GOLDEN TO MARS

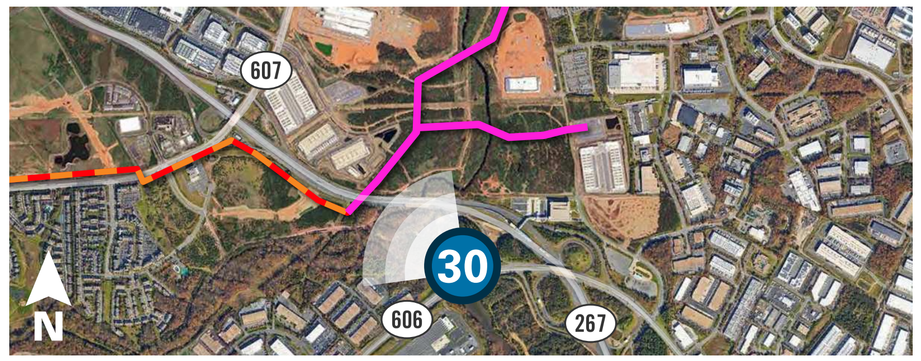
Transmission Line Project

Viewpoint 30

Date: 06/12/2024 **Time:** 8:39 am **Viewing Direction:** Northwest

30 Viewpoint Location — Route 1 — Route 5

— Common Route



Dominion Energy®

EXISTING CONDITIONS

306

PROPOSED CONDITIONS

Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

GOLDEN TO MARS

Transmission Line Project

Viewpoint 30

Date: 06/12/2024 **Time:** 8:39 am **Viewing Direction:** Northwest

30 Viewpoint Location — Route 2 — Route 3 — Route 4 — Common Route

Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

GOLDEN TO MARS

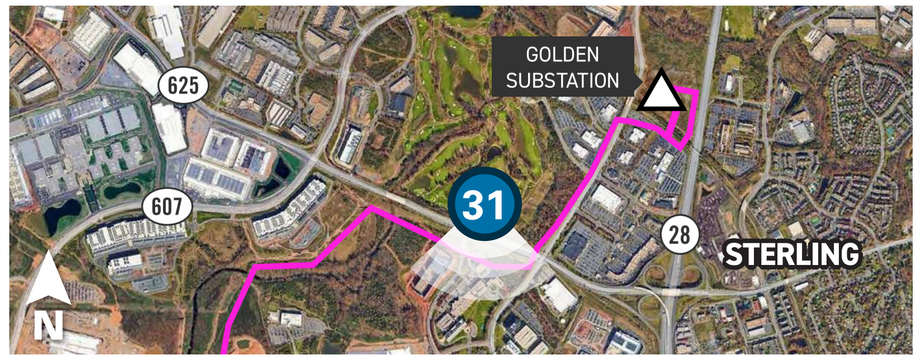
Transmission Line Project

Viewpoint 31

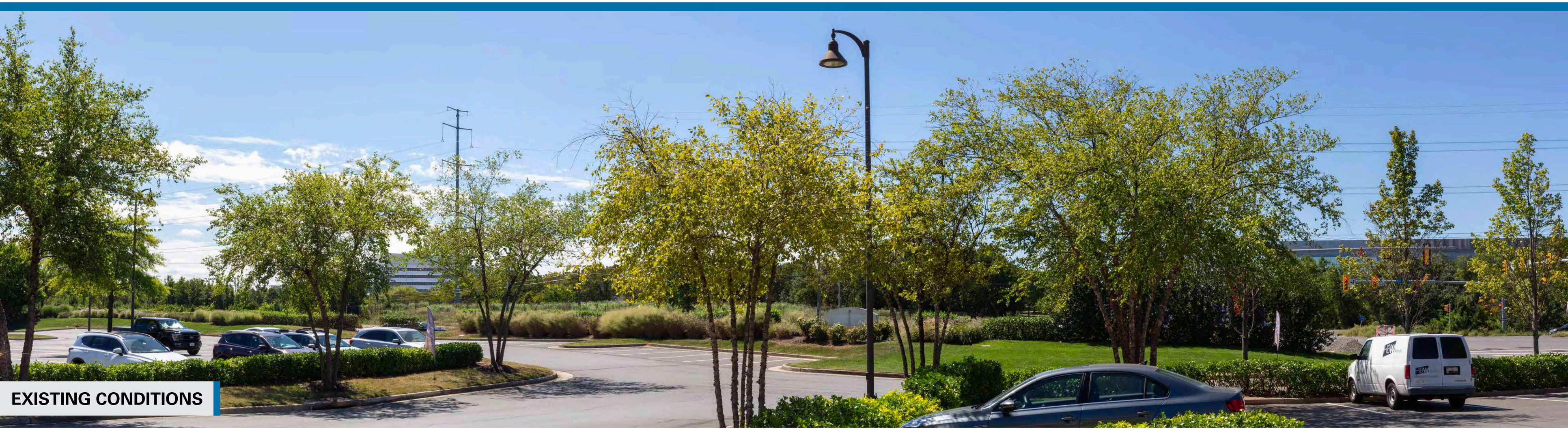
Date: 08/31/2023 **Time:** 10:52 am **Viewing Direction:** South

31 Viewpoint Location — Common Route

△ Proposed 500 kV Substation



Dominion Energy®



EXISTING CONDITIONS

PROPOSED CONDITIONS

308

Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

GOLDEN TO MARS

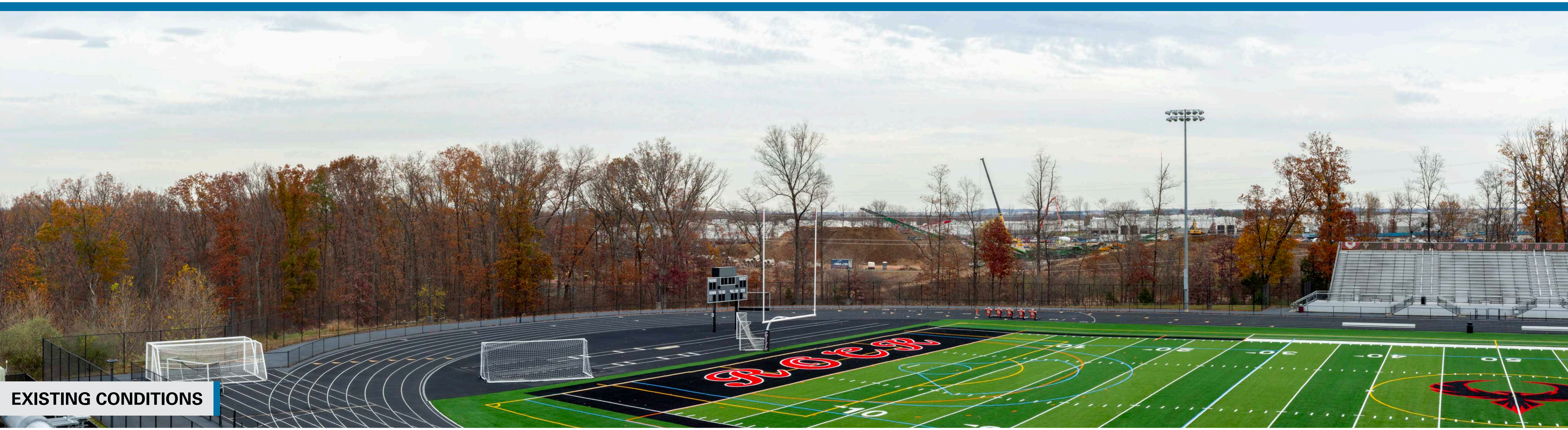
Transmission Line Project

Viewpoint 322

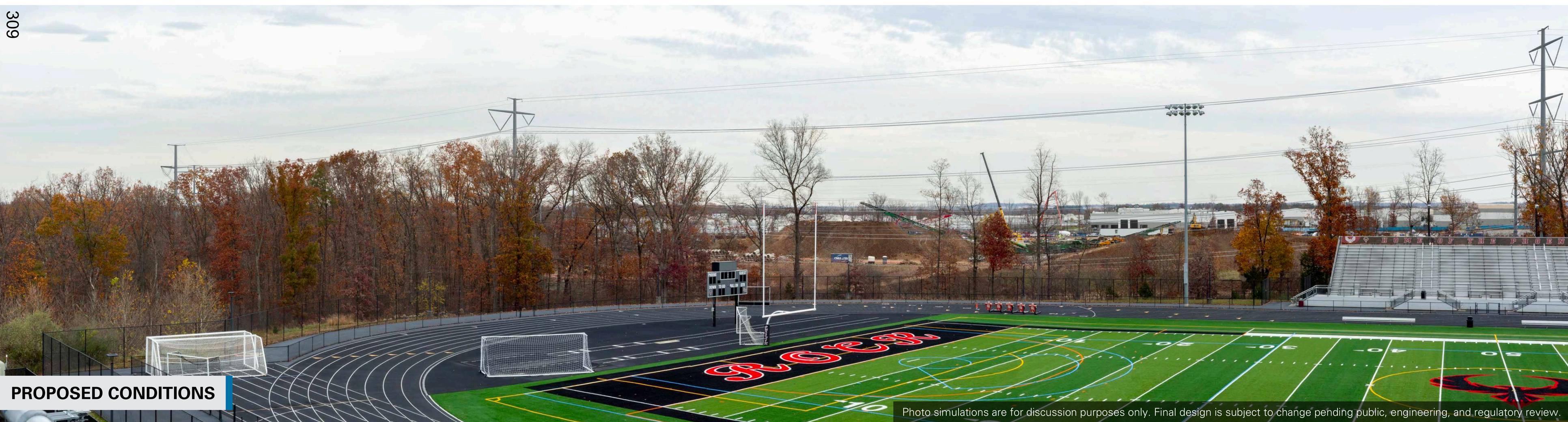
Date: 11/19/2024 **Time:** 11:30 am **Viewing Direction:** Northeast

322 Viewpoint Location — Route 4

Dominion Energy®



EXISTING CONDITIONS



PROPOSED CONDITIONS

Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

GOLDEN TO MARS

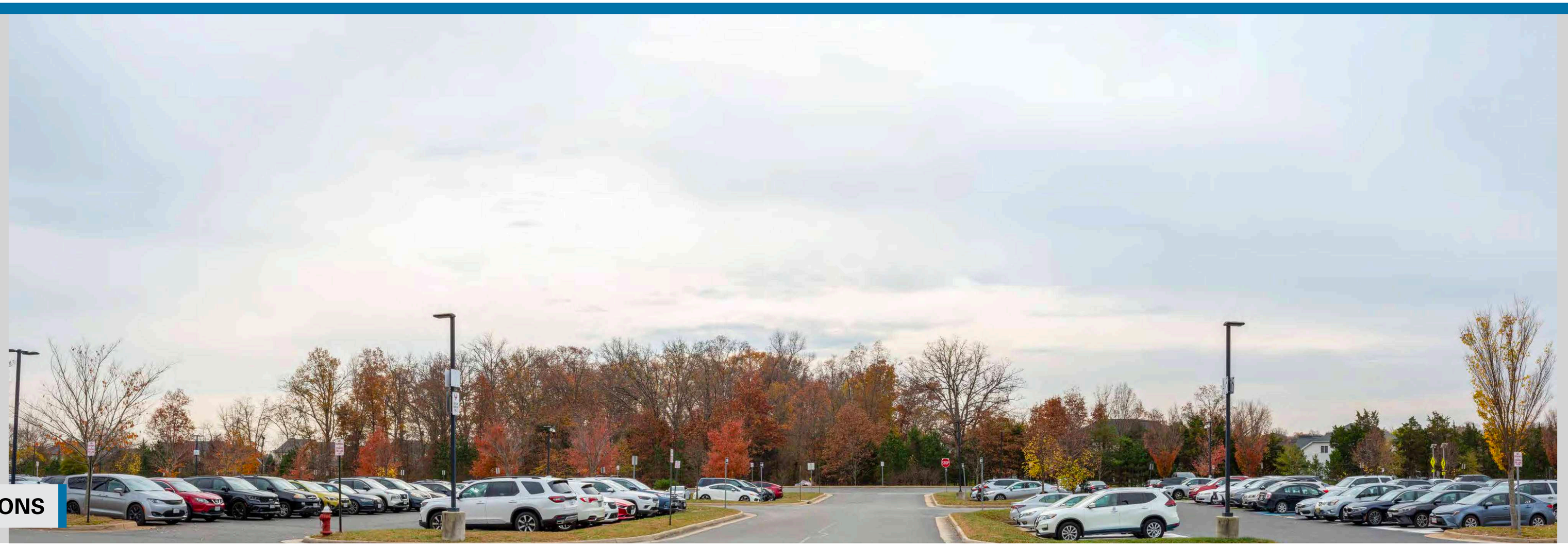
Transmission Line Project

Viewpoint 324

Date: 11/19/2024 **Time:** 11:12 am **Viewing Direction:** South

324 Viewpoint Location — Route 4

Dominion Energy®



EXISTING CONDITIONS

310

PROPOSED CONDITIONS

Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

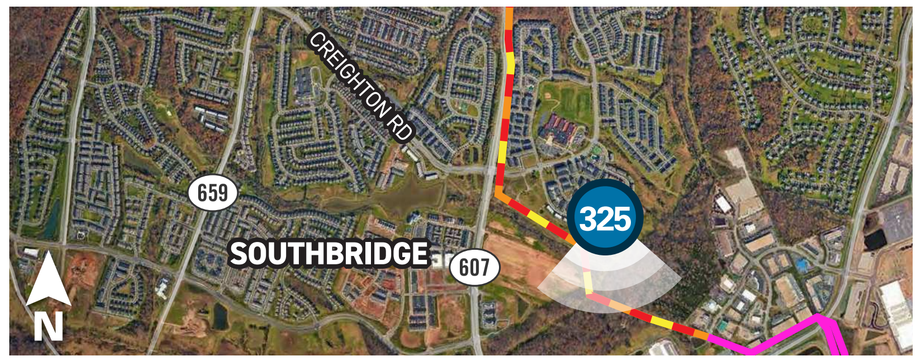
GOLDEN TO MARS

Transmission Line Project

Viewpoint 325

Date: 11/19/2024 **Time:** 12:15 pm **Viewing Direction:** South

325 Viewpoint Location — Route 1 — Route 2 — Route 5 — Common Route



Dominion Energy®

EXISTING CONDITIONS

311

PROPOSED CONDITIONS

Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

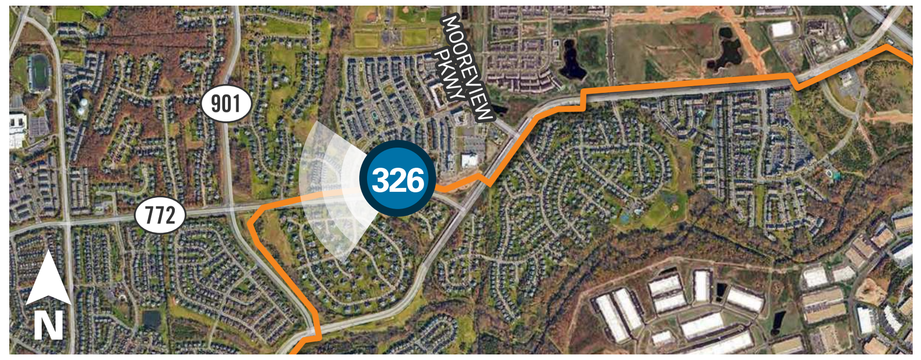
GOLDEN TO MARS

Transmission Line Project

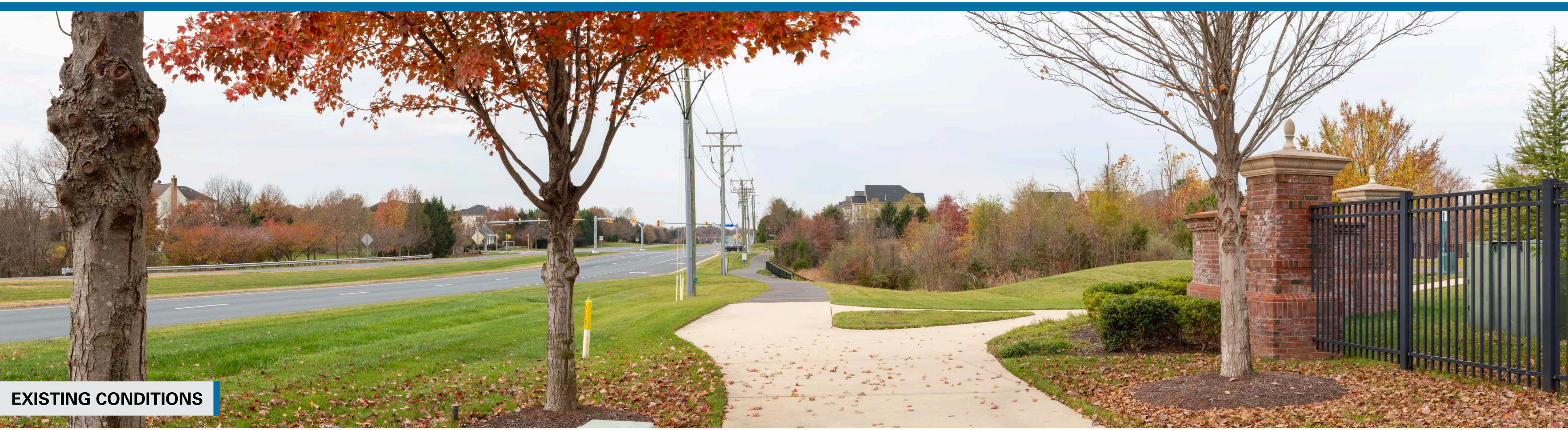
Viewpoint 326

Date: 11/19/2024 **Time:** 9:55 am **Viewing Direction:** West

326 Viewpoint Location — Route 5



Dominion Energy®



EXISTING CONDITIONS

PROPOSED CONDITIONS

Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

GOLDEN TO MARS

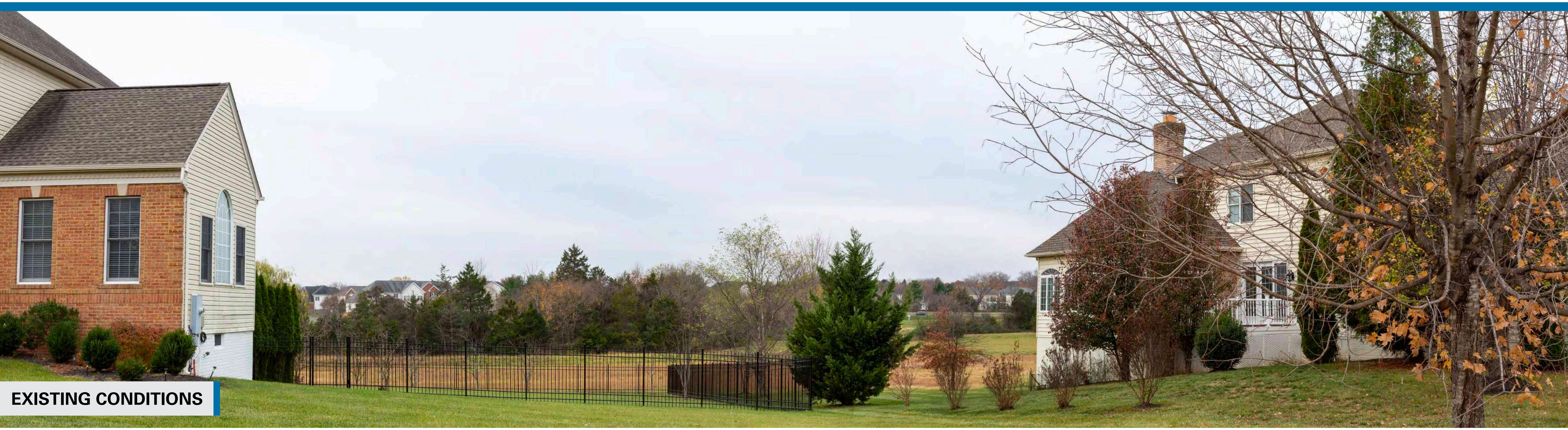
Transmission Line Project

Viewpoint 327

Date: 11/19/2024 **Time:** 10:09 pm **Viewing Direction:** West

327 Viewpoint Location — Route 5

Dominion Energy®



EXISTING CONDITIONS

PROPOSED CONDITIONS

Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

GOLDEN TO MARS

Transmission Line Project

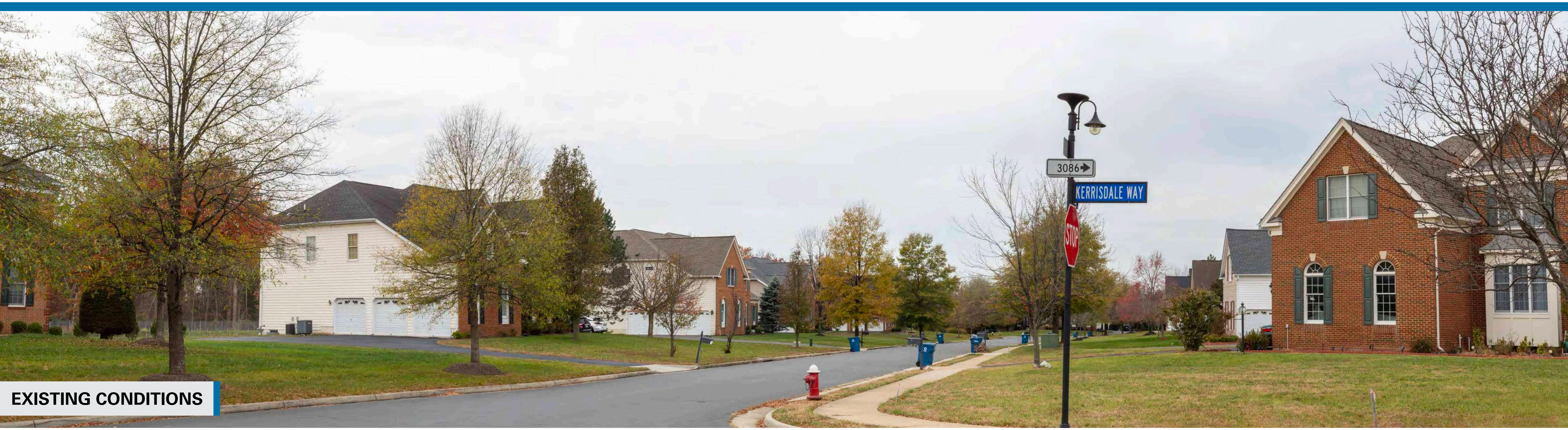
Viewpoint 329

Date: 11/19/2024 **Time:** 10:45 am **Viewing Direction:** West

329 Viewpoint Location — Route 1 — Route 2 — Route 5

Digital Dulles Loop — Common Route

Dominion Energy®



EXISTING CONDITIONS

PROPOSED CONDITIONS

314

Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

GOLDEN TO MARS

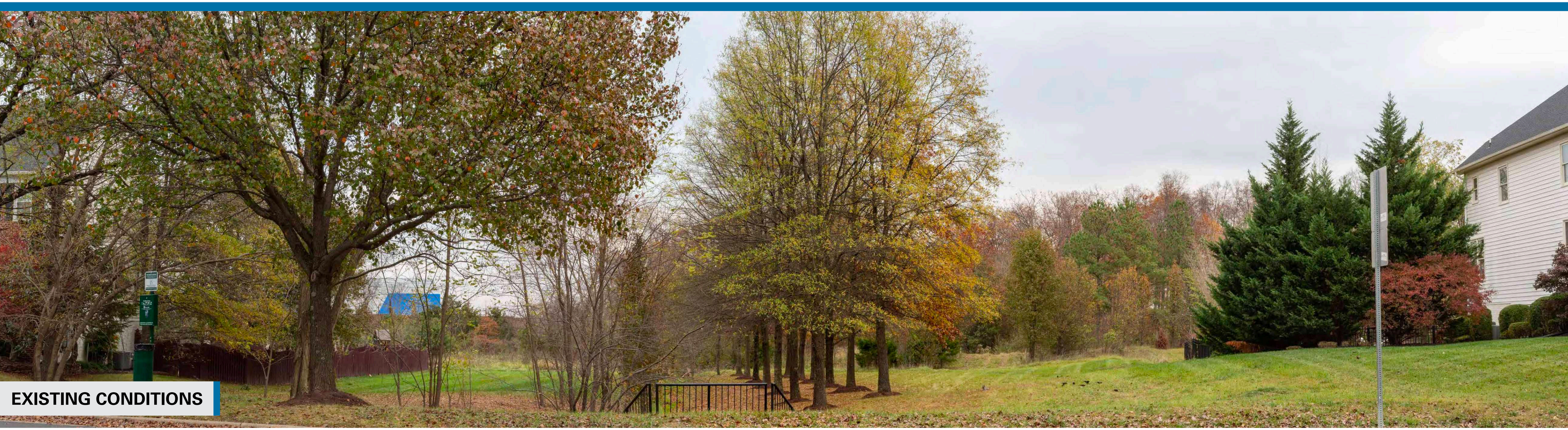
Transmission Line Project

Viewpoint 331

Date: 11/19/2024 **Time:** 1:06 pm **Viewing Direction:** Southeast

331 Viewpoint Location — Common Route

Dominion Energy®



EXISTING CONDITIONS

315

PROPOSED CONDITIONS | OVERLAY

Objects displayed in yellow will be fully or partially obscured by terrain and vegetation.

Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

Meeting Date	Details Regarding Meeting
May 23, 2024	The Company presented the Project to Loudoun County Administration officials, including the general location of the Project. The meeting included the Deputy County Manager, County Attorney, Economic Development Director, and the Project team.
June 13, 2024	The Company presented the Project to the Loudoun County School Board Staff ("LCSB Staff"). The meeting included LCSB Staff with responsibilities for operations and maintenance of school property and the Project team.
June 28, 2024	The Company briefed Loudoun County Supervisor Koran Saines on Project-specific information. The meeting included staff from Supervisor Saines's office and the Project team.
July 1, 2024	The Company briefed Loudoun County Supervisor Laura TeKrony on Project-specific information. The meeting included staff from Supervisor TeKrony's office and the Project team.
July 9, 2024	The Company briefed Loudoun County Chair-at-large, Supervisor Phyllis Randall on Project-specific information. The meeting included staff from Supervisor Randall's office and Project team.
October 29, 2024	The Company briefed Loudoun County Administration officials and LCSB Staff on Project-specific information. The meeting included the Deputy County Manager, County Attorney, Economic Development Director as well as LCSB officials with responsibilities for operations and maintenance of school property and the Project team.
December 18, 2024	The Company briefed Loudoun County Administration officials, LCSB members, and LCSB Staff on Project-specific information. The meeting included the Deputy County Manager, County Attorney, Economic Development Director as well as elected LCSB members and officials with Loudoun County Public Schools with responsibilities for operations and maintenance of school property and the Project team.
January 8, 2025	The Company briefed Loudoun County Administration officials on Project-specific information. The meeting included the Deputy County Manager, County Attorney, Economic Development Director and the Project team.
March 11, 2025	The Company updated LCSB Staff officials on Project-specific information. The meeting followed a LCSB meeting and included facilities personnel with responsibilities for operations and maintenance of school property.
March 19, 2025	The Project team briefed Loudoun County Administration officials and LCSB Staff on Project-specific information. Columbia Gas personnel also joined this meeting. The meeting included the Deputy County Manager, County Attorney, Economic Development Director as well as officials with Loudoun County Public Schools with responsibilities for operations and maintenance of school property and the Project team.

Meeting Date	Details Regarding Meeting
July 24, 2024	The Company hosted a virtual meeting for 10 home owners associations ("HOA") near the Project area. The Project team presented an overview of the Project, including proposing a new 500/230 kV electric transmission line to connect two future 500 kV substations in eastern Loudoun County, the PJM process for approving projects and the Commission filing process. The Project team also presented routing information, including MWAA and NOAA property constraints and existing 230 kV electric transmission lines. The Project team also discussed the challenges associated with undergrounding electric transmission lines generally and noted that the Company was beginning to study the feasibility of undergrounding in the Project area.
August 6, 2024	A Company representative participated virtually in a meeting with Loudoun Valley Estates II and addressed questions regarding the need for the Project, as well as the role of the Commission, current routing analysis, undergrounding of high voltages transmission lines and impacts from EMF. The Company shared the GeoVoice tool.
July 30, 2024	The Company hosted a virtual community meeting for all residents living near the Project area. At the virtual open house meeting, the Company made available details about routing and siting, construction, Project timing, undergrounding and the Commission approval process. The Company also fielded questions from residents, attending virtually.
July 31, 2024 and August 1, 2024	The Company hosted two in-person community meetings for all residents living near the Project area. At the open house meetings the Company made available details about environmental impacts, routing and siting, construction, Project timing, and the Commission approval process. Traditional open house materials have been posted on the website for the proposed Project, including simulations of the proposed Project from key locations.
August 22, 2024	The Company met with Soave Realty, representing the Silver District West development to discuss impacts from the Project. The Company made available details about routing and siting, construction, Project timing, undergrounding and the Commission approval process.
December 3, 2024	The Company met with members of Birchwood HOA to discuss impacts from the proposed Project. In a presentation, the Company made available details about routing and siting, construction, Project timing, undergrounding and the Commission approval process.
January 8, 2025	The Company hosted a virtual HOA meeting for 10 HOA communities near the Project area. During the meeting the Project team presented an overview of the Project including proposing a new 500/230 kV electric transmission line to connect two future 500 kV substations in eastern Loudoun County, the PJM process for approving projects and the Virginia State Corporation Commission process. The Project team also presented detailed information on routing to the substations and constraints including MWAA and NOAA properties and existing 230

	kV electric transmission lines. The Project team also discussed in detail, challenges with undergrounding electric transmission lines.
January 15, 2025	The Company met with Steve Schulte, representing the Silver District West development to discuss impacts from the proposed Project. The Company made available details about routing and siting, construction, project timing, undergrounding and the Commission approval process.
On January 22, 2025	A Company representative discussed the Project with a representative of Moorefield Green HOA.

DE Transmission

NOVA / Golden-Mars

Report Date: June 25, 2024 – January 30, 2025

DET | NOVA | 6/25/24 – 1/30/25 | Overall Report

The Golden to Mars campaign overall ran on Facebook, Google, Spotify, Native and Nextdoor between 6/25/24 and 1/30/25. These campaigns were targeted at customers over the age of 25 who resided near the project area in Loudoun County, VA.

8,605,165 impressions

of ads were delivered to target audiences.

64,664 clicks

have taken audiences to the landing pages.

603,963 video views with an average 40.94% VCR.

0.75% CTR

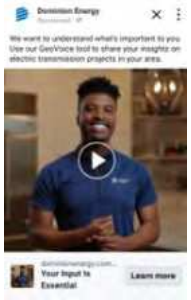
Most CTRs near or above benchmarks.

320,320 ad engagements

such as reactions, likes, comments, shares and saves have been made on the ads.

Notable Creative

The Cortne GeoVoice video in Phase 6 on Facebook had the highest CTR at 3.53%, which is 292% higher than the 0.90% Facebook benchmark.



Notable Insights

- Facebook ads had a CTR of 1.86% and 137,941 completed video views for a 46.32% VCR.
- Nextdoor ads performed well with a CTR of 0.44%, which is 193% above benchmark.
- Spotify ads had a CTR of 0.13% and 13,967 audio completions.
- Google Video ads had 95,368 completed video views for a 31.15% VCR, which is 108% above the 15% Google VCR benchmark.
- Native ads had a CTR of 0.28%, which is 87% higher than the 0.15% benchmark.

Facebook CTR Benchmark: 0.90% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15% | Native CTR Benchmark: 0.15%

DET | NOVA | 6/25/24 – 7/16/24 | English Phase 1

The Golden to Mars campaign promoting Reliability and GeoVoice ran on Facebook, Google, Native and Nextdoor through 7/16/24. These campaigns were targeted at English-speaking customers over the age of 25 who resided near the project area in Loudoun County, VA.

