BURNS McDONNELL

The Honorable Mike Redwine
Mitchell County Judge
Courthouse

- Soils and geology
- Wildlife, vegetation, and fisheries (including threatened and endangered species)
- Socioeconomics (population, growth, current/future development)
- Cultural resources (historic and archeological sites)
- Transportation and roads (proposed airport and roadway expansions, construction, operations, and maintenance)

Burns & McDonnell thanks you in advance for your comments, which will be an important consideration in our assessment of potential environmental and land use impacts of the proposed transmission line. If you have any questions concerning this Project or our request for information, please contact me at djgreen@burnsmcd.com or 737-236-0111. Your earliest reply will be appreciated.

Sincerely,

Derek Green

Derek Green
Senior Environmental Scientist

Attachment (1)

6200 Bridge Point Parkway \ Building 4, Suite 400 \ Austin, TX 78730
O 512-872-7130 \ F 512-872-7127 \ burnsmcd.com

BURNS McDONNELL

August 19, 2024

Dennis Jones
Mitchell County Precinct 1 Commissioner
355 Oak Street
Colorado City, TX 79512

Re: Request for Information
Oncor Electric Delivery Company LLC's Proposed Ranger Camp Switch to Cattleman Switch 345 kV Transmission Line Project in Mitchell County, Texas

Dear Dennis Jones:

Oncor Electric Delivery Company LLC (Oncor) will be filing an application with the Public Utility Commission of Texas (PUC) to amend its Certificate of Convenience and Necessity (CCN) to construct new electric transmission facilities in Mitchell County, Texas.

Oncor proposes to construct a 345 kilovolt (kV) transmission line between Oncor's Ranger Camp Switch, which is currently being constructed, and Oncor's planned Cattleman Switch (Project). The Oncor Ranger Camp Switch is located approximately 0.7 miles southwest of the intersection of South Farm-to-Market Road (FM) 1229 and State Highway (SH) 163, near Colorado City. The planned Cattleman Switch will be located approximately 0.8 miles west of the intersection of SH 163 and FM 2836. The proposed transmission line will be approximately 4.2 miles in length. Please refer to the attached map for the location of the study area, the Project's alignment, and the two endpoints.

Burns & McDonnell is preparing an Environmental Assessment (EA) for the Project that will support Oncor's application at the PUC. Burns & McDonnell is in the process of collecting and evaluating environmental data for the study area. As part of this effort, we ask that your agency or office communicate any environmental or land use concerns that you may have regarding potential community or environmental effects from the construction of the Project within the designated study area.

We would appreciate receiving information related to any permits, easements, or other approvals that your agency or office requires. We would also like to request information related to any major proposed development or construction projects that your agency or office may be planning, or aware of, within the study area. Your input on any of the following resources as they relate to your agency or office will assist the project team in evaluating the Project:

- Land use (current or proposed land development projects, park/recreation areas, etc.)
- Aesthetics
- Water quality and wetlands
- Soils and geology

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Dennis Jones
Mitchell County Precinct 1 Commissioner

Page 2

- Wildlife, vegetation, and fisheries (including threatened and endangered species)
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Sincerely,

Derek Green

Derek Green
Senior Environmental Scientist

Attachment (1)

BURNS McDONNELL

August 19, 2024

Jeremy Strain
Mitchell County Precinct 2 Commissioner
355 Oak Street
Colorado City, TX 79512

Re: Request for Information
Oncor Electric Delivery Company LLC's Proposed Ranger Camp Switch to Cattleman Switch 345 kV Transmission Line Project in Mitchell County, Texas

Dear Jeremy Strain:

Oncor Electric Delivery Company LLC (Oncor) will be filing an application with the Public Utility Commission of Texas (PUC) to amend its Certificate of Convenience and Necessity (CCN) to construct new electric transmission facilities in Mitchell County, Texas.

Oncor proposes to construct a 345 kilovolt (kV) transmission line between Oncor's Ranger Camp Switch, which is currently being constructed, and Oncor's planned Cattleman Switch (Project). The Oncor Ranger Camp Switch is located approximately 0.7 miles southwest of the intersection of South Farm-to-Market Road (FM) 1229 and State Highway (SH) 163, near Colorado City. The planned Cattleman Switch will be located approximately 0.8 miles west of the intersection of SH 163 and FM 2836. The proposed transmission line will be approximately 4.2 miles in length. Please refer to the attached map for the location of the study area, the Project's alignment, and the two endpoints.

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Jeremy Strain
Mitchell County Precinct 2 Commissioner

- Wildlife, vegetation, and fisheries (including threatened and endangered species)
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Sincerely,

Derek Green

Derek Green
Senior Environmental Scientist

Attachment (1)

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BURNS McDONNELL

August 19, 2024

Jesse Munoz
Mitchell County Precinct 3 Commissioner
355 Oak Street
Colorado City, TX 79512

Re: Request for Information
Oncor Electric Delivery Company LLC's Proposed Ranger Camp Switch to Cattleman Switch 345 kV Transmission Line Project in Mitchell County, Texas

Dear Jesse Munoz:

Oncor Electric Delivery Company LLC (Oncor) will be filing an application with the Public Utility Commission of Texas (PUC) to amend its Certificate of Convenience and Necessity (CCN) to construct new electric transmission facilities in Mitchell County, Texas.

Oncor proposes to construct a 345 kilovolt (kV) transmission line between Oncor's Ranger Camp Switch, which is currently being constructed, and Oncor's planned Cattleman Switch (Project). The Oncor Ranger Camp Switch is located approximately 0.7 miles southwest of the intersection of South Farm-to-Market Road (FM) 1229 and State Highway (SH) 163, near Colorado City. The planned Cattleman Switch will be located approximately 0.8 miles west of the intersection of SH 163 and FM 2836. The proposed transmission line will be approximately 4.2 miles in length. Please refer to the attached map for the location of the study area, the Project's alignment, and the two endpoints.

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Jesse Munoz
Mitchell County Precinct 3 Commissioner

- Wildlife, vegetation, and fisheries (including threatened and endangered species)
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Derek Green

Derek Green
Senior Environmental Scientist

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BURNS McDONNELL

August 19, 2024

Ricky Bailey
Mitchell County Precinct 4 Commissioner
355 Oak Street
Colorado City, TX 79512

Re: Request for Information
Oncor Electric Delivery Company LLC's Proposed Ranger Camp Switch to Cattleman Switch 345 kV Transmission Line Project in Mitchell County, Texas

Dear Ricky Bailey:

Oncor Electric Delivery Company LLC (Oncor) will be filing an application with the Public Utility Commission of Texas (PUC) to amend its Certificate of Convenience and Necessity (CCN) to construct new electric transmission facilities in Mitchell County, Texas.

Oncor proposes to construct a 345 kilovolt (kV) transmission line between Oncor's Ranger Camp Switch, which is currently being constructed, and Oncor's planned Cattleman Switch (Project). The Oncor Ranger Camp Switch is located approximately 0.7 miles southwest of the intersection of South Farm-to-Market Road (FM) 1229 and State Highway (SH) 163, near Colorado City. The planned Cattleman Switch will be located approximately 0.8 miles west of the intersection of SH 163 and FM 2836. The proposed transmission line will be approximately 4.2 miles in length. Please refer to the attached map for the location of the study area, the Project's alignment, and the two endpoints.

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Ricky Bailey
Mitchell County Precinct 4 Commissioner

Page 2

- Wildlife, vegetation, and fisheries (including threatened and endangered species)
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Sincerely,

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Derek Green
Senior Environmental Scientist

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BURNS McDONNELL

August 19, 2024

Joe Davila
PTIC
Mitchell County Farm Service Agency
2302 C North HWY 208
Colorado City, TX 79512

Re: Request for Information
Oncor Electric Delivery Company LLC's Proposed Ranger Camp Switch to Cattleman Switch 345 kV Transmission Line Project in Mitchell County, Texas

Dear Joe Davila:

Oncor Electric Delivery Company LLC (Oncor) will be filing an application with the Public Utility Commission of Texas (PUC) to amend its Certificate of Convenience and Necessity (CCN) to construct new electric transmission facilities in Mitchell County, Texas.

Oncor proposes to construct a 345 kilovolt (kV) transmission line between Oncor's Ranger Camp Switch, which is currently being constructed, and Oncor's planned Cattleman Switch (Project). The Oncor Ranger Camp Switch is located approximately 0.7 miles southwest of the intersection of South Farm-to-Market Road (FM) 1229 and State Highway (SH) 163, near Colorado City. The planned Cattleman Switch will be located approximately 0.8 miles west of the intersection of SH 163 and FM 2836. The proposed transmission line will be approximately 4.2 miles in length. Please refer to the attached map for the location of the study area, the Project's alignment, and the two endpoints.

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Joe Davila
PTIC
Mitchell County Farm Service Agency

- Soils and geology
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Derek Green
Senior Environmental Scientist

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BURNS McDONNELL

August 19, 2024

George Martin
Chairman
Mitchell County Soil and Water Conservation District #207
P.O. Box 910
Colorado City, TX 79512-0910

Re: Request for Information
Oncor Electric Delivery Company LLC's Proposed Ranger Camp Switch to Cattleman Switch 345 kV Transmission Line Project in Mitchell County, Texas

Dear George Martin:

Oncor Electric Delivery Company LLC (Oncor) will be filing an application with the Public Utility Commission of Texas (PUC) to amend its Certificate of Convenience and Necessity (CCN) to construct new electric transmission facilities in Mitchell County, Texas.

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BURNS McDONNELL

George Martin
Chairman
Mitchell County Soil and Water Conservation District #207

Page 2

- Soils and geology
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Derek Green
Senior Environmental Scientist

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BURNS McDONNELL

August 19, 2024

Ruben Hurt
Mayor
City of Colorado City
180 W. 3rd Street
Colorado City, TX 79512

Re: Request for Information
Oncor Electric Delivery Company LLC's Proposed Ranger Camp Switch to Cattleman Switch 345 kV Transmission Line Project in Mitchell County, Texas

Dear Ruben Hurt:

Oncor Electric Delivery Company LLC (Oncor) will be filing an application with the Public Utility Commission of Texas (PUC) to amend its Certificate of Convenience and Necessity (CCN) to construct new electric transmission facilities in Mitchell County, Texas.

Oncor proposes to construct a 345 kilovolt (kV) transmission line between Oncor's Ranger Camp Switch, which is currently being constructed, and Oncor's planned Cattleman Switch (Project). The Oncor Ranger Camp Switch is located approximately 0.7 miles southwest of the intersection of South Farm-to-Market Road (FM) 1229 and State Highway (SH) 163, near Colorado City. The planned Cattleman Switch will be located approximately 0.8 miles west of the intersection of SH 163 and FM 2836. The proposed transmission line will be approximately 4.2 miles in length. Please refer to the attached map for the location of the study area, the Project's alignment, and the two endpoints.

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Ruben Hurt
Mayor
City of Colorado City

- Soils and geology
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Derek Green
Senior Environmental Scientist

Attachment (1)

6200 Bridge Point Parkway \ Building 4, Suite 400 \ Austin, TX 78730
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BURNS McDONNELL

August 19, 2024

Donna Madrid
City Manager
180 W. 3rd Street
Colorado City, TX 79512

Re: Request for Information
Oncor Electric Delivery Company LLC's Proposed Ranger Camp Switch to Cattleman Switch 345 kV Transmission Line Project in Mitchell County, Texas

Dear Donna Madrid:

Oncor Electric Delivery Company LLC (Oncor) will be filing an application with the Public Utility Commission of Texas (PUC) to amend its Certificate of Convenience and Necessity (CCN) to construct new electric transmission facilities in Mitchell County, Texas.

Oncor proposes to construct a 345 kilovolt (kV) transmission line between Oncor's Ranger Camp Switch, which is currently being constructed, and Oncor's planned Cattleman Switch (Project). The Oncor Ranger Camp Switch is located approximately 0.7 miles southwest of the intersection of South Farm-to-Market Road (FM) 1229 and State Highway (SH) 163, near Colorado City. The planned Cattleman Switch will be located approximately 0.8 miles west of the intersection of SH 163 and FM 2836. The proposed transmission line will be approximately 4.2 miles in length. Please refer to the attached map for the location of the study area, the Project's alignment, and the two endpoints.

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Donna Madrid
City Manager

Page 2

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BURNS McDONNELL

August 19, 2024

Dr. Larry Polk, Jr.
Superintendent
Colorado Independent School District
1132 Hickory Street
Colorado City, TX 79512

Re: Request for Information
Oncor Electric Delivery Company LLC's Proposed Ranger Camp Switch to Cattleman Switch 345 kV Transmission Line Project in Mitchell County, Texas

Dear Dr. Larry Polk, Jr.:

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Dr. Larry Polk, Jr.
Superintendent
Colorado Independent School District

- Soils and geology
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BURNS McDONNELL

August 19, 2024

Dr. Raemi Thompson
Superintendent
Westbrook Independent School District
102 Bertner
Westbrook, TX 79565

Re: Request for Information
Oncor Electric Delivery Company LLC's Proposed Ranger Camp Switch to Cattleman Switch 345 kV Transmission Line Project in Mitchell County, Texas

Dear Dr. Raemi Thompson:

Oncor Electric Delivery Company LLC (Oncor) will be filing an application with the Public Utility Commission of Texas (PUC) to amend its Certificate of Convenience and Necessity (CCN) to construct new electric transmission facilities in Mitchell County, Texas.

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Dr. Raemi Thompson
Superintendent
Westbrook Independent School District

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Attachment (1)

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O 512-872-7130 \ F 512-872-7127 \ burnsmcd.com

BURNS McDONNELL

August 19, 2024

Leslie McGuigan
Park Superintendent
Lake Colorado City State Park, Region 1
Texas Parks and Wildlife Department
4582 FM 2836
Colorado City, TX 79512

Re: Request for Information
Oncor Electric Delivery Company LLC's Proposed Ranger Camp Switch to Cattleman Switch 345 kV Transmission Line Project in Mitchell County, Texas

Dear Leslie McGuigan:

Oncor Electric Delivery Company LLC (Oncor) will be filing an application with the Public Utility Commission of Texas (PUC) to amend its Certificate of Convenience and Necessity (CCN) to construct new electric transmission facilities in Mitchell County, Texas.

Oncor proposes to construct a 345 kilovolt (kV) transmission line between Oncor's Ranger Camp Switch, which is currently being constructed, and Oncor's planned Cattleman Switch (Project). The Oncor Ranger Camp Switch is located approximately 0.7 miles southwest of the intersection of South Farm-to-Market Road (FM) 1229 and State Highway (SH) 163, near Colorado City. The planned Cattleman Switch will be located approximately 0.8 miles west of the intersection of SH 163 and FM 2836. The proposed transmission line will be approximately 4.2 miles in length. Please refer to the attached map for the location of the study area, the Project's alignment, and the two endpoints.

Burns & McDonnell is preparing an Environmental Assessment (EA) for the Project that will support Oncor's application at the PUC. Burns & McDonnell is in the process of collecting and evaluating environmental data for the study area. As part of this effort, we ask that your agency or office communicate any environmental or land use concerns that you may have regarding potential community or environmental effects from the construction of the Project within the designated study area.

We would appreciate receiving information related to any permits, easements, or other approvals that your agency or office requires. We would also like to request information related to any major proposed development or construction projects that your agency or office may be planning, or aware of, within the study area. Your input on any of the following resources as they relate to your agency or office will assist the project team in evaluating the Project:

- Land use (current or proposed land development projects, park/recreation areas, etc.)
- Aesthetics

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Leslie McGuigan
Park Superintendent
Lake Colorado City State Park, Region 1
Texas Parks and Wildlife Department

- Water quality and wetlands
- Soils and geology
- Wildlife, vegetation, and fisheries (including threatened and endangered species)
- Socioeconomics (population, growth, current/future development)
- Cultural resources (historic and archeological sites)
- Transportation and roads (proposed airport and roadway expansions, construction, operations, and maintenance)

Burns & McDonnell thanks you in advance for your comments, which will be an important consideration in our assessment of potential environmental and land use impacts of the proposed transmission line. If you have any questions concerning this Project or our request for information, please contact me at djgreen@burnsmcd.com or 737-236-0111. Your earliest reply will be appreciated.

Sincerely,

Derek Green

Derek Green
Senior Environmental Scientist

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BURNS McDONNELL

August 19, 2024

Sue Young
General Manager
Lone Wolf Groundwater Conservation District
139 W. 2nd Street
Colorado City, TX 79512

Re: Request for Information
Oncor Electric Delivery Company LLC's Proposed Ranger Camp Switch to Cattleman Switch 345 kV Transmission Line Project in Mitchell County, Texas

Dear Sue Young:

Oncor Electric Delivery Company LLC (Oncor) will be filing an application with the Public Utility Commission of Texas (PUC) to amend its Certificate of Convenience and Necessity (CCN) to construct new electric transmission facilities in Mitchell County, Texas.

Oncor proposes to construct a 345 kilovolt (kV) transmission line between Oncor's Ranger Camp Switch, which is currently being constructed, and Oncor's planned Cattleman Switch (Project). The Oncor Ranger Camp Switch is located approximately 0.7 miles southwest of the intersection of South Farm-to-Market Road (FM) 1229 and State Highway (SH) 163, near Colorado City. The planned Cattleman Switch will be located approximately 0.8 miles west of the intersection of SH 163 and FM 2836. The proposed transmission line will be approximately 4.2 miles in length. Please refer to the attached map for the location of the study area, the Project's alignment, and the two endpoints.

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- Water quality and wetlands

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Sue Young
General Manager
Lone Wolf Groundwater Conservation District

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Sincerely,

Derek Green

Derek Green
Senior Environmental Scientist

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BURNS McDONNELL

August 19, 2024

Virgina Belew
Executive Director
Permian Basin Regional Planning Commission
P.O. Box 60660
Midland, TX 79711

Re: Request for Information
Oncor Electric Delivery Company LLC's Proposed Ranger Camp Switch to Cattleman Switch 345 kV Transmission Line Project in Mitchell County, Texas

Dear Virgina Belew:

Oncor Electric Delivery Company LLC (Oncor) will be filing an application with the Public Utility Commission of Texas (PUC) to amend its Certificate of Convenience and Necessity (CCN) to construct new electric transmission facilities in Mitchell County, Texas.

Oncor proposes to construct a 345 kilovolt (kV) transmission line between Oncor's Ranger Camp Switch, which is currently being constructed, and Oncor's planned Cattleman Switch (Project). The Oncor Ranger Camp Switch is located approximately 0.7 miles southwest of the intersection of South Farm-to-Market Road (FM) 1229 and State Highway (SH) 163, near Colorado City. The planned Cattleman Switch will be located approximately 0.8 miles west of the intersection of SH 163 and FM 2836. The proposed transmission line will be approximately 4.2 miles in length. Please refer to the attached map for the location of the study area, the Project's alignment, and the two endpoints.

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Virgina Belew
Executive Director
Permian Basin Regional Planning Commission

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Sincerely,

Derek Green

Derek Green
Senior Environmental Scientist

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BURNS McDONNELL

August 19, 2024

Joe Rogers
Executive Director
West Central Texas Council of Governments
3702 Loop 322
Abilene, TX 79602-7300

Re: Request for Information
Oncor Electric Delivery Company LLC's Proposed Ranger Camp Switch to Cattleman Switch 345 kV Transmission Line Project in Mitchell County, Texas

Dear Joe Rogers:

Oncor Electric Delivery Company LLC (Oncor) will be filing an application with the Public Utility Commission of Texas (PUC) to amend its Certificate of Convenience and Necessity (CCN) to construct new electric transmission facilities in Mitchell County, Texas.

Oncor proposes to construct a 345 kilovolt (kV) transmission line between Oncor's Ranger Camp Switch, which is currently being constructed, and Oncor's planned Cattleman Switch (Project). The Oncor Ranger Camp Switch is located approximately 0.7 miles southwest of the intersection of South Farm-to-Market Road (FM) 1229 and State Highway (SH) 163, near Colorado City. The planned Cattleman Switch will be located approximately 0.8 miles west of the intersection of SH 163 and FM 2836. The proposed transmission line will be approximately 4.2 miles in length. Please refer to the attached map for the location of the study area, the Project's alignment, and the two endpoints.

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Joe Rogers
Executive Director
West Central Texas Council of Governments

- Soils and geology
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Sincerely,

Derek Green

Derek Green
Senior Environmental Scientist

Attachment (1)

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BURNS McDONNELL

August 19, 2024

Chad Ellis
Chief Executive Officer
Texas Agricultural Land Trust
P.O. Box 6152
San Antonio, TX 78209

Re: Request for Information
Oncor Electric Delivery Company LLC's Proposed Ranger Camp Switch to Cattleman Switch 345 kV Transmission Line Project in Mitchell County, Texas

Dear Chad Ellis:

Oncor Electric Delivery Company LLC (Oncor) will be filing an application with the Public Utility Commission of Texas (PUC) to amend its Certificate of Convenience and Necessity (CCN) to construct new electric transmission facilities in Mitchell County, Texas.

Oncor proposes to construct a 345 kilovolt (kV) transmission line between Oncor's Ranger Camp Switch, which is currently being constructed, and Oncor's planned Cattleman Switch (Project). The Oncor Ranger Camp Switch is located approximately 0.7 miles southwest of the intersection of South Farm-to-Market Road (FM) 1229 and State Highway (SH) 163, near Colorado City. The planned Cattleman Switch will be located approximately 0.8 miles west of the intersection of SH 163 and FM 2836. The proposed transmission line will be approximately 4.2 miles in length. Please refer to the attached map for the location of the study area, the Project's alignment, and the two endpoints.

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BURNS McDONNELL

Chad Ellis
Chief Executive Officer
Texas Agricultural Land Trust

Page 2

- Soils and geology
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Sincerely,

Derek Green

Derek Green
Senior Environmental Scientist

Attachment (1)

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BURNS McDONNELL

August 19, 2024

Mark Steinbach
Executive Director
Texas Land Conservancy
P.O. Box 162481
Austin, TX 78716

Re: Request for Information
Oncor Electric Delivery Company LLC's Proposed Ranger Camp Switch to Cattleman Switch 345 kV Transmission Line Project in Mitchell County, Texas

Dear Mark Steinbach:

Oncor Electric Delivery Company LLC (Oncor) will be filing an application with the Public Utility Commission of Texas (PUC) to amend its Certificate of Convenience and Necessity (CCN) to construct new electric transmission facilities in Mitchell County, Texas.

