



Simulation provided by Stantec

OP 11 Proposed
Rappahannock Canal (DHR #111-5297) & Battle of Fredericksburg II (DHR #111-5296)

OP12 – Existing



Photograph provided by Stantec

OP 12 Existing
 Carlton (DHR #089-0010), Chancellorsville Battlefield (DHR #089-5180) &
 Falmouth Historic District (DHR #089-0067)

OP12 – Proposed



Simulation provided by Stantec

OP 12 Proposed
Carlton (DHR #089-0010), Chancellorsville Battlefield (DHR #089-5180) &
Falmouth Historic District (DHR #089-0067)



OP13 – Existing

OP 13 Existing
Roots House (DHR #089-5074), Chancellorsville Battlefield (DHR #089-5180) &
Falmouth Historic District (DHR #089-0067)

Photograph provided by Stantec



Simulation provided by Stantec

OP 13 Proposed
 Roots House (DHR #089-5074), Chancellorsville Battlefield (DHR #089-5180) &
 Falmouth Historic District (DHR #089-0067)

OP14 – Existing



Photograph provided by Stantec

OP 14 Existing

Belmont (DHR #089-0022), Chancellorsville Battlefield (DHR #089-5180), Battle of Fredericksburg II (DHR #111-5296) & Falmouth Historic District (DHR #089-0067)

OP14 – Proposed



Simulation provided by Stantec

OP 14 Proposed
Belmont (DHR #089-0022), Chancellorsville Battlefield (DHR #089-5180), Battle of
Fredericksburg II (DHR #111-5296) & Falmouth Historic District (DHR #089-0067)

OP15 – Existing



Photograph provided by Stantec

OP 15 Existing
Commercial Building, 105 West Cambridge St. (DHR #089-5082),
Chancellorsville Battlefield (DHR #089-5180), Battle of Fredericksburg II (DHR #111-5296) &
Falmouth Historic District (DHR #089-0067)

OP15 – Proposed



Simulation provided by Stantec

OP 15 Proposed
Commercial Building, 105 West Cambridge St. (DHR #089-5082),
Chancellorsville Battlefield (DHR #089-5180), Battle of Fredericksburg II (DHR #111-5296) &
Falmouth Historic District (DHR #089-0067)



Photograph provided by Stantec

OP 16 Existing
Falmouth Historic District (DHR #089-0067), House, 118 Cambridge Street (DHR #089-5086) &
House 120 Cambridge Street (DHR #089-5087)



OP16 - Proposed

Simulation provided by Stantec

OP 16 Proposed
 Falmouth Historic District (DHR #089-0067), House, 118 Cambridge Street (DHR #089-5086) &
 House 120 Cambridge Street (DHR #089-5087)

OP17 – Existing



Photograph provided by Stantec

OP 17 Existing
Clearview (DHR #089-0012) & Falmouth Historic District (DHR #089-0067)

OP17 – Proposed



Simulation provided by Stantec

OP 17 Proposed
Clearview (DHR #089-0012) & Falmouth Historic District (DHR #089-0067)

OP17 – Proposed Guide



Simulation provided by Stantec

OP 17 Proposed Guide
Clearview (DHR #089-0012) & Falmouth Historic District (DHR #089-0067)



Photograph provided by Stantec

OP 18 Existing
Glencaire (DHR #089-0020)



OP18 – Proposed

Simulation provided by Stantec

OP 18 Proposed
Glencairne (DHR #089-0020)



OP 19 Existing
Stafford Training School (DHR #089-0247)

Photograph provided by Stantec



OP 19 Proposed
Stafford Training School (DHR #089-0247)

Simulation provided by Stantec



OP21 – Existing

OP 21 Existing
Aquia Creek Quarries (DHR #089-0103)

Photograph provided by Stantec



OP21 – Proposed

OP 21 Proposed
Aquia Creek Quarries (DHR #089-0103)

Simulation provided by Stantec

II. DESCRIPTION OF THE PROPOSED PROJECT

- C. Describe and furnish plan drawings of all new substations, switching stations, and other ground facilities associated with the proposed project. Include size, acreage, and bus configurations. Describe substation expansion capability and plans. Provide one-line diagrams for each.**

Response: There are no new substations, switching stations, or other ground facilities associated with the proposed Rebuild Project. To support the Rebuild Project, the Company will complete the following substation work:

At Fredericksburg Substation, the Company will: (1) install a 230 kV breaker in the open position in the ring to terminate converted Line #29; (2) reconfigure line terminations of 230 kV lines #2157, #2090, and #2083 (the latter two of which are not otherwise involved in this Rebuild Project); (3) upgrade circuit breakers, switches, line leads, current transformers, relays, and wave trap to 230 kV and 4000A; and (4) ensure terminal equipment will not limit conductor ratings.

At Cranes Corner Substation, the Company will: (1) upgrade the Line #2157 wave trap; (2) upgrade the circuit breaker lead and line lead to 4000A.

At Stafford Substation, the Company will: (1) upgrade line switches to 4000A; and (2) upgrade terminal equipment as needed to not limit conductor ratings.

At Aquia Harbour Station, the Company will: (1) upgrade circuit breaker switches and wave traps to 4000A; (2) ensure that terminal equipment will not limit conductor ratings; (3) upgrade the Line #252 wave trap, line lead, circuit breaker switch, circuit breaker lead, and other terminal equipment to 4000A; (4) upgrade switches to 4000A; and (5) upgrade circuit breakers to 4000A if the equipment are nearing their end of life.

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

- A. Describe the character of the area that will be traversed by this line, including land use, wetlands, etc. Provide the number of dwellings within 500 feet, 250 feet and 100 feet of the centerline, and within the ROW for each route considered. Provide the estimated amount of farmland and forestland within the ROW that the proposed project would impact.**

Response: **Land Use**

The proposed Rebuild Project is located in Stafford County and the City of Fredericksburg. The Rebuild Project crosses the Rappahannock River. Land use at the southern end of the Rebuild Project in Fredericksburg is urban. Heading north, the land use begins to transition to open space areas and rural lands with scattered residential developments. After crossing Courthouse Road, land use becomes suburban with numerous residential developments occurring outside the existing right-of-way.

Farmlands/Forests

The corridor goes through approximately 68.5 acres of prime farmland soils and 80.4 acres of farmland of statewide importance according to the Natural Resource Conservation Service Data. See Attachment III.A.1. The existing corridor is currently maintained for transmission line operation, and no forestland occurs within the existing right-of-way. The right-of-way expansion is only proposed between Structures #29/1725 and #29/1728, and #2104/5447 and #2104/5450, near Dogwood Airpark, requiring approximately one acre of tree clearing within a privately owned lot. Additional discussion on farmlands and forests is provided in Section 2.L of the DEQ Supplement.

Wetlands

The proposed Rebuild Project is located within the Lower Rappahannock and Lower Potomac watersheds, Hydrologic Unit Codes 02080104 and 02070011. According to the U.S. Geological Survey (“USGS”) Fredericksburg [1994] topographic quadrangle, existing transmission line cross the Rappahannock River (Structures #29/1693-1694) and Potomac Creek (Structures #29/1734-1735 and #2104/5458-5459). According to the USGS Stafford [1994] topographic quadrangle, the existing transmission lines cross Accokeek Creek (Structures #29/1754-1755 and #2104/5480-5481) and Austin Run (Structures #29/1781-1782 and #2104/5514-5515).

On behalf of the Company, Stantec Consulting Services, Inc. (“Stantec”) conducted a desktop level evaluation to identify potential wetlands and other surface waters within the Rebuild Project. The details of the evaluation are discussed in Section 2.D of the DEQ Supplement. Prior to construction, the Company will delineate

wetlands and other waters of the United States using the Routine Determination Method, as outlined in the 1987 Corps of Engineers Wetland Delineation Manual and methods described in the 2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plan Region (Version 2.0). The Company will conduct the delineation using the latest guidance provided by the Corps and EPA, and coordinate with DEQ if needed. Prior to construction, the Company will obtain any necessary permits to impact jurisdictional waters.

For additional description of the character of the area that will be traversed by the Rebuild Project and the related impacts, see Section 2.D of the DEQ Supplement.

Historic Features

In accordance with the *Guidelines for Assessing Impacts of Proposed Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia (2008)*, a Stage I Pre-Application Analysis was conducted by Stantec. This report was forwarded to the VDHR and is included as Attachment 2.I.2 to the DEQ Supplement. The background archival research identified three (3) National Historic Landmarks within the 1.5-mile radius; fourteen (14) NRHP-listed resources and three (3) battlefields within the one-mile radius; and six (6) NRHP-eligible resources within the 0.5-mile radius.

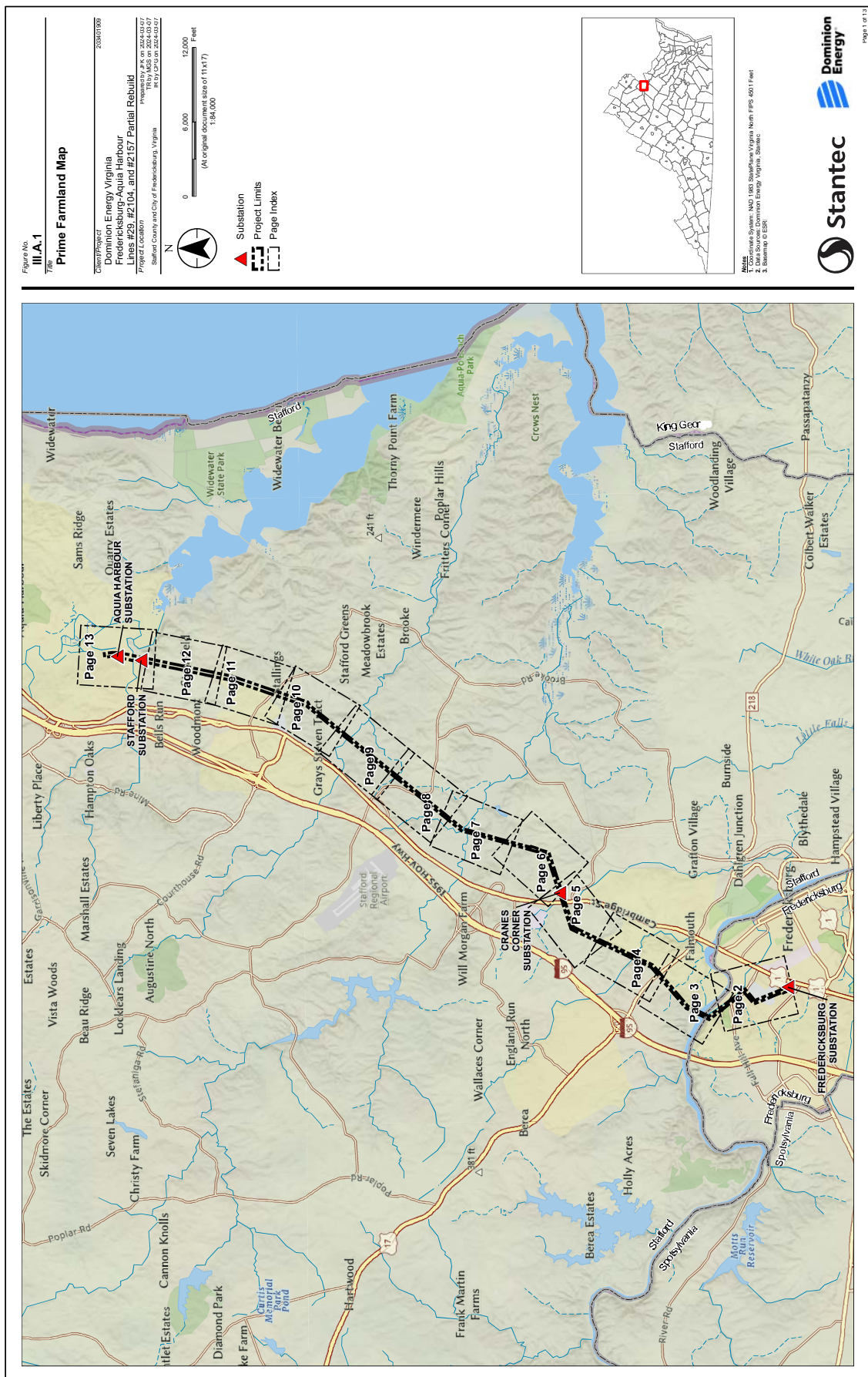
Threatened and Endangered Species

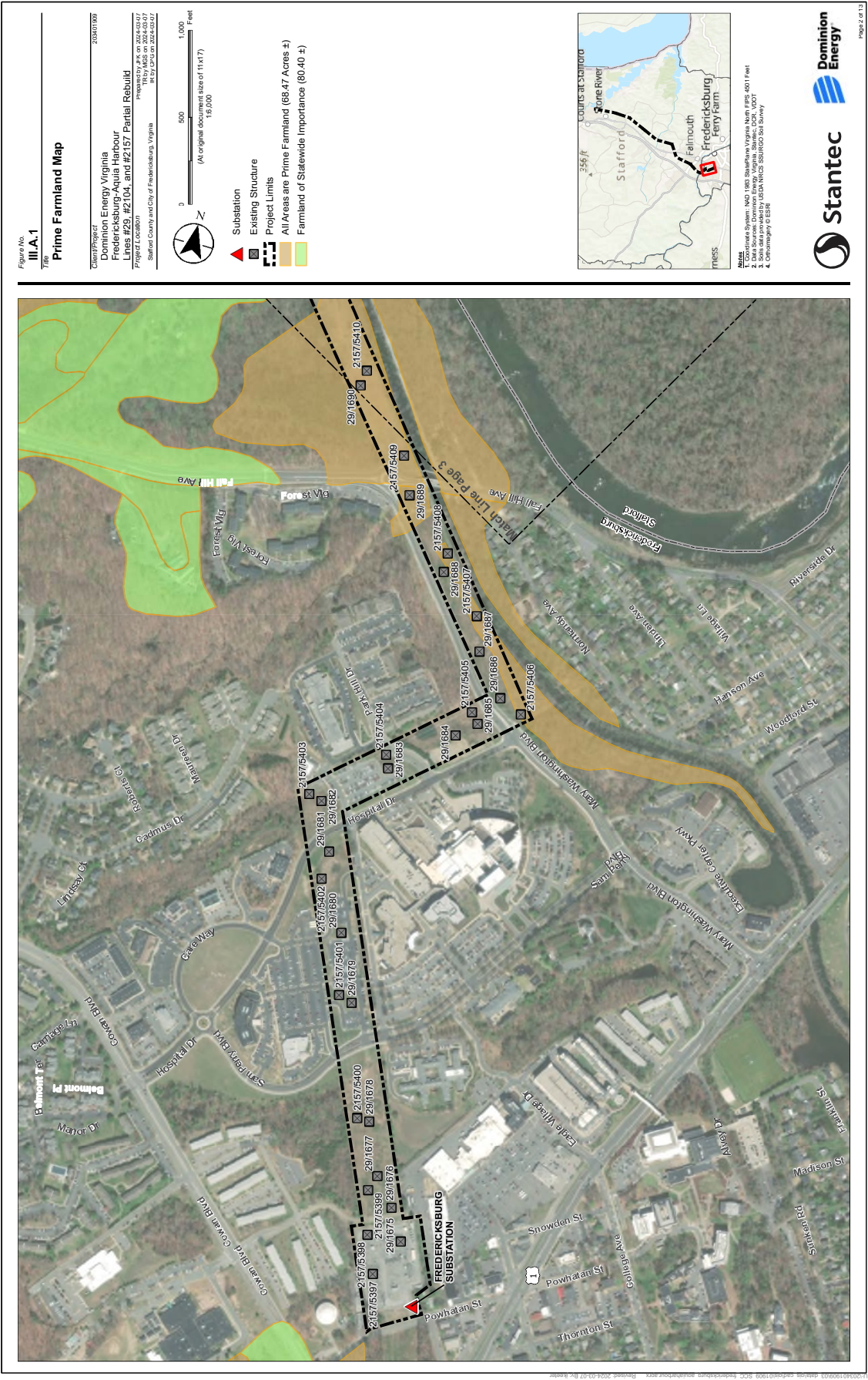
Online database searches for threatened and endangered species in the vicinity of the Rebuild Project, including the U.S. Fish and Wildlife (“USFWS”) Information, Planning, and Conservation (“IPaC”) system, the Virginia Department of Wildlife Resources (“DWR”) Virginia Fish and Wildlife Information Service (“VAFWIS”), Virginia Department of Conservation and Recreation (“DCR”), Natural Heritage Data Explorer (“NHDE”), and the Center for Conservation Biology (“CCB”) Bald Eagle Nest Locator, were conducted, which identified federal- and state-listed species that have the potential to occur within the vicinity of the Rebuild Project right-of-way. These results are included in Attachment 2.G.1 to the DEQ Supplement. The Company intends to reasonably minimize any impact on these resources and coordinate with pertinent agencies, as appropriate.

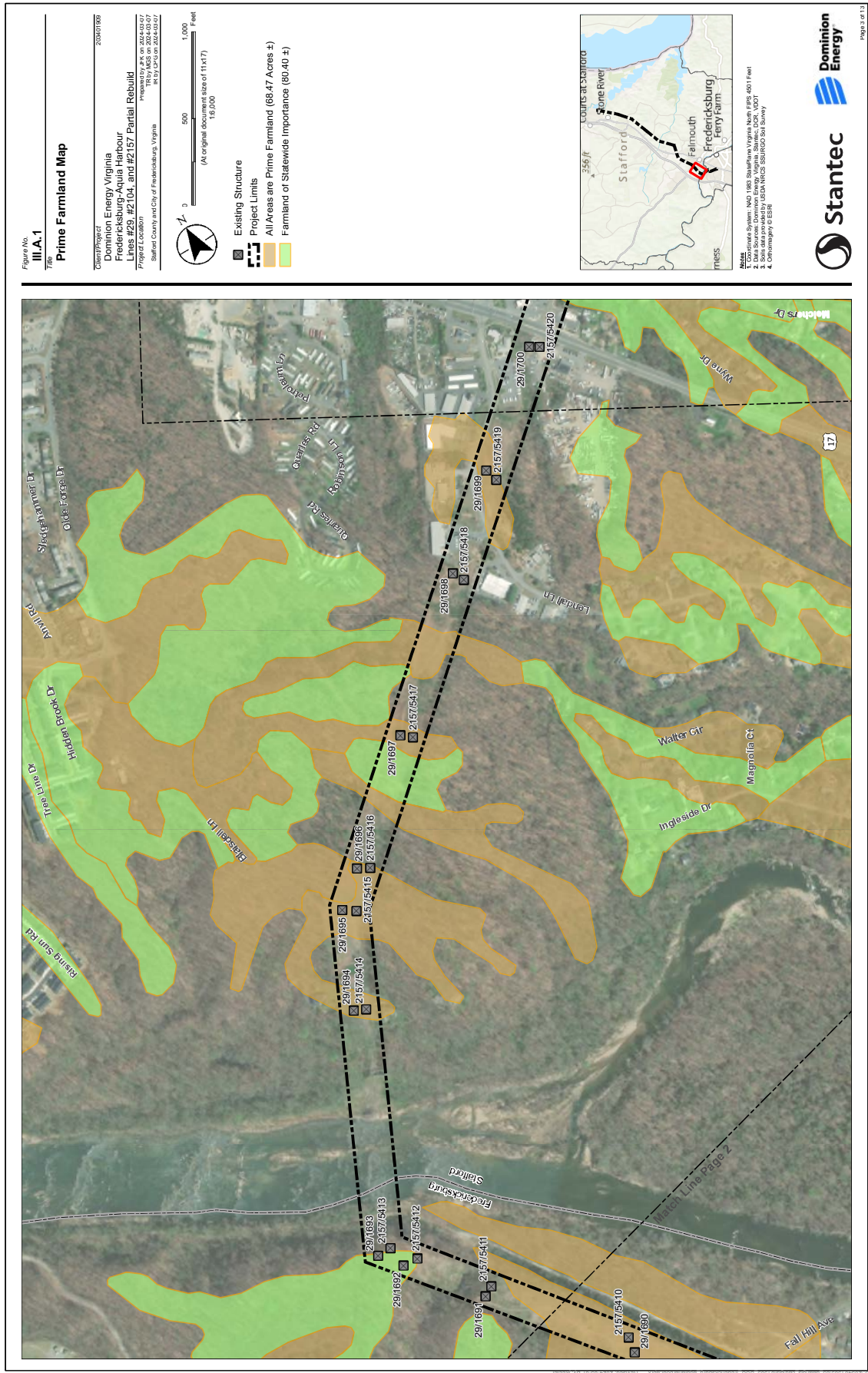
Dwellings

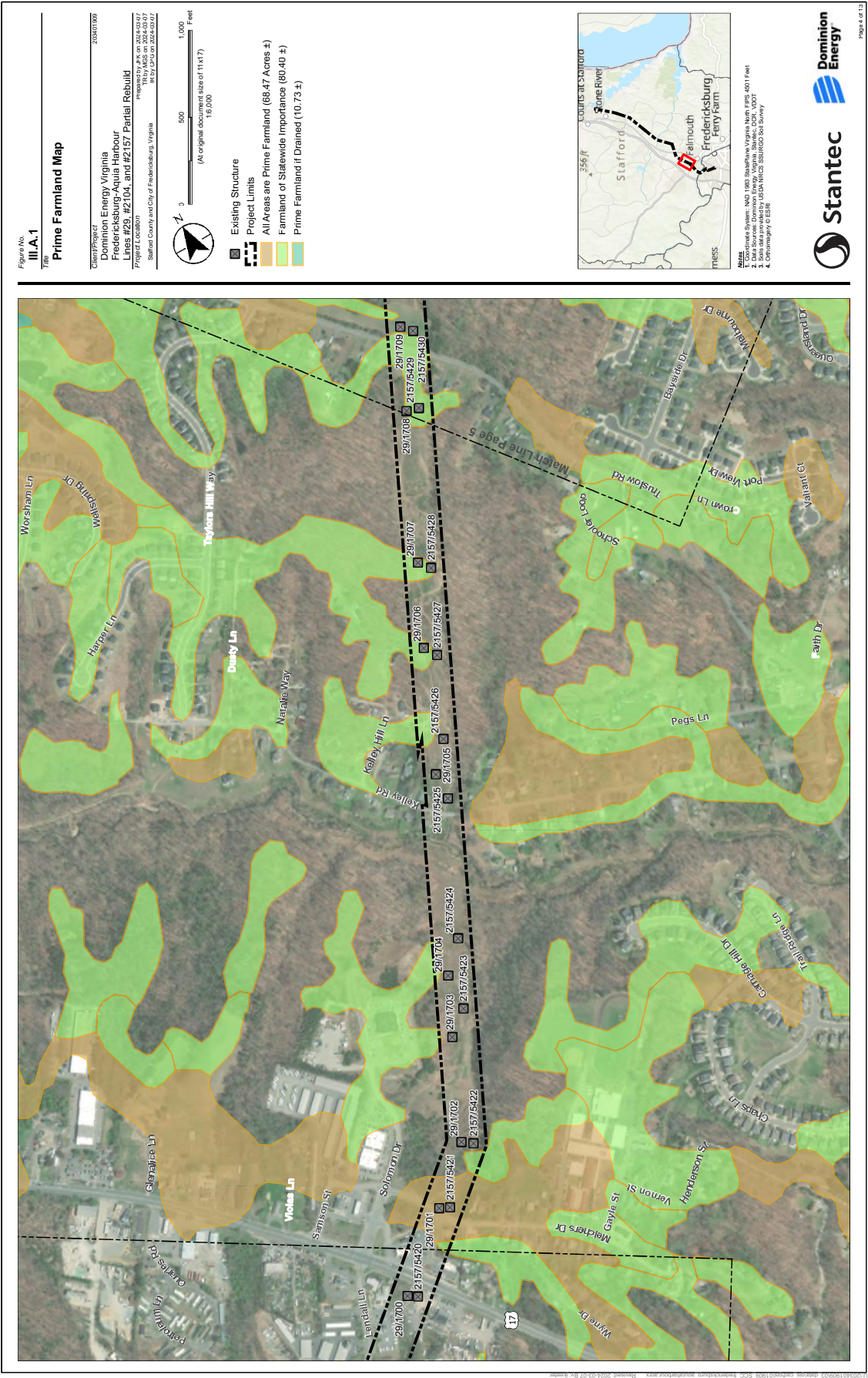
According to Stafford County and the City of Fredericksburg GIS data, there are approximately 410 dwellings in Stafford County within 500 feet of the centerline of the Rebuild Project, 38 dwellings in the City of Fredericksburg within 500 feet of the centerline, 166 dwellings in the Stafford County within 250 feet of the centerline, 9 dwellings in the City of Fredericksburg within 250 feet of the centerline, 25 dwellings in Stafford County within 100 feet of the centerline, and 0 dwellings in the City of Fredericksburg within 100 feet of the centerline.

