



# **Dominion<sup>®</sup>**

**Application, Appendix,  
DEQ Supplement, Direct  
Testimony and Exhibits of  
Virginia Electric and  
Power Company**

**Before the State Corporation  
Commission of Virginia**

**Line #65 115 kV Rebuild at  
Norris Bridge**

**Application No. 276**

**Case No. PUE-2016-00021**

**Filed: February 29, 2016**

**Volume 1 of 2**



**COMMONWEALTH OF VIRGINIA  
BEFORE THE  
STATE CORPORATION COMMISSION**

**APPLICATION OF  
VIRGINIA ELECTRIC AND POWER COMPANY  
FOR APPROVAL AND CERTIFICATION  
OF ELECTRIC FACILITIES**

**Line #65 115 kV Rebuild at Norris Bridge**

**Application No. 276**

**Case No. PUE-2016-00021**

**Filed: February 29, 2016**

COMMONWEALTH OF VIRGINIA  
BEFORE THE  
STATE CORPORATION COMMISSION

Application of	)	
	)	
Virginia Electric and Power Company	)	Case No. PUE-2016-00021
	)	
For approval and certification of electric	)	
transmission facilities under Va. Code	)	
§ 56-46.1 and the Utility Facilities Act,	)	
Va. Code § 56-265.1 <i>et seq.</i>	)	

**APPLICATION OF VIRGINIA ELECTRIC AND POWER COMPANY  
FOR APPROVAL AND CERTIFICATION OF ELECTRIC FACILITIES  
FOR LINE #65 115 KV REBUILD AT NORRIS BRIDGE**

Virginia Electric and Power Company (“Dominion Virginia Power” or the “Company”) respectfully shows as follows:

1. Dominion Virginia Power is a public service corporation organized under the laws of the Commonwealth of Virginia furnishing electric service to the public within its Virginia service territory. The Company also furnishes electric service to the public in portions of North Carolina. Dominion Virginia Power’s electric system, consisting of facilities for generation, transmission and distribution of electric energy, is interconnected with the electric systems of neighboring utilities, and is a part of the interconnected network of electric systems serving the continental United States. By reason of its operation in two states and its interconnections with other utilities, the Company is engaged in interstate commerce.

2. In order to perform its legal duty to furnish adequate and reliable electric service, Dominion Virginia Power must, from time to time, replace and construct new transmission facilities in its system. The electric facilities proposed in this application are necessary so that Dominion Virginia Power can maintain the structural integrity and



reliability of its transmission system and reliable electric service to its customers in the area and perform needed maintenance on its existing facilities.

3. Accordingly, the Company proposes to rebuild an approximately 2.2-mile segment of an existing single circuit 115 kV transmission line, Harmony Village-Northern Neck Line #65, including (1) approximately 0.3 mile on land entirely within the existing right-of-way on both sides of the Rappahannock River in Lancaster County (less than 0.1 mile) and Middlesex County (approximately 0.3 mile); and (2) an approximately 1.9-mile section of Line #65 in the Rappahannock River utilizing an 80-foot right-of-way permitted by the Virginia Marine Resources Commission, which expands to 200 feet at two sections in the center span of the Robert O. Norris Bridge ("Norris Bridge") to accommodate the fender system in the navigational channel of the river. Collectively, this approximately 2.2-mile segment of Line #65 between White Stone Substation and Harmony Village Substation in Lancaster and Middlesex Counties is the proposed rebuild project (the "Rebuild Project").

4. There is an immediate and current need for the Rebuild Project to assure that Dominion Virginia Power can continue to provide reliable electric transmission service consistent with the Company's obligation under Virginia law to serve retail electric customers in its exclusive service territory. Presuming State Corporation Commission ("Commission") authorization by November 1, 2016, and the ability to obtain the necessary outages, the Company anticipates that the Rebuild Project could be in service by December 2017. The necessity for the proposed Rebuild Project is described in more detail in Section I of the Appendix attached to this application.

5. For the land portion of the Rebuild Project, the Company proposes to replace structures along an existing right-of-way for approximately 0.3 mile combined in both

Lancaster and Middlesex Counties. On the Lancaster County (north) side of the Rappahannock River, one existing wooden three-pole structure will be removed and replaced by a galvanized steel three-pole structure. On the Middlesex County (south) side of the river, one existing wooden monopole structure will be eliminated entirely and three existing monopoles will be removed and replaced with one double deadend galvanized steel monopole and two weathering steel monopoles.

6. For the approximately 1.9-mile water crossing portion of the Rebuild Project, the Company proposes to remove seven wooden H-frame structures in the water and 14 davit arm style structures currently attached to the Norris Bridge, which were installed in 1962. The Rebuild Project will replace these 21 water-crossing structures with a total of 10 galvanized steel H-frame structures in the water, thereby adding a total of three structures in the water and eliminating all 14 bridge attachments. The centerline of the proposed H-frame structures will be located approximately 100 feet east of the Norris Bridge. Additionally, a fender system will be installed in front of the two structures on either side of and parallel to the navigational channel for protection of the structures against boating traffic.

7. In addition to the structure replacement, the Company proposes to remove approximately 2.2 miles of existing 477 ACSR (24/7) three-phase conductor and one 3#6 static wire between the existing river bank three-pole structure in Lancaster County and existing monopole on the Middlesex County bank. Approximately 2.2 miles of 900 ACSS/TW/HS-285/MM (20/7) three-phase conductor and two shield wires will be installed between the three-pole double deadend structure in Lancaster County and the existing double deadend monopole in Middlesex County.

8. As noted above, the Company anticipates that the Rebuild Project could be in service by December 2017, subject to Commission approval and outage scheduling if a Commission order is received by November 1, 2016. The estimated total cost of the proposed Rebuild Project, which assumes completion by December 2017, is approximately \$26.2 million (2016 dollars). This includes the cost to relocate an existing approximately 0.2-mile distribution line on the Middlesex County side of the Rebuild Project, which is currently underbuilt on three transmission structures. The Company plans to relocate this distribution line as part of the Rebuild Project. There is no station work associated with the Rebuild Project.

9. The proposed facilities will afford the best, most cost-effective means of meeting the continuing need for reliable service, while reasonably minimizing adverse impact on the scenic, environmental and historic assets of the area.

10. The Company has identified a proposed route (Proposed 115 kV Overhead Route), a 230 kV alternative (230 kV Overhead Alternative), and an underground option (Underground Option) for the Commission's consideration. Though the Company does not support approval of the Underground Option, for reasons discussed in the Appendix and pre-filed direct testimony filed herein, in the interest of avoiding further delay to the Rebuild Project, the Company does not oppose the Commission directing that the Underground Option, along with the Company's Proposed 115 kV Overhead Route and 230 kV Overhead Alternative, be set forth for public, landowner and public officials' notice pursuant to Va. Code § 56-265.2 and § 56-46.1. The Proposed 115 kV Overhead Route, 230 kV Overhead Alternative, Underground Option, as well as other options reviewed and rejected by the Company are described in Section III of the Appendix.

11. Based on consultations with the Virginia Department of Environmental Quality (“DEQ”), the Company has developed a supplement (“DEQ Supplement”) containing information designed to facilitate review and analysis of the proposed facilities by the DEQ and other relevant agencies. The DEQ Supplement is attached to this application, as is an Alternatives Analysis.

12. Dominion Virginia Power’s experience, the advice of consultants and a review of published studies by experts in the field have disclosed no causal link to harmful health or safety effects from electric and magnetic fields generated by the Company’s existing or proposed facilities. For further discussion of this topic, *see* Section IV of the Appendix.

13. A list of federal, state and local agencies and officials that reasonably may be expected to have an interest in the proposed construction, and to which a copy of the application will be sent, is set forth in Section V of the Appendix.

14. In addition to the information provided in the Appendix, DEQ Supplement, and Alternatives Analysis, this application is supported by the prepared direct testimony of Company Witnesses Dennis D. Kaminsky; Jacob G. Heisey; Amanda M. Mayhew; and Jon M. Berkin filed with this application.

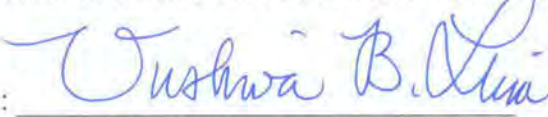
[INTENTIONALLY LEFT BLANK]

WHEREFORE, Dominion Virginia Power respectfully requests that the Commission:

- (a) direct that notice of this application be given as required by § 56-265.2 and § 56-46.1 of the Code of Virginia;
- (b) approve pursuant to § 56-265.2 of the Code of Virginia the construction of the proposed 115 kV transmission facilities in order for construction to begin by November 1, 2016; and
- (c) grant a certificate of public convenience and necessity for the facilities under the Utility Facilities Act.

**VIRGINIA ELECTRIC AND POWER COMPANY**

By:



Counsel for Applicant

Charlotte P. McAfee  
Dominion Resources Services, Inc.  
Law Department  
120 Tredegar Street, Riverside 2  
Richmond, Virginia 23219  
(804) 819-2277  
[charlotte.p.mcafee@dom.com](mailto:charlotte.p.mcafee@dom.com)

Vishwa B. Link  
Jennifer D. Valaika  
Lisa R. Crabtree  
McGuireWoods LLP  
Gateway Plaza  
800 E. Canal Street  
Richmond, Virginia 23219  
(804) 775-4330  
(804) 775-1051  
(804) 775-1327  
[vlink@mcguirewoods.com](mailto:vlink@mcguirewoods.com)  
[jvalaika@mcguirewoods.com](mailto:jvalaika@mcguirewoods.com)  
[lcrabtree@mcguirewoods.com](mailto:lcrabtree@mcguirewoods.com)

*Counsel for Applicant Virginia Electric and Power Company*

February 29, 2016



COMMONWEALTH OF VIRGINIA  
BEFORE THE  
STATE CORPORATION COMMISSION

APPLICATION OF  
VIRGINIA ELECTRIC AND POWER COMPANY  
FOR APPROVAL AND CERTIFICATION  
OF ELECTRIC FACILITIES

Line #65 115 kV Rebuild at Norris Bridge

Application No. 276

**Appendix**

Containing Information in Response to  
“Guidelines of Minimum Requirements for Transmission Line Application”

Case No. PUE-2016-00021

Filed: February 29, 2016

## TABLE OF CONTENTS

I.	Necessity for the Proposed Project .....	1
II.	Description of the Proposed Project .....	110
III.	Impact of Line on Scenic, Environmental and Historic Features .....	146
IV.	Health Aspects of EMF .....	203
V.	Notice .....	212



## **I. NECESSITY FOR THE PROPOSED PROJECT**

- A. Detail the engineering justifications for the proposed project (for example, provide narrative to support why the project is necessary to upgrade or replace an existing facility, to significantly increase system reliability, to connect a new generating station to the Company's system, etc.). Detail the later plans for the proposed project, if appropriate.**

**Response:** In order to maintain the structural integrity and reliability of its transmission system and perform needed maintenance on its existing facilities, Virginia Electric and Power Company ("Dominion Virginia Power" or the "Company") proposes to rebuild an approximately 2.2-mile segment of an existing single circuit 115 kV transmission line, Harmony Village-Northern Neck Line #65, including (1) approximately 0.3 mile on land entirely within the existing right-of-way on both sides of the Rappahannock River in Lancaster County (less than 0.1 mile) and Middlesex County (approximately 0.3 mile); and (2) an approximately 1.9-mile section of Line #65 in the Rappahannock River utilizing an 80-foot right-of-way permitted by the Virginia Marine Resources Commission ("VMRC"), which expands to 200 feet at two sections in the center span of the Robert O. Norris Bridge ("Norris Bridge") to accommodate the fender system on either side of and parallel to the navigational channel in the river. Collectively, this approximately 2.2-mile segment of Line #65 between White Stone Substation and Harmony Village Substation in Lancaster and Middlesex Counties, respectively, is the proposed rebuild project (the "Rebuild Project"). Attachment I.E.1 contains a map of the Company's existing transmission system in this area.

