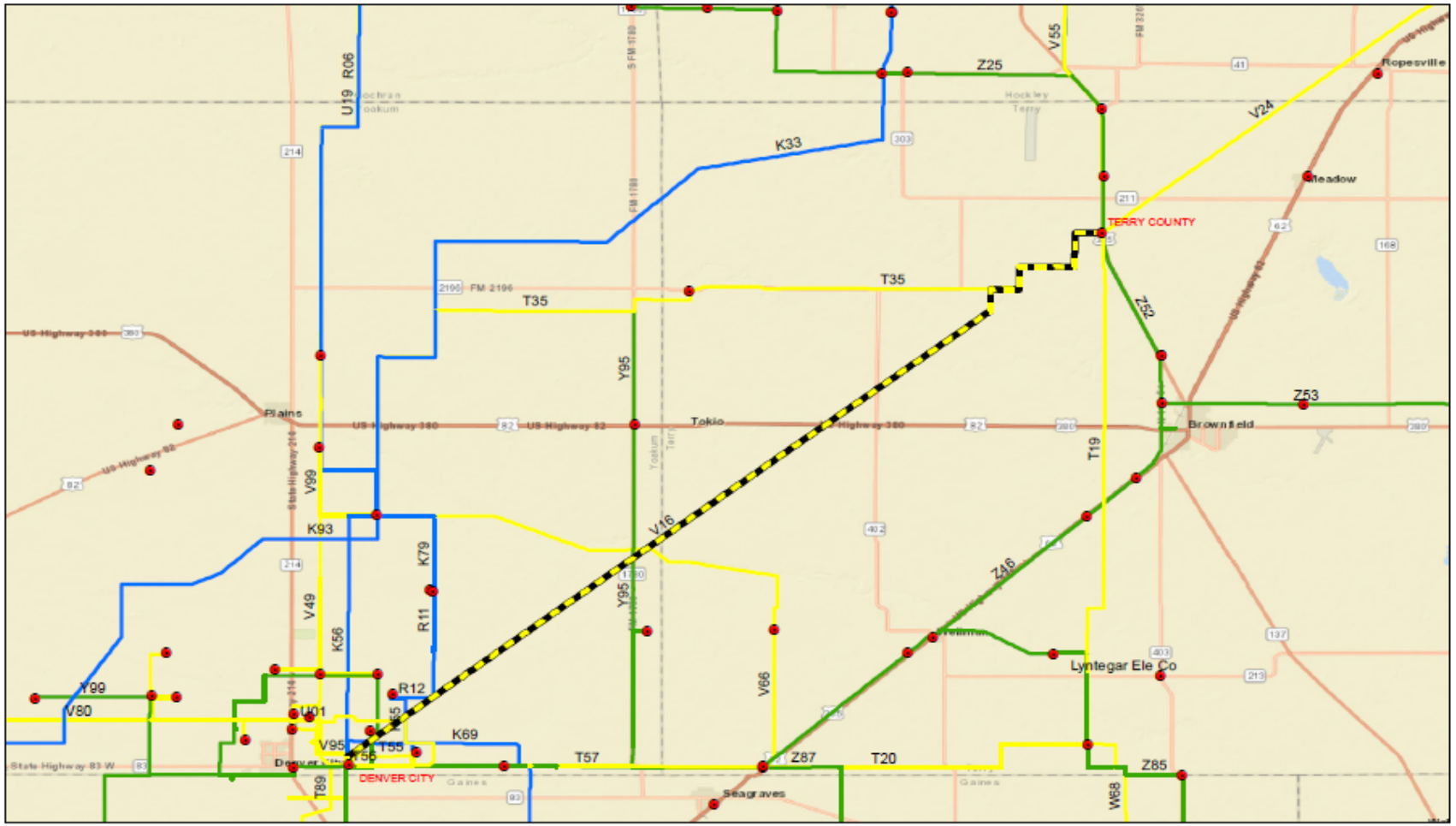
W21 Eagle Creek to Eddy County 115kV (Rebuild)

0 1 2 Miles

Xcel Energy®

Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\W21 Eagle Creek to Eddy County 115kV.mxd

V16 Terry County to Denver City (Rebuild)



SPS Transmission

- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- SPS New Substation

Project

- V16 Terry Co-Denver City 115kV

Terry Co to Denver City 115kV (Rebuild)

0 5 10 Miles

Document Path: R:\Project Warehouse\0_SPS Projects\Planning_PM_Maps\Terry Co to Denver City.mxd

Voltage: 115 kV

ISD: May 2023

NTC: No

Description: Rebuild 115 kV line (~35 miles long)

Need: Asset Renewal

Additional Future Project

- Kiowa Substation - Add an additional 345 kV breaker in Series
  - Adding an additional breaker between two line terminals (in the breaker and a half configuration) to mitigate a breaker failure contingency
  - ISD: December 2021