1,014,481 impressions

of ads were delivered to target audiences.

7,003 clicks

have taken audiences to the landing pages.

81,591 video views with an average 39.76% VCR.

0.69% CTR

Most CTRs near or above benchmarks.

42,463 ad engagements

such as reactions, likes, comments, shares and saves have been made on the ads.

Notable Creative

The Claire GeoVoice video on Facebook had the highest CTR at 2.00%, which is 122% higher than the 0.90% Facebook benchmark.

Notable Insights

- Facebook ads had a CTR of 1.75% and 17,778 completed video views for a 44.98% VCR.
- Nextdoor ads performed well with a CTR of 0.92%, which is 513% above benchmark.
- Google Video ads had 12,214 completed video views for a 29.03% VCR, which is 94% above the 15% Google VCR benchmark.
- Native ads had a CTR of 0.29%, which is 93% higher than the 0.15% benchmark.

Facebook CTR Benchmark: 0.90% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15% | Native CTR Benchmark: 0.15%

DET | NOVA | 6/25/24 – 7/16/24 | Spanish Phase 1

The Golden to Mars campaign promoting Reliability and GeoVoice ran on Facebook, Native and Google through 7/16/24. These campaigns were targeted at Spanish-speaking customers over the age of 25 who resided near the project area in Loudoun County, VA.

285,979 impressions

of ads were delivered to target audiences.

2,422 clicks

have taken audiences to the landing pages.

19,860 video views with an average 51.82% VCR.

0.85% CTR

Most CTRs near or above benchmarks.

17,931 ad engagements

such as reactions, likes, comments, shares and saves have been made on the ads.

Notable Creative

The Cortne Reliability video in Spanish on Facebook had the highest CTR at 2.52%, which is 180% higher than the 0.90% Facebook benchmark.

Notable Insights

- Facebook ads had a CTR of 2.40% and 9,172 completed video views for a 55.13% VCR.
- Google Video ads had 1,119 completed video views for a 34.72% VCR, which is 131% above the 15% Google VCR benchmark.

Facebook CTR Benchmark: 0.90% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15% | Native CTR Benchmark: 0.15%

DET | NOVA | 6/25/24 – 7/16/24 | English Phase 2

The Golden to Mars campaign promoting Project Announcement ran on Facebook, Google, Native, Spotify and Nextdoor through 7/16/24. These campaigns were targeted at English-speaking customers over the age of 25 who resided near the project area in Loudoun County, VA.

1,269,002 impressions

of ads were delivered to target audiences.

8,618 clicks

have taken audiences to the landing pages.

122,171 video views with an average 38.09% VCR.

0.68% CTR

Most CTRs near or above benchmarks.

54,084 ad engagements

such as reactions, likes, comments, shares and saves have been made on the ads.

Notable Creative

The Janae Project Announcement video on Facebook had the highest CTR at 1.97%, which is 119% higher than the 0.90% Facebook benchmark.

Notable Insights

- Facebook ads had a CTR of 1.83% and 20,974 completed video views for a 41.62% VCR.
- Nextdoor ads performed well with a CTR of 0.35%, which is 133% above benchmark.
- Spotify ads had a CTR of 0.18% and 2,142 audio completions.
- Google Video ads had 23,420 completed video views for a 32.63% VCR, which is 118% above the 15% Google VCR benchmark.
- Native ads had a CTR of 0.29%, which is 93% higher than the 0.15% benchmark.

Facebook CTR Benchmark: 0.90% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15% | Native CTR Benchmark: 0.15%

DET | NOVA | 6/25/24 – 7/16/24 | Spanish Phase 2

The Golden to Mars campaign promoting Project Announcement ran on Facebook, Native and Google through 7/16/24. These campaigns were targeted at Spanish-speaking customers over the age of 25 who resided near the project area in Loudoun County, VA.

324,711 impressions

of ads were delivered to target audiences.

2,364 clicks

have taken audiences to the landing pages.

19,775 video views with an average 44.00% VCR.

0.73% CTR

Most CTRs near or above benchmarks.

17,083 ad engagements

such as reactions, likes, comments, shares and saves have been made on the ads.

Notable Creative

The Janae Project Announcement video in Spanish on Facebook had the highest CTR at 2.10%, which is 133% higher than the 0.90% Facebook benchmark.

Notable Insights

- Facebook ads had a CTR of 1.52% and 7,137 completed video views for a 44.79% VCR.
- Google Video ads had 1,564 completed video views for a 40.71% VCR, which is 171% above the 15% Google VCR benchmark.
- Native ads had a CTR of 0.23%, which is 53% higher than the 0.15% benchmark.

Facebook CTR Benchmark: 0.90% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15% | Native CTR Benchmark: 0.15%

DET | NOVA | 7/17/24 – 8/1/24 | English Phase 3

The Golden to Mars campaign promoting Pre-Event ran on Facebook, Google, Native, Spotify and Nextdoor through 8/1/24. These campaigns were targeted at English-speaking customers over the age of 25 who resided near the project area in Loudoun County, VA.

1,358,321 impressions
of ads were delivered to target audiences.

7,881 clicks
have taken audiences to the landing pages.

90,431 video views with an average 49.71% VCR.

0.58% CTR
Most CTRs near or above benchmarks.

38,922 ad engagements
such as reactions, likes, comments, shares and saves have been made on the ads.

Notable Creative

The Taylor GeoVoice video on Facebook had the highest CTR at 2.43%, which is 170% higher than the 0.90% Facebook benchmark.

Notable Insights

- Facebook ads had a CTR of 2.22% and 15,851 completed video views for a 43.46% VCR.
- Nextdoor ads performed well with a CTR of 0.36%, which is 140% above benchmark.
- Spotify ads had a CTR of 0.14% and 11,445 audio completions.
- Google Video ads had 17,659 completed video views for a 32.73% VCR, which is 118% above the 15% Google VCR benchmark.
- Native ads had a CTR of 0.31%, which is 107% higher than the 0.15% benchmark.

Facebook CTR Benchmark: 0.90% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15% | Native CTR Benchmark: 0.15%

DET | NOVA | 7/17/24 – 8/1/24 | Spanish Phase 3

The Golden to Mars campaign promoting Pre-Event ran on Facebook, Google, Native and Spotify through 8/1/24. These campaigns were targeted at Spanish-speaking customers over the age of 25 who resided near the project area in Loudoun County, VA.

330,672 impressions

of ads were delivered to target audiences.

2,229 clicks

have taken audiences to the landing pages.

20,409 video views with an average 49.13% VCR.

0.67% CTR

Most CTRs near or above benchmarks.

18,693 ad engagements

such as reactions, likes, comments, shares and saves have been made on the ads.

Notable Creative

The Taylor GeoVoice video in Spanish on Facebook had the highest CTR at 2.49%, which is 177% higher than the 0.90% Facebook benchmark.

Notable Insights

- Facebook ads had a CTR of 1.73% and 8,724 completed video views for a 49.79% VCR.
- Spotify ads had a CTR of 0.08% and 380 audio completions.
- Google Video ads had 923 completed video views for a 31.99% VCR, which is 113% above the 15% Google VCR benchmark.
- Native ads had a CTR of 0.24%, which is 60% higher than the 0.15% benchmark.

Facebook CTR Benchmark: 0.90% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15% | Native CTR Benchmark: 0.15%

DET | NOVA | 8/2/24 – 8/12/24 | English Phase 4

The Golden to Mars campaign promoting Post-Event ran on Facebook, Google, Native, Spotify and Nextdoor through 8/12/24. These campaigns were targeted at English-speaking customers over the age of 25 who resided near the project area in Loudoun County, VA.

1,309,869 impressions

of ads were delivered to target audiences.

9,368 clicks

have taken audiences to the landing pages.

111,140 video views with an average 37.18% VCR.

0.72% CTR

Most CTRs near or above benchmarks.

37,867 ad engagements

such as reactions, likes, comments, shares and saves have been made on the ads.

Notable Creative

The Taylor GeoVoice video on Facebook had the highest CTR at 2.52%, which is 180% higher than the 0.90% Facebook benchmark.

Notable Insights

- Facebook ads had a CTR of 1.85% and 16,851 completed video views for a 47.56% VCR.
- Nextdoor ads performed well with a CTR of 0.35%, which is 133% above benchmark.
- Spotify ads had a CTR of 0.14%.
- Google Video ads had 24,471 completed video views for a 32.32% VCR, which is 115% above the 15% Google VCR benchmark.
- Native ads had a CTR of 0.28%, which is 87% higher than the 0.15% benchmark.

Facebook CTR Benchmark: 0.90% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15% | Native CTR Benchmark: 0.15%

DET | NOVA | 8/2/24 – 8/12/24 | Spanish Phase 4

The Golden to Mars campaign promoting Post-Event ran on Facebook, Google, Native, and Spotify through 8/12/24. These campaigns were targeted at Spanish-speaking customers over the age of 25 who resided near the project area in Loudoun County, VA.

244,939 impressions

of ads were delivered to target audiences.

1,943 clicks

have taken audiences to the landing pages.

18,888 video views with an average 49.88% VCR.

0.79% CTR

Most CTRs near or above benchmarks.

17,260 ad engagements

such as reactions, likes, comments, shares and saves have been made on the ads.

Notable Creative

The Taylor GeoVoice video in Spanish on Facebook had the highest CTR at 2.17%, which is 141% higher than the 0.90% Facebook benchmark.

Notable Insights

- Facebook ads had a CTR of 1.63% and 8,257 completed video views for a 51.36% VCR.
- Spotify ads had a CTR of 0.11%.
- Google Video ads had 1,165 completed video views for a 41.46% VCR, which is 176% above the 15% Google VCR benchmark.
- Native ads had a CTR of 0.31%, which is 107% higher than the 0.15% benchmark.

Facebook CTR Benchmark: 0.90% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15% | Native CTR Benchmark: 0.15%

DET | NOVA | 1/2/25 – 1/15/25 | English Phase 5

The Golden to Mars campaign promoting Pre-Event ran on Facebook, Google, Spotify, Native and Nextdoor through 1/15/25. These campaigns were targeted at English-speaking customers over the age of 25 who resided near the project area in Loudoun County, VA.

1,732,000 impressions

of ads were delivered to target audiences.

16,456 clicks

have taken audiences to the landing pages.

84,667 video views with an average 36.83% VCR.

0.95% CTR

Most CTRs near or above benchmarks.

49,753 ad engagements

such as reactions, likes, comments, shares and saves have been made on the ads.

Notable Creative

The Cortne GeoVoice video on Facebook had the highest CTR at 2.73%, which is 203% higher than the 0.90% Facebook benchmark.

Notable Insights

- Facebook ads had a CTR of 1.75% and 20,937 completed video views for a 45.75% VCR.
- Nextdoor ads performed well with a CTR of 0.45%, which is 200% above benchmark.
- Spotify ads had a CTR of 0.13%.
- Google Video ads had 2,591 completed video views for a 23.64% VCR, which is 58% above the 15% Google VCR benchmark.
- Native ads had a CTR of 0.25%, which is 67% higher than the 0.15% benchmark.

Facebook CTR Benchmark: 0.90% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15% | Native CTR Benchmark: 0.15%

DET | NOVA | 1/23/25 – 1/30/25 | English Phase 6

The Golden to Mars campaign promoting Post-Event ran on Facebook, Google, Spotify, Native and Nextdoor through 2/5/25. These campaigns were targeted at English-speaking customers over the age of 25 who resided near the project area in Loudoun County, VA.

735,191 impressions

of ads were delivered to target audiences.

6,380 clicks

have taken audiences to the landing pages.

35,031 video views with an average 42.39% VCR.

0.87% CTR

Most CTRs near or above benchmarks.

26,264 ad engagements

such as reactions, likes, comments, shares and saves have been made on the ads.

Notable Creative

The Cortne GeoVoice video on Facebook had the highest CTR at 3.53%, which is 292% higher than the 0.90% Facebook benchmark.

Notable Insights

- Facebook ads had a CTR of 2.22% and 12,260 completed video views for a 50.94% VCR.
- Nextdoor ads performed well with a CTR of 0.43%, which is 187% above benchmark.
- Spotify ads had a CTR of 0.14%.
- Google Video ads had 2,591 completed video views for a 23.64% VCR, which is 58% above the 15% Google VCR benchmark.
- Native ads had a CTR of 0.32%, which is 113% higher than the 0.15% benchmark.

Facebook CTR Benchmark: 0.90% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15% | Native CTR Benchmark: 0.15%

Summary:

- The Phase 6 GeoVoice ad featuring Cortne on Facebook was the highest-performing ad with a CTR of 3.53%.
- Females 65+ were the top engagers within the English campaigns, while males 25-44 were the top engagers within the Spanish campaigns.
- Google Video was the top-performing platform for the campaign and ended the campaign with a VCR 108% over the 15% Google Video benchmark.
- Video performed well in this campaign, with 603,963 video views. There were 247,276 completed video views across the platforms for a total VCR of 40.94%.
- The GeoVoice ads were the top performers across all platforms. The GeoVoice ads were the top performers in nearly every phase. GeoVoice creative featured Claire, Taylor and Cortne.
- There was not a Spanish component for ads in Phase 5 and Phase 6.
- Phase 6 was paused on 1/30/25, before the original 2/5/25 end date.
- The electricity provider, energy industry information, and home & garden audience segments had the highest CTRs on Google.

Facebook CTR Benchmark: 0.90% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15% | Native CTR Benchmark: 0.15%


We're working to meet Virginia's energy needs.
We'd like your input on the upcoming Golden-Mars electric transmission project in Loudoun County.
Choose the meeting most convenient for you.
Virtual Meeting:
Tuesday, January 14, 2025, 12-1 p.m.
In-Person Meeting:
Wednesday, January 15, 2025, 5:30-7:30 p.m.
Presentation at 6 p.m.
The Lodge at Hanson Park
23394 Endeavor Drive, Aldie, VA 20105
Learn more at DominionEnergy.com/NOVA
Use your phone's camera or QR reader app to visit the project page directly.
Dominion Energy
Dominion Energy®
Powering Your Every Day.℠

Environmental Justice: Ongoing Commitment to Our Communities

At Dominion Energy, we are committed to providing reliable, affordable, clean energy in accordance with our values of safety, ethics, excellence, embrace change and team work. This includes listening to and learning all we can from the communities we are privileged to serve.

Our values also recognize that environmental justice considerations must be part of our everyday decisions, community outreach and evaluations as we move forward with projects to modernize the generation and delivery of energy.

To that end, communities should have a meaningful voice in our planning and development process, regardless of race, color, national origin, or income. Our neighbors should have early and continuing opportunities to work with us. We pledge to undertake collaborative efforts to work to resolve issues. We will advance purposeful inclusion to ensure a diversity of views in our public engagement processes.

Dominion Energy will be guided in meeting environmental justice expectations of fair treatment and sincere involvement by being inclusive, understanding, dedicated to finding solutions, and effectively communicating with our customers and our neighbors. We pledge to be a positive catalyst in our communities.

November 2018

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

C. Detail the nature, location, and ownership of each building that would have to be demolished or relocated if the project is built as proposed.

Response: The Company identified the following buildings that would have to be demolished or relocated to construct the Project as proposed.

Golden-Mars Proposed Route

Four parcels crossed by the Golden-Mars Route 3 have outbuildings that would need to be addressed. The Company will coordinate with each landowner on the removal or relocation of the impacted outbuildings prior to construction.

Lockridge 230 kV Loop

No buildings would require demolition or relocation if the Lockridge 230 kV Loop is built as proposed.

Sojourner 230 kV Loop

No buildings would require demolition or relocation if the Sojourner 230 kV Loop is built as proposed.

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

D. Identify existing physical facilities that the line will parallel, if any, such as existing transmission lines, railroad tracks, highways, pipelines, etc. Describe the current use and physical appearance and characteristics of the existing ROW that would be paralleled, as well as the length of time the transmission ROW has been in use.

Response: Existing Transmission Infrastructure

There are several Company-owned existing overhead transmission and distribution line corridors within the study area. Based on a review of the Company's right-of-way records and publicly available Geographic Information Systems data, the majority of existing electric utility infrastructure in the study area is owned by the Company. Existing overhead transmission lines paralleled by the Project's Proposed and Alternative Routes are described and quantified in Table 1 below. Further descriptions of electric transmission and distribution features are summarized in Table 2 below.

Roads

The road network in the study area includes a variety of road types ranging from major arterial roadways to local streets. Arterial and major collector roadway corridors within the study area offer greater potential for collocation opportunities as opposed to local roads and streets due to right-of-way width and setbacks. Loudoun County has previously indicated to the Company that collocation along major roadways is preferable to creating new utility corridors on undeveloped land. Roads paralleled by the Project's Proposed and Alternative Routes are described and quantified in Tables 1 and 2 below.

Other Existing Utilities

Based on a review of data provided to the Company by Loudoun Water, the study area contains an extensive network of buried Loudoun Water Utility infrastructure, including drinking water, reclaimed water and wastewater force, gravity and pressure mains. The majority of this network is located within road and street rights-of-way, in densely developed areas or are already collocated with existing Company-owned transmission lines outside of roadway corridors. A cleared wastewater gravity main corridor, called the Broad Run Interceptor, exists along the length of Broad Run from the northeastern to southwestern extents of the study area, crossing through Broad Run Park, and branching out to various developments and road corridors in the surrounding area.

A Columbia Gas pipeline spans from east to west through the midsection of the study area and collocates with sections of the Company's existing Lines #2095/#2218 and Lines #2223/#2188. This pipeline corridor offers minimal collocation opportunities due to its east-west orientation. No other pipeline

corridors exist within the study area.

Utilities corridors paralleled by the Project's Proposed and Alternative Routes are described and quantified in Tables 1 and 2 below.

Table 1. Collocation Length of Facilities Paralleled by the Project's Proposed and Alternative Routes (miles)

Existing Facility Feature Category	**Golden-Mars 500-230 kV Lines**					**Lockridge 230 kV Loop**	**Sojourner 230 kV Loop**
Route Alternative	**1**	**2**	**3**	**4**	**5**	**Proposed Route**	**Proposed Route**
Dominion Infrastructure (Total)	**2.9**	**4.1**	**4.1**	**4.5**	**3.1**	**0.3**	**0.1**
Dominion Energy Virginia Transmission Lines[1]	2.8	4.0	4.0	4.4	2.8	0.3	0.1
Dominion Energy Virginia Distribution Lines[2]	0.1	0.1	0.1	0.1	0.3	0.0	0.0
Roadways (Total)	**5.3**	**2.9**	**1.4**	**1.4**	**5.5**	**0.0**	**0.1**
Carters School Road	0.4	0.4	0.4	0.4	0.4	0.0	0.0
Claiborne Parkway	0.0	0.0	0.0	0.0	0.4	0.0	0.0
Digital Dulles Drive	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Dulles Greenway	0.5	0.0	0.0	0.0	0.5	0.0	0.0
Loudoun County Parkway	3.4	1.5	0.0	0.0	2.6	0.0	0.0
Old Ox Road	0.3	0.3	0.3	0.3	0.3	0.0	0.0
Pacific Boulevard	0.6	0.6	0.6	0.6	0.6	0.0	0.0
Ryan Road	0.0	0.0	0.0	0.0	0.6	0.0	0.0
Sully Road (Route 28)	0.1	0.1	0.1	0.1	0.1	0.0	0.0
Other Utility Infrastructure Corridors (Total)[3]	**1.5**	**1.6**	**1.7**	**1.5**	**1.5**	**0.0**	**0.0**
Loudoun County Water Utility Broad Run Interceptor	0.6	0.8	1.3	1.1	0.6	0.0	0.0
Other Loudoun County Water Utility Infrastructure	0.9	0.9	0.4	0.4	0.9	0.0	0.0

1: Transmission lines include existing and approved overhead transmission line corridors, and future/existing substations.
2: Distribution lines include existing overhead powerlines only. Distance does not account for collocation with distribution lines in transmission line corridors (accounted for in transmission line totals), or underground distribution lines.
3: 'Other Utility Infrastructure Corridors' excludes all road-shoulder utility distribution rights-of-way.

Table 2. Description of Features being Paralleled by the Project's Proposed and Alternative Routes

Existing Facility Feature	Description of Collocation Feature
Dominion Energy Virginia Transmission Lines (Overhead and Substations)	Several existing transmission line corridors occur within the study area. Collocated corridors include Lines #2150/#2081 located south of the future Golden Substation, Lines #2165/#2170 located parallel to Waxpool Road, Lines #2152/#2170, #2203/#2214, #2149/#2214, #2031/#2223 located south of Waxpool Road and north of Dulles Greenway along Broad Run, and Lines #2095/#2218 located parallel to Dulles Greenway then extends south along Broad Run, and deviates from Broad Run to the east of Rock Ridge Highschool, to parallel Old Ox Road. The transmission network in this area has been in use since the early 2010s.
Dominion Energy Virginia Distribution Lines	Overhead distribution lines on wooden monopoles, usually containing additional utilities lines, and located on rights-of-way maintained as grasses and shrubs. An extensive network of underground distribution lines is also present in the study area and located in road rights-of-way. For the purposes of routing and selecting collocation opportunities, existing overhead infrastructure has been prioritized over collocation with underground utilities. The distribution lines in this area have been in use since the early 1990s.
Sully Road	Eight to ten lane principal arterial freeway surrounded by existing commercial and industrial facilities, with buried water, gas and/or electric utilities, and overhead electric distribution and transmission lines within the right-of-way. In the study area, Sully Road has been in use since the early 1990s.
Pacific Boulevard	Four lane major collector roadway surrounded by existing commercial facilities, with buried water, gas and/or electric utilities, and overhead electric distribution lines within the right-of-way. In the study area, Pacific Boulevard has been in use since the mid-1990s.
Waxpool Road	Six lane minor arterial roadway surrounded by existing commercial and industrial facilities, with buried water, gas and/or electric utilities, and overhead electric distribution and transmission lines within the right-of-way. In the study area, Waxpool Road has been in use since the mid-1990s.
Dulles Greenway	Six to eight lane principal arterial freeway surrounded by existing industrial facilities, with buried water, gas and/or electric utilities, a large gas pipeline corridor, and overhead electric distribution and transmission

Existing Facility Feature	Description of Collocation Feature
	lines within the right-of-way. In the study area, Dulles Greenway has been in use since the late-1990s.
Loudoun County Parkway	Six lane non-freeway principal arterial roadway surrounded by existing commercial and residential properties, with buried water, gas and/or electric utilities, and sections of overhead electric distribution lines within the right-of-way. In the study area, Loudoun County Parkway has been in use since the early-2000s.
Ryan Road	Four to six lane major collector roadway surrounded by existing residential properties, with buried water, gas and/or electric utilities, and sections of overhead electric distribution lines within the right-of-way. In the study area, Ryan Road has been in use since the early-2000s.
Claiborne Parkway	Four lane major collector roadway surrounded by existing residential properties, with buried water, gas and/or electric utilities within the right-of-way. In the study area, Claiborne Parkway has been in use since the early-2000s.
Old Ox Road	Six lane principal arterial roadway surrounded by existing commercial and industrial facilities, with buried water, gas and/or electric utilities, and overhead electric transmission lines within the right-of-way. Old Ox Road has been in use since the late-1990s.
Carters School Road	Four lane minor collector surrounded by existing commercial and municipal/industrial properties, with buried water, gas and/or electric utilities within the right-of-way. Carters School Road has been in use since the mid-2000s.
Buried Water/Sewer, Loudoun Water Utility Corridors; Broad Run Interceptor	Cleared areas adjacent to roadways or through forested lands that are maintained as grasses and shrubs, with no buildings or permanent structures. Loudoun Water maintains an extensive network of water and sewer lines throughout the proposed Project area. A prominent Loudoun Water corridor, referred to as the Broad Run Interceptor, follows the length of Broad Run through cleared corridors between Waxpool Road and Old Ox Road. The Broad Run Interceptor has been in use since the early-2000s.
Columbia Gas Pipeline Corridor	A Columbia Gas pipeline runs east-west through the proposed Project area within a cleared and maintained forested and grass/shrub covered corridor. The corridor is located north of Dulles Greenway in the east, and crosses to the south of Dulles Greenway at the Loudoun County Parkway interchange. Columbia Gas Pipeline has been in use since the early-2000s.

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

E. Indicate whether the Applicant has investigated land use plans in the areas of the proposed route and indicate how the building of the proposed line would affect any proposed land use.

Response: The Loudoun County 2019 General Plan amended through February 7, 2023 ("General Plan")[64], the Loudoun County 2019 Countywide Transportation Plan ("2019 CTP")[65] and Linear Parks and Trails System Plan ("2021 Trail Plan")[66] were reviewed to evaluate the potential effect the Project could have on future development. The General Plan and 2019 CTP do not address electric transmission lines within their land use policies and strategies explicitly. The General Plan identifies parts of the Loudoun County within the Project area in continue to be a key location for new development, including suburban employment, suburban neighborhood, industrial, and mixed-use development as well as urban transit center, mixed use and employment areas. The General Plan anticipates data center development to be a component in the employment and industrial areas and the Plan acknowledges that data centers need to be accommodated in places that have access to utilities, including electricity, water, and fiber.

The Company consulted with Loudoun County Department of Planning and Zoning staff, Loudoun County Natural Resources staff, Loudoun County Department of Transportation and Capital Infrastructure ("DTCI") staff, Loudoun County Parks Recreations and Community Service Staff ("Parks"), NOVA Parks staff, VDOT staff, Loudoun Water, the Loudoun County BOS Office, LCSB staff, homeowners associations, Columbia Gas, major developers, and landowners in study area. The purpose of the consultations was to discuss the Project and determine if there were any constraints present that would conflict with existing or proposed land uses.

Several conflicting land uses were identified by the Company and various Loudoun County Department staff stating the County's land use planning objective of limiting development within the Broad Run riparian corridor. Loudoun County is planning an interconnected, countywide linear parks and trails system to preserve natural habitat and provide recreational opportunities for residents. Portions of the existing and planned Countywide parks and trails system are located along the Broad Run riparian corridor. County staff strenuously supports paralleling existing road and established utility corridors throughout the Project area, especially where impacts to the Broad Run riparian corridor can be reasonably avoided. The Golden-Mars Routes and Lockridge Loop were routed to mitigate visual and environmental

[64] *See* https://www.loudoun.gov/DocumentCenter/View/152285/General-Plan---Combined-with-small-maps-bookmarked. June 20, 2019, amended through February 7, 2023.

[65] *See* https://www.loudoun.gov/DocumentCenter/View/152287/CTP---Combined-with-small-maps-bookmarked. June 20, 2019, amended through February 7, 2023.

[66] *See* https://www.loudoun.gov/DocumentCenter/View/167395/LPAT-Plan_211029_Full-Appendices-4. July 6, 2021, amended October 29, 2021.

impacts to Broad Run by placing structures above the floodplain and using single span, perpendicular crossings collocated with either existing transmission lines or future transmission lines. Outside of the Broad Run corridor, Golden-Mars Routes 1, 2, and 5 collocate with Loudoun County Parkway to minimize impacts to surrounding residences and neighborhoods. The Sojourner Loop was routed in coordination with the property owner and developer and would not conflict with proposed land uses.

Review of publicly available information (including the 2019 CTP) and consultations with Loudoun County DTCI staff and VDOT staff were completed to determine the impact of the Project routes on future road projects. Several future road projects were identified in the Project area; however, none would be affected by the Project's Proposed and Alternative Routes. The Project was further vetted by DTCI staff and VDOT staff to confirm the feasibility of road crossings along both existing and planned roads and VDOT dedicated rights-of-way.

Potentially conflicting land uses within 0.25 mile of the Golden-Mars routes were identified through developer and landowner consultations as well as the Company's review of publicly available site plan and legislative application submissions to Loudoun County. Land use plans crossed by the Golden-Mars routes were investigated by the Company and studied for potential effect and considered as part of the route selection process. Potential impacts to proposed land uses are summarized below. Potential visual impacts to sensitive visual resources are discussed in Section 5.3 of the Environmental Routing Study.

Proposed Land Use Plans Crossed by the Golden-Mars Proposed and Alternative Routes		
Name	Description	Impact
Paragon Park III Technology Park	Data center and Mars Substation	No anticipated impacts.
AutoNation Honda Improvements	Building addition to automotive sales and service building	No anticipated impacts. Routes cross small area of existing landscaping and parking and do not cross site area affected by proposed building addition.
Dulles 28 Technology Park	Two data center buildings and two warehouse buildings	No anticipated impacts to the proposed buildings.
Pacific Corporate Park	Three data center buildings and substation	No anticipated impacts to the proposed buildings.

Proposed Land Use Plans Crossed by the Golden-Mars Proposed and Alternative Routes		
Name	Description	Impact
Project Nova Broad Run	Three data center buildings	No anticipated impacts. The Company coordinated with developer to avoid proposed buildings.
Project Nova Southeast	Three data center buildings and Prentice Drive Substation	No anticipated impacts. The Company coordinated with developer to avoid the proposed buildings and substation.
Silver District West	Mixed use development with attached and multifamily dwellings, retail, office, and structured parking.	The right-of-way for Golden-Mars Routes 1 and 5 overlap with three retail/office buildings according to the applicant's conceptual plan. Final site plans have not yet been submitted to the County and minor adjustments may allow the buildings to be shifted outside of the route right-of-way. A proffered trail and bike lane along the south side of Dulles Greenway is within the route right-of-way and there are also planned multifamily dwellings in close proximity to the routes. The rights-of-way for Golden-Mars Routes 2, 3 and 4 cross the trail and bike lane and pass through proffered open space, including land to be dedicated to Loudoun County as part of the Broad Creek Linear Park.
Freedom Station Rezoning	Pre-application review of rezoning from business/office zoning to mixed residential and commercial	No anticipated impacts. Golden-Mars Routes 1 and 5 cross the southwest corner of the site. Conceptual development plans have not yet been submitted to the County.
Moorefield Parcel D-2	Part of 606-acre mixed use development. Parcel D-2 is approved on legislative plans for commercial buildings and structured parking.	No anticipated impacts on planned buildings. A 10-foot-wide trail (partially built) is within the right-of-way of Golden-Mars Routes 1 and 5 parallel to Loudoun County Parkway.

Proposed Land Use Plans Crossed by the Golden-Mars Proposed and Alternative Routes		
Name	Description	Impact
Moorefield Gas Station and the Shops at Moorefield	Gas station and retail. Legislative plan approved; engineered site plan under review	Golden-Mars Route 5 crosses an approved convenience store and gas pump canopy. The site would become unusable if Golden-Mars Route 5 were selected because the proposed buildings could not be built within the right-of-way nor is there sufficient space to reconfigure the gas station on the parcel.
Columbia Gas Distribution Line	Planned 12-inch gas distribution line within a 30-foot-wide right-of-way paralleling portions of Golden-Mars Routes 2, 3, and 4.	The Company is coordinating with Columbia Gas to determine whether the Golden-Mars Lines right-of-way for Routes 2, 3, and 4 can overlap with the Columbia Gas easement, whereby the Company's new 100-foot-wide right-of-way would be reduced to a new 70-foot-wide easement where it overlaps with the 30-foot-wide Columbia Gas easement.
Northwoods Property	Data center campus with four data center buildings and a NOVEC substation	No anticipated impacts. Golden-Mars Routes 3 and 4 are collocated along an existing Company-owned right-of-way and would not impact the development of the site.
Stone Hill Residential Rezoning	Legislative application under review for rezoning to allow multifamily dwellings	No direct impacts to proposed residential lots are anticipated however visual impacts would be anticipated from future residences. Golden-Mars Routes 1 and 5 are within a proposed tree conservation area associated with a stream.
Brambleton Active Adult Community	Single-family, attached and multi-family dwellings; clubhouse and athletic courts; open space	No direct impacts to proposed residential lots are anticipated however visual impacts would be anticipated from future residences and the HOA amenities such as the Birch House community center. Golden-Mars Routes 1 and 5 cross proffered open space land, including a stream valley buffer and trail.