Oncor proposes to construct a 345 kilovolt (kV) transmission line between Oncor's Ranger Camp Switch, which is currently being constructed, and Oncor's planned Cattleman Switch (Project). The Oncor Ranger Camp Switch is located approximately 0.7 miles southwest of the intersection of South Farm-to-Market Road (FM) 1229 and State Highway (SH) 163, near Colorado City. The planned Cattleman Switch will be located approximately 0.8 miles west of the intersection of SH 163 and FM 2836. The proposed transmission line will be approximately 4.2 miles in length. Please refer to the attached map for the location of the study area, the Project's alignment, and the two endpoints.

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Mark Steinbach
Executive Director
Texas Land Conservancy

- Soils and geology
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Sincerely,

Derek Green

Derek Green
Senior Environmental Scientist

Attachment (1)

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BURNS McDONNELL

August 19, 2024

Lori Olson
Executive Director
Texas Land Trust Council
P.O. Box 2677
Wimberly, TX 78676

Re: Request for Information
Oncor Electric Delivery Company LLC's Proposed Ranger Camp Switch to Cattleman Switch 345 kV Transmission Line Project in Mitchell County, Texas

Dear Lori Olson:

Oncor Electric Delivery Company LLC (Oncor) will be filing an application with the Public Utility Commission of Texas (PUC) to amend its Certificate of Convenience and Necessity (CCN) to construct new electric transmission facilities in Mitchell County, Texas.

Oncor proposes to construct a 345 kilovolt (kV) transmission line between Oncor's Ranger Camp Switch, which is currently being constructed, and Oncor's planned Cattleman Switch (Project). The Oncor Ranger Camp Switch is located approximately 0.7 miles southwest of the intersection of South Farm-to-Market Road (FM) 1229 and State Highway (SH) 163, near Colorado City. The planned Cattleman Switch will be located approximately 0.8 miles west of the intersection of SH 163 and FM 2836. The proposed transmission line will be approximately 4.2 miles in length. Please refer to the attached map for the location of the study area, the Project's alignment, and the two endpoints.

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Lori Olson
Executive Director
Texas Land Trust Council

Page 2

- Soils and geology
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Sincerely,

Derek Green

Derek Green
Senior Environmental Scientist

Attachment (1)

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BURNS McDONNELL

August 19, 2024

Suzanne Scott
State Director
The Nature Conservancy
200 E. Grayson St., Suite 202
San Antonio, TX 78215

Re: Request for Information
Oncor Electric Delivery Company LLC's Proposed Ranger Camp Switch to Cattleman Switch 345 kV Transmission Line Project in Mitchell County, Texas

Dear Suzanne Scott:

Oncor Electric Delivery Company LLC (Oncor) will be filing an application with the Public Utility Commission of Texas (PUC) to amend its Certificate of Convenience and Necessity (CCN) to construct new electric transmission facilities in Mitchell County, Texas.

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BURNS McDONNELL

Suzanne Scott
State Director
The Nature Conservancy

Page 2

- Soils and geology
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Senior Environmental Scientist

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APPENDIX B
ENVIRONMENTAL AND LAND USE CONSTRAINTS MAP

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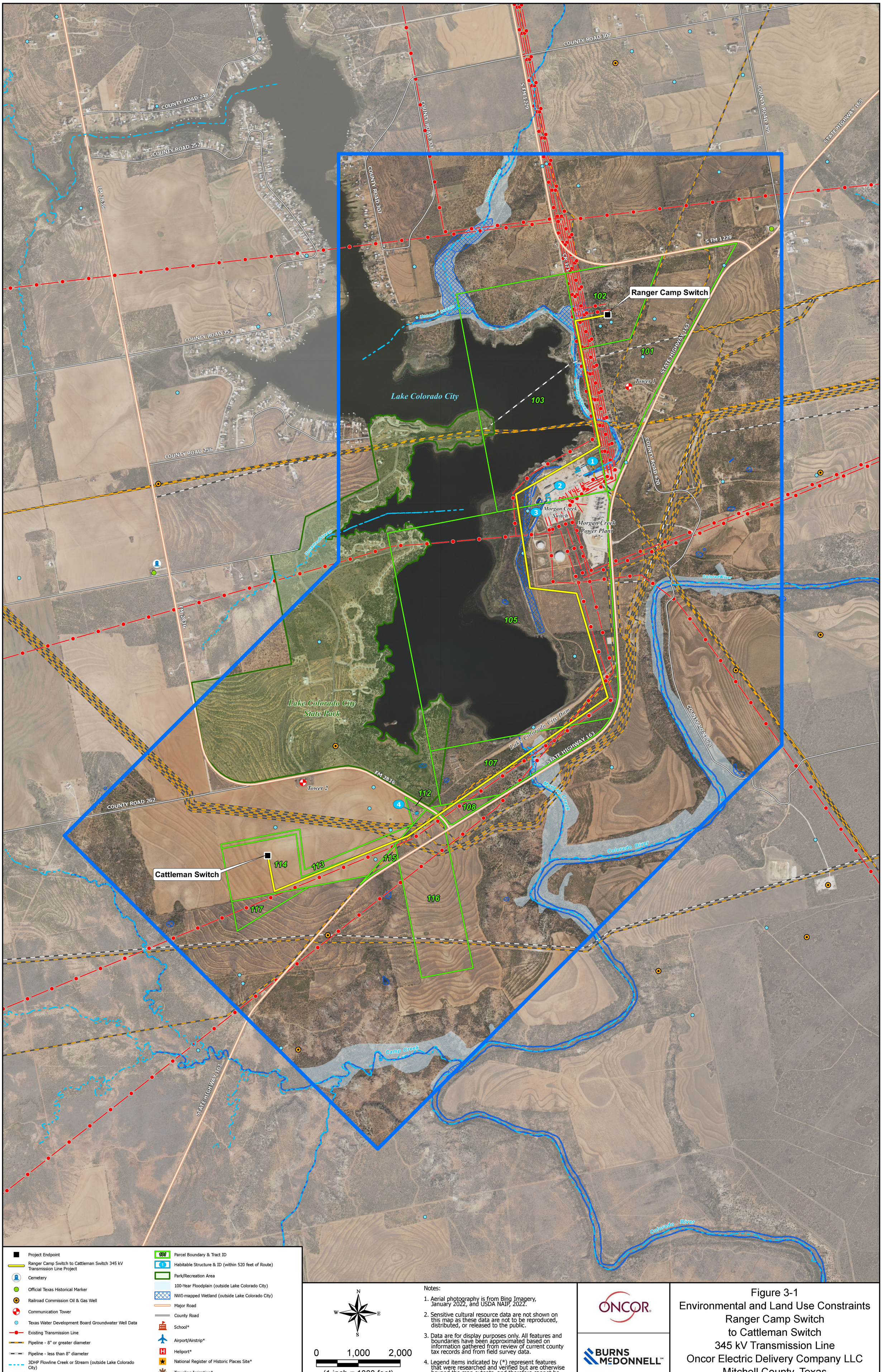

Notes:

1. Aerial photography is from Bing Imagery, January 2022, and USDA NAIP, 2022.
2. Sensitive cultural resource data are not shown on this map as these data are not to be reproduced, distributed, or released to the public.
3. Data are for display purposes only. All features and boundaries have been approximated based on information gathered from review of current county tax records and from field survey data.
4. Legend items indicated by (*) represent features that were researched and verified but are otherwise beyond the map extents, and therefore cannot be located on the map.

ONCOR

BURNS McDONNELL℠

Figure 3-1
Environmental and Land Use Constraints
Ranger Camp Switch to Cattleman Switch 345 kV Transmission Line
Oncor Electric Delivery Company LLC
Mitchell County, Texas

Source: ESRI; Bing; USDA NAIP; USGS 3DHP (formerly NHD); USFWS NWI; TWDB; FEMA; TPWD; FCC; RRC; THC; TXDOT; Burns & McDonnell Engineering Company, Inc.

Issued: 11/26/2024

BURNS McDONNELL

CREATE AMAZING.

Burns & McDonnell
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Austin, TX 78730
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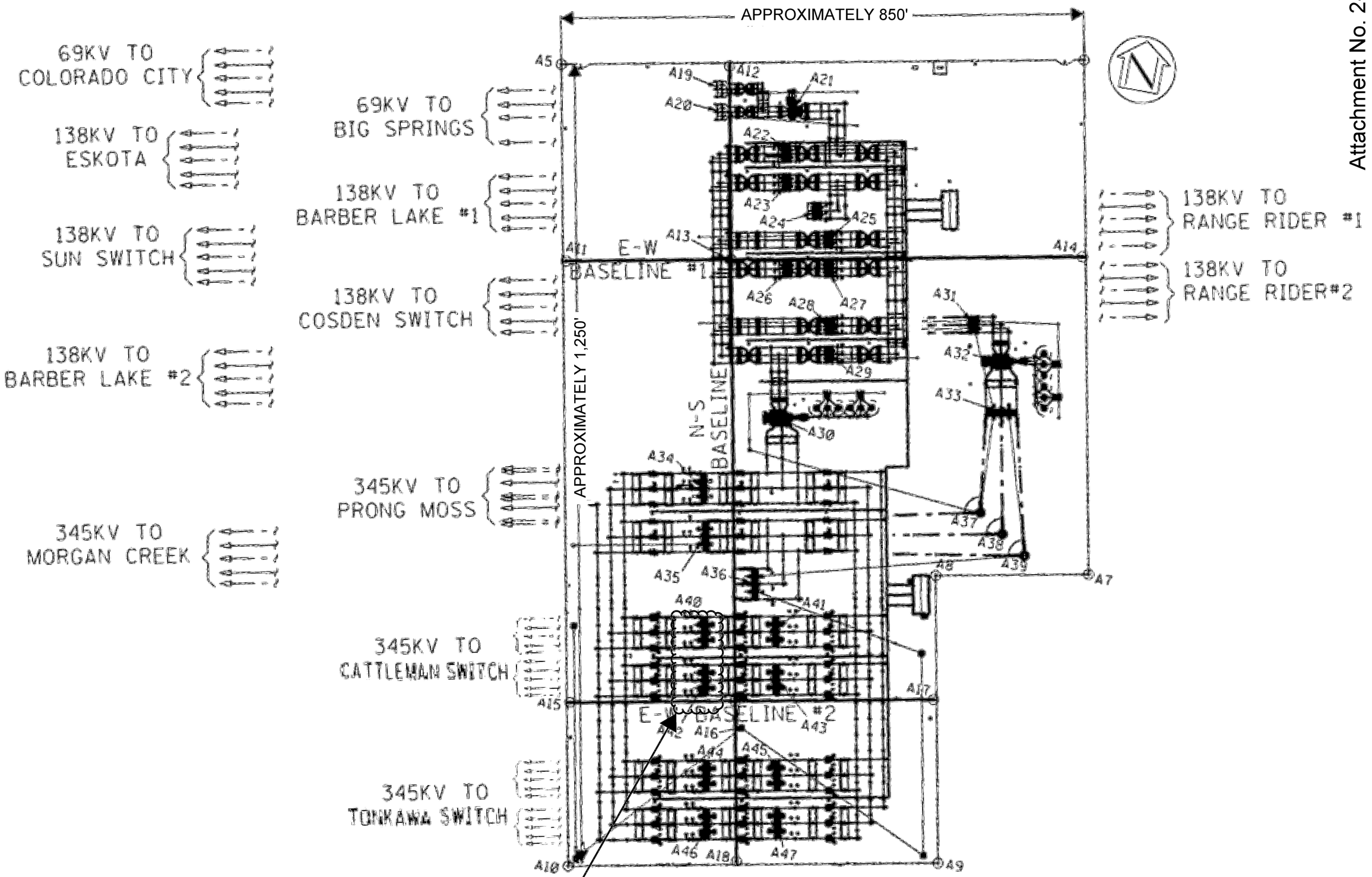
www.burnsmcd.com

Attachment No. 2-A

CD



PROPOSED RANGER CAMP SWITCH - CATTLEMAN SWITCH 345 KV TRANSMISSION LINE CONNECTION

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES

ONCOR
TRANSMISSION ENGINEERING

REVISION DESCRIPTION	STD NO.	VER.	DATE	DRAWN	CH.	APP.	APP.

WORK CENTER | REGION | W.A. | NO. | DATE | W.A. | APP.

UNIT ID

SCALE NONE | DWN. | CH. | ENG. | APP. | APP.

RANGER CAMP SWITCH
PRELIMINARY EQUIPMENT LAYOUT

DATE

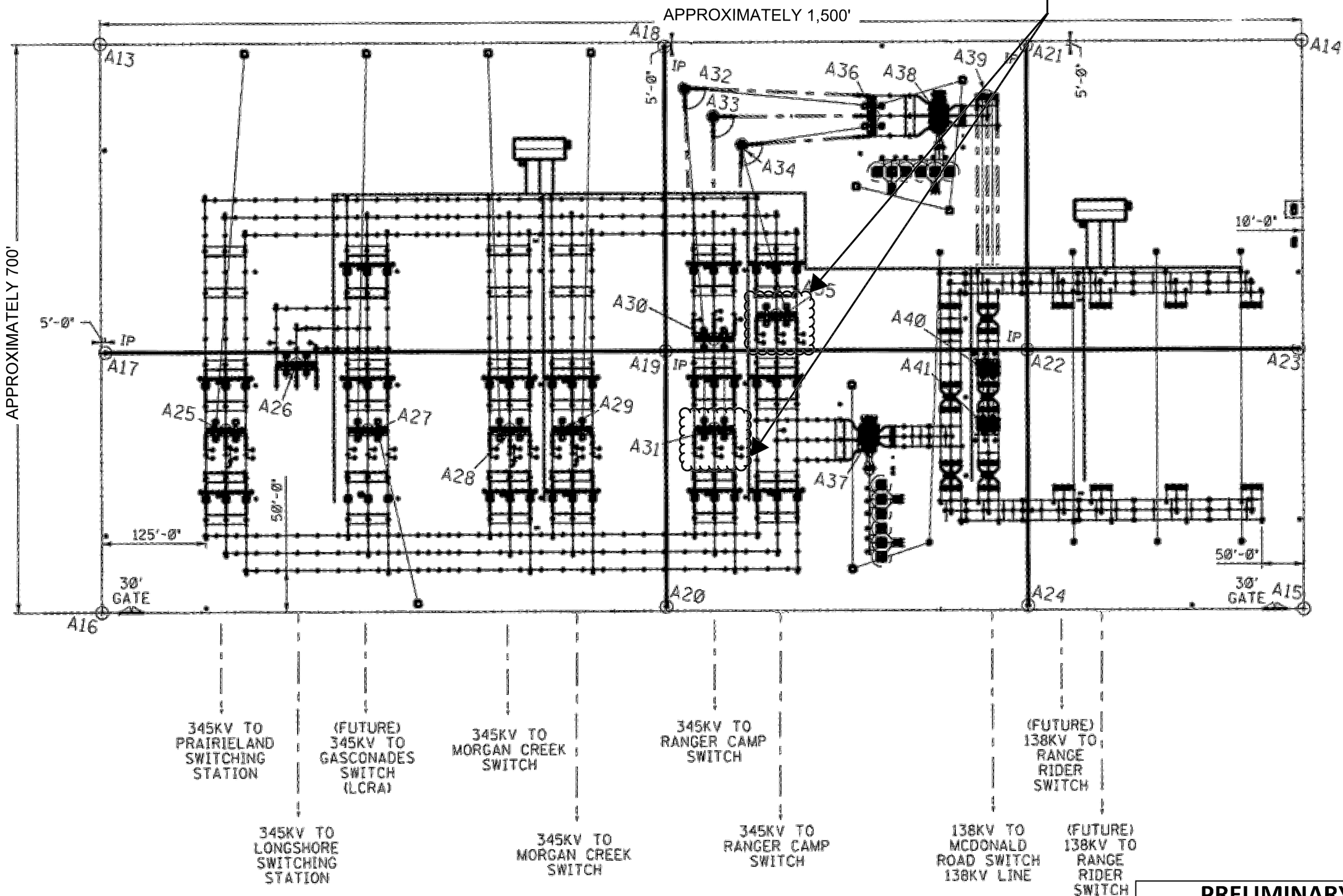
E

SHEET NO.

SHEET NO.

PROPOSED RANGER CAMP SWITCH - CATTLEMAN SWITCH 345 KV TRANSMISSION LINE CONNECTION

Attachment No. 2-B



PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES

CD

ONCOR

TRANSMISSION ENGINEERING

REVISION DESCRIPTION | STD NO. | VER. | DATE | DRAWN CH. | APP. | APP.

WORK CENTER | W.A. | REGION

UNIT ID CATSW | LIST OF DRAWINGS | APP. | APP.

SCALE | DWN. | CH. | ENG. | APP. | DATE | W.A. | NO. | DATE

CATTLEMAN SWITCH
PRELIMINARY STATION LAYOUT

E
SHEET NO.

FOLD

ERCOT Permian Basin Load Interconnection Study

Final

December 2021

ATTACHMENT NO. 3

Document Revisions

Date	Version	Description	Author(s)
December 8, 2021	1.0	Final	Ying Li
		Reviewed by	Sun Wook Kang, Shun Hsien (Fred) Huang

Executive Summary

ERCOT, with extensive review and input by the affected Transmission Service Providers (TSPs) and stakeholders, performed the Permian Basin Load Interconnection Study and identified transmission upgrades, especially long lead time transmission upgrades, necessary to reliably serve the existing and projected oil and gas loads in the Permian Basin area. This report describes the identified potential reliability needs and details of the transmission upgrades to meet the electric demand driven by the oil and natural gas industry and the associated economic expansion in the Permian Basin area. The Permian Basin area includes the Delaware Basin, Midland Basin, and Central Basin Platforms which covers most of the counties in the Far West Weather Zone plus five adjacent counties in the West Weather Zone.

The Far West Weather Zone has experienced an average annual peak demand growth rate of approximately 12% from 2016 to 2021 due to significant growth in oil and natural gas industry demand. This growth rate is the highest of any weather zone in the ERCOT region. Due to the short-term planning horizons of the oil and gas industry resulting in lack of long-term load commitments, ensuring that necessary transmission improvements are in place in time to accommodate the rapid oil and gas development continues to be a challenge. As part of the efforts to address the challenge, several transmission upgrades, including the Far West Texas Project (FWTP), the Far West Texas Dynamic Reactive Devices (DRD) Project, and the Far West Texas Project 2 (FWTP2) have been completed in recent years. In addition, ERCOT completed the Delaware Basin Load Integration Study[1] in December 2019 and developed the roadmap involving major new 345-kV lines to improve load serving capability to import power into the Delaware Basin area. The Stage 1 upgrade in the roadmap was endorsed in June 2021 and is expected to be complete in 2023.

Given the challenges associated with the rapid load growth in the Permian Basin area, TSPs serving the Permian Basin area have also made significant efforts to better understand the underlying dynamics of oil and gas development throughout the region. This effort led to the completion of a customer demand study by IHS Markit, which provides an in-depth analysis of the oil and gas industry and provides more granular and detailed electricity demand forecast in the Permian Basin area through 2030. According to the IHS Markit study report[2] published in April 2020, the electricity needs of the Permian Basin is projected to be nearly double by 2030 compared to 2019, based on a detailed examination of the key drivers underlying power demand associated with recent and ongoing growth of oil and gas activities in the Midland Basin, Delaware Basin, Central Basin Platform, and Fringe regions of the Permian Basin. ERCOT and the TSPs relevant to the area reviewed the demand forecast from the IHS Markit study and deemed that the forecast is reasonable and appropriate to be used for the local transmission/load interconnection study of the Permian Basin area.

As a result, ERCOT with significant support from the relevant TSPs performed steady state analyses utilizing the demand forecast through 2030 (8,450 MW in 2025 and 9,970 MW in 2030) and identified a set of transmission improvements to connect and reliably serve the projected oil and gas loads in the Permian Basin area. As summarized in Section 5 of this report, ERCOT identified both preferred and placeholder transmission upgrades. If the preferred upgrades identified in this study are submitted to Regional Planning Group (RPG) for review, ERCOT may use this study report as part of ERCOT Independent Review. The placeholder projects may require further review. Table E.1 lists the details of the preferred upgrades identified in this study. The total cost of the preferred transmission upgrades is estimated to be approximately $1.5 Billion. Capital cost estimates of each transmission upgrade

[1] https://www.ercot.com/gridinfo/planning
[2] https://www.ercot.com/files/docs/2020/11/27/27706_ERCOT_Letter_to_Commissioners_-_Follow-up_Status_Update_on_Permian....pdf

were provided by the TSPs relevant to each upgrade. ERCOT used the cost estimates provided by the TSPs to calculate total project cost estimates for various projects.