For the land portion of the Rebuild Project, the Company proposes to replace structures along an existing right-of-way for approximately 0.3 mile combined in both Lancaster and Middlesex Counties. On the Lancaster County (north) side of the Rappahannock River, one existing wooden three-pole structure will be removed and replaced by a galvanized steel three-pole structure. On the Middlesex County (south) side of the river, one existing wooden monopole structure will be eliminated entirely and three existing monopoles will be removed and replaced with one double deadend galvanized steel monopole and two weathering steel monopoles.

For the approximately 1.9-mile water crossing portion of the Rebuild Project, the Company proposes to remove seven wooden H-frame structures in the water and 14 davit arm style structures currently attached to the Norris Bridge, which were installed in 1962. The Rebuild Project will replace these 21 water-crossing structures with a total of 10 galvanized steel H-frame structures in the water, thereby adding a total of three structures in the water and eliminating all 14 bridge attachments. The centerline of the proposed H-frame structures will be located approximately 100 feet east of the Norris Bridge. Additionally, a fender system will be installed in front of the two

structures on either side of and parallel to the navigational channel for protection against boating traffic.

In addition to the structure replacement, the Company proposes to remove approximately 2.2 miles of existing 477 ACSR (24/7) three-phase conductor and one 3#6 static wire between the existing river bank three-pole structure in Lancaster County and existing monopole on the Middlesex County bank. Approximately 2.2 miles of 900 ACSS/TW/HS-285/MM (20/7) three-phase conductor and two shield wires will be installed between the three-pole double deadend in Lancaster County and the existing double deadend monopole in Middlesex County.

The proposed route of the Rebuild Project begins in Middlesex County and heads northeast for approximately 0.3 mile, where it crosses the Rappahannock River for approximately 1.9 miles before coming ashore on the northern bank of the river, where it then travels less than 0.1 mile in a northeasterly direction before ending at the first structure on land in Lancaster County ("Proposed 115 kV Overhead Route" or "Proposed Route"). The Rebuild Project was selected because it meets the identified need at the lowest cost, maximizes use of existing right-of-way from VMRC, minimizes direct impacts to the river bottom, offers reduced structure heights, and can be built in a timely manner to met the PJM energization date.

There is a current and immediate need for the Rebuild Project. Presuming Commission authorization by November 1, 2016, and the ability to obtain the necessary outages, the Company anticipates that the Rebuild Project could be in service by December 2017. The estimated total cost of the proposed Rebuild Project, which assumes completion by December 2017, is approximately \$26.2 million (2016 dollars). This includes the cost to relocate an existing approximately 0.2-mile distribution line on the Middlesex County side of the Rebuild Project, which is currently underbuilt on three transmission structures. The Company plans to relocate this distribution line as part of the Rebuild Project. There is no station work associated with the Rebuild Project.

The Rebuild Project is necessary to assure that Dominion Virginia Power can maintain and improve reliable electric service consistent with the Company's obligation under Virginia law to serve retail electric customers in its exclusive service territory. The single circuit 115 kV Harmony Village-Northern Neck Line #65 provides service to the Company's White Stone, Ocran and Lancaster Substations and to the 115 kV Northern Neck Electric Cooperative ("NNEC") Garner Delivery Point ("DP"), which in total serve almost 19,000 customers, including over 6,200 NNEC customers, and is a critical component to the Company's electric transmission grid for providing reliable electric transmission service in its territory in Virginia. The failure to address the critical structural and operational deficiencies

associated with the existing structures and bridge attachments identified in the Rebuild Project will limit the Company's ability to maintain reliable transmission service to these customers.

In the spring of 2014, this 2.2-mile segment of Line #65 was identified for removal due to the following issues:

#### Safety

- The close proximity of this segment of Line #65 to the Norris Bridge deck requires that it be de-energized anytime bridge maintenance is performed by the Virginia Department of Transportation ("VDOT"), resulting in compromised reliability of the entire Line #65.
- Company maintenance of Line #65 where it is attached to the bridge requires significant traffic control due to the narrow width of the bridge, putting Company personnel at risk while performing work in an already difficult environment.

#### Reliability

- Compared to the system rate, a significant number of unplanned outages affecting the entire Line #65 due to the bridge attachment have occurred. Since 2010 there have been seven unplanned outage events that occurred on the Norris Bridge water crossing. This is 30 times the annual rate/mile that Dominion Virginia Power has set for its goal for its entire overhead transmission system of approximately 6,400 miles. This large number of outages has occurred even though this segment of line has been de-energized over 50% of the time since 2010 due to VDOT maintenance. This outage number would likely be much higher if this segment had been in service the entire time. See Attachment I.A.1 for a chart of referenced outages.
- Recently, the Company received a new request from VDOT to remove this portion of Line #65 from service for 26+ months (811 days) starting in the spring of 2016, in order to allow VDOT to paint the center span of Norris Bridge. See Attachment I.A.2 for correspondence with VDOT regarding requested outages.
- The radial configuration of Line #65 (in which the segment of Line #65 between Harmony Village and White Stone Substations is de-energized and isolated from the rest of Line #65) during unplanned and planned outages, including VDOT bridge maintenance, results in compromise to the reliability of the local transmission network. Unplanned outages that occur on the remainder of Line #65 during this configuration will be longer in

duration and result in less reliable delivery of electric power to the four distribution DPs (i.e., Garner DP (feeds NNEC), Lancaster Substation, Ocran Substation, White Stone Substation) fed from Line #65. This radial configuration occurs during outages on the segment of Line #65 attached to the Norris Bridge for VDOT maintenance. Since 1999, there have been 21 planned outages for VDOT bridge maintenance on this line segment for a total of 2,175 days, which averages to over 135 days per year or 37% of the time that this line has been in a radial configuration. See Attachment I.A.1 for a chart of the referenced outages.

- The North American Reliability Corporation (“NERC”) Reliability Standard TPL-001-4 effective January 1, 2015, now requires that planned outages to the transmission system longer than six months in duration be modeled as normal system conditions as noted in Section B under Requirement R1, item 1.1.2.<sup>1</sup> This requirement states that System models shall be maintained for performing the studies needed to complete the Planning assessment. This requirement will result in NERC violations starting as soon as 2018, if VDOT outages longer than six months on the Line #65 bridge attachment are modeled as normal system conditions in the future years.

#### Maintenance and Improvements on the Remainder of Line #65

- Any Company work on the remainder of Line #65, including upgrades or repairs, needs to be scheduled during times when VDOT is not performing bridge maintenance. VDOT bridge maintenance between 2010 and 2012 resulted in a two-year delay to a NERC Reliability project to upgrade Line #65 between Garner DP and Lancaster Substation.

#### Current Standards

- This segment of Line #65 was built in 1962, is nearing its anticipated lifespan and has been damaged in the past as a result of debris from bridge traffic.
- Moving this line segment to structures in the river built to today’s standards will result in better clearances for safety and reliability.
- Keeping Line #65 in a network configuration by avoiding planned VDOT bridge outages will maintain the strength of the local network and allow for quicker restoration when unplanned outages occur.
- According to a Wood Piles Inspection conducted in July 2015, on

---

<sup>1</sup> See <http://www.nerc.com/files/TPL-001-4.pdf>.

behalf of the Company by Crofton Industries, the wooden pile foundations in the river crossing segment of the Rebuild Project have reached the end of their service lives, exhibiting hour glassing that results in reduced section, checking and splitting. See Attachment I.A.3 for a copy of the Inspection, and Attachment I.A.4 for illustrations of existing attachment structures, H-frame structures and insulators.

- Insulators on the bridge attachments have also reached the end of their service lives. Damaged insulators attached to the Norris Bridge, as shown in Attachment I.A.5, reduce the integrity of the insulators and can lead to electrical flashover from the line to ground due to the reduced insulation value, which will result in unplanned outages on the entire Line #65.

Accordingly, after several years of compromised reliability and operational problems on the entire Line #65 due to the impact of the Norris Bridge line attachment and the condition of the associated facilities, the Rebuild Project was submitted by the Company to PJM Interconnection L.L.C. (“PJM”) in June 2014, as an Operational Performance upgrade and accepted by PJM as such on November 5, 2014. A copy of the slides presented at the PJM Southern Sub-Regional meetings for stakeholder input in June 2014 are provided in Attachment I.A.6. The cost and target date from the June 2014 presentation were subsequently revised at the PJM Southern Sub-Regional meeting held on September 24, 2014 (see Attachment I.A.7). The first estimate was a Planning Estimate to get the Rebuild Project initiated. As engineering progressed and surveys of the river bottom were completed, a preliminary estimate was developed. This took the actual depth of the river into account for the foundations, which was not known in the Planning Estimate.

Dominion Virginia Power is part of the Eastern Interconnection transmission grid, meaning it is interconnected, directly or indirectly, with all of the other transmission systems in the U.S. and Canada between the Rocky Mountains and the Atlantic coast, except Quebec and most of Texas. All of the transmission systems in the Eastern Interconnection are dependent on each other for support in moving bulk power through the transmission system and for reliability support. Dominion Virginia Power’s service to its customers is extremely reliant on a robust and reliable regional transmission system.

Dominion Virginia Power also is part of the PJM regional transmission organization (RTO) providing service to a large portion of the eastern United States. PJM is currently responsible for ensuring the reliability and coordinating the movement of electricity through all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia. This service area has a population of about 60 million

and on July 21, 2011, set a record high of 158,450 MW for summer peak demand, of which Dominion Virginia Power's load portion was approximately 19,636 MW serving 2.4 million customers. On July 22, 2011, the Company set a record high of 20,061 MW for summer peak demand. On February 20, 2015, the Company set a winter and all-time record demand of 21,651 MW. Moreover, based on the 2016 PJM Load Forecast, the Dominion Zone is expected to be one of the fastest growing zones in PJM with an average summer peak load growth rate of 1.2% over the next 10 years compared to the PJM average of 0.6% over the same period.

Dominion Virginia Power's transmission system is responsible for providing transmission service to the Company's retail customers and also to Appalachian Power Company (APCo), Old Dominion Electric Cooperative (ODEC), Northern Virginia Electric Cooperative (NOVEC), Central Virginia Electric Cooperative (CVEC), and Virginia Municipal Electric Association (VMEA) for redelivery to their retail customers in Virginia, as well as to North Carolina Electric Membership Corporation (NCEMC) and North Carolina Eastern Municipal Power Agency (NCEMPA) for redelivery to their customers in North Carolina. The Company needs to be able to maintain the overall, long-term reliability of its transmission system, as its customers require more power in the future.

The proposed Rebuild Project will replace aging infrastructure at the end of its service life with infrastructure built to today's standards and remove impediments that are presently degrading the integrity of the entire Line #65, thereby enabling the Company to maintain and improve the overall long-term reliability of its transmission system.