Proposed Land Use Plans Crossed by the Golden-Mars Proposed and Alternative Routes		
Name	Description	Impact
Cyrus One Sterling 11 Phase II	One data center building	No anticipated impacts. The Company coordinated with the property owner to adjust Golden-Mars Routes 1-5 to avoid the planned data center building.
Dulles Commerce Center and West Dulles	Removal of existing industrial buildings for redevelopment as data center with greater height and building area than allowed under current zoning.	No anticipated impact. Rezoning application shows only bulk parcels and does not specify building location. Consultation with the landowner resulted in shifting the Golden-Mars route alternatives to the south side of the Dulles Commerce Center parcel to parallel Old Ox Road and avoid future building envelopes.
Digital Dulles	Data center campus with 13 data center buildings and six future substation sites	No anticipated impacts. The Company coordinated with developer to avoid proposed buildings.

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

F. Government Bodies

1. Indicate if the Applicant determined from the governing bodies of each county, city and town in which the proposed facilities will be located whether those bodies have designated the important farmlands within their jurisdictions, as required by § 3.2-205 B of the Code.

2. If so, and if any portion of the proposed facilities will be located on any such important farmland:

a. Include maps and other evidence showing the nature and extent of the impact on such farmlands;

b. Describe what alternatives exist to locating the proposed facilities on the affected farmlands, and why those alternatives are not suitable; and

c. Describe the Applicant's proposals to minimize the impact of the facilities on the affected farmland.

Response: (1) Coordination with Loudoun County has concluded that no land is designated as important farmlands within the study area.

(2) Not applicable.

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

G. Identify the following that lie within or adjacent to the proposed ROW:

1. **Any district, site, building, structure, or other object included in the National Register of Historic Places maintained by the U.S. Secretary of the Interior;**

2. **Any historic architectural, archeological, and cultural resources, such as historic landmarks, battlefields, sites, buildings, structures, districts or objects listed or determined eligible by the Virginia Department of Historic Resources ("DHR");**

3. **Any historic district designated by the governing body of any city or county;**

4. **Any state archaeological site or zone designated by the Director of the DHR, or its predecessor, and any site designated by a local archaeological commission, or similar body;**

5. **Any underwater historic assets designated by the DHR, or predecessor agency or board;**

6. **Any National Natural Landmark designated by the U.S. Secretary of the Interior;**

7. **Any area or feature included in the Virginia Registry of Natural Areas maintained by the Virginia Department of Conservation and Recreation ("DCR");**

8. **Any area accepted by the Director of the DCR for the Virginia Natural Area Preserves System;**

9. **Any conservation easement or open space easement qualifying under §§ 10.1-1009 – 1016, or §§ 10.1-1700 – 1705, of the Code (or a comparable prior or subsequent provision of the Code);**

10. **Any state scenic river;**

11. **Any lands owned by a municipality or school district; and**

12. **Any federal, state or local battlefield, park, forest, game or wildlife preserve, recreational area, or similar facility. Features, sites, and the like listed in 1 through 11 above need not be identified again.**

Response: (1) None.

(2) One known eligible resource for listing on the NRHP is within or adjacent to the Golden-Mars Proposed and Alternative Routes. No listed or potentially eligible resources are intersected or adjacent to the Golden-Mars Proposed and Alternative Routes. Section 2.1 of the DEQ Supplement provides additional details.

Historic Property	Description	NRHP Status	Route Alternative
053-0276	Washington & Old Dominion Railroad Historic District	Eligible	Golden-Mars Route 1 Golden-Mars Route 2 Golden-Mars Route 3 Golden-Mars Route 4 Golden-Mars Route 5

No listed, eligible, or potentially eligible resources are intersected or adjacent to the Lockridge Loop Proposed Route or the Sojourner Loop Proposed Route.

(3) None.

(4) Golden-Mars Lines

There are 15 known archaeological sites in the right-of-way for the Golden-Mars Proposed and Alternative Routes. Of these, 12 are unevaluated and three are not eligible. None of the previously recorded archaeological sites are cemeteries. One is a lithic scatter, five are temporary camps, one is an artifact scatter, one is an artifact scatter and single dwelling, four are single dwellings, one consists of multiple dwellings, one is a dwelling and trash scatter, and one is a schoolhouse.

Site Number	Description	NRHP Status	Route Alternative
44LD0111	Prehistoric (Early Archaic) camp, temporary	Not Eligible	Golden-Mars Route 1 Golden-Mars Route 2 Golden-Mars Route 3 Golden-Mars Route 4 Golden-Mars Route 5
44LD0170	Prehistoric (Pre-Contact) camp, temporary	Not Eligible	Golden-Mars Route 1 Golden-Mars Route 2 Golden-Mars Route 3Golden-Mars Route 4 Golden-Mars Route 5
44LD0330	Prehistoric (unknown) lithic scatter	Unevaluated	Golden-Mars Route 5
44LD0332	Prehistoric (unknown) camp, temporary	Unevaluated	Golden-Mars Route 1 Golden-Mars Route 2
44LD0333	Prehistoric (unknown) camp, temporary	Unevaluated	Golden-Mars Route 1 Golden-Mars Route 2
44LD0334	Prehistoric (unknown) camp, temporary	Unevaluated	Golden-Mars Route 2
44LD0335	Prehistoric (unknown) camp, temporary	Unevaluated	Golden-Mars Route 2 Golden-Mars Route 3

Site Number	Description	NRHP Status	Route Alternative
44LD0472	Prehistoric (Late Archaic) lithic scatter	Unevaluated	Golden-Mars Route 1 Golden-Mars Route 2 Golden-Mars Route 3 Golden-Mars Route 4 Golden-Mars Route 5
44LD0945	Historic (20th century) dwelling, multiple	Unevaluated	Golden-Mars Route 1 Golden-Mars Route 2 Golden-Mars Route 3 Golden-Mars Route 4 Golden-Mars Route 5
44LD1244	Historic (18th century) farmstead	Unevaluated	Golden-Mars Route 1 Golden-Mars Route 5
44LD1311	Historic (19th and 20th century) dwelling, single	Unevaluated	Golden-Mars Route 1 Golden-Mars Route 5
44LD1742	Historic (20th century) schoolhouse (Carter Schoolhouse)	Not Eligible	Golden-Mars Route 1 Golden-Mars Route 2 Golden-Mars Route 3 Golden-Mars Route 4 Golden-Mars Route 5
44LD1909	Historic (20th century) dwelling, single	Not Eligible	Golden-Mars Route 1 Golden-Mars Route 2 Golden-Mars Route 3 Golden-Mars Route 4 Golden-Mars Route 5
44LD1922	Historic (19th and 20th century) dwelling, single	Unevaluated	Golden-Mars Route 1 Golden-Mars Route 5
44LD1978	Historic (19th and 20th century) artifact scatter	Unevaluated	Golden-Mars Route 1 Golden-Mars Route 2 Golden-Mars Route 3 Golden-Mars Route 4 Golden-Mars Route 5

Lockridge 230 kV Loop

There is one known archaeological site in the right-of-way for the Lockridge Loop Proposed Route that is not eligible.

Site Number	Description	NRHP Status	Route Alternative
44LD1916	Prehistoric (unknown) lithic scatter	Not Eligible	Lockridge Loop Proposed Route

Sojourner 230 kV Loop

There is one known archaeological site in the right-of-way for the Sojourner Loop Proposed Route that is not eligible.

Site Number	Description	NRHP Status	Route Alternative
44LD1737	Historic (20th Century) farmstead	Not Eligible	Sojourner Loop Proposed Route

(5) None.

(6) None.

(7) None.

(8) None.

(9) Golden-Mars Routes 1-4 each cross one or more Loudoun County BOS open space easements. Alternative Route 5 of the Golden-Mars Lines does not cross conservation easements or open space easements.

Easement Type	Description	Impact Acres	Route Alternative
Loudoun County BOS Open Space Easement – Instrument # 200205090475388	Loudoun Valley Estates II HOA Open Space Parcel	3.1	Golden-Mars Route 1
Loudoun County BOS Open Space Easement – Instrument # 201606300040798[67]	Broad Run Stream Valley Park Parcel	0.9 3.7	Golden-Mars Route 2 Golden-Mars Route 3
Loudoun County BOS Open Space Easement – Instrument # 200405250051928	Loudoun Valley Estates III HOA Open Space Parcel	1.4 2.5	Golden-Mars Route 3 Golden-Mars Route 4

The Lockridge Loop Proposed Route and the Sojourner Loop Proposed Route do not cross any conservation easements or open space easements.

(10) None.

(11) Golden-Mars Routes 1 and 5 cross one parcel owned by the Loudoun County BOS, which connects to the Moorefield Station Eastern Regional Pond. The portion of BOS property crossed by both routes contains a 16-foot-wide temporary access road to the pond. This access road will eventually be dedicated to VDOT as right-of-way for Moorefield Boulevard, which will serve the Moorefield

[67] Loudoun County BOS Open Space Easement – Instrument # 201606300040798 referenced in the table below subpart (9) is the same parcel referenced as Loudoun County BOS – PIN 122178940000 in the table following subpart (11). The parcel is not double counted.

development.

While the BOS-owned land could be avoided by adjusting the routes to cross the south side of Loudoun County Parkway, this adjustment would place the Golden-Mars Lines directly adjacent to existing residences in Loudoun Valley Estates I. To avoid impacts to existing residences, minimize additional VDOT road crossings, and eliminate the need for up to four additional two-pole angle structures in this area, Loudoun County staff informed the Company that it preferred the original route alignment. Loudoun County staff further agreed to work with the Company on right-of-way acquisition.

Golden-Mars Routes 1-5 cross properties owned by the Loudoun County BOS and/or Loudoun County School Board. Those crossings are summarized in the table below.

Owner/Parcel ID Number	Description	Impact Acres	Route Alternative
Loudoun County School Board – PIN 122287422000	Rosa Lee Carter Elementary and Rock Ridge High School Campus	3.2 3.0 7.1	Golden-Mars Route 2 Golden-Mars Route 3 Golden-Mars Route 4
Loudoun County BOS – PIN 122178940000[68]	Broad Run Stream Valley Park Parcel	0.9 3.8	Golden-Mars Route 2 Golden-Mars Route 3
Loudoun County BOS – PIN 122176978000	Broad Run Stream Valley Park Parcel	<0.1	Golden-Mars Route 3
Loudoun County BOS – PIN 123478380000	Broad Run Stream Valley Park Parcel	0.6 0.6	Golden-Mars Route 3 Golden-Mars Route 4
Loudoun County BOS – PIN 123479294000	Broad Run Stream Valley Park Parcel	1.6 1.6	Golden-Mars Route 3 Golden-Mars Route 4
Loudoun County BOS – PIN 123280662000	Broad Run Stream Valley Park Parcel	2.7 2.7	Golden-Mars Route 3 Golden-Mars Route 4
Loudoun County BOS – PIN 090465344000	Access to Moorefield Station Eastern Regional Pond	<0.1 <0.1	Golden-Mars Route 1 Golden-Mars Route 5

The Lockridge Loop Proposed Route and Sojourner Loop Proposed Route do not cross any lands owned by a municipality or school district conservation.

(12) The Golden-Mars Proposed and Alternative Routes cross the W&OD Trail south of Golden Substation, impacting approximately 0.9 acre. This portion of the W&OD Trail is also within an existing Company-owned easement.

Golden-Mars Routes 1, 2, and 5 cross the Valley Falls Community Park for approximately 0.3 mile where the routes parallel Loudoun Valley Parkway. The park is owned and maintained by Loudoun Valley Estates II and contains a multiuse pedestrian trail connected to adjacent the County-maintained trail system. The routes would run parallel and overhead of the trail requiring tree clearing.

Golden-Mars Routes 1 and 5 cross the Moorefield Station Neighborhood Trail for

[68] *See supra*, n. 68.

approximately 0.7 mile where the routes parallel the north side of Loudoun County Parkway east of Claude Moore Drive. The multiuse pedestrian trail is being privately developed according to proffers of the greater Moorefield development and will be connect to adjacent trails. The routes would run parallel and overhead of the trail and could require tree clearing and grading landscape berms at structure locations.

Golden-Mars Routes 2, 3, and 4 cross the Broad Run Valley Park and Broad Run Trail for 0.1, 0.7, and 0.4 mile, respectively. Broad Run Valley Park is owned and maintained by Loudoun County and situated along mostly undeveloped areas adjacent to Broad Run. The park contains the Broad Run Trail, a natural surface trail that is part of the Loudoun County Linear Parks and Trail System, which continues to be developed and connected with other trails and parklands along the Broad Run corridor. Golden Mars Routes 2, 3, and 4 would require tree clearing and crossings of the park and trail system north of Loudoun Reserve Drive, adjacent to LCSB's Rock Ridge High School Campus. South of Loudoun Reserve Drive, Golden-Mars Alternative Routes 3 and 4 cross portions of the park but would be situated on the eastern bank of Broad Run, away from the trail and parallel to existing cleared right-of-way for the Broad Run Interceptor, a Loudoun Water sewer line that runs parallel to Broad Run through most of the study area.

The Lockridge Loop Proposed Route and Sojourner Loop Proposed Route do not cross any federal, state or local battlefield, park, forest, game or wildlife preserve, recreational area, or similar facility.

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

H. List any registered aeronautical facilities (airports, helipads) where the proposed route would place a structure or conductor within the federally-defined airspace of the facilities. Advise of contacts, and results of contacts, made with appropriate officials regarding the effect on the facilities' operations.

Response: The FAA is responsible for overseeing air transportation in the United States. The FAA manages air traffic in the United States and evaluates physical objects that may affect the safety of aeronautical operations through an obstruction evaluation. The prime objective of the FAA in conducting an obstruction evaluation is to ensure the safety of air navigation and the efficient utilization of navigable airspace by aircraft.

The Company has reviewed the FAA's websites[69] to identify airports within 10.0 nautical miles of the proposed Project. Based on this review, the following FAA-restricted airports and heliports are located within 10.0 nautical miles of the Project:

Airport Name and FAA ID	Approximate Distance and Direction from the Proposed Project (Nautical Miles ("nm"))	Use
Washington Dulles International Airport (IAD)	Dulles Airport has three existing north-south runways, one existing east-west runway, and one future east-west runway. The closest runways to the Project include: *Runway 01L/19R*: 0.4 nm east of the Sojourner Loop *Runway 12/30*: Runway 12/30: 0.5 nm south of the future Mars Substation, the southern terminus of Golden-Mars Routes 1, 2, 3, 4, and 5, and the Sojourner Loop.	Public
Stonesprings Heliport (6VG4)	1.9 nm southwest of Golden-Mars Routes 1, 2, and 5.	Private
Inova Loudoun Hospital Heliport (34VA)	4.1 nm northwest of the future Golden Substation.	Private
Reston Hospital Center Heliport (43VA)	4.4 nm southeast of the future Golden Substation and the northern terminus of all Golden-Mars Routes.	Private

[69] *See* https://oeaaa.faa.gov/oeaaa/external/portal.jsp and https://adip.faa.gov/agis/public/#/public.

Airport Name and FAA ID	Approximate Distance and Direction from the Proposed Project (Nautical Miles ("nm"))	Use
Crippen's Heliport (VA54)	4.8 nm east of the future Golden Substation and the northern terminus of all Golden-Mars Routes.	Private
Leesburg Executive Airport (JYO)	5.2 nm north of Golden-Mars Route 5.	Public
Goose Hunt Farm Airport (3VA5)	5.6 nm northwest of Golden-Mars Route 5.	Private
Inova Fair Oaks Hospital Heliport (74VA)	6.4 nm southeast of the Sojourner Loop.	Private
Fairfax County Police Heliport (26VA)	7.9 nm southeast of the Sojourner Loop.	Private
Egypt Farms Heliport (4VA0)	9.6 nm northwest of Golden-Mars Route 5.	Private

Civil airport imaginary surfaces have been established by the FAA for public-use airports and runways to prevent existing or proposed objects from extending from the ground into navigable airspace. The regulations that govern objects that may affect navigable airspace are codified in the Code of Federal Regulations, Title 14, Part 77. The regulations state that restrictions to structure heights only apply to public use airports and do not apply to privately owned airports or heliports that do not have at least one FAA-approved instrument procedure. Of the 10 airports and heliports identified within 10.0 nautical miles of all the Project route alternatives, only Dulles Airport and Leesburg Executive Airport were identified as public-use airports having FAA regulated airspace within 10 nm. Leesburg Executive Airport is approximately 31,700 feet (5.2 nautical miles) north of Golden-Mars Route 5, the closest alternative route to this airport. Based on the Company's review of the airport's single runway, the Project will not overlap the horizontal extent of any imaginary surface.

Dulles Airport is located adjacent to the Project. Regardless of the route selected for the Golden-Mars Lines, the Project when built will be completely within the horizontal extents of Dulles Airport's imaginary surfaces. The Company conducted a maximum allowable structure height analysis that compared ground elevation at planned structure locations to the most restrictive imaginary surface altitudes above them. No imaginary surface penetration is anticipated for any structure along any of the Project's Proposed or Alternative Routes. The Company will continue to consider these maximum allowable heights during final engineering design will coordinate with the FAA regarding these locations, as appropriate.

A notice must be filed with the FAA for each structure that penetrates a 100 to 1

imaginary notice surface within 20,000 feet of the runway primary surfaces at Dulles Airport. All structures associated with each Project route alternative are within 20,000 feet of at least one runway. The Project's Proposed and Alternative Routes each have structure locations requiring notification to the FAA for penetrating the 100 to 1 imaginary surface. The Company will utilize FAA Form 7460-1, Notice of Proposed Construction or Alteration, pursuant to 14 CFR Part 77 for FAA notification. The submittal will occur after a route is selected for the Golden-Mars transmission lines by the Commission. Based on the results of the maximum allowable structure height analysis, all route alternatives are likely in compliance with FAA requirements, and the Company will confirm this through required notification with the FAA.

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

I. Advise of any scenic byways that are in close proximity to or that will be crossed by the proposed transmission line and describe what steps will be taken to mitigate any visual impacts on such byways. Describe typical mitigation techniques for other highways' crossings.

Response: No scenic byways are in close proximity to the proposed Project or would be crossed by the transmission line routes. Perpendicular road crossings, which are preferred by VDOT and DTCI, will be utilized at other road crossings wherever practicable.

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

J. Identify coordination with appropriate municipal, state, and federal agencies.

Response: The Company solicited feedback from Loudoun County and coordinated with municipal, state, and federal agencies, as follows:

- Coordination with the U.S. Army Corps of Engineers, DEQ, VMRC, and VDOT will take place as appropriate to obtain necessary approvals for the Project.

- A letter dated February 12, 2025, was submitted to Loudoun County to describe the Project and request comments. See Section V.D.

- A Stage I Pre-Application Analysis has been prepared and was submitted to VDHR on March 27, 2025. See Attachment 2.I.1 to the DEQ Supplement.

- On July 15, 2024, the Company solicited comments via letter from several federally recognized Native American tribes, including:

Chief Walt "Red Hawk" Brown	Cheroenhaka (Nottoway) Indian Tribe
Mary Frances Wilkerson	Cheroenhaka (Nottoway) Indian Tribe
Chief Stephen Adkins	Chickahominy Indian Tribe
Assistant Chief Reginald Stewart	Chickahominy Indian Tribe
Chief Gerald A. Stewart	Chickahominy Indian Tribe Eastern Division
Jessica Phillips	Chickahominy Indian Tribe Eastern Division
Dana Adkins	Chickahominy Tribe
Chief Mark Custalow	Mattaponi Tribe
Chief Kenneth Branham	Monacan Indian Nation
Chief Keith Anderson	Nansemond Indian Nation
Chief Lynette Allston	Nottoway Indian Tribe of Virginia
SUB: Ms. Beth Roach	Nottoway Indian Tribe of Virginia
Chief Robert Gray	Pamunkey Indian Tribe
Shaleigh R. Howells	Pamunkey Indian Tribal Resource Office
Chief Charles (Bootsie) Bullock	Patawomeck Indian Tribe of Virginia
Chief G. Anne Richardson	Rappahannock Tribe
SUB: Assistant Chief	Rappahannock Tribe
Chief W. Frank Adams	Upper Mattaponi Indian Tribe
Leigh Mitchell	Upper Mattaponi Indian Tribe
Carissa Speck	Delaware Nation of Oklahoma
Caitlin Rogers	Catawba Indian Nation
Paul Barton	Eastern Shawnee Tribe of Oklahoma
Glenna Wallace	Eastern Shawnee Tribe of Oklahoma

A copy of the letter template is included as Attachment III.J.1.

See also Sections III.B, III.K, and V.D of this Appendix, and the DEQ Supplement.

Dominion Energy Virginia
Electric Transmission
P.O. Box 26666, Richmond, VA 23261
DominionEnergy.com

July 15, 2024

New Electric Transmission Project in Loudoun County

Dear _____:

Dominion Energy is committed to providing safe, reliable, affordable, and increasingly clean electricity. As a valued stakeholder with a unique perspective, you can help us meet these objectives as we plan necessary electric infrastructure projects in your area.

Over the past two years, we have worked with eastern Loudoun County residents to plan electric transmission infrastructure projects. These important projects are designed to bring bulk electricity into the Ashburn area, otherwise known as Data Center Alley. Data has become essential to our economy and everyday lives, making data centers a critical industry.

Dominion Energy's infrastructure investments will enhance the local electric grid and improve reliability for all our customers.

We are planning an important electric transmission project to address the growing energy needs of Loudoun County and the surrounding region. We are in the early stages of planning, and your input is important to the project's development. Details, including routing options, are being considered. For your convenience, the enclosed Loudoun Reliability Project map indicates the study area.

Your feedback will help develop the best possible route for this project. We are planning several opportunities to meet with community members to hear your concerns and to help you learn more about this project. We invite you to join us virtually on **July 30, 2024,** and in person on **July 31, 2024 and August 1, 2024.**

Virtual Meeting	**In-person Meetings**
• Tuesday, July 30, 2024 • Noon – 1 p.m. • Link available at DominionEnergy.com/NOVA	• Wednesday, July 31, 2024 • Thursday, August 1, 2024 • 5:30 p.m. – 7:30 p.m.

Loudoun Reliability Electric Transmission Projects

	Stone Hill Middle School 23415 Evergreen Ridge Dr. Ashburn, VA 20148

Please feel free to notify other relevant organizations that may have an interest in the project area. For reference, recipients of this letter include other county and statewide historic, cultural, and scenic organizations and Native American Tribes.

If you would like any additional information, have questions, or would like to set up a meeting to discuss the project, please get in touch with me by sending an email to Robert.E.Richardson@DominionEnergy.com or calling 888-291-0190.

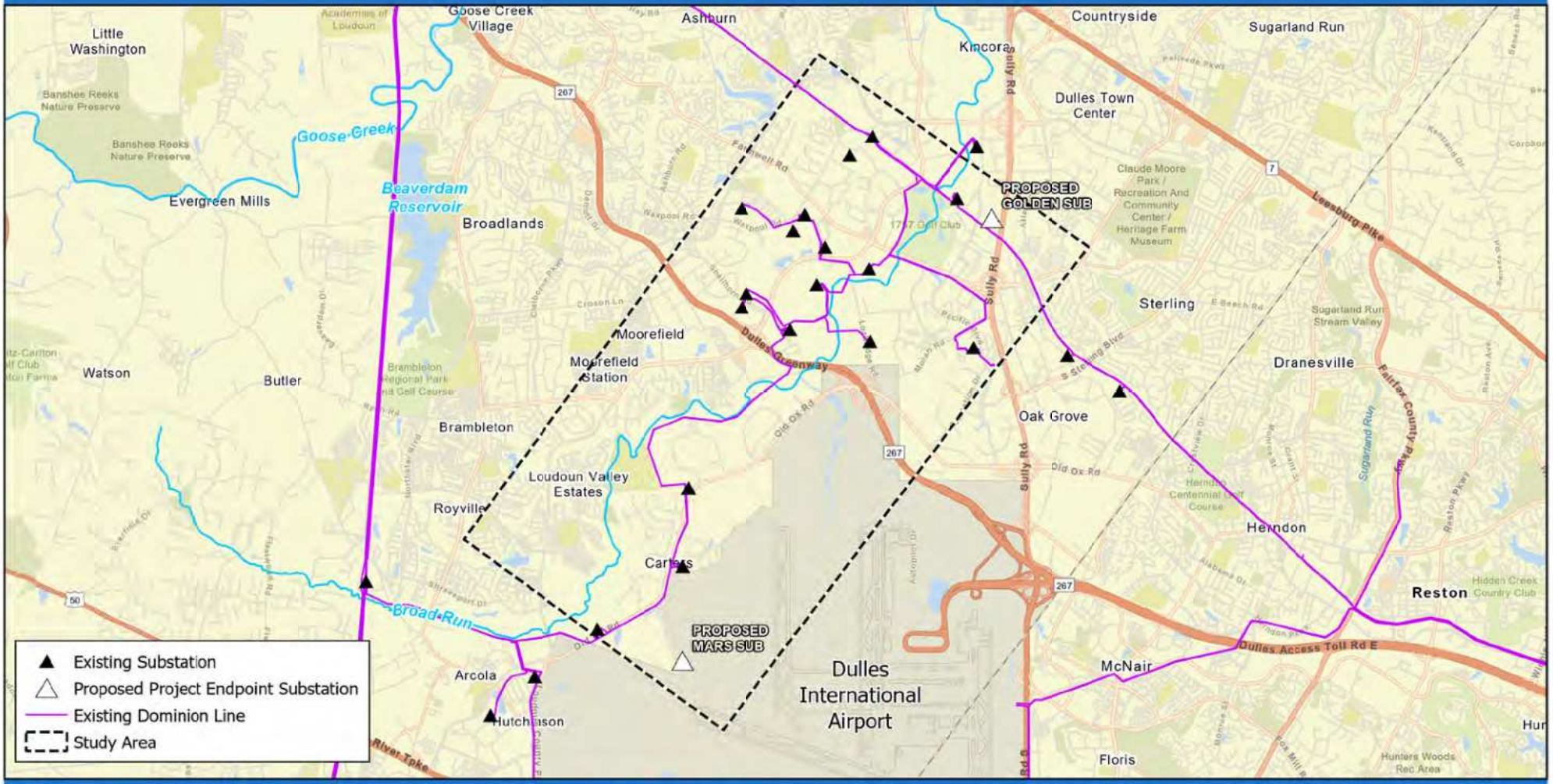
I appreciate your willingness to join us in our commitment to serving the community.

Sincerely,

Robert E. Richardson

Rob Richardson
Electric Transmission Communications

Project Study Area



Golden-Mars 500-230 kV Electric Transmission Project

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

K. Identify coordination with any non-governmental organizations or private citizen groups.

Response: On July 15, 2024, the Company solicited comments via letter from the community leaders, environmental groups, and business groups identified below. A copy of the letter template is included as Attachment III.K.1.

Name	Organization
Ms. Elizabeth S. Kostelny	Preservation Virginia
Mr. Thomas Gilmore	American Battlefield Trust
Mr. Jim Campi	American Battlefield Trust
Mr. Max Hokit	American Battlefield Trust
Mr. Steven Williams	Colonial National Historical Park
Ms. Eleanor Breen, PhD, RPA	Council of Virginia Archaeologists
Ms. Leighton Powell	Scenic Virginia
Ms. Elaine Chang	National Trust for Historic Preservation
Ms. Julie Bolthouse	Piedmont Environmental Council
Mr. John McCarthy	Piedmont Environmental Council
Dr. Cassandra Newby-Alexander, Dean	Norfolk State University
Mr. Roger Kirchen, Archaeologist	Virginia Department of Historic Resources
Ms. Adrienne Birge-Wilson	Virginia Department of Historic Resources
Mr. Dave Dutton	Dutton + Associates, LLC

Dominion Energy Virginia
Electric Transmission
P.O. Box 26666, Richmond, VA 23261
DominionEnergy.com

July 15, 2024

New Electric Transmission Project in Loudoun County

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Dominion Energy's infrastructure investments will enhance the local electric grid and improve reliability for all our customers.

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May XX, 2023
Loudoun Reliability Electric Transmission Projects

	Stone Hill Middle School 23415 Evergreen Ridge Dr. Ashburn, VA 20148

Please feel free to notify other relevant organizations that may have an interest in the project area. For reference, recipients of this letter include other county and statewide historic, cultural, and scenic organizations and Native American Tribes.

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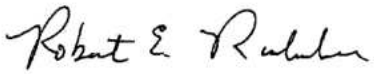
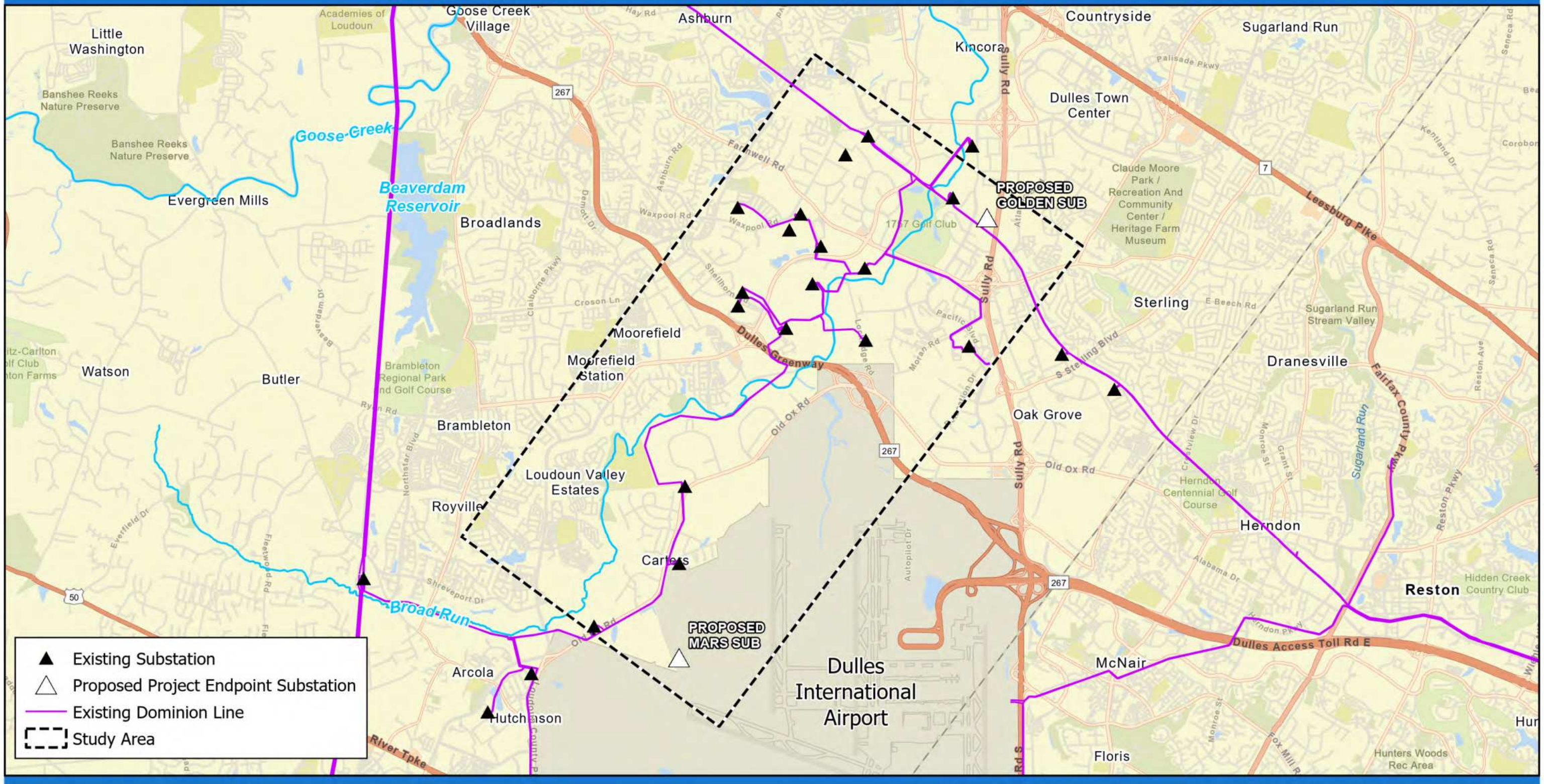
Sincerely,



Rob Richardson
Electric Transmission Communications

Project Study Area



Golden-Mars 500-230 kV Electric Transmission Project

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

L. Identify any environmental permits or special permissions anticipated to be needed.

Response: The permits or special permissions that are likely to be required for the proposed Project are listed below.