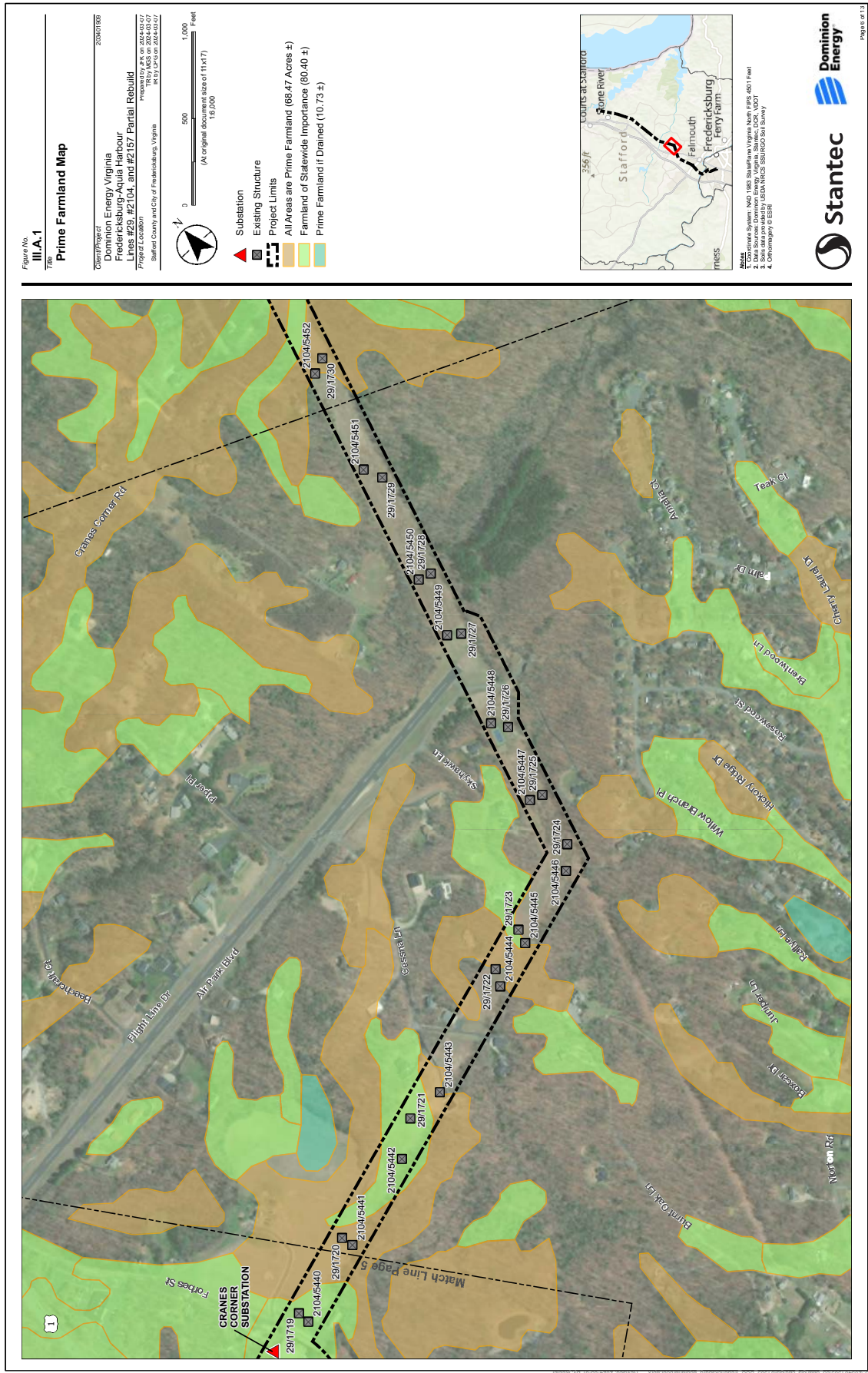
For additional description of the character of the area that will be traversed by the Rebuild Project and the related impacts, see the DEQ Supplement, specifically as to wetlands (Section 2.D), forests (Section 2.L), agricultural lands (Section 2.L), historic resources (Section 2.I), and wildlife (Section 2.K).