Table E.1 Preferred Reliability Upgrades

Project ID	Preferred Transmission Upgrades (Note: Assumed ratings can be found in Section 6)	Year of Study Case with Reliability Need Starting to Appear	Approximate Cost Estimate ($M)
1	Rebuild existing Morgan Creek – Tonkawa 345-kV line using double-circuit capable structures and add a 2nd circuit	2025	100.58
2	Rebuild existing Midland East – Falcon Seaboard 345-kV line using double-circuit capable structures and add a 2nd circuit	2025	196.47
2	Rebuild existing Morgan Creek – Falcon Seaboard 345-kV line using double-circuit capable structures and add a 2nd circuit	2030	
2	Rebuild existing Midland East – Midland County NW 345-kV line using double-circuit capable structures and add a 2nd circuit	2025	
3	Upgrade existing Morgan Creek – Longshore 345-kV line	2030	393.88
3	Upgrade existing Morgan Creek – Longshore Fly 345-kV line	2025	
3	Establish a new 345/138-kV substation at Consavvy with two new 345/138-kV transformers; Loop existing Longshore – Midessa South 345-kV line into Consavvy and upgrade Longshore – Consavvy 345-kV line; Loop existing South Midland – Pronghorn 138-kV line and Midland East – Spraberry 138-kV line into Consavvy	2025	
3	Upgrade Consavvy – Midessa South 345-kV line	2025	
3	Upgrade existing Longshore Fly – Quail 345-kV line	2025	
3	Loop existing Grelton – Odessa EHV 345-kV line into Consavvy	2025	
3	Upgrade existing Midessa South – Odessa EHV 345-kV line	2025	
3	Upgrade existing Quail – Odessa EHV 345-kV line	2025	
3	Upgrade existing Midessa South 345/138-kV transformer and add a 2nd Midessa South 345/138-kV transformer	2025	
18	Add Verhalen – New Load 90108 138-kV line	2025	6.60
24	Establish a new IH20 345-kV Substation and install two new 345/138-kV transformers	2030	65.55
24	Loop existing Solstice – Sand Lake 345-kV double-circuit line at the new IH20 345-kV Substation	2030	
25	Establish a new 345/138-kV Reiter Substation with two new 345/138-kV transformers; Establish a new 345-kV Quail East Substation; Add a new Quail East – Reiter 345-kV double-circuit line	2025	104.65
31	Add Quarry Field – New Load 90004 138-kV line	2025	80.23
31	Add New Load 90004 – New Load 90007 – New Load 90015 – New Load 90066 – Keystone 138-kV line	2025	
31	Add capacitor bank (90 Mvar) at new load bus 90004	2025	
33	Add ONC90005_TAP – New Load 90005 138-kV line	2025	67.25
33	Add New Load 90005 – New Load 90111 – New Load 90023 - New Load 90012 138-kV line	2025	

33	Add capacitor bank (90 Mvar) at new load bus 90012	2025	
34	Add New Load 90012 – New Load 90021 138-kV line	2030	29.6
35	Add Faulkner – New Load 90038 – New Load 90021 138-kV line	2025	33.8
35	Add capacitor bank (90 Mvar) at new load bus 90021	2030	
36	Add Faulkner – New Load 90108 138-kV line	2030	17.55
42	Add Bearkat – North McCamey 345-kV double-circuit line (Stage 2 upgrade)	2030	392.41
42	Add North McCamey – Sand Lake 345-kV double-circuit line (Stage 2 upgrade)	2030	

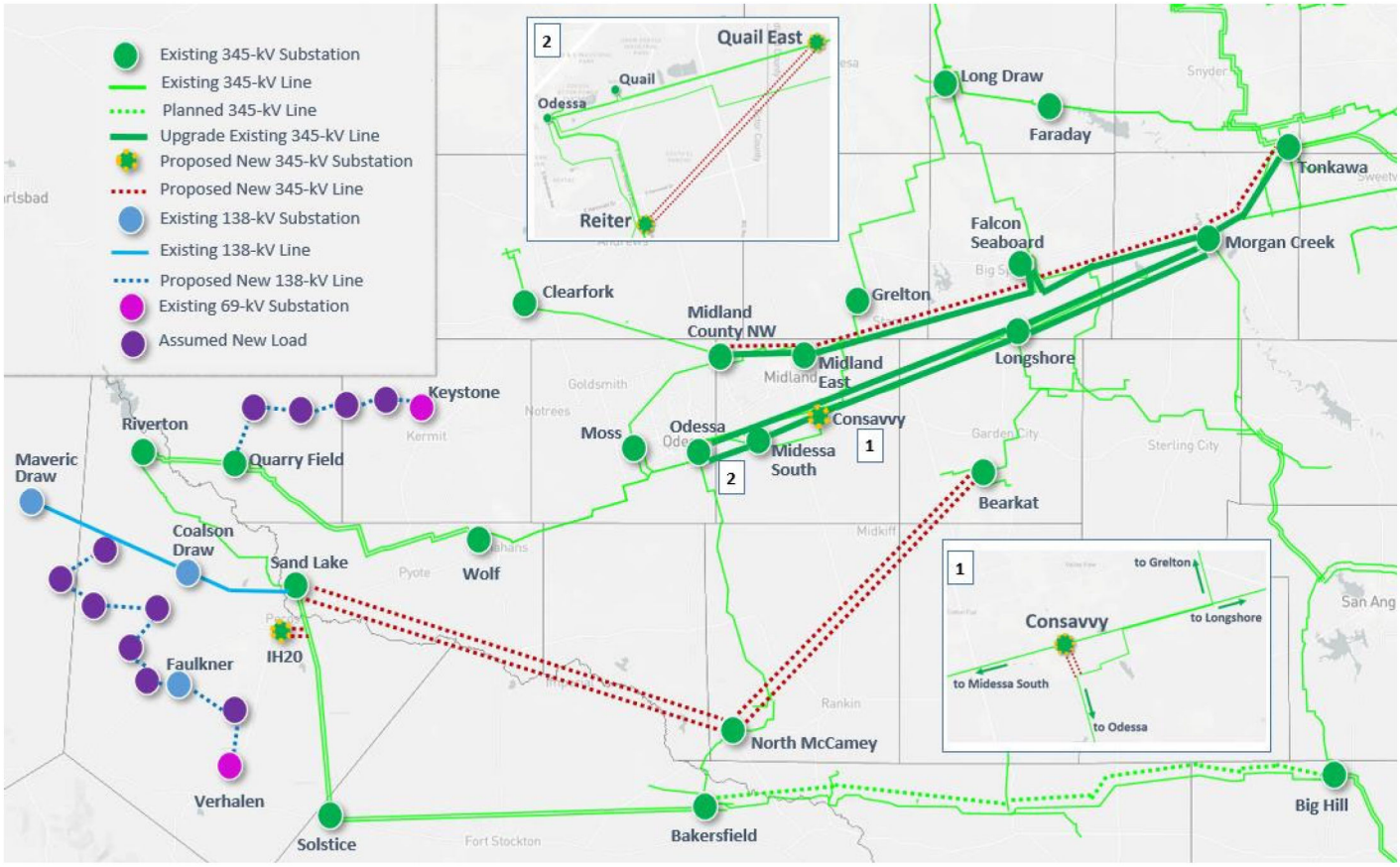


Figure E.1 Preferred Reliability Upgrades for 2030

Table of Contents

1. Introduction

Over the past several years, the Far West Weather Zone, which includes the Delaware Basin, Midland Basin, and Central Basin Platform, has experienced an average annual peak demand growth rate of approximately 12% from 2016 to 2021 due to significant growth in oil and natural gas industry demand. Figure 1.1 shows the primary oil basin resources in the Permian area.

Ensuring that necessary transmission improvements are in place in time to accommodate the rapid oil and gas development in the Permian Basin area has been and will continue to be a significant challenge for both transmission planning and system operations. The challenge originates from fundamental difference in planning horizons between major transmission improvement and oil and gas development. Due to the nature of the oil and gas industry, it is extremely difficult to accurately forecast their electricity demand more than one to two years. On the other hand, transmission improvements, which include planning studies, routing analysis, regulatory approvals, route acquisition, design, and construction, generally can take up to six years. Because of lack of long-term load commitments from the oil and gas industry, transmission planning studies are able to accurately identify system needs only for one to two years in advance, which is not sufficient to plan and construct new transmission improvements for the rapid and significant load growth in the Permian Basin area.

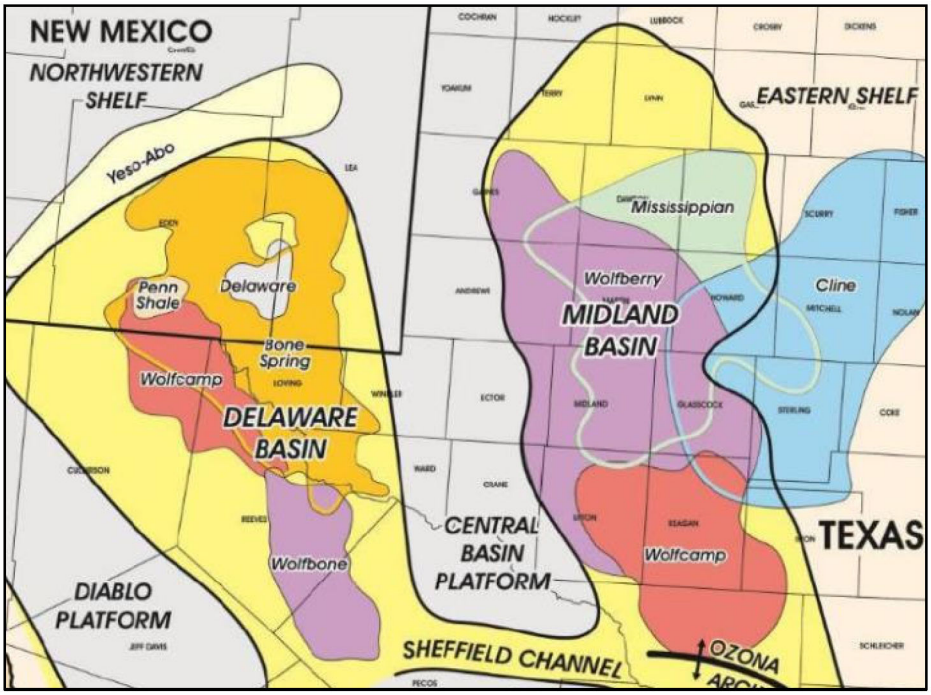


Figure 1.1 Map of Tectonic Subdivision of the Permian Basin[3]

As part of the efforts to address the challenge, several transmission upgrades, including the Far West Texas Project (FWTP), the Far West Texas Dynamic Reactive Devices (DRD) Project, and the Far West Texas Project 2 (FWTP2) have been completed in recent years to accommodate the significant and rapid load growth and address the transmission needs in the Delaware Basin area. In December 2019, ERCOT completed the Delaware Basin Load Integration Study to identify potential long lead

[3] https://www.oilandgas360.com/ngl-energy-partners-adds-water-sources-for-oil-gas-operators-in-the-permian/

time transmission improvements (i.e., new 345-kV transmission lines) to accommodate the rapid oil and gas development. The study developed a roadmap involving major new 345-kV lines to improve the capability to import power into the Delaware Basin area using a higher-than-forecasted (i.e. conceptual plus planned) load growth in the Delaware Basin area. The conceptual loads assumed in the Delaware Basin Load Integration Study were provided by the TSPs in the area based on the surveys of their high-use oil and gas customers. The Stage 1 upgrade in the roadmap was endorsed in June 2021 and is expected to be complete in 2023.

The TSPs serving the load in the Permian Basin area have also made significant efforts to better understand the underlying dynamics of oil and gas development throughout the region. This effort led to the completion of a customer demand study by IHS Markit, which provides an in-depth analysis of the oil and gas industry and provides an electricity demand forecast in the Permian area through 2030. According to the IHS Markit study report, the demand forecast was based on geology and resource assessment, industry intelligence, oil and gas expertise, commercial considerations, translations of historical and forecasted oil and gas activities into electric load demands in every single square mile in the Permian Basin area.

ERCOT and the TSPs relevant to the area reviewed the demand forecast projected in the IHS Markit study and deemed that the forecast is reasonable and appropriate to be used for the local transmission/load interconnection study of the Permian Basin area. More details of the projected demand forecast from the IHS Markit study can be found in Section 2.2 of this report. ERCOT with significant support from the relevant TSPs completed this Permian Basin Load Interconnection Study in 2021 utilizing the demand forecast from the IHS Markit study to identify the reliability challenges and a set of transmission improvements to connect and reliably serve the existing and projected oil and gas loads in the Permian Basin. This report describes the study assumptions, methodology and the results of ERCOT's assessment.

ERCOT also reviewed the historical oil and gas activities and load growth in the Far West region. As shown in Figure 1.2, the oil rig count data showed that the oil and gas drilling activities in the Permian Basin area have been increasing since July 2020 although the activities temporarily declined in early 2020 due to COVID-19 and international oil markets. Figure 1.3 shows the historical peak demand in the Far West Weather Zone which also indicates the resumed rapid load growth in the area.

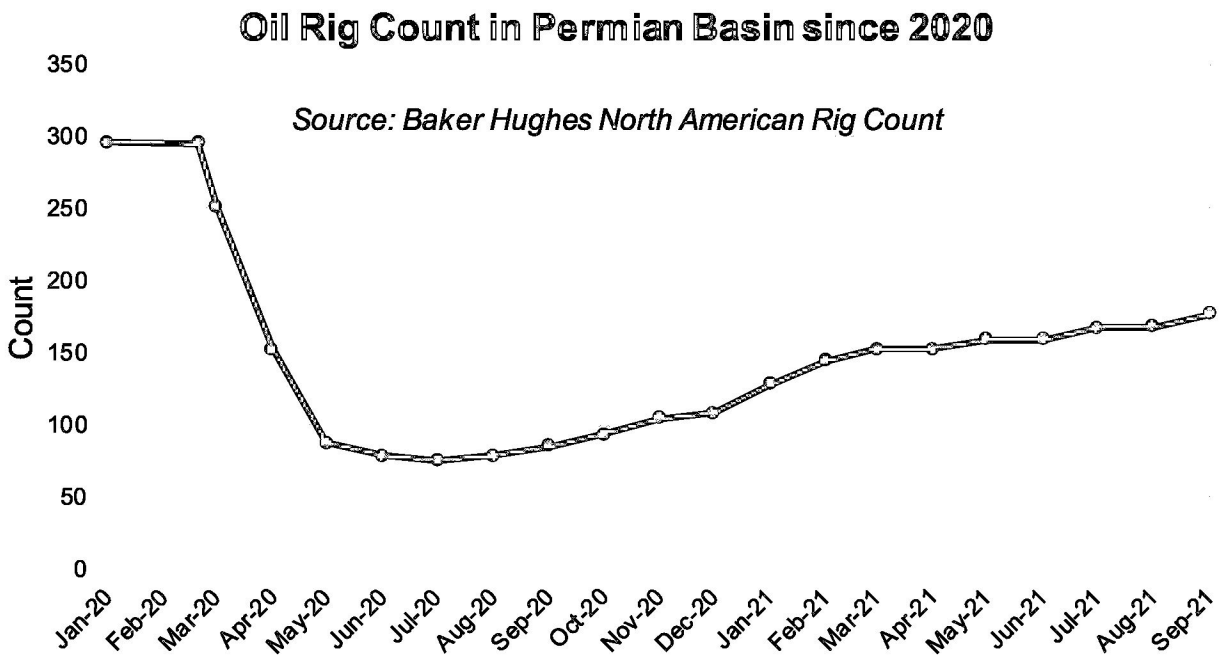


Figure 1.2 Oil Rig Counts in Permian Basin

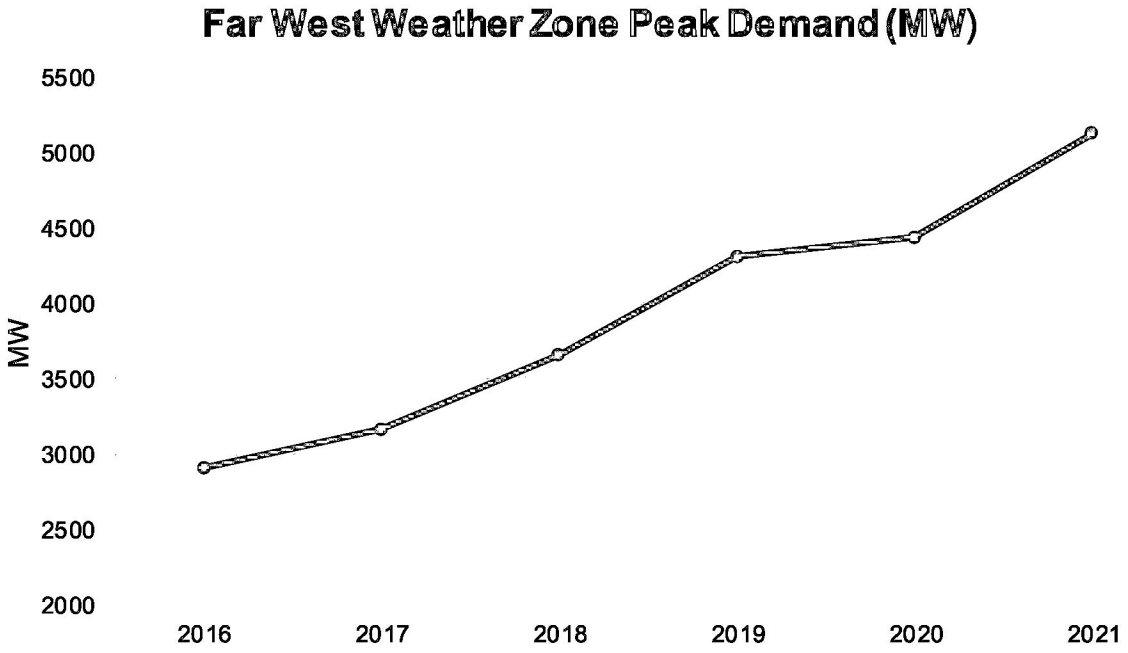


Figure 1.3 Far West Weather Zone Historical Peak Demand

2. Study Assumptions and Methodology

This section describes study assumptions and methodology employed in the Permian Basin Load Interconnection Study.

2.1. Study Area

The Permian Basin area spans most of the counties in the Far West Weather Zone plus five adjacent counties in the West Weather Zone. Table 2.1 shows the counties included in the study area in this study.

Table 2.1 Counties in the Study Area

County	Weather Zone
Andrews	Far West
Borden	Far West
Crane	Far West
Crockett	Far West
Culberson	Far West
Dawson	Far West
Ector	Far West
Glasscock	Far West
Howard	Far West
Irion	West
Loving	Far West
Martin	Far West
Midland	Far West
Mitchell	West
Pecos	Far West
Reagan	Far West
Reeves	Far West
Schleicher	West
Scurry	West
Sterling	West
Upton	Far West
Ward	Far West
Winkler	Far West

2.2. Study Assumption

2.2.1. Reliability Case

The following starting case was used to develop study cases for year 2025 and 2030 in the study:

- The 2025 West/Far West (WFW) summer peak case[4] from the 2020 RTP (posted in October 2020 in the ERCOT MIS site)

[4] https://mis.ercot.com/secure/data-products/grid/regional-planning?id=PG7-173-M

2.2.2. Study Case Loads

The IHS Markit study provides an in-depth analysis of the oil and gas industry and provides an electricity demand forecast in the Permian Basin area through 2030.

As described in Section 1, ERCOT and the TSPs relevant to the area reviewed the demand forecast from the IHS Markit study and deemed that the forecast is reasonable and appropriate to be used in this study. The TSPs made a joint effort and mapped the granular load forecast data to the substation level. The substation level load includes the load connecting to the existing substations and the projected new loads that require new interconnections to the existing transmission grid. Figure 2.1 and Figure 2.2 show the geographic locations of the projected new loads for the year 2025 and 2030.

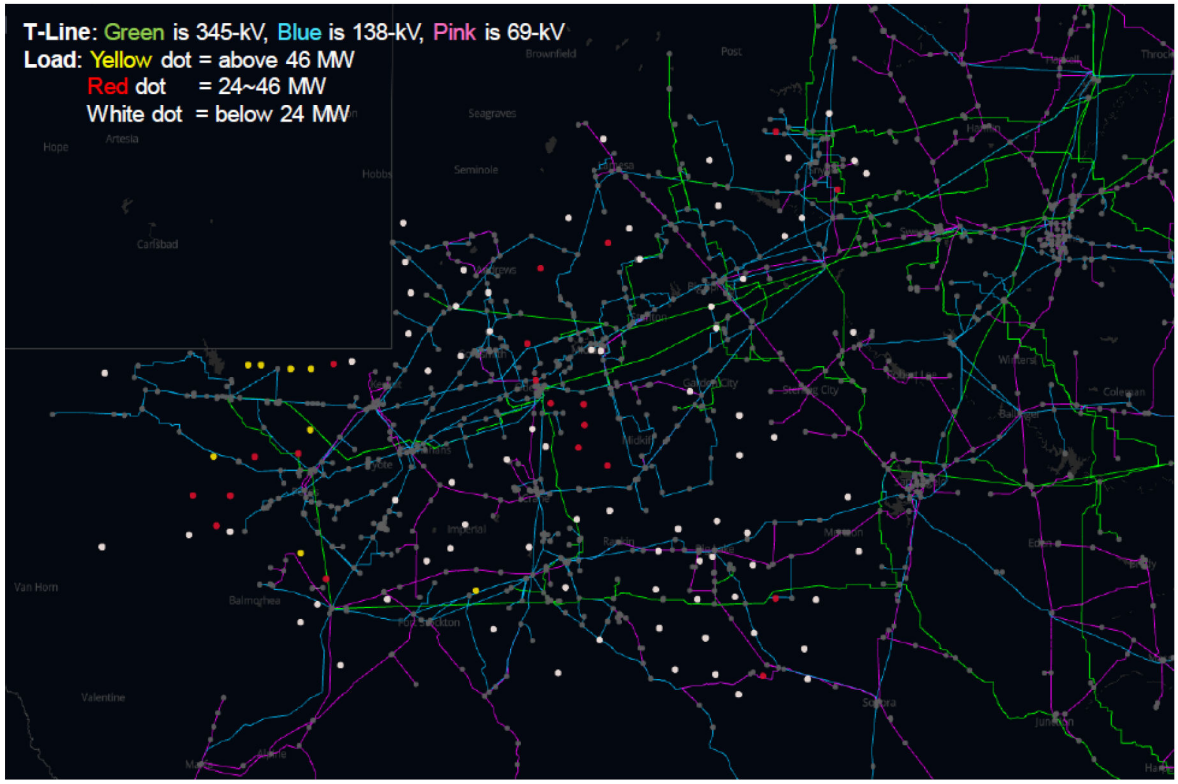


Figure 2.1 Approximate Locations of Projected New Loads for Year 2025

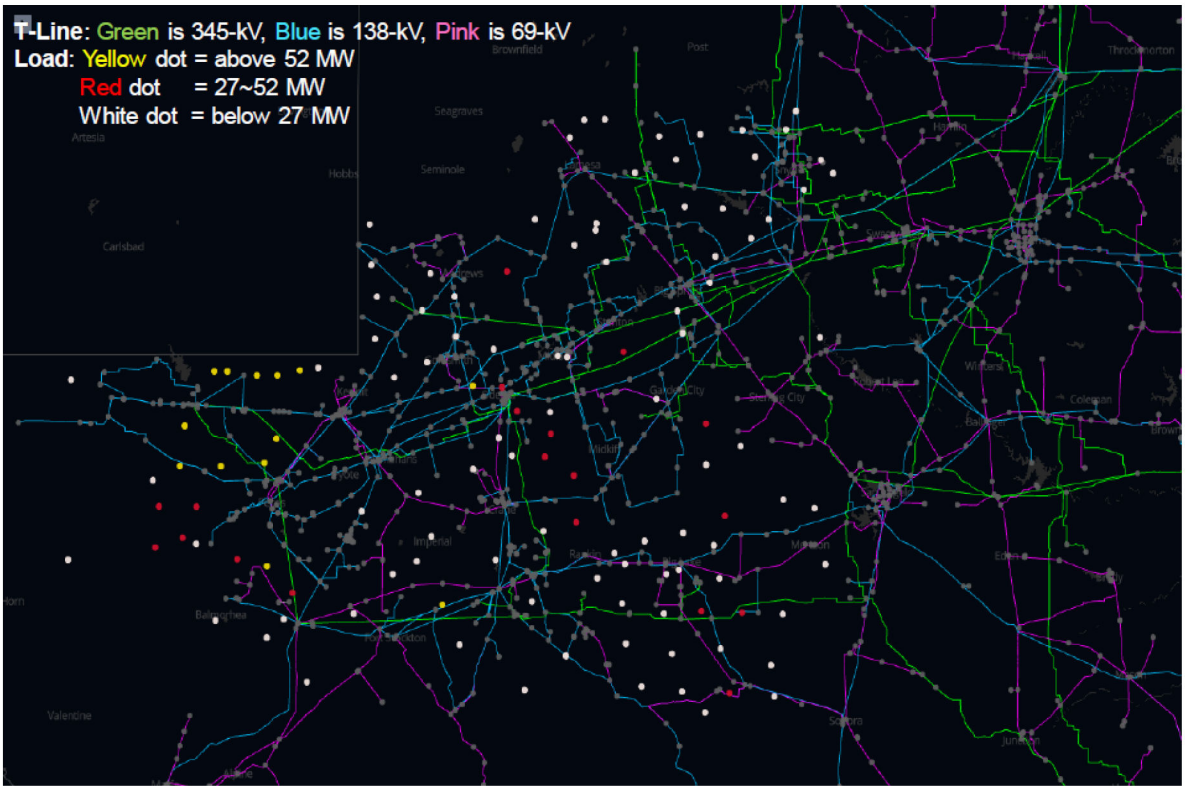


Figure 2.2 Approximate Locations of Projected New Loads for Year 2030

The load in the Permian Basin area in the starting case was updated with the substation level load derived from the demand forecast in the IHS Markit study to develop the study base case. Certain placeholder transmission interconnection projects were assumed to connect the projected new loads into the study base case. Table 2.2 summarizes the load level modeled in this Permian Basin Load Interconnection Study compared to the load in the 2020 RTP case.