Potential Permits

Activity	Potential Permit	Agency/Organization
Impacts to wetlands and other waters of the U.S.	Nationwide Permit 57	U.S. Army Corps of Engineers
Impacts to wetlands and other waters of the U.S.	Virginia Water Protection Permit	Virginia Department of Environmental Quality
Discharge of stormwater from construction	Construction General Permit	Virginia Department of Environmental Quality
Aerial Water Crossing	Subaqueous Habitat Management Permit	Virginia Marine Resources Commission
Work within VDOT rights-of-way	Land Use Permit	Virginia Department of Transportation
Work within VDOT rights-of-way	Roadway Access Permit	Virginia Department of Transportation
Airspace obstruction evaluation	FAA 7460-1	Federal Aviation Administration/Metropolitan Washington Airports Authority

IV. HEALTH ASPECTS OF ELECTROMAGNETIC FIELDS ("EMF")

A. Provide the calculated maximum electric and magnetic field levels that are expected to occur at the edge of the ROW. If the new transmission line is to be constructed on an existing electric transmission line ROW, provide the present levels as well as the maximum levels calculated at the edge of ROW after the new line is operational.

Response: Public exposure to magnetic fields associated with high voltage power lines is best estimated by field levels calculated at annual average loading. For any day of the year, the EMF levels associated with average conditions provide the best estimate of potential exposure. Maximum (peak) values are less relevant as they may occur for only a few minutes or hours each year.

This section describes the levels of EMF associated with the proposed transmission lines. EMF levels are provided for future (2028) annual average and maximum (peak) loading conditions. The EMF values provided in this section were calculated based on the Company's proposed line characteristics of a typical span in both average and peak loading conditions.

Golden-Mars Lines (Existing Lines #2261, #2287, #2095, #2292, and #2218)[70] – Historical Average Loading

EMF levels were calculated for the existing lines at the ***historical average*** load condition (374 amps for Line #2261, 79 amps for Line #2287, 1,034 amps for Line #2095, 906 amps for Line #2292, and 980 amps for Line #2218) and at operating voltages of 242 kV for each 230 kV circuit when supported on the existing structures. See Attachments II.A.5.a and d.

These field levels were calculated at mid-span where the conductors are closest to the ground and the conductors are at a historical average load operating temperature.

EMF levels at the edge of the right-of-way for the existing lines at the historical average loading:

Existing Lines - Historical *Average* Loading (2025)				
	Left Edge ROW Per II.A.5 Drawing View		**Right Edge ROW Per II.A.5 Drawing View**	
Attachment	Electric Field (kV/m)	Magnetic Field (mG)	Electric Field (kV/m)	Magnetic Field (mG)
II.A.5.a	0.560	22.009	0.632	44.523
II.A.5.d	0.553	72.737	0.547	84.003

[70] *See supra*, n.4, regarding the Carters School Road Segment.

Golden-Mars Lines (Existing Lines #2261, #2287, #2095, #2292, and #2218)[71] – Historical Peak Loading

EMF levels were calculated for the existing lines at the ***historical peak*** load condition (624 amps for Line #2261, 132 amps for Line #2287, 1,724 amps for Line #2095, 1,511 amps for Line #2292, and 1,634 amps for Line #2218) and at operating voltages of 242 kV for each 230 kV circuit when supported on the existing structures. See Attachments II.A.5.a and d.

These field levels were calculated at mid-span where the conductors are closest to the ground and the conductors are at a historical peak load operating temperature.

EMF levels at the edge of the right-of-way for the existing lines at the historical peak loading:

Existing Lines - Historical *Peak* Loading (2025)				
	Left Edge ROW Per II.A.5 Drawing View		**Right Edge ROW Per II.A.5 Drawing View**	
Attachment	Electric Field (kV/m)	Magnetic Field (mG)	Electric Field (kV/m)	Magnetic Field (mG)
II.A.5.a	0.560	36.776	0.632	75.283
II.A.5.d	0.553	121.276	0.547	140.061

Proposed Project – Projected average loading in 2028

EMF levels were calculated for the Golden-Mars Lines, the Sojourner 230 kV Loop, and the Lockridge 230 kV Loop at the ***projected average*** load condition of 1,198 amps (Line #2218, 1,252 amps for Line #2095, 377 amps for Line #2261, 205 amps for Line #2287, 555 amps for Line #2292, 585 amps for Line #2427, 462 amps for Line #2413, 357 amps for Line #2412, and 961 amps for Line #5003) and at operating voltages of 242 kV for each 230 kV circuit and 525 kV for the 500 kV circuit when supported on the proposed structures. See Attachments II.A.5.b-e and f-i.

These field levels were calculated at mid-span where the conductors are closest to the ground and the conductors are at a projected average load operating temperature.

EMF levels at the edge of the rights-of-way for the Golden-Mars Lines, the Sojourner 230 kV Loop, and the Lockridge 230 kV Loop at the projected average loading:

[71] *See supra*, n.4, regarding the Carters School Road Segment.

Proposed Project - Projected *Average* Loading (2028)				
	Left Edge ROW Per II.A.5 Drawing View		**Right Edge ROW Per II.A.5 Drawing View**	
Attachment	Electric Field (kV/m)	Magnetic Field (mG)	Electric Field (kV/m)	Magnetic Field (mG)
II.A.5.b	0.905	30.371	2.288	39.291
II.A.5.c	2.499	64.660	2.320	57.263
II.A.5.e	2.099	59.170	0.273	114.574
II.A.5.f	2.959	51.466	3.054	54.810
II.A.5.g,h,i*	0.870	52.536	0.871	52.270
II.A.5.j	0.844	32.936	0.834	35.401

* For Attachments II.A.5.g, h, and i the EMF values provided are for the initial build conditions of a 100-foot-wide right-of-way (-50 foot and +50 foot offsets).

Proposed Project – Projected peak loading in 2028

EMF levels were calculated for the Golden-Mars Lines, the Sojourner 230 kV Loop, and the Lockridge 230 kV Loop at the ***projected peak*** load condition (1,997 amps for Line #2218, 2,087 amps for Line #2095, 628 amps for Line #2261, 342 amps for Line #2287, 925 amps for Line #2292, 975 amps for Line #2427, 770 amps for Line #2413, 595 amps for Line #2412, and 1,601 amps for Line #5003) and at operating voltages of 242 kV for each 230 kV circuit and 525 kV for the 500 kV circuit when supported on the proposed structures. See Attachments II.A.5.b-e and f-i.

These field levels were calculated at mid-span where the conductors are closest to the ground and the conductors are at a projected peak load operating temperature.

EMF levels at the edge of the rights-of-way for the Golden-Mars Lines, the Sojourner 230 kV Loop, and the Lockridge 230 kV Loop at the projected peak loading:

Proposed Project - Projected *Peak* Loading (2028)				
	Left Edge ROW Per II.A.5 Drawing View		**Right Edge ROW Per II.A.5 Drawing View**	
Attachment	Electric Field (kV/m)	Magnetic Field (mG)	Electric Field (kV/m)	Magnetic Field (mG)
II.A.5.b	0.905	50.613	2.281	65.453
II.A.5.c	2.499	108.241	2.320	96.060
II.A.5.e	2.099	95.148	0.273	153.780
II.A.5.f	2.956	85.756	3.050	91.327
II.A.5.g,h,i*	0.870	87.560	0.871	87.117
II.A.5.j	0.844	54.893	0.834	59.002

***** For Attachments II.A.5.g, h, and i the EMF values provided are for the initial build conditions of a 100-foot-wide right-of-way (-50 foot and +50 foot offsets).

IV. HEALTH ASPECTS OF ELECTROMAGNETIC FIELDS ("EMF")

B. If the Applicant is of the opinion that no significant health effects will result from the construction and operation of the line, describe in detail the reasons for that opinion and provide references or citations to supporting documentation.

Response: The conclusions of multidisciplinary scientific review panels assembled by national and international scientific agencies during the past few decades are the foundation of the Company's opinion that no adverse health effects are anticipated to result from the operation of the proposed Project. Each of these panels has evaluated the scientific research related to health and extremely low frequency ("ELF") EMF, also referred to as power-frequency (50/60 Hertz ("Hz")) EMF, and provided conclusions that form the basis of guidance to governments and industries. The Company regularly monitors the recommendations of these expert panels to guide their approach to EMF.

Research on EMF and human health varies widely in approach. Some studies evaluate the effects on biological responses of high, short-term EMF exposure not typically found in people's day-to-day lives, while others evaluate the effects of common, low EMF exposures found throughout communities. Studies also have evaluated the possibility of effects (*e.g.*, cancer, neurodegenerative diseases, and reproductive effects) of long-term exposure. Altogether, this research includes well over 100 epidemiologic studies of people in their natural environment and many more laboratory studies of animals (*in vivo*) and isolated cells and tissues (*in vitro*). Standard scientific procedures, such as weight-of-evidence methods, were used by the expert panels assembled by scientific agencies to identify, review, and summarize the results of this large and diverse research.

The reviews of ELF EMF-related biological and health research have been conducted by numerous scientific and health agencies, including, for example, the European Health Risk Assessment Network on Electromagnetic Fields Exposure ("EFHRAN"), the International Commission on Non-Ionizing Radiation Protection ("ICNIRP"), the World Health Organization ("WHO"), the IEEE's International Committee on Electromagnetic Safety ("ICES"), the Scientific Committee on Health, Environmental and Emerging Risks ("SCHEER") (formerly the Scientific Committee on Emerging and Newly Identified Health Risks ["SCENIHR"]) of the European Commission, and the Swedish Radiation Safety Authority ("SSM") (formerly the Swedish Radiation Protection Authority ["SSI"]) (WHO, 2007; SCENIHR, 2009, 2015; EFHRAN, 2010, 2012; ICNIRP, 2010; SSM, 2015, 2016, 2018, 2019, 2020, 2021, 2022; ICES, 2019; SCHEER, 2023). The general scientific consensus of the agencies that have reviewed this research, relying on generally accepted scientific methods, is that the scientific evidence does not confirm that common sources of EMF in the environment, including transmission lines and other parts of the electric system, appliances, etc., are a cause of any adverse health effects.

The most recent reviews on this topic include the 2015 and 2023 reports by

SCENIHR and SCHEER, respectively, and annual reviews published by SSM (i.e., for the years 2015 through 2022). These reports, similar to previous reviews, found that the scientific evidence does not confirm the existence of any adverse health effects caused by environmental or community exposure to EMF.

WHO has recommended that countries adopt recognized international standards published by ICNIRP and ICES. Typical levels of EMF from Dominion Energy Virginia's high voltage power lines outside its property and rights-of-way are far below the screening reference levels of EMF recommended for the general public and still lower than exposures equivalent to restrictions to limits on fields within the body (ICNIRP, 2010; ICES, 2019).

Thus, based on the conclusions of scientific reviews and the levels of EMF associated with the proposed Project, the Company has determined that no adverse health effects are anticipated to result from the operation of the proposed Project.

References

European Health Risk Assessment Network on Electromagnetic Fields Exposure (EFHRAN). Report on the Analysis of Risks Associated to Exposure to EMF: *In Vitro* and *In Vivo* (Animals) Studies. Milan, Italy: EFHRAN, 2010.

European Health Risk Assessment Network on Electromagnetic Fields Exposure (EFHRAN). Risk Analysis of Human Exposure to Electromagnetic Fields (Revised). Report D2 of the EFHRAN Project. Milan, Italy: EFHRAN, 2012.

International Commission on Non-ionizing Radiation Protection (ICNIRP). Guidelines for limiting exposure to time-varying electric and magnetic fields (1 Hz to 100 kHz). Health Phys 99: 818-36, 2010.

International Committee on Electromagnetic Safety (ICES). IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields 0 to 300 GHz. IEEE Std C95.1-2019. New York, NY: IEEE, 2019.

Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR). Health Effects of Exposure to EMF. Brussels, Belgium: European Commission, 2009.

Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR). Opinion on Potential Health Effects of Exposure to Electromagnetic Fields (EMF). Brussels, Belgium: European Commission, 2015.

Scientific Committee on Health, Environmental and Emerging Risks (SCHEER). Preliminary Opinion on Potential Health Effects of Exposure to Electromagnetic Fields (EMF): Update with regard to frequencies between 1Hz and 100 kHz. Brussels, Belgium: European Commission, 2023.

Swedish Radiation Safety Authority (SSM). Research 2015:19. Recent Research

on EMF and Health Risk - Tenth report from SSM's Scientific Council on Electromagnetic Fields. Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2015.

Swedish Radiation Safety Authority (SSM). Research 2016:15. Recent Research on EMF and Health Risk - Eleventh report from SSM's Scientific Council on Electromagnetic Fields, 2016. Including Thirteen years of electromagnetic field research monitored by SSM's Scientific Council on EMF and health: How has the evidence changed over time? Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2016.

Swedish Radiation Safety Authority (SSM). Research 2018:09. Recent Research on EMF and Health Risk - Twelfth report from SSM's Scientific Council on Electromagnetic Fields, 2017. Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2018.

Swedish Radiation Safety Authority (SSM). Research 2019:08. Recent Research on EMF and Health Risk – Thirteenth Report from SSM's Scientific Council on Electromagnetic Fields, 2018. Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2019.

Swedish Radiation Safety Authority (SSM). Research 2020:04. Recent Research on EMF and Health Risk – Fourteenth Report from SSM's Scientific Council on Electromagnetic Fields, 2019. Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2020.

Swedish Radiation Safety Authority (SSM). Research 2021:08. Recent Research on EMF and Health Risk – Fifteenth report from SSM's Scientific Council on Electromagnetic Fields, 2020. Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2021.

Swedish Radiation Safety Authority (SSM). Research 2022:16. Recent Research on EMF and Health Risk – Sixteenth report from SSM's Scientific Council on Electromagnetic Fields, 2021. Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2022.

World Health Organization (WHO). Environmental Health Criteria 238: Extremely Low Frequency (ELF) Fields. Geneva, Switzerland: World Health Organization, 2007.

IV. HEALTH ASPECTS OF ELECTROMAGNETIC FIELDS ("EMF")

C. Describe and cite any research studies on EMF the Applicant is aware of that meet the following criteria:

1. Became available for consideration since the completion of the Virginia Department of Health's most recent review of studies on EMF and its subsequent report to the Virginia General Assembly in compliance with 1985 Senate Joint Resolution No. 126;

2. Include findings regarding EMF that have not been reported previously and/or provide substantial additional insight into findings; and

3. Have been subjected to peer review.

Response: The Virginia Department of Health ("VDH") conducted its most recent review and issued its report on the scientific evidence on potential health effects of extremely low frequency ELF EMF in 2000: "[T]he Virginia Department of Health is of the opinion that there is no conclusive and convincing evidence that exposure to extremely low frequency EMF emanated from nearby high voltage transmission lines is causally associated with an increased incidence of cancer or other detrimental health effects in humans."[72]

The continuing scientific research on ELF EMF exposure and health has resulted in many peer-reviewed publications since 2000. The accumulating research results have been regularly and repeatedly reviewed and evaluated by national and international health, scientific, and government agencies, including most notably:

- WHO, which published one of the most comprehensive and detailed reviews of the relevant scientific peer-reviewed literature in 2007;
- SCHEER (formerly SCENIHR), a committee of the European Commission, which published its assessments in 2009, 2015 and 2023;
- The SSM, which has published annual reviews of the relevant peer-reviewed scientific literature since 2003, with its most recent review published in 2022; and,
- EFHRAN, which published its reviews in 2010 and 2012.

The above reviews provide detailed analyses and summaries of relevant recent peer-reviewed scientific publications. The conclusions of these reviews that the evidence overall does not confirm the existence of any adverse health effects due to exposure to EMF below scientifically established guideline values are consistent with the conclusions of the VDH report. With respect to the statistical association observed in some of the childhood leukemia epidemiologic studies, the most recent

[72] *See* http://www.vdh.virginia.gov/content/uploads/sites/12/2016/02/highfinal.pdf.

comprehensive review of the literature by SCENIHR, published in 2015, concluded that "no mechanisms have been identified and no support is existing [*sic*] from experimental studies that could explain these findings, which, together with shortcomings of the epidemiological studies prevent a causal interpretation" (SCENIHR, 2015, p. 16). In their 2023 Preliminary Opinion providing an update on the potential health effects of exposure to electromagnetic fields in the 1 Hz to 100 kilohertz ("kHz") range, SCHEER concluded that "overall, there is weak evidence concerning the association of ELF-MF [magnetic field] exposure with childhood leukaemia" (SCHEER 2023, p. 2).

While research is continuing on multiple aspects of EMF exposure and health, many of the recent publications have focused on an epidemiologic assessment of the relationship between EMF exposure and childhood leukemia and EMF exposure and neurodegenerative diseases. Of these, the following recent publications, published following the inclusion date (June 2014) for the SCENIHR (2015) report through March 2024, provide additional evidence and contribute to clarification of previous findings. Overall, new research studies have not provided evidence to alter the previous conclusions of scientific and health organizations, including WHO and SCENIHR.

Epidemiologic studies of EMF and childhood leukemia published during the above referenced period include:

- Bunch et al. (2015) assessed the potential association between residential proximity to high voltage underground cables and development of childhood cancer in the United Kingdom largely using the same epidemiologic data as in a previously published study on overhead transmission lines (Bunch et al., 2014). No statistically significant associations or trends were reported with either distance to underground cables or calculated magnetic fields from underground cables for any type of childhood cancers.

- Pedersen et al. (2015) published a case-control study that investigated the potential association between residential proximity to power lines and childhood cancer in Denmark. The study included all cases of leukemia (n=1,536), central nervous system tumors, and malignant lymphoma (n=417) diagnosed before the age of 15 between 1968 and 2003 in Denmark, along with 9,129 healthy control children matched on sex and year of birth. Considering the entire study period, no statistically significant increases were reported for any of the childhood cancer types.

- Salvan et al. (2015) compared measured magnetic-field levels in the bedroom for 412 cases of childhood leukemia under the age of 10 and 587 healthy control children in Italy. Although the statistical power of the study was limited because of the small number of highly exposed subjects, no consistent statistical associations or trends were reported between measured magnetic-field levels and the occurrence of leukemia among children in the study.

- Bunch et al. (2016) and Swanson and Bunch (2018) published additional

analyses using data from an earlier study (Bunch et al., 2014). Bunch et al. (2016) reported that the association with distance to power lines observed in earlier years was linked to calendar year of birth or year of cancer diagnosis, rather than the age of the power lines. Swanson and Bunch (2018) re-analyzed data using finer exposure categories (*e.g.*, cut-points of every 50-meter distance) and broader groupings of diagnosis date (*e.g.*, 1960-1979, 1980-1999, and 2000 and after) and reported no overall associations between exposure categories and childhood leukemia for the later periods (1980 and after), and consistent pattern for the periods prior to 1980.

- Crespi et al. (2016) conducted a case-control epidemiologic study of childhood cancers and residential proximity to high voltage power lines (60 kV to 500 kV) in California. Childhood cancer cases, including 5,788 cases of leukemia and 3,308 cases of brain tumor, diagnosed under the age of 16 between 1986 and 2008, were identified from the California Cancer Registry. Controls, matched on age and sex, were selected from the California Birth Registry. Overall, no consistent statistically significant associations for leukemia or brain tumor and residential distance to power lines were reported.

- Kheifets et al. (2017) assessed the relationship between calculated magnetic-field levels from power lines and development of childhood leukemia within the same study population evaluated in Crespi et al. (2016). In the main analyses, which included 4,824 cases of leukemia and 4,782 controls matched on age and sex, the authors reported no consistent patterns, or statistically significant associations between calculated magnetic-field levels and childhood leukemia development. Similar results were reported in subgroup and sensitivity analyses. In two subsequent studies, Amoon et al. (2018a, 2019) examined the potential impact of residential mobility (i.e., moving residences between birth and diagnosis) on the associations reported in Crespi et al. (2016) and Kheifets et al. (2017). Amoon et al. (2018a) concluded that changing residences was not associated with either calculated magnetic-field levels or proximity to the power lines, while Amoon et al. (2019) concluded that while uncontrolled confounding by residential mobility had some impact on the association between EMF exposure and childhood leukemia, it was unlikely to be the primary driving force behind the previously reported associations in Crespi et al. (2016) and Kheifets et al. (2017).

- Amoon et al. (2018b) conducted a pooled analysis of 29,049 cases and 68,231 controls from 11 epidemiologic studies of childhood leukemia and residential distance from high voltage power lines. The authors reported no statistically significant association between childhood leukemia and proximity to transmission lines of any voltage. Among subgroup analyses, the reported associations were slightly stronger for leukemia cases diagnosed before 5 years of age and in study periods prior to 1980. Adjustment for various potential confounders (*e.g.*, socioeconomic status, dwelling type, residential mobility) had little effect on the estimated associations.

- Kyriakopoulou et al. (2018) assessed the association between childhood acute leukemia and parental occupational exposure to social contacts, chemicals, and electromagnetic fields. The study was conducted at a major pediatric hospital in Greece and included 108 cases and 108 controls matched for age, gender, and ethnicity. Statistically non-significant associations were observed between paternal exposure to magnetic fields and childhood acute leukemia for any of the exposure periods examined (1 year before conception; during pregnancy; during breastfeeding; and from birth until diagnosis); maternal exposure was not assessed due to the limited sample size. No associations were observed between childhood acute leukemia and exposure to social contacts or chemicals.

- Auger et al. (2019) examined the relationship between exposure to EMF during pregnancy and risk of childhood cancer in a cohort of 784,000 children born in Quebec. Exposure was defined using residential distance to the nearest high voltage transmission line or transformer station. The authors reported statistically non-significant associations between proximity to transformer stations and any cancer, hematopoietic cancer, or solid tumors. No associations were reported with distance to transmission lines.

- Crespi et al. (2019) investigated the relationship between childhood leukemia and distance from high voltage lines and calculated magnetic-field exposure, separately and combined, within the California study population previously analyzed in Crespi et al. (2016) and Kheifets et al. (2017). The authors reported that neither close proximity to high voltage lines nor exposure to calculated magnetic fields alone were associated with childhood leukemia; an association was observed only for those participants who were both close to high voltage lines (< 50 meters) and had exposure to high calculated magnetic fields (≥ 0.4 microtesla ["μT"]) (i.e., ≥ 4 milligauss ["mG"]). No associations were observed with low-voltage power lines (< 200 kV). In a subsequent study, Amoon et al. (2020) examined the potential impact of dwelling type on the associations reported in Crespi et al. (2019). Amoon et al. (2020) concluded that while the type of dwelling at which a child resides (*e.g.*, single-family home, apartment, duplex, mobile home) was associated with socioeconomic status and race or ethnicity, it was not associated with childhood leukemia and did not appear to be a potential confounder in the relationship between childhood leukemia and magnetic-field exposure in this study population.

- Swanson et al. (2019) conducted a meta-analysis of 41 epidemiologic studies of childhood leukemia and magnetic-field exposure published between 1979 and 2017 to examine trends in childhood leukemia development over time. The authors reported that while the estimated risk of childhood leukemia initially increased during the earlier period, a statistically non-significant decline in estimated risk has been observed from the mid-1990s until the present (i.e., 2019).

- Talibov et al. (2019) conducted a pooled analysis of 9,723 cases and 17,099

controls from 11 epidemiologic studies to examine the relationship between parental occupational exposure to magnetic fields and childhood leukemia. No statistically significant association was found between either paternal or maternal exposure and leukemia (overall or by subtype). No associations were observed in the meta-analyses.

- Núñez-Enríquez et al. (2020) assessed the relationship between residential magnetic-field exposure and B-lineage acute lymphoblastic leukemia ("B-ALL") in children under 16 years of age in Mexico. The study included 290 cases and 407 controls matched on age, gender, and health institution; magnetic-field exposure was assessed through the collection of 24-hour measurements in the participants' bedrooms. While the authors reported some statistically significant associations between elevated magnetic-field levels and development of B-ALL, the results were dependent on the chosen cut-points.

- Seomun et al. (2021) performed a meta-analysis based on 33 previously published epidemiologic studies investigating the potential relationship between magnetic-field exposure and childhood cancers, including leukemia and brain cancer. For childhood leukemia, the authors reported statistically significant associations with some, but not all, of the chosen cut-points for magnetic-field exposure. The associations between magnetic-field exposure and childhood brain cancer were statistically non-significant. The study provided limited new insight as most of the studies included in the current meta-analysis, were included in previously conducted meta- and pooled analyses.

- Amoon et al. (2022) conducted a pooled analysis of four studies of residential exposure to magnetic fields and childhood leukemia published following a 2010 pooled analysis by Kheifets et al. (2010). The study by Amoon et al. (2022) compared the exposures of 24,994 children with leukemia to the exposures of 30,769 controls without leukemia in California, Denmark, Italy, and the United Kingdom. Exposure was assessed by measured or calculated magnetic fields at their residences. The exposure of these two groups to magnetic fields were found not to significantly differ. A decrease in the combined effect estimates in epidemiologic studies was observed over time, and the authors concluded that their findings, based on the most recent studies, were "not in line" with previous pooled analyses that reported an increased risk of childhood leukemia.

- Brabant et al. (2022) performed a literature review and meta-analysis of studies of childhood leukemia and magnetic-field exposure. The overall analysis included 21 epidemiologic studies published from 1979 to 2020. The authors reported a statistically significant association, which they noted was "mainly explained by the studies conducted before 2000." The authors reported a statistically significant association between childhood leukemia and measured or calculated magnetic-field exposures > 0.4 μT (4 mG); no statistically significant overall associations were reported between childhood leukemia and lower magnetic-field exposure (< 0.4 μT [4 mG]), residential distance from power lines, or wire coding configuration. An association between childhood

leukemia and electric blanket use was also reported. The overall results were likely influenced by the inclusion of a large number of earlier studies; 10 of the 21 studies in the main analysis were published prior to 2000. Studies published prior to 2000 included fewer studies deemed to be of higher study quality, as determined by the authors, compared to studies published after 2000.

- Nguyen et al. (2022) investigated whether potential pesticide exposure from living in close proximity to commercial plant nurseries confounds the association between magnetic-field exposure and childhood leukemia development reported within the California study population previously analyzed in Crespi et al. (2016) and Kheifets et al. (2017). The authors in Nguyen et al. (2022) noted that while the association between childhood leukemia and magnetic-field exposure was "slightly attenuated" after adjusting for nursery proximity or when restricting to subjects living > 300 meters from nurseries, their results "do not support plant nurseries as an explanation for observed childhood leukemia risks." The authors further noted that close residential proximity to nurseries may be an independent risk factor for childhood leukemia.

- Guo et al. (2023) reported conducting a systematic review and meta-analysis of studies published from 2015 to 2022 that evaluated associations between magnetic-field exposure and childhood leukemia development. Three meta-analyses were conducted to evaluate the relationship using different exposure metrics. In the first meta-analysis, magnetic-field levels ranging from 0.4 μT (4 mG) to 0.2 μT (2 mG) were associated with a statistically significant reduced risk of childhood leukemia development (i.e., a protective association). In the second meta-analysis, exposure was based on wiring configuration codes, and the reported pooled relative risk estimates demonstrated a statistically significant increased association with childhood leukemia. In the third meta-analysis, exposure was categorized into groupings of magnetic-field strength; no statistically significant associations with childhood leukemia were reported for any of the groupings, including for magnetic-field levels ≥ 0.4 μT (4 mG). There are significant limitations of this study that prevent meaningful interpretations of the results. Most of the analyses of magnetic fields did not state whether measurements and calculations were included, and the authors provided no description of the methods used for their analyses, no data tables to support their findings, and no references to the number and type of studies included. In fact, much of the article's introduction discusses ionized radiation. The authors also do not report relevant metrics for evaluating meta-analyses such as study heterogeneity.

- Malagoli et al. (2023) examined associations between exposure to magnetic fields from high voltage power lines (≥ 132 kV) and childhood leukemia development in a case-control study of children in Italy. The study included 182 cases diagnosed with childhood leukemia between 1998 and 2019 and 726 controls matched based on age, sex, and Italian province. The authors assessed magnetic-field exposure by calculating the distance from each participant's

residence to the nearest high voltage power line and classifying that distance into one of three exposed categories (participants living < 100 meters, 100 to < 200 meters, or 200 to < 400 meters from the power lines) or as unexposed (participants living ≥ 400 meters from the power lines). The authors reported a non-statistically significant association between childhood leukemia and a residence distance of <100 meters; no statistically significant associations were reported for any distance, including when stratifying by age (< 5 or ≥ 5 years) or when restricting to acute lymphoblastic leukemia (ALL).

- Nguyen et al. (2023) extended their previous investigation (Nguyen et al., 2022) into whether pesticide exposure was an independent risk factor or confounder for childhood leukemia in the presence of magnetic-field exposure from high voltage power lines by examining the potential impact of specific pesticide exposure factors (*e.g.*, intended use, chemical class, active ingredient). The authors found no statistically significant associations between distance to high voltage power lines or magnetic-field exposure and childhood leukemia, including when adjusting for pesticide exposures. Several of the examined pesticides were determined by the authors to be potential independent risk factors for childhood leukemia.

- Zagar et al. (2023) examined the relationship between magnetic fields and childhood cancers, including childhood leukemia, in Slovenia. Cancer cases, including 194 cases of leukemia, were identified from the Slovenian Cancer Registry; cases were then classified into one of five calculated magnetic-field exposure levels (ranging from < 0.1 μT [< 1 mG] to ≥ 0.4 μT [≥ 4 mG]) based on residential distance to high voltage (*e.g.*, 110-kV, 220-kV, and 400-kV) power lines. The authors reported that less than 1% of Slovenian children and adolescents lived in an area near high voltage power lines. No differences in the development of childhood cancers, including leukemia, brain tumors, or all cancers combined, were reported across the five exposure categories.

- Crespi et al. (2024) assessed the association between residential proximity to electricity transformers in multi-story residential buildings and childhood leukemia development in the International Transformer Exposure study. Participants were required to live in an apartment building that contained a built-in transformer; exposure was estimated using the participants' apartment location relative to the transformer and categorized as high exposure (located above or adjacent to the transformer), intermediate exposure (located on the same floor as apartments in the high exposure category), or unexposed (all other apartments). In the pooled analyses of five countries' data, a total of 74 cases and 20,443 controls were included; 18 of the 74 cases were identified in the intermediate or high exposure categories. No significant associations were reported between proximity to residential transformers and childhood leukemia. Sensitivity analyses performed using the data from one of the five countries (Finland) where a cohort study design was used, also reported no significant associations. The authors concluded that the evidence for an elevated risk of childhood leukemia from proximity to residential transformers was "weak."

- Duarte-Rodríguez et al. (2024) conducted a population-based case-control study to examine the geographical distribution of childhood ALL cases in Mexico City, Mexico. Cases and controls were geolocated using the most recent residential address, and a spatial scan statistic was used to detect spatial clusters of cancer cases. The authors identified eight spatial clusters of cases, representing nearly 40% of all cases included in the study (n=1,054 cases). The authors noted that six of the eight spatial clusters were located in proximity to high voltage power lines and high voltage electric installations (distances not specified), and that the remaining two clusters were located near former petrochemical industrial facility sites. Since the study did not directly assess magnetic-field exposure and made no conclusions about magnetic-field exposure and cancer development, this study adds little value to the existing literature regarding a potential association between exposure to ELF EMF and childhood leukemia development.