ADDITIONAL INFORMATION

Cancelled NTC Projects

Network Upgrades Associated with DISIS 2016-002

2019 Integrated Transmission Plan (ITP) Project list

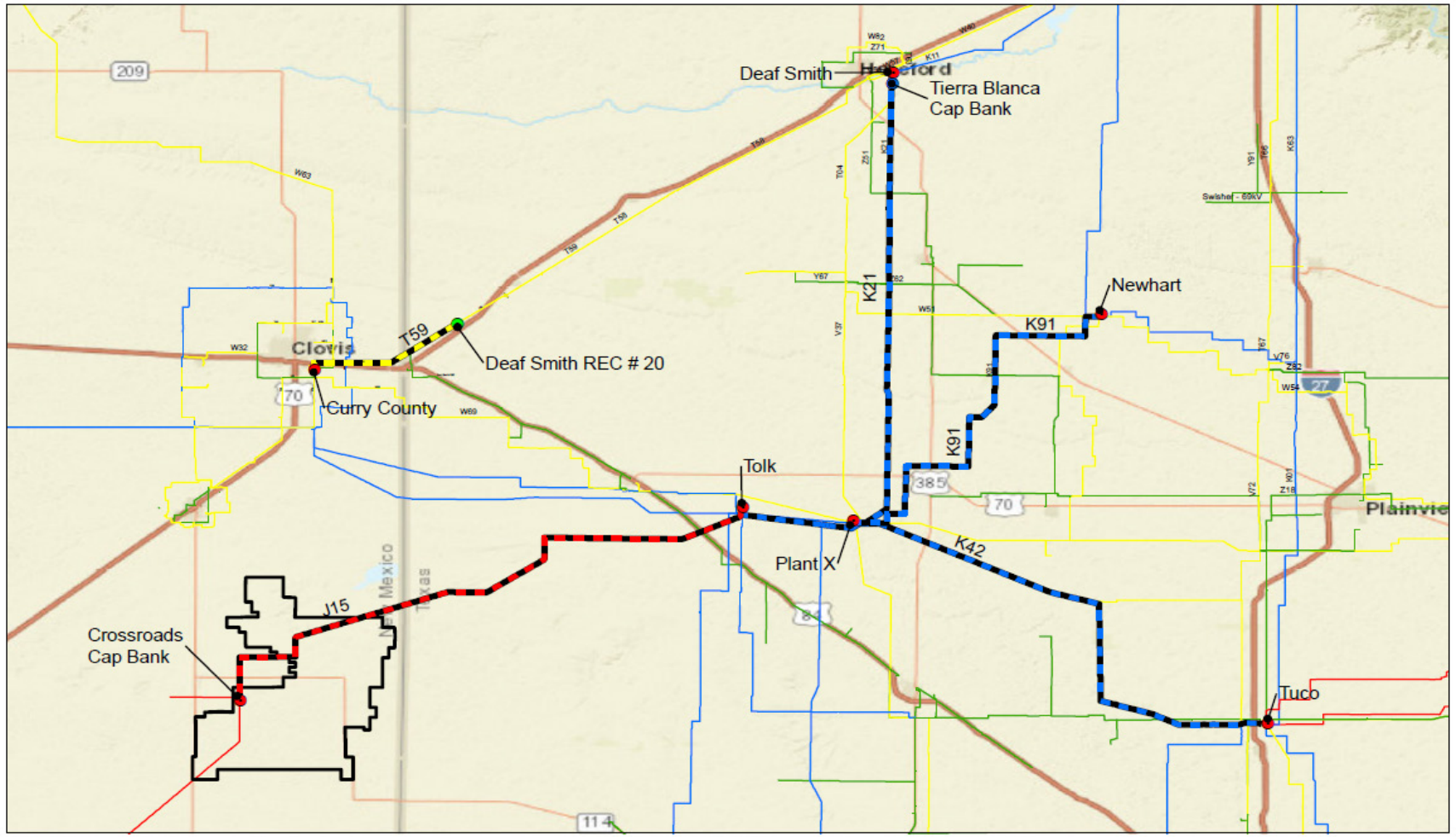
Power for the Plains

Cancelled NTC Projects

- Pecos 230/115 kV Transformer Upgrade
  - Requested to SPP by Xcel Energy due to internal review
  - Received NTC withdrawal letter – September 2019

- Byrd Tap – Cooper Ranch – Oil Center – Lea Road 115 kV Rebuild
  - Requested to SPP by Xcel Energy due to internal review
  - Received NTC withdrawal letter – August 2020

DISIS 2016-002 Network Upgrades



SPS Transmission

- 69kV
- 115kV
- 230kV
- 345kV
- SPS Existing Substation
- Foreign Substation

Project

- J15 Crossroads to Tolk 345kV
- K91 Newhart to Plant X 230kV
- K42 Tolk to Tuco 230kV
- K21 Deaf Smith to Plant X 230kV
- T59 Curry to Deaf Smith #20 115kV
- Sagamore Wind Boundary

DISIS-2016-002 Network Upgrades

0 15 30 Miles

Voltage: 345, 230, 115 kV

ISD: see next slide

NTC: No, GIA

Description: see next slide

Need: Generation Interconnection

DISIS 2016-002 Network Upgrades (continued) – SPS Projects

- Newhart – Plant X 230 kV line (uprate)
  - ISD: April 2020
- Tolk – Tuco 230 kV line (uprate)
  - ISD: April 2020
- Crossroads – Tolk 345 kV line (uprate)
  - ISD: April 2020
- Crossroads – Eddy Co 345 kV line (uprate)
  - ISD: April 2020
- Curry – Deaf Smith #6 115 kV (rebuild)
  - ISD: November 2020
- Deaf Smith – Plant X 230 kV line (uprate)
  - ISD: November 2020
- Crossroads capacitor bank – 100 MVAR
  - ISD: November 2020
- Tuco capacitor bank – 100 MVAR
  - ISD: May 2021
- Tierra Blanca capacitor bank – 100 MVAR
  - ISD: November 2021
- Tolk 2nd 345/230 kV transformer
  - ISD: November 2021

2019 Integrated Transmission Plan (ITP) Projects

- Overstressed breaker replacements
  - Carlsbad Interchange (1x)
  - Hale County 115 kV (3x)
  - Denver City Interchange (2x)

  ➢ ISD:

  ➢ ISD: December 2020

  ➢ ISD: March 2021

- Amoco – Sundown 115 kV
  - Need: Economic
  - Description: Upgrade terminal equipment

  ➢ ISD: December 2020

- Spearman – Hansford 115 kV
  - Need: Economic
  - Description: Upgrade terminal equipment and rebuild 1.2 miles of 115 kV line

  ➢ ISD: April 2021

Power for the Plains Website

http://www.powerfortheplains.com/

- Description for some of the projects
- Routing maps, when available
- General project information

SWITCH REQUIREMENTS for Load Interconnections

Kenny Munsell | Senior Manager, Transmission Line Engineering

Xcel Energy – Texas/New Mexico Sub-Regional Transmission Planning Meeting

October 5, 2020

WHAT WE'LL REVIEW

1. Xcel Energy Interconnection Guidelines
2. Xcel Energy Line Switch Standard
3. What we've done in the past
4. What we're doing today
5. Questions