Table 2.2 Permian Basin Load Projection for Year 2025 and 2030 in the Study

Permian Basin Load	IHS Load Forecast (MW)		2020 RTP (MW)
	2025 Load	2030 Load	2025 Load
Total Load at Existing Substations	6,601	7,402	8,343
Total Load Requiring New Transmission Interconnections	1,850	2,568	n/a
Total Load	**8,450**	**9,970**	**8,343**

Table 2.3 shows the load projection by the locations in the study base cases.

Table 2.3 IHS Load Projection by Locations for Year 2025 and 2030

Area	2025 Load (MW)	2030 Load (MW)
Delaware Basin	3,789	4,898
Far West (Excluded Delaware Basin)	4,128	4,533
West (Included Five Counties)	532	539
Total	**8,450**	**9,970**

The reactive consumption of the projected new oil and gas load was assumed based on historical operational performance of existing oil and gas load in the Permian Basin area. Based on the review of the historical performance and inputs from the relevant TSPs, 0.97 power factor was used in this study for the projected new oil and gas loads. For the loads at the existing substations, the power factors were assumed the same as in the 2020 RTP case.

2.2.3. Transmission Topology

All RPG-approved Tier 1, 2, and 3 and all Tier 4 transmission projects expected to be in-service within the study area by the respective years were added to the corresponding study base cases based on the review of the ERCOT Transmission Project Information and Tracking (TPIT) report posted in October 2020. During the study, additional transmission projects expected to be in-service within the study area were also added to the study base cases based on the review of the June 2021 TPIT report. Table 2.4 lists the transmission projects added to the study base cases.

Table 2.4 Transmission Additions for Year 2025 and 2030

ERCOT Project #	Project Title	Projected In-Service Date (Month/Year)	Planning Charter Tier
54255	Rebuild Rio Pecos – Lynx Ckt 2 (1926 ACSS)	Dec-20	Tier 4
55372	Conversion of TNMP Gomez to 138-kV service.	Dec-20	Tier 4
57173	TNMP Soaptree Switching Station	Dec-20	Tier 4
52311	Add Gardendale 345-kV Switch	Dec-20	Tier 4
52295	Natural Dam 138-kV Switch	May-21	Tier 4
57797	Athey: Build 138-kV Station	Sep-21	Tier 4
55367	Wolfcamp: Build 138-kV box bay	Nov-21	Tier 4
52322	Establish Courtney Creek Switch	Dec-21	Tier 4
58540	Rebuild 16th St – Soaptree	Dec-21	Tier 4
6719	Twelvemile Substation Addition	Sep-22	Tier 4
55470	Bison to Ozona: Rebuild 69-kV line	Nov-22	Tier 4
51788	Amos Creek Circuit Breaker Addition	Nov-20	Tier 4
52464	Alamito Creek to Ft. Davis: Rebuild 69-kV line	May-23	Tier 4
60489	Adds Leon Creek Switching Station and Tarbush Tie	Sep-21	Tier 4
60491	Rebuild 16th Street-Airport with 1926 ACSS	Mar-22	Tier 4
59402	Add Midland East Switch 345/138-kV Autotransformer #2	Dec-22	Tier 3
62728	Wink – Shifting Sands 69-kV Line Conversion to 138-kV	May-22	Tier 4
63491, 63493, 63495, 63497	Bakersfield to Big Hill 345-kV Second Circuit Addition Project	Summer 2023	Tier 2

ERCOT also included the Stage 2 upgrade (adding a new Bearkat – North McCamey – Sand Lake 345-kV double-circuit line) identified in the Delaware Basin Load Integration Study in the 2030 study case since the load level in the Delaware Base area in the 2030 study case exceeded the trigger point of the Stage 2 upgrade as shown in Table 2.5. It indicates the need of a new transmission import path to the Delaware Basin area in the 2030 study case. More details about the Stage 2 upgrade were described in Section 4.3.

Table 2.5 Delaware Basin Transmission Upgrade Roadmap

Stage	Estimated Delaware Basin Load Level (MW)	Upgrade Element	Trigger
1	3,052	Add a second circuit on the existing Big Hill – Bakersfield 345-kV line	Import Needs
2	4,022	A new Bearkat – North McCamey – Sand Lake 345-kV double-circuit line	Import Needs
3	4,582	A new Riverton – Owl Hills 345-kV single-circuit line	Culberson Loop Needs
4	5,032	Riverton – Sand Lake 138-kV to 345-kV conversion and a new Riverton - Sand Lake 138-kV line	Culberson Loop Needs
5	5,422	A new Faraday – Lamesa – Clearfork – Riverton 345-kV double-circuit line	Import Needs

2.2.4. Generation

Planned generators in the West and Far West Weather Zones that met Planning Guide Section 6.9(1) requirements for inclusion in the base cases were added to the study cases based on the 2020 December Generation Interconnection Status (GIS) report posted on January 4, 2021. The added generators are listed in Table 2.6.

Table 2.6 Added Generators for Year 2025 and 2030

GINR	Project Name	County	Projected COD	Fuel	Capacity (MW)
17INR0052	Horse13 CalID Repower	Taylor	12/31/2020	WIND	44
17INR0061	Capricorn IV Repower	Sterling	12/31/2020	WIND	9
18INR0079	Woodward I Repower	Pecos	12/31/2020	WIND	0
19INR0121	Galloway Solar	Concho	10/01/2021	SOLAR	250
20INR0046	Maverick Creek II W	Concho	03/23/2021	WIND	118.8
21INR0357	SP TX-12B BESS	Upton	10/31/2021	STORAGE	22.68
21INR0365	Bat Cave Energy Storage	Mason	06/01/2021	STORAGE	100.49
21INR0431	Galloway 2 Solar	Concho	04/01/2022	SOLAR	110
21INR0449	Panther Creek III Repower	Howard	02/02/2021	WIND	15.96

Solar generation in the study area was assumed to be offline to represent a stressed system condition since the oil and natural gas loads are assumed to operate as constant loads throughout the day and night. The dispatch of Energy Storage Resource (ESR) and wind generation as well as solar generation outside of the study area were consistent with the 2020 RTP methodology. Generation retired, indefinitely mothballed, or to be decommissioned was turned off if it was not already offline in the case.

2.2.5. Capital Cost Estimates

Capital cost estimates of each transmission upgrade identified in this study were provided by the TSPs relevant to each upgrade. ERCOT used the cost estimates provided by the TSPs to calculate total project cost estimates for various projects. For new transmission lines requiring new rights of way, ERCOT assumed a routing adder of 20% to the straight distance between two end points.

2.3. Study Methodology

The existing transmission system in some local area was not sufficient to serve the assumed load, especially with the new load interconnections in the Delaware Basin area. In fact, the voltage instability issues were identified in the initial 2025 and 2030 study cases under system intact (i.e., N-0) conditions. The following local transmission upgrade was identified to address the voltage instability issues and applied to the study cases during the case development. This upgrade was assumed in-service during the reliability need analysis.

- Convert existing Barrilla Loop to 138-kV: Barrilla – Hoefs Road – Verhalen – Cherry Creek – Saragosa 69-kV line to 138-kV

ERCOT evaluated various transmission upgrade options and identified a set of transmission upgrades to address the reliability criteria violations in the study area. These transmission upgrades were then categorized as ERCOT preferred upgrades or placeholder upgrades.

Various transmission load interconnection upgrades were considered to connect the projected new loads in Figure 2.3. For example, a radial line from the nearest substation was considered as placeholder to connect the relatively smaller loads (e.g., white dots). For most of the bigger loads (e.g., red and yellow dots), the transmission interconnections were initially modeled based on the inputs from the TSPs as the placeholder. For Area 1, further detailed analysis was performed as described below.

Among the new loads in Figure 2.3, ERCOT and the relevant TSPs focused relatively more on Area 1 in the Delaware Basin area to identify proper local transmission load interconnection projects based on the following considerations:

- A large amount of projected new loads (e.g., red and yellow dots) are concentrated in Area 1 compared to other areas. Area 1 is in the Delaware Basin area which is the most profitable area for the oil and gas development in the Permian Basin according to the IHS Markit study report.
- Compared to other areas in the Permian Basin, Area 1 has limited existing transmission infrastructures.

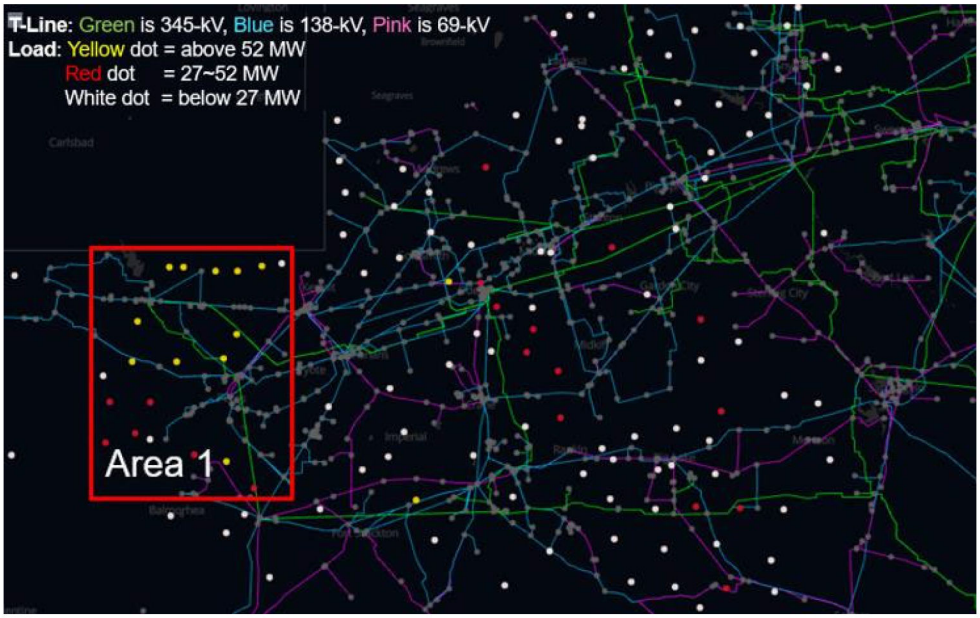


Figure 2.3 Focused Area for New Transmission Interconnection

2.3.1. Tools

ERCOT utilized the following software tool in this study:

- PowerWorld Simulator version 21 was used for SCOPF and steady state contingency and voltage stability analysis

2.3.2. Contingencies

All the NERC P1, P2-1, and P7 contingencies in the West and Far West Weather Zones were evaluated for the AC power flow analyses. ERCOT also evaluated G-1+N-1 and X-1+N-1 contingencies in the study area.

For the G-1+N-1 analyses, the following generator outages were considered to represent the anticipated significant G-1 conditions in the study area:

- Permian Basin all five units (340 MW)
- Odessa Combined Cycle Train 1 (497 MW)

For the X-1+N-1 analyses, the following 345/138-kV transformers were considered to represent the anticipated significant X-1 conditions for the study area:

- Riverton 345/138-kV transformer 1
- Sand Lake 345/138-kV transformer 1
- Wolf 345/138-kV transformer 1
- Quarry Field 345/138-kV transformer 1
- Solstice 345/138-kV transformer 1
- Odessa EHV 345/138-kV transformer 1

2.3.3. Criteria

The reliability assessment was performed based on NERC Reliability Standard TPL-001-4, ERCOT Nodal Protocol and Planning Criteria.

3. Reliability Need

The 2025 and 2030 study base cases were evaluated to determine if system improvements would be necessary to meet the projected demand forecast in the Permian Basin area. The reliability assessment results revealed that both thermal overloads and voltage instability would occur without system improvements. Table 3.1 summarizes the reliability analysis results under N-0, N-1, G-1+N-1, and X-1+N-1 contingencies for the 2025 and 2030 study base cases. No cascading issues were identified in this study. More details of the reliability analysis results were described in the subsequent sections. Transmission upgrades were identified in Section 4 to address these reliability criteria violations.

Table 3.1 Summary of the Reliability Violations

Reliability Needs	2025 Case	2030 Case
Number of Unsolvable Contingencies	2	17
Transmission Line Overloads	~ 196 miles of 345-kV line ~ 347 miles of 138-kV line ~ 127 miles of 69-kV line	~ 269 miles of 345-kV line ~ 366 miles of 138-kV line ~ 177 miles of 69-kV line
Transformer Overloads	Three 345/138-kV transformers Four 138/69-kV transformers	Seven 345/138-kV transformers Six 138/69-kV transformers

3.1. Reliability Needs Inside Delaware Basin Area

The Delaware Basin area mainly includes six counties in Far West Weather Zone: Culberson, Loving, Pecos, Reeves, Ward, and Winkler. The total loads in the Delaware Basin area in the study base cases are 3,789 MW and 4,898 MW in 2025 and 2030 respectively.

Several transmission upgrades, including both the 345-kV and 138-kV upgrades, have been completed in recent years to accommodate the rapid load growth in the Delaware Basin area. The newly built 345-kV lines, Odessa EHV/Moss – Wolf – Quarry Field – Riverton – Sand lake – Solstice – Bakersfield recommended in FWTP and FWTP2, extended the extra high voltage transmission system in the Far West to the Delaware Basin area and formed a loop to serve the underlying system. These 345-kV lines are connected to the 138-kV transmission facilities distributing power flows through the newly added Wolf, Quarry Field, Riverton, Sand Lake, and Solstice 345/138-kV transformers. These 345-kV upgrades together with other 138-kV upgrades such as the Horseshoe Springs Switch – Riverton Switch 138-kV Second Circuit Project and the Ward/Winkler Transmission Improvement Project are sufficient to meet projected near-term load forecast in the Delaware Basin area. However, with the IHS projected load level up to 2030 in this study, the existing transmission system in the Delaware Basin area could experience significant reliability criteria violations without additional transmission upgrades.

The reliability study results showed that there is no unsolvable contingency in the 2025 case, but ten unsolvable contingencies in the 2030 case. Besides the unsolvable consistencies, thermal overloads were also observed in the Delaware Basin area as shown in Table 3.2.

Table 3.2 Summary of the Reliability Violations Inside Delaware Basin Area

Reliability Needs	2025 Case	2030 Case
Number of Unsolvable Contingencies	0	10
Transmission Line Overloads	~ 18 miles of 138-kV line ~ 7 miles of 69-kV line	~ 20 miles of 138-kV line ~ 29 miles of 69-kV line
Transformer Overloads	none	Four 345/138-kV transformers Two 138/69-kV transformers

The following sections describe the details of the thermal violations in those six counties in the Delaware Basin area.

3.1.1. Reliability Needs in Culberson, Loving, and Winkler Counties

The existing transmission overloads in Culberson, Loving, and Winkler Counties were all occurred in the 2030 case as shown in Table 3.3.

Table 3.3 Thermal Overloads in Culberson, Loving, and Winkler Counties

Overloaded Element	Limiting Contingency	Percent Overload	
		2025	2030
Wink – California Tnp 69-kV line	Base Case	< 100	123.7
Wink Tnp 138/69-kV transformer 1	Wink Tnp 138/69-kV transformer 2	< 100	106.5
Wink Tnp 138/69-kV transformer 2	Wink Tnp 138/69-kV transformer 1	< 100	106.5
Riverton 345/138-kV transformer 1	Quarry Field 345/138-kV transformer 1 + Riverton 345/138-kV transformer 2	< 100	104.2
Riverton 345/138-kV transformer 2	Quarry Field 345/138-kV transformer 1 + Riverton 345/138-kV transformer 1	< 100	104.0

3.1.2. Reliability Needs in Reeves and Ward Counties

Reeves County has the highest load projection in the study area, 1,430 MW in 2025 and 1,824 MW in 2030. With the projected load level in the 2030 case, both thermal overloads and voltage instability issues were observed in this area. Table 3.4 lists the thermal overloads.

Table 3.4 Thermal Overloads in Reeves and Ward Counties

Overloaded Element	Limiting Contingency	Percent Overload	
		2025	2030
Caymus TNP – Gas Pad 138-kV line	Base Case	< 100	130.7
Sand Lake – Cochise TNP 138-kV ckt 1	Sand Lake – Cochise TNP 138-kV ckt 2	< 100	109.7
Sand Lake – Cochise TNP 138-kV ckt 2	Sand Lake – Cochise TNP 138-kV ckt 1	< 100	109.7
Sand Lake 345/138-kV transformer 2	Sand Lake 345/138-kV transformer 1	< 100	105.8
Sand Lake 345/138-kV transformer 1	Sand Lake 345/138-kV transformer 2	< 100	105.5

3.1.3. Reliability Needs in Pecos County

All the identified reliability needs in Pecos County are all related to the thermal overloads of the existing 69-kV and 138-kV lines. Table 3.5 lists the thermal overloads in Pecos County.

Table 3.5 Thermal Overloads in Pecos County

Overloaded Element	Limiting Contingency	Percent Overload	
		2025	2030
Fort Stockton – Leon Creek TNP 138-kV line	Lynx – Tombstone 138-kV line	125.4	125.8
Wolfcamp Tap – Coyanosa 69-kV line	Base Case	101.4	121
Wolfcamp – Coyanosa 69-kV line	Base Case	101.4	121
Wolfcamp Tap – Courtney Creek 69-kV line	Base Case	< 100	119.9
16th Street – Fort Stockton TNP 69-kV line	Base Case	108.1	109.4
Yucca – Royalty 69-kV line	Base Case	< 100	103.8
Lynx – Tombstone 138-kV line	Base Case	100.0	101.1

3.2. Reliability Needs Outside Delaware Basin Area

The reliability needs outside of the Delaware Basin area are mainly divided into the following three regions:

- Dawson, Borden, and Scurry Counties
- Ector, Midland, Howard, and Mitchell Counties
- Upton, Reagan, and Irion Counties.

Table 3.6 summarizes the reliability violations outside of the Delaware Basin area.

Table 3.6 Summary of the Reliability Violations Outside Delaware Basin Area

Reliability Needs	2025 Case	2030 Case
Number of Unsolvable Contingencies	2	7
Transmission Line Overloads	~ 196 miles of 345-kV line ~ 329 miles of 138-kV line ~ 120 miles of 69-kV line	~ 269 miles of 345-kV line ~ 346 miles of 138-kV line ~ 148 miles of 69-kV line
Transformer Overloads	Three 345/138-kV transformers Four 138/69-kV transformers	Three 345/138-kV transformers Four 138/69-kV transformers

The following sections describe the details of thermal violations outside of the Delaware Basin area.

3.2.1. Reliability Needs in Dawson, Borden, and Scurry Counties

The existing 138-kV transmission systems in Dawson, Borden, and Scurry Counties are relatively old and have low normal and emergency ratings. The power flow from the Willow Valley 345-kV source goes through the 138-kV transmission system to serve the load in the area, causing the thermal overloads shown in Table 3.7.

Table 3.7 Thermal Overloads in Dawson, Borden, and Scurry Counties

Overloaded Element	Limiting Contingency	Percent Overload	
		2025	2030
Lamesa – Jim Payne – Dawson – Alkali Lake 138-kV line	Vealmoor – Long Draw 345-kV line	110.2	131.0
Scurry – Kndrsacrc – Knapp 138-kV line	Scurry County South – Long Draw/Faraday 345-kV double-circuit line	109.3	124.7
Lamesa – Key Sub – Gail Sub – Willow Valley Switch 138-kV line	Base Case	128.8	117.3
Knapp – Bluff Creek Switch – Exxon Sharon Ridge 138-kV line	Scurry County South – Long Draw/Faraday 345-kV double-circuit line	< 100	109.2
Deep Creek Sub – Sacroc 138-kV line	Odessa Combined Cycle Train 1 + Dermott – Scurry County South 345-kV double-circuit line	< 100	104.9
Howard Switch – Vealmoor 138-kV line	Odessa Combined Cycle Train 1 + Buzzard Draw – Koch Tap 138-kV line	< 100	102.9

3.2.2. Reliability Needs in Ector, Midland, Howard, and Mitchell Counties

The Morgan Creek – Odessa EHV 345-kV path includes the existing Morgan Creek – Longshore – Quail/Odessa EHV 345-kV double-circuit line and the Morgan Creek – Falcon Seaboard – Midland East – Midland County NW 345-kV single-circuit line. The Morgan Creek – Odessa EHV 345-kV path

is one of the major backbone transmission systems in the area, and the path is connected to a number of 138-kV transmission facilities distributing power flows through multiple 345/138-kV transformers located along the path. In addition, since the newly built FWTP and FWTP2 extended the 345-kV transmission lines from Moss and Odessa EHV to the Delaware Basin area, more power is expected to flow through the Morgan Creek – Odessa EHV 345-kV path toward the newly built 345-kV lines as the load in the Delaware Basin area continues to grow.

The study results indicated that the existing system can no longer reliably serve the projected demand in the area without upgrading the existing 345-kV lines along the path. Table 3.8 lists the 345-kV level thermal overload issues along the Morgan Creek – Odessa EHV path. Table 3.9 shows the summary of the thermal overloads of the 138-kV and 69-kV systems in the area.