- Malavolti et al. (2024) examined the association between magnetic-field exposure from transformer stations and childhood leukemia in the same Italian study population as Malagoli et al. (2023). Magnetic-field exposure was estimated based on residential distance to the nearest transformer station, and participants were then categorized as exposed or unexposed using two different distance cut-points: residing within a radius of 15 or 25 meters from the transformer station (exposed); residing ≥ 15 meters or ≥ 25 meters from the transformer station (unexposed). No significant associations were reported for all leukemias, or ALL specifically, when either distance cut-point was used, and in fact no association at all (an odds ratio = 1.0) was observed when the more stringent cut-point of 15 meters was used. In sub-analyses that stratified by participant age (< 5 years vs. ≥ 5 years), no significant associations were reported for either age category.

Epidemiologic studies of EMF and neurodegenerative diseases published during the above referenced period include:

- Seelen et al. (2014) conducted a population-based case-control study in the Netherlands and included 1,139 cases diagnosed with amyotrophic lateral sclerosis ("ALS") between 2006 and 2013 and 2,864 frequency-matched controls. The shortest distance from the case and control residences to the nearest high voltage power line (50 to 380 kV) was determined by geocoding. No statistically significant associations between residential proximity to power lines with voltages of either 50 to 150 kV or 220 to 380 kV and ALS were reported.

- Sorahan and Mohammed (2014) analyzed mortality from neurodegenerative diseases in a cohort of approximately 73,000 electricity supply workers in the United Kingdom. Cumulative occupational exposure to magnetic-fields was calculated for each worker in the cohort based on their job titles and job locations. Death certificates were used to identify deaths from neurodegenerative diseases. No associations or trends for any of the included

neurodegenerative diseases (Alzheimer's disease, Parkinson's disease, and ALS) were observed with various measures of calculated magnetic fields.

- Koeman et al. (2015, 2017) analyzed data from the Netherlands Cohort Study of approximately 120,000 men and women who were enrolled in the cohort in 1986 and followed up until 2003. Lifetime occupational history, obtained through questionnaires, and job-exposure matrices on ELF magnetic fields and other occupational exposures were used to assign exposure to study subjects. Based on 1,552 deaths from vascular dementia, the researchers reported a statistically not significant association of vascular dementia with estimated exposure to metals, chlorinated solvents, and ELF magnetic fields. However, because no exposure-response relationship for cumulative exposure was observed and because magnetic fields and solvent exposures were highly correlated with exposure to metals, the authors attributed the association with ELF magnetic fields and solvents to confounding by exposure to metals (Koeman et al., 2015). Based on a total of 136 deaths from ALS among the cohort members, the authors reported a statistically significant, approximately two-fold association with ELF magnetic fields in the highest exposure category. This association, however, was no longer statistically significant when adjusted for exposure to insecticides (Koeman et al., 2017).

- Fischer et al. (2015) conducted a population-based case-control study that included 4,709 cases of ALS diagnosed between 1990 and 2010 in Sweden and 23,335 controls matched to cases on year of birth and sex. The study subjects' occupational exposures to ELF magnetic fields and electric shocks were classified based on their occupations, as recorded in the censuses and corresponding job-exposure matrices. Overall, neither magnetic fields nor electric shocks were related to ALS.

- Vergara et al. (2015) conducted a mortality case-control study of occupational exposure to electric shock and magnetic fields and ALS. They analyzed data on 5,886 deaths due to ALS and over 58,000 deaths from other causes in the United States between 1991 and 1999. Information on occupation was obtained from death certificates and job-exposure matrices were used to categorize exposure to electric shocks and magnetic fields. Occupations classified as "electric occupations" were moderately associated with ALS. The authors reported no consistent associations for ALS, however, with either electric shocks or magnetic fields, and they concluded that their findings did not support the hypothesis that exposure to either electric shocks or magnetic fields explained the observed association of ALS with "electric occupations."

- Pedersen et al. (2017) investigated the occurrence of central nervous system diseases among approximately 32,000 male Danish electric power company workers. Cases were identified through the national patient registry between 1982 and 2010. Exposure to ELF magnetic fields was determined for each worker based on their job titles and area of work. A statistically significant increase was reported for dementia in the high exposure category when

compared to the general population, but no exposure-response pattern was identified, and no similar increase was reported in the internal comparisons among the workers. No other statistically significant increases among workers were reported for the incidence of Alzheimer's disease, Parkinson's disease, motor neuron disease, multiple sclerosis, or epilepsy, when compared to the general population, or when incidence among workers was analyzed across estimated exposure levels.

- Vinceti et al. (2017) examined the association between ALS and calculated magnetic-field levels from high voltage power lines in Italy. The authors included 703 ALS cases and 2,737 controls; exposure was assessed based on residential proximity to high voltage power lines. No statistically significant associations were reported and no exposure-response trend was observed. Similar results were reported in subgroup analyses by age, calendar period of disease diagnosis, and study area.

- Checkoway et al. (2018) investigated the association between Parkinsonism[73] and occupational exposure to magnetic fields and several other agents (endotoxins, solvents, shift work) among 800 female textile workers in Shanghai. Exposure to magnetic fields was assessed based on the participants' work histories. The authors reported no statistically significant associations between Parkinsonism and occupational exposure to any of the agents under study, including magnetic fields.

- Gunnarsson and Bodin (2018) conducted a meta-analysis of occupational risk factors for ALS. The authors reported a statistically significant association between occupational exposures to EMF, estimated using a job-exposure matrix, and ALS among the 11 studies included. Statistically significant associations were also reported between ALS and jobs that involve working with electricity, heavy physical work, exposure to metals (including lead) and chemicals (including pesticides), and working as a nurse or physician. The authors reported some evidence for publication bias. In a subsequent publication, Gunnarsson and Bodin (2019) updated their previous meta-analysis to also include Parkinson's disease and Alzheimer's disease. A slight, statistically significant association was reported between occupational exposure to EMF and Alzheimer's disease; no association was observed for Parkinson's disease.

- Huss et al. (2018) conducted a meta-analysis of 20 epidemiologic studies of ALS and occupational exposure to magnetic fields. The authors reported a weak overall association; a slightly stronger association was observed in a subset analysis of six studies with full occupational histories available. The authors noted substantial heterogeneity among studies, evidence for publication

[73] Parkinsonism is defined by Checkoway et al. (2018) as "a syndrome whose cardinal clinical features are bradykinesia, rest tremor, muscle rigidity, and postural instability. Parkinson disease is the most common neurodegenerative form of [parkinsonism]" (p. 887).

bias, and a lack of a clear exposure-response relationship between exposure and ALS.

- Jalilian et al. (2018) conducted a meta-analysis of 20 epidemiologic studies of occupational exposure to magnetic fields and Alzheimer's disease. The authors reported a moderate, statistically significant overall association; however, they noted substantial heterogeneity among studies and evidence for publication bias.

- Röösli and Jalilian (2018) performed a meta-analysis using data from five epidemiologic studies examining residential exposure to magnetic fields and ALS. A statistically non-significant negative association was reported between ALS and the highest exposed group, where exposure was defined based on distance from power lines or calculated magnetic-field level.

- Gervasi et al. (2019) assessed the relationship between residential distance to overhead power lines in Italy and risk of Alzheimer's dementia and Parkinson's disease. The authors included 9,835 cases of Alzheimer's dementia and 6,810 cases of Parkinson's disease; controls were matched by sex, year of birth, and municipality of residence. A weak, statistically non-significant association was observed between residences within 50 meters of overhead power lines and both Alzheimer's dementia and Parkinson's disease, compared to distances of over 600 meters.

- Peters et al. (2019) examined the relationship between ALS and occupational exposure to both magnetic fields and electric shock in a pooled study of data from three European countries. The study included 1,323 ALS cases and 2,704 controls matched for sex, age, and geographic location; exposure was assessed based on occupational title and defined as low (background), medium, or high. Statistically significant associations were observed between ALS and ever having been exposed above background levels to either magnetic fields or electric shocks; however, no clear exposure-response trends were observed with exposure duration or cumulative exposure. The authors also noted significant heterogeneity in risk by study location.

- Filippini et al. (2020) investigated the associations between ALS and several environmental and occupational exposures, including electromagnetic fields, within a case-control study in Italy. The study included 95 cases and 135 controls matched on age, gender, and residential province; exposure to electromagnetic fields was assessed using the participants' responses to questions related to occupational use of electric and electronic equipment, occupational EMF exposure, and residential distance to overhead power lines. The authors reported a statistically significant association between ALS and residential proximity to overhead power lines and a statistically non-significant association between ALS and occupational exposure to EMF; occupational use of electric and electronic equipment was associated with a statistically non-significant decrease in ALS development.

- Huang et al. (2020) conducted a meta-analysis of 43 epidemiologic studies examining potential occupational risk factors for dementia or mild cognitive impairment. The authors included five cohort studies and seven case-control studies related to magnetic-field exposure. For both study types, the authors reported positive associations between dementia and work-related magnetic-field exposures. The paper, however, provided no information on the occupations held by the study participants, their magnetic-field exposure levels, or how magnetic-field levels were assessed; therefore, the results are difficult to interpret. The authors also reported a high level of heterogeneity among studies. Thus, this analysis adds little, if any, to the overall weight of evidence on a potential association between dementia and magnetic fields.

- Jalilian et al. (2020) conducted a meta-analysis of ALS and occupational exposure to both magnetic fields and electric shocks within 27 studies from Europe, the United States, and New Zealand. A weak, statistically significant association was reported between magnetic-field exposure and ALS; however, the authors noted evidence of study heterogeneity and publication bias. No association was observed between ALS and electric shocks.

- Chen et al. (2021) conducted a case-control study to examine the association between occupational exposure to electric shocks, magnetic fields, and motor neuron disease ("MND") in New Zealand. The study included 319 cases with a MND diagnosis (including ALS) and 604 controls, matched on age and gender; exposure was assessed using the participants' occupational history questionnaire responses and previously developed job-exposure matrices for electric shocks and magnetic fields. The authors reported no associations between MND and exposure to magnetic fields; positive associations were reported between MND and working at a job with the potential for electric shock exposure.

- Grebeneva et al. (2021) evaluated disease rates among electric power company workers in the Republic of Kazakhstan. The authors included three groups of "exposed" workers who "were in contact with equipment generating [industrial frequency EMF]" (a total of 161 workers), as well as 114 controls "who were not associated with exposure to electromagnetic fields." Disease rates were assessed "based on analyzing the sick leaves of employees" from 2010 to 2014 and expressed as "incidence rate per 100 employees." The authors reported a higher "incidence rate" of "diseases of the nervous system" in two of the exposed categories compared to the non-exposed group. No meaningful conclusions from the study could be drawn, however, because no specific diagnoses within "diseases of the nervous system" were identified in the paper and no clear description was provided on how the authors defined and calculated "incidence rate" for the evaluated conditions. In addition, no measured or calculated magnetic-field levels were presented by the authors.

- Filippini et al. (2021) conducted a meta-analysis to assess the dose-response relationship between residential exposure to magnetic fields and ALS. The

authors identified six ALS epidemiologic studies, published between 2009 and 2020, that assessed exposure to residential magnetic fields by either distance from overhead power lines or magnetic-field modeling. They reported a decrease in risk of ALS in the highest exposure categories for both distance-based and modeling-based exposure estimates. The authors also reported that their dose-response analyses "showed little association between distance from power lines and ALS"; the data were too sparse to conduct a dose-response analysis for modeled magnetic-field estimates. The authors noted that their study was limited by small sample size, "imprecise" exposure categories, the potential for residual confounding, and by "some publication bias."

- Jalilian et al. (2021) conducted a meta-analysis of occupational exposure to ELF magnetic fields and electric shocks and development of ALS. The authors included 27 studies from Europe, the United States, and New Zealand that were published between 1983 and 2019. A weak, statistically significant association was reported between magnetic-field exposure and ALS, and no association was observed between electric shocks and ALS. Indications of publication bias and "moderate to high" heterogeneity were identified for the studies of magnetic-field exposure and ALS, and the authors noted that "the results should be interpreted with caution."

- Goutman et al. (2022) examined occupational exposures, including "electromagnetic radiation" exposure, and associations with ALS in a case-control study of Michigan workers across various industries. The study included 381 cases diagnosed with ALS, all patients at the University of Michigan's Pranger ALS clinic, and 272 controls recruited from an online database for the University of Michigan. Participants were enrolled from 2010 to 2020 and completed a written survey of their work history and occupational exposures to nine exposure categories, including electromagnetic fields, particulate matter (PM), and pesticides. Exposure to electromagnetic fields was ascertained with a binary question asking whether they were "[e]xposed to power lines, transformation [*sic*] stations or other EM [electromagnetic radiation]?" The analysis was adjusted for age, sex, and military service. No association was observed between electromagnetic field exposure and ALS, while exposure to PM, pesticides, and metals, among others, were determined by the authors to be "associated with an increased ALS risk in this cohort."

- Sorahan and Nichols (2022) investigated magnetic-field exposure and mortality from MND in a large cohort of employees of the former Central Electricity Generating Board of England and Wales. The study included nearly 38,000 employees first hired between 1942 and 1982 and still employed in 1987. Estimates of exposure magnitude, frequency, and duration were calculated using data from the power stations and the employees' job histories, and were described in detail in a previous publication (Renew et al., 2003). Mortality from MND in the total cohort was observed to be similar to national rates. No statistically significant dose-response trends were observed with lifetime, recent, or distant magnetic-field exposure; statistically significant associations

were observed for some categories of recent exposure, but not for the highest exposure category.

- Duan et al. (2023) conducted a meta-summary of ALS and exposure to magnetic fields, which was 1 of 22 non-genetic risk factors evaluated across 67 studies for its association with ALS. Six of the 67 studies examined magnetic-field exposure and associations with ALS; of the six studies identified, the authors included four case-control studies and one cohort study in their meta-analysis. Pooling results from these studies resulted in significant increased odds of ALS among individuals with higher (but undefined) exposure to magnetic fields. However, this pooled odds ratio for magnetic-field exposure (1.22) was below the minimum odds ratio threshold of 1.3 set by the authors as the criterion for defining an exposure as an ALS risk factor. In addition, the authors identified "substantial" heterogeneity between studies evaluating magnetic-field exposure and ALS.

- In a subsequent publication of the same study as Goutman et al. (2022), Goutman et al. (2023) assessed the potential for the same nine exposure categories, including "electromagnetic radiation" exposure, to be risk factors for ALS progression, including survival and onset segment (bulbar, cervical, lumbar). Electromagnetic field exposure was not significantly associated with ALS survival or with bulbar onset compared to lumbar, but was significantly associated with cervical onset compared to lumbar. It is worth noting that an association with cervical onset compared to lumbar was observed in the majority (7/9) of the exposure categories. The authors make no concluding statements on electromagnetic field exposure and ALS and instead emphasize that occupational pesticide exposure and working in military operations were significantly associated with worse ALS survival.

- Saucier et al. (2023) carried out three systematic reviews of studies that evaluated relationships between urbanization, air pollution, and water pollution, and ALS development. The authors identified five studies that assessed whether electromagnetic fields (of varying frequencies) and high voltage infrastructure were significant urbanization risk factors for ALS, but make no conclusion about magnetic-field exposure and ALS development based on these studies, therefore adding little value to the existing literature.

- Vasta et al. (2023) examined the relationship between residential distance to power lines and ALS development in a cohort study of 1,098 participants in Italy. The authors reported no differences in the age of ALS onset or ALS progression rate between low-exposed and high-exposed participants based on residential distance to power lines at the time of the participants' diagnosis. Similarly, no differences were observed when exposure was based on residential distance to repeater antennas.

- Vitturi et al. (2023) conducted a systematic review and meta-analysis of case-control studies examining potential occupational risk factors related to multiple

sclerosis, including solvents, mercury, pesticides, and low-frequency magnetic fields. The authors included 24 studies in their review, but only one of the included studies investigated exposure to magnetic fields (Pedersen et al., 2017, discussed above), thereby adding little new information to the existing body of research.

References

Amoon AT, Oksuzyan S, Crespi CM, Arah OA, Cockburn M, Vergara X, Kheifets L. Residential mobility and childhood leukemia. Environ Res 164:459-466, 2018a.

Amoon AT, Crespi CM, Ahlbom A, Bhatnagar M, Bray I, Bunch KJ, Clavel J, Feychting M, Hemon D, Johansen C, Kreis C, Malagoli C, Marquant F, Pedersen C, Raaschou-Nielsen O, Röösli M, Spycher BD, Sudan M, Swanson J, Tittarelli A, Tuck DM, Tynes T, Vergara X, Vinceti M, Wunsch-Filho V, Kheifets L. Proximity to overhead power lines and childhood leukaemia: an international pooled analysis. Br J Cancer 119:364-373, 2018b.

Amoon AT, Arah OA, Kheifets L. The sensitivity of reported effects of EMF on childhood leukemia to uncontrolled confounding by residential mobility: a hybrid simulation study and an empirical analysis using CAPS data. Cancer Causes Control 30:901-908, 2019.

Amoon AT, Crespi CM, Nguyen A, Zhao X, Vergara X, Arah OA, and Kheifets L. The role of dwelling type when estimating the effect of magnetic fields on childhood leukemia in the California Power Line Study (CAPS). Cancer Causes Control 31:559-567, 2020.

Amoon AT, Swanson J, Magnani C, Johansen C, Kheifets L. Pooled analysis of recent studies of magnetic fields and childhood leukemia. Environ Res 204(Pt A):111993, 2022.

Auger N, Bilodeau-Bertrand M, Marcoux S, Kosatsky T. Residential exposure to electromagnetic fields during pregnancy and risk of child cancer: A longitudinal cohort study. Environ Res 176:108524, 2019.

Brabant C, Geerinck A, Beaudart C, Tirelli E, Geuzaine C, Bruyère O. Exposure to magnetic fields and childhood leukemia: a systematic review and meta-analysis of case-control and cohort studies. Rev Environ Health 38(2):229-253, 2022.

Bunch KJ, Keegan TJ, Swanson J, Vincent TJ, Murphy MF. Residential distance at birth from overhead high voltage powerlines: childhood cancer risk in Britain 1962-2008. Br J Cancer 110:1402-1408, 2014.

Bunch KJ, Swanson J, Vincent TJ, Murphy MF. Magnetic fields and childhood cancer: an epidemiological investigation of the effects of high voltage underground cables. J Radiol Prot 35:695-705, 2015.

Bunch KJ, Swanson J, Vincent TJ, Murphy MF. Epidemiological study of power lines and childhood cancer in the UK: further analyses. J Radiol Prot 36:437-455, 2016.

Checkoway H, Ilango S, Li W, Ray RM, Tanner CM, Hu SC, Wang X, Nielsen S, Gao DL, Thomas DB. Occupational exposures and parkinsonism among Shanghai women textile workers. Am J Ind Med 61:886-892, 2018.

Chen GX, Mannetje A, Douwes J, Berg LH, Pearce N, Kromhout H, Glass B, Brewer N, McLean DJ. Occupational exposure to electric shocks and extremely low-frequency magnetic fields and motor neurone disease. Am J Epidemiol 190(3):393-402, 2021.

Crespi CM, Vergara XP, Hooper C, Oksuzyan S, Wu S, Cockburn M, Kheifets L. Childhood leukaemia and distance from power lines in California: a population-based case-control study. Br J Cancer 115:122-128, 2016.

Crespi CM, Swanson J, Vergara XP, Kheifets L. Childhood leukemia risk in the California Power Line Study: Magnetic fields versus distance from power lines. Environ Res 171:530-535, 2019.

Crespi CM, Sudan M, Juutilainen J, Roivainen P, Hareuveny R, Huss A, Kandel S, Karim-Kos HE, Thuróczy G, Jakab Z, Spycher BD, Flueckiger B, Vermeulen R, Vergara X, Kheifets L. International study of childhood leukemia in residences near electrical transformer rooms. Environ Res 249:118459, 2024.

Duan QQ, Jiang Z, Su WM, Gu XJ, Wang H, Cheng YF, Cao B, Gao X, Wang Y, Chen YP. Risk factors of amyotrophic lateral sclerosis: a global meta-summary. Front Neurosci 17:1177431, 2023.

Duarte-Rodríguez DA, Flores-Lujano J, McNally RJQ, et al. Evidence of spatial clustering of childhood acute lymphoblastic leukemia cases in Greater Mexico City: report from the Mexican Inter-Institutional Group for the identification of the causes of childhood leukemia. Front Oncol 14:1304633, 2024.

European Health Risk Assessment Network on Electromagnetic Fields Exposure (EFHRAN). Report on the Analysis of Risks Associated to Exposure to EMF: *In Vitro* and *In Vivo* (Animals) Studies. Milan, Italy: EFHRAN, 2010.

European Health Risk Assessment Network on Electromagnetic Fields Exposure (EFHRAN). Risk Analysis of Human Exposure to Electromagnetic Fields (Revised). Report D2 of the EFHRAN Project. Milan, Italy: EFHRAN, 2012.

Filippini T, Tesauro M, Fiore M, Malagoli C, Consonni M, Violi F, Iacuzio L, Arcolin E, Oliveri Conti G, Cristaldi A, Zuccarello P, Zucchi E, Mazzini L, Pisano F, Gagliardi I, Patti F, Mandrioli J, Ferrante M, Vinceti M. Environmental and occupational risk factors of amyotrophic lateral sclerosis: A population-based case-control study. Int J Environ Res Public Health 17(8):2882, 2020.

Filippini T, Hatch EE, Vinceti M. Residential exposure to electromagnetic fields and risk of amyotrophic lateral sclerosis: a dose-response meta-analysis. Sci Rep 11(1):11939, 2021.

Fischer H, Kheifets L, Huss A, Peters TL, Vermeulen R, Ye W, Fang F, Wiebert P, Vergara XP, Feychting M. Occupational Exposure to Electric Shocks and Magnetic Fields and Amyotrophic Lateral Sclerosis in Sweden. Epidemiology 26:824-830, 2015.

Gervasi F, Murtas R, Decarli A, Giampiero Russo A. Residential distance from high voltage overhead power lines and risk of Alzheimer's dementia and Parkinson's disease: a population-based case-control study in a metropolitan area of Northern Italy. Int J Epidemiol 48(6):1949-1957, 2019.

Grebeneva OV, Rybalkina DH, Ibrayeva LK, Shadetova AZ, Drobchenko EA, Aleshina NY. Evaluating occupational morbidity among energy enterprise employees in industrial region of Kazakhstan. Russian Open Medical Journal 10(3):e0319, 2021.

Goutman SA, Boss J, Godwin C, Mukherjee B, Feldman EL, Batterman SA. Associations of self-reported occupational exposures and settings to ALS: a case-control study. Int Arch Occup Environ Health 95(7):1567-1586, 2022.

Goutman SA, Boss J, Godwin C, Mukherjee B, Feldman EL, Batterman SA. Occupational history associates with ALS survival and onset segment. Amyotroph Lateral Scler Frontotemporal Degener 24(3-4):219-229, 2023.

Gunnarsson LG and Bodin L. Amyotrophic lateral sclerosis and occupational exposures: A systematic literature review and meta-analyses. Int J Environ Res Public Health 15(11):2371, 2018.

Gunnarsson LG and Bodin L. Occupational exposures and neurodegenerative diseases: A systematic literature review and meta-analyses. Int J Environ Res Public Health 16(3):337, 2019.

Guo H, Kang L, Qin W, Li Y. Electromagnetic Radiation Exposure and Childhood Leukemia: Meta-Analysis and Systematic Review. Altern Ther Health Med 29(8):75-81, 2023.

Huang LY, Hu HY, Wang ZT, Ma YH, Dong Q, Tan L, Yu JT. Association of occupational factors and dementia or cognitive impairment: A systematic review and meta-analysis. J Alzheimers Dis 78(1):217-227, 2020.

Huss A, Peters S, Vermeulen R. Occupational exposure to extremely low-frequency magnetic fields and the risk of ALS: A systematic review and meta-analysis. Bioelectromagnetics 39:156-163, 2018.

Jalilian H, Teshnizi SH, Röösli M, Neghab M. Occupational exposure to extremely

low frequency magnetic fields and risk of Alzheimer disease: A systematic review and meta-analysis. Neurotoxicology 69:242-252, 2018.

Jalilian H, Najafi K, Khosravi Y, and Röösli M. Amyotrophic lateral sclerosis, occupational exposure to extremely low frequency magnetic fields and electric shocks: A systematic review and meta-analysis. Rev Environ Health 36(1):129-142, 2021.

Kheifets L, Crespi CM, Hooper C, Cockburn M, Amoon AT, Vergara XP. Residential magnetic fields exposure and childhood leukemia: a population-based case-control study in California. Cancer Causes Control 28:1117-1123, 2017.

Koeman T, Schouten LJ, van den Brandt PA, Slottje P, Huss A, Peters S, Kromhout H, Vermeulen R. Occupational exposures and risk of dementia-related mortality in the prospective Netherlands Cohort Study. Am J Ind Med 58:625-635, 2015.

Koeman T, Slottje P, Schouten LJ, Peters S, Huss A, Veldink JH, Kromhout H, van den Brandt PA, Vermeulen R. Occupational exposure and amyotrophic lateral sclerosis in a prospective cohort. Occup Environ Med 74: 578-585, 2017.

Kyriakopoulou A, Meimeti E, Moisoglou I, Psarrou A, Provatopoulou X, Dounias G. Parental Occupational Exposures and Risk of Childhood Acute Leukemia. Mater Sociomed 30: 209-214, 2018.

Malagoli C, Malavolti M, Wise LA, Balboni E, Fabbi S, Teggi S, Palazzi G, Cellini M, Poli M, Zanichelli P, Notari B, Cherubini A, Vinceti M, Filippini T. Residential exposure to magnetic fields from high voltage power lines and risk of childhood leukemia. Environ Res 232:116320, 2023.

Malavolti M, Malagoli C, Wise LA, Poli M, Notari B, Taddei I, Fabbi S, Teggi S, Balboni E, Pancaldi A, Palazzi G, Vinceti M, Filippini T. Residential exposure to magnetic fields from transformer stations and risk of childhood leukemia. Environ Res 245:118043, 2024.

Nguyen A, Crespi CM, Vergara X, Kheifets L. Commercial outdoor plant nurseries as a confounder for electromagnetic fields and childhood leukemia risk. Environ Res 212(Pt C):113446, 2022.

Nguyen A, Crespi CM, Vergara X, Kheifets L. Pesticides as a potential independent childhood leukemia risk factor and as a potential confounder for electromagnetic fields exposure. Environ Res 238(Pt 1):116899, 2023.

Núñez-Enríquez JC, Correa-Correa V, Flores-Lujano J, Pérez-Saldivar ML, Jiménez-Hernández E, Martín-Trejo JA, Espinoza-Hernández LE, Medina-Sanson A, Cárdenas-Cardos R, Flores-Villegas LV, Peñaloza-González JG, Torres-Nava JR, Espinosa-Elizondo RM, Amador-Sánchez R, Rivera-Luna R, Dosta-Herrera JJ, Mondragón-García JA, González-Ulibarri JE, Martínez-Silva SI, Espinoza-Anrubio G, Duarte-Rodríguez DA, García-Cortés LR, Gil-Hernández AE, Mejía-

Aranguré JM. Extremely low-frequency magnetic fields and the risk of childhood B-lineage acute lymphoblastic leukemia in a city with high incidence of leukemia and elevated exposure to ELF magnetic fields. Bioelectromagnetics 41(8):581-597, 2020.

Pedersen C, Johansen C, Schüz J, Olsen JH, Raaschou-Nielsen O. Residential exposure to extremely low-frequency magnetic fields and risk of childhood leukaemia, CNS tumour and lymphoma in Denmark. Br J Cancer 113:1370-1374, 2015.

Pedersen C, Poulsen AH, Rod NH, Frei P, Hansen J, Grell K, Raaschou-Nielsen O, Schüz J, Johansen C. Occupational exposure to extremely low-frequency magnetic fields and risk for central nervous system disease: an update of a Danish cohort study among utility workers. Int Arch Occup Environ Health 90:619-628, 2017.

Peters S, Visser AE, D'Ovidio F, Beghi E, Chio A, Logroscino G, Hardiman O, Kromhout H, Huss A, Veldink J, Vermeulen R, van den Berg LH. Associations of Electric Shock and Extremely Low-Frequency Magnetic Field Exposure With the Risk of Amyotrophic Lateral Sclerosis. Am J Epidemiol 188:796-805, 2019.

Renew DC, Cook RF, Ball MC. A method for assessing occupational exposure to power-frequency magnetic fields for electricity generation and transmission workers. J Radiol Prot 23(3):279-303, 2003.

Röösli M and Jalilian H. A meta-analysis on residential exposure to magnetic fields and the risk of amyotrophic lateral sclerosis. Rev Environ Health 33:295-299, 2018.

Salvan A, Ranucci A, Lagorio S, Magnani C. Childhood leukemia and 50 Hz magnetic fields: findings from the Italian SETIL case-control study. Int J Environ Res Public Health 12:2184-2204, 2015.

Saucier D, Registe PPW, Bélanger M, O'Connell C. Urbanization, air pollution, and water pollution: Identification of potential environmental risk factors associated with amyotrophic lateral sclerosis using systematic reviews. Front Neurol 14:1108383, 2023.

Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR). Health Effects of Exposure to EMF. Brussels, Belgium: European Commission, 2009.

Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR). Opinion on Potential Health Effects of Exposure to Electromagnetic Fields (EMF). Brussels, Belgium: European Commission, 2015.

Scientific Committee on Health, Environmental and Emerging Risks (SCHEER). Preliminary Opinion on Potential Health Effects of Exposure to Electromagnetic Fields (EMF): Update with regard to frequencies between 1Hz and 100 kHz.

Brussels, Belgium: European Commission, 2023.

Seelen M, Vermeulen RC, van Dillen LS, van der Kooi AJ, Huss A, de Visser M, van den Berg LH, Veldink JH. Residential exposure to extremely low frequency electromagnetic fields and the risk of ALS. Neurology 83:1767-1769, 2014.

Seomun G, Lee J, Park J. Exposure to extremely low-frequency magnetic fields and childhood cancer: A systematic review and meta-analysis. PLoS One 16:e0251628, 2021.

Sorahan T and Mohammed N. Neurodegenerative disease and magnetic field exposure in UK electricity supply workers. Occup Med (Lond) 64:454-460, 2014.

Sorahan T and Nichols L. Motor neuron disease risk and magnetic field exposures. Occup Med (Lond) 72(3):184-190, 2022.

Swanson J and Bunch KJ. Reanalysis of risks of childhood leukaemia with distance from overhead power lines in the UK. J Radiol Prot 38:N30-N35, 2018.

Swanson J, Kheifets L, and Vergara X. Changes over time in the reported risk for childhood leukaemia and magnetic fields. J Radiol Prot 39:470-488, 2019.

Swedish Radiation Safety Authority (SSM). Research 2019:08. Recent Research on EMF and Health Risk – Thirteenth Report from SSM's Scientific Council on Electromagnetic Fields, 2018. Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2019.

Talibov M, Olsson A, Bailey H, Erdmann F, Metayer C, Magnani C, Petridou E, Auvinen A, Spector L, Clavel J, Roman E, Dockerty J, Nikkila A, Lohi O, Kang A, Psaltopoulou T, Miligi L, Vila J, Cardis E, Schüz J. Parental occupational exposure to low-frequency magnetic fields and risk of leukaemia in the offspring: findings from the Childhood Leukaemia International Consortium (CLIC). Occup Environ Med 76:746-753, 2019.