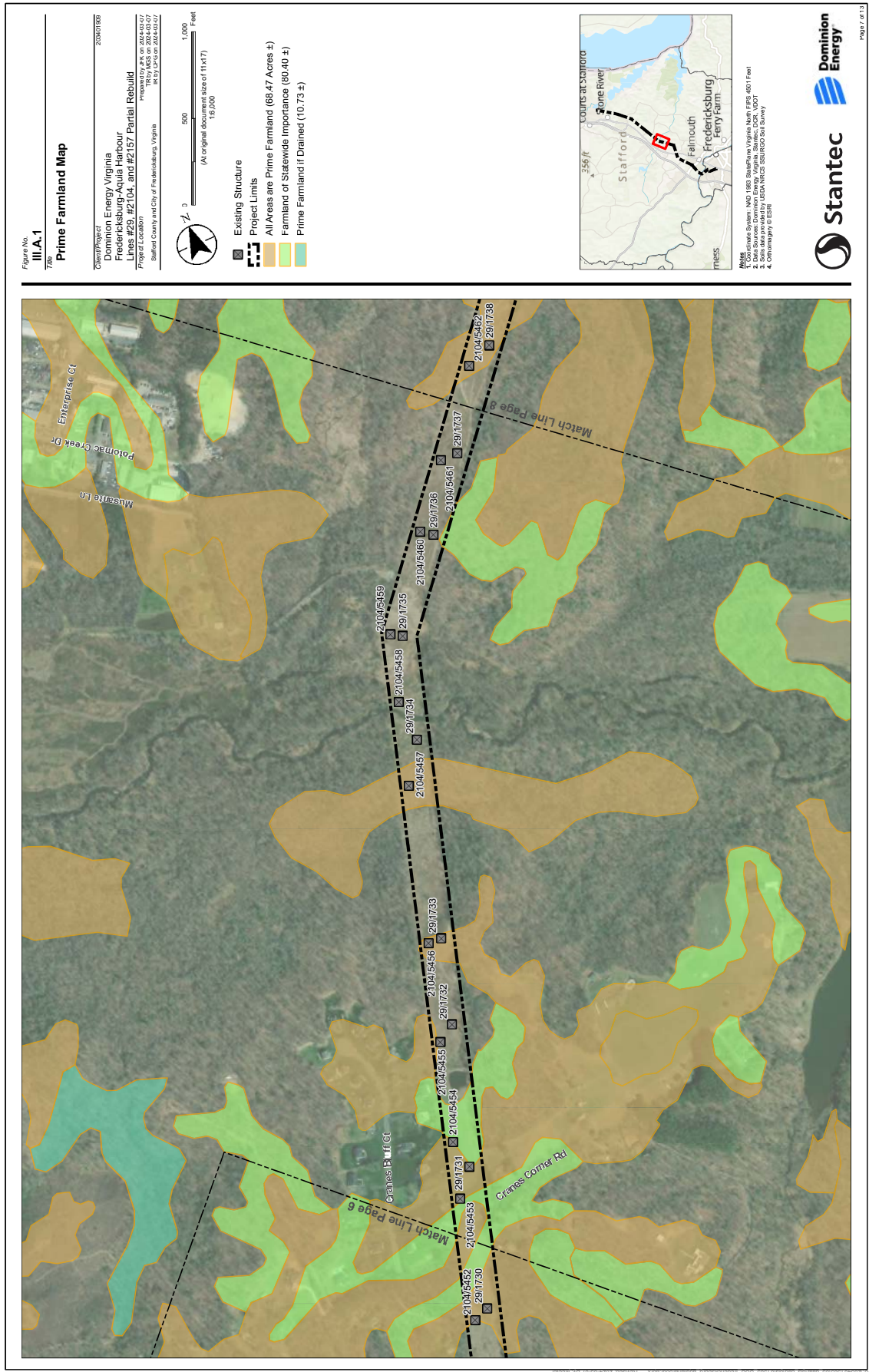


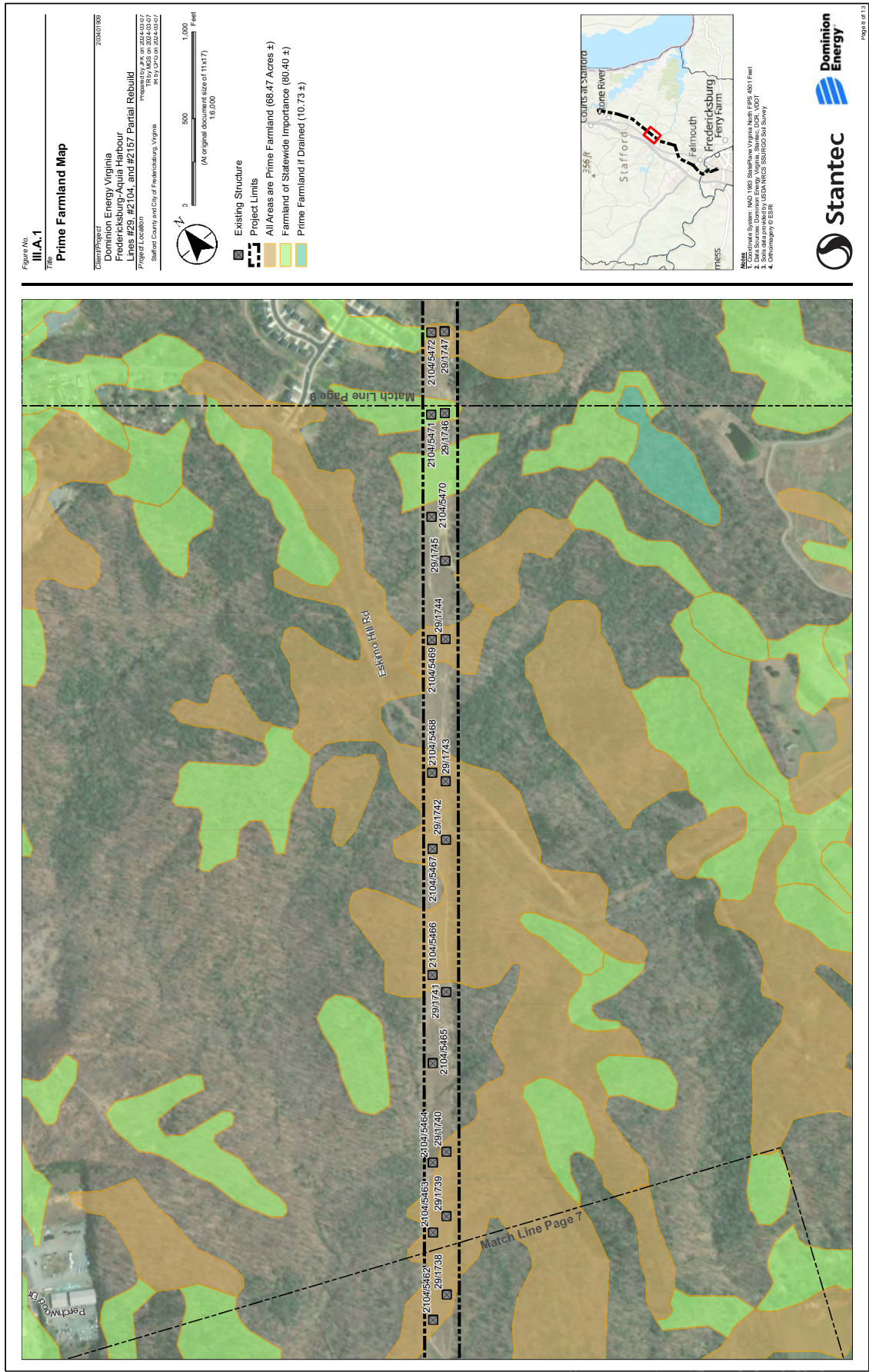


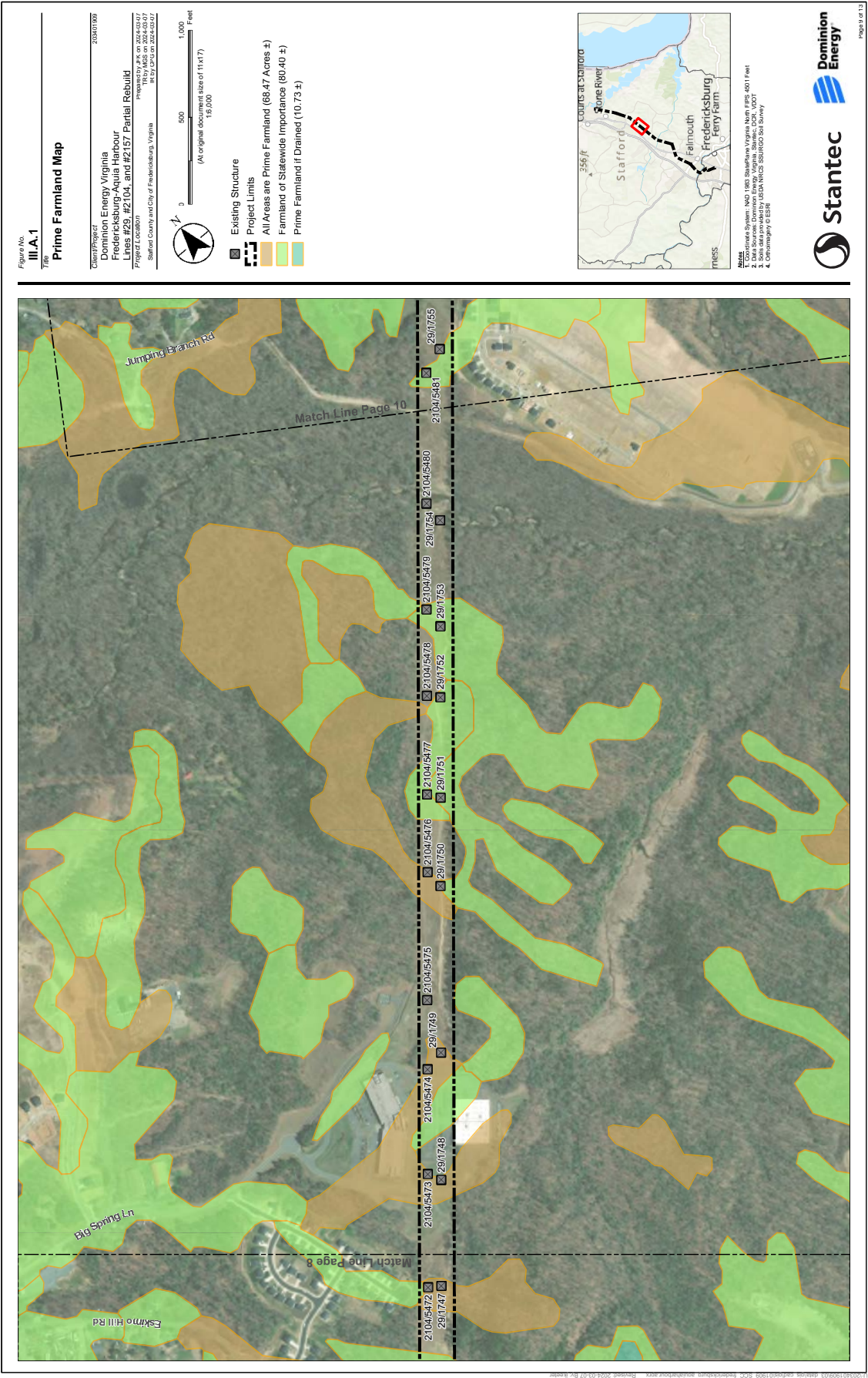


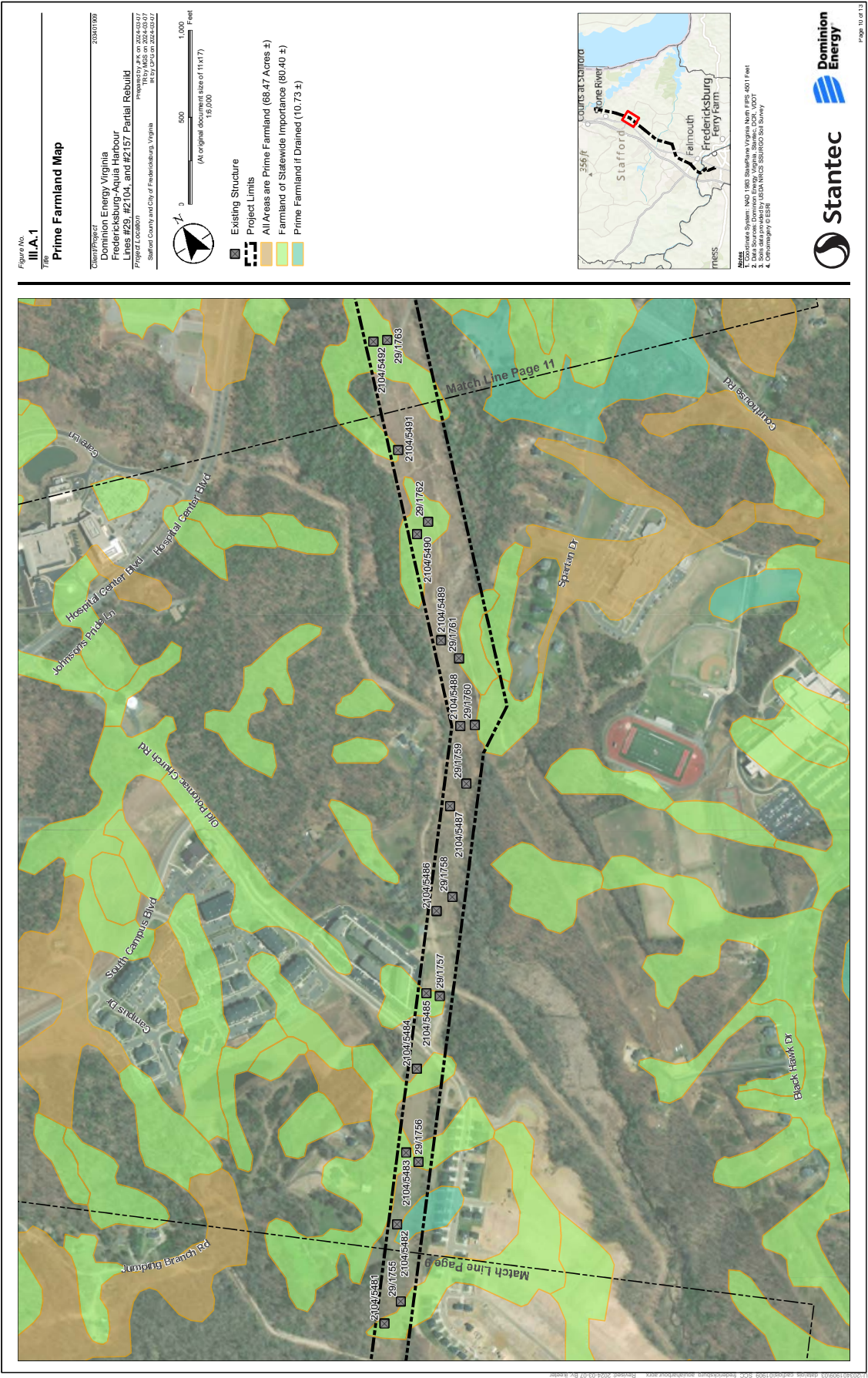


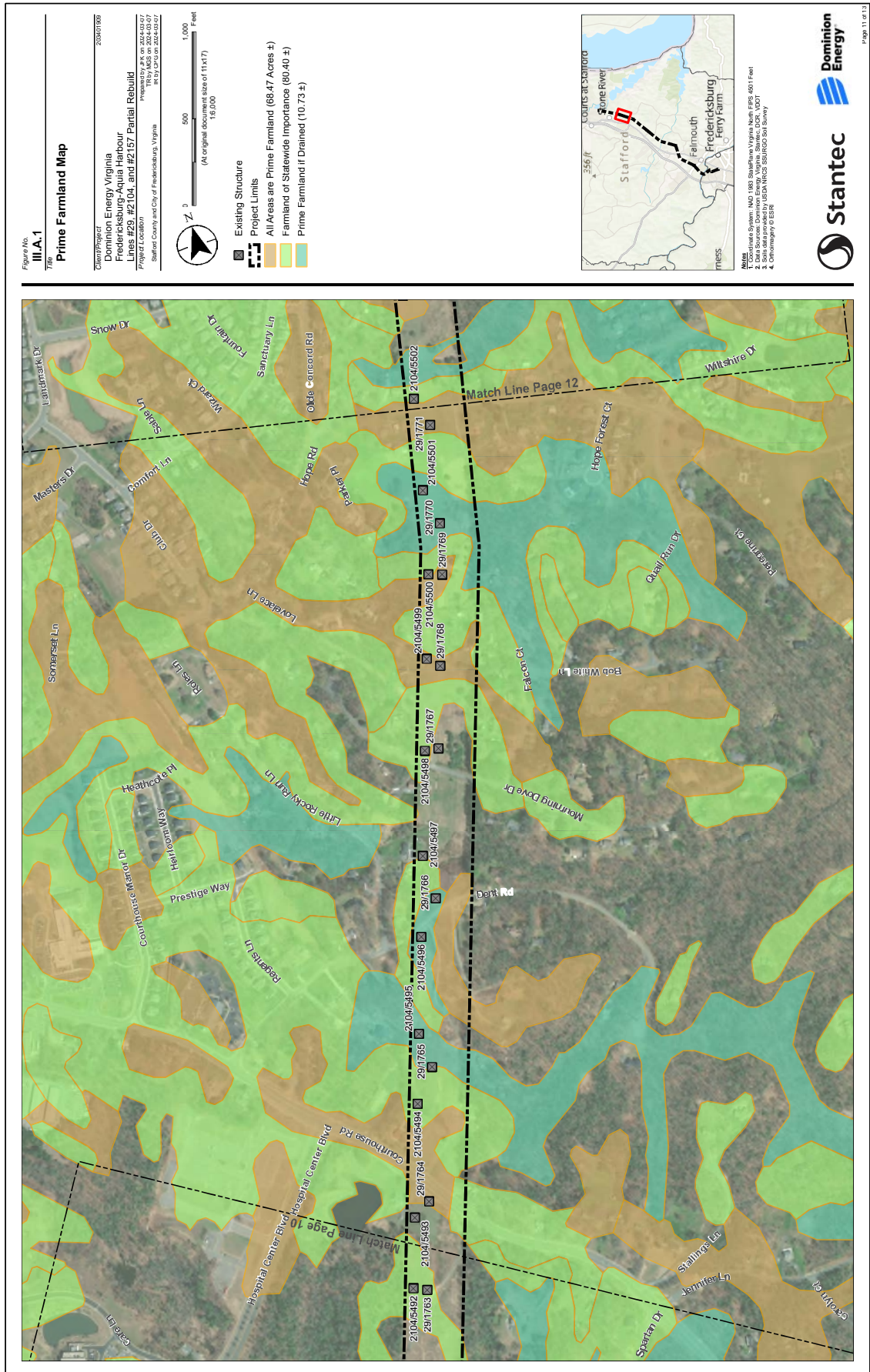


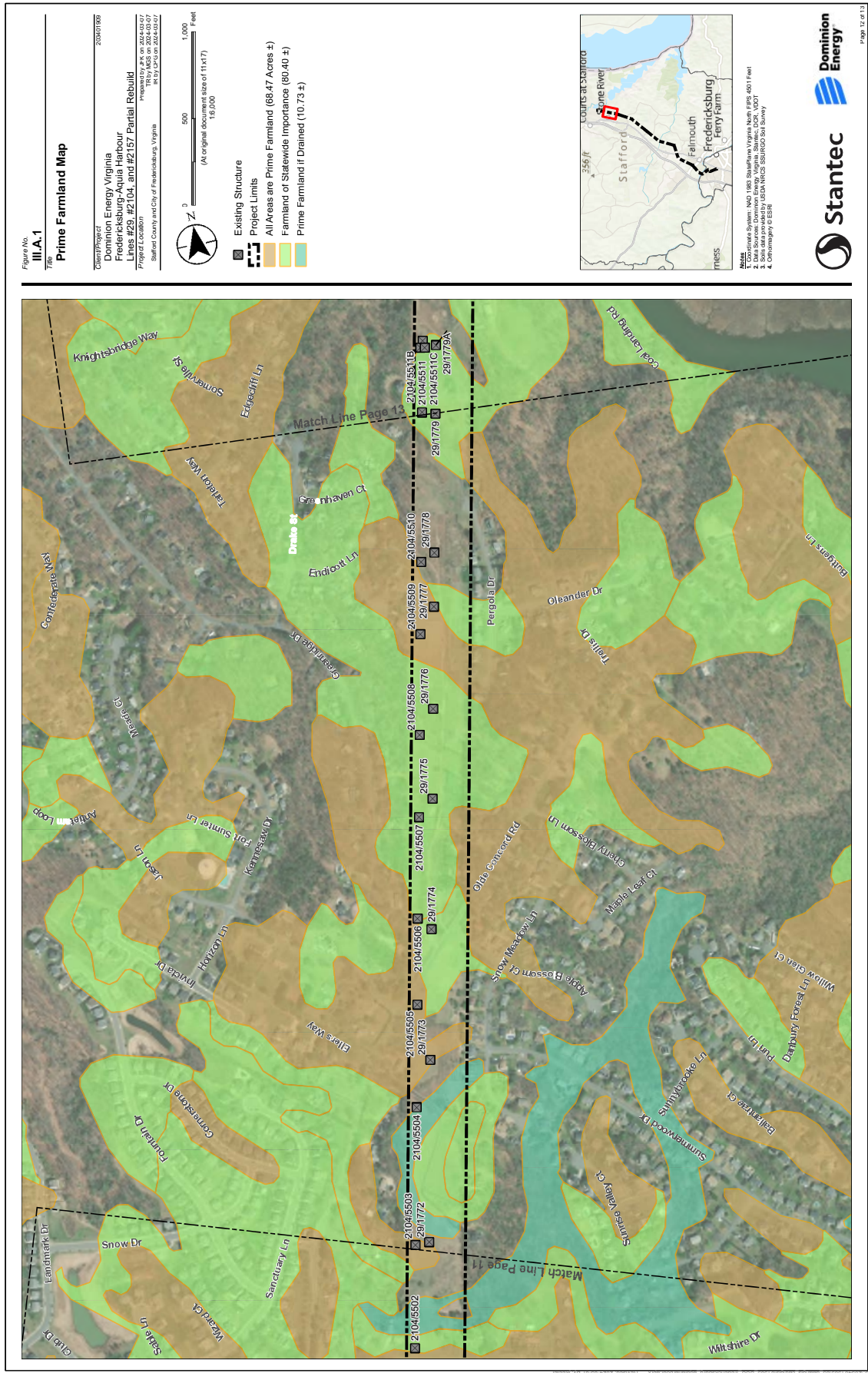


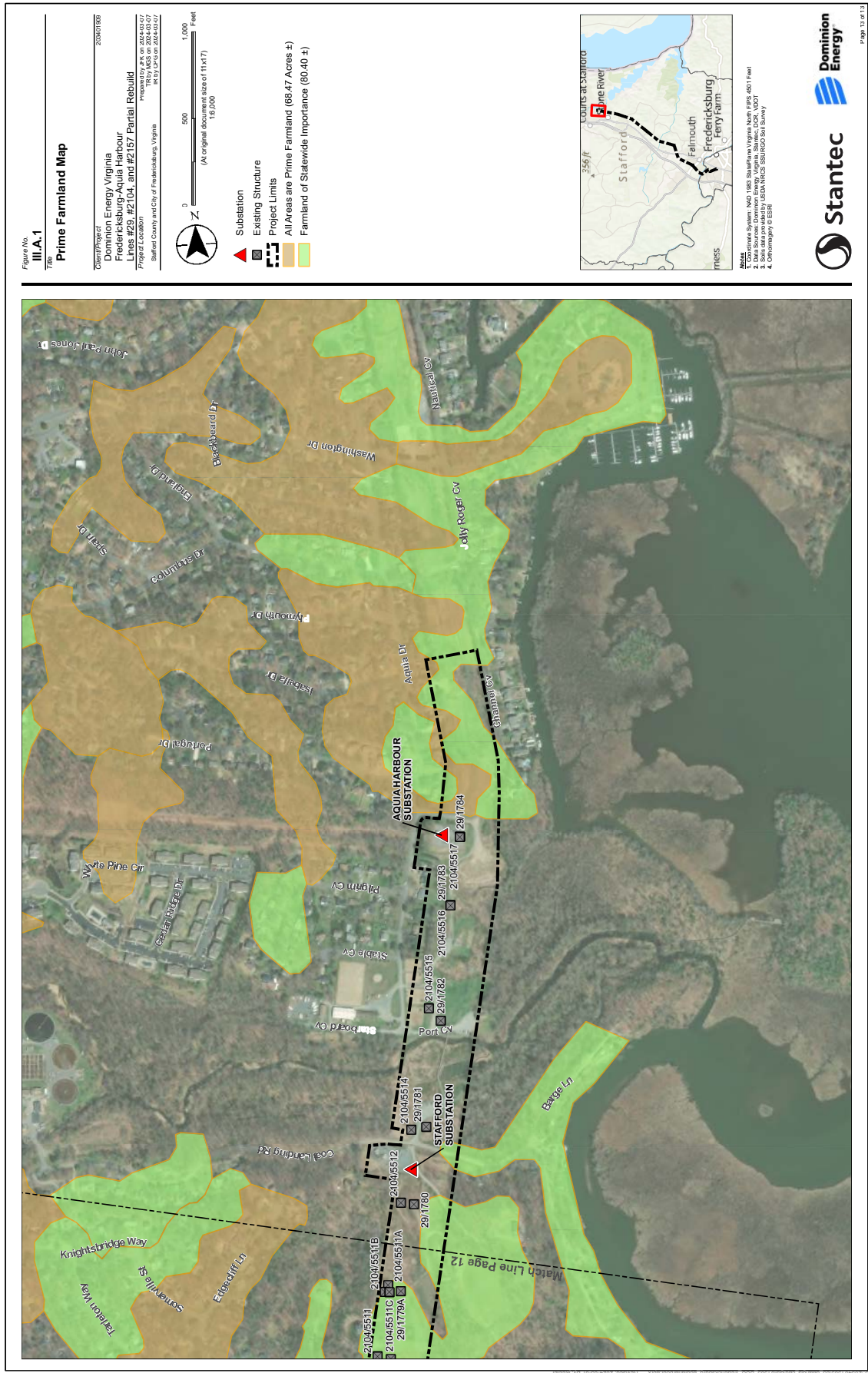












III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL, AND HISTORIC FEATURES

B. Describe any public meetings the Applicant has had with neighborhood associations and/or officials of local, state or federal governments that would have an interest or responsibility with respect to the affected area or areas.

Response: In accordance with Va. Code § 15.2-2202 E, letters were delivered to the City and/or County Administrator or City and/or County Executive in each municipality where the Rebuild Project is located, advising of the Company's intention to file this Application and inviting these localities to consult with the Company about the Rebuild Project. These letters are included as Attachment V.D.1. See Section V.D of the Appendix.

In late September 2023, Company representatives began meeting with representatives from the Dogwood Airpark Association, the private airpark where a small section of new right of way is required, as discussed in Section II.A.9 of the Appendix. These interactions began with an initial phone call with Linda Burdette, President of the Dogwood Airpark Association on September 22, 2024. Additional coordination included in-person meetings at Ms. Burdette's home with other leadership representatives of the Dogwood Airpark Association on September 27, 2023, November 16, 2023, and a virtual meeting on February 9, 2024. Company representatives also met with the broader Dogwood Airpark community during an informational meeting hosted by Ms. Burdette on February 26, 2024. During that meeting, Company representatives discussed the need for the project, showcased visual simulations specific to the Airpark, and noted extensive coordination with the Dogwood Airpark representative with whom the Company has been working to acquire new right of way.

Information is provided to the public through an internet website dedicated to the Rebuild Project:

www.dominionenergy.com/FredericksburgPossumPoint

The website includes route maps, an explanation of need, a description of the Rebuild Project and its benefits, information on the Commission review process, structure diagrams and simulations, and an interactive "backyard app" tool allowing users to input their address to see where they live in relation to the project and proposed transmission line engineering in the vicinity.

Save-the-date postcards were sent to 2,088 property owners and residents inviting them to attend an open house event to share specific details relating to the project and the Commission process, and to answer any questions. The postcards also included a map of the project along with a brief description. These notifications were also provided by a Company representative to officials from the City of Fredericksburg and Stafford County. Examples of the postcards and letters are included as Attachment III.B.1.

A variety of graphics were presented to the public at the open house, including simulations of the proposed Rebuild Project from key locations. These key location simulations are included as Attachment III.B.2.

The postcard sent to property owners outlined the scope of the Rebuild Project, provided an overview map of the line, and invited recipients to visit www.dominionenergy.com/fredericksburgpossumpoint for more information regarding the Rebuild Project. The open house event was held on February 8, 2024, from 5:30 p.m. to 7:30 p.m. at the Rowser Building, located at 1739 Jefferson Davis Hwy, Stafford, VA 22554, at which 21 people attended. Included in the attendees were two members of the Stafford County Board of Supervisors. A company representative discussed at length with Supervisors Meg Bohmke and Deuntay Diggs the Rebuild Project and answered their questions during the community meeting.

In addition to the postcards, print advertisements for the open house were placed in local newspapers, The Washington Post and The Free Lance Star, prior to the event. All newspaper print advertisement for The Washington Post ran on February 1, 2024, and the print advertisement for the Free Lance Star ran on February 4, 2024.

Digital ads also ran on Facebook, Instagram, Google Video and NextDoor in both English and Spanish languages. A copy of the print advertisement placed in the newspapers is provided in Attachment III.B.3. Copies of digital advertising and related messaging are provided as Attachment III.B.4.

The Rebuild Project's digital and social media campaign ran from January 29, 2024 – February 8, 2024. The campaigns targeted audiences in the City of Fredericksburg and Stafford County.

Pre-event digital ads generated over 579,000 impressions and over 45,000 link clicks. There were over 39,000 video views with a 50.60% average video completion rate and the digital ads had a 7.77% click thru rate.

All of the open house materials, including photograph renderings and an overview video, have been posted on the Rebuild Project's website.

As part of preparing for this Rebuild Project, the Company researched the demographics of the surrounding communities using the Environmental Protection Agency's EJ mapping and screening tool, EJScreen 2.2 and census data from the U.S. Census Bureau 2017-2021 American Community Survey. This information revealed that 42 Census Block Groups ("CBGs") are within one mile of the existing transmission line to be rebuilt. A review of ethnicity, income, age, and education data identified populations within the study area that meet the Virginia Environmental Justice Act threshold to be defined as Environmental Justice Communities ("EJ Communities").

Pursuant to Va. Code §§ 56-46.1 C and 56-259 C and FERC Guidelines, there is a strong preference for the use of existing utility rights-of-way whenever feasible. The Rebuild Project is primarily located within the existing right-of-way and will only require a small amount of additional permanent right-of-way between Structures #29/1725 and #29/1728, and #2104/5447 and #2104/5450 (near Dogwood Airpark). The structural height average will increase by 44 feet from approximately 45 feet to approximately 99 feet. Height differences will vary per structural location. Based on the analysis of the Rebuild Project, the Company does not anticipate disproportionately high or adverse impacts to the surrounding community and the EJ Communities located within the study area, consistent with the Project design to reasonably minimize impacts.

In addition to its evaluation of impacts, the Company will engage the EJ Communities and others affected by the Rebuild Project in a manner that allows them to meaningfully participate in the Rebuild Project development and approval process so that their views and input can be taken into consideration. See Attachment III.B.5 for a copy of the Company's Environmental Justice Policy.



Dominion Energy image. Not project specific.

Fredericksburg-Potomac Point Sub Map & Postcard_NW992955VCP_Jan2024.indd 1

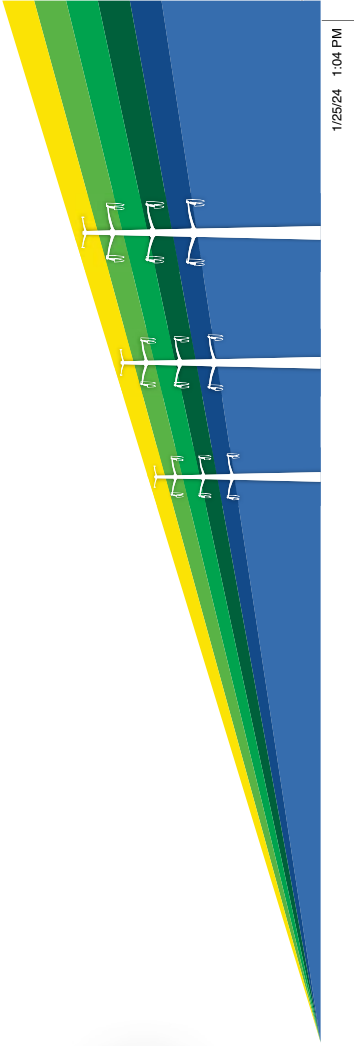


Electric Transmission
P.O. Box 26666
Richmond, VA 23261

Learn more about a transmission line rebuild project
in the City of Fredericksburg and Stafford County, Virginia.



SCAN HERE
TO LEARN
MORE



Join us at our Community Meeting

Fredericksburg-Possum Point 230 kV Electric Transmission Line Rebuild – Phase 1

At Dominion Energy, we are committed to continually reviewing and analyzing our energy infrastructure to provide safe and reliable electric service to the communities we serve. You are receiving this notification

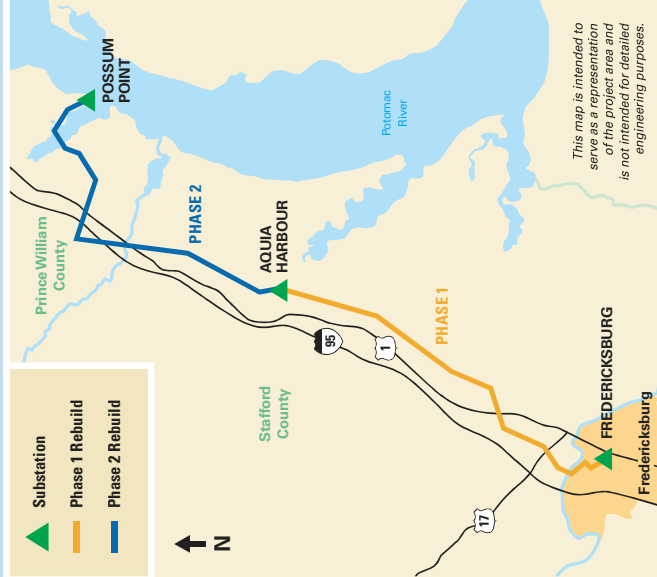
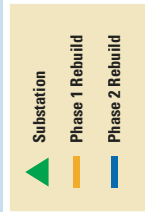
as we prepare for Phase 1 of this project to upgrade and rebuild existing electric transmission lines between our Fredericksburg and Possum Point Substations within the City of Fredericksburg, Stafford County, and Prince William County. Phase 1 will consist of rebuilding transmission lines between Fredericksburg and Aquia Harbour Substations only, in Stafford County, mostly within existing right of way. Phase 2, continuing through Prince William County, will come at a later date.

While well maintained over its lifespan, due to the age of the infrastructure, the lines and related components need to be replaced to ensure continued reliable operation and to accommodate increased energy demand on the system.

To learn more about the project, please consider joining us for a community meeting on February 8, 2024. You will have the opportunity to speak to the project team directly and ask questions. No formal presentation will be provided, so please feel free to stop by any time during the meeting. Your continued involvement, participation, and input is essential to this process.

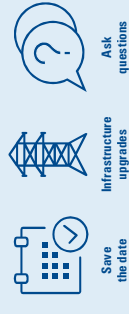


SCAN HERE
TO LEARN
MORE



MEETING DETAILS

Thursday, February 8, 2024
5:30 p.m. to 7:30 p.m.
Rowser Building, Room A
1739 Jefferson Davis Highway
Stafford, VA 22554



CONTACT US

Website: DominionEnergy.com/fredericksburgpossumpoint
Phone: 888-291-0190
Email: powerline@dominionenergy.com

Protecting the grid against natural and man-made acts is a top priority. You can learn more about our commitment to safety at powerlines101.dominionenergy.com.

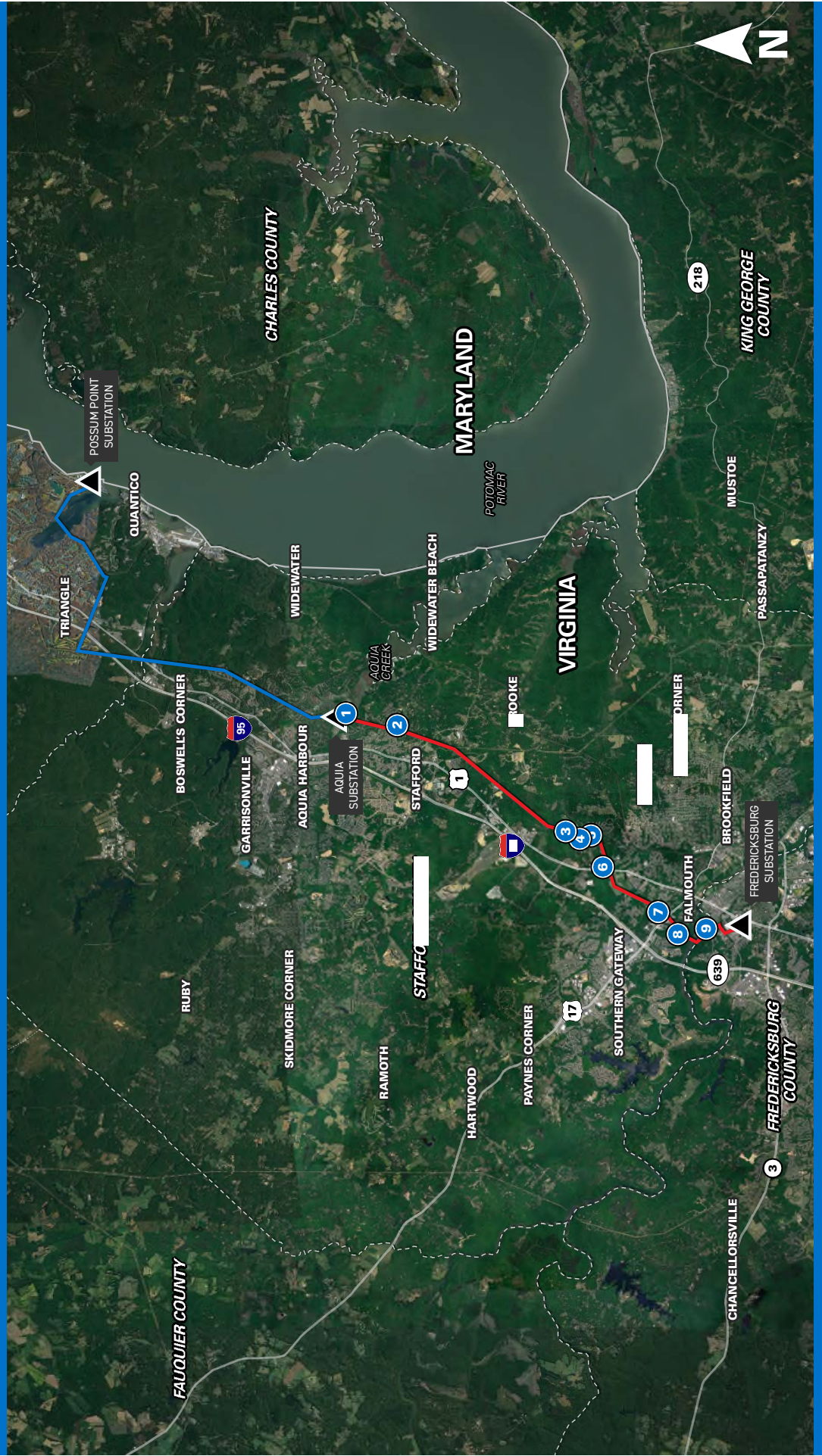
FREDERICKSBURG TO POSSUM POINT

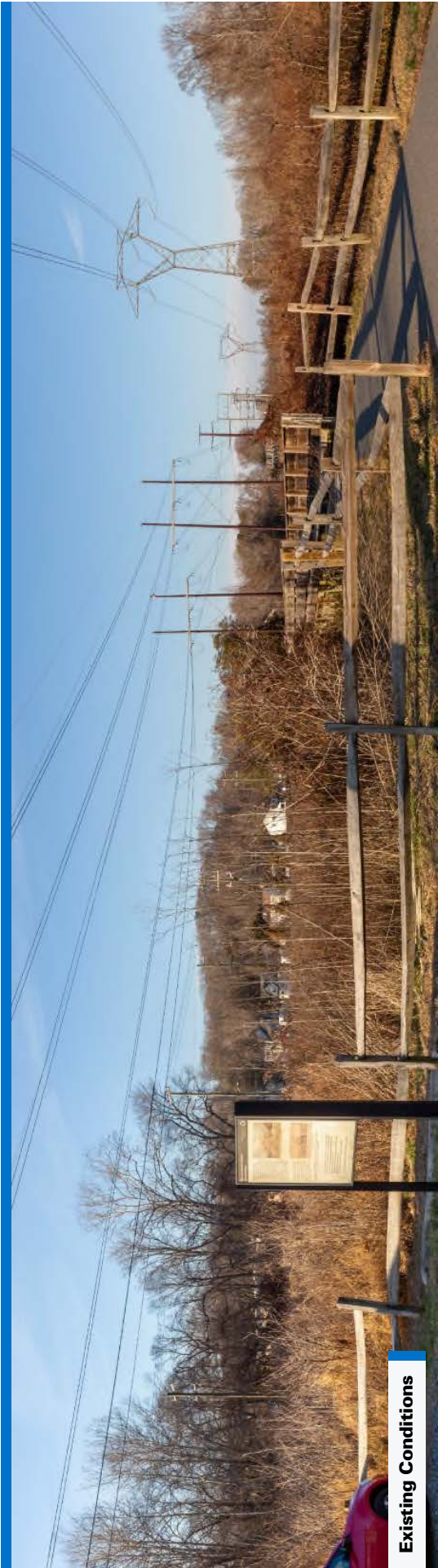
Transmission Line Project

Photo Viewpoint Map



- Photo Simulation
- Substation
- Fredericksburg - Aquia Harbor (Phase 1)
- Aquia Harbor - Possum Point (Phase 2)