Table 3.8 345-kV Thermal Overloads on the Morgan Creek – Odessa EHV Path

Overloaded Element	Limiting Contingency	Percent Overload	
		2025	2030
Morgan Creek – Tonkawa 345-kV line	Morgan Creek – Champion Creek/Bitter Creek 345-kV double-circuit line	115.0	164.2
Consavvy – Midessa South 345-kV line	Quail – Odessa EHV 345-kV line	129.0	127.0
Quail – Odessa EHV 345-kV line	Consavvy – Midessa South 345-kV line	124.8	122.8
Morgan Creek – Longshore 345-kV line	Bakersfield – Cedar Canyon 345-kV double-circuit line	< 100	122.5
Midland East – Falcon Seaboard 345-kV line	Morgan Creek – Longshore – Consavvy 345-kV double-circuit line	109.3	121.2
Consavvy 345/138-kV transformer	Consavvy – Midessa South/Quail 345-kV double-circuit line	124.2	119.2
Odessa EHV 345/138-kV transformer 2	Odessa EHV – Moss/Wolf 345-kV double-circuit line	112.8	116.1
Morgan Creek – Falcon Seaboard 345-kV line	Morgan Creek – Longshore – Consavvy 345-kV double-circuit line	< 100	106.6
Longshore Fly – Consavvy 345-kV line	Permian Basin Five Units + Big Hill – Schneeman Draw 345-kV double-circuit line	101.4	106.2
Longshore – Consavvy 345-kV line	Odessa Combined Cycle Train 1 + Bakersfield – Cedar Canyon 345-kV double-circuit line	115.5	104.8
Midessa South 345/138-kV transformer	Odessa Combined Cycle Train 1 + Consavvy – Quail & Odessa EHV – Midessa South 345-kV double-circuit line	101.2	104.8
Morgan Creek – Longshore Fly 345-kV line	Odessa Combined Cycle Train 1 + Bakersfield – Cedar Canyon 345-kV double-circuit line (2025); Morgan Creek – Longshore 345-kV line (2030)	105.4	101.8
Midessa South – Odessa EHV 345-kV line	Quail – Odessa EHV 345-kV line	104.0	101.1

Table 3.9 138-kV and 69-kV Thermal Overloads in Ector, Midland, Howard, and Mitchell Counties

Overloaded Element	Limiting Contingency	Percent Overload	
		2025	2030
Stanton East – Spraberry 69-kV line	Spraberry 138/69-kV transformer	152.0	165.3
Midkiff 138/69-kV transformer	Spraberry 138/69-kV transformer	117.6	136.3
China Grove – Getty Tap 138-kV line	Vealmoor – Long Draw 345-kV line	105.4	116.4
General Tire Switch – Edwards Tap – Judkins 138-kV line	Permian Basin Five Units + Wolf – Moss/Odessa EHV 345-kV double-circuit line	112.3	110.0
Morgan Creek – McDonald 138-kV line	Base Case	119.6	109.0
Sterling City – Sterling County 69-kV line	Bakersfield – Cedar Canyon 345-kV double-circuit line	< 100	108.4
Odessa EHV – Yarbrough Sub – Wolf 138-kV line	Permian Basin Five Units + Wolf – Moss/Odessa EHV 345-kV double-circuit line	115.8	107.7
Getty Tap – Big Spring 138-kV line	Vealmoor – Long Draw 345-kV line	< 100	106.7
Odessa North – Odessa 138-kV line	Permian Basin Five Units + Odessa EHV – Moss/Wolf 345-kV double-circuit line	108.0	106.5
Stanton East 138/69-kV transformer	Spraberry 138/69-kV transformer	100.1	106.2
Spraberry 138/69-kV transformer	Midkiff – Reagan Shell Tap 69-kV line	105.9	105.8
Odessa EHV – Big Three Odessa Tap – Odessa Southwest 138-kV line	Odessa EHV – Moss/Wolf 345-kV double-circuit line	104.7	105.1

3.2.3. Reliability Needs in Upton, Reagan, and Irion Counties

The study results indicated that some of the existing 69-kV and 138-kV lines are no longer able to reliably serve the projected demand even under the N-0 contingency condition. Table 3.10 summarizes the thermal overloads in this area.

Table 3.10 Thermal Overloads in Upton, Reagan, and Irion Counties

Overloaded Element	Limiting Contingency	Percent Overload	
		2025	2030
Big Lake – Barnhart 69-kV line	Barnhart – Cassava 69-kV line	< 100	129.6
Rio Pecos – McCamey – Rankin4 69-kV line	Base Case	116.0	126.4
Cassava – San Angelo Mathis Field 69-kV line	Bakersfield – Cedar Canyon 345-kV double-circuit line	105.4	120.9
Rio Pecos 138/69-kV transformer 1	Rio Pecos 138/69-kV transformer 2	100.4	110.4
Jerry – Big Lake 138-kV line	Odessa Combined Cycle Train 1 + Big Hill – Schneeman Draw 345-kV double-circuit line	< 100	106.3
Twin Buttes – Hargrove – Pumpjack – Jerry 138-kV line	Bakersfield – Cedar Canyon 345-kV double-circuit line (2025); Base Case (2030)	128.5	104.0

4. Project Evaluation

Multiple transmission projects were evaluated in this section to address the reliability violations identified in Section 3.

4.1. Transmission Upgrades Inside Delaware Basin Area

The transmission upgrades inside the Delaware Basin area are divided into the following three areas:

- Culberson, Loving, and Winkler Counties
- Reeves and Ward Counties
- Pecos County

4.1.1. Culberson, Loving, and Winkler Counties

The conversion of the TNMP Wink – California – Wickett 69-kV line to 138-kV was identified to address the overloads of the Wink - California Tnp 69-kV line and Wink Tnp 138/69-kV transformers in the 2030 study case under NERC P0 and P1 contingencies. More details of the reliability needs are available in Table 3.3.

The four new loads #4, #7, #15, and #66 (total of 233 MW in 2030) shown in Figure 4.1 need new connections to the existing transmission grid. ERCOT evaluated the following two options to interconnect these new loads into the system.

- Option A: Add new 138-kV lines to connect the new loads #4, #7, #15, and #66 to 138-kV Kyle Ranch Substation
- Option B: Add new 138-kV lines to connect the new loads #4, #7, #15, and #66 to 138-kV Quarry Field Substation, and connect new load #66 to Keystone Substation to form a 138-kV loop

Connecting the new load #4 to Kyle Ranch (~ 4 miles) in Option A has a shorter distance compared to connecting it to Quarry Field (~ 10 miles) in Option B. However, Option A is expected to result in negative impact on the loading of the Riverton 345/138-kV transformer 2. The loading on the existing Riverton 345/138-kV transformer 2 is expected to be close to its emergency rating under the critical G-1+N-1 contingency condition in Option A. Therefore, ERCOT recommends Option B, shown in Figure 4.1, as the preferred option to connect the new loads in Loving and Winkler Counties.

According to the June 2021 TPIT report, the existing Keystone 69-kV Substation conversion to 138-kV in Option B is scheduled to be in-service by summer 2022 as part of the Tier 4 project TPIT # 62728: Wink - Shifting Sands (i.e., Keystone) 69-kV line conversion to 138-kV.

In summary, the following two transmission upgrades were identified in Culberson, Loving, and Winkler Counties.

- Convert existing TNMP Wink – California – Wickett 69-kV line to 138-kV (identified in 2030 study case)
- Add new 138-kV lines to connect the new loads #4, #7, #15, and #66 to 138-kV Quarry Field Substation, and then connect new load #66 to Keystone Substation to form a 138-kV loop (identified in 2025 study case)

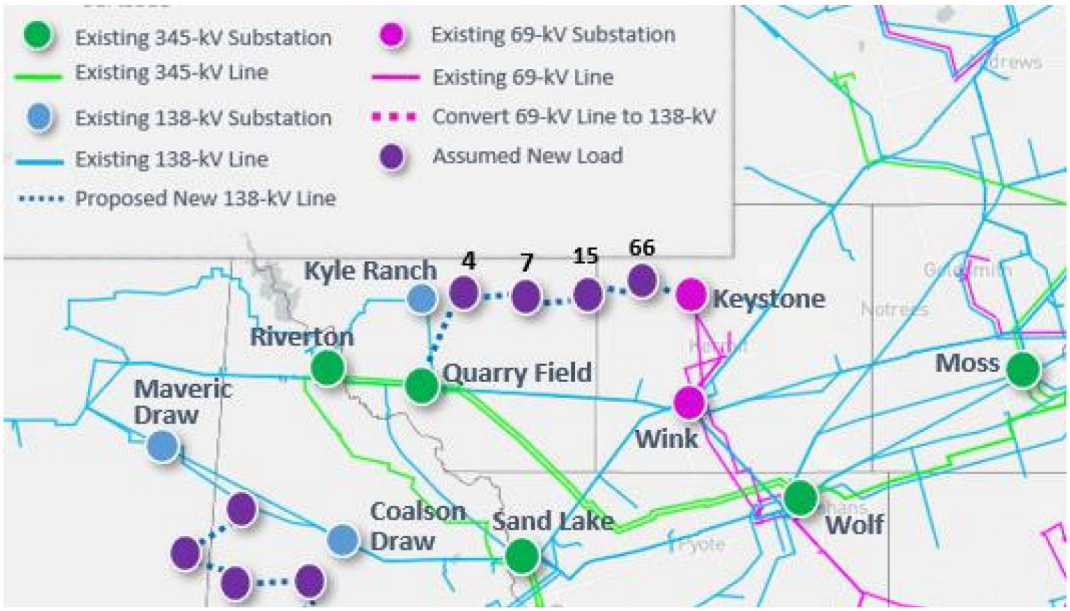


Figure 4.1 Loving and Winkler County Transmission Interconnection

4.1.2. Reeves and Ward Counties

Reeves County has the highest load projection in the study area, 1,430 MW in 2025 and 1,824 MW in 2030. Among these total load projections, 362 MW in 2025 and 566 MW in 2030 are related to new loads requiring new connections to the existing transmission grid. In addition to the new load connection projects, upgrades associated with existing transmission facilities were also identified to address the reliability needs in Reeves and Ward Counties listed in Section 3.1.2.

4.1.2.1 New Load Connection Projects

Figures 4.2 and 4.3 show the transmission interconnections to the new loads in 2025 and 2030. There are seven new loads in Reeves County which need connections to the existing transmission grid in 2030 as shown in Figure 4.3.

Below are the identified new 138-kV transmission lines to interconnect these new loads into the system in 2025:

- Tap a new 138-kV station on existing Coalson Draw – Maveric Draw 138-kV line, about 7.3 miles away from Coalson Draw
- Add new 138-kV lines to connect the new loads #5, #111, #23, and #12 to the new station on the Coalson Draw – Maveric Draw 138-kV line
- Add new 138-kV lines to connect the new loads #38 and #21 to Faulkner Substation

In 2030, the following additional new transmission lines are needed to form a 138-kV loop to reliably serve the projected load in this area:

- Add a new 138-kV line to connect the new load #108 to Verhalen Substation. This new load appears in 2030
- Add a new 138-kV line to connect the new loads #12 and #21 to form a 138-kV loop in 2030
- Add a new 138-kV line to connect the new load #108 to Faulkner to form a 138-kV loop in 2030

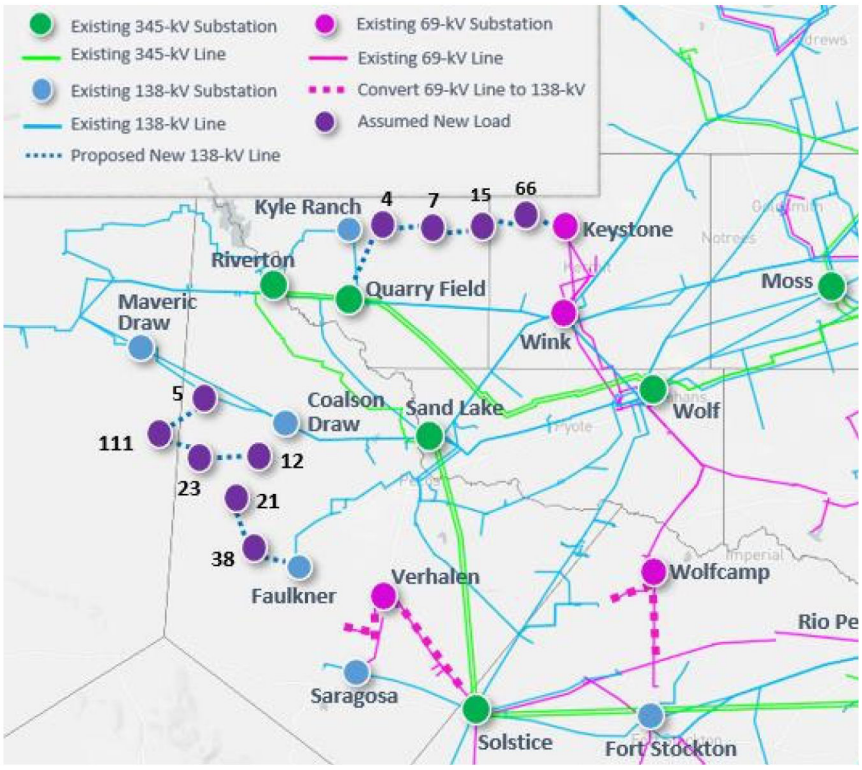


Figure 4.2 Reeves County Transmission Interconnection in 2025

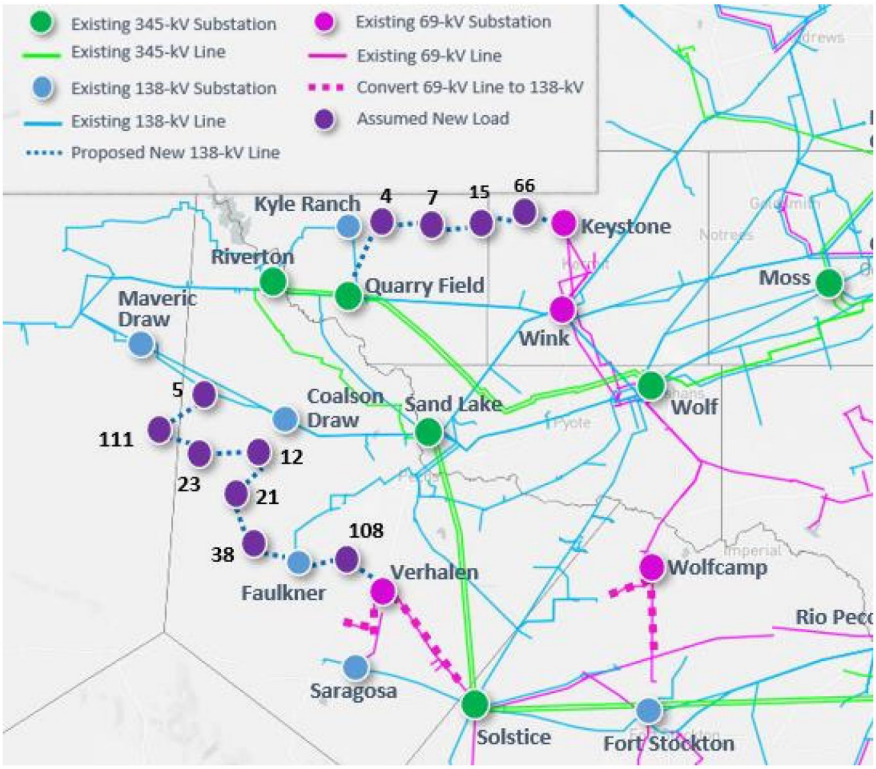


Figure 4.3 Reeves County Transmission Interconnection in 2030

4.1.2.2 Upgrades Associated with Existing Transmission Facilities

The conversion of the Barrilla Loop to 138-kV was identified to address the voltage instability issues in Reeves County.

As shown in Table 3.4 in Section 3, thermal overloads of the Sand Lake 345/138-kV transformers and Sand Lake – Cochise 138-kV double-circuit line were observed in the 2030 case under NERC P1 (N-1) contingencies. The overloads of the Sand Lake 345-kV transformers are substantially higher under the critical X-1+N-1 contingency conditions. This indicates that additional 345/138-kV transformation capacity is needed in this area to serve the projected load. ERCOT tested the following three options that involve looping the existing Solstice – Sand Lake 345-kV line into the 138-kV system with two new 345/138-kV transformers near the existing IH20 138-kV Substation to address the reliability needs.

- Option A: Loop Solstice – Sand Lake 345-kV double-circuit line at IH20 Substation
- Option B: Loop Solstice – Sand Lake 345-kV double-circuit line at Collie Field Substation
- Option C: Loop Solstice – Sand Lake 345-kV double-circuit line at Saddleback Substation

Option A resolves all the violations without any additional upgrades. Option A also has more 138-kV outlets compared to Option B and Option C.

Option B and Option C also resolve the violations but need additional upgrades. Option B needs to upgrade additional 2.95 miles of existing 138-kV line from Collie Field Tap to IH20. Option C needs to upgrade additional 4.88 miles of existing 138-kV line from Saddleback to IH20.

Based on the comparison, ERCOT recommends Option A as the preferred option to address the reliability need in the area.

Details of the identified transmission upgrades associated with the existing transmission facilities in Reeves and Ward Counties are described below:

- Convert existing Barrilla Loop to 138-kV: Barrilla – Hoefs Road – Verhalen – Cherry Creek – Saragosa 69-kV line to 138-kV (identified in 2025 study case)
- Establish a new IH20 345-kV Substation and install two new 345/138-kV transformers and loop the existing Solstice – Sand Lake 345-kV double-circuit line into the new IH20 Substation (identified in 2030 study case)
- Terminal equipment upgrade associated with existing Caymus TNP - Gas Pad 138-kV line (identified in 2030 study case)

4.1.3. Pecos County

All the identified reliability issues in Pecos County are related to the thermal overloads of the existing 69-kV and 138-kV lines. The following transmission upgrades were identified in the 2025 study case to address the reliability needs in Table 3.5:

- Convert existing Yucca – Wolfcamp – Courtney Creek 69-kV line to 138-kV
- Upgrade existing Lynx – Tombstone – Fort Stockton138-kV line
- Upgrade existing Fort Stockton – Leon Creek 138-kV line
- Upgrade existing 16th Street – Fort Stockton TNP 69-kV line

4.2. Transmission Upgrades Outside Delaware Basin Area

The transmission upgrades outside of the Delaware Basin area are mainly in three areas:

- Dawson, Borden, and Scurry Counties

- Ector, Midland, Howard, and Mitchell Counties
- Upton, Reagan, and Irion Counties

4.2.1. Dawson, Borden, and Scurry Counties

As shown in Table 3.7, thermal overloads were observed in Dawson, Borden, and Scurry Counties, and the following transmission upgrades were identified to address the reliability needs:

- Upgrade existing Sacroc – Deep Creek Sub – Snydrs 138-kV line (identified in 2030 study case)
- Upgrade existing Scurry – Kndrsacrc – Knapp 138-kV line (identified in 2025 study case)
- Upgrade existing Knapp – Bluff Creek Switch – Willow Valley Switch 138-kV line (identified in 2030 study case)
- Upgrade existing Lamesa - Key Sub – Gail Sub – Willow Valley Switch 138-kV line (identified in 2025 study case)
- Upgrade existing Lamesa – Jim Payne – Dawson – Alkali Lake 138-kV line (identified in 2025 study case)

4.2.2. Ector, Midland, Howard, and Mitchell Counties

Majority of the thermal overloads, especially the 345-kV transmission level, were occurred in Ector, Midland, Howard, and Mitchell Counties. This section describes the details of the transmission upgrades identified to address the reliability needs in this area.

4.2.2.1 345-kV Transmission Upgrades

The following transmission upgrades were identified in 2025 study case and recommended by ERCOT.

- Upgrade #1: Rebuild existing Morgan Creek – Tonkawa 345-kV line using double-circuit capable structures and add a 2nd circuit
- Upgrade #2: Rebuild existing Morgan Creek – Falcon Seaboard – Midland East – Midland County NW 345-kV line using double-circuit capable structures and add a 2nd circuit
- Upgrade #3: Upgrade existing Morgan Creek – Longshore – Odessa EHV 345-kV double-circuit line
- Upgrade #4: Establish a new 345/138-kV substation at Consavvy with two new transformers; Loop existing Longshore – Midessa South 345-kV line into Consavvy; Loop existing Grelton – Odessa EHV 345-kV line into Consavvy; Loop existing South Midland – Pronghorn 138-kV line and Midland East – Spraberry 138-kV line into Consavvy
- Upgrade #5: Upgrade existing Midessa South 345/138-kV transformer and add a 2nd Midessa South 345/138-kV transformer
- Upgrade #6: Establish a new 345/138-kV substation at Reiter (~ 3 miles south of Odessa EHV 345-kV Substation) with two new transformers, and loop existing Odessa EHV – Moss/Wolf 345-kV double-circuit line into Reiter; Establish a new 345-kV substation at Quail East (~ 2.5 miles east of Quail 345-kV Substation), and loop existing Odessa EHV – Midessa South 345-kV and Quail – Longshore Fly 345-kV line into Quail East; Add a new Quail East - Reiter 345-kV double-circuit line (~ 2.5 miles)

Among the six upgrades, Upgrades #1, #2, #3, and #5 are the upgrades of existing transmission facilities to address some of the reliability needs identified in Table 3.8. Upgrades #4, #5, and #6 are

related to adding new transmission facilities to address the remaining reliability needs in Table 3.8. Details of Upgrades #4 and #6 including option evaluations were discussed below.

Upgrade #4 is needed to serve the load in Midland County. As shown in Table 3.8, under certain P7 contingency related to the segment of the Morgan Creek – Longshore – Odessa EHV 345-kV double-circuit line, all the flow from the Morgan Creek to Odessa EHV path redirected to Consavvy resulted in the overload of the Consavvy 345/138-kV transformer. Several options were evaluated to address the reliability need, and the performance of each option was compared in Table 4.1.