Vasta R, Callegaro S, Grassano M, Canosa A, Cabras S, Di Pede F, Matteoni E, De Mattei F, Casale F, Salamone P, Mazzini L, De Marchi F, Moglia C, Calvo A, Chiò A, Manera U. Exposure to electromagnetic fields does not modify neither the age of onset nor the disease progression in ALS patients. Amyotroph Lateral Scler Frontotemporal Degener 24(3-4):343-346, 2023.

Vergara X, Mezei G, Kheifets L. Case-control study of occupational exposure to electric shocks and magnetic fields and mortality from amyotrophic lateral sclerosis in the US, 1991-1999. J Expo Sci Environ Epidemiol 25:65-71, 2015.

Vinceti M, Malagoli C, Fabbi S, Kheifets L, Violi F, Poli M, Caldara S, Sesti D, Violanti S, Zanichelli P, Notari B, Fava R, Arena A, Calzolari R, Filippini T, Iacuzio L, Arcolin E, Mandrioli J, Fini N, Odone A, Signorelli C, Patti F, Zappia M, Pietrini V, Oleari P, Teggi S, Ghermandi G, Dimartino A, Ledda C, Mauceri C,

Sciacca S, Fiore M, Ferrante M. Magnetic fields exposure from high voltage power lines and risk of amyotrophic lateral sclerosis in two Italian populations. Amyotroph Lateral Scler Frontotemporal Degener 18:583-589, 2017.

Vitturi BK, Montecucco A, Rahmani A, Dini G, Durando P. Occupational risk factors for multiple sclerosis: a systematic review with meta-analysis. Front Public Health 11:1285103, 2023.

World Health Organization (WHO). Environmental Health Criteria 238: Extremely Low Frequency (ELF) Fields. Geneva, Switzerland: World Health Organization, 2007.

Zagar T, Valic B, Kotnik T, Korat S, Tomsic S, Zadnik V, Gajsek P. Estimating exposure to extremely low frequency magnetic fields near high voltage power lines and assessment of possible increased cancer risk among Slovenian children and adolescents. Radiol Oncol 57(1):59-69, 2023.

V. NOTICE

A. Furnish a proposed route description to be used for public notice purposes. Provide a map of suitable scale showing the route of the proposed project. For all routes that the Applicant proposed to be noticed, provide minimum, maximum and average structure heights.

Response: The Project includes construction of a new overhead 500 kV single circuit transmission line and a new 230 kV single circuit transmission line between Dominion Energy Virginia's Golden and Mars Substations (the Golden-Mars Lines); a new overhead double circuit 230 kV transmission line that loops into the Company's Lockridge Substation (the Lockridge 230 kV Loop); a new overhead 230 kV double circuit transmission line that reconnects the Company's Mars Substation and Sojourner Substation (the Sojourner 230 kV Loop) and requires the removal and/or modification of certain existing structures; and related substation work.

A map is provided in Attachment V.A showing the overhead Proposed and Alternative Routes for the Golden-Mars Lines, Lockridge 230 kV Loop, and Sojourner 230 kV Loop. The map also includes the location of the related substations.

Importantly, note that Golden-Mars Routes 1, 2, 3, 4 cannot be constructed without Loudoun County Board of Supervisors (*i.e.*, the County or BOS) and/or Loudoun County School Board (*i.e.*, the LCSB) approval. While Golden-Mars Route 5 is the most impactful of all of the noticed Golden-Mars routes, it is the only currently viable Golden-Mars route because it does not cross public lands and easements except for a <0.1-acre portion of BOS-owned property that the County indicated verbally was acceptable to cross. Golden-Mars Route 4 is the least impactful route and is the County's preferred route; however, Golden-Mars Route 3 is the second least impactful route and is the County's secondary route preference. While LCSB voted against all overhead routes (8-1) that impact LCSB property on March 25, 2025, Golden-Mars Route 3 remains the second least impactful route overall, the County's secondary route preference, and the route that the Company believes to be least impactful to LCSB property. Accordingly, the Company supports Route 3 as the Golden-Mars Proposed Route and remains committed to continuing to work with the LCSB to obtain timely consent for Route 3. No less than two weeks prior to the deadline for Respondent testimony established by the Commission in the Order for Notice and Hearing entered in this proceeding, the Company will file a notification in the docket indicating whether the Company has received LCSB consent for the Golden-Mars Route 3's crossings of LCSB property; if not, the Company's notification will change the Golden-Mars Proposed Route to Golden-Mars Alternative Route 5 as the only viable route.

A written description of the Project's Proposed and Alternative Routes are as follows:

GOLDEN-MARS LINES

Golden-Mars Proposed Route (Route 3)

The Proposed Route (Route 3) of the Golden-Mars Lines is approximately 8.3 miles in length. The route originates at Golden Substation located between Pacific Boulevard and Sully Road north of the Washington and Old Dominion ("W&OD") Trail. The route exits the substation to the south, crosses the W&OD Trail, then turns west to cross Pacific Boulevard. The route then turns south and parallels Pacific Boulevard before crossing Waxpool Road where it turns west to parallel existing transmission lines on the south side of Waxpool Road. The route continues across Broad Run before turning southwest where it parallels existing transmission lines and crosses Broad Run twice before crossing the Dulles Greenway. The route continues southwest where it parallels existing transmission lines adjacent to Broad Run. North of Rock Ridge High School, the route turns west, crosses Broad Run three times before turning south and crossing Loudoun Reserve Drive. The route continues south through Broad Run Stream Valley Park and across Overland Road. The route turns east and parallels the north side of Old Ox Road then turns south along Carters School Road before terminating at Mars Substation near Carters School Road.

The Proposed Route (Route 3) of the Golden-Mars Lines will be constructed on almost entirely new right-of-way primarily varying between 100 and 150 feet in width in order to accommodate a new 500 kV line and a new 230 kV line on either double circuit three-pole or H-frame structures or double circuit two-pole or monopole structures with a minimum structure height of approximately 110 feet, a maximum height of 180 feet, and an average structure height of approximately 154 feet, based on preliminary conceptual design, not including foundation reveal, and subject to change based on final engineering design.

Golden-Mars Alternative Route 1

Alternative Route 1 of the Golden-Mars Lines is approximately 9.4 miles in length. The route originates at Golden Substation located between Pacific Boulevard and Sully Road north of the W&OD Trail. The route exits the substation to the south, crosses the W&OD Trail, then turns west to cross Pacific Boulevard. The route then turns south and parallels Pacific Boulevard before crossing Waxpool Road where it turns west to parallel existing transmission lines on the south side of Waxpool Road. The route continues across Broad Run before turning southwest where it parallels existing transmission lines and crosses Broad Run twice before crossing the Dulles Greenway. The route turns northwest and follows the south side of the Dulles Greenway before turning west to parallel the south side of Loudoun County Parkway. The route briefly crosses to the north side of Loudoun County Parkway, then back south, and parallels the west side of Loudoun County Parkway from Gleedsville Manor Drive south to Evergreen Ridge Drive. After crossing Evergreen Ridge Drive, the route turns southeast, crosses Broad Run, and turns east to parallel the north side of Old Ox Road. The route then turns south along Carters School Road before terminating at Mars Substation near Carters

School Road.

Alternative Route 1 of the Golden-Mars Lines will be constructed on almost entirely new right-of-way primarily varying between 100 and 150 feet in width in order to accommodate a new 500 kV line and a new 230 kV line on either double circuit three-pole or H-frame structures or double circuit two-pole or monopole structures with a minimum structure height of approximately 110 feet, a maximum height of 185 feet, and an average structure height of approximately 156 feet, based on preliminary conceptual design, not including foundation reveal, and subject to change based on final engineering design.

Golden-Mars Alternative Route 2

Alternative Route 2 of the Golden-Mars Lines is approximately 9.3 miles in length. The route originates at Golden Substation located between Pacific Boulevard and Sully Road north of the W&OD Trail. The route exits the substation to the south, crosses the W&OD Trail, then turns west to cross Pacific Boulevard. The route then turns south and parallels Pacific Boulevard before crossing Waxpool Road where it turns west to parallel existing transmission lines on the south side of Waxpool Road. The route continues across Broad Run before turning southwest where it parallels existing transmission lines and crosses Broad Run twice before crossing the Dulles Greenway. The route continues southwest where it parallels existing transmission lines adjacent to Broad Run. North of Rock Ridge High School, the route turns west, crosses Broad Run three times before reaching Loudoun County Parkway. The route continues south and parallels the west side of Loudoun County Parkway past Evergreen Ridge Drive. After crossing Evergreen Ridge Drive, the route turns southeast, crosses Broad Run, and turns east to parallel the north side of Old Ox Road. The route then turns south along Carters School Road before terminating at Mars Substation near Carters School Road.

Alternative Route 2 of the Golden-Mars Lines will be constructed on almost entirely new right-of-way primarily varying between 100 and 150 feet in width in order to accommodate a new 500 kV line and a new 230 kV line on either double circuit three-pole or H-frame structures or double circuit two-pole or monopole structures with a minimum structure height of approximately 110 feet, a maximum height of 180 feet, and an average structure height of approximately 154 feet, based on preliminary conceptual design, not including foundation reveal, and subject to change based on final engineering design.

Golden-Mars Alternative Route 4

Alternative Route 4 of the Golden-Mars Lines is approximately 8.3 miles in length. The route originates at Golden Substation located between Pacific Boulevard and Sully Road north of the W&OD Trail. The route exits the substation to the south, crosses the W&OD Trail, then turns west to cross Pacific Boulevard. The route then turns south and parallels Pacific Boulevard before crossing Waxpool Road where it turns west to parallel existing transmission lines on the south side of Waxpool Road. The route continues across Broad Run before turning southwest

where it parallels existing transmission lines and crosses Broad Run twice before crossing the Dulles Greenway. The route continues southwest where it parallels existing transmission lines adjacent to Broad Run. North of Rock Ridge High School, the route turns south and continues to parallel existing transmission lines before turning west along Loudoun Reserve Drive. The route then turns south through Broad Run Stream Valley Park and across Overland Road. The route turns east and parallels the north side of Old Ox Road then turns south along Carters School Road before terminating at Mars Substation near Carters School Road.

Alternative Route 4 of the Golden-Mars Lines will be constructed on almost entirely new right-of-way primarily varying between 100 and 150 feet in width in order to accommodate a new 500 kV line and a new 230 kV line on either double circuit three-pole or H-frame structures or double circuit two-pole or monopole structures with a minimum structure height of approximately 110 feet, a maximum height of 180 feet, and an average structure height of approximately 155 feet, based on preliminary conceptual design, not including foundation reveal, and subject to change based on final engineering design.

Golden-Mars Alternative Route 5

Alternative Route 5 of the Golden-Mars Lines is approximately 9.8 miles in length. The route originates at Golden Substation located between Pacific Boulevard and Sully Road north of the W&OD Trail. The route exits the substation to the south, crosses the W&OD Trail, then turns west to cross Pacific Boulevard. The route then turns south and parallels Pacific Boulevard before crossing Waxpool Road where it turns west to parallel existing transmission lines on the south side of Waxpool Road. The route continues across Broad Run before turning southwest where it parallels existing transmission lines and crosses Broad Run twice before crossing the Dulles Greenway. The route turns northwest and follows the south side of the Dulles Greenway before turning west to parallel the south side of Loudoun County Parkway. The route briefly crosses to the north side of Loudoun County Parkway, then back south, and parallels the west side of Loudoun County Parkway past Gleedsville Manor Drive then turns west to parallel the north side of Ryan Road. Near Claiborne Parkway, the route turns south to rejoin Loudoun County Parkway and continues south to Evergreen Ridge Drive. After crossing Evergreen Ridge Drive, the route turns southeast, crosses Broad Run, and turns east to parallel the north side of Old Ox Road. The route then turns south along Carters School Road before terminating at Mars Substation near Carters School Road.

Alternative Route 5 of the Golden-Mars Lines will be constructed on almost entirely new right-of-way primarily varying between 100 and 150 feet in width in order to accommodate a new 500 kV line and a new 230 kV line on either double circuit three-pole or H-frame structures or double circuit two-pole or monopole structures with a minimum structure height of approximately 110 feet, a maximum height of 185 feet, and an average structure height of approximately 157 feet, based on preliminary conceptual design, not including foundation reveal, and subject to change based on final engineering design.

LOCKRIDGE 230 KV LOOP

Lockridge Loop Proposed Route

The Lockridge Loop Proposed Route is approximately 0.6 mile in length. The route originates approximately 0.3 mile north of the Dulles Greenway and 0.2 mile east of Shellhorn Road where it ties into the proposed 230 kV Golden-Mars Line at Structure #2412/8. The route travels east from the proposed 500-230 kV Golden-Mars Lines corridor and crosses Broad Run and Lockridge Road before looping in and out of the Lockridge Substation, located east of Lockridge Road approximately 0.2 mile south of Prentice Drive.

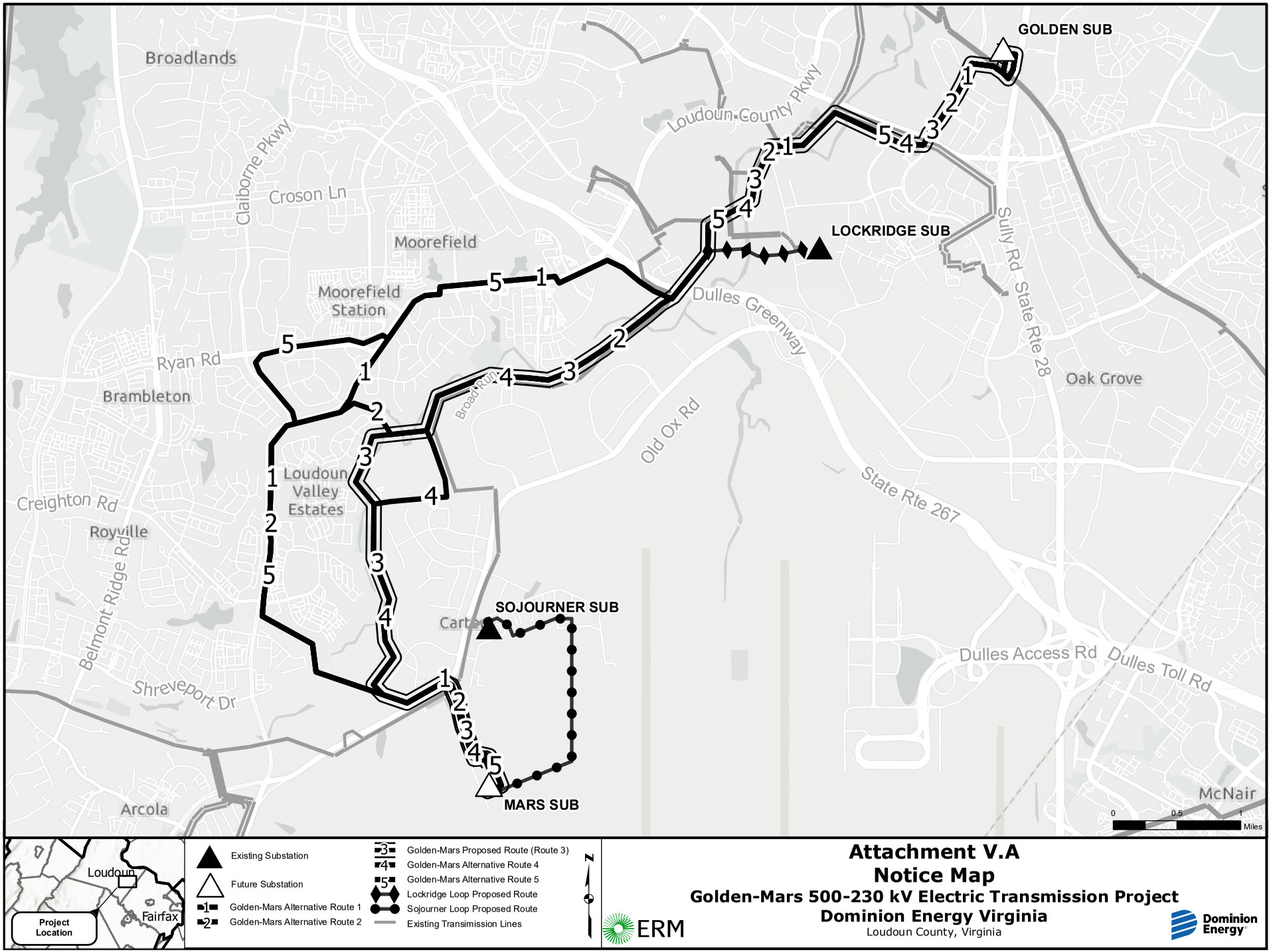
The Lockridge Loop Proposed Route will be constructed on new 100-foot-wide right-of-way in order to accommodate double circuit monopole structures with a minimum structure height of approximately 100 feet, a maximum height of 120 feet, and an average structure height of approximately 112 feet, based on preliminary conceptual design, not including foundation reveal, and subject to change based on final engineering design. Note that the minimum and average structure heights exclude one approximately 55-foot-tall structure that would have created a downward bias in the overall average height of the Lockridge Loop Proposed Route (approximately 104 feet).

SOJOURNER 230 KV LOOP

Sojourner Loop Proposed Route

The Sojourner Loop Proposed Route is approximately 1.9 miles in length. The route originates at Sojourner Substation between Beaver Meadow Road and Digital Dulles Drive. The route travels east before turning south to parallel the western perimeter of Washington Dulles International Airport. The route then turns west, terminating at Golden Substation near Carters School Road.

The Sojourner Loop Proposed Route will be constructed on new 100-foot-wide right-of-way in order to accommodate double circuit monopole structures with a minimum structure height of approximately 95 feet, a maximum height of 120 feet, and an average structure height of approximately 106 feet, based on preliminary conceptual design, not including foundation reveal, and subject to change based on final engineering design. Note that the minimum and average structure heights exclude one approximately 50-foot-tall structure that would have created a downward bias in the overall average height of the Sojourner Loop Proposed Route (approximately 104 feet).


GOLDEN SUB
LOCKRIDGE SUB
SOJOURNER SUB
MARS SUB
Broadlands
Claiborne Pkwy
Croson Ln
Loudoun County Pkwy
Moorefield
Moorefield Station
Ryan Rd
Brambleton
Broad Run
Dulles Greenway
Sully Rd - State Rte 28
Oak Grove
Old Ox Rd
State Rte 267
Loudoun Valley Estates
Creighton Rd
Royville
Belmont Ridge Rd
Shreveport Dr
Dulles Access Rd
Dulles Toll Rd
McNair
Arcola
0
0.5
1
Miles
Loudoun
Fairfax
Project Location
Existing Substation
Future Substation
Golden-Mars Alternative Route 1
Golden-Mars Alternative Route 2
Golden-Mars Proposed Route (Route 3)
Golden-Mars Alternative Route 4
Golden-Mars Alternative Route 5
Lockridge Loop Proposed Route
Sojourner Loop Proposed Route
Existing Transimission Lines
N
ERM
Attachment V.A
Notice Map
Golden-Mars 500-230 kV Electric Transmission Project
Dominion Energy Virginia
Loudoun County, Virginia
Dominion Energy

V. NOTICE

B. List Applicant offices where members of the public may inspect the application. If applicable, provide a link to website(s) where the application may be found.

Response: Shortly after filing, the Application will be made available electronically for public inspection at: www.dominionenergy.com/NOVA.

V. NOTICE

C. List all federal, state, and local agencies and/or officials that may reasonably be expected to have an interest in the proposed construction and to whom the Applicant has furnished or will furnish a copy of the application.

Response:

Ms. Bettina Rayfield
Virginia Department of Environmental Quality
Office of Environmental Impact Review
1111 East Main Street, Suite 1400
Richmond, Virginia 23219
bettina.rayfield@deq.virginia.gov

Ms. Michelle Henicheck
Virginia Department of Environmental Quality
Office of Wetlands and Streams
1111 East Main Street, Suite 1400
Richmond, Virginia 23219

Ms. Rene Hypes
Virginia Department of Conservation and Recreation
Division of Natural Heritage
600 East Main Street, 24th Floor
Richmond, Virginia 23219

Environmental Reviewer
Virginia Department of Conservation and Recreation
Planning & Recreation Bureau
600 East Main Street, 17th Floor
Richmond, Virginia 23219

Ms. Hannah Schul
Virginia Department of Wildlife Resources
Wildlife Information and Environmental Services
7870 Villa Park, Suite 400
Henrico, Virginia 23228

Mr. Keith Tignor
Virginia Department of Agriculture and Consumer Services
Office of Plant Industry Services
102 Governor Street
Richmond, Virginia 23219

Mr. Clint Folks
Virginia Department of Forestry
Forestland Conservation Division
900 Natural Resources Drive, Suite 800
Charlottesville, Virginia 22903

Scoping at VMRC
Virginia Marine Resources Commission
Habitat Management Division
Building 96, 380 Fenwick Road
Ft. Monroe, Virginia 23651

Mr. Troy Andersen
U.S. Fish and Wildlife Service
Virginia Field Office, Ecological Services
6669 Short Lane
Gloucester, Virginia 23061

Ms. Regena Bronson
U.S. Army Corps of Engineers
Fredericksburg Field Office
1420 Central Park Boulevard
Fredericksburg, Virginia 22401

Ms. Arlene Fields Warren
Virginia Department of Health
Office of Drinking Water
109 Governor Street, 6th Floor
Richmond, Virginia 23219

Mr. Roger Kirchen
Department of Historic Resources
Review and Compliance Division
2801 Kensington Avenue
Richmond, Virginia 23221

Ms. Martha Little
Virginia Outdoors Foundation
39 Garrett Street St. 200
Warrenton, Virginia 20186

Mike Helvey
Obstruction Evaluation Group Manager
Federal Aviation Administration, FAA Eastern Regional Office
800 Independence Ave, SW, Room 400 East
Washington, DC 20591

Mr. Scott Denny
Virginia Department of Aviation
Airport Services Division
5702 Gulfstream Road
Richmond, Virginia 23250

Mr. John D. Lynch
Northern Virginia District Engineer
Virginia Department of Transportation, Northern Virginia District Office
4975 Alliance Drive
Fairfax, Virginia 22030

Mr. Marc Cioffi
Land Use Permits Manager
Virginia Department of Transportation, Northern Virginia District Office
4975 Alliance Drive
Fairfax, Virginia 22030

Mr. Tim Hemstreet
County Administrator
Loudoun County
P.O. Box 7000
Leesburg, Virginia 20177-7000

Supervisor Matt Letourneau
Loudoun County – Dulles District
P.O. Box 7000
Leesburg, Virginia 20177-7000

Supervisor Phyllis J. Randall
Loudoun County – Chair At-Large
P.O. Box 7000
Leesburg, Virginia 20177-7000

Supervisor Laura A. TeKrony
Loudoun County – Little River District
P.O. Box 7000
Leesburg, Virginia 20177-7000

Supervisor Koran T. Saines
Loudoun County – Sterling District
P.O. Box 7000
Leesburg, Virginia 20177-7000

Supervisor Sylvia R. Glass
Loudoun County – Broad Run District
P.O. Box 7000
Leesburg, Virginia 20177-7000

V. NOTICE

D. If the application is for a transmission line with a voltage of 138 kV or greater, provide a statement and any associated correspondence indicating that prior to the filing of the application with the SCC the Applicant has notified the chief administrative officer of every locality in which it plans to undertake construction of the proposed line of its intention to file such an application, and that the Applicant gave the locality a reasonable opportunity for consultation about the proposed line (similar to the requirements of § 15.2-2202 of the Code for electric transmission lines of 150 kV or more).

Response: In accordance with Va. Code § 15.2-2202 E, a letter dated February 12, 2025, was sent to Tim Hemstreet, Administrator of Loudoun County, where the Project is located. The letter stated the Company's intention to file this Application and invited the County to consult with the Company about the Project. This letter is included as Attachment V.D.1. See Attachment V.D.2 for a letter dated March 25, 2025, from Loudoun County's Department of Planning and Zoning that the Company received with comments on the proposed Project that the Company received in response.

Dominion Energy Virginia
5000 Dominion Blvd, 3rd Floor, Glen Allen, Virginia 23060

February 12, 2025

Tim Hemstreet
Loudoun County Administrator
1 Harrison St., SE
Leesburg, VA 20175

RE: Dominion Energy Virginia's Proposed 500 kV and 230 kV Golden-Mars Lines, Lockridge 230 kV Loop, Sojourner 230 kV Loop, and Related Projects
Notice Pursuant to Va. Code § 15.2-2202 E

Dear Mr. Hemstreet:

Dominion Energy Virginia (the "Company") is proposing to construct a new overhead 500 kilovolt ("kV") single circuit transmission line and a new 230 kV single circuit transmission line that connects the Company's Golden and Mars Substations (the "Golden-Mars Lines"), a new overhead 230 kV double circuit transmission line that loops into the Company's Lockridge Substation (the "Lockridge 230 kV Loop"), a new overhead 230 kV double circuit transmission line that reconnects the Company's Mars and Sojourner Substations (the "Sojourner 230 kV Loop"), and substation-related work in Loudoun County, Virginia (collectively, the "Project").

The Project is needed in order to relieve identified violations of mandatory North American Electric Reliability Corporation Reliability Standards, to reconnect the Mars and Sojourner Substations along a route that will allow the Company to interconnect future load, and to maintain the structural integrity and reliability of its transmission system.

The Company is in the process of preparing an application for a certificate of public convenience and necessity ("CPCN") from the State Corporation Commission (the "Commission"). As part of the route selection process and in preparation for filing the CPCN, the Company began outreach with Loudoun County in May 2024, regarding the potential crossing of lands and easements owned and/or managed by the Loudoun County Board of Supervisors ("BOS") and Loudoun County School Board ("LCSB"). As a result of those outreach efforts, the Company understands that on January 22, 2025, the BOS approved a measure identifying Golden-Mars Alternative Route 4 as the County's preferred route and Golden-Mars Alternative Route 3 as the County's secondary route preference, and proposing to communicate with LCSB to request LCSB's support of either Golden-Mars Alternative Routes 3 or 4. The Company understands that as of the date of this letter, LCSB is still evaluating the Golden-Mars Lines route alternatives. In an effort to continue discussions with the County, the Company respectfully requests

that you submit any additional comments or information regarding the proposed Project that you may have as soon as available.

Enclosed is a Project Overview Map depicting the Project's route alternatives for the Golden-Mars Lines, the Lockridge 230 kV Loop, and the Sojourner 230 kV Loop, as well as the general Project location. All final materials, including maps, will be available in the Company's CPCN filing to the Commission.

If you would like to receive a GIS shapefile of the transmission line routes to assist in the project review or if there are any questions, please do not hesitate to contact me at (804) 201-3053 or greg.r.baka@dominionenergy.com.

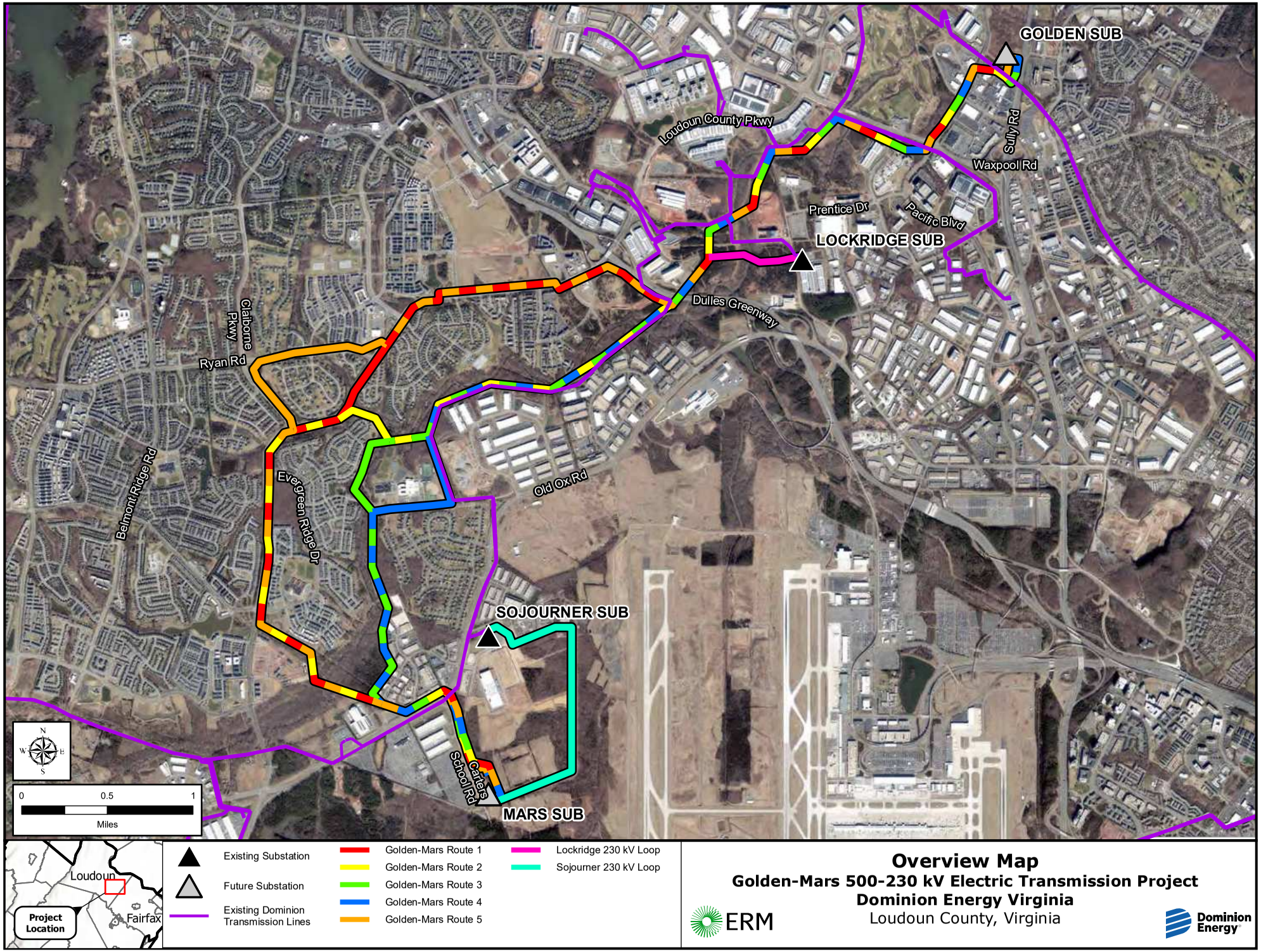
Dominion Energy Virginia appreciates your assistance with this project review and looks forward to any additional comments or information you may have to offer.

Sincerely,

Greg Baka

Greg Baka
Local Permitting Consultant

Attachment: Project Overview Map



Overview Map

Golden-Mars 500-230 kV Electric Transmission Project

Dominion Energy Virginia

Loudoun County, Virginia

ERM

Dominion Energy

LOUDOUN COUNTY VIRGINIA | Planning and Zoning

1 Harrison Street, SE, PO Box 7000, Leesburg, VA 20177-7000
703-777-0246 O | 703-777-0441 F | dpz@loudoun.gov
loudoun.gov/planningandzoning

March 25, 2025

Greg Baka, Local Permitting Consultant
Dominion Energy Virginia
5000 Dominion Blvd, 3rd Floor
Glen Allen, VA 23060

Re: **Dominion Energy Virginia's Proposed 500-230kV Golden to Mars Transmission Line, 230kV Lockridge and Sojourner Loops, and Related Project, Loudoun County, Virginia, Notice Pursuant to VA Code 15.2-2202 E.**

Mr. Baka:

Enclosed are Loudoun County's Department of Planning and Zoning (DPZ) comments regarding Dominion Energy Virginia's (Dominion) Proposed 500-230kV Golden to Mars Transmission Line and 230kV Lockridge and Sojourner Loops.

Loudoun County's (County) understanding is that the proposed electrical transmission lines are needed to meet current and future electrical demand for the area, and to comply with mandatory North American Electric Reliability Corporation Standards (Figure 1). County staff from DPZ and the Department of Building and Development (DBD) participated in periodic virtual and in-person meetings beginning in the spring of 2024 with Dominion representatives to review and discuss potential routes, existing and future land uses, visual impacts, and potential impacts to environmental and heritage resources.