INTERCONNECTION GUIDELINES

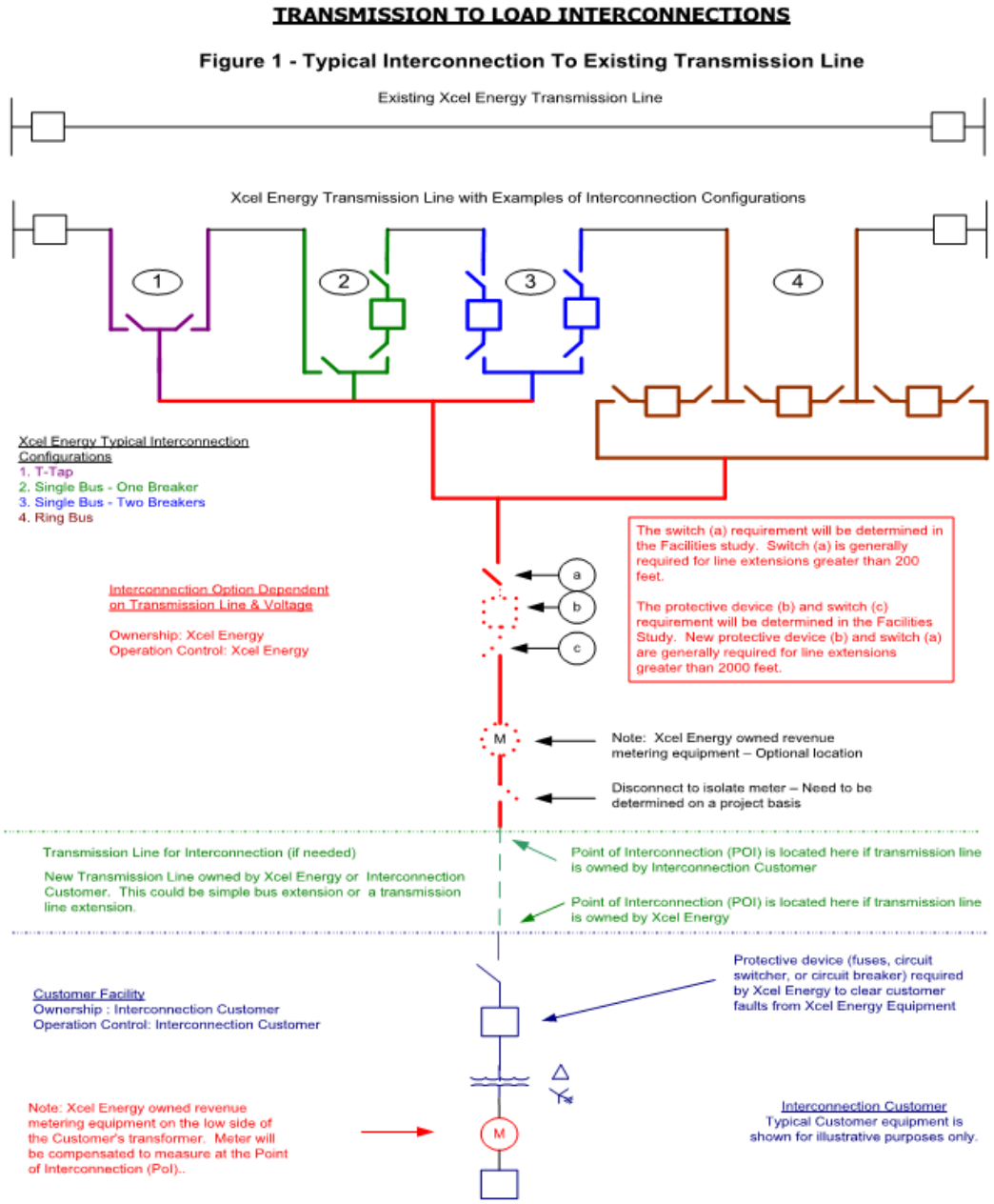
Link to Document:

Interconnection Guidelines for Transmission Interconnected Customer Loads

Technical Requirements

Interconnection Configuration

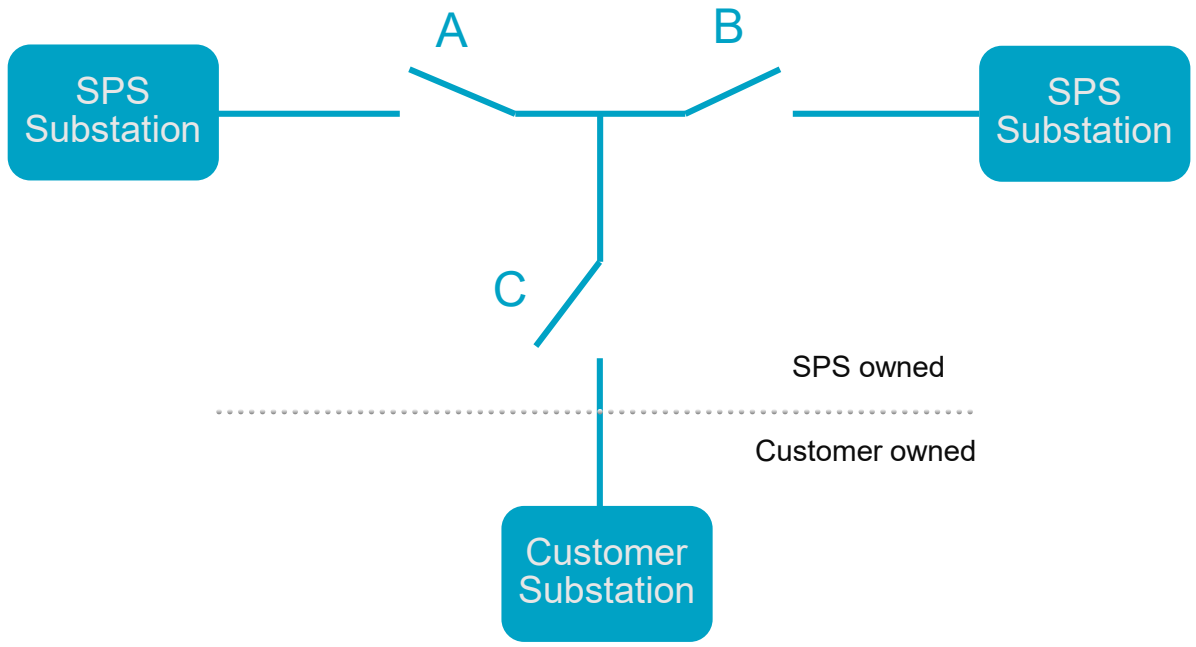
- Substation or line tap
  - Substation interconnections are more reliable, but also more costly
  - Line taps allowed for 69kV and 115kV
  - May require substation interconnection to limit potential loss of load for line fault
    - Limit number of taps
    - Limit load on taps
- Diagrams provided to illustrate typical configurations
  - Facility Study determines configuration
- Let's focus on line taps



Line Taps

Switch Configuration

- Determined by Facility Study
- Switches either side of the tap – A and B
  - Always required
  - Allow for sectionalizing of the line
  - Better reliability for customer
  - Network upgrade cost
- Switch on tap – C
  - Normally required
  - Allows for disconnect of customer
  - Restore line in event of damage to customer equipment
  - Cost assigned to customer