**VDOT Outages  
1999-2015**

Company	Line / Equipment	Substation(s)	Date From	Date To	Duration (days)
VDOT	65 Line (Harmony Village - White Stone)	Harmony Village, White Stone	6/7/1999	6/11/1999	5
VDOT	65 Line (Harmony Village - White Stone)	Harmony Village, White Stone	7/10/2000	7/19/2000	10
VDOT	65 Line (Harmony Village - White Stone)	Harmony Village, White Stone	7/9/2001	7/19/2001	11
VDOT	65 Line (Harmony Village - White Stone)	Harmony Village, White Stone	9/4/2003	10/16/2003	43
VDOT	65 Line (Harmony Village - White Stone)	Harmony Village, White Stone	7/19/2004	7/19/2004	1
VDOT	65 Line (Harmony Village - White Stone)	Harmony Village, White Stone	7/20/2004	7/21/2004	2
VDOT	65 Line (Harmony Village - White Stone)	Harmony Village, White Stone	5/9/2005	5/11/2005	3
VDOT	65 Line (Harmony Village - White Stone)	Harmony Village, White Stone	5/17/2006	5/19/2006	3
VDOT	65 Line (Harmony Village - White Stone)	Harmony Village, White Stone	5/14/2007	5/18/2007	5
VDOT	65 Line (Harmony Village - White Stone)	Harmony Village, White Stone	7/31/2007	8/6/2007	7
VDOT	65 Line (Harmony Village - White Stone)	Harmony Village, White Stone	8/20/2007	9/21/2007	33
VDOT	65 Line (Harmony Village - White Stone)	Harmony Village, White Stone	4/28/2008	6/9/2008	43
VDOT	65 Line (Harmony Village - White Stone)	Harmony Village, White Stone	5/4/2009	6/5/2009	33
VDOT	65 Line (Harmony Village - White Stone)	Harmony Village, White Stone	3/1/2010	12/28/2012	1034
VDOT	65 Line (Harmony Village - White Stone)	Harmony Village, White Stone	1/22/2013	1/23/2013	2
VDOT	65 Line (Harmony Village - White Stone)	Harmony Village, White Stone	2/24/2013	3/11/2013	16
VDOT	65 Line (Harmony Village - White Stone)	Harmony Village, White Stone	3/2/2014	4/4/2014	34
VDOT	65 Line (Harmony Village - White Stone)	Harmony Village, White Stone	10/5/2014	10/24/2014	20
VDOT	65 Line (Harmony Village - White Stone)	Harmony Village, White Stone	3/1/2015	4/3/2015	34
VDOT	65 Line (Harmony Village - White Stone)	Harmony Village, White Stone	10/6/2015	10/30/2015	25
VDOT	65 Line (Harmony Village - White Stone)	Harmony Village, White Stone	5/8/2016	7/27/2016	811

**Total: 2,175 days**



**From:** Matthew Parker (VirginiaPower - 1T)  
**To:** "Danovich, Leslie J., P.E. (VDOT)"  
**Cc:** Adams, Annette F., PE (VDOT)  
**Subject:** RE: Norris power line lock out for painting  
**Date:** Thursday, October 29, 2015 4:26:00 PM  
**Attachments:** 16-00264 VDOT Outage Request of 65 Line.pdf

---

Leslie,

I have gone ahead and created an outage request ticket in our system for your requested outage of the 115kV line on the Rt. 3 Norris Bridge. I wanted to go ahead and get it into the system so it is at least on record, but I know we will discuss more next Monday in Fredericksburg. For reference, when talking with any Dominion employee about the outage request, you can reference TOA #16-00264. The attached .pdf file is a copy of your request that we will handle internally.

Thanks for setting up the meeting and I look forward to seeing everyone on Monday at 2:00 pm. In the mean time, please let me know if you have any questions or concerns.

Thanks,

Matt

Matthew Alan Parker, Manager  
Electric Transmission System Operations Planning  
Dominion Virginia Power  
5000 Dominion Blvd.  
Glen Allen, Virginia 23060  
Phone: (804) 273-3310  
Cell: (804) 516-0480  
Fax: (804) 273-2405

"If you don't like something, change it. If you can't change it, change your attitude; Don't complain."  
- Maya Angelou

-----Original Message-----

From: Danovich, Leslie J., P.E. (VDOT) [mailto:Leslie.Danovich@VDOT.Virginia.gov]  
Sent: Friday, October 16, 2015 7:32 AM  
To: Matthew Parker (VirginiaPower - 1T)  
Cc: Lillard, Walter (VDOT); Adams, Annette F., PE (VDOT); Koura-Bodji, Abdoul, PE (VDOT)  
Subject: Norris power line lock out for painting

Good morning Matt,

I was elected by Annette Adams to start the ball rolling with this inquiry.

She received the additional funding required to finish painting the Norris bridge through truss span. The design side indicated that this project will begin May 2016 and will last for 26 months. The power will need to be shut off during this time frame.

Also, apparently the last time that work was done on the bridge when the lines needed to be re-energized Dominion went to the contractor. I was asked to let inform Dominion that if the power needs to be restored to please contact the VDOT ACE (Area Construction Engineer) not the painting contractor





WOOD PILES INSPECTION  
SECTION 5.0 CHECKLIST

Structure: 65 / 686		Number of Ganged Piles: EAST 4 WEST 4		Date: 7-21-2015
	DAMAGE	ROT	MARINE BORERS	SOUNDING
FDN 1 WEST	MISSING COPPER	SEE NOTES	NONE NOTED	GOOD
FDN 2 EAST	MISSING COPPER	SEE NOTES	NONE NOTED	GOOD
<del>FDN 3</del>				
<del>FDN 4</del>				
Comments: GROUND CABLE INTACT.				
COPPER SHEATHING ON ALL PILES IS 90% MISSING.				
PROBING TO 1/8" DEEP EXCEPT WEST BATTER PILE # 3 IS 1/2" DEEP AT WATERLINE.				
WEST BATTER PILE # 3 HAS HOUR GLASSING AT THE WATERLINE UP TO 3' TALL AND 1/2" DEEP				
SURFACE CORROSION ON HARDWARE				
CHECKING AND SPLITTING ON ALL PILES				
6' WATER DEPTH				

WEST EAST

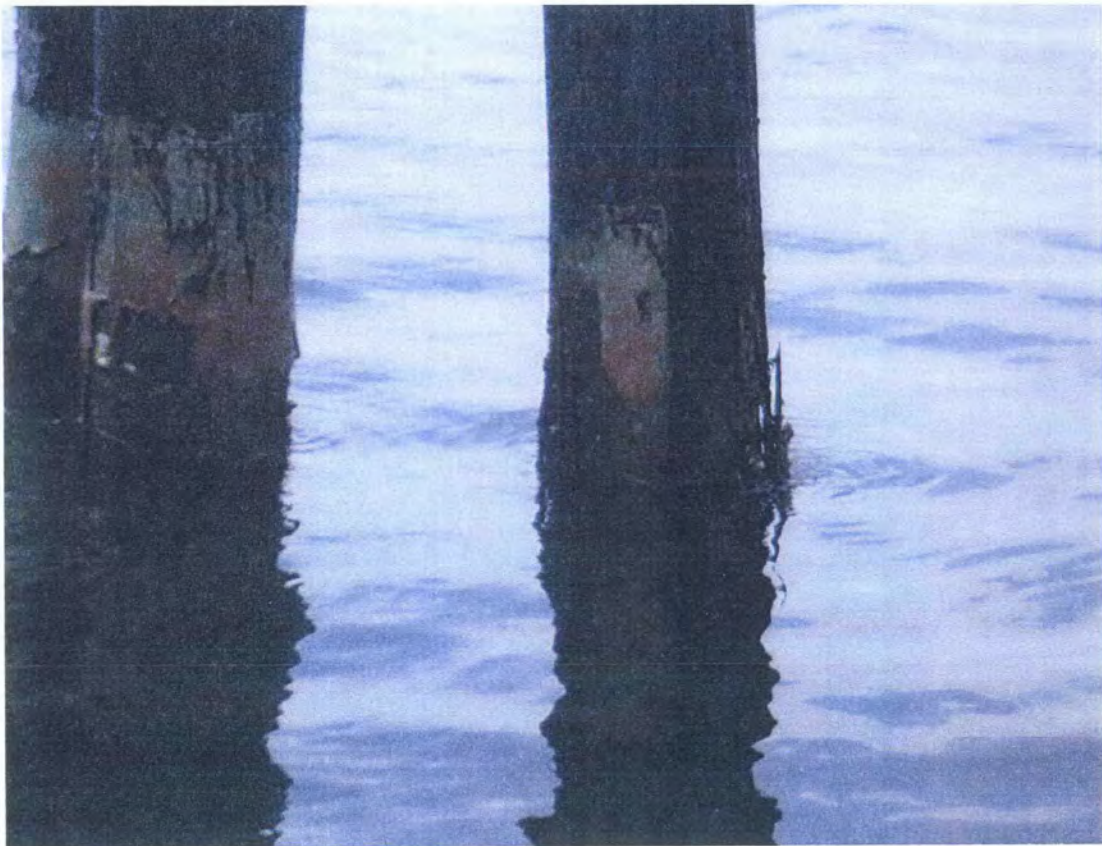
① ②

② ③

③ ③



Waterline Deterioration (Typical)



Waterline Deterioration (Typical)





Missing Copper Sheathing (Typical)

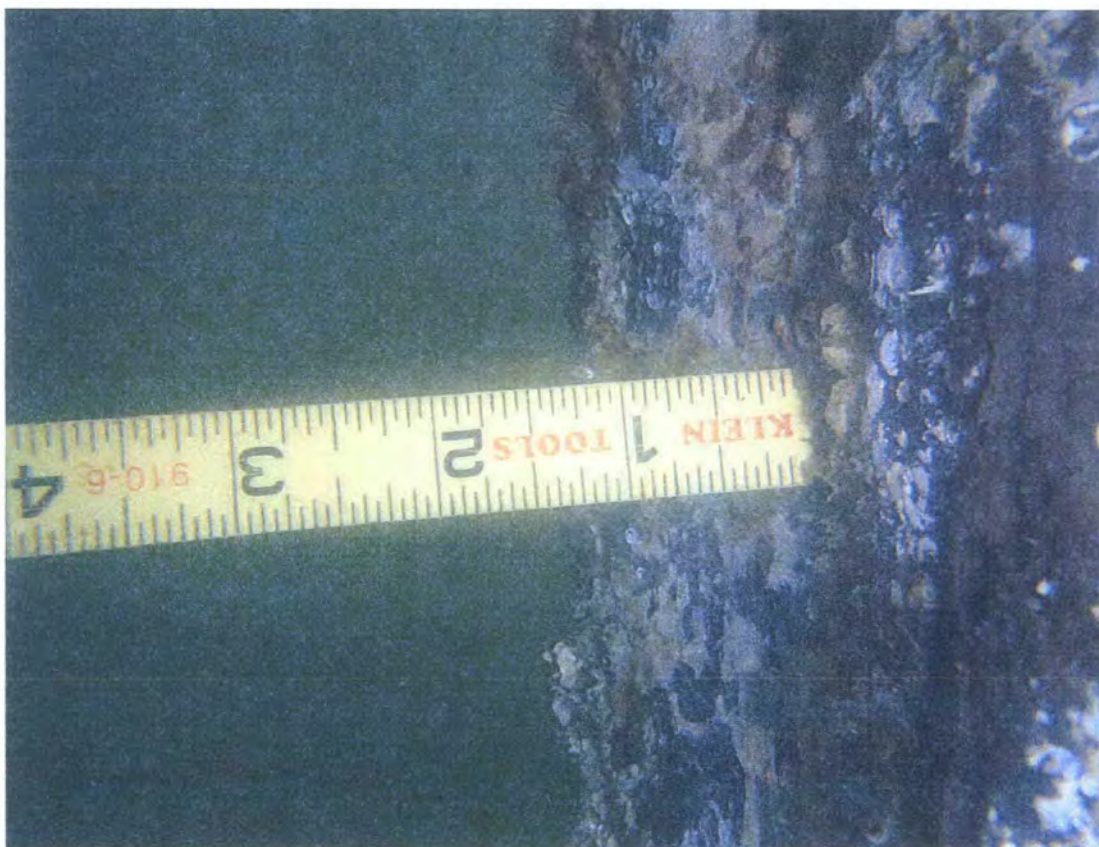


Missing Copper Sheathing (Typical)





Waterline Close-up



Underwater Close-up

WOOD PILES INSPECTION  
SECTION 5.0 CHECKLIST

Structure: <b>65/687</b>		Number of Ganged Piles: <b>EAST 4</b> <b>WEST 4</b>		Date: <b>7-21-2015</b>	
	DAMAGE	ROT	MARINE BORERS	SOUNDING	
FDN 1 WEST	MISSING COPPER	NO	NONE NOTED	GOOD	
FDN 2 EAST	MISSING COPPER	NO	NONE NOTED	GOOD	
<del>FDN 3</del>					
<del>FDN 4</del>					
Comments: <b>GROUND CABLE BROKEN ABOVE WATER LINE.</b>					
<b>PROBING TO 1/8" DEEP. SOUNDINGS GOOD.</b>					
<b>COPPER SHEATHING- 90% MISSING ON ALL PILES.</b>					
<b>SURFACE CORROSION ON HARDWARE</b>					
<b>CHECKING AND SPLITTING ON ALL PILES</b>					
<b>15' WATER DEPTH</b>					

WEST

EAST

(1)

(2)

(P)

(2)

(P)

(P)

(3)

(3)

TIDE GAUGE ON WEST BATTER PILE #1  
IS CRACKED AT +3'6" MARK BUT NOT  
FULLY DETACHED.