Staff reviewed the five proposed overhead double circuit 500-230kV Golden to Mars transmission line alignments, and the proposed single circuit 230kv Lockridge and Sojourner Loop transmission line alignments provided with your letter dated February 12, 2025. The County views electrical service as an essential component of daily life and supports the construction of necessary electrical transmission infrastructure to ensure the capacity and reliability of the electrical transmission system to support existing and future business and residential uses.[1] Specifically, the electrical policies in the *Loudoun County 2019 General Plan* (2019 GP) call for the County to work with electrical providers to identify potential high voltage transmission/distribution lines and substation locations that minimize impacts on key travel corridors, sensitive cultural and historic resources, and existing residential communities; and, where possible, use existing transmission corridors to expand capacity.[2] The electrical policies call for additional consideration of the appearance of electrical transmission lines and substations to ensure they are adequately sited and screened to reduce the visual impact on the surrounding community.[3]

[1] 2019 GP, Chapter 6, Energy and Communication, text
[2] 2019 GP, Chapter 6, Electrical, Action 6.1.C
[3] 2019 GP, Chapter 6, Energy and Communication, text

At the January 22, 2025 Loudoun County Board of Supervisors (Board) Business Meeting, the Board approved a motion (8-0-1 Supervisor Kershner absent) to affirm the County's position identifying Route 4 of the Golden to Mars Transmission Line alignment as the County's preferred route and Route 3 of the Golden to Mars Transmission Line alignment as the County's secondary route preference. The approved motion also recommended Dominion underground any transmission lines planned to pass closer than 500 feet from any residence or public school, and directed staff to continue to work with property owners, Loudoun County Public Schools (LCPS), the Virginia Department of Transportation (VDOT), Metropolitan Washington Airports Authority (MWAA), and Dominion to develop the proposed route.[4] The Board and staff opposed Routes 1, 2 and 5 which require the establishment of a new transmission corridor right-of-way (ROW) that will significantly impact the visual characteristics and sense of place of existing master planned residential communities adjoining Loudoun County Parkway (Route 607), as well as existing and future vertically integrated, mixed-use urban development surrounding the Ashburn Metro Station. The County offers the following comments on the proposed overhead transmission line routes pertaining to land use and potential community and environmental impacts.

COMPREHENSIVE PLAN CONFORMANCE

The Golden to Mars Transmission Line project includes options for five potential overhead routes that vary from 8.2 to 9.8 miles in length and that originate at the Golden Substation (located in the northwest quadrant of the intersection of Route 28 and the Washington & Old Dominion Trail). The route follows major roadways and segments of the Broad Run floodplain west of Sully Road (Route 28) before terminating at Mars Substation southeast of Old Ox Road (Route 606) adjacent to Washington Dulles International Airport (Attachment 1). Commission Permits are required for the proposed Golden and Mars substations, which the County will review separately through the legislative process.

Routes 1, 2, and 5 of the Golden to Mars Transmission Line alignment are proposed to cross areas in the Suburban and Urban Policy Areas south of the Dulles Greenway (Route 267) that are developed with existing residential neighborhoods and mixed-use urban centers where the introduction of an overhead high voltage transmission corridor has the potential to significantly impact the design, aesthetics and community character of these predominately residential areas. This includes areas identified as the Suburban Mixed Use and Suburban Neighborhood Place Types where vertically integrated mixed-use residential and commercial centers, as well as traditional residential developments, currently exist and/or are planned to develop. A small portion of the proposed transmission line is located near areas identified as the Urban Transit Center and Urban Mixed Use, that are proximate to the Ashburn Metro Station which are planned to develop as dense, walkable, mixed-use urban environments with a host of office, employment, commercial, and high/medium density residential uses. The proposed transmission line alignments are not in keeping with the types of uses or design characteristics envisioned in the 2019 GP for these Place Types.

Routes 1, 2, and 5 south of the Dulles Greenway require the establishment of a new transmission corridor ROW that parallels segments of Loudoun County Parkway through existing residential neighborhoods and mixed-use urban centers with the highest concentrations of existing and planned residential uses. Proposed overhead high voltage transmission corridors in these predominantly residential areas pose significant community impacts and are not in keeping with the typed of uses or design characteristics envisioned for

[4] January 22, 2025 Board Business Meeting-Item 11 Golden to Mars Transmission Line Alignment

these planned residential neighborhood and mixed-use development areas.[5] The County finds the siting of an overhead transmission corridor in these areas inconsistent with planned land use and development pattern envisioned in the 2019 GP and opposes the construction of Routes 1, 2, and 5 south of the Dulles Greenway. However, should Routes 1, 2 and 5 be further considered for construction, the Board and staff recommend that Dominion underground the proposed transmission lines adjoining Loudoun County Parkway to reduce and mitigate potential visual impacts on existing and future uses proximate to the proposed transmission corridor in conformance with the electrical policies of the 2019 GP.[6]

The proposed Golden to Mars Transmission Line alignment bisect areas within the Suburban Policy Area identified as the Suburban Employment and Suburban Industrial/Mineral Extraction Place Types, where office and industrial parks, data center campuses, flex space and warehousing, and other business uses exist and/or are planned to develop.[7] The County supports the location of high voltage electric transmission corridors in areas planned for employment and industrial uses, where public utilities are more in keeping with the types of uses and design characteristics anticipated in the area. Routes 3 and 4 are predominantly located in areas identified as the Suburban Employment and Suburban Industrial/Mineral Extraction Place Types, where residential uses are prohibited and where electrical infrastructure (i.e. transmission poles, switch stations, and substations) are more in keeping with the design characteristics for these Place Types. Routes 3 and 4 also parallel an existing 230kV overhead high voltage transmission corridor for most of the route as well as a segment of a major sewer easement. Collocating the new and existing transmission poles within a shared ROW reduces the overall visual impact on the surrounding community by grouping these tall transmission structures together in conformance with the electrical polices of the 2019 GP.[8] Collocating Routes 3 and 4 with the existing transmission corridor and sewer easement also reduces the width of the required ROW and minimizes impacts on existing forest cover and associated wildlife habitat and vegetation, while minimizing habitat fragmentation created by the establishment of a new transmission corridor within the Broad Run Floodplain. The County's policies recognize stream corridors and the associated floodplains as important natural systems and seek to protect these corridors by preserving, conserving, and restoring their water quality, flood protection, aquatic and wildlife habitat and scenic value.[9] Therefore, staff recommends that the transmission corridor ROW adjoining the Broad Run be managed as natural habitat with actions to promote the growth of native vegetation to support wildlife habitat and protect water quality in keeping with the policies of the 2019 GP.

A portion of Routes 3 and 4 are located near existing homes within Loudoun Valley Estates II and III. The Board and staff acknowledge that the number of potentially affected homes associated with Routes 3 and 4 are significantly lower than those identified for the proposed routes adjoining Loudoun County Parkway. Routes 3 and 4 bisect portions of County-owned land occupied by Rosa Lee Carter Elementary School and Rock Ridge High School as well as the Broad Run Stream Valley Park. Continuing discussions and negotiations for the use of County property are anticipated in the coming months with LCPS, the County, and Dominion. Coordination with Dominion and the County's Department of Parks and Recreation are also recommended to explore opportunities for passive trails within the transmission corridor ROW that are

[5] 2019 GP, Chapter 6, Electrical, Action 6.1.C
[6] 2019 GP, Chapter 6, Electrical, Action 6.1.B and 6.1.C
[7] 2019 GP, Chapter 2, Suburban Employment and Suburban Industrial/Mineral Extraction Place Types
[8] 2019 GP, Chapter 6, Electrical, Action 6.1.B
[9] 2019 GP, Chapter 3, River and Stream Resources, Strategy 2.2, and Permitted Uses in the RSCR

within an area identified in the Countywide Linear Parks and Trail System Plan (LPAT) as the "Broad Run Trail and Blueway" being developed as part of a larger County-wide linear trail network.[10]

SUMMARY RECOMMENDATION

County policies support the establishment of the proposed 500-230kV Golden to Mars Transmission Line to meet electric demand for the area while ensuring the structural integrity and reliability of the transmission system. The County acknowledges that each of the five proposed overhead routes has the potential to impact businesses, residents, County-owned schools and parks, and river and stream corridor resources to some degree. The Board and staff oppose Routes 1, 2, and 5 south of the Dulles Greenway and find the proposed overhead routes are inconsistent with the fundamental land use and design characteristics envisioned for the planned residential neighborhoods and mixed use urban centers adjoining the proposed transmission line corridors. The Board and staff support an underground option, if feasible, to mitigate the adverse impacts on the community. If an underground option is not feasible, the Board and staff find that Routes 3 and 4 provide the most direct routes and have the least impacts on existing and planned mixed use and residential development by collocating the proposed transmission corridor with an existing 230kV transmission line alignment near existing commercial, data center and flex-industrial uses in conformance with the policies of the 2019 GP. The County has identified Route 4 of the Golden to Mars Transmission Line alignment as the preferred route and Route 3 as the secondary preferred route. The County encourages further coordination with property owners, LCPS, VDOT, MWAA, and Dominion to develop either Route 3 or 4 of the Golden to Mars Transmission Line.

If you have any questions regarding these comments, please contact Pat Giglio, Senior Planner, Loudoun County Department of Planning and Zoning, at 703-737-8563 or patrick.giglio@loudoun.gov.

Thank you for the opportunity to provide comments.

Sincerely,

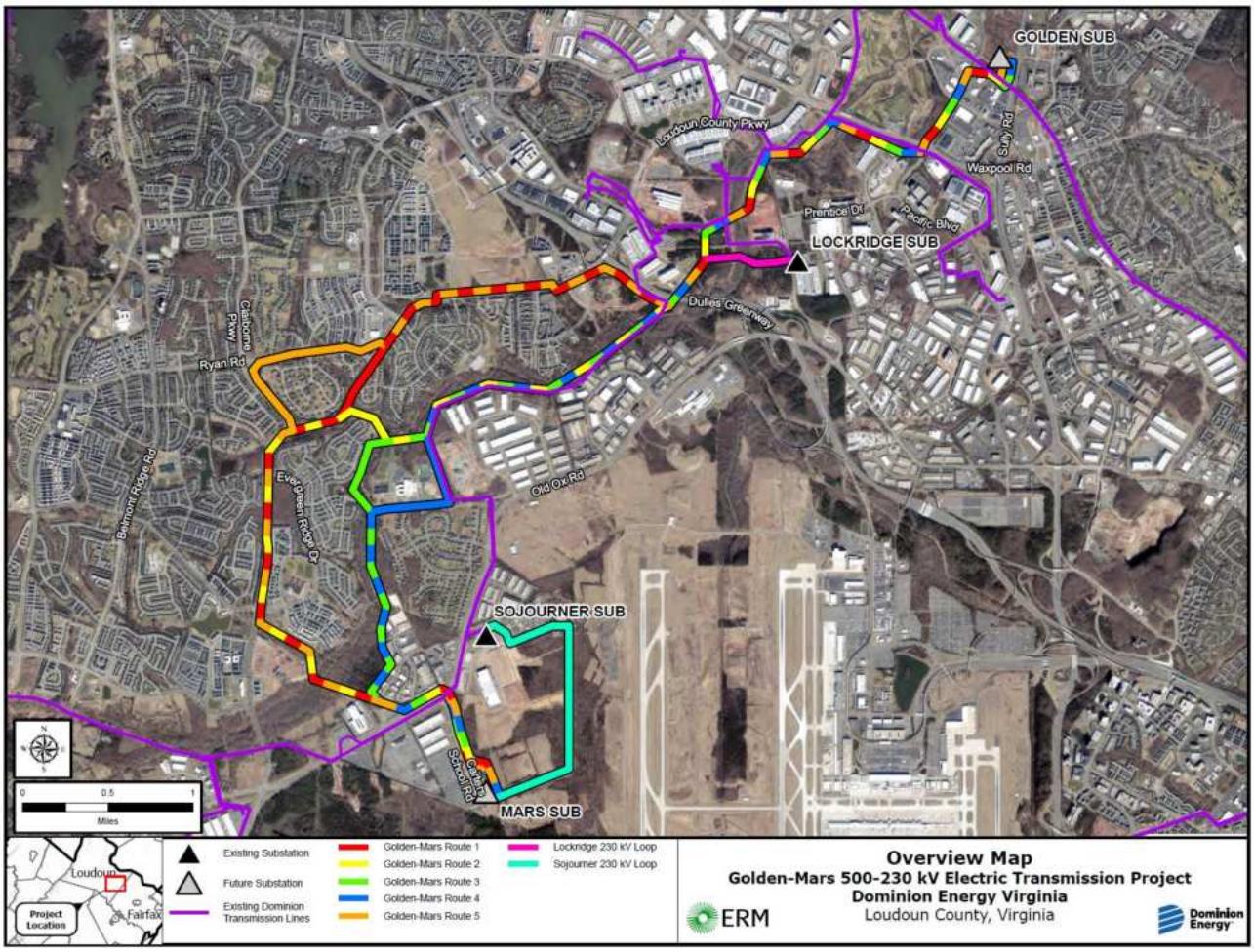
Daniel Galindo, Director
Department of Planning and Zoning

cc: *via email only*
Tim Hemstreet, County Administrator
Joe Kroboth, III, PE, Deputy County Administrator
Leo Rogers, County Attorney
Buddy Rizer, Director, Economic Development
Betsy Smith, Director, Building and Development
Steve Torpy, Director, Parks and Recreation

Enclosure: Figure 1. Vicinity map depicting proposed Transmission Routes and Substation, provided by Dominion Energy Virginia.

[10] LPAT, Chapter 7, Map 16-Eastern Loudoun

Figure 1.


GOLDEN SUB
LOCKRIDGE SUB
SOJOURNER SUB
MARS SUB
Loudoun County Pkwy
Waxpool Rd
Sully Rd
Prentice Dr
Pacific Blvd
Dulles Greenway
Claiborne Pkwy
Ryan Rd
Belmont Ridge Rd
Evergreen Ridge Dr
Old Ox Rd
Gilbert School Rd
0 0.5 1
Miles
Loudoun
Fairfax
Project Location
Existing Substation
Future Substation
Existing Dominion Transmission Lines
Golden-Mars Route 1
Golden-Mars Route 2
Golden-Mars Route 3
Golden-Mars Route 4
Golden-Mars Route 5
Lockridge 230 kV Loop
Sojourner 230 kV Loop
Overview Map
Golden-Mars 500-230 kV Electric Transmission Project
Dominion Energy Virginia
Loudoun County, Virginia
ERM
Dominion Energy

COMMONWEALTH OF VIRGINIA

STATE CORPORATION COMMISSION

APPLICATION OF	)	
	)	
VIRGINIA ELECTRIC AND POWER COMPANY	)	Case No. PUR-2025-00056
	)	
For approval and certification of electric transmission facilities: 500 kV and 230 kV Golden-Mars Lines, Lockridge 230 kV Loop, Sojourner 230 kV Loop, and Related Projects	)	

IDENTIFICATION, SUMMARIES, AND TESTIMONY OF DIRECT WITNESSES OF VIRGINIA ELECTRIC AND POWER COMPANY

Bradley S. Lowe

Witness Direct Testimony Summary
Direct Testimony
Appendix A: Background and Qualifications

Trey M. Rydel

Witness Direct Testimony Summary
Direct Testimony
Appendix A: Background and Qualifications

Kamlesh A Joshi

Witness Direct Testimony Summary
Direct Testimony
Appendix A: Background and Qualifications

Greg R. Baka

Witness Direct Testimony Summary
Direct Testimony
Appendix A: Background and Qualifications

Jacob M. Rosenberg

Witness Direct Testimony Summary
Direct Testimony
Appendix A: Background and Qualifications

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Bradley S. Lowe

Title: Consulting Engineer – Electric Transmission Planning

Summary:

Company Witness Bradley S. Lowe sponsors those portions of the Appendix describing the Company's electric transmission system and the need for, and benefits of, the proposed Project, as follows:

- Section I.B: This section details the engineering justifications for the proposed Project.
- Section I.C: This section describes the present system and details how the proposed Project will effectively satisfy present and projected future load demand requirements.
- Section I.D: This section describes critical contingencies and associated violations due to the inadequacy of the existing system.
- Section I.E: This section explains feasible project alternatives, when applicable.
- Section I.G: This section provides a system map of the affected area.
- Section I.H: This section provides the desired in-service date of the proposed Project and the estimated construction time.
- Section I.J: This section provides information about the project if approved by the RTO.
- Section I.K: Although not applicable to the proposed Project, this section, when applicable, provides outage history and maintenance history for existing transmission lines if the proposed project is a rebuild and is due in part to reliability issues.
- Section I.M: Although not applicable to the proposed Project, this section, when applicable, contains information for transmission lines interconnecting a non-utility generator.
- Section I.N: This section provides the proposed and existing generating sources, distribution circuits or load centers planned to be served by all new substations, switching stations, and other ground facilities associated with the proposed Project.
- Section II.A.3: This section provides color maps of existing or proposed rights-of-way in the vicinity of the proposed Project.
- Section II.A.10: This section provides details of the construction plans for the proposed Project, including requested line outage schedules.

Additionally, Company Witness Lowe co-sponsors the following portions of the Appendix:

- Section I.A (co-sponsored with Company Witnesses Trey M. Rydel, Kamlesh A. Joshi, Greg R. Baka, and Jacob M. Rosenberg): This section details the primary justifications for the proposed Project.
- Section I.L (co-sponsored with Company Witness Trey M. Rydel): Although not applicable to the proposed Project, this section, when applicable, provides details on the deterioration of structures and associated equipment.

A statement of Mr. Lowe's background and qualifications is attached to his testimony as Appendix A.

DIRECT TESTIMONY
OF
BRADLEY S. LOWE
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2025-00056

Q. Please state your name, position with Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company"), and business address.

A. My name is Bradley S. Lowe, and I am a Consulting Engineer in the Electric Transmission Planning Department for the Company. My business address is 5000 Dominion Boulevard, Glen Allen, Virginia 23060. A statement of my qualifications and background is provided as Appendix A.

Q. Please describe your areas of responsibility with the Company.

A. I am responsible for planning the Company's electric transmission system for voltages of 69 kilovolt ("kV") through 500 kV.

Q. What is the purpose of your testimony in this proceeding?

A. In order to relieve identified violations of mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards beginning in the summer 2028 timeframe brought on by significant increases in electrical demand as well as expected demand growth projected for the future, to interconnect future load, and to maintain the structural integrity and reliability of its transmission system, Dominion Energy Virginia proposes in Loudoun County, Virginia, to:

(i) Construct a new overhead 500 kV single circuit transmission line and a new overhead 230 kV single circuit transmission line originating at the 500 kV and 230 kV buses of the 500-230 kV Golden Substation and continuing approximately 8.3 miles to the 500-230 kV Mars Substation (the "Golden-Mars Lines"). In order to

allow sufficient right-of-way for the Golden-Mars Lines to enter the Mars Substation, the Company proposes to remove Mars-Shellhorn Line #2095 and Mars-Sojourner Line #2292 from the existing transmission line corridor that spans between the Sojourner and Mars Substations, and to reconnect the Sojourner and Mars Substations along an alternate route that also will allow the Company to interconnect future load (see the proposed Sojourner 230 kV Loop, as defined herein). The proposed Golden-Mars Lines will be constructed on almost entirely new right-of-way primarily varying between 100 and 150 feet in width in order to accommodate a 5/2 configuration on a combination of dulled galvanized steel double circuit monopole or two-pole structures (100-foot-wide right-of-way) or three-pole or H-frame structures (150-foot-wide right-of-way). The new 500 kV line will utilize three-phase triple-bundled 1351.5 Aluminum Conductor Steel Reinforced ("ACSR") conductors with a summer transfer capability of 4,357 MVA. The new 230 kV line will utilize three-phase twin-bundled Aluminum Conductor Steel Supported/Trapezoidal Wire/High Strength ("ACSS/TW/HS") type conductor with a summer transfer capability of 1,573 MVA.

(ii) Construct a new approximately 0.6-mile overhead double circuit 230 kV transmission line by cutting the proposed 230 kV Golden-Mars Line at Structure #2412/8 and looping it into and out of the existing 230-34.5 kV Lockridge Substation (the "Lockridge 230 kV Loop" or "Lockridge Loop"). The Lockridge Loop will be constructed on new 100-foot-wide right-of-way supported primarily by dulled galvanized steel double circuit monopoles and will utilize three-phase twin-bundled ACSS/TW/HS type conductor with a summer transfer capability of 1,573 MVA.

(iii) Construct a new approximately 1.9-mile overhead double circuit 230 kV transmission line from Mars Substation to Sojourner Substation (the "Sojourner 230 kV Loop" or "Sojourner Loop"). The proposed Sojourner Loop will be constructed on entirely new 100-foot-wide right-of-way supported primarily by dulled galvanized steel double circuit monopoles and will utilize three-phase twin-bundled ACSS/TW/HS type conductor with a summer transfer capability of 1,573 MVA.

(iv) Perform work at the Company's Golden, Mars, Lockridge, Sojourner, and Shellhorn Substations.

The Golden-Mars Lines, the Lockridge 230 kV Loop, the Sojourner 230 kV Loop, and the substation-related work are collectively referred to as the "Golden-Mars 500-230 kV Electric Transmission Project" or the "Project."

The Project is necessary to relieve identified violations of NERC Reliability Standards in order to maintain and improve reliable electric service to customers in the load area

extending generally from the Fairfax/Loudoun County line to the east, Potomac River to the north, the Company's existing 500 kV Brambleton-Goose Creek Line #558 to the west, and State Route 50 to the south, including Data Center Alley (or "DCA") and Washington Dulles International Airport in Loudoun County, Virginia (the "Eastern Loudoun Load Area"). Additionally, the Project is needed to resolve a 300 MW N-1-1 load drop violation identified by PJM Interconnection, L.L.C. ("PJM") by looping the Mars-Golden Lines into and out of the Lockridge Substation (*i.e.*, the Lockridge Loop), and to address spatial and FAA constraints along the Carters School Road Segment of the Golden-Mars Lines by removing existing Lines #2095/#2292 from an existing transmission corridor and reconnecting the Mars and Sojourner Substations along a route that will allow the Company to interconnect future load (*i.e.*, the Sojourner Loop Proposed Route, as described in the Appendix). Importantly, the proposed Project, along with the Mars-Wishing Star Project and the Aspen-Golden Project, will complete the 500 kV transmission loop in the Northern Virginia area surrounding DCA, bringing needed capacity to the Eastern Loudoun Load Area, while also mitigating identified NERC reliability violations and maintaining reliable service for overall load growth in the Project area and the Commonwealth.

The purpose of my testimony is to describe the Company's electric transmission system and the need for, and benefits of, the proposed Project. I sponsor Sections I.B, I.C, I.D, I.E, I.G, I.H, I.J, I.K, I.M, I.N, II.A.3, and II.A.10 of the Appendix. Additionally, I co-sponsor the Executive Summary and Sections I.A with Company Witnesses Trey M. Rydel, Kamlesh A. Joshi, Greg R. Baka, and Jacob M. Rosenberg; and Section I.L with Company Witness Trey M. Rydel.

Q. Does this conclude your pre-filed direct testimony?

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS
OF
BRADLEY S. LOWE

Bradley S. Lowe received his Bachelor of Science and Master of Science degrees in Electrical Engineering from Virginia Polytechnic Institute and State University in 2014 and 2015 respectively. Mr. Lowe received his NERC Reliability Coordinator and PJM Interconnection Owner/Operator certifications in 2019. Mr. Lowe has been employed by Dominion Energy since 2015 where he has worked on several teams within the Power Delivery group including System Protection, Substation Control Design, Substation Engineering, Transmission Operations, and Transmission Planning. He has been with the Transmission Area Planning team since February 2023.

Mr. Lowe has previously submitted pre-filed testimony to the State Corporation Commission of Virginia.

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Trey M. Rydel

Title: Supervisor Electric Transmission Engineering

Summary:

Company Witness Trey M. Rydel sponsors those portions of the Appendix providing an overview of the design characteristics of the transmission facilities for the proposed Project, and discussing electric and magnetic field levels, as follows:

- Section I.F: This section describes any lines or facilities that will be removed, replaced, or taken out of service upon completion of the proposed Project.
- Section II.A.5: This section provides drawings of the right-of-way cross section showing typical transmission lines structure placements.
- Section II.B.1 to II.B.2: These sections provide the line design and operational features of the proposed Project, as applicable.
- Section IV: This section provides analysis on the health aspects of electric and magnetic field levels.

Additionally, Company Witness Rydel co-sponsors the following portions of the Appendix:

- Section I.A (co-sponsored with Company Witnesses Bradley S. Lowe, Kamlesh A. Joshi, Greg R. Baka, and Jacob M. Rosenberg): This section details the primary justifications for the proposed Project.
- Section I.I (co-sponsored with Company Witness Kamlesh A. Joshi): This section provides the estimated total cost of the proposed Project.
- Section I.L (co-sponsored with Company Witness Bradley S. Lowe): This section, when applicable, provides details on the deterioration of structures and associated equipment.
- Sections II.B.3 to II.B.5 (co-sponsored with Company Witness Greg R. Baka): These sections, when applicable, provide supporting structure details along the proposed and alternative routes.
- Section II.B.6 (co-sponsored with Company Witnesses Greg R. Baka and Jacob M. Rosenberg): This section provides photographs of existing facilities, representations of proposed facilities, and visual simulations.
- Section V.A (co-sponsored with Company Witnesses Greg R. Baka, and Jacob M. Rosenberg): This section provides the proposed route description and structure heights for notice purposes.

A statement of Mr. Rydel's background and qualifications is attached to his testimony as Appendix A.

DIRECT TESTIMONY
OF
TREY M. RYDEL
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2025-00056

Q. Please state your name, position with Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company"), and business address.

A. My name is Trey M. Rydel, and I am a Supervisor Electric Transmission Engineering in the Electric Transmission Line Engineering Department of the Company. My business address is 5000 Dominion Boulevard, Glen Allen, Virginia 23060. A statement of my qualifications and background is provided as Appendix A.

Q. Please describe your areas of responsibility with the Company.

A. I am responsible for the estimating, conceptual, and final design of high voltage transmission line projects from 69 kilovolt ("kV") to 500 kV.

Q. What is the purpose of your testimony in this proceeding?

A. In order to relieve identified violations of mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards beginning in the summer 2028 timeframe brought on by significant increases in electrical demand as well as expected demand growth projected for the future, to interconnect future load, and to maintain the structural integrity and reliability of its transmission system, Dominion Energy Virginia proposes in Loudoun County, Virginia, to:

(i) Construct a new overhead 500 kV single circuit transmission line and a new overhead 230 kV single circuit transmission line originating at the 500 kV and 230 kV buses of the 500-230 kV Golden Substation and continuing approximately 8.3 miles to the 500-230 kV Mars Substation (the "Golden-Mars Lines"). In order to

allow sufficient right-of-way for the Golden-Mars Lines to enter the Mars Substation, the Company proposes to remove Mars-Shellhorn Line #2095 and Mars-Sojourner Line #2292 from the existing transmission line corridor that spans between the Sojourner and Mars Substations, and to reconnect the Sojourner and Mars Substations along an alternate route that also will allow the Company to interconnect future load (see the proposed Sojourner 230 kV Loop, as defined herein). The proposed Golden-Mars Lines will be constructed on almost entirely new right-of-way primarily varying between 100 and 150 feet in width in order to accommodate a 5/2 configuration on a combination of dulled galvanized steel double circuit monopole or two-pole structures (100-foot-wide right-of-way) or three-pole or H-frame structures (150-foot-wide right-of-way). The new 500 kV line will utilize three-phase triple-bundled 1351.5 Aluminum Conductor Steel Reinforced ("ACSR") conductors with a summer transfer capability of 4,357 MVA. The new 230 kV line will utilize three-phase twin-bundled Aluminum Conductor Steel Supported/Trapezoidal Wire/High Strength ("ACSS/TW/HS") type conductor with a summer transfer capability of 1,573 MVA.

(ii) Construct a new approximately 0.6-mile overhead double circuit 230 kV transmission line by cutting the proposed 230 kV Golden-Mars Line at Structure #2412/8 and looping it into and out of the existing 230-34.5 kV Lockridge Substation (the "Lockridge 230 kV Loop" or "Lockridge Loop"). The Lockridge Loop will be constructed on new 100-foot-wide right-of-way supported primarily by dulled galvanized steel double circuit monopoles and will utilize three-phase twin-bundled ACSS/TW/HS type conductor with a summer transfer capability of 1,573 MVA.

(iii) Construct a new approximately 1.9-mile overhead double circuit 230 kV transmission line from Mars Substation to Sojourner Substation (the "Sojourner 230 kV Loop" or "Sojourner Loop"). The proposed Sojourner Loop will be constructed on entirely new 100-foot-wide right-of-way supported primarily by dulled galvanized steel double circuit monopoles and will utilize three-phase twin-bundled ACSS/TW/HS type conductor with a summer transfer capability of 1,573 MVA.

(iv) Perform work at the Company's Golden, Mars, Lockridge, Sojourner, and Shellhorn Substations.

The Golden-Mars Lines, the Lockridge 230 kV Loop, the Sojourner 230 kV Loop, and the substation-related work are collectively referred to as the "Golden-Mars 500-230 kV Electric Transmission Project" or the "Project."

The Project is necessary to relieve identified violations of NERC Reliability Standards in order to maintain and improve reliable electric service to customers in the load area

extending generally from the Fairfax/Loudoun County line to the east, Potomac River to the north, the Company's existing 500 kV Brambleton-Goose Creek Line #558 to the west, and State Route 50 to the south, including Data Center Alley (or "DCA") and Washington Dulles International Airport in Loudoun County, Virginia (the "Eastern Loudoun Load Area"). Additionally, the Project is needed to resolve a 300 MW N-1-1 load drop violation identified by PJM Interconnection, L.L.C. by looping the Mars-Golden Lines into and out of the Lockridge Substation (*i.e.*, the Lockridge Loop), and to address spatial and FAA constraints along the Carters School Road Segment of the Golden-Mars Lines by removing existing Lines #2095/#2292 from an existing transmission corridor and reconnecting the Mars and Sojourner Substations along a route that will allow the Company to interconnect future load (*i.e.*, the Sojourner Loop Proposed Route, as described in the Appendix). Importantly, the proposed Project, along with the Mars-Wishing Star Project and the Aspen-Golden Project, will complete the 500 kV transmission loop in the Northern Virginia area surrounding DCA, bringing needed capacity to the Eastern Loudoun Load Area, while also mitigating identified NERC reliability violations and maintaining reliable service for overall load growth in the Project area and the Commonwealth.

The purpose of my testimony is to describe the design characteristics of the transmission facilities for the proposed Project, and also to discuss electric and magnetic field levels. I sponsor Sections I.F, II.A.5, II.B.1, II.B.2, and IV of the Appendix. Additionally, I co-sponsor the Executive Summary and Sections I.A with Company Witnesses Bradley S. Lowe, Kamlesh A. Joshi, Greg R. Baka, and Jacob M. Rosenberg; Section I.I with Company Witness Kamlesh A. Joshi; Section I.L with Company Witness Bradley S.

Lowe; Sections II.B.3 to II.B.5 with Company Witness Greg R. Baka; Section II.B.6 and V.A with Company Witnesses Greg R. Baka and Jacob M. Rosenberg.

Q. Does this conclude your pre-filed direct testimony?

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS
OF
TREY M. RYDEL

Trey Rydel received a Bachelor of Science degree in Civil Engineering from Virginia Polytechnic Institute and State University in 2016. He is licensed as a Professional Engineer in the Commonwealth of Virginia. He has been employed by the Company since 2020, where he worked with the conceptual and detailed transmission line engineering teams. Prior to working for the Company, Mr. Rydel worked as a civil engineer for four years in the transportation sector.