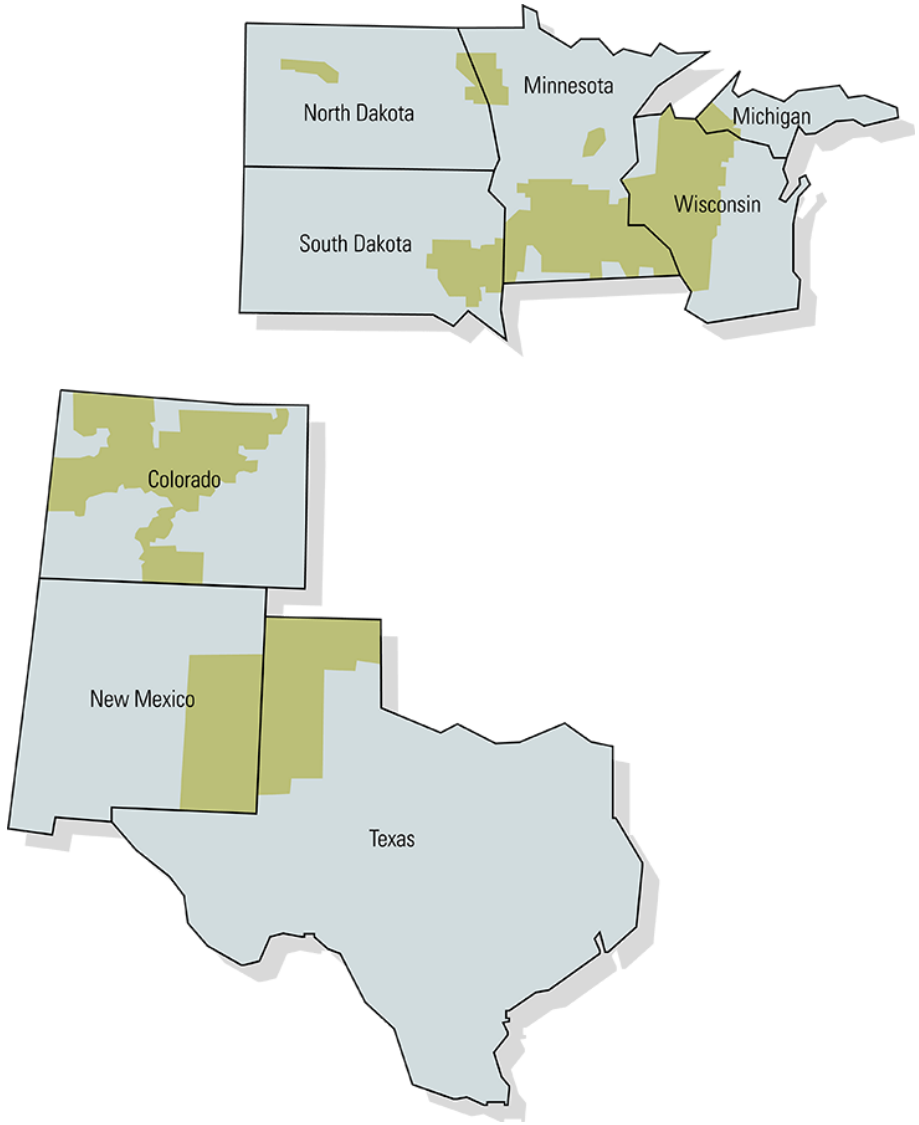


XCEL ENERGY TRANSMISSION LINE SWITCH STANDARD

Guideline for Engineering & Design of Switches – Pole Mounted

History
And Applicability

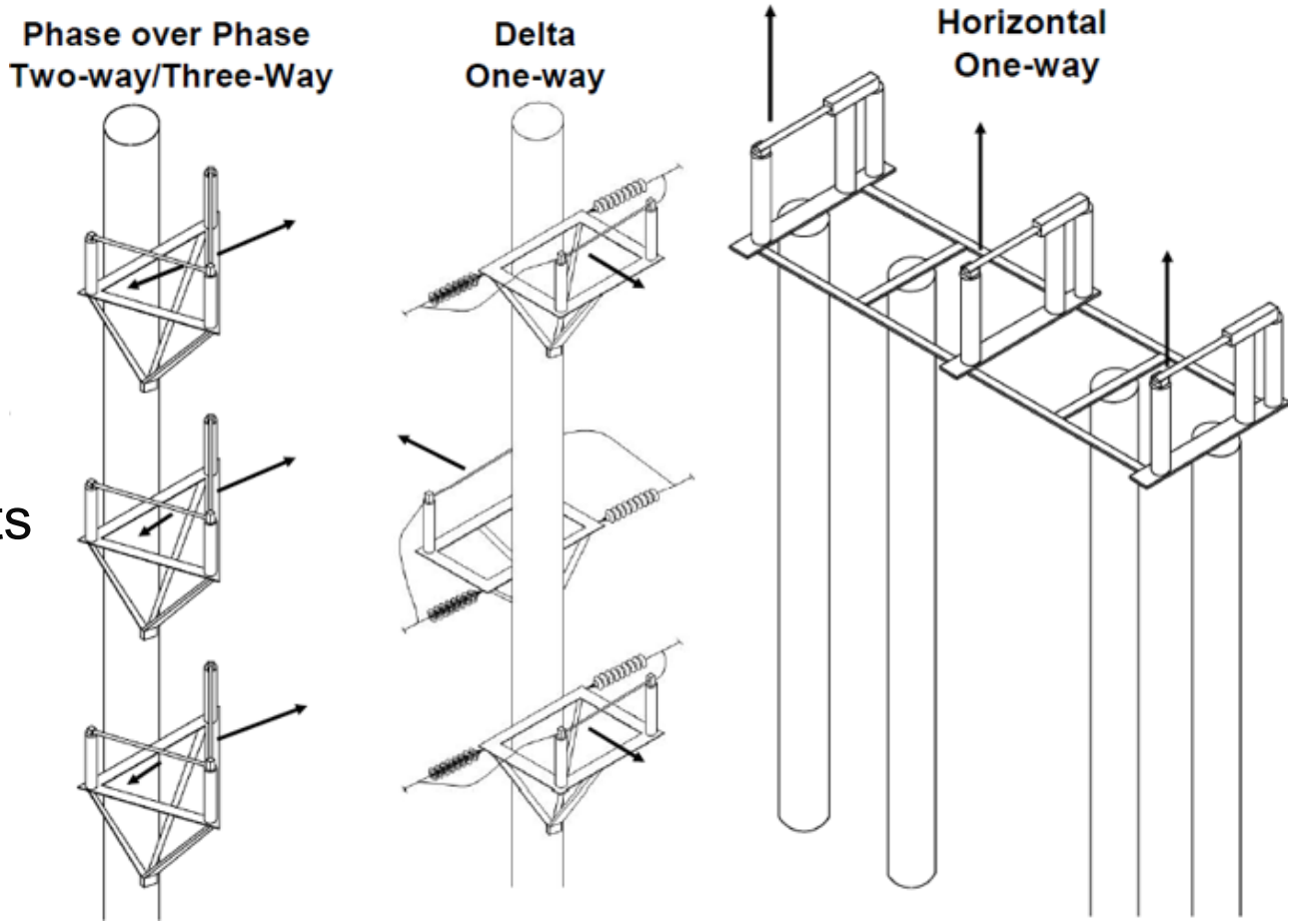
- Created in 2013
- Applicable in all Xcel Energy Operating Companies
  - SPS
  - PSC
  - NSPM
  - NSPW



What Does it Say

Relevant Items

- Shall not install switches above 115kV
- All three-way or radial taps shall have switches
- Phase over phase and delta switch installations on steel structures
- Horizontal switch recommend on steel, but wood can be used if deflection limits met
- Transition structures required if installing phase over phase or delta switches on horizontal line