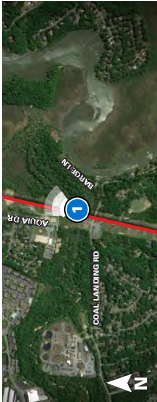
Visualization is for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

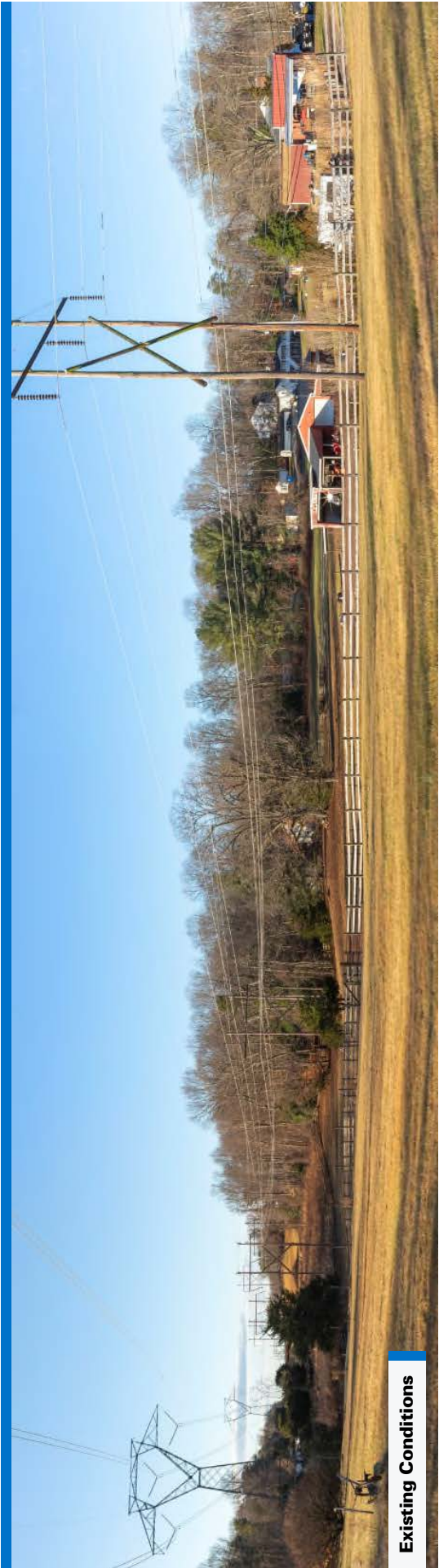
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Transmission Line Project

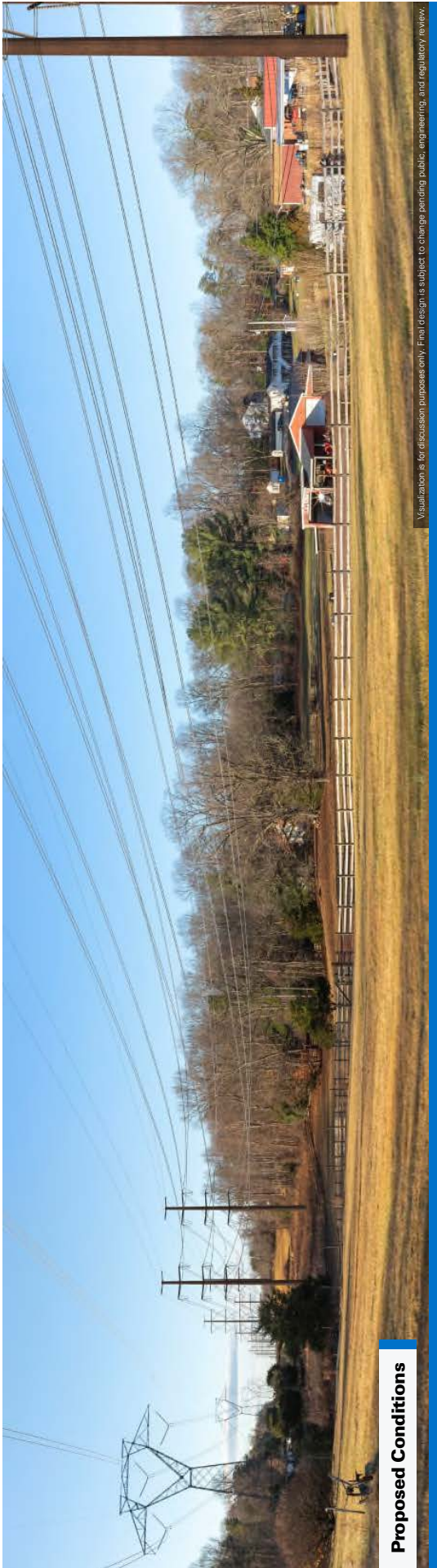
Viewpoint 1

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Fredericksburg - Aquia Harbor (Phase 1) Photo Simulation





Existing Conditions



Proposed Conditions

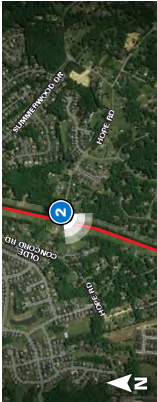
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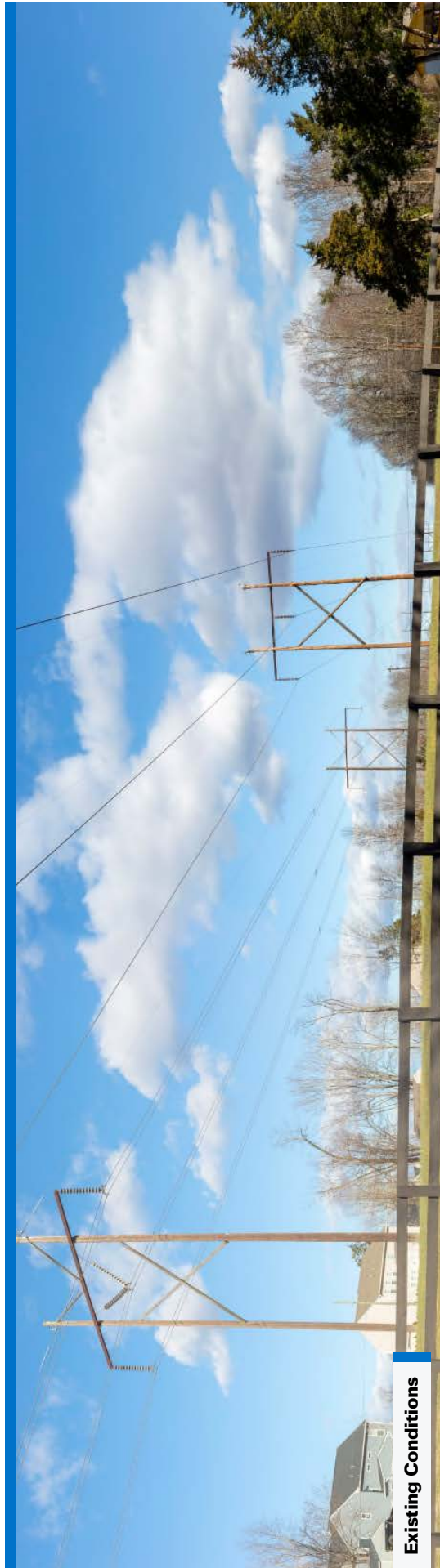
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Transmission Line Project

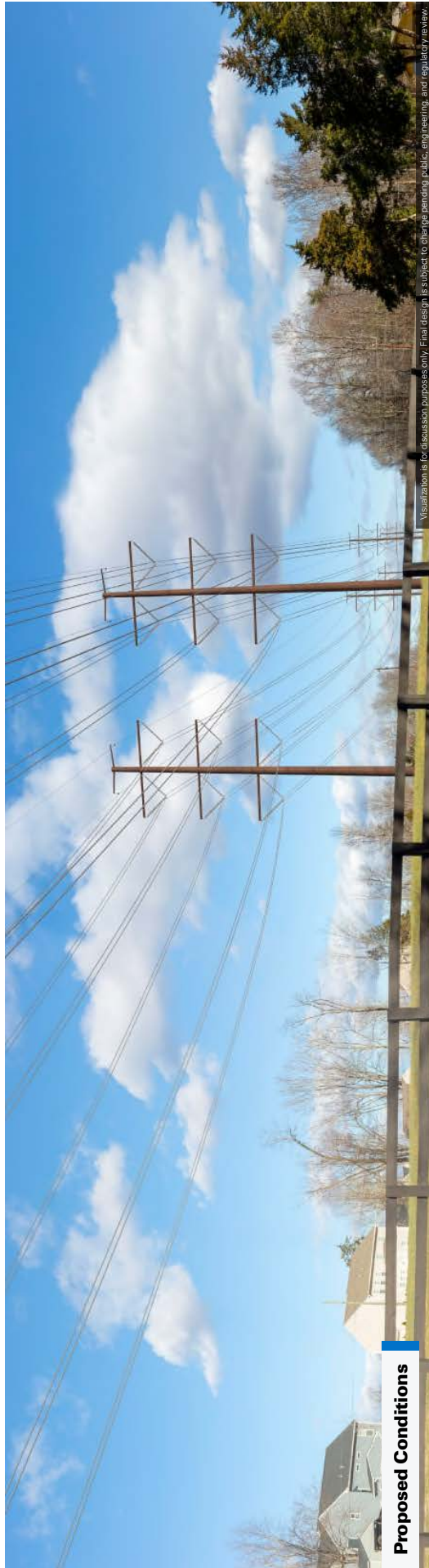
Viewpoint 2

Date: 1/20/2023 Time: 8:47 am Direction: Southwest
— Fredericksburg - Aquia Harbor (Phase 1) ② Photo Simulation





Existing Conditions



Proposed Conditions

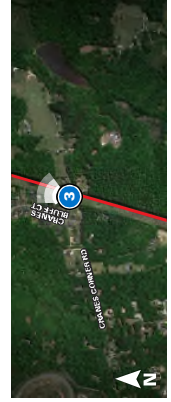
Visualization is for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

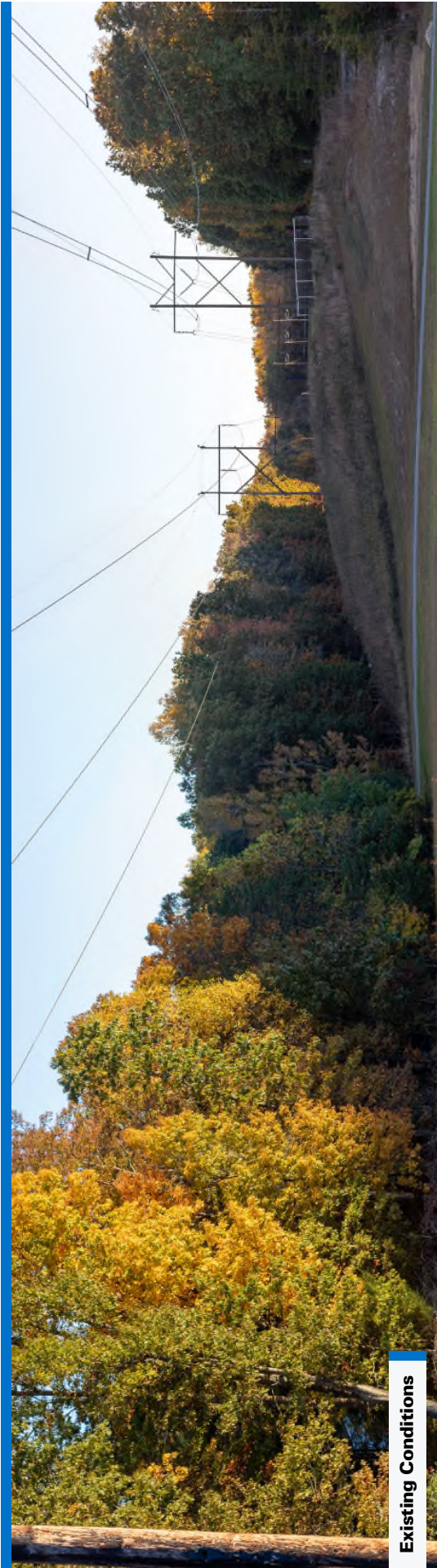
FREDERICKSBURG TO POSSUM POINT Transmission Line Project

Viewpoint 3

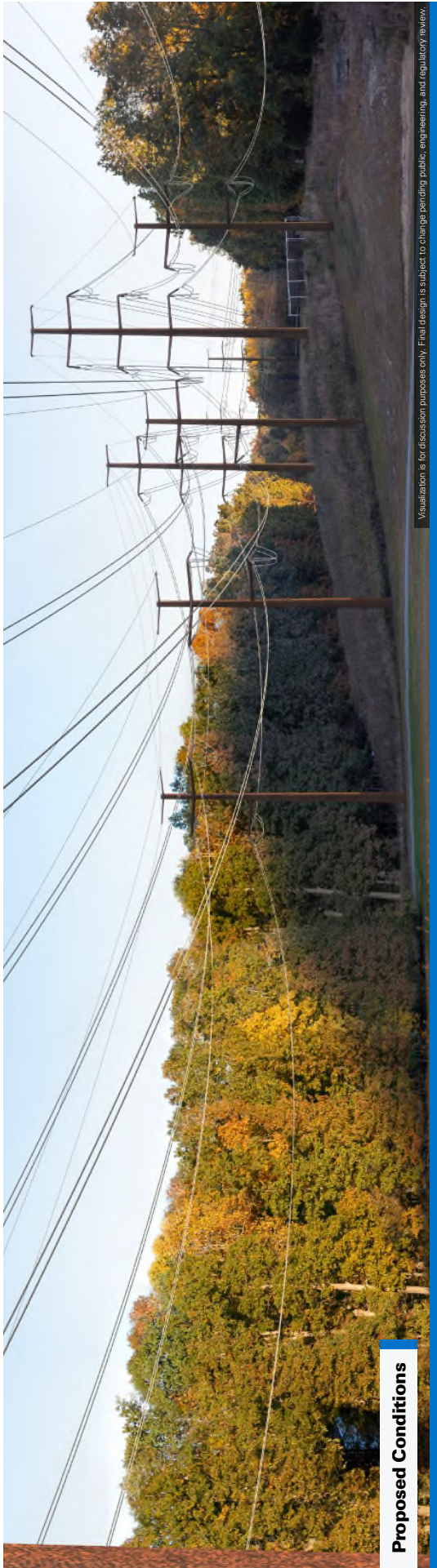
Date: 1/20/2023 **Time:** 10:17 am **Direction:** North

— Fredericksburg - Aquia Harbor (Phase 1) ③ Photo Simulation





Existing Conditions



Proposed Conditions

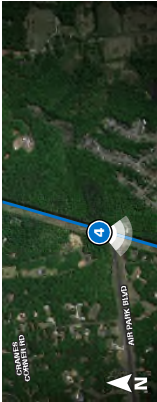
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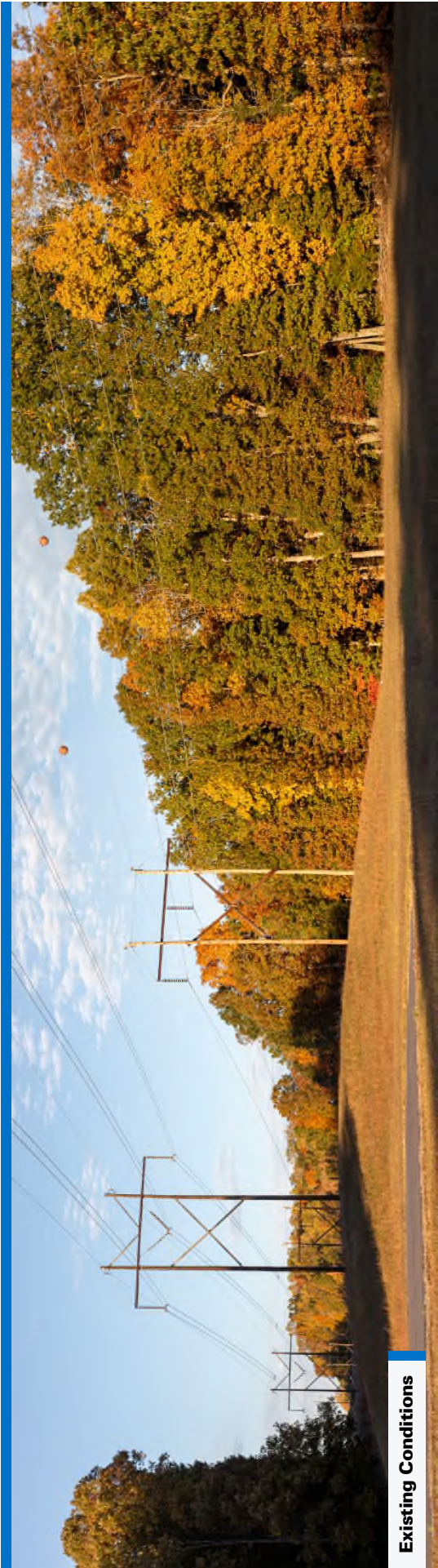
FREDERICKSBURG TO POSSUM POINT

Transmission Line Project

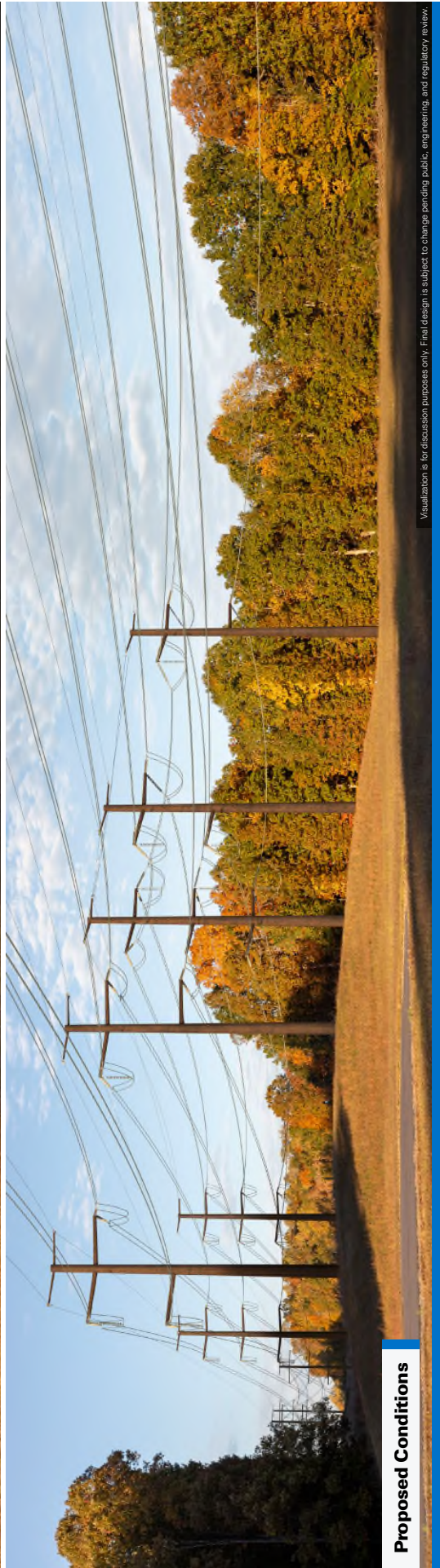
Viewpoint 4

Date: 10/25/2023 Time: 4:39 pm Direction: South
— Fredericksburg - Aquia Harbor (Phase 1) Photo Simulation





Existing Conditions



Proposed Conditions

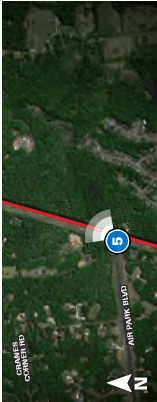
Visualization is for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

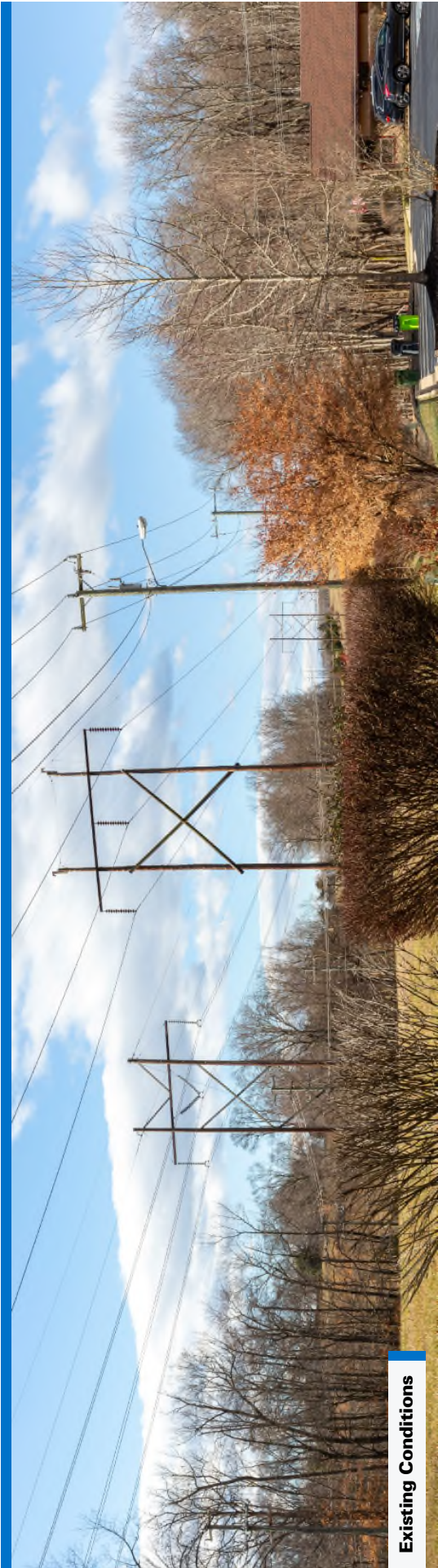
FREDERICKSBURG TO POSSUM POINT

Transmission Line Project

Viewpoint 5

Date: 10/25/2023 Time: 4:30 pm Direction: Northeast
— Fredericksburg - Aquia Harbor (Phase 1) 5 Photo Simulation