Missing Copper Sheathing (Typical)



Missing Copper Sheathing (Typical)





Waterline Close-up



Waterline Close-up



WOOD PILES INSPECTION  
SECTION 5.0 CHECKLIST

Structure: 65/688		Number of Ganged Piles: EAST 4 WEST 4		Date: 7-21-2015	
	DAMAGE	ROT	MARINE BORERS	SOUNDING	
FDN 1	MISSING COPPER SEE NOTES	SEE NOTES	NONE NOTED	GOOD	
FDN 2	MISSING COPPER	SEE NOTES	NONE NOTED	GOOD	
<del>FDN 3</del>					
<del>FDN 4</del>					
<p>Comments: GROUND WIRE BROKEN ABOVE WATERLINE. COPPER SHEATHING MISSING 90% ON ALL PILES. PROBING TO 1/8" DEEP. SOUNDINGS GOOD. WEST BATTER PILE #3 POSSIBLE IMPACT DAMAGE ON SOUTHWEST SIDE. DAMAGED AREA FROM WATERLINE UP 7' TALL X 8" WIDE X 1" DEEP.</p> <p>WEST BATTER PILE #2 AND #3 AND EAST BATTER PILE #3 HAVE HOURGLASSING AT WATERLINE 1/4" DEEP SURFACE CORROSION ON HARDWARE. CHECKING AND SPLITTING ON ALL PILES. 12' WATER DEPTH</p>					

① WEST EAST ②  
③ ① ② ③



Missing Copper Sheathing (Typical)



Missing Copper Sheathing (Typical)





Waterline Damage



Waterline Damage





Waterline Damage



Waterline Damage

WOOD PILES INSPECTION  
SECTION 5.0 CHECKLIST

Structure: 65/689		Number of Ganged Piles: EAST 4 WEST 4		Date: 7-21-2015
	DAMAGE	ROT	MARINE BORERS	SOUNDING
FDN 1 WEST	MISSING COPPER	SEE NOTES	NONE NOTED	GOOD
FDN 2 EAST	MISSING COPPER	SEE NOTES	NONE NOTED	GOOD
<del>FDN 3</del>				
<del>FDN 4</del>				
Comments: GROUND WIRE BROKEN ABOVE WATERLINE.				
COPPER SHEATHING MISSING 90% ON ALL PILES.				
PROBING TO 1/8" DEEP. SOUNDINGS GOOD.				
HOURGLASSING UP TO 1/4" DEEP AT WATERLINE				
ON 4 EAST PILES AND WEST BATTER PILE #1				
SURFACE CORROSION ON HARDWARE.				
CHECKING AND SPLITTING ON ALL PILES.				
25' WATER DEPTH.				

① WEST EAST ②  
 (P) ② ① (P)  
 ③ ③





Waterline (Typical)



Missing Copper Sheathing (Typical)





Waterline Deterioration



Waterline Deterioration





Waterline Deterioration

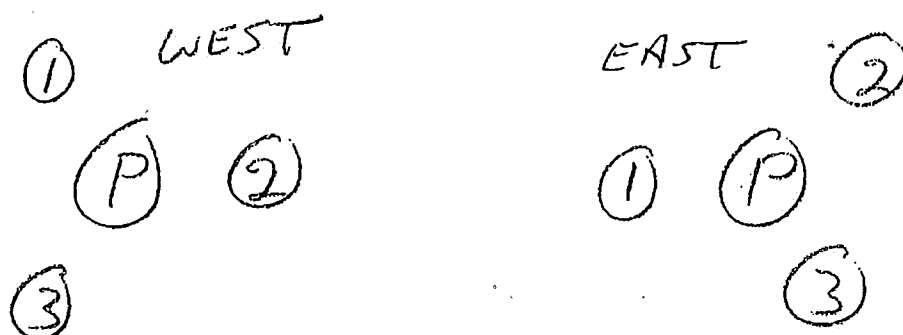


Waterline Deterioration



WOOD PILES INSPECTION  
SECTION 5.0 CHECKLIST

Structure: 65/704		Number of Ganged Piles: EAST 4 WEST 4		Date: 7-20-2015	
	DAMAGE	ROT	MARINE BORERS	SOUNDING	
FDN 1	MISSING COPPER	SEE NOTES	NONE NOTED	GOOD	
FDN 2	MISSING COPPER	SEE NOTES	NONE NOTED	SEE NOTES	
<del>FDN 3</del>					
<del>FDN 4</del>					
Comments: GROUND WIRE BROKEN ABOVE WATERLINE. COPPER SHEATHING ON ALL PILES IS 95% MISSING.					
PROBING TO 1/8" DEEP EXCEPT 1/4" DEEP AT WATERLINE 5' WEST PLUMB PILE AND WEST BATTER PILE #2. HOUR GLASSING AT WATERLINE ON WEST PLUMB PILE UP TO 1/2" DEEP.					
SURFACE CORROSION ON HARDWARE CHECKING AND SPLITTING ON ALL PILES.					
18' WATER DEPTH					





Splitting (Typical)



West Foundation Plumb Pile





Waterline Condition (Typical)



Waterline Condition (Typical)

WOOD PILES INSPECTION  
SECTION 5.0 CHECKLIST

Structure: 65/705		Number of Ganged Piles: EAST 4 WEST 4		Date: 7-20-2015	
	DAMAGE	ROT	MARINE BORERS	SOUNDING	
FDN 1 WEST	MISSING COPPER	SEE NOTES	NONE NOTED	SEE NOTES	
FDN 2 EAST	MISSING COPPER	SEE NOTES	NONE NOTED	GOOD	
<del>FDN 3</del>					
<del>FDN 4</del>					
<p>Comments: GROUND WIRE BROKEN ABOVE WATERLINE. COPPER SHEATHING IS 95% INTACT ON EAST BATTER PILE #3 BUT ONLY 30% INTACT ON ALL OTHER PILES.</p> <p>PROBING TO 1/8" DEEP EXCEPT WEST BATTER PILE #1 TO 1/4" DEEP AT WATERLINE. SOUNDING GOOD EXCEPT WEST BATTER PILE AT WATERLINE CHECKING AND SPLITTING ON ALL PILES. SECTION LOSS ON HARDWARE BELOW HIGH WATER LINE. SURFACE CORROSION ON ALL OTHER. 4' WATER DEPTH</p>					

① WEST EAST ②  
 (P) ② ① (P)  
 ③ ③





Broken Ground



Hardware (Typical)





Waterline Condition (Typical)



Waterline Condition (Typical)

WOOD PILES INSPECTION  
SECTION 5.0 CHECKLIST

Structure: 65/706		Number of Ganged Piles: EAST 4 WEST 4		Date: 7-20-2015
	DAMAGE	ROT	MARINE BORERS	SOUNDING
FDN 1 WEST	MISSING COPPER	NO	NONE NOTED	GOOD
FDN 2 EAST	MISSING COPPER	NO	NONE NOTED	GOOD
<del>FDN 3</del>				
<del>FDN 4</del>				
Comments: GROUND WIRE BROKEN BELOW WATERLINE. COPPER SHEATHING MISSING GO TO SMALL PILES PROBING TO 1/8" DEEP. SOUNDINGS GOOD.  CHECKING AND SPLITTING ON ALL PILES.  SECTION LOSS ON HARDWARE BELOW HIGH WATER LINE. SURFACE CORROSION ON OTHER HARDWARE 4' WATER DEPTH				

① WEST

① ②

③

EAST

②

① ②

③





Hardware (Typical)



Hardware (Typical)





Waterline Condition (Typical)