Table 4.1 Options to Address Consavvy Transformer Overload

Option	Option Description	Percent Loading	
		2025	2030
Option 1	Establish a new 345/138-kV substation at Consavvy with two new 345/138-kV transformers; Loop existing Longshore – Midessa South 345-kV line into Consavvy	102.7	89.3
Option 2	Establish a new 345/138-kV substation at Consavvy with two new 345/138-kV transformers; Loop existing Longshore – Midessa South 345-kV line into Consavvy; Loop existing Grelton – Odessa EHV 345-kV line into Consavvy	78.7	76.7
Option 3	Establish a new 345/138-kV substation at Consavvy with two new 345/138-kV transformers; Loop existing Longshore – Midessa South and Longshore Fly – Quail 345-kV double-circuit line into Consavvy; Loop existing Grelton – Odessa EHV 345-kV line into Consavvy	92.2	93.3

As shown in Table 4.1, Option 2 adds a new Consavvy 345-kV source to serve the load in Midland County while relieving the overload on the Consavvy transformer under X-1+N-1 contingency condition of one Consavvy 345/138-kV transformer and the related P7 contingency. Based on the study results, ERCOT recommends Option 2 as the preferred solution.

Odessa EHV 345/138-kV transformer 2 is overloaded in both 2025 and 2030 cases. According to the TSP, upgrading the existing Odessa EHV transformer or adding additional transformer at Odessa EHV are not feasible options due to the space constraints and based on TSP's practice. As such, four transmission upgrade options were evaluated to address this overload issue. The details of the options and performance were compared in Table 4.2.

Table 4.2 Options to Address Odessa EHV Transformer 2 Overload

Option	Option Description	Percent Loading	
		2025	2030
Option 1	Add a new Midessa South – Moss 345-kV single-circuit line (~20 miles)	96.1	98.1
Option 2	Establish a new 345/138-kV substation at Reiter with two new 345/138-kV transformers, and loop existing Odessa EHV – Moss/Wolf 345-kV double-circuit line into Reiter; Establish a new 345/138-kV substation at Quail East with two new 345/138-kV transformers, and loop existing Odessa EHV – Midessa South 345-kV and Quail – Longshore Fly 345-kV double-circuit line into Quail East; Add a new Quail East – Reiter 345-kV double-circuit line (~2.5 miles)	64.8	64.7
Option 3	Establish a new 345/138-kV substation at Reiter with two new 345/138-kV transformers, and loop existing Odessa EHV – Moss/Wolf 345-kV double-circuit line into Reiter;	80.4	80.6

	Establish a new 345-kV substation at Quail East, and loop existing Odessa EHV – Midessa South 345-kV and Quail – Longshore Fly 345-kV double-circuit line into Quail East; Add a new Quail East – Reiter 345-kV double-circuit line (~2.5 miles)		
Option 4	Establish a new 345/138-kV substation at Reiter with two new 345/138-kV transformers, and loop existing Odessa EHV – Moss/Wolf 345-kV double-circuit line into Reiter; Add a new Reiter – Midessa South 345-kV double-circuit line (~6 miles)	89.5	91.7

The study results showed that Options 2 and 3 performed better than Options 1 and 4. Option 3 is less costly than Option 2 since Option 3 does not require the new 138-kV Quail East Substation and two new 345/138-kV transformers. As such, ERCOT recommends Option 3 as the preferred upgrade.

4.2.2.2 138-kV and 69-kV Transmission Upgrades

Besides the 345-kV level upgrades, the following 138-kV and 69-kV transmission upgrades were identified to address the reliability needs in Table 3.9:

- Upgrade existing China Grove – Getty Tap 138-kV line (identified in 2025 study case)
- Upgrade existing Getty Tap – Big Spring 138-kV line (identified in 2020 study case)
- Upgrade existing Morgan Creek – McDonald 138-kV line (identified in 2025 study case)
- Upgrade existing Odessa EHV – Big Three Odessa Tap – Odessa Southwest 138-kV line (identified in 2025 study case)
- Upgrade existing Sterling City – Sterling County 69-kV line (identified in 2030 study case)
- Convert existing Spraberry – Midkiff 69-kV line to 138-kV (identified in 2025 study case)
- Upgrade existing Salt Flat – Pronghorn – Consavvy 138-kV line (identified in 2025 study case)
- Upgrade existing Odessa EHV – Rexall – General Tire Switch – Edwards Tap – Judkins – Sandhills Tap – Wolf 138-kV line (identified in 2025 study case)
- Upgrade existing Moss – Wolf 138-kV line (identified in 2025 study case)
- Upgrade existing Odessa North – Odessa 138-kV line (identified in 2025 study case)
- Upgrade existing Odessa EHV – Yarbrough Sub – Wolf 138-kV line (identified in 2025 study case)
- Upgrade existing Holt – Scharbauer POI 138-kV line (identified in 2025 study case)

4.2.3. Upton, Reagan, and Irion County Projects

The following transmission upgrades were identified in the 2025 study case to address the reliability needs in Table 3.10.

- Upgrade existing Twin Buttes – Hargrove – Pumpjack – Big Lake 138-kV line
- Convert existing Rio Pecos – Big Lake 69-kV line to 138-kV
- Convert existing Big Lake – San Angelo Concho 69-kV line to 138-kV

Since the new loads in Upton, Reagan, and Irion Counties are relatively smaller and sparse compared to other loads in the Delaware Basin or Midland area, these transmission upgrades are considered as placeholders. Further review of these upgrades will be required if submitted for RPG review.

4.3. Stage 2 Upgrade

ERCOT completed the Delaware Basin Load Integration Study in December 2019 and identified a roadmap of preferred system upgrades to meet future demand growth in the Delaware Basin area and improve the capability to import power into the Delaware Basin area. The roadmap involves five stages of the long lead time 345-kV upgrades as shown in Table 2.5. Among the upgrades, the Stage 1 upgrade which adds a second circuit on the existing Big Hill – Bakersfield 345-kV line was endorsed by ERCOT in June 2021 and is expected to be implemented in 2023.

As described in Section 2.2.3, the load level associated with the Delaware Base area in the 2030 study case is expected to exceed the trigger point of the Stage 2 upgrade (i.e., a new Bearkat – North McCamey – Sand Lake 345-kV double-circuit line). Although ERCOT conducted the detailed analysis of the need for the Stage 2 upgrade in the Delaware Basin Load Integration Study, ERCOT performed additional analysis in this Permian Basin Load Interconnection Study to reconfirm the need for the Stage 2 upgrade. The additional analysis was performed using the 2030 study case without the Stage 2 upgrade, and the results showed voltage instability under multiple P7 contingencies (i.e., N-1 conditions).

As described in Sections 4, 5, and 6 of the Delaware Basin Load Integration Study, ERCOT evaluated a number of import path options as alternatives to the Stage 2 upgrade, including a new Faraday – Lamesa – Clearfork – Riverton 345-kV double-circuit line (i.e., the Stage 5 upgrade). Due to more mileages of new rights-of-way and higher project costs of those alternatives, ERCOT proposed the addition of a new Bearkat – North McCamey – Sand Lake 345-kV double-circuit line as the Stage 2 upgrade in the Delaware Basin Load Integration Study.

Based on the results of the Delaware Basin Load Integration Study and this Permian Basin Load Interconnection Study, ERCOT recommends the Stage 2 upgrade as a new transmission import path to the Delaware Basin area in the 2030 study case:

- Stage 2 upgrade: add a new Bearkat – North McCamey – Sand Lake double-circuit 345-kV line (~164 miles), with the minimum normal and emergency rating of at least 2564 MVA

5. Summary of the Transmission Upgrades

As discussed in Section 4, various transmission upgrades were developed to address the reliability criteria violations identified in the Permian Basin Load Interconnection Study. The long lead time transmission upgrades (e.g., RPG Tier 1 and Tier 2 projects) and the new load connections in the Delaware Basin area which form a 138-kV loop are considered as preferred projects. The remaining transmission upgrades are considered as placeholder projects and may require further review. The placeholder projects include the transmission upgrades that are expected to be potential RPG Tier 3 and Tier 4 projects as well as the transmission upgrades in Upton, Reagan, and Irion Counties which are at the border of the Permian Basin study area. Table 5.1 summarizes the transmission upgrades identified in this study. The total cost of the preferred transmission upgrades is estimated to be approximately $1.5 Billion.

Table 5.1 Summary of the Identified Transmission Upgrades in 2025 and 2030

Reliability Upgrades	Unit	Project Consideration
New 345-kV Line	~ 295 miles	Preferred
Existing 345-kV Line Upgrade	~ 211 miles	Preferred
New 345-kV Substation	4	Preferred
New 345/138-kV Transformer	7	Preferred
New 138-kV Line	~ 128 miles	Preferred
Existing 138-kV Line Upgrade	~ 449 miles	Placeholder
69-kV line to 138-kV Conversion	~ 313 miles	Placeholder
Reactive Support Need	~ 400 MVAR	Placeholder

Table 5.2 lists the details of the preferred transmission upgrades identified in this study. Figures 5.1 and 5.2 show the maps of the preferred reliability upgrades identified in the 2025 and 2030 cases.

Table 5.2 List of the Preferred Transmission Upgrades

Project ID	Preferred Transmission Upgrades	Assumed Rate A/B (MVA) in Study Case	Year of Study Case with Reliability Need Starting to Appear	Approximate Cost Estimate ($M)
1	Rebuild existing Morgan Creek – Tonkawa 345-kV line using double-circuit capable structures and add a 2nd circuit	2988/2988	2025	100.58
2	Rebuild existing Midland East – Falcon Seaboard 345-kV line using double-circuit capable structures and add a 2nd circuit	1792/1792	2025	196.47
2	Rebuild existing Morgan Creek – Falcon Seaboard 345-kV line using double-circuit capable structures and add a 2nd circuit	1792/1792	2030	
2	Rebuild existing Midland East – Midland County NW 345-kV line using double-circuit capable structures and add a 2nd circuit	1792/1792	2025	
3	Upgrade existing Morgan Creek – Longshore 345-kV line	1792/1792	2030	393.88
3	Upgrade existing Morgan Creek – Longshore Fly 345-kV line	1792/1792	2025	
3	Establish a new 345/138-kV substation at Consavvy with two new 345/138-kV transformers; Loop existing Longshore – Midessa South 345-kV line into Consavvy and upgrade Longshore – Consavvy line;	1792/1792	2025	

	Loop existing South Midland – Pronghorn 138-kV line and Midland East – Spraberry 138-kV line into Consavvy			
3	Upgrade Consavvy – Midessa South 345-kV line	1792/1792	2025	
3	Upgrade existing Longshore Fly – Quail 345-kV line	1792/1792	2025	
3	Loop existing Grelton – Odessa EHV 345-kV line into Consavvy	1723/1723	2025	
3	Upgrade existing Midessa South – Odessa EHV 345-kV line	1792/1792	2025	
3	Upgrade existing Quail – Odessa EHV 345-kV line	1792/1792	2025	
3	Upgrade existing Midessa South 345/138-kV transformer and add a 2nd Midessa South 345/138-kV transformer	600/600	2025	
18	Add Verhalen – New Load 90108 138-kV line	483/ 483	2025	6.60
24	Establish a new IH20 345-kV Substation and install two new 345/138-kV transformers	700/750	2030	65.55
24	Loop existing Solstice – Sand Lake 345-kV double-circuit line at the new IH20 345-kV Substation	2988/2988	2030	
25	Establish a new 345/138-kV Reiter Substation with two new 345/138-kV transformers; Establish a new 345-kV Quail East Substation; Add a new Quail East – Reiter 345-kV double-circuit line	2988/2988	2025	104.65
31	Add Quarry Field – New Load 90004 138-kV line	614/614	2025	80.23
31	Add New Load 90004 – New Load 90007 – New Load 90015 – New Load 90066 – Keystone 138-kV line	614/614	2025	
31	Add capacitor bank (90 Mvar) at new load bus 90004		2025	
33	Add ONC90005_TAP – New Load 90005 138-kV line	617/617	2025	67.25
33	Add New Load 90005 – New Load 90111 – New Load 90023 – New Load 90012 138-kV line	614/614	2025	
33	Add capacitor bank (90 Mvar) at new load bus 90012		2025	
34	Add New Load 90012 – New Load 90021 138-kV line	617/617	2030	29.6
35	Add Faulkner – New Load 90038 – New Load 90021 138-kV line	617/617	2025	33.8
35	Add capacitor bank (90 Mvar) at new load bus 90021		2030	
36	Add Faulkner – New Load 90108 138-kV line	617/617	2030	17.55
42	Add Bearkat – North McCamey 345-kV double-circuit line	2564/2564	2030	392.41
42	Add North McCamey – Sand Lake 345-kV double-circuit line	2564/2564	2030	

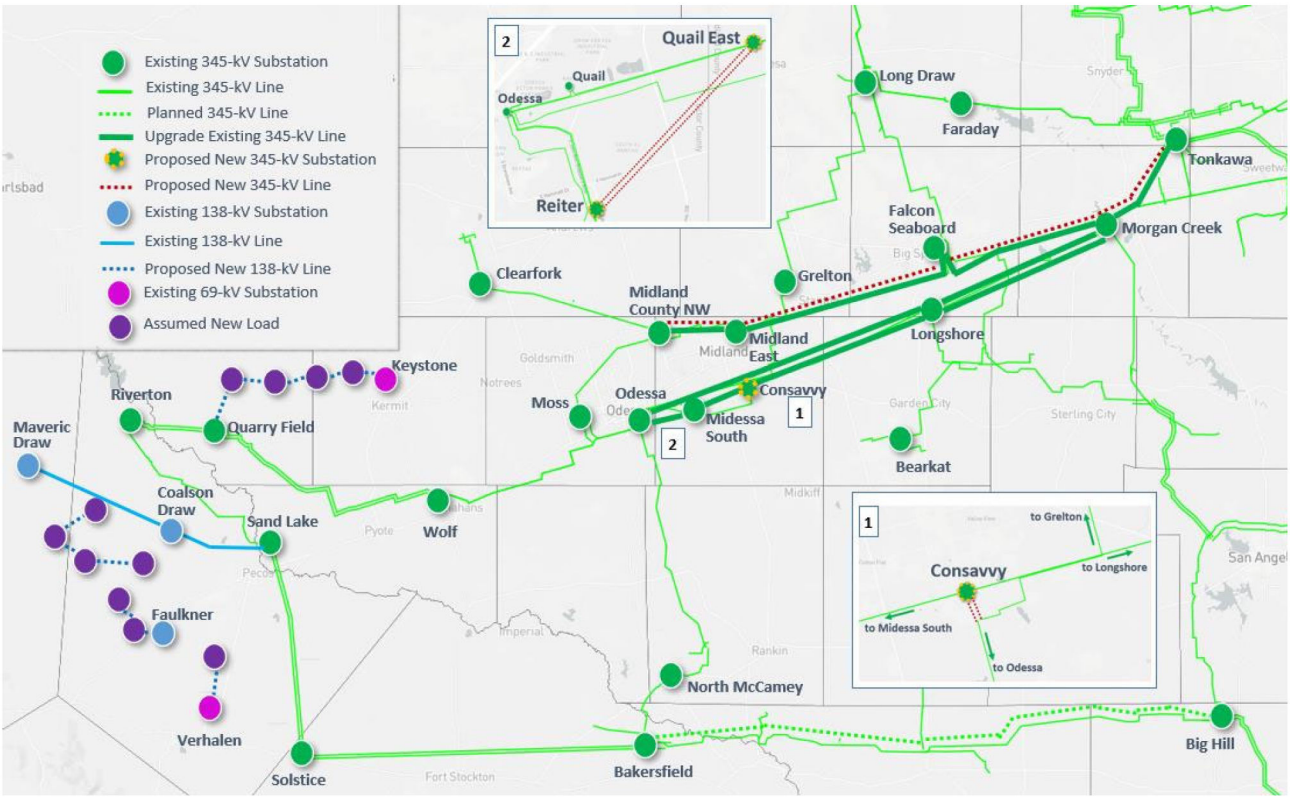


Figure 5.1 Preferred Reliability Upgrades for 2025

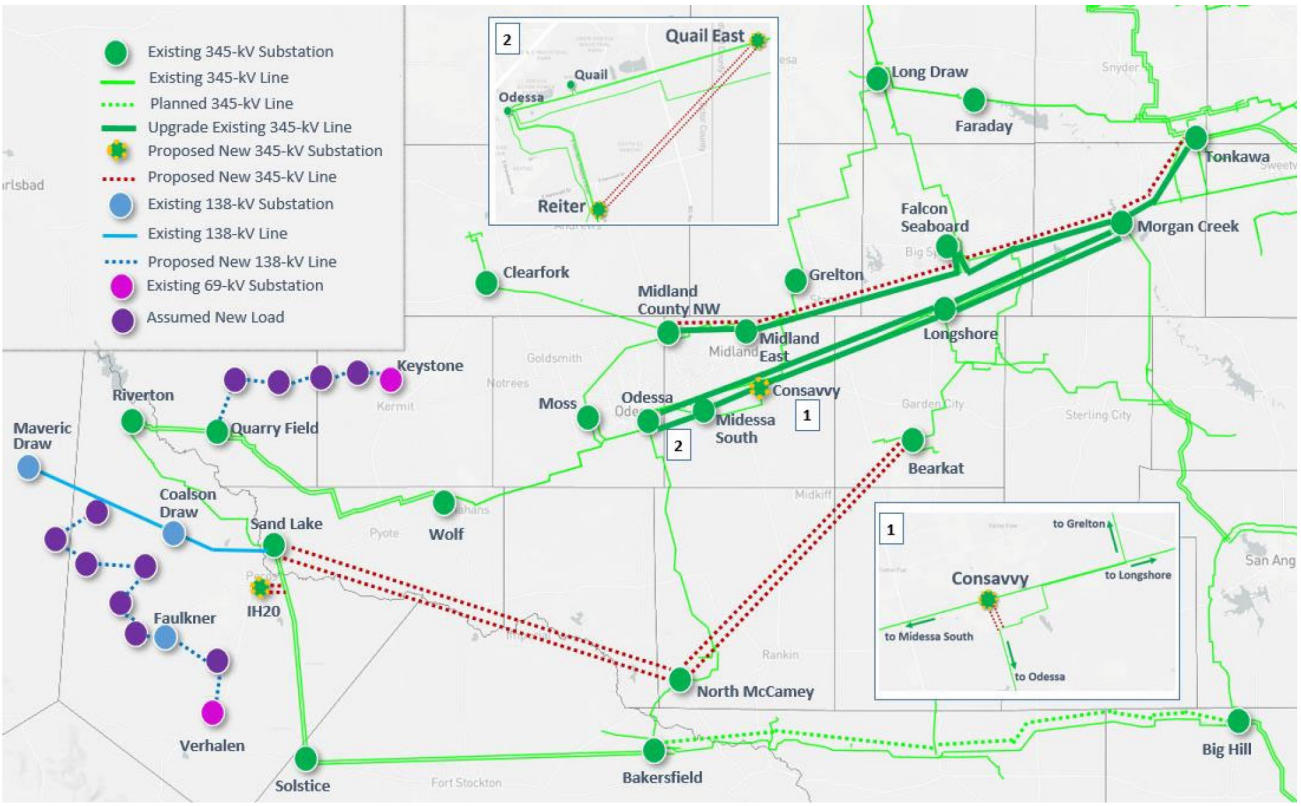


Figure 5.2 Preferred Reliability Upgrades for 2030

Table 5.3 lists the placeholder transmission upgrades identified in this study.

Table 5.3 List of the Placeholder Transmission Upgrades

Project ID	Placeholder Transmission Upgrades	Year of Study Case with Reliability Need Starting to Appear	Approximate Cost Estimate ($M)
4	Upgrade existing Sacroc – Deep Creek Sub – Snydrs 138-kV line	2030	24.23
5	Upgrade existing Scurry – Kndrsacrc – Knapp 138-kV line	2025	19.44
6	Upgrade existing Knapp – Bluff Creek Switch 138-kV line	2030	46.02
6	Upgrade existing Bluff Creek Switch – Willow Valley Switch 138-kV line	2030	
7	Upgrade exisitng Lamesa – Key Sub – Gail Sub – Willow Valley Switch 138-kV line	2025	45.09
8	Upgrade existing Lamesa – Jim Payne – Dawson – Alkali Lake 138-kV line	2025	28.98
9	Upgrade existing China Grove – Getty Tap 138-kV line	2025	56.86
10	Upgrade existing Getty Tap – Big Spring 138-kV line	2030	20.63
11	Upgrade existing Morgan Creek – McDonald 138-kV line	2025	46.66
12	Upgrade existing Odessa EHV – Big Three Odessa Tap – Odessa Southwest 138-kV line	2025	21.16
13	Upgrade existing Lynx – Tombstone – Fort Stockton 138-kV line	2025	38.60
14	Upgrade existing Fort Stockton – Leon Creek 138-kV line	2025	3.58
15	Upgrade existing Twin Buttes – Hargrove – Pumpjack – Big Lake 138-kV line	2025	65.05
16	Upgrade existing Sterling City – Sterling County 69-kV line	2030	2.48
17	Upgrade existing 16th Street – Fort Stockton TNP 69-kV line	2025	0.75
18	Convert existing Barrilla Loop 69-kV line to 138-kV	2025	46.81
18	Add Verhalen – New Load 90008 138-kV line	2025	
18	Add Hoefs Road – New Load 90026 138-kV line	2025	
18	Add capacitor bank (90 Mvar) at new load bus 90008	2025	
19	Convert existing Yucca – Wolfcamp – Courtney Creek 69-kV line to 138-kV	2025	75.50
20	Convert existing Big Lake – San Angelo Concho 69-kV line to 138-kV	2025	61.24
21	Convert existing Rio Pecos – Big Lake 69-kV line to 138-kV	2025	114.00
22	Convert existing Spraberry – Midkiff 69-kV line to 138-kV	2025	6.84
23	Convert existing TNMP Wink – California – Wickett 69-kV to 138-kV	2030	14.46
26	Upgrade existing Odessa EHV – Rexall – General Tire Switch – Edwards Tap – Judkins – Sandhills Tap – Wolf 138-kV line	2025	62.74
27	Upgrade existing Moss – Wolf 138-kV line	2025	39.30
28	Upgrade existing Odessa North – Odessa 138-kV line	2025	15.76

29	Upgrade existing Odessa EHV – Yarbrough Sub – Wolf 138-kV line	2025	63.11
30	Upgrade existing Holt – Scharbauer POI 138-kV line	2025	10.46
32	Add Kyle Ranch – New Load 90001 – New Load 90006 138-kV line	2025	3.97
35	Add New Load 90021 - New Load 90032 138-kV line	2025	17.0
37	Add ONC90002_TAP – New Load 90002 138-kV line	2025	18.37
37	Add capacitor bank (24 Mvar) at new load bus 90002	2030	
38	Add Three Mile Draw Switch – New Load 90106 138-kV line	2030	13.54
39	Add ONC90009_TAP – New Load 90009 138-kV line	2025	14.53
41	Increase the capacitor bank at bus 1323 to 18.4 Mvar from 9.2 Mvar	2030	0.50
44	Upgrade existing Salt Flat – Pronghorn – Consavvy 138-kV line	2025	15.70
45	Terminal equipment upgrade for existing Caymus TNP – Gas Pad 138-kV line	2030	0.50

6. Conclusion

The purpose of this Permian Basin Load Interconnection Study was to identify transmission upgrades that are necessary to connect projected oil and gas loads in the Permian Basin area.