WHAT WE'VE DONE IN THE PAST

Legacy Installations

Generally prior to 2000

- Substation tapped directly to SPS line with no switches

- Tap switch only

- Switches either side of tap, but no switch on tap

More Recent Installations

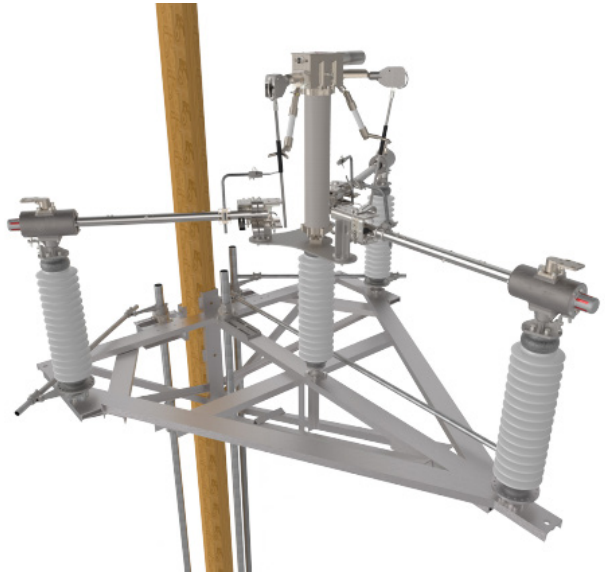
Since at least 2012

- Three-way switch on tap structure
  - Installed approximately 15 since 2012

Three-Way Switch Experience

Installation and Maintenance Concerns

- More difficult to install and adjust
- Cannot maintain any switch with others energized
- Conductor tensions and pull off angle on tap



WHAT WE'RE DOING TODAY

Current Practice

First Installation in 2018

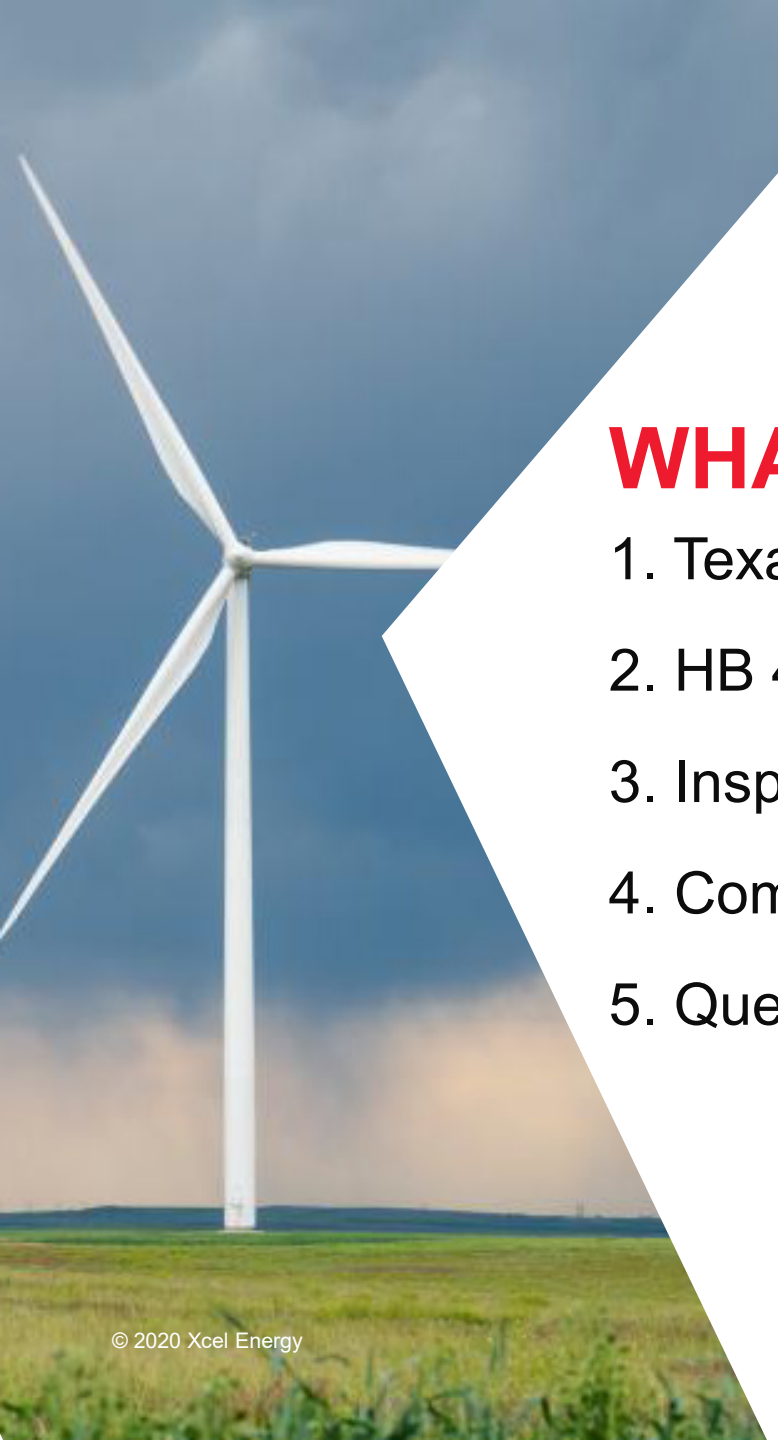
- Three Single Switches
  - Alleviates concerns with three-way switch

TEXAS HOUSE BILL 4150
Texas Transmission Line Inspections

Corby White| Principal Engineer, Transmission Line Performance

Xcel Energy – Texas/New Mexico Sub-Regional Transmission Planning Meeting

October 5, 2020



WHAT WE'LL REVIEW

1. Texas House Bill 4150 (HB 4150) Origin
2. HB 4150 Requirements
3. Inspection Planning
4. Common Clearance Issues & Mitigation
5. Questions

TEXAS HB4150

Links to House Bill 4150 information:

Texas Legislature Online webpage for HB4150

PDF copy of the final HB4150

TEXAS HOUSE BILL 4150 ORIGIN

Corps of Engineers: Power line in boating accident that killed 3 area Boy Scouts appeared lower than required

Power line safety bill passes Texas House; legislation renamed for Scouts who died

By Glenn Evans gevans@news-journal.com May 3, 2019

TEXAS HOUSE BILL 4150 REQUIREMENTS

Report to be kept on file with the PUC

- Training programs regarding Safety and NESC clearance for employees.
- File is to be updated within 30 days of any changes to these programs.

5 Year Report filed with the PUC

- The percentage of overhead transmission lines (over 60kV) that:
  - have been inspected for NESC compliance in the past 5 years
  - are anticipated to be inspected for NESC compliance in the next 5 years

Annual Report filed with the PUC

- The number of identified occurrences on noncompliance with NESC vertical clearance code
- Whether the utility has knowledge that any part of the transmission system is not in compliance with NESC
- The number of fatalities or injuries to the public resulting from noncompliance with NESC vertical clearance requirements
- A description of corrective actions taken to prevent reoccurrence of injury.

Lake Crossings

- All distribution and transmission lake crossings shall meet minimum NESC clearance over the 178 Texas lakes.