Split

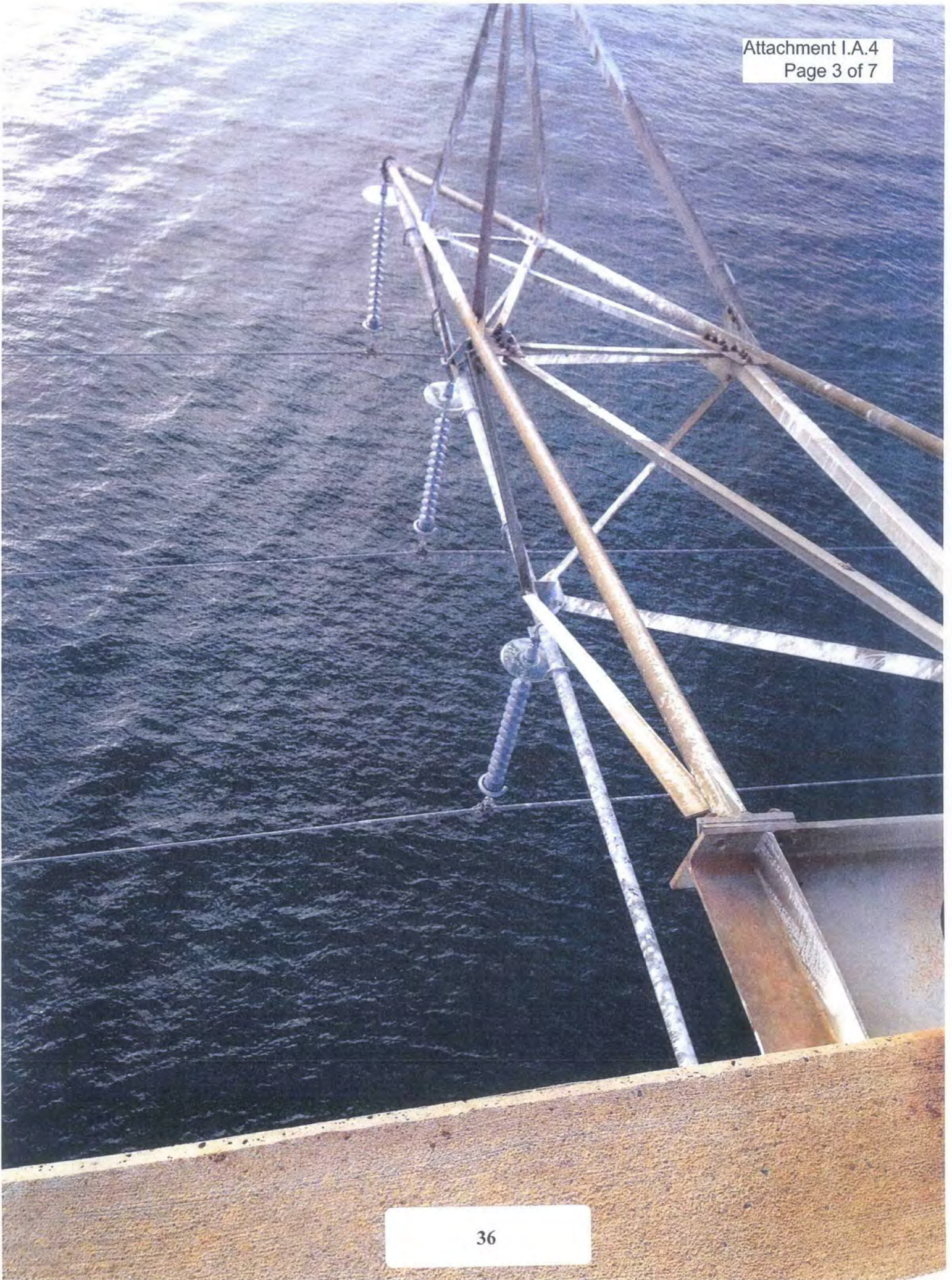








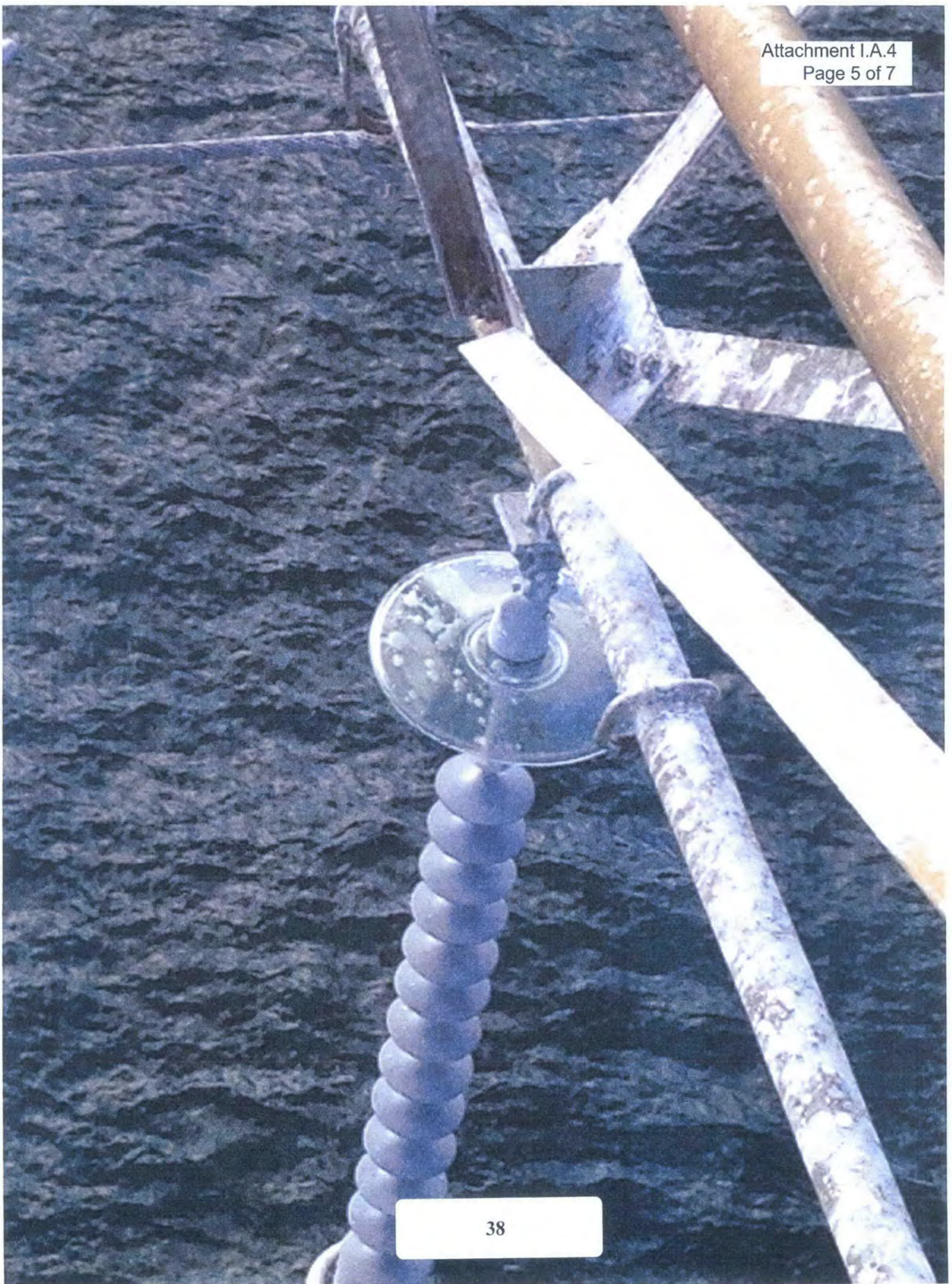




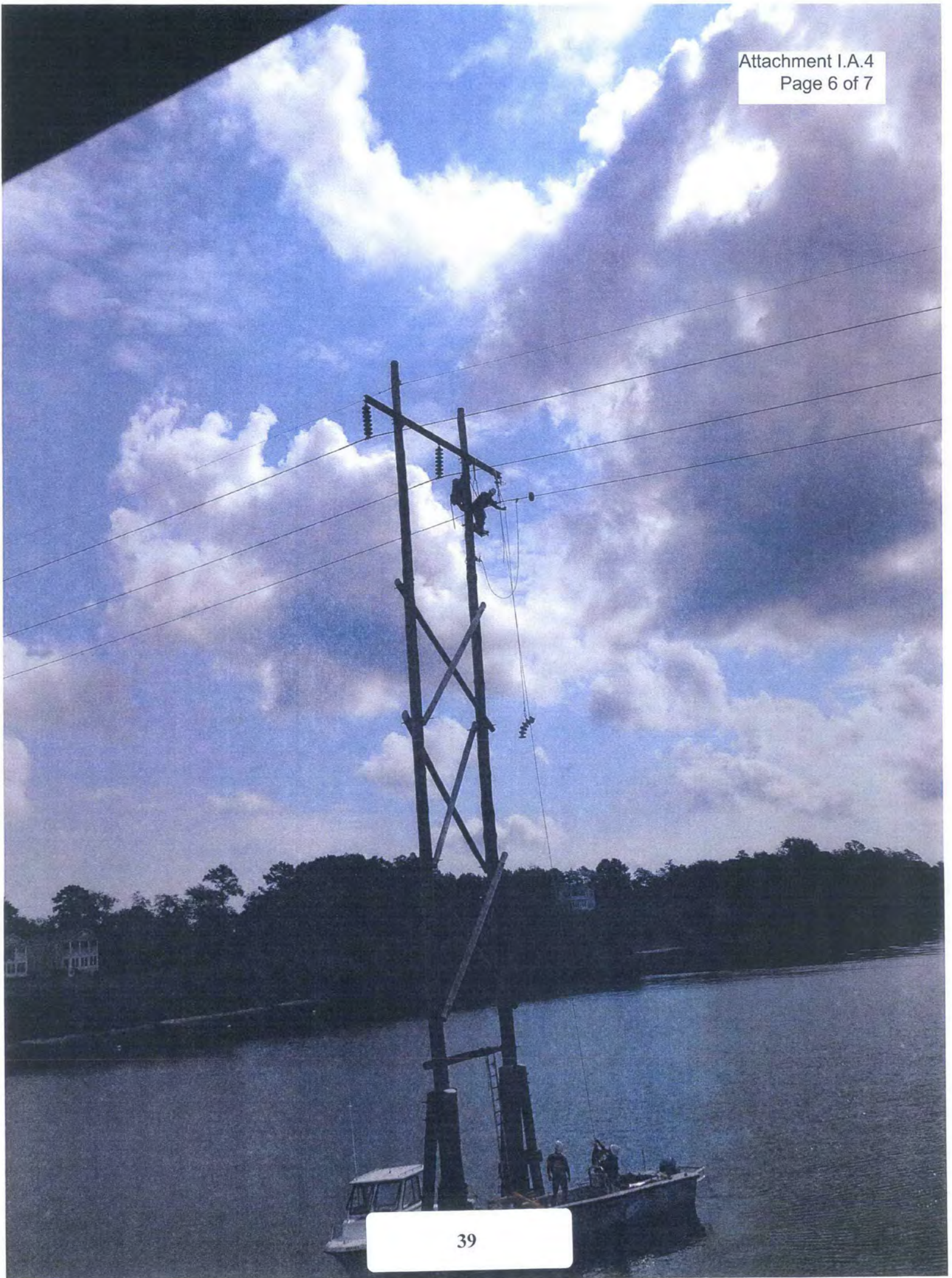




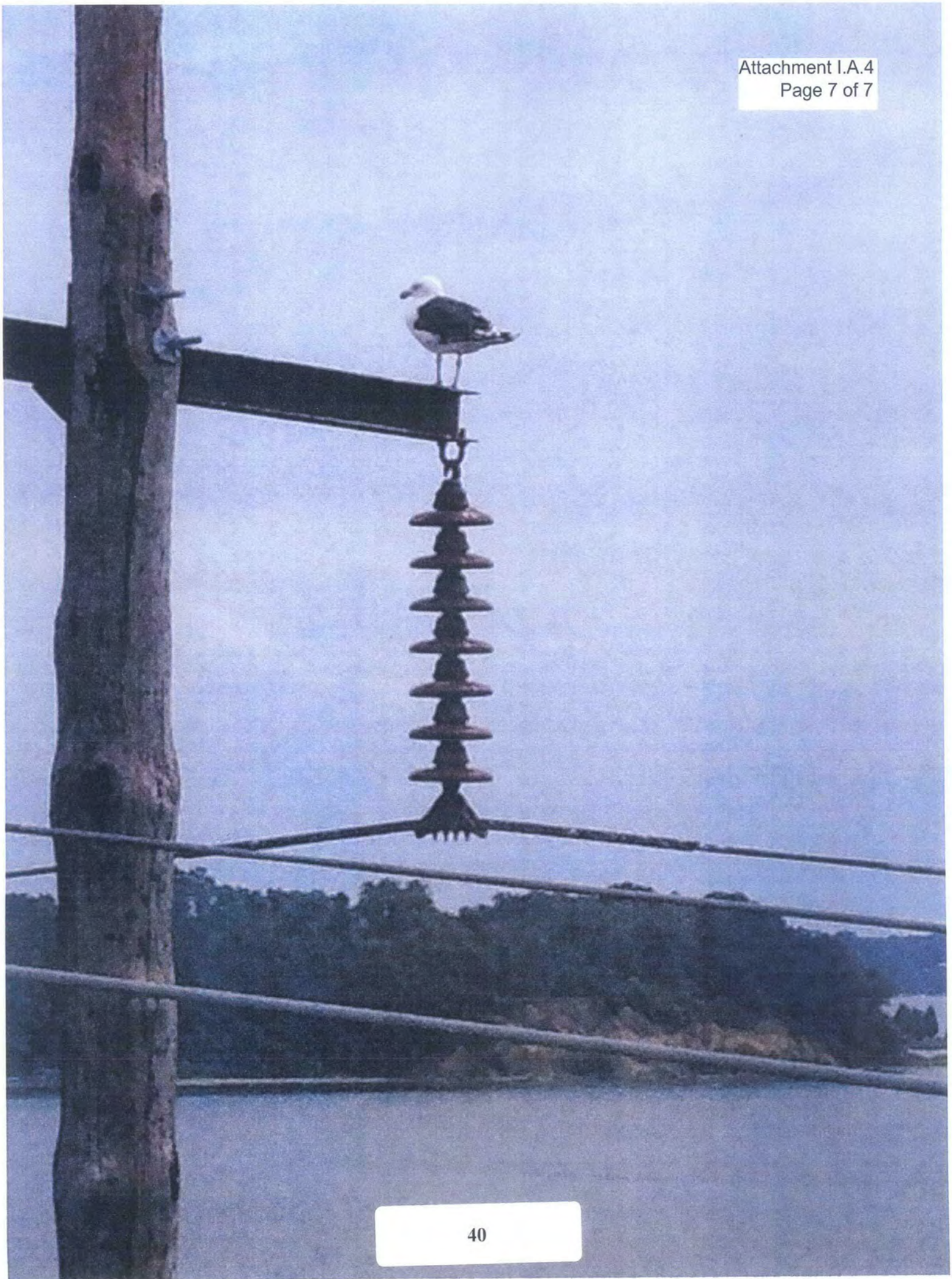




















# Sub Regional RTEP Committee PJM South

June 24, 2014

PJM©2014



## 2014 RTEP Status

- Baseline N-0 & N-1
- Generator Deliverability and Common Mode Outage
- Load Deliverability
- N-1-1
- TO Specific Criteria
- Next Steps
- Anticipated RTEP Proposal Window