This study identified a list of the transmission upgrades, including both the preferred and placeholder projects, required by 2025 and 2030 to address the identified reliability criteria violations in the study area.

The preferred projects may be endorsed by ERCOT based on the results of this Permian Basin Load Interconnection Study if they are submitted for RPG review. The total cost of the preferred transmission upgrades is estimated to be approximately $1.5 Billion. The placeholder projects are expected to require further analysis if submitted for RPG review.

7. Appendix

7.1. Appendix A: Reliability Violations	Appendix A - Reliability Violations
7.2. Appendix B: List of All Transmission Upgrades and Corresponding Reliability Need	Appendix B - List of All Transmission Up
7.3. Appendix C: Maps of All Transmission Upgrades	Appendix C - Maps of All Transmission U

WEST TEXAS 345 KV INFRASTRUCTURE REBUILD PROJECT

ERCOT RPG Submittal
November 3, 2023

ATTACHMENT NO. 4

Table of Contents

Executive Summary

The need to expand and rebuild Oncor's transmission facilities in West Texas is being driven by load growth, load integration requests, and the need to rebuild aging facilities. The aging facilities in this area need extensive upgrades and modifications to meet surging customer load and current planning and design standards. This project addresses the need to expand and further reinforce the transmission system in West Texas.

The need for this project is derived from the recommendations in ERCOT's Permian Basin Load Interconnection Study – Final Update presentation, presented by ERCOT at the October 15, 2021 Regional Planning Group (RPG) meeting. The Permian Basin Load Interconnection (PBLI) Study was performed by ERCOT with input from affected Transmission Service Providers (TSPs) and other RPG stakeholders. The final PBLI study report was published by ERCOT on December 8, 2021. The study identified transmission reliability needs resulting from continued expansion of the oil and natural gas industry in the Permian Basin area. In the PBLI Study, ERCOT identified a set of 'Preferred' and a set of 'Placeholder' transmission upgrade projects, with the understanding that ERCOT could use the PBLI Study as part of ERCOT's Independent Review of a 'Preferred' RPG Project. This RPG Project presents and provides the justification for many of the ERCOT designated 'Preferred' transmission upgrades in the PBLI Study in this single submittal. This Proposed RPG Project includes components of ERCOT's 'Preferred' Project IDs 1, 2, 3, and 25, with each of the applicable Project ID components being modeled in the analysis. Some of the components of the ERCOT 'Preferred' Projects list have already been submitted and approved by ERCOT and the RPG, (see the Introduction section of this Proposed RPG Project).

An integral part of this Proposed RPG Project is the reconfiguration of the Morgan Creek Switch and the rebuild of the 345 kV Lines from Morgan Creek – Tonkawa, Morgan Creek – Midland County Northwest, and Morgan Creek – Odessa EHV. The Morgan Creek Switch property is currently shared between Oncor and Vistra. Due to the size of the proposed Morgan Creek Switch rebuild, the land constraints necessary to rebuild the switch, and the routing constraints with the existing property, Morgan Creek Switch will need to be broken up into two separate switch stations (Ranger Camp and Cattleman 345/138 kV Switches) to accommodate the 345 kV, 138 kV, and 69 kV facilities and a third station (Morgan Creek 138 kV Switch) to be rebuilt to interconnect the existing Morgan Creek generation. The 345 kV lines from Morgan Creek to Tonkawa, Morgan Creek to Midland County Northwest, and Morgan Creek to Odessa EHV will each need to be rebuilt with newer structures and higher ampacity conductor.

Oncor is proposing a Tier 1 project that will consist of the following elements:

- Establish the new Ranger Camp 345/138/69 kV Switch, approximately 1.0 mile north of the existing Morgan Creek 345/138 kV Switch, including two 600 MVA, 345/138 kV autotransformers, and one 177 MVA, 138/69 kV autotransformer. The Ranger Camp 345/138/69 kV Switch will initially be installed with (1) a 14-breaker, 345 kV, breaker-and-a-half bus arrangement, (2) a 16-breaker, 138 kV, breaker-and-a-half bus arrangement, and 3) a 2-breaker, 69 kV, single bus arrangement. All terminal and associated equipment will meet or exceed 5000 A for 345 kV, 3200 A for 138 kV and 2000 A for 69 kV;
    - Connect the existing 69 kV lines into the new Ranger Camp Switch:
        - Morgan Creek – Colorado City 69 kV Line (normal and emergency rating of 81 MVA)
        - Morgan Creek – Big Spring 69 kV Line (normal and emergency rating of 62 MVA)

- Connect the existing 138 kV lines into the new Ranger Camp Switch:
  - Morgan Creek – Eskota 138 kV Line (normal and emergency rating of 186 MVA)
  - Morgan Creek – Barber Lake West 138 kV Line (normal and emergency rating of 186 MVA)
  - Morgan Creek – Barber Lake East 138 kV Line (normal and emergency rating of 186 MVA)
  - Morgan Creek – Sun 138 kV Line (normal and emergency rating of 186 MVA)
  - Morgan Creek – Cosden 138 kV Line (normal and emergency rating of 287 MVA)
- Reroute the existing Morgan Creek – Falcon Seaboard 345 kV Line (normal and emergency rating of 956 MVA) approximately 1.4 miles, on new right-of-way (ROW), to loop into the new Ranger Camp Switch;
- Reroute the existing Morgan Creek – Tonkawa 345 kV Line (normal and emergency rating of 1072 MVA) approximately 1.7 miles, with approximately 0.76 miles of existing ROW and approximately 0.94 miles of new ROW, to loop into the new Ranger Camp Switch;
- Relocate the existing 177 MVA, 138/69 kV autotransformer from Morgan Creek Switch to the new Ranger Camp Switch;

- Establish the new Cattleman 345/138 kV Switch, approximately 2.0 miles southwest of the existing Morgan Creek 345/138 kV Switch, including two 600 MVA, 345/138 kV autotransformers. The Cattleman 345/138 kV Switch will initially be installed with (1) a 15-breaker, 345 kV, breaker-and-a-half bus arrangement, and (2) a 9-breaker, 138 kV, breaker-and-a-half bus arrangement. All terminal and associated equipment will meet or exceed 5000 A for 345 kV, and 3200 A for 138 kV;
  - Connect the existing McDonald Road – Morgan Creek 138 kV Line (normal and emergency rating of 329 MVA) into the new Cattleman Switch, using new ROW;
  - Reroute the existing Morgan Creek – Champion Creek/LCRA Bitter Creek 345 kV Double-Circuit (DCKT) Line (normal and emergency rating of 1072 MVA) approximately 2.5 miles, with approximately 1.25 miles of existing ROW and approximately 1.25 miles of new ROW, to loop into the new Cattleman Switch;
  - Reroute the existing Morgan Creek – LCRA Gasconades 345 kV Line (normal and emergency rating of 1434 MVA) approximately 2.5 miles, with approximately 0.37 miles of existing ROW and approximately 2.13 miles of new ROW, to loop into the new Cattleman Switch;
  - Connect the existing Morgan Creek – Consavvy 345 kV Line (normal and emergency rating of 1072 MVA) and the existing Morgan Creek – Longshore 345 kV Line (normal and emergency rating of 1072 MVA) into the new Cattleman Switch, using existing ROW;
- Establish the new approximately 4.2 mile Cattleman – Ranger Camp 345 kV DCKT Line (normal and emergency rating of 2987 MVA) using double-circuit capable structures with two circuits in place, using new ROW;
- Rebuild the Morgan Creek 138 kV Switch, in the existing Morgan Creek 345/138 kV Switchyard. The Morgan Creek 138 kV Switch will be rebuilt from the existing 12-breaker, 138 kV double-bus arrangement to a 10-breaker, 138 kV, breaker-and-a-half bus arrangement. All terminal and associated equipment will meet or exceed 3200 A for 138 kV. This portion of the Proposed RPG Project includes the following elements:
  - Establish two approximately 0.1 mile Morgan Creek – Morgan Creek CT Yard 138 kV Lines (normal and emergency rating of 614 MVA) using separate single-circuit capable structures with one circuit in place, using existing ROW;

- Establish a new approximately 1.2 miles Morgan Creek - Ranger Camp 138 kV DCKT Line (normal and emergency rating of 614 MVA) using double-circuit capable structures with two circuits in place, using existing ROW;
- Establish a new approximately 3.3 miles Morgan Creek - Cattleman 138 kV DCKT Line (normal and emergency rating of 614 MVA) using double-circuit capable structures with two circuits in place, using approximately 0.82 miles of existing ROW and approximately 2.48 miles of new ROW;

- Establish the new Prong Moss 345 kV Switch, approximately 29.4 miles southwest of the existing Morgan Creek 345/138 kV Switch along the existing 345 kV Morgan Creek – Midland East 345 kV Line corridor, and approximately 7.0 miles south of the existing Falcon Seaboard generating station. The Prong Moss 345 kV Switch will initially be installed with a 12-breaker, 345 kV, breaker-and-a-half bus arrangement. All terminal and associated equipment will meet or exceed 5000 A;
  - Construct an approximately 0.1 mile loop of the existing Morgan Creek – Falcon Seaboard 345 kV Line (normal and emergency rating of 956 MVA) into the new Prong Moss 345 kV Switch, approximately 7.0 miles south of Falcon Seaboard, using new ROW;
  - Construct an approximately 0.1 mile loop of the existing Falcon Seaboard – Midland East 345 kV Line (normal and emergency rating of 956 MVA) into the new Prong Moss 345 kV Switch, approximately 7.0 miles south of Falcon Seaboard, using new ROW;
  - The existing 345 kV double-circuit line from Falcon Seaboard Switch to the newly proposed location of Prong Moss 345 kV Switch will tie into the new Prong Moss 345 kV Switch but will not be rebuilt as part of this Proposed RPG Project;
- Modify the existing Tonkawa 345 kV Switch by adding one new 5000 A breaker-and-a-half rung with two new 5000 A, 345 kV circuit breakers on the new rung;
- Rebuild the existing 21.3 mile Morgan Creek – Tonkawa 345 kV Line (previously Morgan Creek – Tonkawa, now Ranger Camp – Tonkawa) by:
  - Rebuilding the existing 21.3 mile 345 kV circuit with a conductor rated 5000 A or greater (normal and emergency rating of 2987 MVA), on double-circuit capable structures with one circuit in place, using existing ROW;
  - Installing one new 21.3 mile 345 kV circuit with a conductor rated 5000 A or greater (normal and emergency rating of 2987 MVA) on the vacant side of the structures;
- Rebuild the existing 70.6 mile Morgan Creek – Midland East 345 kV Line (previously Morgan Creek – Falcon Seaboard – Midland East, now Ranger Camp – Prong Moss – Midland East) by:
  - Rebuilding the existing approximately 29.4 mile Ranger Camp – Prong Moss 345 kV circuit with a conductor rated 5000 A or greater (normal and emergency rating of 2987 MVA) using double-circuit capable structures with one circuit in place, using existing ROW;
  - Installing one new 29.4 mile Ranger Camp – Prong Moss 345 kV circuit with a conductor rated 5000 A or greater (normal and emergency rating of 2987 MVA) on the vacant side of the new structures;
  - Rebuilding the existing approximately 41.2 mile Prong Moss – Midland East 345 kV circuit with a conductor rated 5000 A or greater (normal and emergency rating of 2987 MVA) using double-circuit capable structures with one circuit in place, using existing ROW;

- Installing one new 41.2 mile Prong Moss – Midland East 345 kV circuit with a conductor rated 5000 A or greater (normal and emergency rating of 2987 MVA) on the vacant side of the new structures;

- Rebuild the existing 17.3 mile Midland East – Midland County Northwest 345 kV Line by:
  - Rebuilding the existing approximately 17.3 mile Midland East – Midland County Northwest 345 kV circuit with a conductor rated 5000 A or greater (normal and emergency rating of 2987 MVA) using double-circuit capable structures with one circuit in place, with approximately 16.3 miles of existing ROW and 1.0 mile of new ROW;
  - Installing one new 17.3 mile Midland East – Midland County Northwest 345 kV circuit with a conductor rated 5000 A or greater (normal and emergency rating of 2987 MVA) on the vacant side of the new structures;
- Rebuild the existing Midland County Northwest 345 kV Switch buswork and terminal equipment to meet or exceed 5000 A;
  - Modify the existing Midland County Northwest 345 kV Switch by adding one new 5000 A breaker-and-a-half rung with two new 5000 A, 345 kV circuit breakers on the new rung;
- Rebuild the existing 88.7 miles Morgan Creek – Odessa EHV 345 kV DCKT Line (previously Morgan Creek – Odessa EHV, now Cattleman – Odessa EHV) by:
  - Rebuilding the existing 88.7 mile Morgan Creek – Odessa EHV 345 kV DCKT Line with a conductor rated 5000 A or greater (normal and emergency rating of 2987 MVA) using double-circuit capable structures with two circuits in place, using existing ROW;
  - Convert the existing Longshore 345 kV Switch from a 6-breaker ring-bus configuration into an 11-breaker, 345 kV, breaker-and-a-half bus arrangement. All terminal and associated equipment will meet or exceed 5000 A for 345 kV;
    - Construct an approximately 0.1 mile loop of the existing Morgan Creek – Longshore Flyby – Consavvy 345 kV Line into the rebuilt Longshore 345 kV Switch;
  - Upgrade all terminal equipment at the existing 2-breaker Midessa South 345 kV Switch to meet or exceed 5000 A;
  - Upgrade all terminal equipment at the existing Quail East 345 kV Switch, 3-breaker ring bus to meet or exceed 5000 A;
  - Upgrade terminal equipment on two 345 kV breaker-and-a-half rungs of the existing Odessa EHV Switch to meet or exceed 5000 A;
  - Upgrade two 345 kV single breaker terminals and main bus at the existing Odessa EHV Switch to meet or exceed 5000 A;
- Establish the new Reiter 345/138 kV Switch, including two 600 MVA, 345/138 kV autotransformers, approximately 3.0 miles south of the existing Odessa EHV 345/138 kV Switch, along the Odessa EHV – Moss/Wolf 345 kV DCKT Line corridor. The Reiter 345/138 kV Switch will initially be installed with (1) a 12-breaker, 345 kV, breaker-and-a-half bus arrangement and (2) a 10-breaker, 138 kV, breaker-and-a-half bus arrangement. All terminal and associated equipment will meet or exceed 5000 A for 345 kV, and 3200 A for 138 kV;
  - Construct an approximately 0.2 mile loop of the existing Odessa EHV - Moss 138 kV Line (normal and emergency rating of 614 MVA) into the new Reiter 138 kV Switch, using new ROW;

- Construct an approximately 0.1 mile loop of the existing Odessa EHV - Wolf 138 kV Line (normal and emergency rating of 614 MVA) into the new Reiter 138 kV Switch, using new ROW;
- Construct an approximately 0.1 mile loop of the existing Odessa EHV – Moss & Odessa EHV – Wolf 345 kV DCKT Line (normal and emergency rating of 2987 MVA) into the new Reiter 345 kV Switch, using new ROW;

- Modify the existing Tesoro 345 kV Switch by adding two new 5000 A breaker-and-a-half rungs with two new 5000 A, 345 kV circuit breakers on each rung;
- Construct a new approximately 4.0 mile Reiter – Tesoro 345 kV DCKT Line (normal and emergency rating of 2987 MVA) using double-circuit capable structures with two circuits in place, using new ROW;

Table 3 below lists the components of this Proposed RPG Project that will likely require a CCN filing.

This Proposed RPG Project will (1) address ERCOT's identified reliability projects, (2) resolve identified thermal overloads in the ERCOT Permian Basin Load Integration study, (3) improve system operational flexibility, (4) increase system load serving capacity, (5) create an additional 345 kV source for West Texas and (6) upgrade and retire aging infrastructure.

This Tier 1 RPG project in Scurry, Mitchell, Howard, Glasscock, Martin, Midland, and Ector counties is estimated to cost $1.12 billion. The estimated cost of this RPG reflects the fact that the vast majority of the work necessary to complete the various project components associated with this submittal will need to be performed on energized transmission elements ("hot" work) and/or will require construction of temporary by-pass transmission facilities. This type of work on this project is essential for a variety of reasons.

First, obtaining clearances on the existing 345 kV lines would be impractical and risk system reliability. The analysis contained herein demonstrates that thermal violations on various 345 kV lines would occur under certain existing single-circuit 345 kV contingencies, and therefore taking clearances on the existing 345 kV lines would create unfavorable system conditions. Second, load growth in West Texas has been driven primarily by the oil and gas industry. As a result, it is becoming less scalable, because load remains relatively persistent even during off-peak periods when construction is usually performed. Third, obtaining clearances in West Texas is becoming more challenging. Clearance moratoriums are getting longer and more restricted. At times, depending on system conditions and additional work in the area, ERCOT has been required to cancel construction clearances required to perform work on a given project. Clearance cancellations present the worst of both worlds from a project timing and cost perspective, because it necessitates costly hot work but also results in cascading project schedule disruptions based on the shift or disappearance of the clearance previously relied upon in the project work sequencing. Because Oncor does not have control over clearance schedules and clearance timing, it cannot rely on obtaining the necessary clearances while still maintaining a realistic expectation to meet the summer 2028 in-service date for these projects. Thus, performing the work necessary to complete this RPG in a timely and efficient manner requires the flow of 345 kV transmission into West Texas to be uninterrupted and necessitates 'hot' work and/or temporary by-pass transmission facilities for large portions of these projects.

This project is recommended for construction to meet a summer 2028 in-service date. The projected in-service date may change based on requirements for environmental assessment, licensing requests, regulatory approval, rights-of-way acquisition and construction progress. Oncor will work with ERCOT as necessary to develop and implement Constraint Management Plans based on summer 2028 operational conditions. In addition to RPG approval, multiple Certificates of Convenience and Necessity (CCNs) will be required for portions of this Proposed RPG Project, as listed in Table 3 below.

Introduction

Oncor continues to see load growth in west Texas due to the high level of activity in the oil and gas industry. Demand is expected to continue to grow at a rapid pace, mainly driven by new loads and electrification activities, including conversion of gas-powered equipment to electrical operation or moving load from on-site generation to the grid to improve reliability. This growth forecast is supported in the ERCOT Permian Basin Load Interconnection (PBLI) Study report which states that electric load in west Texas is expected to nearly double by 2030.

In order to meet the forecasted Permian Basin load, several projects will be required. Other RPG submittals Oncor has recently submitted or plans to submit for review in the near future are:

- Midland East Area Project (accepted by RPG 3/12/21);
- Consavyy 345/138 kV Switch Project (accepted by RPG 4/4/2022);
- Lenorah/Volta 345/138 kV Switch Project (accepted by RPG 4/4/2022);
- Tesoro (fka known as Quail East) 345/138 kV Switch Project (accepted by RPG 11/7/22);
- Rockhound 345/138 kV Switch Project;
- Prong Moss 345/138 kV Switch Project
- Prairieland 345/138 kV Switch and Prairieland – Quartz Sand 138 kV Line Project; and
- Multiple projects identified in the ERCOT Delaware Basin Load Interconnection Study.

The extent of the necessary transmission system changes and upgrades requires Oncor to submit major projects well in advance of the need, as it is anticipated that the completion of the Proposed RPG Project may take 4-5 years. Oncor's Proposed RPG Project provides a roadmap to improve and reinforce the 345 kV transmission grid in West and Far West Texas. Morgan Creek Switch is an aging facility, and in order to accommodate the aforementioned projects and the increasing area demand more generally, a rebuild of Morgan Creek Switch will be essential for maintaining operational flexibility and reliability in the area. Because of land and routing constraints, the Morgan Creek Switch portion of the Proposed RPG Project will result in two new 345/138 kV switches, Ranger Camp Switch and Cattleman Switch, and one rebuilt 138 kV switch, Morgan Creek Switch. Additionally, the ERCOT Permian Basin Load Interconnection Study recommended the existing single-circuit 345 kV Line from Tonkawa – Morgan Creek – Midland County Northwest, be rebuilt as a double-circuit 345 kV Line.

Figure 1 identifies the approximate location of the Proposed RPG Project, while Figure 2 provides a simplified one-line diagram illustrating the existing configuration of Morgan Creek Switch and adjacent facilities prior to the Proposed RPG Project.