Existing Conditions



Proposed Conditions

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

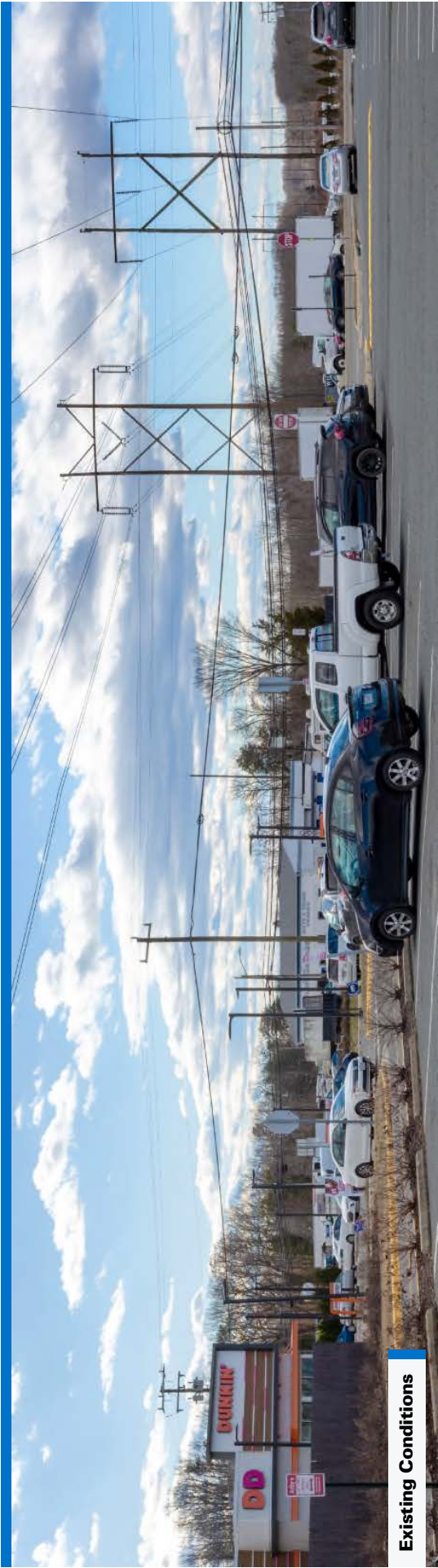


Viewpoint 6

Date: 1/20/2023 **Time:** 10:40 am **Direction:** Southwest
— Fredericksburg - Aquia Harbor (Phase 1) 6 Photo Simulation

**FREDERICKSBURG
TO POSSUM POINT**
Transmission Line Project





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

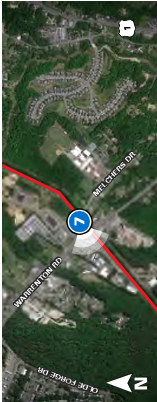
FREDERICKSBURG TO POSSUM POINT

Transmission Line Project

Viewpoint 7

Date: 1/20/2023 Time: 11:13 am Direction: Southwest
Fredericksburg - Aquia Harbor (Phase 1)

Photo Simulation





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

Existing Conditions

Proposed Conditions

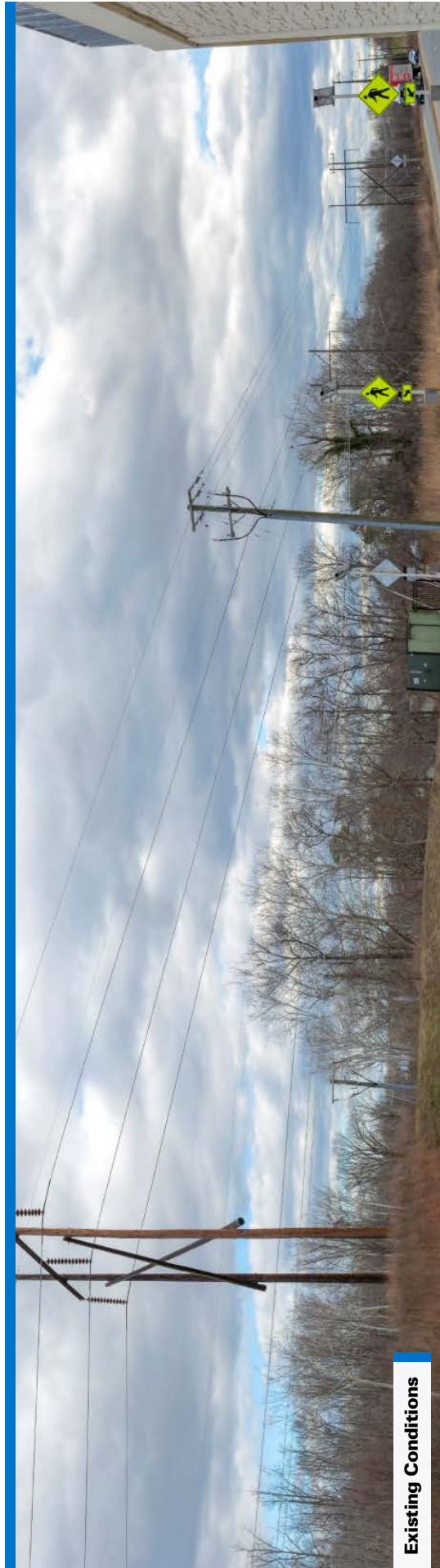
FREDERICKSBURG TO POSSUM POINT

Transmission Line Project

Viewpoint 8

Date: 1/20/2023 Time: 11:48 am Direction: Southwest
— Fredericksburg - Aquia Harbor (Phase 1) ④ Photo Simulation





Existing Conditions




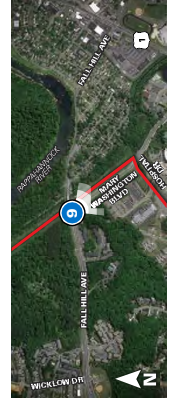
Proposed Conditions

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

FREDERICKSBURG TO POSSUM POINT Transmission Line Project

Viewpoint 9

Date: 1/20/2023 **Time:** 12:47 pm **Direction:** Southeast
— Fredericksburg - Aquia Harbor (Phase 1)  Photo Simulation



You are invited to our Community Meeting

Learn about Phase 1 of the Fredericksburg-Poosum Point Electric Transmission Line Rebuild Project taking place in your area.

Join us:

Thursday, February 8, 5:30-7:30 p.m.

Rowser Building, Room A
1739 Jefferson Davis Hwy
Stafford, VA 22554

You can find more information at

DominionEnergy.com/FredericksburgPoosumPoint



Use your phone's
camera or QR
reader app to visit
the project page
directly.



**Dominion Energy
Electric Transmission**

 Fredericksburg-Possum Point
 Phase 1 Event Display

Learn about Phase 1 of the Fredericksburg-Possum Point Electric Transmission Line Rebuild Project taking place in your area.



Learn about Phase 1 of the Fredericksburg-Possum Point Electric Transmission Line Rebuild Project taking place in your area.

Learn about Phase 1 of the Fredericksburg-Possum Point Electric Transmission Line Rebuild Project taking place in your area.



Thursday, February 8
5:30-7:30 p.m.
1739 Jefferson Davis Hwy
Stafford, VA 22554

[Click here to learn more.](#)

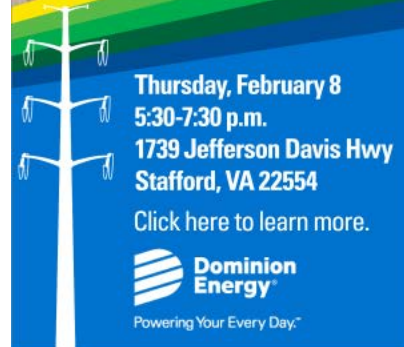


Powering Your Every Day.™

What matters to you matters to us.
You're invited to a Community Meeting.




Powering Your Every Day.™



Thursday, February 8
5:30-7:30 p.m.
1739 Jefferson Davis Hwy
Stafford, VA 22554

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**Dominion Energy
Electric Transmission**

Fredericksburg-Possum
Point Phase 1 Event Nextdoor
Imagery

Event Image:



**Dominion Energy
Electric Transmission**

Fredericksburg-Possum Point
Phase 1 Event Social Videos

[Pre-event Video \(Click to Play\)](#)



**Dominion Energy
Electric Transmission**

Fredericksburg-Possum Point
Phase 1 Event Newspaper

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Stafford, VA 22554

You can find more information at

DominionEnergy.com/FredericksburgPossumPoint



Use your phone's camera or QR reader app to visit the project page directly.




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**Dominion Energy
Electric Transmission**

Fredericksburg-Possum Point
Phase 1 Event Half Page
Newspaper



**You are invited to our
Community Meeting**

Learn about Phase 1 of the Fredericksburg-Possum Point Electric Transmission Line Rebuild Project taking place in your area.

Join us:

Thursday, February 8, 5:30-7:30 p.m.
Rowser Building, Room A
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Stafford, VA 22554

You can find more information at
DominionEnergy.com/FredericksburgPossumPoint

Use your phone's camera or QR reader app to visit the project page directly.



Powering Your Every Day.™

The graphic features a background image of a man in a red shirt and a woman looking at a tablet. A diagonal band of yellow, green, and blue stripes runs across the bottom, with white utility poles and power lines overlaid on it.



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: During the Company's review of the existing corridor, it identified 31 unauthorized encroachments within the Rebuild Project corridor which include sheds, broken down vehicles, trailers, a runway, an underground pool, trampolines, playsets, and greenhouses. The encroachments will need to be addressed with the respective property owners as the Company continues to investigate the right-of-way.

The Company is not aware of any residences encroaching on the existing corridor and does not expect to have any residences demolished or relocated in connection with the Rebuild Project.

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: Construction of Line #29 was completed in 1957 and construction of Line #2104 was completed in 1978. Construction of Line #2157 was completed in 1981. The right-of-way has been in continuous use since that time. The proposed Rebuild Project shares the existing transmission corridor right-of-way with Line #568 from Structures #29/1760 and #2104/5488 to #29/1823 and #252/5556.

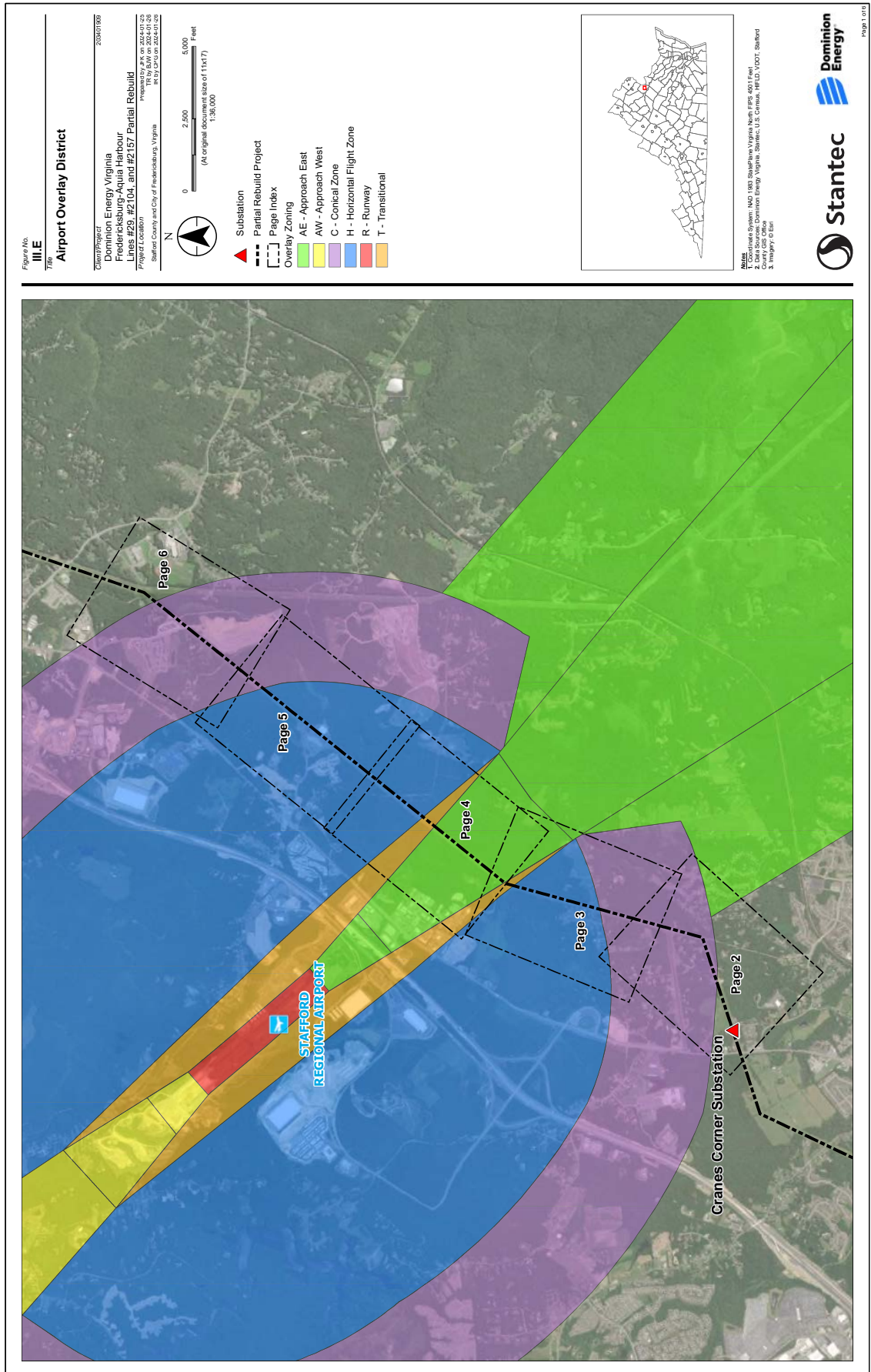
III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL, AND HISTORIC FEATURES

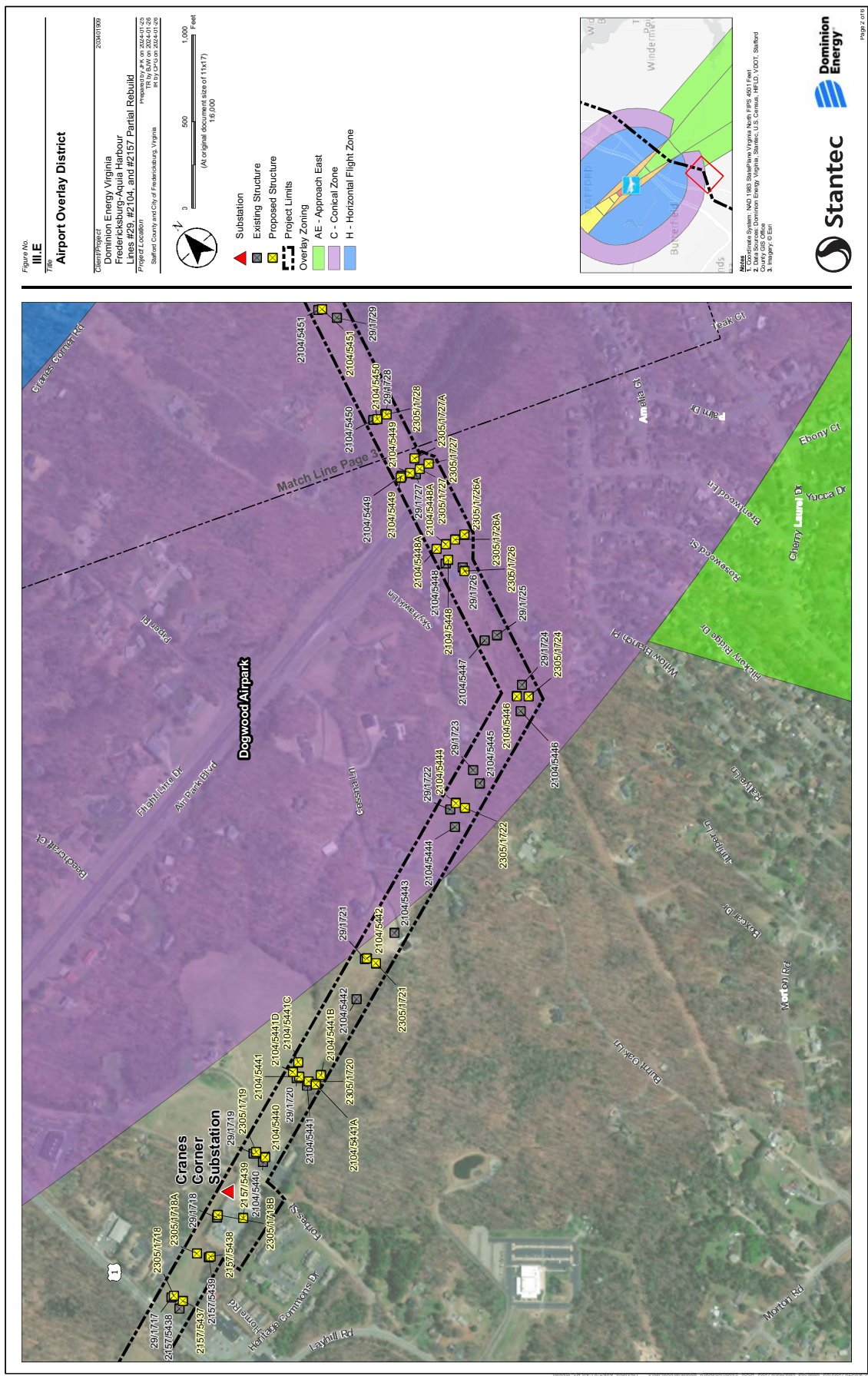
E. Indicate whether the Applicant has investigated land use plans in the areas of the proposed route and indicate how the building of the proposed line would affect any proposed land use.

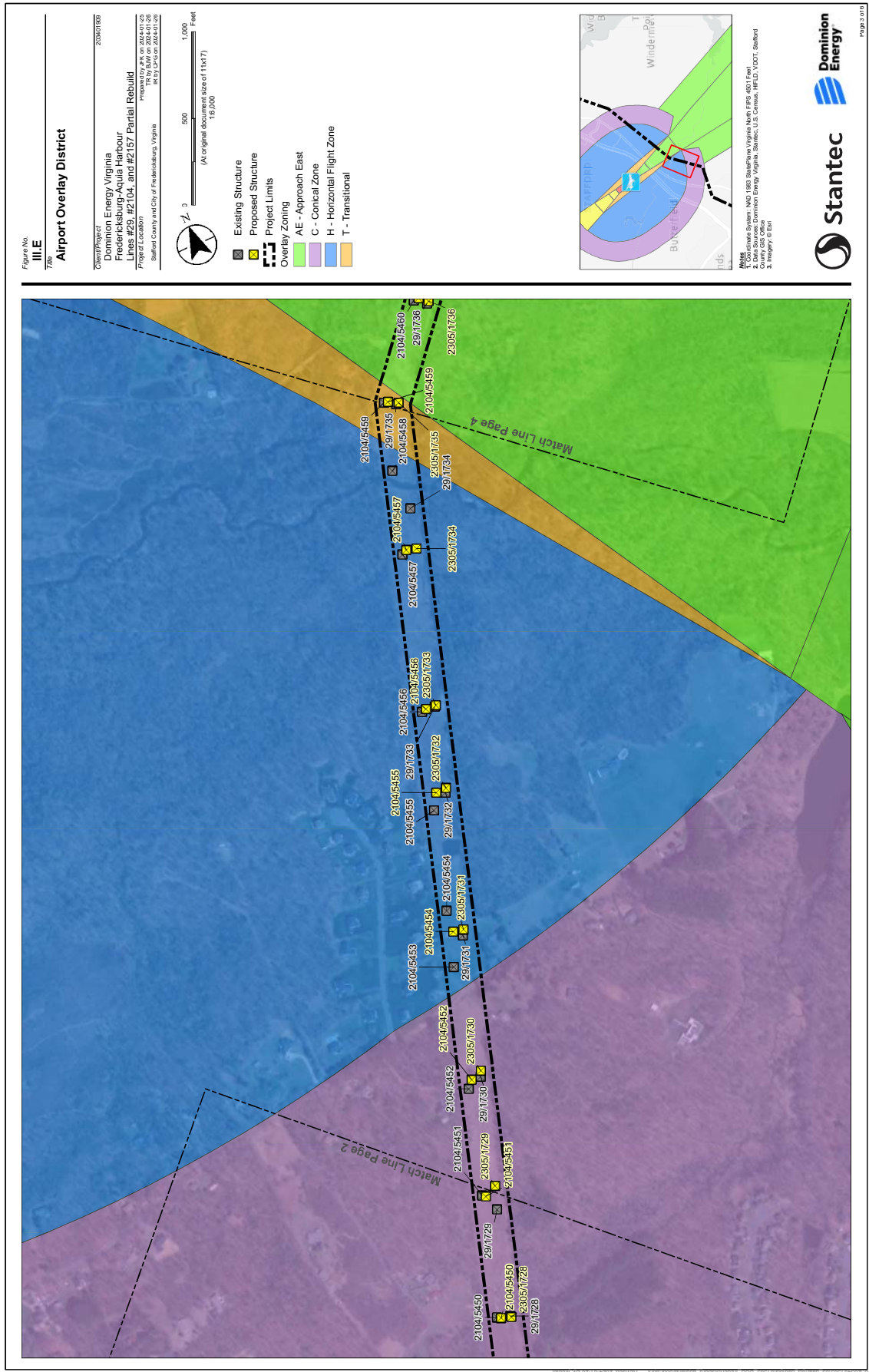
Response: The Company reviewed Comprehensive Plans for Stafford County and the City of Fredericksburg, titled *The Stafford County Comprehensive Plan 2016-2036* and *The Fredericksburg Virginia Comprehensive Plan 2015 edition*, to evaluate the potential effect the Rebuild Project could have on future development. The placement and construction of electric transmission lines is not addressed within the plans.

Stafford County has designated an Airport Overlay District, which extends into the Rebuild Project area, as shown on Attachment III.E. Portions of the Rebuild Project fall within the Conical Zone, Horizontal Zone, Transitional Zone, and Approach Zone. Heights for the Rebuild Project proposed structures will comply with required maximum heights defined for these zones by the Federal Aviation Administration.

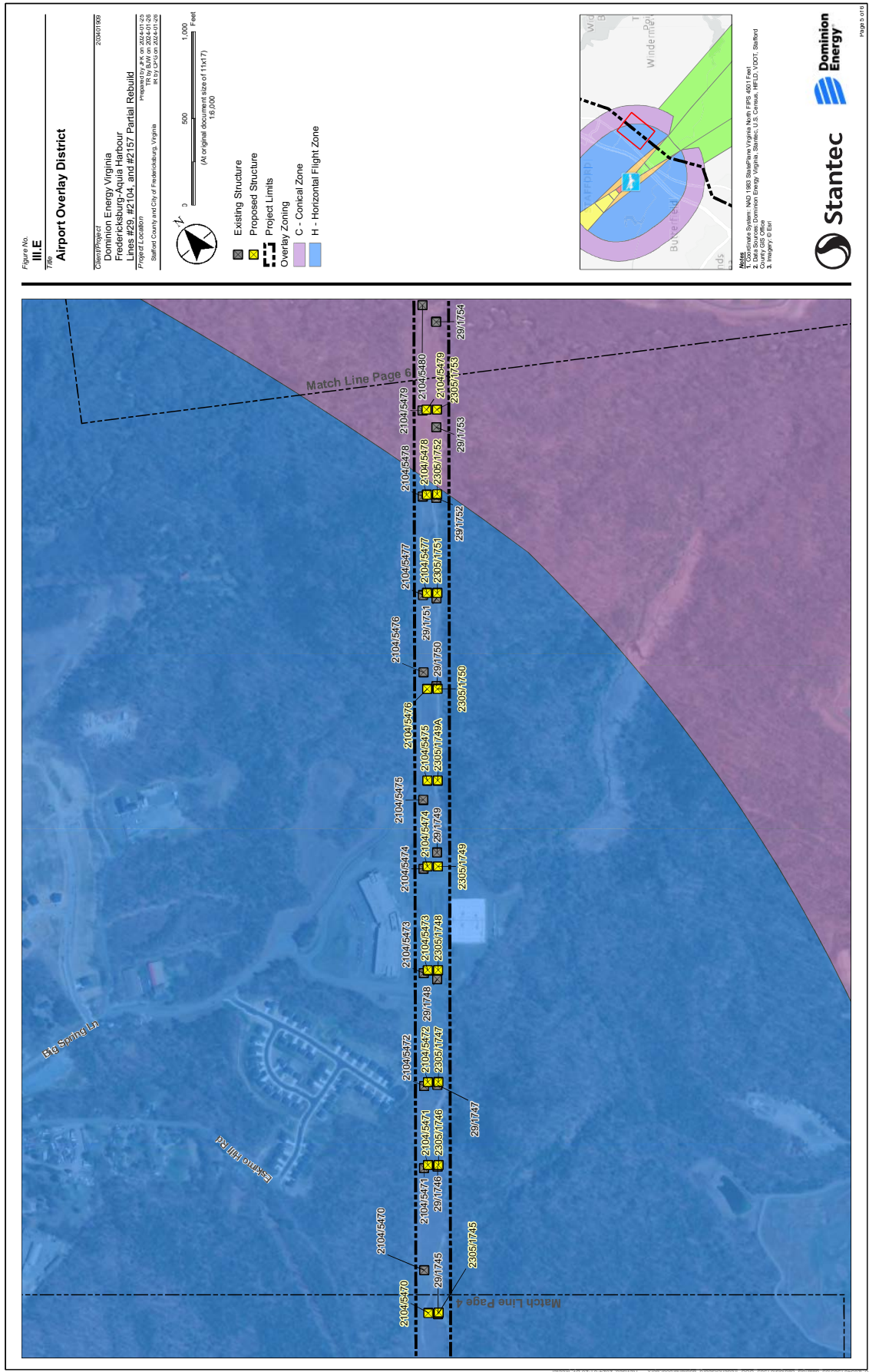
The Rebuild Project is primarily located within existing right-of-way or on Company-owned property, and would not affect any proposed land use in that area. The Rebuild Project is not expected to impact the character of these localities as the transmission corridor has been in use since the 1950s. The proposed right-of-way expansion between Structures #29/1725 and #29/1728, and #2104/5447 and #2104/5450 will require clearing approximately one acre of forest located on a private lot used for residential purposes.