Inspection Data

5 Year Report

Track percentage of system inspected

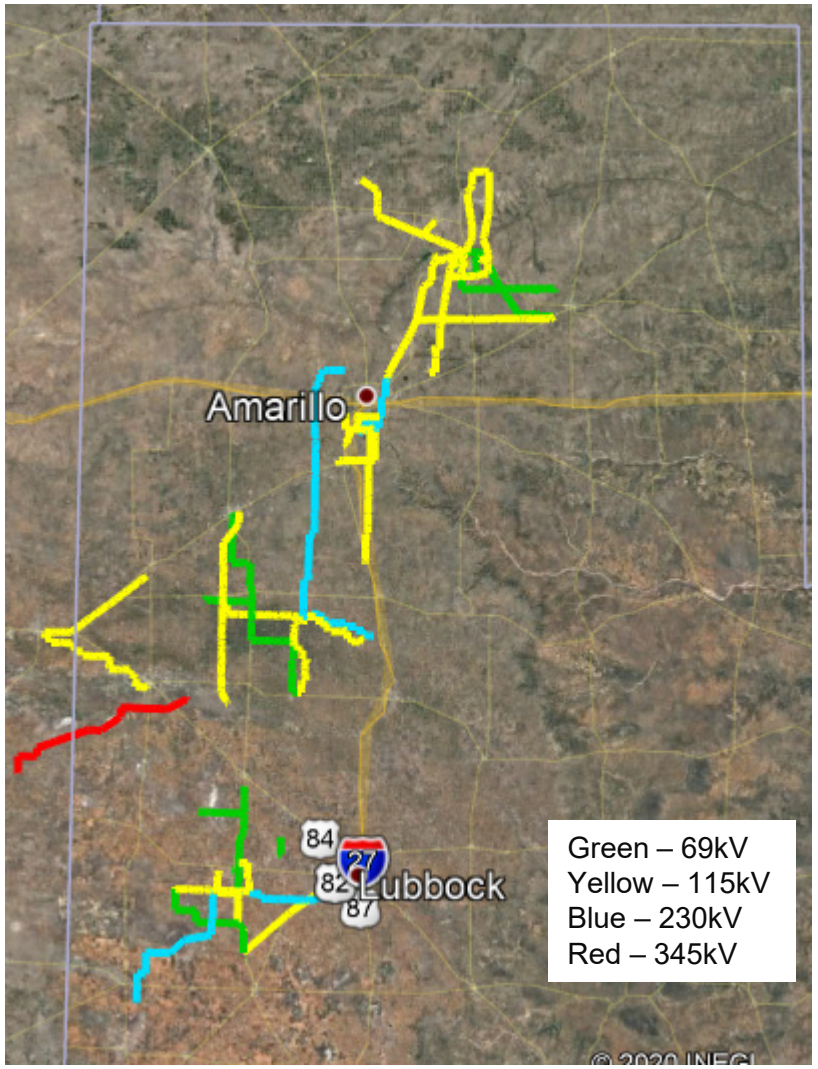
Annual Report

Number of found clearance violations

Annual Report

Unmitigated clearance violations

TEXAS HOUSE BILL 4150 INSPECTIONS



Planned circuit inspections - 2020

Approximate mileage of SPS transmission lines in Texas:

- Total miles: 5500
  - 69kV: 1300
  - 115kV: 2200
  - 230kV: 1450
  - 345kV: 550

Approximate yearly average inspection miles:

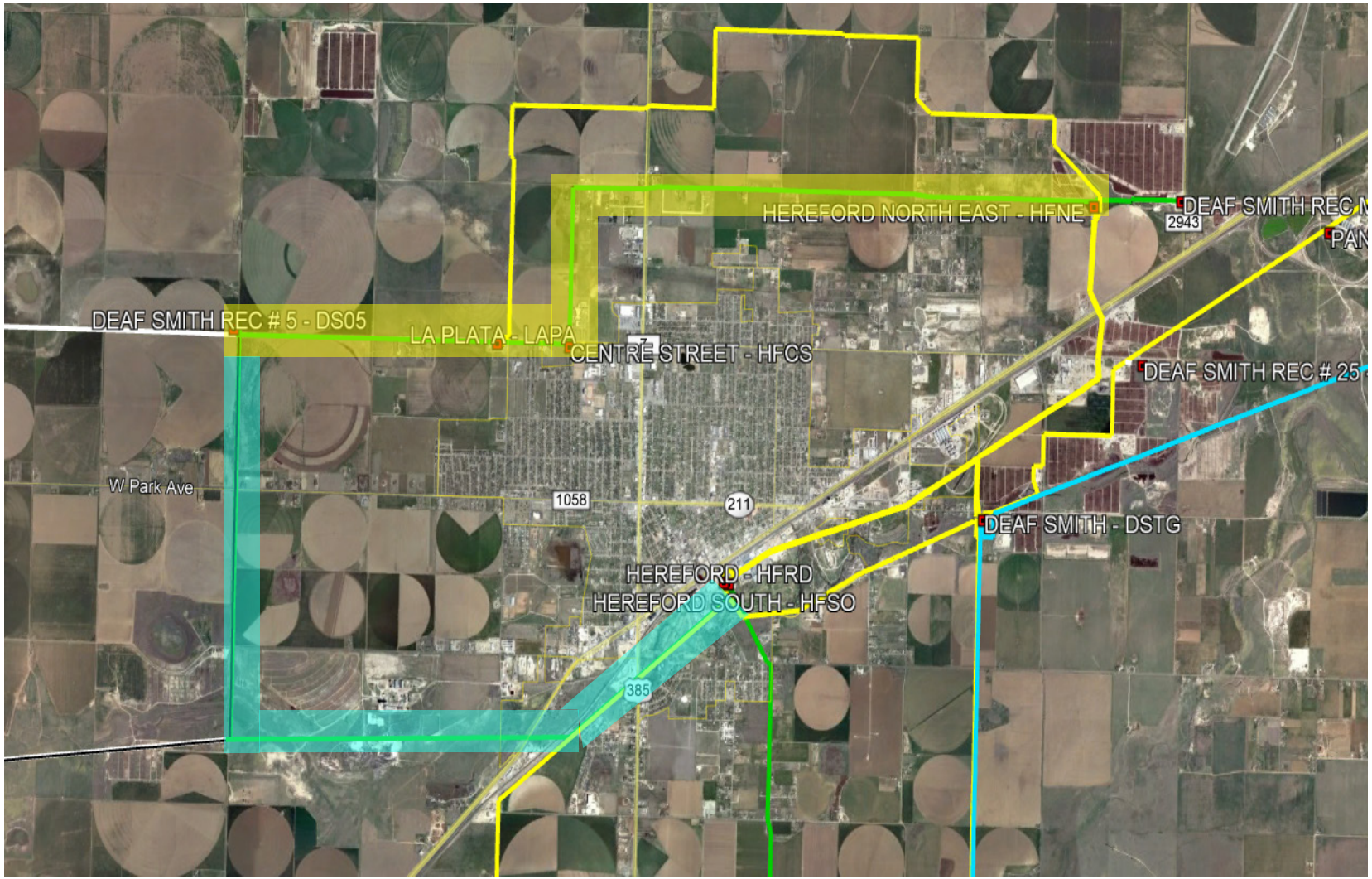
- Total miles: 1100
  - 69kV: 260
  - 115kV and above: 840

Inspections are done with LiDAR (Light Detection and Ranging) surveys using low-flying helicopters with specialized sensors. Ground surveys are done as needed for additional information.