Mr. Rydel has previously submitted pre-filed testimony to the State Corporation Commission of Virginia.

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Kamlesh A. Joshi

Title: Senior Electrical Engineer – Transmission and Distribution Services Department

Summary:

Company Witness Kamlesh A. Joshi sponsors or co-sponsors the following sections of the Appendix describing the substation work to be performed for the proposed Project as follows:

- Section I.A (co-sponsored with Company Witnesses Bradley S. Lowe, Trey M. Rydel, Greg R. Baka, and Jacob M. Rosenberg): This section details the primary justifications for the proposed Project.

- Section I.I (co-sponsored with Company Witness Trey M. Rydel): This section provides the estimated total cost of the proposed Project.

- Section II.C: This section describes and furnishes a one-line diagram of the substation associated with the proposed Project.

A statement of Mr. Joshi's background and qualifications is attached to his testimony as Appendix A.

DIRECT TESTIMONY
OF
KAMLESH A. JOSHI
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2025-00056

Q. Please state your name, position and place of employment, and business address.

A. My name is Kamlesh A. Joshi. I am employed as a Senior Electrical Engineer in the Transmission and Distribution Services Department at Burns & McDonnell. My business address is 2301 Maitland Center Parkway, Maitland, Florida 32751. A statement of my qualifications and background is provided as Appendix A.

Q. What are your responsibilities as a Senior Electrical Engineer at Burns & McDonnell?

A. I am responsible for evaluation of the substation project requirements, feasibility studies, conceptual physical design, scope development, preliminary engineering and cost estimating for high voltage transmission and distribution substations.

Q. What is the purpose of your testimony in this proceeding?

A. In order to relieve identified violations of mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards beginning in the summer 2028 timeframe brought on by significant increases in electrical demand as well as expected demand growth projected for the future, to interconnect future load, and to maintain the structural integrity and reliability of its transmission system, Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company") proposes in Loudoun County, Virginia, to:

(i) Construct a new overhead 500 kilovolt ("kV") single circuit transmission line and a new overhead 230 kV single circuit transmission line originating at the 500 kV and 230 kV buses of the 500-230 kV Golden Substation and continuing approximately 8.3 miles to the 500-230 kV Mars Substation (the "Golden-Mars Lines"). In order to allow sufficient right-of-way for the Golden-Mars Lines to enter the Mars Substation, the Company proposes to remove Mars-Shellhorn Line #2095 and Mars-Sojourner Line #2292 from the existing transmission line corridor that spans between the Sojourner and Mars Substations, and to reconnect the Sojourner and Mars Substations along an alternate route that also will allow the Company to interconnect future load (see the proposed Sojourner 230 kV Loop, as defined herein). The proposed Golden-Mars Lines will be constructed on almost entirely new right-of-way primarily varying between 100 and 150 feet in width in order to accommodate a 5/2 configuration on a combination of dulled galvanized steel double circuit monopole or two-pole structures (100-foot-wide right-of-way) or three-pole or H-frame structures (150-foot-wide right-of-way). The new 500 kV line will utilize three-phase triple-bundled 1351.5 Aluminum Conductor Steel Reinforced ("ACSR") conductors with a summer transfer capability of 4,357 MVA. The new 230 kV line will utilize three-phase twin-bundled Aluminum Conductor Steel Supported/Trapezoidal Wire/High Strength ("ACSS/TW/HS") type conductor with a summer transfer capability of 1,573 MVA.

(ii) Construct a new approximately 0.6-mile overhead double circuit 230 kV transmission line by cutting the proposed 230 kV Golden-Mars Line at Structure #2412/8 and looping it into and out of the existing 230-34.5 kV Lockridge Substation (the "Lockridge 230 kV Loop" or "Lockridge Loop"). The Lockridge Loop will be constructed on new 100-foot-wide right-of-way supported primarily by dulled galvanized steel double circuit monopoles and will utilize three-phase twin-bundled ACSS/TW/HS type conductor with a summer transfer capability of 1,573 MVA.

(iii) Construct a new approximately 1.9-mile overhead double circuit 230 kV transmission line from Mars Substation to Sojourner Substation (the "Sojourner 230 kV Loop" or "Sojourner Loop"). The proposed Sojourner Loop will be constructed on entirely new 100-foot-wide right-of-way supported primarily by dulled galvanized steel double circuit monopoles and will utilize three-phase twin-bundled ACSS/TW/HS type conductor with a summer transfer capability of 1,573 MVA.

(iv) Perform work at the Company's Golden, Mars, Lockridge, Sojourner, and Shellhorn Substations.

The Golden-Mars Lines, the Lockridge 230 kV Loop, the Sojourner 230 kV Loop, and the substation-related work are collectively referred to as the "Golden-Mars 500-230 kV Electric Transmission Project" or the "Project."

The Project is necessary to relieve identified violations of NERC Reliability Standards in order to maintain and improve reliable electric service to customers in the load area extending generally from the Fairfax/Loudoun County line to the east, Potomac River to the north, the Company's existing 500 kV Brambleton-Goose Creek Line #558 to the west, and State Route 50 to the south, including Data Center Alley (or "DCA") and Washington Dulles International Airport in Loudoun County, Virginia (the "Eastern Loudoun Load Area"). Additionally, the Project is needed to resolve a 300 MW N-1-1 load drop violation identified by PJM Interconnection, L.L.C. by looping the Mars-Golden Lines into and out of the Lockridge Substation (*i.e.*, the Lockridge Loop), and to address spatial and FAA constraints along the Carters School Road Segment of the Golden-Mars Lines by removing existing Lines #2095/#2292 from an existing transmission corridor and reconnecting the Mars and Sojourner Substations along a route that will allow the Company to interconnect future load (*i.e.*, the Sojourner Loop Proposed Route, as described in the Appendix). Importantly, the proposed Project, along with the Mars-Wishing Star Project and the Aspen-Golden Project, will complete the 500 kV transmission loop in the Northern Virginia area surrounding DCA, bringing needed capacity to the Eastern Loudoun Load Area, while also mitigating identified NERC reliability violations and maintaining reliable service for overall load growth in the Project area and the Commonwealth.

The purpose of my testimony, which I am submitting on behalf of Dominion Energy Virginia, is to describe the work to be performed as part of the Project. As it pertains to station work, I sponsor Section II.C of the Appendix. Additionally, I co-sponsor the Executive Summary and Section I.A with Company Witnesses Bradley S. Lowe, Trey M.

Rydel, Greg R. Baka, and Jacob M. Rosenberg; and Section I.I of the Appendix with Company Witness Trey M. Rydel.

Q. Does this conclude your pre-filed direct testimony?

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS OF KAMLESH A. JOSHI

Kamlesh A. Joshi received a Master of Science in Project Management from Harrisburg University of Science & Technology, as well as a Master of Science in Electrical Engineering from Missouri University of Science and Technology in December 2013.

Mr. Joshi worked as a Substation Design Engineer from January 2014 to July 2019 at Black & Veatch Corporation, Overland Park, Kansas. Mr. Joshi worked with the Black & Veatch Orlando, Florida, office Substation Design Team from August 2019 to January 2021. Mr. Joshi joined the Burns & McDonnell Engineering Substation Department as a Staff Electrical Engineer in February 2021. He was promoted to Senior Electrical Engineer in January 2022 at Burns & McDonnell.

Mr. Joshi's responsibilities include the evaluation of the substation project requirements; development of project scope documents, estimates and schedules; preparation of specifications and bid documents; material procurement; development of detailed physical drawings, bill of materials, electrical one-lines, schematics and wiring diagrams. He has been licensed as a Professional Engineer in Texas since 2018 and in Florida since 2021.

Mr. Joshi has previously submitted pre-filed testimony to the State Corporation Commission of Virginia.

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Greg R. Baka
Title: Local Permitting Consultant – Siting and Permitting Group
Summary:

Company Witness Greg R. Baka will sponsor those portions of the Appendix providing an overview of the design of the route for the proposed Project, and related permitting, as follows:

- Section II.A.12: This section identifies the counties and localities through which the proposed Project will pass and provides General Highway Maps for these localities.
- Sections V.B-D: These sections provide information related to public notice of the proposed Project.

Additionally, Mr. Baka co-sponsors the following section of the Appendix:

- Section I.A (co-sponsored with Company Witnesses Bradley S. Lowe, Trey M. Rydel, Kamlesh A. Joshi, and Jacob M. Rosenberg): This section details the primary justifications for the proposed Project.
- Section II.A.1 (co-sponsored with Company Witness Jacob M. Rosenberg): This section provides the length of the proposed corridor and viable alternatives to the proposed Project.
- Section II.A.2 (co-sponsored with Company Witness Jacob M. Rosenberg): This section provides a map showing the route of the proposed Project in relation to notable points close to the proposed Project.
- Section II.A.4 (co-sponsored with Company Witness Jacob M. Rosenberg): This section explains why the existing right-of-way is not adequate to serve the need.
- Sections II.A.6 to II.A.8 (co-sponsored with Company Witness Jacob M. Rosenberg): These sections provide detail regarding the right-of-way for the proposed Project.
- Section II.A.9 (co-sponsored with Company Witness Jacob M. Rosenberg): This section describes the proposed route selection procedures and details alternative routes considered.
- Section II.A.11 (co-sponsored with Company Witness Jacob M. Rosenberg): This section details how the construction of the proposed Project follows the provisions discussed in Attachment 1 of the Transmission Appendix Guidelines.
- Sections II.B.3 to II.B.5 (co-sponsored with Company Witness Trey M. Rydel): These sections, when applicable, provide supporting structure details along the proposed and alternative routes.
- Section II.B.6 (co-sponsored with Company Witnesses Trey M. Rydel and Jacob M. Rosenberg): This section provides photographs of existing facilities, representations of proposed facilities, and visual simulations.
- Section III (co-sponsored with Company Witness Jacob M. Rosenberg): This section details the impact of the proposed project on scenic, environmental, and historic features.
- Section V.A (co-sponsored with Company Witnesses Trey M. Rydel and Jacob M. Rosenberg): This section provides the proposed route description and structure heights for notice purposes.

Finally, Mr. Baka co-sponsors the DEQ Supplement with Company Witness Jacob M. Rosenberg. A statement of Mr. Baka's background and qualifications is attached to his testimony as Appendix A.

DIRECT TESTIMONY
OF
GREG R. BAKA
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2025-00056

Q. Please state your name, position with Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company"), and business address.

A. My name is Greg R. Baka, and I am a Local Permitting Consultant with the Siting and Permitting Group for Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company"). My business address is 5000 Dominion Boulevard, Glen Allen, Virginia 23060. A statement of my qualifications and background is provided as Appendix A.

Q. Please describe your areas of responsibility with the Company.

A. I am responsible for identifying appropriate routes for transmission lines and obtaining necessary federal, state, and local approvals and environmental permits for those facilities. In this position, I work closely with government officials, permitting agencies, property owners, and other interested parties, as well as with other Company personnel, to develop facilities needed by the public so as to reasonably minimize environmental and other impacts on the public in a reliable, cost-effective manner.

Q. What is the purpose of your testimony in this proceeding?

A. In order to relieve identified violations of mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards beginning in the summer 2028 timeframe brought on by significant increases in electrical demand as well as expected demand

growth projected for the future, to interconnect future load, and to maintain the structural integrity and reliability of its transmission system, Dominion Energy Virginia proposes in Loudoun County, Virginia, to:

(i) Construct a new overhead 500 kilovolt ("kV") single circuit transmission line and a new overhead 230 kV single circuit transmission line originating at the 500 kV and 230 kV buses of the 500-230 kV Golden Substation and continuing approximately 8.3 miles to the 500-230 kV Mars Substation (the "Golden-Mars Lines"). In order to allow sufficient right-of-way for the Golden-Mars Lines to enter the Mars Substation, the Company proposes to remove Mars-Shellhorn Line #2095 and Mars-Sojourner Line #2292 from the existing transmission line corridor that spans between the Sojourner and Mars Substations, and to reconnect the Sojourner and Mars Substations along an alternate route that also will allow the Company to interconnect future load (see the proposed Sojourner 230 kV Loop, as defined herein). The proposed Golden-Mars Lines will be constructed on almost entirely new right-of-way primarily varying between 100 and 150 feet in width in order to accommodate a 5/2 configuration on a combination of dulled galvanized steel double circuit monopole or two-pole structures (100-foot-wide right-of-way) or three-pole or H-frame structures (150-foot-wide right-of-way). The new 500 kV line will utilize three-phase triple-bundled 1351.5 Aluminum Conductor Steel Reinforced ("ACSR") conductors with a summer transfer capability of 4,357 MVA. The new 230 kV line will utilize three-phase twin-bundled Aluminum Conductor Steel Supported/Trapezoidal Wire/High Strength ("ACSS/TW/HS") type conductor with a summer transfer capability of 1,573 MVA.

(ii) Construct a new approximately 0.6-mile overhead double circuit 230 kV transmission line by cutting the proposed 230 kV Golden-Mars Line at Structure #2412/8 and looping it into and out of the existing 230-34.5 kV Lockridge Substation (the "Lockridge 230 kV Loop" or "Lockridge Loop"). The Lockridge Loop will be constructed on new 100-foot-wide right-of-way supported primarily by dulled galvanized steel double circuit monopoles and will utilize three-phase twin-bundled ACSS/TW/HS type conductor with a summer transfer capability of 1,573 MVA.

(iii) Construct a new approximately 1.9-mile overhead double circuit 230 kV transmission line from Mars Substation to Sojourner Substation (the "Sojourner 230 kV Loop" or "Sojourner Loop"). The proposed Sojourner Loop will be constructed on entirely new 100-foot-wide right-of-way supported primarily by dulled galvanized steel double circuit monopoles and will utilize three-phase twin-bundled ACSS/TW/HS type conductor with a summer transfer capability of 1,573 MVA.

(iv) Perform work at the Company's Golden, Mars, Lockridge, Sojourner, and Shellhorn Substations.

The Golden-Mars Lines, the Lockridge 230 kV Loop, the Sojourner 230 kV Loop, and the substation-related work are collectively referred to as the "Golden-Mars 500-230 kV Electric Transmission Project" or the "Project."

The Project is necessary to relieve identified violations of NERC Reliability Standards in order to maintain and improve reliable electric service to customers in the load area extending generally from the Fairfax/Loudoun County line to the east, Potomac River to the north, the Company's existing 500 kV Brambleton-Goose Creek Line #558 to the west, and State Route 50 to the south, including Data Center Alley (or "DCA") and Washington Dulles International Airport in Loudoun County, Virginia (the "Eastern Loudoun Load Area"). Additionally, the Project is needed to resolve a 300 MW N-1-1 load drop violation identified by PJM Interconnection, L.L.C. by looping the Mars-Golden Lines into and out of the Lockridge Substation (*i.e.*, the Lockridge Loop), and to address spatial and FAA constraints along the Carters School Road Segment of the Golden-Mars Lines by removing existing Lines #2095/#2292 from an existing transmission corridor and reconnecting the Mars and Sojourner Substations along a route that will allow the Company to interconnect future load (*i.e.*, the Sojourner Loop Proposed Route, as described in the Appendix). Importantly, the proposed Project, along with the Mars-Wishing Star Project and the Aspen-Golden Project, will complete the 500 kV transmission loop in the Northern Virginia area surrounding DCA, bringing needed capacity to the Eastern Loudoun Load Area, while also mitigating identified NERC reliability violations and maintaining reliable service for overall load growth in the Project area and the Commonwealth.

The purpose of my testimony is to provide an overview of the route and permitting for the proposed Project. I sponsor Sections II.A.11 and V.B to V.D of the Appendix. Additionally, I co-sponsor the Executive Summary and Section I.A with Company Witnesses Bradley S. Lowe, Trey M. Rydel, Kamlesh A. Joshi, and Jacob M. Rosenberg; Sections II.A.1, II.A.2, II.A.4, II.A.6 to II.A.9, II.A.11, and III with Company Witness Jacob M. Rosenberg; Sections II.B.3 to II.B.5 with Company Witness Trey M. Rydel; and Section II.B.6 and V.A with Company Witnesses Trey M. Rydel and Jacob M. Rosenberg. Finally, I co-sponsor the DEQ Supplement with Company Witness Jacob M. Rosenberg.

Q. Has the Company complied with Va. Code § 15.2-2202 E?

A. Yes. In accordance with Va. Code § 15.2-2202 E, a letter dated February 12, 2025, was delivered to Mr. Tim Hemstreet, Administrator of Loudoun County, where the Project is located. The letter stated the Company's intention to file this Application and invited the County to consult with the Company about the proposed Project. A copy of this letter is included as Attachment V.D.1 to the Appendix.

Q. Does this conclude your pre-filed direct testimony?

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS
OF
GREG R. BAKA

Mr. Greg R. Baka graduated from the University of Richmond in 1989 with a Bachelor of Arts degree in Urban Studies and Political Science. From 1990 to 1992, he worked as a Zoning Analyst for the City of Gaithersburg, Maryland. From 1992 to 1995, he worked as the Zoning Administrator for King William County, Virginia. From 1995 to 1998, he served Hanover County, Virginia as a Planner and was promoted to Senior Comprehensive Planner. He returned to King William County from 1998 to 2000 and served as their Director of Planning and Community Development. He then worked at Resource International, Ltd. as a Municipal Planner between 2001 and 2003. From 2004 to 2011, Mr. Baka owned and operated Viewshed Consulting, LLC, serving clients as a Land Planning Consultant. From 2011 to 2013, he worked as the Director of Economic Development for Cumberland County, Virginia. He joined the Company's Transmission Right-of-Way group in 2013 as Senior Siting & Permitting Specialist, was promoted to Supervisor of Siting, Permitting, and Real Estate in 2015, and became a Local Permitting Consultant, his current position, in 2019. Mr. Baka has served on several land planning and development-related local boards and commissions.

Mr. Baka has previously submitted pre-filed testimony to the Virginia State Corporation Commission.

WITNESS REBUTTAL TESTIMONY SUMMARY

Witness: Jacob M. Rosenberg

Title: Consulting Director, Environmental Resource Management

Summary:

Company Witness Jacob M. Rosenberg sponsors the Environmental Routing Study provided as part of the Company's Application.

Additionally, Mr. Rosenberg co-sponsors the following portion of the Appendix:

- Section I.A (co-sponsored with Company Witnesses Bradley S. Lowe, Trey M. Rydel, Kamlesh A. Joshi, and Greg R. Baka): This section details the primary justifications for the proposed Project.
- Section II.A.1 (co-sponsored with Company Witness Greg R. Baka): This section provides the length of the proposed corridor and viable alternatives to the proposed Project.
- Section II.A.2 (co-sponsored with Company Witness Greg R. Baka): This section provides a map showing the route of the proposed Project in relation to notable points close to the proposed Project.
- Section II.A.4 (co-sponsored with Company Witness Greg R. Baka): This section explains why the existing right-of-way is not adequate to serve the need.
- Sections II.A.6 to II.A.8 (co-sponsored with Company Witness Greg R. Baka): These sections provide detail regarding the right-of-way for the proposed Project.
- Section II.A.9 (co-sponsored with Company Witness Greg R. Baka): This section describes the proposed route selection procedures and details alternative routes considered.
- Section II.A.11 (co-sponsored with Company Witness Greg R. Baka): This section details how the construction of the proposed project follows the provisions discussed in Attachment 1 of the Transmission Appendix Guidelines.
- Section II.B.6 (co-sponsored with Company Witnesses Trey M. Rydel and Greg R. Baka): This section provides photographs of existing facilities, representations of proposed facilities, and visual simulations.
- Section III (co-sponsored with Company Witness Greg R. Baka): This section details the impact of the proposed Project on scenic, environmental, and historic features.
- Section V.A (co-sponsored with Company Witnesses Trey M. Rydel and Greg R. Baka): This section provides the proposed route description and structure heights for notice purposes.

Finally, Mr. Rosenberg co-sponsors the DEQ Supplement filed with this Application with Company Witness Greg R. Baka.

A statement of Mr. Rosenberg's background and qualifications is attached to his testimony as Appendix A.

DIRECT TESTIMONY
OF
JACOB M. ROSENBERG
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2025-00056

Q. Please state your name, position and place of employment and business address.

A. My name is Jacob M. Rosenberg. I am employed as a Consulting Director with Environmental Resource Management ("ERM"). My business address is 222 South 9th Street, Suite 2900, Minneapolis, Minnesota 55402. A statement of my qualifications and background is provided as Appendix A.

Q. Please describe your areas of responsibility with the Company.

A. I am responsible for directly supporting Company transmission project managers and their respective project teams in the routing and siting of electric transmission projects. I work closely with Company specialists, permitting agencies, property owners, stakeholders, and government officials to route and site electric facilities in a manner that reasonably minimizes impacts to communities and the environment.

Q. What professional experience does ERM have with the routing of linear energy transportation facilities?

A. ERM has extensive experience in the field of routing, siting, and permitting energy infrastructure projects. ERM has assisted its clients in the identification, evaluation and development of linear energy facilities for the past 30 years. During this time, ERM has developed a consistent approach for linear facility routing and route selection based on the identification, mapping, and comparative evaluation of routing constraints and

opportunities within defined study areas. ERM uses Geographic Information System tools with the most up-to-date and detailed data and aerial photography resources available for the identification, evaluation and selection of transmission line routes.

In addition to Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company"), ERM's clients include some of the largest energy companies in the United States, Canada, and the world, including ExxonMobil, TC Energy, Shell, NextEra Energy, Phillips 66, Kinder Morgan, British Petroleum, Enbridge Energy, and others. ERM also routinely assists the staff of the Federal Energy Regulatory Commission, United States Army Corps of Engineers, and the U.S. Forest Service in the identification and/or evaluation of linear energy routes to support federal National Environmental Policy Act evaluations. ERM works on both small and large energy projects and has assisted in routing some of the largest electric transmission line and pipeline facilities in North America.

In Virginia, ERM served as routing consultant to Dominion Energy Virginia for many projects over the last 15 years, including:

- Cannon Branch-Cloverhill 230 kV ("kilovolt") transmission line project in the City of Manassas and Prince William County (Case No. PUE-2011-00011);
- Dahlgren 230 kV double circuit transmission line project in King George County (Case No. PUE-2011-00113);
- Surry-Skiffes Creek-Whealton 500 and 230 kV transmission lines (Case No. PUE-2012-00029);
- Remington CT-Warrenton 230 kV double circuit transmission line (Case No. PUE-2014-00025);
- Haymarket 230 kV Line and Substation Project (Case No. PUE-2015-00107);
- Remington-Gordonsville Electric Transmission Project (Case No. PUE-2015-00117);

- Norris Bridge (Case No. PUE-2016-00021);
- Idylwood-Tysons 230 kV single circuit underground transmission line, Tysons Substation rebuild, and related transmission facilities (Case No. PUR-2017-00143);
- Lockridge 230 kV Line Loop and Substation (Case No. PUR-2019-00215);
- Coastal Virginia Offshore Wind Commercial Project (Case No. PUR-2021-00142);
- DTC 230 kV Line Loop and DTC Substation (Case No. PUR-2021-00280);
- Aviator 230 kV Line Loop and Substation (Case No. PUR-2022-00012);
- Nimbus Substation and 230 Farmwell-Nimbus Transmission Line (Case No. PUR-2022-00027);
- 500-230 kV Wishing Star Substation, 500 kV and 230 kV Mars-Wishing Star Lines, 500-230 kV Mars Substation, and Mars 230 kV Loop (Case No. PUR-2022-00183);
- 500-230 kV Unity Switching Station, 230 kV Tunstall-Unity Lines #2259 and #2262, 230-36.5 kV Tunstall, Evans Creek, Raines Substations, and 230 kV Substation Interconnect Lines (Case No. PUR-2022-00167);
- Butler Farm to Clover 230 kV Line and Butler Farm to Finneywood 230 kV Line (Case No. PUR-2022-00175);
- 230 kV Altair Loop and Altair Switching Station (Case No. PUR-2022-00197);
- 230 kV Finneywood-Jeffress Lines and Jeffress Switching Station Conversion (Case No. PUR-2023-00088);
- 230 kV White Oak Lines and White Oak Substation Expansion (Case No. PUR-2023-00110);
- 230 kV Germanna Lines and Germanna Substation (Case No. PUR-2023-00206);
- Daves Store 230 kV Line Extension (Case No. PUR 2024-00021);
- Aspen-Golden 500-230 kV Electric Transmission Project (Case No. PUR-2024-00032);
- Apollo-Twin Creeks Electric Transmission Project (Case No. PUR-2024-00044);
- Line #588 Rebuild & Fentress-Yadkin Line #5005 (Case No. PUR-2024-00105); and
- New Line Projects to Network Takeoff Substation (Case No. PUR-2024-00131).

Most recently, ERM served as the routing consultant for the Company's Centreport 230 kV Electric Transmission Project, in Case No. PUR-2024-00170; Cloud-Nebula-Raines Transmission Project, in Case No. PUR-2025-00014; and 230 kV Technology Boulevard Lines, Bunker Substation, and Saltwood Switching Station, in Case No. PUR-2025-00042.

ERM's role as routing consultant for each of these transmission line projects included preparation of an Environmental Routing Study for the project and submission of testimony sponsoring his study.

Q. What were you asked to do in connection with this case?

A. In order to relieve identified violations of mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards beginning in the summer 2028 timeframe brought on by significant increases in electrical demand as well as expected demand growth projected for the future, to interconnect future load, and to maintain the structural integrity and reliability of its transmission system, Dominion Energy Virginia proposes in Loudoun County, Virginia, to:

(i) Construct a new overhead 500 kV single circuit transmission line and a new overhead 230 kV single circuit transmission line originating at the 500 kV and 230 kV buses of the 500-230 kV Golden Substation and continuing approximately 8.3 miles to the 500-230 kV Mars Substation (the "Golden-Mars Lines"). In order to allow sufficient right-of-way for the Golden-Mars Lines to enter the Mars Substation, the Company proposes to remove Mars-Shellhorn Line #2095 and Mars-Sojourner Line #2292 from the existing transmission line corridor that spans between the Sojourner and Mars Substations, and to reconnect the Sojourner and Mars Substations along an alternate route that also will allow the Company to interconnect future load (see the proposed Sojourner 230 kV Loop, as defined herein). The proposed Golden-Mars Lines will be constructed on almost entirely new right-of-way primarily varying between 100 and 150 feet in width in order to accommodate a 5/2 configuration on a combination of dulled galvanized steel double circuit monopole or two-pole structures (100-foot-wide right-of-way) or three-pole or H-frame structures (150-foot-wide right-of-way). The new 500 kV

line will utilize three-phase triple-bundled 1351.5 Aluminum Conductor Steel Reinforced ("ACSR") conductors with a summer transfer capability of 4,357 MVA. The new 230 kV line will utilize three-phase twin-bundled Aluminum Conductor Steel Supported/Trapezoidal Wire/High Strength ("ACSS/TW/HS") type conductor with a summer transfer capability of 1,573 MVA.

(ii) Construct a new approximately 0.6-mile overhead double circuit 230 kV transmission line by cutting the proposed 230 kV Golden-Mars Line at Structure #2412/8 and looping it into and out of the existing 230-34.5 kV Lockridge Substation (the "Lockridge 230 kV Loop" or "Lockridge Loop"). The Lockridge Loop will be constructed on new 100-foot-wide right-of-way supported primarily by dulled galvanized steel double circuit monopoles and will utilize three-phase twin-bundled ACSS/TW/HS type conductor with a summer transfer capability of 1,573 MVA.

(iii) Construct a new approximately 1.9-mile overhead double circuit 230 kV transmission line from Mars Substation to Sojourner Substation (the "Sojourner 230 kV Loop" or "Sojourner Loop"). The proposed Sojourner Loop will be constructed on entirely new 100-foot-wide right-of-way supported primarily by dulled galvanized steel double circuit monopoles and will utilize three-phase twin-bundled ACSS/TW/HS type conductor with a summer transfer capability of 1,573 MVA.

(iv) Perform work at the Company's Golden, Mars, Lockridge, Sojourner, and Shellhorn Substations.

The Golden-Mars Lines, the Lockridge 230 kV Loop, the Sojourner 230 kV Loop, and the substation-related work are collectively referred to as the "Golden-Mars 500-230 kV Electric Transmission Project" or the "Project."

The Project is necessary to relieve identified violations of NERC Reliability Standards in order to maintain and improve reliable electric service to customers in the load area extending generally from the Fairfax/Loudoun County line to the east, Potomac River to the north, the Company's existing 500 kV Brambleton-Goose Creek Line #558 to the west, and State Route 50 to the south, including Data Center Alley (or "DCA") and Washington Dulles International Airport in Loudoun County, Virginia (the "Eastern Loudoun Load Area"). Additionally, the Project is needed to resolve a 300 MW N-1-1

load drop violation identified by PJM Interconnection, L.L.C. by looping the Mars-Golden Lines into and out of the Lockridge Substation (*i.e.*, the Lockridge Loop), and to address spatial and FAA constraints along the Carters School Road Segment of the Golden-Mars Lines by removing existing Lines #2095/#2292 from an existing transmission corridor and reconnecting the Mars and Sojourner Substations along a route that will allow the Company to interconnect future load (*i.e.*, the Sojourner Loop Proposed Route, as described in the Appendix). Importantly, the proposed Project, along with the Mars-Wishing Star Project and the Aspen-Golden Project, will complete the 500 kV transmission loop in the Northern Virginia area surrounding DCA, bringing needed capacity to the Eastern Loudoun Load Area, while also mitigating identified NERC reliability violations and maintaining reliable service for overall load growth in the Project area and the Commonwealth.

ERM was engaged on behalf of the Company to assist it in the identification and evaluation of route alternatives to resolve the identified electrical need while meeting the applicable criteria of Virginia law and the Company's operating needs.

The purpose of my testimony is to introduce and sponsor the Environmental Routing Study, which is included as part of the Application filed by the Company in this proceeding. Additionally, I co-sponsor the Executive Summary and Section I.A with Company Witnesses Bradley S. Lowe, Trey M. Rydel, Kamlesh A. Joshi, and Greg R. Baka; Sections II.A.1, II.A.2, II.A.4, II.A.6 to II.A.9, II.A.11, and III with Company Witness Greg R. Baka; and Sections II.B.6 and V.A with Company Witnesses Trey M. Rydel and Greg R. Baka. Lastly, I co-sponsor the DEQ Supplement with Company Witness Greg R. Baka.

Q. Does this conclude your pre-filed direct testimony?

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS OF JACOB M. ROSENBERG

Jacob M. Rosenberg earned a Bachelor of Arts degree and a Master of Science degree from University of Iowa. He has approximately ten years of experience working in the energy-related consulting field specializing in the siting and regulatory permitting of major linear energy facilities, including both interstate and intrastate electric transmission lines and gas and oil pipelines throughout the United States, as well as seven years of experience working in local government specializing in urban and regional planning and community development. During this time, he was employed for three years with the Routt County Planning Department; three years with the City of Brooklyn Park Planning, Zoning, and Development Department; and ten years with ERM, a privately-owned consulting company specializing in the siting, licensing and environmental construction compliance of large, multi-state energy transportation facilities.

Mr. Rosenberg's professional experience related to electric transmission line projects includes the direct management of field studies, impact assessments and agency consultations associated with the routing and licensing of multiple transmission line projects in the mid-Atlantic region, including the management and/or supervision of the routing and permitting. Work on these projects included studies to identify and delineate routing constraints and options; identification and evaluation of route alternatives; and the direction of field studies to inventory wetlands, stream crossings, cultural resources and sensitive habitats and land uses. Within the last several years he has assisted with or managed the identification and evaluation of nine 230 kV transmission line projects and two 500 kV transmission line projects in the Commonwealth for Virginia Electric and Power Company.

Mr. Rosenberg has previously submitted pre-filed testimony to the State Corporation Commission of Virginia.