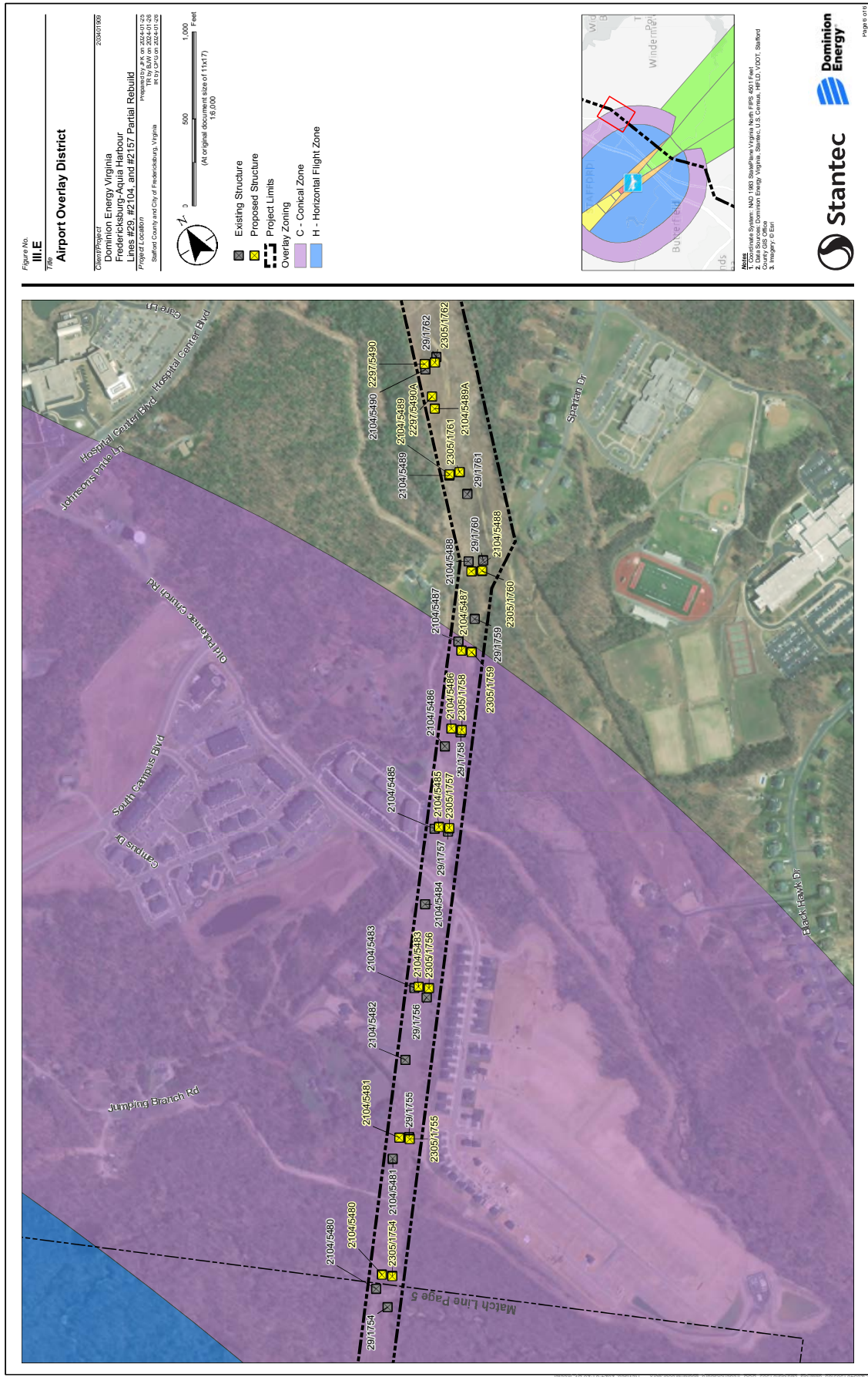












III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL, AND HISTORIC FEATURES

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. Stafford County and the City of Fredericksburg have not designated important farmlands within their jurisdiction under Va. Code § 3.2-205 B.
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. NRHP-listed resources that are within and adjacent to the Rebuild Project are provided in Table 4 of the DEQ Supplement. Section 2.I of the DEQ Supplement provides additional discussion.
2. Resources that are eligible or potentially eligible for listing in the NRHP that are within and adjacent to the Rebuild Project are provided in Table 4 of the DEQ Supplement. Section 2.I of the DEQ Supplement provides additional discussion.
3. The City of Fredericksburg has designated a historic district, but the district is over 0.5 miles from the Rebuild Project. Stafford County has designated the Rappahannock River as a historic overlay district from approximately the Rocky Pen Run Reservoir, west of the Rebuild Project, to the Route 3 bridge, east of the Rebuild Project. The Rebuild Project has an aerial crossing of the Rappahannock River.

Historic overlay districts designated by Stafford County are not within or adjacent to the Rebuild Project right-of-way.

4. Archaeological Sites within the Rebuild Project right-of-way are provided in Table 3 of the DEQ Supplement. There are 15 archaeological sites within 200 feet of the Rebuild Project right-of-way and considered adjacent. The table below provides information about archaeological sites adjacent to the right-of-way.

VDHR #	Site Name/Information
44SP0874	Road: Early National Period (1790 – 1829)
44SP0572	Earthwork 2: 19 th Century: 3 rd Quarter (1860 – 1874)
44ST0007	Hunter's Ironworks Archaeological Site
44ST0785	Lithic scatter: Prehistoric/Unknown (15000 B.C. – 1606)
44ST0781	Lithic scatter: Prehistoric/Unknown (15000 B.C. – 1606)
44ST0782	Lithic scatter: Prehistoric/Unknown (15000 B.C. – 1606)
44ST0793	Lithi scatter: Prehistoric/Unknown (15000 B.C. – 1606)
	Farmstead: 18 th Century 2 nd half, 19 th Century 1 st half
44ST0276	Military base
44ST0626	Cemetery: 20 th Century 1 st quarter

44ST0100	Daffodil Cottage: 18 th Century, 19 th Century
44ST0281	Military base: 19 th Century 3 rd quarter (1860 – 1874)
44ST0280	Trash scatter
44ST0674	Lithic scatter: Prehistoric/Unknown (1500 B.C. – 1606)
44ST0976	Stafford Civil War Park – North Camp: Antebellum Period (1830 – 1860), Civil War (1861 - 1865)
44ST1046	Camp, temporary, Lithic scatter: Archaic Period (3000 – 1201 B.C.E.), Early Woodland 1200 B.C.E. 299 C.E.), Late Woodland (1000 – 1606)

5. The Embry Crib Dam was located within the Rappahannock River within the Rebuild Project right-of-way. The Commonwealth of Virginia removed this dam as part of a fish passage project in 2004 and it no longer exists. No work will occur within the Rappahannock River as part of the Rebuild Project.
6. None.
7. None.
8. None.
9. The Nature Conservancy holds an easement adjacent to the Rebuild Project right-of-way and along the Rappahannock River, north of Fall Hill Avenue in the vicinity of structures #2157/5409, #2157/5410, and #29/1690. The VDHR holds an easement adjacent to the west side of right-of-way at this location. Virginia Outdoors Foundation (“VOF”) easements #STF-VOF-2347 and #STF-VOF-3779 are present on the property parcels that existing structures #29/1709 through #29/1715 and #2157/5430 through #2157/5435 are situated on. Both conservation easements were established after the Company’s easements with #STF-VOF-2347 established in 2006 and #STF-VOF-3779 established in 2013.
10. The Rappahannock River is designated as a state scenic river from Chester Gap at its headwaters to the Route 3 Bridge Fredericksburg, east of the Rebuild Project. The Rebuild Project crosses the Rappahannock River where it has been designated a state scenic river.
11. The City of Fredericksburg owns parcels on both sides of the Rappahannock River where the Rebuild Project crosses. The Embry Dam/Rappahannock Canal Trail is located within the parcel on the south side of the

Rappahannock River and is crossed by the Rebuild Project. The Rebuild Project is adjacent to the Melchers School in the vicinity of structures #29/1702, #29/1703, #2157/5422, and #2157/5423. The Rebuild Project is also within 750 feet of Stafford Middle School at structure #29/1761. The Stafford Government Island Park is also crossed by the Rebuild Project with the parking area for the trail system adjacent to structure #29/1781.

The Rebuild Project is within 750 feet of Stafford Middle School at structure #2104/5489. The Stafford Government Island Park is also crossed by the Rebuild Project with the parking area for the trail system adjacent to structure #2104/5514.

12. None.

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 Federal Aviation Administration (“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 reviewed the FAA’s website²¹ to identify airports within 10 miles of the proposed Rebuild Project. Based on this review, there are three airports located within 10 miles of the Rebuild Project.²²

- Marine Corps Air Facility Quantico (NYG): 5.5 miles NE of Aquia Harbour Station
- Stafford Regional Airport (RMN): 1.3 miles NW of Structures #2104/5465 and #29/1741
- Shannon Airport (EZF): 3.2 miles SE of Fredericksburg Substation

Stafford County has designated an Airport Overlay District for the Stafford Regional Airport as described in Section III.E of this Appendix. The proposed structure heights for the Rebuild Project will comply with the height restrictions required by the various zones.

In an email dated January 29, 2024, the Virginia Department of Aviation (“DOAv”) stated that a Form 7460 will need to be submitted to the FAA to initiate an aeronautical study to ensure that the proposed Rebuild Project will not constitute a hazard to air navigation. This correspondence is provided as Attachment 2.O.2 of the DEQ Supplement. The Company will submit Form 7460 to the FAA prior to construction to initiate aeronautical studies and will design the proposed structures to avoid interference with air navigation.

²¹ <https://oeaaa.faa.gov/oeaaa/external/portal.jsp>.

²² The Company also identified a private airport, Dogwood Airpark-VA42 (“Dogwood”), that is located within 10 miles of the Rebuild Project. Because Dogwood Airpark is privately owned and does not fall within the purview of the FAA, the Company will not be submitting a Form 7460 for an aeronautical study regarding Dogwood. Additional information regarding Dogwood can be found in Section 2.O of the DEQ Supplement.

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: The Rebuild Project corridor does not cross nor is it in close proximity to any scenic Virginia byways. Use of the existing right-of-way minimizes additional impacts at any road crossings. Perpendicular road crossings, which are preferred by VDOT, will be utilized at all road crossings where applicable.

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 Stafford County and the City of Fredericksburg administrators regarding the proposed Rebuild Project. Below is a list of coordination efforts that have occurred with municipal, state, and federal agencies:

- The Company solicited comments from DEQ's Office of Wetlands and Stream Protection to initiate the wetlands impact consultation. See Attachment 2 of the DEQ Supplement.
- A Stage I Pre-Application Analysis has been prepared and submitted to VDHR. See Attachment 2.I.2 of the DEQ Supplement.
- The Company solicited comments from the Virginia Marine Resources Commission ("VMRC") and the Corps regarding the proposed Rebuild Project. See Attachment 2.1 and 2.B.1 of the DEQ Supplement.
- The Company requested comments from the USFWS, DWR, and DCR regarding the proposed Rebuild Project. See Attachment 2.1 and 2.G.2 of the DEQ Supplement.
- Letters were submitted to Stafford County and City of Fredericksburg pursuant to Va. Code § 15.2-2202 E to describe the Rebuild Project and request comment. See Section V.D of this Appendix.
- The Company solicited comments from the DOAv regarding the proposed Rebuild Project. See Attachment 2 and 2.O.2 of the DEQ Supplement.
- Letters were submitted to the agencies listed in Section V.C on January 25, 2024, describing the Rebuild Project and requesting comment.
- On February 1, 2024, the Company solicited comments via letter from several federally and state recognized Native American tribes, including the Cheroenhaka (Nottoway), Chickahominy, Chickahominy Indian Tribe Eastern Division, Mattaponi, Monacan, Nansemond, Nottoway, Pamunkey, Patawomeck, Rappahannock, Upper Mattaponi, Catawba Indian Nation, and Delaware Nation, Oklahoma.

A copy of the letter template sent to the Native American tribes is included as Attachment III.J.1. On February 17, 2024, the Company received an inquiry from Chief Bullock of the Patawomeck Tribe in Stafford County asking if the project will be overhead. A Company representative responded on February 19, 2024, in the affirmative. A copy of this email exchange is provided as Attachment III.J.2.

Dominion Energy Virginia
Electric Transmission
P.O. Box 26666, Richmond, VA 23261-6666
DominionEnergy.com



February 1, 2024

**Fredericksburg-Possum Point 230 kV Electric Transmission Upgrade and Rebuild Project
– Phase 1**

Dear Chief Red Hawk:

At Dominion Energy, we are dedicated to maintaining reliable and secure electric service in the communities we serve. As a valued stakeholder with a vested interest in the community, we would like to inform you of the need for an electric transmission line infrastructure project in the City of Fredericksburg, Stafford County, and Prince William County, VA. This letter pertains to Phase 1 of the project which will take place in the City of Fredericksburg and Stafford County, only. Phase 2 of the project will commence at a later date, and we will be back in touch with more information then.

Phase 1 of the Fredericksburg-Possum Point 230 kilovolt (kV) Electric Transmission Upgrade and Rebuild project will include the rebuild of an existing transmission line corridor that runs from our Fredericksburg Substation, located west of the University of Mary Washington, near Cowan Boulevard and Emancipation Highway in the City of Fredericksburg, and head north through Stafford County to our Aquia Harbour Substation at the intersection of Aquia Drive and Channel Cove. While well maintained over its lifespan, due to the age of the infrastructure, the lines and related components need to be replaced to ensure continued reliable operation and to accommodate increased energy demand on the system. Some of the existing structures and components along this 12.5-mile portion of the transmission line corridor have been in service since the late 1950's. The lines were built primarily with wooden H-frame structures and galvanized lattice structures. We are proposing to rebuild these mostly with brown, weathering steel monopole structures, mostly within the existing right of way.

The project will also upgrade the majority of the lines in the transmission corridor from 115 kilovolts (kV) to 230 kV to increase the current capacity. This will include reconductoring, or replacing the wires, and replacing existing structures. To comply with the latest safety standards, the new structures would be approximately 41.7 feet taller on average and be built in approximately the same locations as the existing structures. New right of way will be needed at Dogwood Airpark near Richmond Highway and Air Park Boulevard; however, the majority of the line will not require new right of way.

Enclosed is a project overview map for your reference. This project does require review by the Virginia State Corporation Commission (SCC). We are currently in the conceptual phase and are seeking input as we prepare to submit an application with the SCC later this month. Providing your input now allows us to consider any concerns you may have as we work to meet the project's needs. Please feel free to notify other relevant organizations that may have an interest in the project area. For reference, other recipients of this letter include county and state historic, cultural, and scenic organizations, as well as Tribal Nations.

For additional information on the project, please visit the project webpage at www.DominionEnergy.com/fredericksburgpossumpoint.

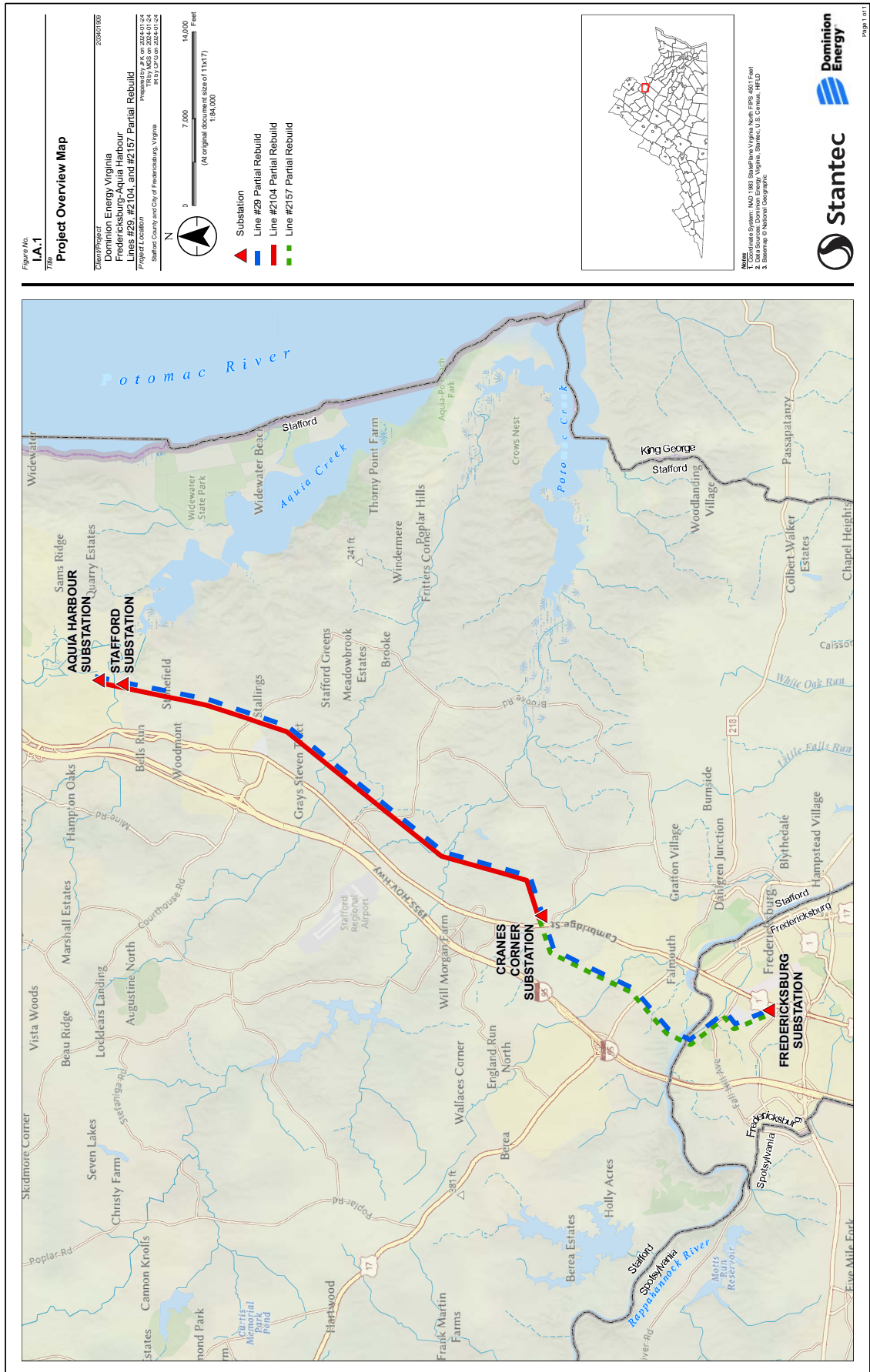
If you would like to meet to discuss, or if you have any initial questions, please do not hesitate to contact us by sending an email to Stephen.S.Precker@dominionenergy.com or calling 888-291-0190. You may also contact Tribal Relations Manager Ken Custalow by sending an email to Ken.Custalow@dominionenergy.com.

Sincerely,

A handwritten signature in black ink, appearing to read "Stephen Precker". The signature is fluid and cursive, with the first name "Stephen" and last name "Precker" clearly distinguishable.

Steve Precker
The Electric Transmission Project Team

Enclosure: Project Overview Map



Stephen S Precker (DEV Trans Distribution - 1)

From: Ken Custalow (Services - 6)
Sent: Monday, February 19, 2024 8:52 AM
To: Stephen S Precker (DEV Trans Distribution - 1)
Subject: FW: [EXTERNAL] Fredericksburg -Possum Point 230bl upgrade and rebuild

For your records...thanks

From: Ken Custalow (Services - 6)
Sent: Monday, February 19, 2024 8:51 AM
To: Charles Bullock <raellinger@verizon.net>
Subject: RE: [EXTERNAL] Fredericksburg -Possum Point 230bl upgrade and rebuild

Good Morning Chief Bootsie. Thanks for reaching out. All work be overhead. Let me know if you have additional questions. I look forward to seeing or talking to you soon.

From: Charles Bullock <raellinger@verizon.net>
Sent: Saturday, February 17, 2024 9:07 AM
To: Ken Custalow (Services - 6) <ken.custalow@dominionenergy.com>
Subject: [EXTERNAL] Fredericksburg -Possum Point 230bl upgrade and rebuild

CAUTION! This message was NOT SENT from DOMINION ENERGY

Are you expecting this message to your DE email? Suspicious? Use PhishAlarm to report the message. Open a browser and type in the name of the trusted website instead of clicking on links. DO NOT click links or open attachments until you verify with the sender using a known-good phone number. Never provide your DE password.

Ken

Will all work be over head?

Thanks Bootsie

[Sent from AOL on Android \[play.google.com\]](https://play.google.com)

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

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

Response: On February 1, 2024, the Company solicited comments via letter from the nongovernmental organizations and private citizen groups identified below. A copy of the letter template and overview map 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. Elaine Chang	National Trust for Historic Preservation
Ms. Leighton Powell	Scenic Virginia
Ms. Julie Bolthouse	Piedmont Environmental Council
Mr. John McCarthy	Piedmont Environmental Council
Dr. Cassandra Newby-Alexander	Norfolk State University
Mr. Roger Kirchen	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 23261-6666
DominionEnergy.com



February 1, 2024

**Fredericksburg-Possum Point 230 kV Electric Transmission Upgrade and Rebuild Project
– Phase 1**

Dear Ms. Kostelny:

At Dominion Energy, we are dedicated to maintaining reliable and secure electric service in the communities we serve. As a valued stakeholder with a vested interest in the community, we would like to inform you of the need for an electric transmission line infrastructure project in the City of Fredericksburg, Stafford County, and Prince William County, VA. This letter pertains to Phase 1 of the project which will take place in the City of Fredericksburg and Stafford County, only. Phase 2 of the project will commence at a later date, and we will be back in touch with more information then.