# 2014 RTEP Baseline Analysis Update

06/24/2014



- B1794 Cost and Scope Change:
- Previous Scope:
  - Split 230 kV Line #2056 (Hornertown - Rocky Mount) and double tap the line to Battleboro Substation. Expand station, install a 230 kV 3 breaker ring bus and install a 230/115 kV transformer.
- New Scope:
  - Build a new substation near the Edgecombe NUG to be called Morning Star Substation with a 230-115kV Tx, 4-230kV breakers in a breaker and half scheme, 3-115kV breakers in a ring. Re-configure Lines 80 (Battleboro – Anaconda), 229 (Edgecombe – Tarboro) and 2058 to terminate into Morning Star Substation.
- Estimated Project Cost:
  - Previous → \$ 8 M
  - New → \$ 14.5 M
- Expected IS Date:
  - 5/30/2016

## Dominion Transmission Zone

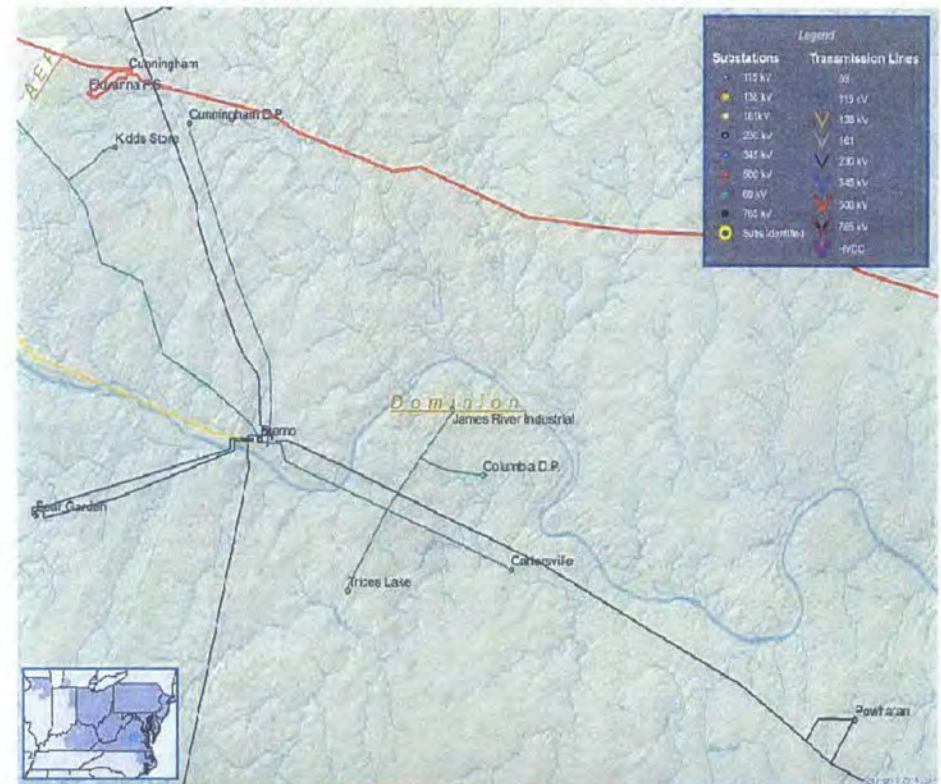






- Dominion Planning Criteria:
- Dominion 100 MW Radial Load Planning Criteria violation on line #4 Bremono – Cartersville 115 kV.
- To accommodate the load growth served by the line #4.
- Proposed Solution:
  - Install 230-34.5kV Tx at Bremono to transfer 22 MVA of load from Line #4 to Line #2028 (B2503.1).
  - Install 230-34.5kV Tx at Cartersville to transfer +12 MVA of load from Line #4 to Line #2027 (B2503.2).
  - Rebuild 3.8 miles of Line #4 as it leaves Bremono to address line age related reliability concerns (B2503.3).
  - Abandon 5.5 miles of Line #4 as it heads west from Cartersville (B2503.4).
- Estimated Project Cost:  
\$ 9.2 M
- Projected IS Date:  
6/1/2018

## Dominion Transmission Zone







- Operational Performance:
- Line # 32 from South Boston – Halifax 115 kV has 6 miles of exposure serving 7600 customers. The line built in 1928 is mostly 3/0 ACSR on 2 pole wood H frame that is deteriorating. It has a motor operator auto-sectionalizing scheme that transfers South Boston's 4500 customers to Line # 127 (Reedy Creek – Halifax 115 kV) for Line #32 lockout. Line # 32 has had 3 momentary operations in the last 5 years.
- Line #127 has 27 miles of exposure serving 5300 customers. It has had 12 momentary operations and 2 lockouts in the last 5 years.
- Proposed Solution:
  - Rebuild the 115 kV Line #32 from Halifax to South Boston (6 miles) for a minimum of 240 MVA and transfer the Welco tap to Line #32. Moving Welco to Line #32 requires disabling the auto-sectionalizing scheme (B2504).
- Estimated Project Cost: \$ 6.5 M
- Required IS Date: 6/30/2015

## Dominion Transmission Zone





- Operational Performance:
- Line #65 Whitestone – Harmony Village 115kV is presently attached to the Rt. 3 bridge crossing the Rappahannock River
- VDOT maintenance on the bridge requires an outage of the 65 Line segment between Harmony Village and Whitestone Substations and creates a radial line for several months to over a year at time.
- This line serves almost 19,000 customers including over 5,800 NNEC customers.
- Outages attributed to bridge maintenance equipment have occurred while line segment is energized.
- Damaged insulators have been found due to objects thrown from bridge.
- Proposed Solution:
  - Install structures in river to remove the 115 kV #65 line from bridge and improve reliability of the line (B2505).
- Estimated Project Cost:  
\$ 10 M
- Required IS Date:  
5/31/2016

## Dominion Transmission Zone







# Supplemental Projects

49





- Supplemental:
- Dominion Distribution (DVP) has submitted a Delivery Point (DP) Request for a proposed Pacific Substation (site acquired near Moran Rd and Pacific Blvd) for 60 MW load growing to over 100 MW by 2020.
- Proposed Solution:
  - Loop (in-and-out) an overhead, double-circuit, 230kV transmission line extension approximately 2 miles (along new right-of-way) from either Line #2137 (Brambleton-BECO) or Line #2081 (Beaumeade-Sterling Park) (S0744.1).
  - Install four 230kV breakers in a six-breaker ring arrangement to accommodate the connection of DVP 230-34.5kV transformers (S0744.2).
- Estimated Project Cost:  
\$ 15 M
- Projected IS Date:  
5/31/2016

## Dominion Transmission Zone







- Supplemental:
- Northern Virginia Electric Cooperative (NOVEC) has submitted a Delivery Point Request for a proposed Runway Substation for 8 MW load growing to over 15 MW by 2020 .
- Proposed Solution:
  - Tap Line #2137 (Brambleton-BECO) between structures 2095/57 and 2095/59. Install appropriate 230 kV transmission structures to accommodate tapping to DVP's backbone structure, including 2 – 230 kV air-break switches with vacuum bottle attachments (S0745).
- Estimated Project Cost:  
\$ 0.75 M
- Projected IS Date:  
5/30/2015

## Dominion Transmission Zone







- Supplemental:
- Customer request (governmental) for redundant capacity
- Proposed Solution:
  - Cut and route Line #174 (Davis-Rosslyn) in and out of new substation (<0.25mi).
  - Install 3-breaker 69kV ring bus and customer owned transformation. (S0746).
- Estimated Project Cost:  
\$ 0 M
- Projected IS Date:  
2/1/2015

## Dominion Transmission Zone





- Supplemental:
- Needed to relieve loading at Jarratt Substation with an initial 5 MW load transfer
- Projected 7 MW load in 2025
- Proposed Solution:
  - **Fields Crossroads** - Install a backbone structure and two 115kV switches on Line #148 (Clubhouse - Purdy)
  - Install transformer high side circuit switcher (S0747).
- Estimated Project Cost: \$ 0.7 M
- Projected IS Date: 5/31/2015

## Dominion Transmission Zone

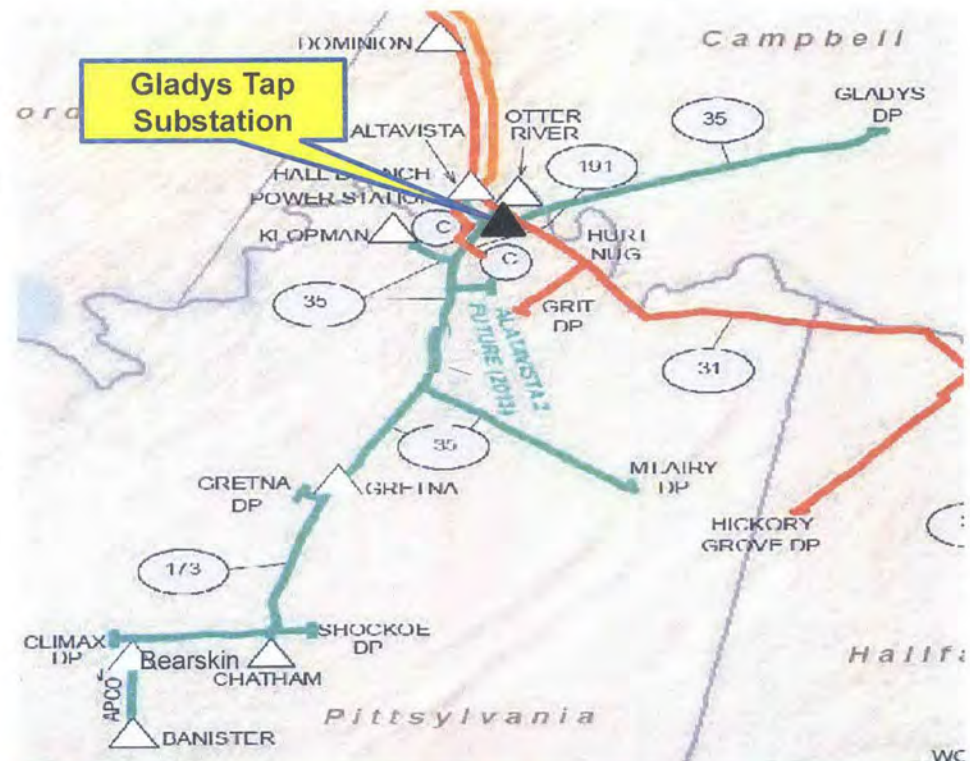






- Supplemental:
- Line #35 (Altavista – Gretna, 69kV) has a 13 mile long radial tap that serves Gladys DP. As part of Dominion's Tap Rebuild Improvement Program, the tap to Gladys DP is being rebuilt and in conjunction with this project, the need to remove this long tap exposure from the main line was identified for reliability
- **Proposed Solution:**
  - Build a new substation under Line #35 at the Gladys tap with a single breaker connected to the tap feeding Gladys DP. The station will be operated at 69kV and built for 115kV (S0748).
- **Estimated Project Cost:**  
\$ 1 M
- **Projected IS Date:**  
6/30/2015