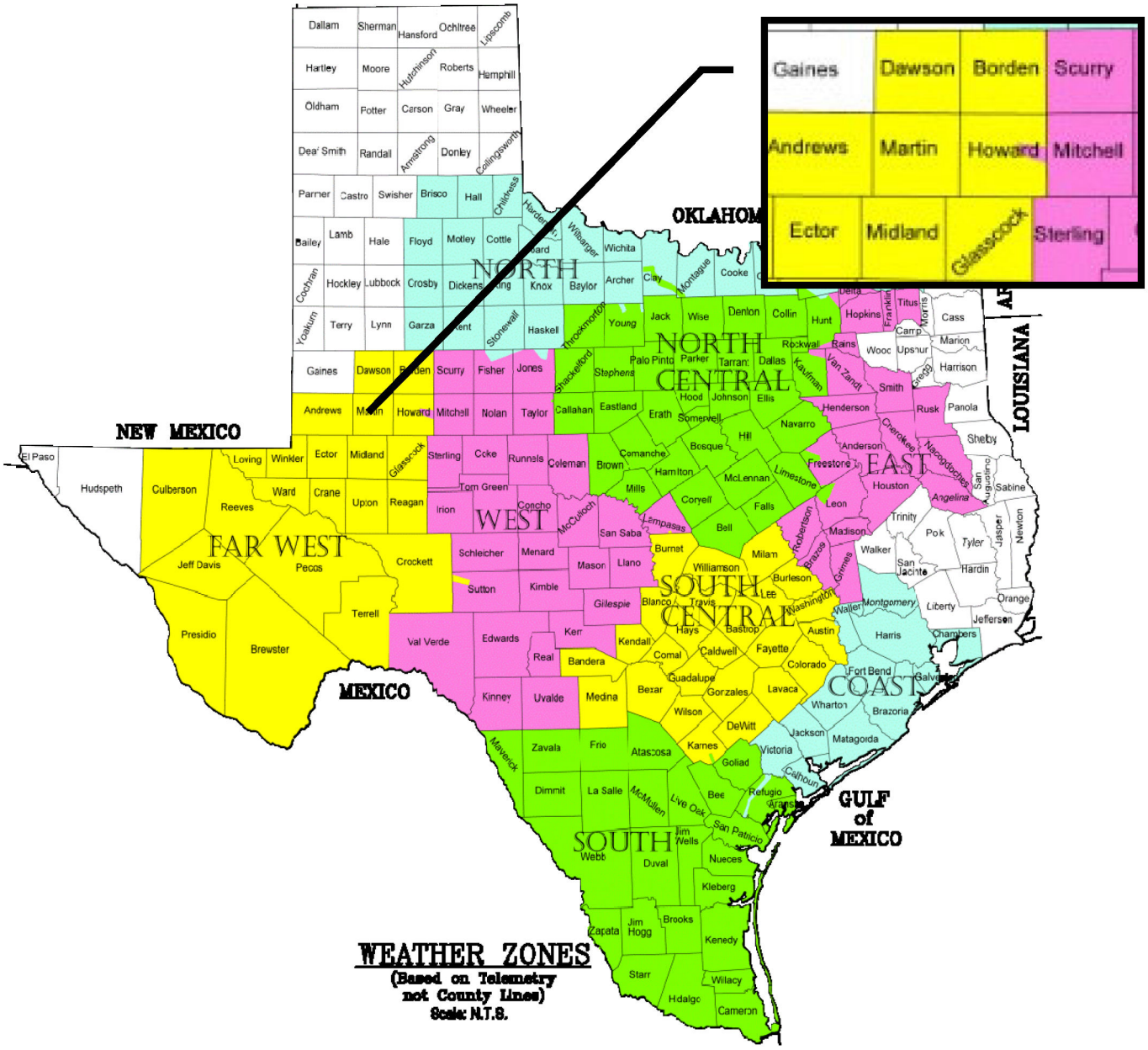


Figure 1. Proposed Project Approximate Location

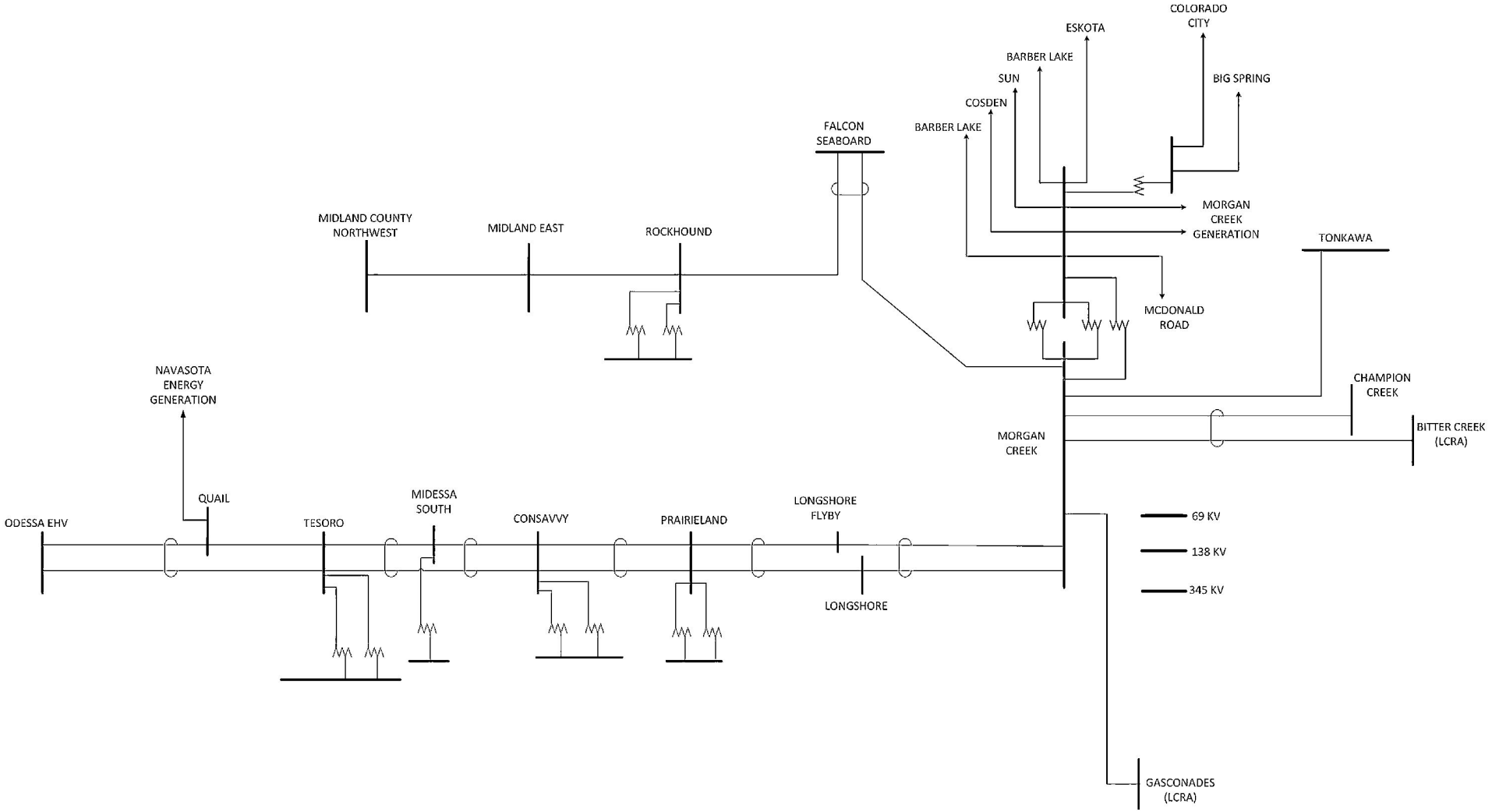


Figure 2. West Texas 345 kV Infrastructure Rebuild Pre-Project Configuration

Purpose and Necessity

The ERCOT Permian Basin Load Interconnection Study and Oncor's analysis identified several transmission upgrades that will be necessary to connect oil and gas loads in the Permian Basin area. The Proposed RPG Project will be necessary to accommodate the upgrades identified in Oncor's analysis and in the ERCOT Permian Basin Load Integration Study. This project, along with the others listed in the Introduction, will be vital to maintaining reliability and operational flexibility within the region for the foreseeable future.

Steady-State Analysis

Oncor performed a comparative steady-state analysis under Summer 2028 conditions which revealed thermal overloads on various 345 kV lines in the West Texas portion of Oncor's transmission grid. These overloads were identified under various contingency conditions, including some N-1 contingency scenarios. The case used for this study was the ERCOT Steady State Working Group (SSWG) case published October 10, 2022 (22SSWG_2028_SUM1_U1_Final_10102022). Relevant off-cycle IDVs published on the ERCOT Market Information System (MIS) as of May 18, 2023 were applied to the base case. Additionally, the base case was modified to include approximately 800 MW of newly signed Oncor loads in West Texas and Far West Texas through May 18, 2023. To determine the Proposed RPG Project's potential adverse impacts to system voltages and thermal loading limits, contingency analysis for this project was performed in accordance with NERC Reliability Standard TPL-001-5.1 and ERCOT Planning Guide Reliability Performance Criteria 4.1.1.1 (1) (d). The results justifying the need for the proposed project, in addition to the results listed in the ERCOT Permian Basin Load Interconnection Study, are summarized in Table 1. The subsequent results after the completion of the Proposed RPG Project are summarized in Table 2.

Pre-Project Thermal Loading				
NERC Category	Contingency		Monitored Element	2028 Summer % Loading Without Proposed Projects
	Initial Event (PSSE Buses)	Second Event (PSSE Buses)		
P1	Prairieland - Morgan Creek 345 kV Line (18548 - 19000 id 1, 19000 - 1030 id 1)	N/A	Longshore - Prairieland 345 kV Line	107.5
	Consavvy - Prairieland 345 kV Line 1 (11387 - 18548 id 1)	N/A	Consavvy - Prairieland 345 kV Line 2	99.4
	Consavvy - Prairieland 345 kV Line 2 (11387 - 18548 id 2)	N/A	Consavvy - Prairieland 345 kV Line 1	99.4
P7	Morgan Creek - Champion Creek/LCRA Bitter Creek 345 kV Double-circuit Line (1030 - 1414 id 1, 1030 - 71050 id 1)	N/A	Morgan Creek - Tonkawa 345 kV Line	129.1
	Prairieland - Longshore/Morgan Creek 345 kV Double-circuit Line (18548 -1058 id 1, 18548 - 19000 id 1, 19000 - 1030 id 1)	N/A	Falcon Seaboard - Rockhound 345 kV Line	105.8
P3	Either Odessa Ector CC Train (130321 id C1, 130322 id C2, 130323 id C0)	Prairieland - Morgan Creek 345 kV Line (18548 - 19000 id 1, 19000 - 1030 id 1)	Morgan Creek - Longshore 345 kV Line	95.1
		Consavvy - Prairieland 345 kV Line 1 (11387 - 18548 id 1)	Consavvy - Prairieland 345 kV Line 2	114.7
		Consavvy - Prairieland 345 kV Line 2 (11387 - 18548 id 2)	Consavvy - Prairieland 345 kV Line 1	114.7
		Prairieland - Longshore 345 kV Line (18548 -1058 id 1)	Prairieland - Morgan Creek 345 kV Line	102.9
EP3	Either Odessa Ector CC Train (130321 id C1, 130322 id C2, 130323 id C0)	Morgan Creek - Champion Creek/LCRA Bitter Creek 345 kV Double-circuit Line (1030 - 1414 id 1, 1030 - 71050 id 1)	Morgan Creek - Tonkawa 345 kV Line	143.3
		Prairieland - Longshore/Morgan Creek 345 kV Double-circuit Line (18548 -1058 id 1, 18548 - 19000 id 1, 19000 - 1030 id 1)	Falcon Seaboard - Rockhound 345 kV Line	116.4
	Falcon Seaboard CC Train (130001 id C1, 130002 id C2, 130003 id C0)	Prairieland - Longshore/Morgan Creek 345 kV Double-circuit Line (18548 -1058 id 1, 18548 - 19000 id 1, 19000 - 1030 id 1)	Falcon Seaboard - Morgan Creek 345 kV Line	108.8
EP6	Consavvy 345/138 kV Autotransformer 1 (11386, 11387, 11388 id 1)	Consavvy - Midessa South/Tesoro 345 kV Double-circuit Line (11387 - 18540 id 1, 11387 - 1125 id 1)	Consavvy 345/138 kV Autotransformer 2	100.5
	Consavvy 345/138 kV Autotransformer 2 (11386, 11387, 11389 id 2)	Consavvy - Midessa South/Tesoro 345 kV Double-circuit Line (11387 - 18540 id 1, 11387 - 1125 id 1)	Consavvy 345/138 kV Autotransformer 1	100.5
	Einstein 345/138 kV Autotransformer (23852, 23874, 23875 id 1)	Bearkat - North McCamey 345 kV Double-circuit Line (59903 - 76000 id 1, 59903 - 76000 id 2)	Longshore - Prairieland 345 kV Line	120.8

Table 1 – Worst Post-Contingency Line Loading (Pre-Project)

Post-Project Thermal Loading	
Monitored Element	**2028 Summer Worst % Loading After Proposed Projects (All Contingencies)**
Ranger Camp - Cattleman 345 kV Line 1	18.8
Ranger Camp - Cattleman 345 kV Line 2	18.8
Falcon Seaboard - Prong Moss 345 kV Line 1	24.6
Falcon Seaboard - Prong Moss 345 kV Line 2	24.6
Midland East - Rockhound 345 kV Line 1	25.1
Midland East - Rockhound 345 kV Line 2	25.1
Ranger Camp - Prong Moss 345 kV Line 1	29.9
Ranger Camp - Prong Moss 345 kV Line 2	29.9
Cattleman - Longshore 345 kV Line 1	32.5
Cattleman - Longshore 345 kV Line 2	32.5
Consavvy - Prairieland 345 kV Line 1	36.1
Consavvy - Prairieland 345 kV Line 2	36.1
Ranger Camp - Tonkawa 345 kV Line 1	37.0
Ranger Camp - Tonkawa 345 kV Line 2	37.0
Prong Moss - Rockhound 345 kV Line 1	38.2
Prong Moss - Rockhound 345 kV Line 2	38.2
Longshore - Prairieland 345 kV Line 1	42.9
Longshore - Prairieland 345 kV Line 2	42.9
Consavvy 345/138 kV Autotransformer 1	84.4
Consavvy 345/138 kV Autotransformer 2	84.4

Table 2 – Worst Post-Contingency Line Loading (Post-Project)

Dynamic Analysis

Oncor performed a dynamic stability analysis to evaluate the impact of the addition of this project on the transmission system. The analysis was conducted using two of the Dynamic Working Group (DWG) cases published in May 2022 (DWG SUM2029 and DWG HWLL2026). The HWLL 2026 case was adjusted to match the long-term topology to create an off- peak 2028 case, designated as HWLL2028. System topology updates necessary to implement the Proposed RPG Project were used in both study cases. Contingencies included in NERC Categories P1, P3, P4, P6, and P7 were studied. NERC Categories P2 and P5 were omitted as NERC category P4 contingencies are more impactful than P2, and P5 contingencies generally would not be applicable given Oncor's redundant system protection philosophy within the study area. The results of the dynamic stability assessment indicate that the proposed project will not have an adverse effect on transmission system dynamic stability in the project vicinity. Oncor will continue to perform annual dynamic analysis for this area.

Subsynchronous Resonance (SSR) Screening

The Proposed Project was screened in 2029 Summer Peak conditions (DWG 2029 Summer Peak case published May 2022). The study was performed with and without the Proposed Project in-service, and the project did not result in a reduction in the number of outages required to create a radial path between a generator and a series compensated line. Since the project will not increase the likelihood of a radial condition occurring with respect to pre-project system conditions, no further SSR analysis is warranted.

Short-Circuit Study

Oncor evaluated the short-circuit impacts of the Proposed Project using the System Protection Working Group (SPWG) case "22_SPWG_2027_FY_06302022_FINAL". The SPWG case was modified to include changes associated with the proposed project, as well as other Oncor system changes that occurred since the development of the SPWG case. The analysis revealed that the Proposed RPG Project did cause various 138 kV breakers, in the vicinity of the project, to become overdutied. The cost of the overdutied breakers is not included in the cost of this Proposed RPG Project. All identified overdutied breakers will be replaced with upgraded breakers over the next 4 – 5 years, prior to or in connection with energization of the Proposed RPG Project, with other breakers identified during Oncor's annual Overdutied Breaker Analysis. Oncor will continue to perform annual short-circuit studies.

Project Description

In order to address the identified reliability concerns, Oncor recommends the project components listed in the Executive Summary section.

Figure 3 provides a simplified one-line diagram illustrating the configuration of Morgan Creek Switch and adjacent facilities after the Proposed RPG Project.

One-Line Diagram

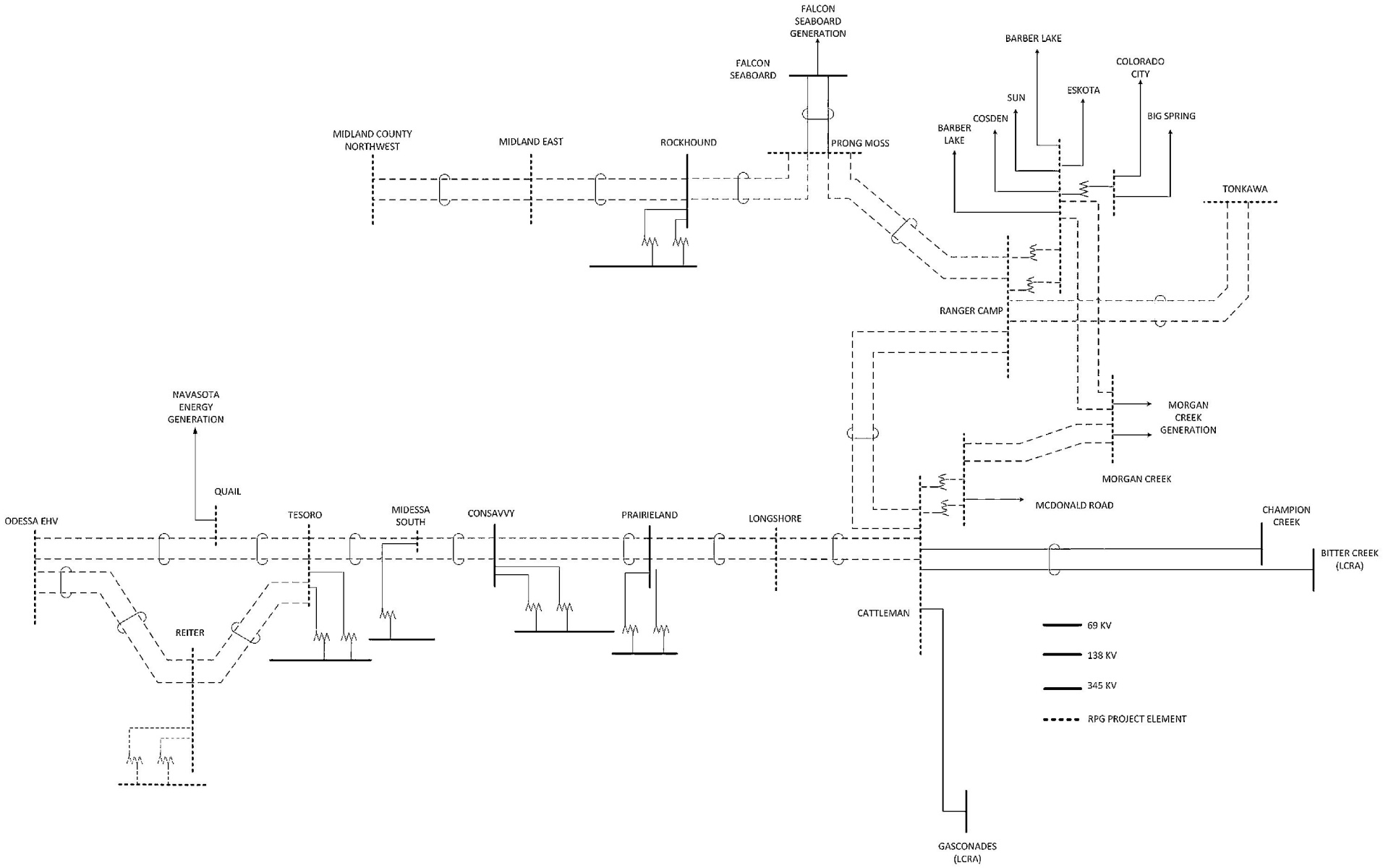


Figure 3. West Texas 345 kV Infrastructure Rebuild Post-Project Configuration

Alternative Solutions Considered

Given the age and state of the existing Morgan Creek Switch and 345 kV lines in West Texas, this project was deemed necessary to accommodate the substantial increases in area demand in general, and the specific upgrades identified in the ERCOT Permian Basin Load Interconnection Study in particular. As mentioned in the Executive Summary and in the Introduction of this submittal, the ERCOT Permian Basin Load Integration Study recommended all of the proposed upgrades included in this Proposed RPG Project.

As a result of the interconnectedness of the existing system, there are no alternatives to many of the upgrade and station reconfigurations discussed above. However, due to the inability of taking multiple, extended clearance outages to rebuild the existing 345 kV lines and stations Oncor did analyze the possibility of constructing additional 345 kV circuits, on new structures within new ROW, next to the existing 345 kV transmission lines leaving Morgan Creek Switch. This alternative does provide certain advantages, avoidance of "hot work", creation of an alternative transmission path into the area, and other operational, resiliency, and flexibility benefits to the system. However, building additional 345 kV transmission lines, adjacent and parallel to, the existing 345 kV transmission lines would require the purchase of additional new ROWs and would also require a CCN for each new 345 kV transmission line, resulting in additional time to complete and the likelihood of higher costs. Nevertheless, this alternative did not produce results similar to the Proposed RPG Project and Oncor did not deem this a viable alternative from a cost or timeliness perspective. No other additional alternatives were considered to the necessary upgrades listed in the ERCOT Permian Basin Load Interconnection Study, and confirmed in Oncor's analysis detailed in this Proposed RPG Project.

Project Cost

Component	Project Cost (Millions)	New ROW Required	CCN
Ranger Camp 345/138 kV Switch *	$94.76	Yes	No
Cattleman 345/138 kV Switch *	$106.48	Yes	No
Morgan Creek 138 kV Switch **	$27.10	Yes	Yes
Tonkawa – Morgan Creek 345 kV DCKT Line	$37.16	No	Yes
Morgan Creek – Odessa EHV 345 kV DCKT Line	$362.70	Yes	No
Morgan Creek – Midland East 345 kV DCKT Line	$307.34	No	Yes
Midland East – Midland County NW 345 kV DCKT Line	$90.02	Yes	Yes
Reiter 345/138 kV Switch	$70.04	No	No
Reiter – Tesoro 345 kV DCKT Line	$20.74	Yes	Yes
TOTALS	**$1,116.34**		

* - Switch cost includes line reroutes and reconnections
** - This cost includes a new 138 kV line from Morgan Creek Switch – Cattleman Switch

Table 3. Proposed RPG Solution Project Cost Summary

Recommendation

In order to accommodate the system upgrades outlined in the Permian Basin Load Interconnection Study, modernize aging infrastructure, and maintain operational flexibility and reliability, Oncor recommends that the West Texas 345 kV Infrastructure Rebuild Project be carried out to include the project components listed in the Executive Summary section.

In addition to the aging infrastructure, this project is necessary to accommodate the upgrades identified in the ERCOT Permian Basin Load Interconnection Study. The projected in-service date may change based on requirements for environmental assessment, licensing requests, regulatory approval, rights-of-way acquisition and construction progress. Completing the West Texas 345 kV Infrastructure Rebuild Project will meet reliability requirements, relieve thermal overloading, maintain acceptable system voltages, and provide adequate transmission capacity for the system under pre- and post-contingency conditions. The estimated cost for this Tier 1 Proposed RPG Project is $1.12 billion, based on the expectation that some elements of this project will be constructed using energized (hot) work processes. This project is recommended to meet a summer 2028 in-service date.

ERCOT Independent Review of the Oncor West Texas 345-kV Infrastructure Rebuild Project

ATTACHMENT NO. 5

Document Revisions

Date	Version	Description	Author(s)
May 16, 2024	1.0	Final	Ben Richardson
		Reviewed by	Robert Golen, Prabhu Gnanam