The lines will be modeled using PLS-CADD software. Clearances will be looked at under emergency rating loads and various temperatures and weather conditions.

TEXAS HOUSE BILL 4150 INSPECTIONS

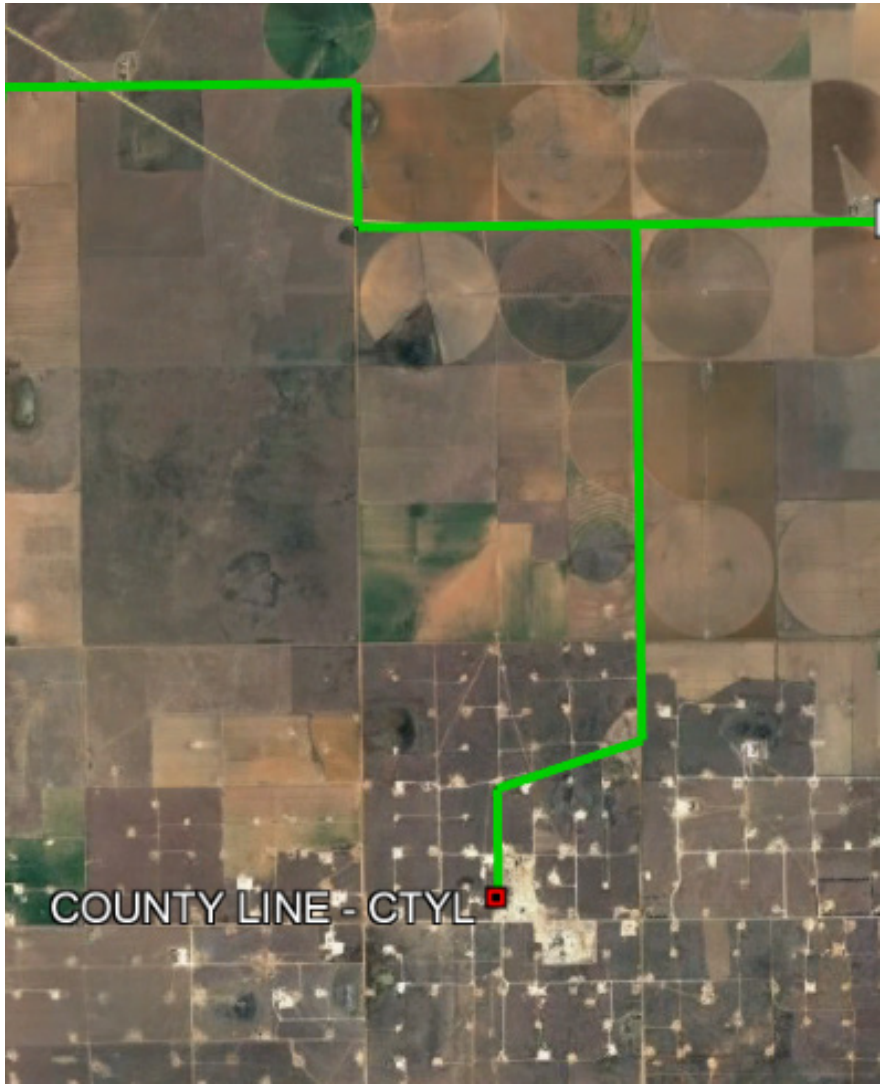
Multiple Sources



- Lines that have multiple sources have more than one option for feeding substations.
  - These lines can usually be de-energized in sections for maintenance on the line.
  - Can be seasonally dependent (typically fall and spring times)

TEXAS HOUSE BILL 4150 INSPECTIONS

Radial Feed – Single Source

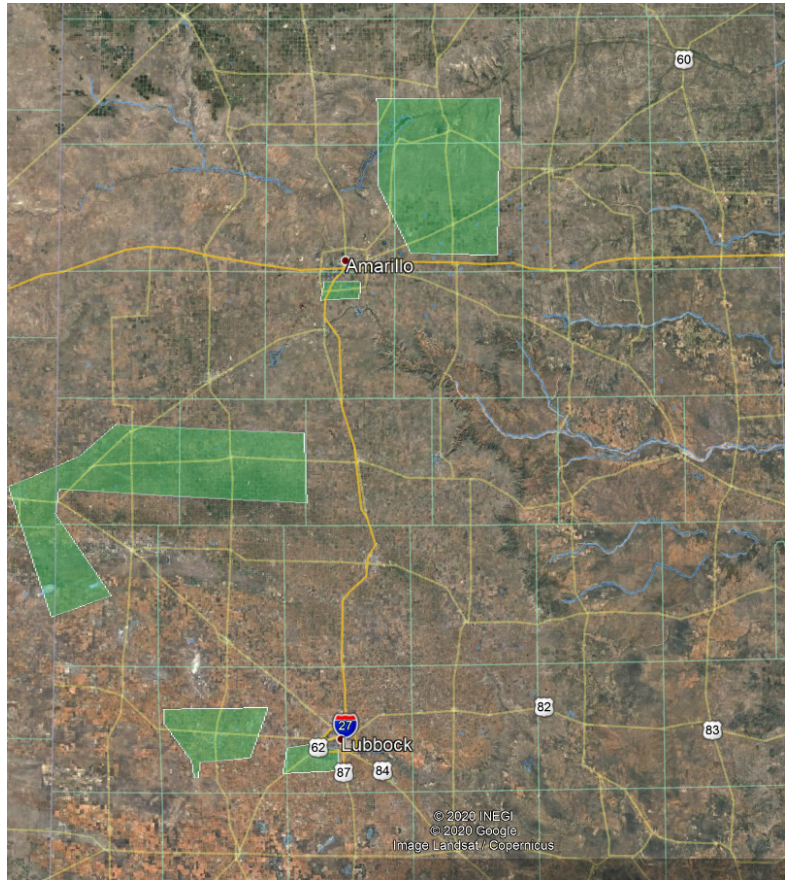


- Radial transmission lines (no normally open switches) are more challenging to work on than lines with multiple sources.
- Typical options to do work:
  - De-energize the line for construction
    - Feed the substation load with nearby substations
    - Coordinate an outage with the customers
  - “Hot” work with specially trained crews for certain types of maintenance
  - “Shoofly” around the work area with a temporary line

Radial lines are a major factor in our inspection plan.

TEXAS HOUSE BILL 4150 INSPECTIONS

Priorities for the inspection schedule of all the SPS lines in Texas included outage coordination issues and radial lines.