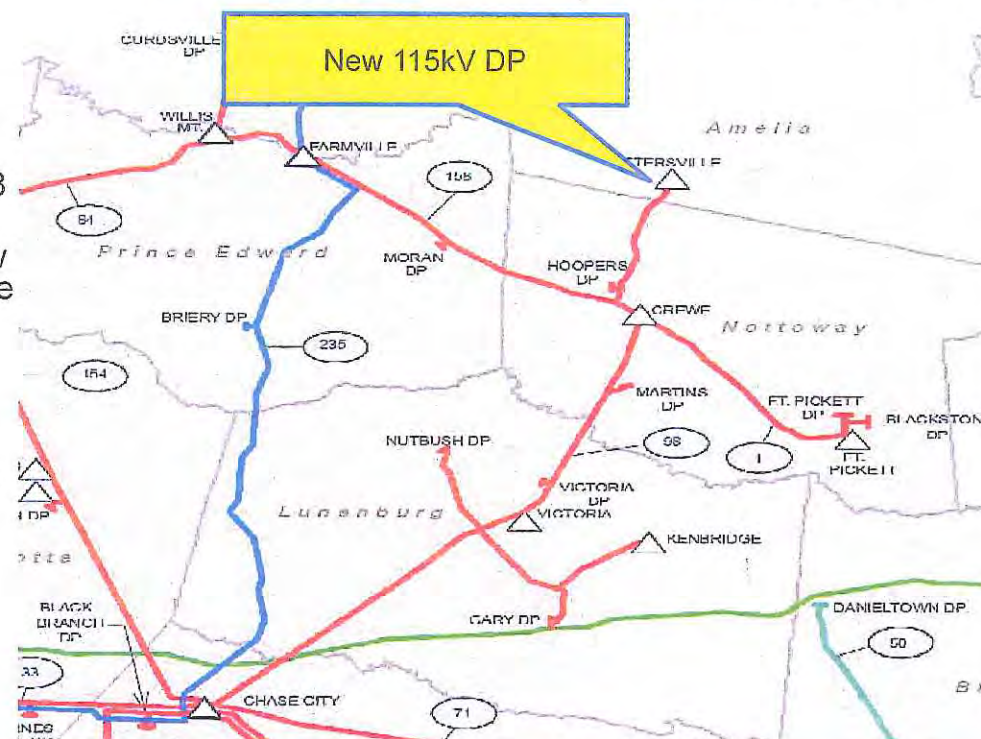
## Dominion Transmission Zone





## Dominion Transmission Zone

- Supplemental:
- SEC has requested a new 115kV DP to replace Pointon 34.5kV DP to improve reliability - Pointon has been the worst performer on SEC's outage list for the last 8 years
- Dominion Distribution has a need for a new substation in 2018 in the Amelia Courthouse area to relieve the Jetersville transformer loading and for reliability
- **Proposed Solution:**
  - Perform a routing study, acquire right-of-way and build a single circuit 115kV line from Jetersville to the existing Pointon DP, approximately 8 to 10 miles long (S0749).
- **Estimated Project Cost:**  
\$ 17 M
- **Projected IS Date:**  
7/30/2015







- Supplemental:
- Initially 4 MW load transferred from AEP's 138kV
- Potential two new tenants (additional 3 MW)
- Projected load 25 MW by 2023.
- Proposed Solution:
  - Install two 115kV switches on Line #30 (Altavista – Skimmer)
  - SEC to acquire ROW and build 115kV single transmission line from their proposed New London Substation to Dominion's structure (S0750)
- Estimated Project Cost: \$ 0.7 M
- Projected IS Date: 8/30/2014

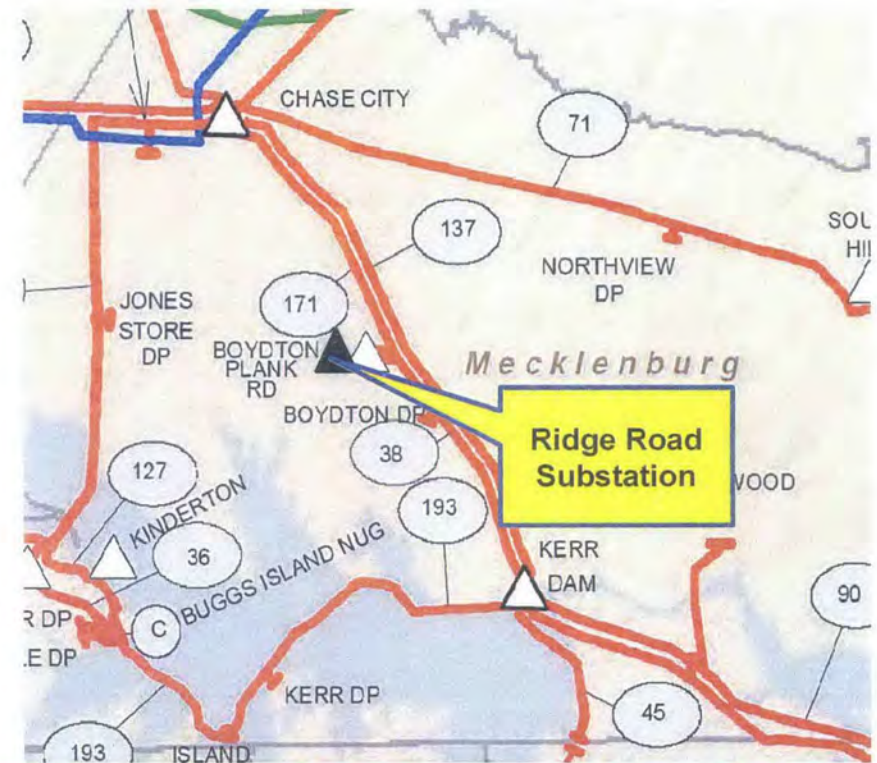
## Dominion Transmission Zone





- Supplemental:
- A large customer is building a facility north of Boydton Plank Road Substation in Mecklenburg County, VA. The initial load is 27 MW.
- Proposed Solution:
  - Build a new substation, Ridge Rd Substation with a 115kV breaker and a half scheme initially with 4 breakers and 2 distribution transformers (future build-out 9 breakers and 4 distribution transformers) (S0751.1)
  - Split Line #137 (Chase City-Kerr Dam) and extend a double circuit 115kV line for 1.9 miles to feed Ridge Road Substation (S0751.2).
- Estimated Project Cost:  
\$ 9 M
- Projected IS Date:  
4/15/2015

## Dominion Transmission Zone

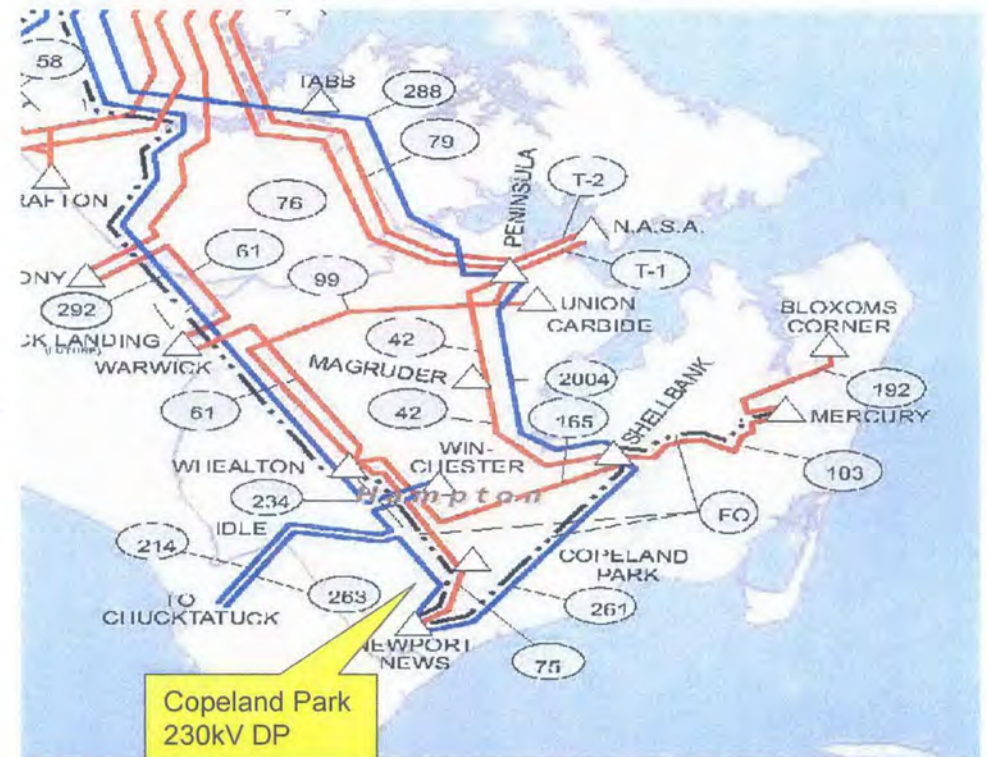






- Supplemental:
- Replace existing 115kV Delivery Point with 230kV Delivery Point for greater capacity.
- Transfer 8 MW from Newport News to the new 230kV delivery point. DP also needed to support Newport News transformer contingency.
- Projected load is 24.5MW in 2015 growing to 30 MW by 2025.
- Proposed Solution:
  - Copeland Park 230kV Delivery - Install 230kV Backbone, associated equipment and transformer high side circuit switcher (S0752).
- Estimated Project Cost:  
\$ 0.8 M
- Projected IS Date:  
5/31/2015

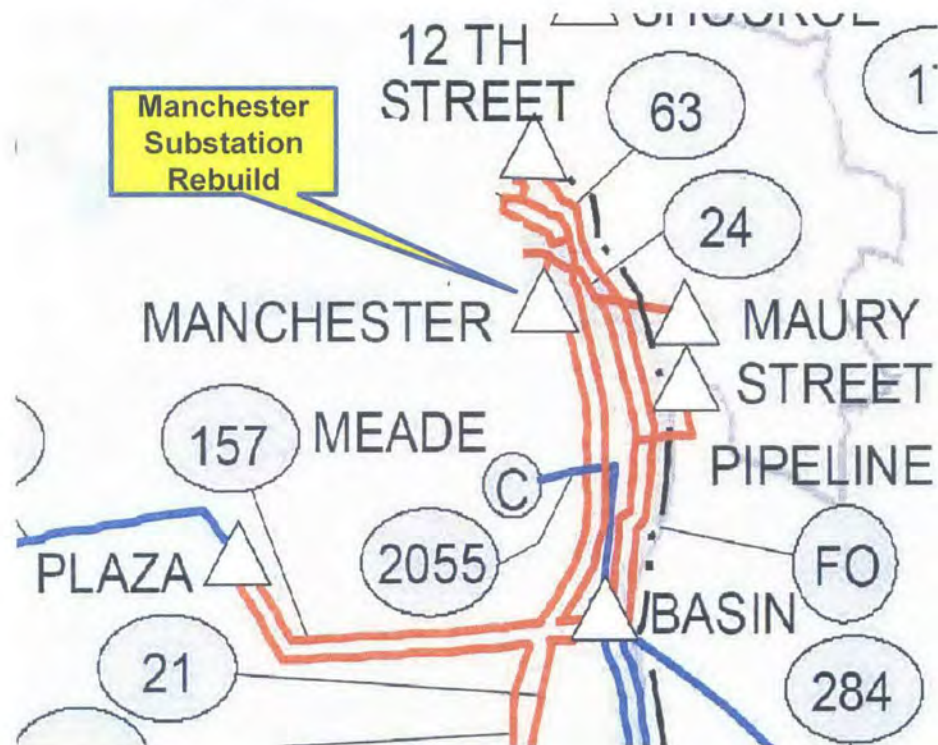
## Dominion Transmission Zone





- Supplemental:
- All 115kV concrete structures and foundations in Manchester Substation are deteriorating. The 115kV has a straight bus arrangement with 2 line breakers and a tie breaker.
- Proposed Solution:
  - Rebuild Manchester Substation with 2 new backbones and a 115kV four breaker ring bus. Add high side circuit switchers to the 2 distribution transformers (S0753).
- Estimated Project Cost:  
\$ 3 M
- Projected IS Date:  
6/30/2015

## Dominion Transmission Zone







- Supplemental:
- Transferring 31 MW (winter) from Locks 115 kV to the new 230kV DP needed for transformer contingency (exceeds mobile transformer rating).
- Projected load is 38 MW by 2025.
- Proposed Solution:
  - Relocate section of Locks 230 kV bus and install high side switch and circuit switcher (S0754).
- Estimated Project Cost: \$ 0.5 M
- Projected IS Date: 11/30/2014