Phase 1 of the Fredericksburg-Possum Point 230 kilovolt (kV) Electric Transmission Upgrade and Rebuild project will include the rebuild of an existing transmission line corridor that runs from our Fredericksburg Substation, located west of the University of Mary Washington, near Cowan Boulevard and Emancipation Highway in the City of Fredericksburg, and head north through Stafford County to our Aquia Harbour Substation at the intersection of Aquia Drive and Channel Cove. While well maintained over its lifespan, due to the age of the infrastructure, the lines and related components need to be replaced to ensure continued reliable operation and to accommodate increased energy demand on the system. Some of the existing structures and components along this 12.5-mile portion of the transmission line corridor have been in service since the late 1950's. The lines were built primarily with wooden H-frame structures and galvanized lattice structures. We are proposing to rebuild these mostly with brown, weathering steel monopole structures, mostly within the existing right of way.

The project will also upgrade the majority of the lines in the transmission corridor from 115 kilovolts (kV) to 230 kV to increase the current capacity. This will include reconductoring, or replacing the wires, and replacing existing structures. To comply with the latest safety standards, the new structures would be approximately 41.7 feet taller on average and be built in approximately the same locations as the existing structures. New right of way will be needed at Dogwood Airpark near Richmond Highway and Air Park Boulevard; however, the majority of the line will not require new right of way.

Our project team will host an in-person community meeting and we invite you to attend and speak with our subject matter experts about any questions you might have. Logistical details are as follows:

Thursday, February 8, 2024

Drop by anytime between 5:30-7:30 p.m.

Rowser Building, Room A
1739 Jefferson Davis Hwy
Stafford, VA 22554

Enclosed is a project overview map for your reference. This project does require review by the Virginia State Corporation Commission (SCC). We are currently in the conceptual phase and are seeking input as we prepare to submit an application with the SCC later this month. Providing your input now allows us to consider any concerns you may have as we work to meet the project's needs. Please feel free to notify other relevant organizations that may have an interest in the project area. For reference, other recipients of this letter include county and state historic, cultural, and scenic organizations, as well as Tribal Nations.

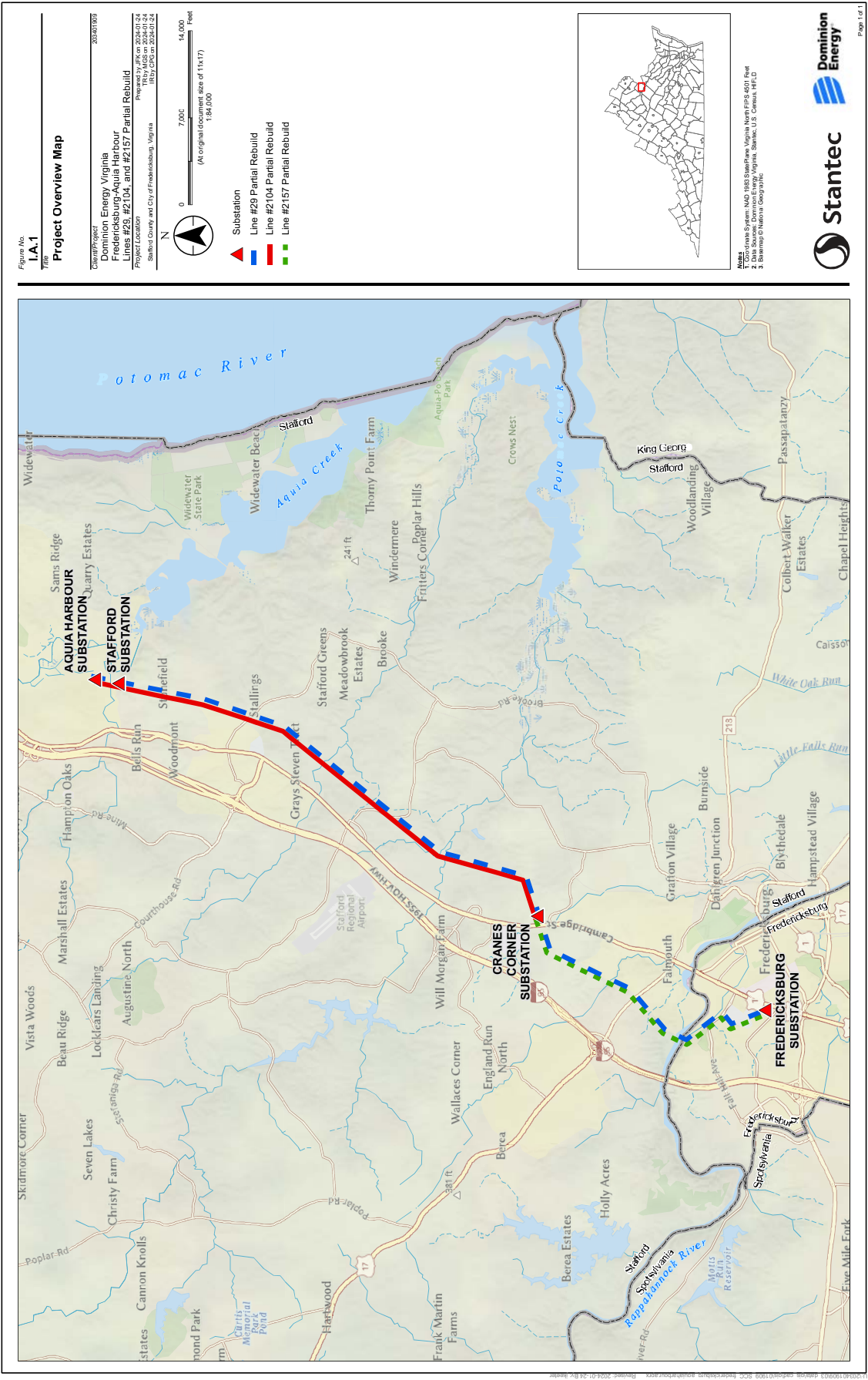
For additional information on the project, please visit the project webpage at www.DominionEnergy.com/fredericksburgpossumpoint.

If you would like to schedule a small group or one on one meeting to discuss the project, please reach out to us at Powerline@dominionenergy.com or call 888-291-0190. Please do not hesitate to reach out with any questions.

Sincerely,

The Electric Transmission Project Team

Enclosure: Project Overview Map



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 Rebuild Project are listed below.

Potential Permits

Activity	Permit	Agency
Impacts to wetlands and waters of the U.S.	Nationwide Permit	U.S. Army Corps of Engineers
Impacts to wetlands and State surface waters	Virginia Water Protection Permit	Virginia Department of Environmental Quality
Work within, over or under state subaqueous bottom	Subaqueous Bottom Permit	Virginia Marine Resources Commission
Discharges of Stormwater from Construction Activities	Construction General Permit	Virginia Department of Environmental Quality
Work within VDOT right-of-way	Land Use Permit	Virginia Department of Transportation
Airspace obstruction evaluation	FAA 7460-1	Federal Aviation Administration
Encroachment within tidal wetlands	Wetlands Permit	Stafford County Wetlands Board

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 existing and proposed transmission line. EMF levels are provided for both historical (2022) and future (2028) annual average and maximum (peak) loading conditions.

Existing lines – Historical average loading

EMF levels were calculated for the existing line at the *historical average* load condition (125.5 Amps for Line #29, 454.0 Amps for Line #2104, 553.6 Amps for Line #2157) at an operating voltage of 241.5 kV when supported on the existing structures – see [Attachments II.A.5.a-j](#).

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

EMF levels at the edge of the maintenance limits for the existing lines at the historical average loading:

	<u>West Edge</u>		<u>East Edge</u>	
	<u>Electric Field</u>	<u>Magnetic Field</u>	<u>Electric Field</u>	<u>Magnetic Field</u>
	(kV/m)	(mG)	(kV/m)	(mG)
Attachment II.A.5.a	0.159	16.827	0.266	2.214
Attachment II.A.5.b	0.601	6.325	1.921	20.485
Attachment II.A.5.c	2.057	18.493	0.343	4.564
Attachment II.A.5.d	2.072	18.961	0.332	4.614
Attachment II.A.5.e	2.072	18.960	0.335	4.605

Attachment II.A.5.f	2.058	18.541	0.343	4.566
Attachment II.A.5.g	2.117	19.66	1.623	13.588
Attachment II.A.5.h	0.265	4.325	0.2675	19.125
Attachment II.A.5.i	0.193	3.040	1.123	10.536
Attachment II.A.5.j	0.163	2.705	0.879	8.714

Existing lines – Historical peak loading

EMF levels were calculated for the existing line at the *historical peak* load condition (640.1 Amps for Line #29, 1163.7 Amps for Line #2104, 1272.8 Amps for Line #2157) and at an operating voltage of 241.5 kV when supported on the existing structures – see Attachments II.A.5.a-j.

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

EMF levels at the edge of the maintenance limits for the existing lines at the historical peak loading:

	<u>West Edge</u>		<u>East Edge</u>	
	<u>Electric Field</u>	<u>Magnetic Field</u>	<u>Electric Field</u>	<u>Magnetic Field</u>
	(kV/m)	(mG)	(kV/m)	(mG)
Attachment II.A.5.a	0.162	41.991	0.265	7.335
Attachment II.A.5.b	0.595	34.352	1.934	46.488
Attachment II.A.5.c	2.059	46.450	0.337	24.045
Attachment II.A.5.d	2.073	47.542	0.329	24.230
Attachment II.A.5.e	2.073	47.536	0.332	24.185
Attachment II.A.5.f	2.061	46.571	0.337	24.052
Attachment II.A.5.g	2.121	49.056	1.612	33.276
Attachment II.A.5.h	0.264	10.495	2.676	48.172
Attachment II.A.5.i	0.193	7.642	1.116	26.941

Attachment II.A.5.j	0.243	10.416	3.194	56.154
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Proposed Rebuild Project – Projected Average Loading in 2028²³

EMF levels were calculated for the proposed Rebuild Project at the *projected average* load condition (363.3Amps for Line #29, 408.5 Amps for Line #2104, 511.3 Amps for Line #2157) and at an operating voltage of 241.5 kV when supported on the proposed Rebuild Project structures – see Attachments II.A.5.a-j.

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 maintenance limits for the proposed Rebuild Project at the projected average loading:

	<u>West Edge</u>		<u>East Edge</u>	
	<u>Electric Field</u>	<u>Magnetic Field</u>	<u>Electric Field</u>	<u>Magnetic Field</u>
	(kV/m)	(mG)	(kV/m)	(mG)
Attachment II.A.5.a	0.146	12.138	0.113	1.519
Attachment II.A.5.b	0.225	11.392	0.332	6.359
Attachment II.A.5.c	0.547	9.206	0.296	6.020
Attachment II.A.5.d	0.464	9.668	0.306	5.141
Attachment II.A.5.e	0.533	9.573	0.365	5.320
Attachment II.A.5.f	1.696	16.935	1.049	2.393
Attachment II.A.5.g	0.221	15.411	1.774	10.380
Attachment II.A.5.h	0.466	4.115	3.262	17.565
Attachment II.A.5.i	0.225	2.379	0.264	6.480
Attachment II.A.5.j	0.153	2.806	1.506	17.146

²³ EMF levels for the proposed Rebuild Project at projected average and peak loading were calculated based on two 230 kV circuit carrying load in the corridor. The future 230 kV circuits were modeled with no load (0 Amps).

Proposed Rebuild Project – Projected Peak Loading in 2028

EMF levels were calculated for the proposed Rebuild Project at the projected *peak* load condition (712.0 Amps for Line #29, 839.0 Amps for Line #2104, 1055.0 Amps for Line #2157) and at an operating voltage of 241.5 kV when supported on the proposed Rebuild Project structures – see Attachments II.A.5.a-j.

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

EMF levels at the edge of the maintenance limits for the proposed Rebuild Project at the projected peak loading:

	<u>West Edge</u>		<u>East Edge</u>	
	<u>Electric Field</u>	<u>Magnetic Field</u>	<u>Electric Field</u>	<u>Magnetic Field</u>
	(kV/m)	(mG)	(kV/m)	(mG)
Attachment II.A.5.a	0.140	24.818	0.113	2.988
Attachment II.A.5.b	0.217	23.704	0.331	12.558
Attachment II.A.5.c	0.554	18.868	0.297	11.949
Attachment II.A.5.d	0.470	19.813	0.307	10.203
Attachment II.A.5.e	0.535	19.568	0.365	10.554
Attachment II.A.5.f	1.698	34.921	1.049	4.668
Attachment II.A.5.g	0.475	32.297	1.760	25.970
Attachment II.A.5.h	0.466	8.611	3.259	43.805
Attachment II.A.5.i	0.225	5.257	0.272	16.480
Attachment II.A.5.j	0.150	6.369	3.196	43.022

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 three decades are the foundation of the Company’s opinion that no adverse health effects are anticipated to result from the operation of the proposed Rebuild Project. Each of these panels has evaluated the scientific research related to health and power-frequency 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 of high, short-term EMF exposures not typically found in people’s day-to-day lives on biological responses, while others evaluate the effects of common, lower 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 a hundred 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 agencies to identify, review, and summarize the results of this large and diverse research.

The reviews of 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 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). 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 report by SCENIHR and annual reviews published by SSM (e.g., 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.

The WHO has recommended that countries adopt recognized international standards published ICNIRP and ICES. Typical levels of EMF from Dominion's 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 Rebuild Project, the Company has determined that no adverse health effects are anticipated to result from the operation of the proposed Rebuild 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.

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.”²⁴

The continuing scientific research on 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:

- The WHO, which published one of the most comprehensive and detailed reviews of the relevant scientific peer-reviewed literature in 2007;
- SCENIHR, a committee of the European Commission, which published its assessments in 2009 and 2015;
- 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

²⁴ 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).

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 May 2023, provided additional evidence and contributed to clarification of previous findings. Overall, new research studies have not provided evidence to alter the previous conclusions of scientific and health organizations, including the 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 tumor, 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-on) and reported no overall associations between exposure categories and childhood leukemia for the later periods (1980 and on), 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 Québec. 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 high calculated magnetic fields (≥ 0.4 microtesla [$^{\mu}\text{T}$]) (i.e., ≥ 4 milligauss [$^{\text{mG}}$]). 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 $> 0.4 \mu\text{T}$ (4 mG); no statistically significant overall associations were reported between childhood leukemia and lower magnetic-field exposures ($< 0.4 \mu\text{T}$ [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.
- 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 μ T to \geq 0.4 μ T) 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.

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 Parkinsonism²⁵ 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 bias, and a lack of a clear exposure-response relationship between exposure and ALS.

²⁵ 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).

- 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.
- Rösli 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.”
- Sorahan and Nichols (2022) investigated magnetic-field exposures 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.
- 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.

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, Rösli 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, Beudart 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*, 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.

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, Tesaro 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*, 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: ROMJ* 10(3):e0319, 2021.

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.

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, Röösl 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 Röösl 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.

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.

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-Arangur 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.

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.

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.

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: A map showing the existing route to be used for the Rebuild Project is provided as Attachment V.A. A written description of the route, including the options considered to minimize impacts to the Dogwood Airpark, is as follows:

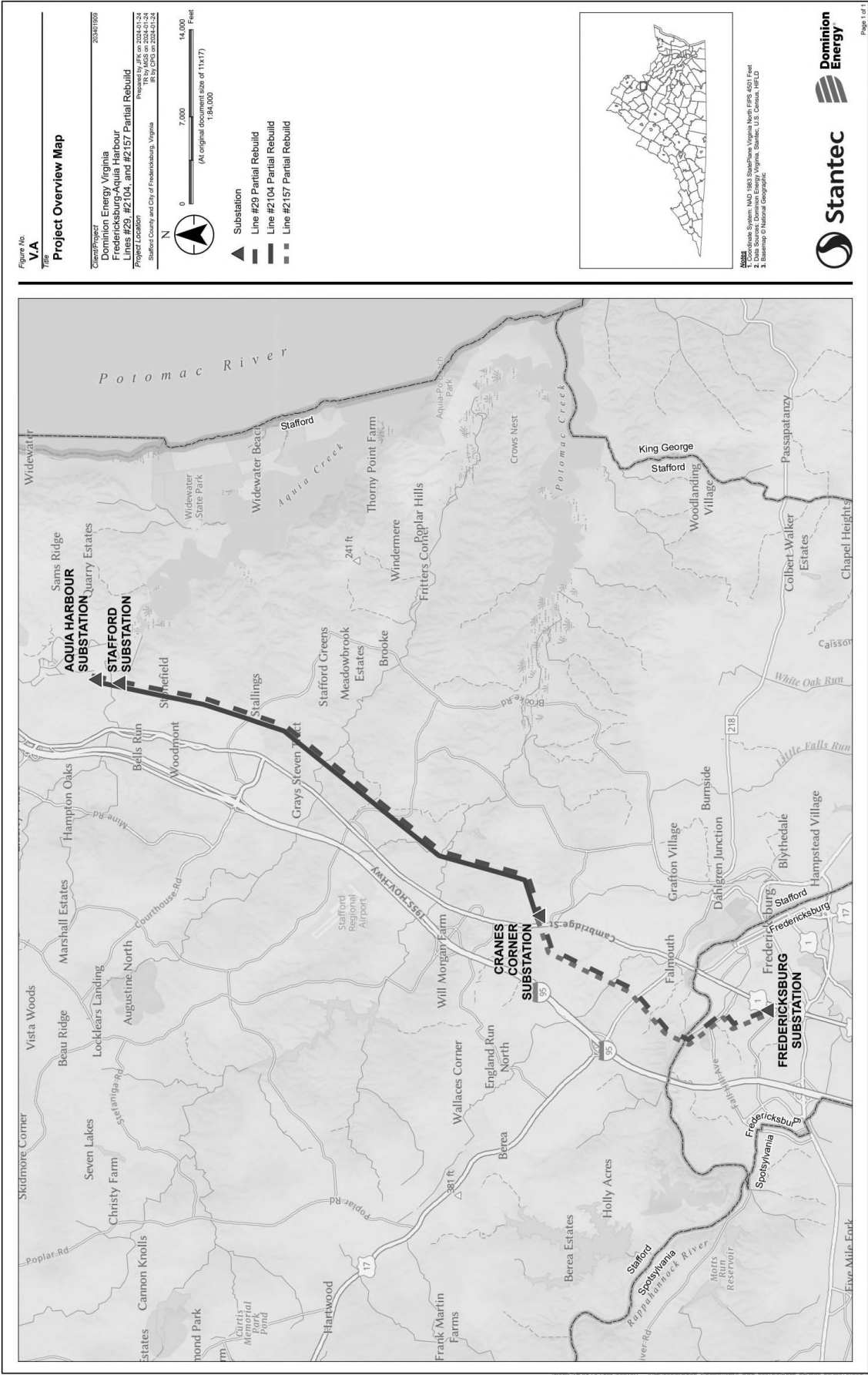
Starting at the Company's Fredericksburg Substation in the City of Fredericksburg, Lines #29 and #2157 travel roughly north for approximately 4.5 miles to Cranes Corner Substation in the Stafford County. At Cranes Corner Substation, Line #2157 terminates into a 230 kV breaker and leaves the substation as Line #2104. Lines #29 and #2104 continue roughly north for approximately 8 miles to the Aquia Harbour Station, also in Stafford County.

In the vicinity of Dogwood Airpark, Option 1 (the Proposed Option) would require an additional approximately 685 feet of 70-foot-wide right-of-way to accommodate four single circuit delta structures. The western most structure will be placed as close to the edge of the existing right-of-way as possible, while still maintaining clearance requirements, to reduce additional right-of-way needs on the eastern edge.

Option 2 would require approximately an additional 735 feet of 155-foot-wide right-of-way to accommodate four single circuit delta structures. The western most structure would be placed closer to the center of the right-of-way to increase the horizontal distance between the edge of the runway and the nearest conductor.

Option 3 would require approximately 1020 feet of additional 115-foot-wide right-of-way to accommodate four single circuit H-frame structures. The western most structure would be placed on the same centerline as the existing H-frame structure in the right-of-way.

For the Rebuild Project, the minimum structure height is approximately 64 feet, the maximum structure height is approximately 165 feet, and the average height is of the proposed structures is approximately 112 feet, based on preliminary conceptual design, not including foundation reveal and subject to change based on final engineering design.



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 available electronically for public inspection at the following website: <https://www.dominionenergy.com/projects-and-facilities/electric-projects/power-line-projects/fredericksburg-possum-point>.

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: The following agency representatives may reasonably be expected to have an interest in the proposed Rebuild Project. Instead of furnishing a copy of the Application to these parties, the Company has sent a letter noting the availability of the Application for the proposed Rebuild Project on the Company's website.²⁶

Ms. Bettina Rayfield
Virginia Department of Environmental Quality
Office of Environmental Impact Review
P.O. Box 1105
Richmond, Virginia 23218

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

Ms. Rene Hypes
Virginia Department of Conservation and Recreation
Division of Natural Heritage
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Environmental Reviewer
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Planning & Recreation Bureau
600 East Main Street, 17th Floor
Richmond, Virginia 23219

Ms. Amy Martin
Environmental Services Biologist Manager
Virginia Department of Wildlife Resources
P.O. Box 90778
Henrico, Virginia 23228

Mr. Keith Tignor
Endangered Plant and Insect Species Program

²⁶ The Virginia Department of Conservation and Recreation ("DCR") asked to be removed from the Company's post-filing mailing list. Accordingly, DCR will not receive post-filing mailings.

Virginia Department of Agriculture and Consumer Affairs
102 Governor Street
Richmond, Virginia 23219

Mr. Clint Folks
Forestland Conservation Coordinator
Virginia Department of Forestry
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
US Fish and Wildlife Service
Ecological Services Virginia Field Office
6669 Short Lane
Gloucester, Virginia 23061

Mr. Keith Goodwin
U.S. Army Corps of Engineers
Norfolk District, Southern Section
9100 Arboretum Parkway, Suite 235
Richmond, Virginia 23236

Mr. Lewis Rogers
Superintendent
Fredericksburg and Spotsylvania National Military Park
120 Chatham Lane
Fredericksburg, Virginia 22405

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

Ms. Martha Little
Virginia Outdoors Foundation
P.O. Box 85073, PMB 38979
Richmond, Virginia 23285-5073

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

Mr. Mike Helvey
Obstruction Evaluation Group Manager
Federal Aviation Administration
800 Independence Ave, SW
Room 400 East
Washington, D.C. 20591

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

Ms. Marcie Parker, P.E.
District Engineer
Virginia Department of Transportation
87 Deacon Road
Fredericksburg, Virginia 22405

Mr. Randal E. Vosburg
Stafford County, County Administrator
1300 Courthouse Road
3rd Floor
Stafford, Virginia 22554

Mr. Timothy J. Baroody
City of Fredericksburg, City Manager
715 Princess Anne Street
Fredericksburg, Virginia 22401

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, letters dated January 25, 2024, were sent to Mr. Randal E. Vosburg, County Administrator in Stafford County; and Mr. Timothy J. Baroody, City Manager in the City of Fredericksburg, advising of the Company's intention to file this Application and inviting the localities to consult with the Company about the proposed Rebuild Project. See Attachment V.D.

Dominion Energy Services, Inc.
5000 Dominion Boulevard, 3rd Floor
Glen Allen, VA 23060
DominionEnergy.com



Mr. Randal E. Vosburg
County Administrator, Stafford County
1300 Courthouse Road, 3rd Floor
Stafford, VA 22554

January 25, 2024

Dear Mr. Vosburg,

Dominion Energy Virginia (the "Company") is proposing to wreck and rebuild existing transmission Lines #29, #2104, and #2157, primarily within approximately 12 miles of existing right-of-way between our Fredericksburg Substation and Aquia Harbour Substation in the City of Fredericksburg and Stafford County. The Company proposes to rebuild the transmission lines primarily on two parallel double-circuit weathering steel monopoles capable of 230 kV capacity. Line #29, which currently operates at 115 kV, will be uprated to 230 kV standards. Approximately one acre of new right-of-way will be required where several spans of four parallel single-circuit monopoles are proposed. Collectively this work is referred to as the "Rebuild Project."