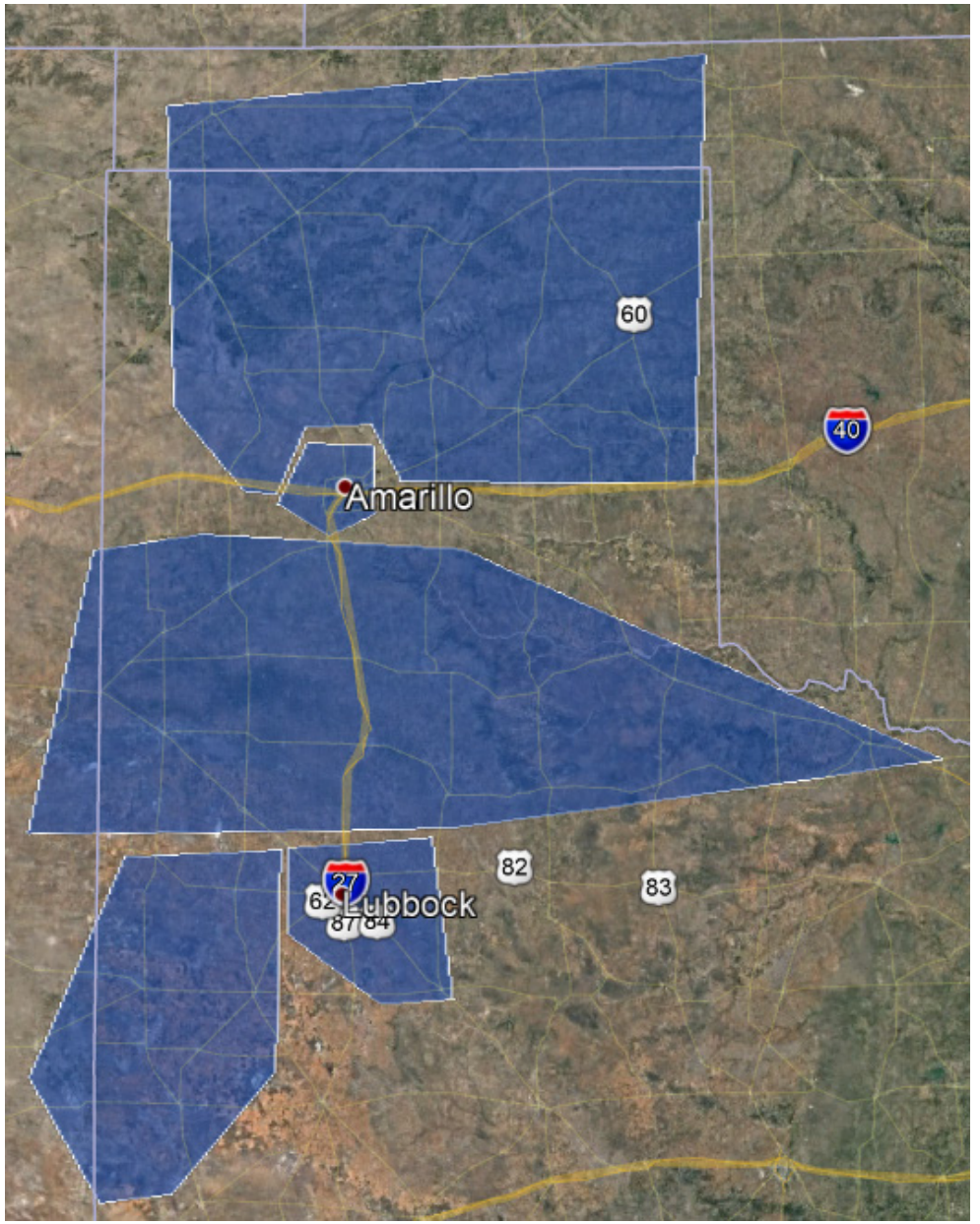
2020 portion of the 5 inspection areas

Five areas were created to help geographically spread the inspections.

- TX South
- TX Central
- TX North
- Lubbock
- Amarillo

Inspections will be done in each area every year.

As clearance issues are found, outages will be requested to address the issues. Too many outages in one area would increase the difficulty of planning these outages.



5 Inspection Areas

COMMON CLEARANCE ISSUES & MITIGATION

Transmission – Distribution Clearance Issues

A common clearance issue is the distance between transmission and distribution conductors.

A variety of solutions are possible for these violations.

- Lower the distribution attachment/crossarm
- Move the distribution pole
- Raise the transmission structures
- Bury the distribution line
- If the pole top is the problem then cut the top
- De-rate the transmission line

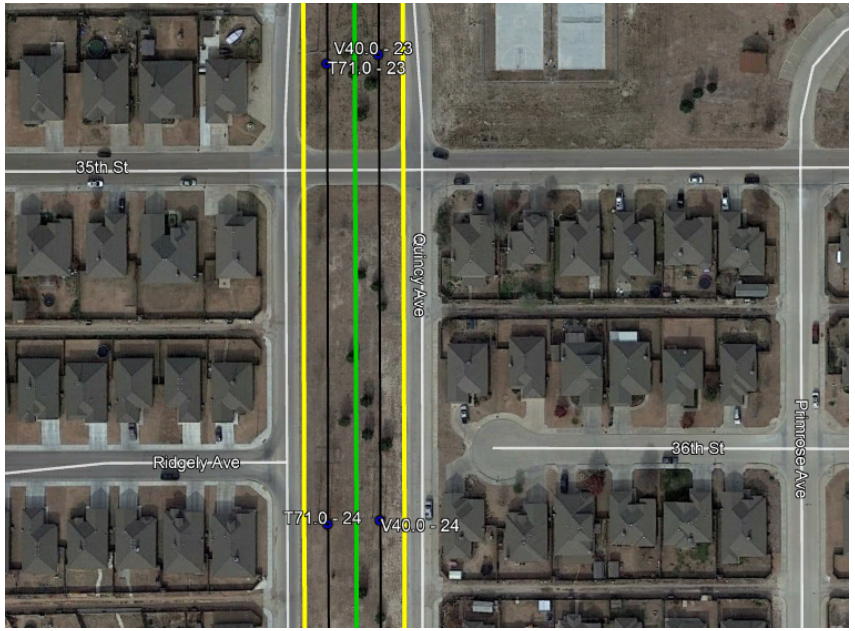
SPS transmission engineers will reach out to the owner of the distribution line to discuss possible solutions to these issues as they arise.

COMMON CLEARANCE ISSUES & MITIGATION

Transmission – Ground Clearance Issues

Violations related to ground clearance are another issue that could be common due to small elevation changes from weather or land development.

- Derate the transmission line
- Install fencing around the Right-Of-Way to prevent traffic under the clearance issue
- Install taller structures



Newly developed land can cause elevation changes leading to violations

Violations related to objects in the Right-Of-Way usually lead to either a line being derated or installing taller structures.

These objects usually can not be easily moved or modified, such as a building or an irrigation pivot.

Right-Of-Way Fence

Irrigation Pivots