The Rebuild Project is needed to maintain the structural integrity and reliability of the networked transmission system, resolve identified violations of the mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards, and provide for future load growth in the area.

The Company is preparing to file an application for a Certificate of Public Convenience and Necessity ("CPCN") with the Virginia State Corporation Commission ("SCC"). Pursuant to Va. Code § 15.2-2202, the Company is writing to notify you of the proposed Rebuild Project in advance of this SCC filing. We respectfully request that you submit any comments or additional information you feel would have bearing on the Rebuild Project within 30 days of the date of this letter. Once filed, the application will be available for review on the Company's website at <https://www.dominionenergy.com/projects-and-facilities/electric-projects/power-line-projects/>.

Enclosed is a Project Overview Map and associated GIS shapefile depicting the proposed Rebuild Project, as well as its general location. Please note that the Project Overview Map and route description depicted therein are preliminary in nature and subject to final engineering. All final materials, including maps, will be available in the Company's application filing to the SCC. Please refer to the CPCN application for any updates to the Rebuild Project description. If there are any questions, please do not hesitate to contact me directly at 804-659-9637 or tracey.s.mcdonald@dominionenergy.com. We appreciate your assistance with this project review and look forward to any additional information you may have to offer.

Regards,

A handwritten signature in black ink that reads "Tracey McDonald".

Tracey McDonald
Senior Siting and Permitting Specialist

Dominion Energy Services, Inc.
5000 Dominion Boulevard, 3rd Floor
Glen Allen, VA 23060
DominionEnergy.com



Mr. Timothy J. Baroody
City Manager, City of Fredericksburg
715 Princess Anne Street
Fredericksburg, VA 22401

January 25, 2024

Dear Mr. Baroody,

Dominion Energy Virginia (the "Company") is proposing to wreck and rebuild existing transmission Lines #29, #2104, and #2157, primarily within approximately 12 miles of existing right-of-way between our Fredericksburg Substation and Aquia Harbour Substation in the City of Fredericksburg and Stafford County. The Company proposes to rebuild the transmission lines primarily on two parallel double-circuit weathering steel monopoles capable of 230 kV capacity. Line #29, which currently operates at 115 kV, will be uprated to 230 kV standards. Approximately one acre of new right-of-way will be required where several spans of four parallel single-circuit monopoles are proposed. Collectively this work is referred to as the "Rebuild Project."

The Rebuild Project is needed to maintain the structural integrity and reliability of the networked transmission system, resolve identified violations of the mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards, and provide for future load growth in the area.

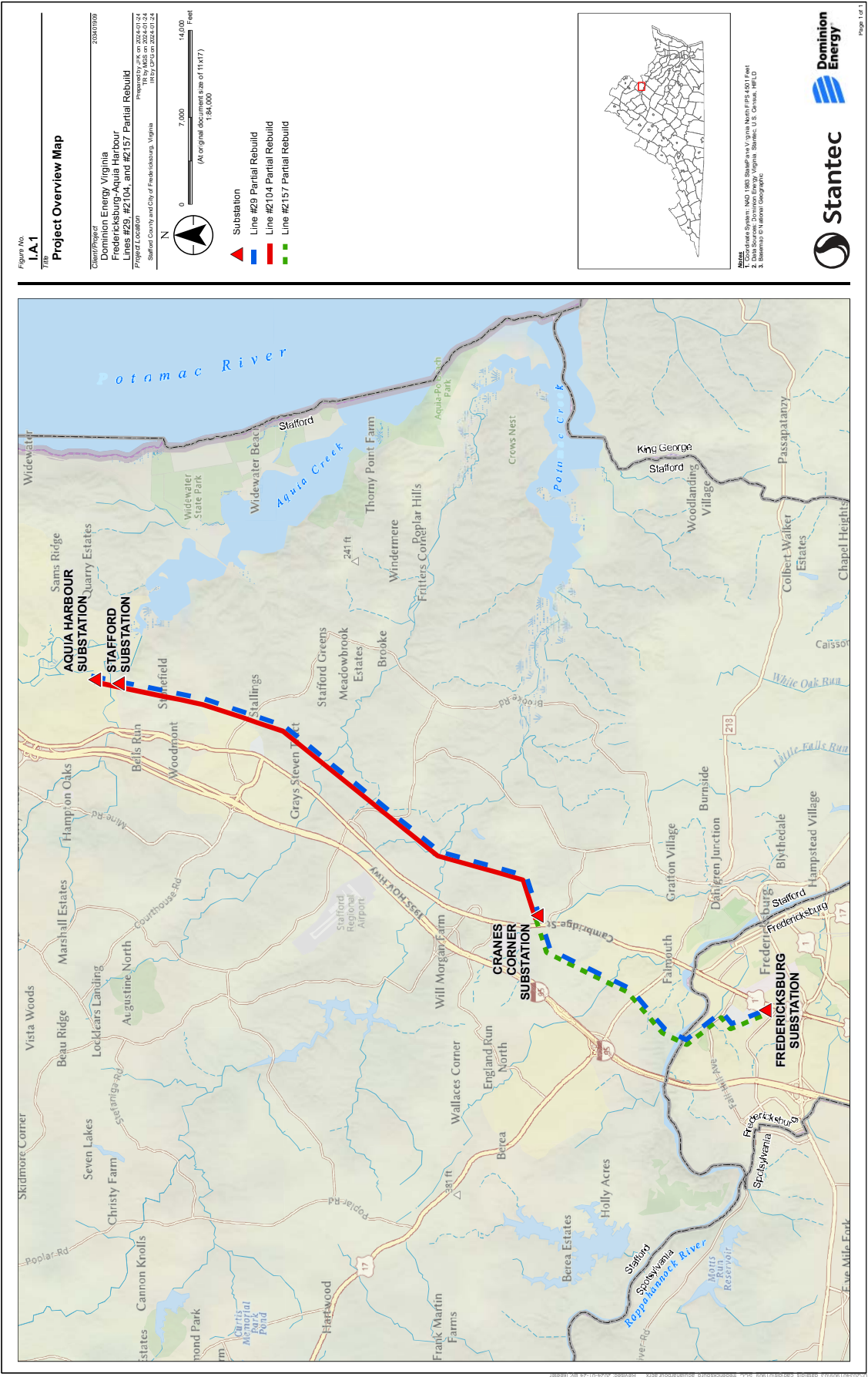
The Company is preparing to file an application for a Certificate of Public Convenience and Necessity ("CPCN") with the Virginia State Corporation Commission ("SCC"). Pursuant to Va. Code § 15.2-2202, the Company is writing to notify you of the proposed Rebuild Project in advance of this SCC filing. We respectfully request that you submit any comments or additional information you feel would have bearing on the Rebuild Project within 30 days of the date of this letter. Once filed, the application will be available for review on the Company's website at <https://www.dominionenergy.com/projects-and-facilities/electric-projects/power-line-projects/>.

Enclosed is a Project Overview Map and associated GIS shapefile depicting the proposed Rebuild Project, as well as its general location. Please note that the Project Overview Map and route description depicted therein are preliminary in nature and subject to final engineering. All final materials, including maps, will be available in the Company's application filing to the SCC. Please refer to the CPCN application for any updates to the Rebuild Project description. If there are any questions, please do not hesitate to contact me directly at 804-659-9637 or tracey.s.mcdonald@dominionenergy.com. We appreciate your assistance with this project review and look forward to any additional information you may have to offer.

Regards,

A handwritten signature in cursive script that reads "Tracey McDonald".

Tracey McDonald
Senior Siting and Permitting Specialist



COMMONWEALTH OF VIRGINIA
STATE CORPORATION COMMISSION

APPLICATION OF)	
)	
VIRGINIA ELECTRIC AND POWER)	Case No. PUR-2024-00035
COMPANY)	
)	
For approval and certification of electric)	
transmission facilities: Fredericksburg)	
-Aquia Harbour Lines #29, #2104, and)	
#2157 Partial Rebuild)	
)	

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

Mark R. Gill

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

Sherrill A. Crenshaw

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

Tracey McDonald

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

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Mark R. Gill

Title: Consulting Engineer – Electric Transmission Planning

Summary:

Company Witness Mark Gill sponsors those sections of the Appendix describing the Company's electric transmission system and the need for, and benefits of, the proposed Rebuild Project, as follows:

- Section I.B: This section details the engineering justifications for the proposed Rebuild Project.
- Section I.C: This section describes the present system and details how the proposed Rebuild 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.
- Section I.G: This section provides a system map for the affected area.
- Section I.H: This section provides the desired in-service date of the proposed Rebuild Project and the estimated construction time.
- Section I.J: This section provides information about the project if approved by the RTO.
- Section I.K: This section 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: This section 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.10: This section provides details of the construction plans for the proposed Rebuild Project, including requested and approved line outage schedules.

Additionally, Mr. Gill co-sponsors the following portions of the Appendix:

- Executive Summary (co-sponsored with Company Witnesses Sherrill Crenshaw and Tracey McDonald): The Executive Summary provides a brief summary of the Project.
- Section I.A (co-sponsored with Company Witness Sherrill Crenshaw): This section details the primary justifications for the proposed Rebuild Project.
- Section I.F (co-sponsored with Company Witness Sherrill Crenshaw): This section describes any lines or facilities that will be removed, replaced or taken out of service upon completion of the proposed Rebuild Project and normal and emergency ratings of the facilities.
- Section II.A.3 (co-sponsored with Company Witness Tracey McDonald): This section provides color maps of existing or proposed rights-of-way in the vicinity of the proposed Rebuild Project.

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

**DIRECT TESTIMONY
OF
MARK R. GILL
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
VIRGINIA STATE CORPORATION COMMISSION
CASE NO. PUR-2024-00035**

1 **Q. Please state your name, business address and position with Virginia Electric and**
2 **Power Company (“Dominion Energy Virginia” or the “Company”).**

3 A. My name is Mark R. Gill, and I am a Consulting Engineer in the Electric Transmission
4 Planning Department of the Company. My business address is 5000 Dominion Boulevard,
5 Glen Allen, Virginia 23060. A statement of my qualifications and background is provided
6 as Appendix A.

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

8 A. I am responsible for planning the Company’s electric transmission system for voltages
9 of 69 kilovolts (“kV”) through 500 kV.

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

11 A. In order to: (a) maintain the structural integrity and reliability of the networked
12 transmission system; (b) resolve identified violations of the mandatory North American
13 Electric Reliability Corporation (“NERC”) Reliability Standards; and (c) provide for future
14 load growth in the Woodbridge Load Area, Virginia Electric and Power Company
15 (“Dominion Energy Virginia” or the “Company”) proposes, in Stafford County and the
16 City of Fredericksburg, to rebuild its Fredericksburg to Possum Point transmission corridor
17 by: (i) partially rebuilding, entirely within existing right-of-way or on Company-owned
18 property, except for an approximately one-acre right-of-way near Dogwood Airpark,
19 approximately 12.5 miles of 115 kV Line #29 on double-circuit monopole structures

1 utilizing current 230 kV standards, between the Company's existing Fredericksburg
2 Substation and Aquia Harbour Switching Station ("Aquia Harbour Station"); (ii)
3 rebuilding, entirely within existing right-of-way or on Company-owned property,
4 approximately 8.0 miles of 230 kV Line #2104 on double-circuit monopole structures
5 between the Company's existing Cranes Corner Substation and Aquia Harbour Station;
6 (iii) removing two 500 kV structures and installing two 500 kV single circuit H-frame
7 structures and two 500 kV single circuit monopoles; and (iv) rebuilding, entirely within
8 existing right-of-way or on Company-owned property, approximately 3.8 miles of 230 kV
9 Line #2157 on double circuit monopole structures between the Company's existing
10 Fredericksburg and Cranes Corner Substations (collectively, the "Rebuild Project").

11 The purpose of my testimony is to describe the Company's electric transmission system
12 and the need for, and benefits of, the proposed Rebuild Project. I am sponsoring Sections
13 I.B, I.C, I.D, I.E, I.G, I.H, I.J, I.K, I.M, I.N, and II.A.10 of the Appendix. Additionally, I
14 also co-sponsor Sections I.A and I.F of the Appendix with Company Witness Sherrill A.
15 Crenshaw, and Section II.A.3 with Company Witness Tracey McDonald. Lastly, I co-
16 sponsor the Executive Summary with Company Witnesses Sherrill A. Crenshaw and
17 Tracey McDonald.

18 **Q. Does this conclude your testimony?**

19 **A.** Yes, it does.

**BACKGROUND AND QUALIFICATIONS
OF
MARK R. GILL**

Mark R. Gill received a Bachelor of Science degree in Electrical Engineering from the University of Virginia in 1989. He has been licensed as a Professional Engineer in the Commonwealth of Virginia since 1994. He has been employed by the Company for 32 years. Mr. Gill's experience with the Company includes Customer Service (1988-1992), Circuit Calculations/System Protection (1992-1999), Distribution Planning (1999-2007), and Transmission Planning (2007-Present).

Mr. Gill has previously testified before the Virginia State Corporation Commission.

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Sherrill A. Crenshaw

Title: Consulting Engineer – Electric Transmission Line Engineering

Summary:

Company Witness Sherrill A. Crenshaw will sponsor those portions of the Appendix providing an overview of the design characteristics of the transmission facilities for the proposed Rebuild Project, and discussing electric and magnetic field levels, as follows:

- Section I.I: This section provides the estimated total cost of the proposed Rebuild Project.
- Section I.L: This section provides photographs illustrating the deterioration of structures and associated equipment as applicable.
- 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.3: These sections provide the line design and operational features of the proposed Rebuild Project.
- Section II.B.4: This section provides the line design and operational features of a proposed project.
- Section II.C: This section describes and furnishes a one-line diagram of the substation associated with the proposed Rebuild Project, if needed.
- Section IV: This section provides analysis on the health aspects of electric and magnetic field levels.

Additionally, Mr. Crenshaw co-sponsors the following portions of the Appendix:

- Executive Summary (co-sponsored with Company Witnesses Mark R. Gill and Tracey McDonald): The Executive Summary provides a brief summary of the Rebuild Project.
- Section I.A (co-sponsored with Company Witness Mark R. Gill): This section details the primary justifications for the proposed Rebuild Project.
- Section I.F (co-sponsored with Company Witness Mark R. Gill): This section describes any lines or facilities that will be removed, replaced or taken out of service upon completion of the proposed Rebuild Project and normal and emergency ratings of the facilities.
- Section II.B.5 (co-sponsored with Company Witness Tracey McDonald): This section provides the mapping and structure heights for the existing and proposed overhead structures.

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

**DIRECT TESTIMONY
OF
SHERRILL A. CRENSHAW
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
VIRGINIA STATE CORPORATION COMMISSION
CASE NO. PUR-2024-00035**

1 **Q. Please state your name, business address and position with Virginia Electric and**
2 **Power Company (“Dominion Energy Virginia” or the “Company”).**

3 A. My name is Sherrill A. Crenshaw, and I am a Consulting Engineer in the Electric
4 Transmission Line Engineering Department at the Company. My business address is 5000
5 Dominion Boulevard, Glen Allen, Virginia 23060. A statement of my qualifications and
6 background is provided as Appendix A.

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

8 A. I am responsible for the estimating, conceptual and final design of high voltage
9 transmission line projects from voltages of 69 kilovolts (“kV”) to 500 kV.

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

11 A. In order to: (a) maintain the structural integrity and reliability of the networked
12 transmission system; (b) resolve identified violations of the mandatory North American
13 Electric Reliability Corporation (“NERC”) Reliability Standards; and (c) provide for future
14 load growth in the Woodbridge Load Area, Virginia Electric and Power Company
15 (“Dominion Energy Virginia” or the “Company”) proposes, in Stafford County and the
16 City of Fredericksburg, to rebuild its Fredericksburg to Possum Point transmission corridor
17 by: (i) partially rebuilding, entirely within existing right-of-way or on Company-owned
18 property, except for an approximately one-acre right-of-way near Dogwood Airpark,
19 approximately 12.5 miles of 115 kV Line #29 on double-circuit monopole structures

1 utilizing current 230 kV standards, between the Company's existing Fredericksburg
2 Substation and Aquia Harbour Switching Station ("Aquia Harbour Station"); (ii)
3 rebuilding, entirely within existing right-of-way or on Company-owned property,
4 approximately 8.0 miles of 230 kV Line #2104 on double-circuit monopole structures
5 between the Company's existing Cranes Corner Substation and Aquia Harbour Station;
6 (iii) removing two 500 kV structures and installing two 500 kV single circuit H-frame
7 structures and two 500 kV single circuit monopoles; and (iv) rebuilding, entirely within
8 existing right-of-way or on Company-owned property, approximately 3.8 miles of 230 kV
9 Line #2157 on double circuit monopole structures between the Company's existing
10 Fredericksburg and Cranes Corner Substations (collectively, the "Rebuild Project").

11 The purpose of my testimony is to describe the design characteristics of the transmission
12 facilities for the proposed Rebuild Project, and also to discuss electric and magnetic field
13 ("EMF") levels. I sponsor Sections I.I, I.L, II.A.5, II.B.1 to II.B.4, II.C, and IV of the
14 Appendix. I also co-sponsor Section I.A and Section I.F of the Appendix with Company
15 Witness Mark R. Gill and Section II.B.5 with Company Witness Tracey McDonald.
16 Lastly, I co-sponsor the Executive Summary with Company Witnesses Mark R. Gill and
17 Tracey McDonald.

18 **Q. Does this conclude your testimony?**

19 **A.** Yes, it does.

**BACKGROUND AND QUALIFICATIONS
OF
SHERRILL A. CRENSHAW**

Sherrill A. Crenshaw graduated from Virginia Polytechnic Institute and State University in 1985 with a Bachelor of Science degree in Civil Engineering. He joined the Company in 1986 and has held various engineering titles within the Electric Transmission Engineering department, where he currently works as a Consulting Engineer. Mr. Crenshaw is a licensed engineer in the Commonwealth of Virginia.

Mr. Crenshaw has previously testified before the Virginia State Corporation Commission.

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Tracey McDonald

Title: Senior Siting and Permitting Specialist

Summary:

Company Witness Tracey McDonald will sponsor those portions of the Appendix providing an overview of the design of the route for the proposed Rebuild Project, and related permitting, as follows:

- Section II.A.1: This section provides the length of the proposed corridor and viable alternatives to the proposed Rebuild Project.
- Section II.A.2: This section provides a map showing the route of the proposed Rebuild Project in relation to notable points close to the proposed Rebuild Project.
- Section II.A.4: This section explains why the existing right-of-way is not adequate to serve the need, to the extent applicable.
- Sections II.A.6 to II.A.8: These sections provide detail regarding the right-of-way for the proposed Rebuild Project.
- Section II.A.9: This section describes the proposed route selection procedures and details alternative routes considered.
- Section II.A.11: This section details how the construction of the proposed Rebuild Project follows the provisions discussed in Attachment 1 of the Transmission Appendix Guidelines.
- Section II.A.12: This section identifies the counties and localities through which the proposed Rebuild Project will pass and provides General Highway Maps for these localities.
- Section II.B.6: This section provides photographs of existing facilities, representations of proposed facilities, and visual simulations.
- Section III: This section details the impact of the proposed Rebuild Project on scenic, environmental, and historic features.
- Section V: This section provides information related to public notice of the proposed Rebuild Project.

Additionally, Ms. McDonald co-sponsors the following portions of the Appendix:

- Executive Summary (co-sponsored with Company Witnesses Mark R. Gill and Sherrill A. Crenshaw): The Executive Summary provides a brief summary of the Rebuild Project.
- Section II.A.3 (co-sponsored with Company Witness Mark R. Gill): This section provides color maps of existing or proposed rights-of-way in the vicinity of the proposed Rebuild Project.
- Section II.B.5 (co-sponsored with Company Witness Sherrill A. Crenshaw): This section provides the mapping and structure heights for the existing and proposed overhead structures.

Finally, Ms. McDonald sponsors the DEQ Supplement filed with the Application. A statement of Ms. McDonald's background and qualifications is attached to her testimony as Appendix A.

**DIRECT TESTIMONY
OF
TRACEY MCDONALD
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2024-00035**

1 **Q. Please state your name, business address and position with Virginia Electric and**
2 **Power Company (“Dominion Energy Virginia” or the “Company”).**

3 A. My name is Tracey McDonald, and I am a Senior Siting and Permitting Specialist for
4 Virginia Electric and Power Company (“Dominion Energy Virginia” or the “Company”)
5 supporting Electric Transmission. My business address is 5000 Dominion Boulevard, Glen
6 Allen, Virginia 23060. A statement of my qualifications and background is provided as
7 Appendix A.

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

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

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

16 A. In order to: (a) maintain the structural integrity and reliability of the networked
17 transmission system; (b) resolve identified violations of the mandatory North American
18 Electric Reliability Corporation (“NERC”) Reliability Standards; and (c) provide for future
19 load growth in the Woodbridge Load Area, Virginia Electric and Power Company

1 (“Dominion Energy Virginia” or the “Company”) proposes, in Stafford County and the
2 City of Fredericksburg, to rebuild its Fredericksburg to Possum Point transmission corridor
3 by: (i) partially rebuilding, entirely within existing right-of-way or on Company-owned
4 property, except for an approximately one-acre right-of-way near Dogwood Airpark,
5 approximately 12.5 miles of 115 kV Line #29 on double-circuit monopole structures
6 utilizing current 230 kV standards, between the Company’s existing Fredericksburg
7 Substation and Aquia Harbour Switching Station (“Aquia Harbour Station”); (ii)
8 rebuilding, entirely within existing right-of-way or on Company-owned property,
9 approximately 8.0 miles of 230 kV Line #2104 on double-circuit monopole structures
10 between the Company’s existing Cranes Corner Substation and Aquia Harbour Station;
11 (iii) removing two 500 kV structures and installing two 500 kV single circuit H-frame
12 structures and two 500 kV single circuit monopoles; and (iv) rebuilding, entirely within
13 existing right-of-way or on Company-owned property, approximately 3.8 miles of 230 kV
14 Line #2157 on double circuit monopole structures between the Company’s existing
15 Fredericksburg and Cranes Corner Substations (collectively, the “Rebuild Project”).

16 The purpose of my testimony is to provide an overview of the route and permitting for the
17 proposed Rebuild Project. As it pertains to routing and permitting, I sponsor Sections
18 II.A.1, II.A.2, II.A.4, II.A.6 to II.A.9, II.A.11, II.A.12, II.B.6, III, and V of the Appendix.
19 I also sponsor the DEQ Supplement filed with the Application, and co-sponsor Section
20 II.A.3 of the Appendix with Company Witness Mark R. Gill and Section II.B.5 with
21 Company Witness Sherrill A. Crenshaw. Lastly, I co-sponsor the Executive Summary with
22 Company Witnesses Mark R. Gill and Sherrill A. Crenshaw.

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

2 A. In accordance with Va. Code § 15.2-2202 E, letters dated January 25, 2024, were sent to
3 (1) Mr. Randal E. Vosburg, County Administrator in Stafford County; and (2) Mr. Timothy
4 J. Baroody, City Manager in the City of Fredericksburg, advising of the Company's
5 intention to file this Application and inviting the County and the City to consult with the
6 Company about the Rebuild Project. Copies of these letters are included as Appendix
7 Attachment V.D.

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

9 A. Yes, it does.

**BACKGROUND AND QUALIFICATIONS
OF
TRACEY MCDONALD**

Tracey McDonald received a Bachelor of Science degree in Anthropology from Radford University in 2003. Ms. McDonald has been employed by the Company since 2023. Prior to joining the Company, she worked as an Archaeologist and Regulatory Specialist from 2003 to 2023. Her areas of expertise are siting and permitting.

Ms. McDonald has not previously testified before the Virginia State Corporation Commission.