## Dominion Transmission Zone





# 2014 RTEP Preliminary Reliability Results Posted for the Anticipated 6/27/2014 RTEP Window

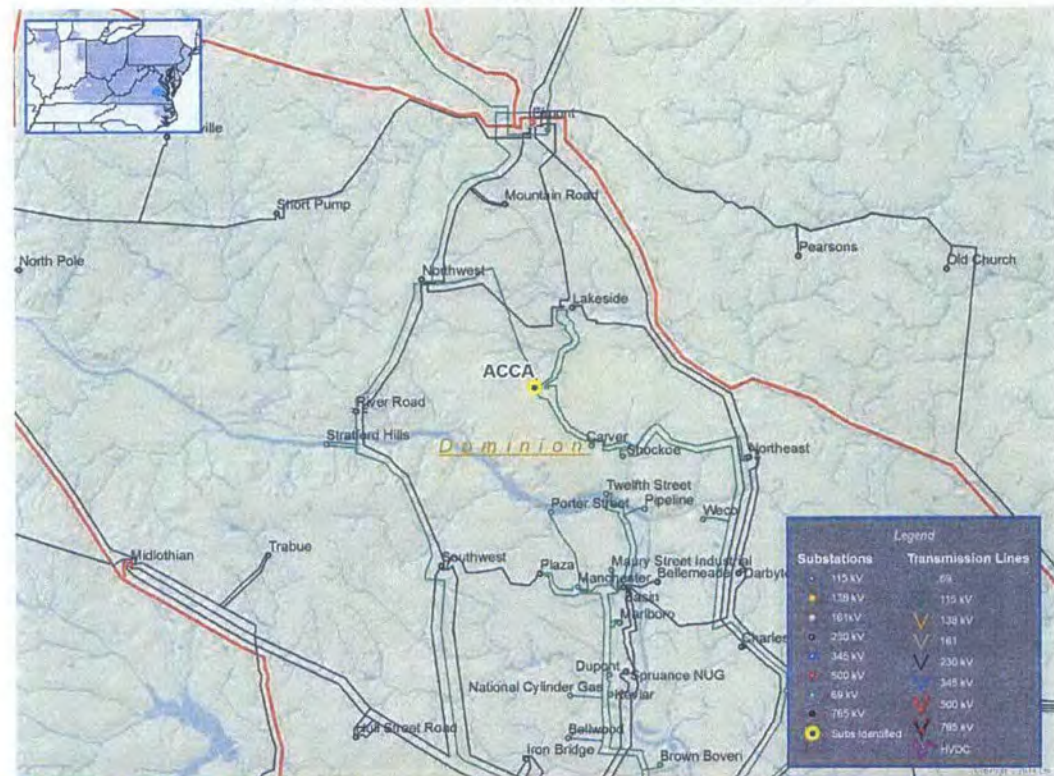
61





- Baseline and Generation Deliverability Violation.
- The ACCA to Shockoe 115 kV circuit is overloaded for single contingency loss of Northeast – Shockoe 115 kV circuit.

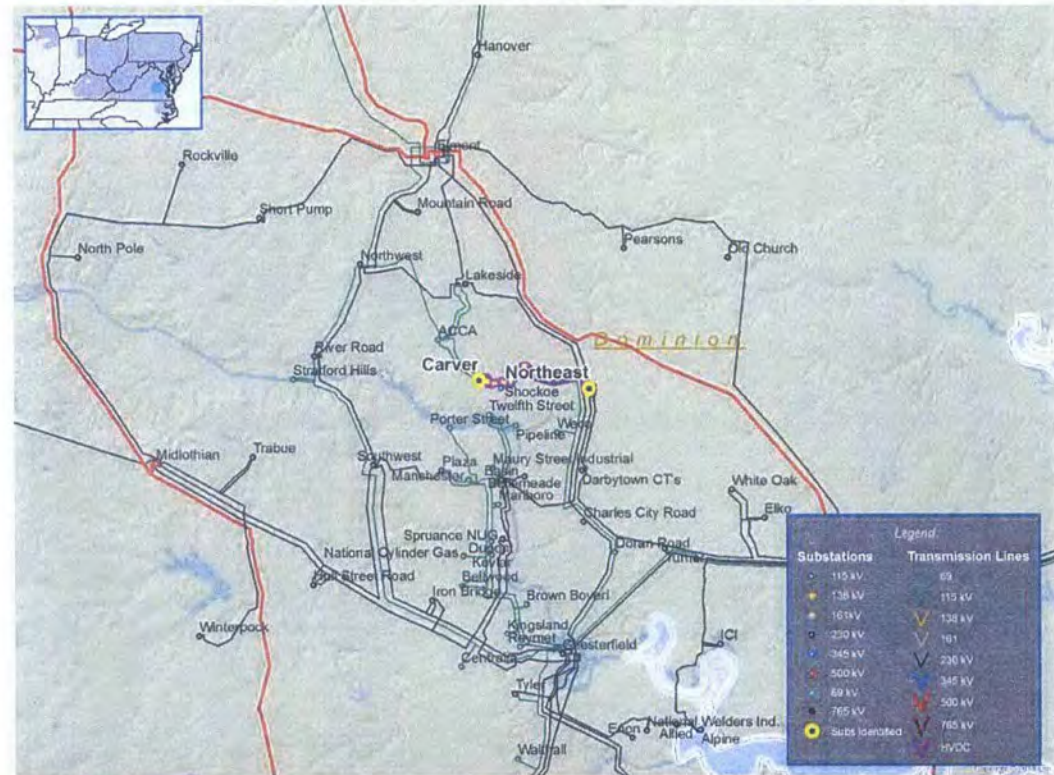
## Dominion Transmission Zone





- Baseline and Generation Deliverability Violation.
- The Northeast to Carver 115 kV circuit is overloaded for single contingency loss of Northeast – Shockoe 115 kV circuit.

## Dominion Transmission Zone







# Sub Regional RTEP Committee PJM South

September 24, 2014



# Reliability Analysis Update

65





- B1794 Cost Increase:
- Project Scope:
  - Build a new substation near the Edgecombe NUG to be called Morning Star Substation with a 230-115kV Tx, 4-230kV breakers in a breaker and half scheme, 3-115kV breakers in a ring. Re-configure Lines 80 (Battleboro – Anaconda), 229 (Edgecombe – Tarboro) and 2058 to terminate into Morning Star Substation.
- Cost increase due to revised engineering cost. The increased cost includes an additional \$1.2M for site development from previous estimate.
- Estimated Project Cost:
  - Previous → \$ 14.5 M
  - New → \$ 19 M
- Expected IS Date: 5/30/2016

## Dominion Transmission Zone





## Dominion Transmission Zone

### B2505 Cost Increase:

- The project is to remove Line #65 Harmony Village to Northern Neck 115 kV from the Whitestone Bridge by installing structures in the water to improve operability and reliability

**Revised Project Cost:** From \$10M to \$30M due to:

- Greater Water depth than anticipated.
- 11 H-Frame structures on quad cylinder pile foundations required in the river.
  - 9 structures at 120'
  - 2 structures at 200'
- 4 new structures on land required.
- Permitting required with FAA, Army Corps, Virginia Marine Resource Commission, local wetlands board (Lancaster and Middlesex Co)

**Revised IS Date:** 12/30/2017







Identified in PJM 2014 RTEP Proposal Window #1

- The 2018 summer base case indicates that an outage of Northeast to Shockoe 115 kV Line #20 results in an overload of the Acca to Hermitage 115 kV section of Line #159..
- This overload also occurs in the PJM 2019 RTEP baseline and generation deliverability analysis for the same contingency

- Update the summer emergency rating of Line #159 to 353 MVA by reconductoring 1.5 miles between Acca and Hermitage and replacing the 1200a wave trap at Acca with a 2000a wave trap. **(b2565)**
- Project ID: P2014\_1-4A-U from 2014 RTEP Proposal Window #1

**Required IS Date: 5/1/2018**

[illegible]



## NERC Category B Violation

### Identified in PJM 2014 RTEP Proposal Window #1

#### Problem:

- The 2019 Baseline and Generation Deliverability RTEP analysis indicates that an outage of Northeast to Shockoe 115 kV Line #20 results in an overload of the Northeast to Carver 115 kV Line #3.

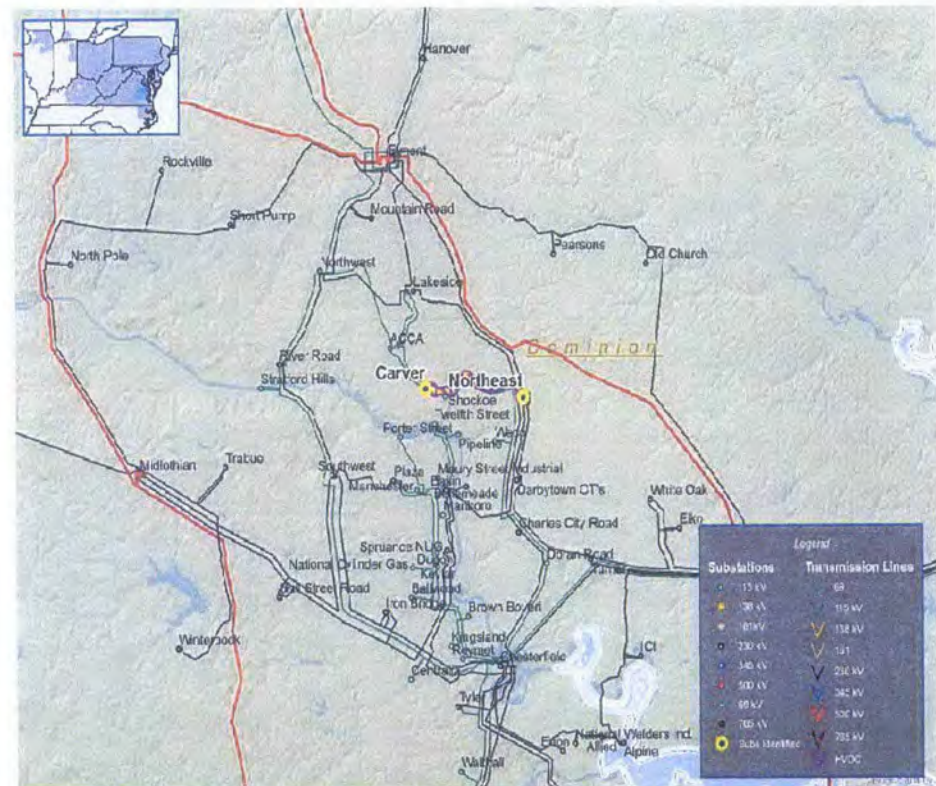
#### Recommended Solution:

- Uprate the summer emergency rating of Line #3 to 176 MVA by replacing the 800a wave trap at Carver with a 2000a wave trap. (b2566)
- Project ID: P2014\_1-4B-U from 2014 RTEP Proposal Window #1

**Estimated Cost:** \$40K

**Required IS Date:** 5/1/2019

## Dominion Transmission Zone







# Supplemental Projects



## Pendleton 115 kV Substation Circuit Switcher

### Problem:

- Dominion Distribution has identified the need to replace the existing 115kV Tx#2 at Pendleton Substation. A circuit switcher needs to be installed on high side of the transformer to replace existing MOAB and ground switch.

**Estimated Project Cost:** \$250K

**Requested IS Date:** 5/1/2015

## Dominion Transmission Zone







## Lebanon 230kV DP

### Problem:

- Dominion Distribution has requested a new 230kV delivery point at the existing Lebanon Substation on Line #209 Skiffes Creek to Yorktown 230 kV and will retire the existing 115kV Tx #1 at this location
- Estimated load is 43 MW growing to 48 MW over 10 years.

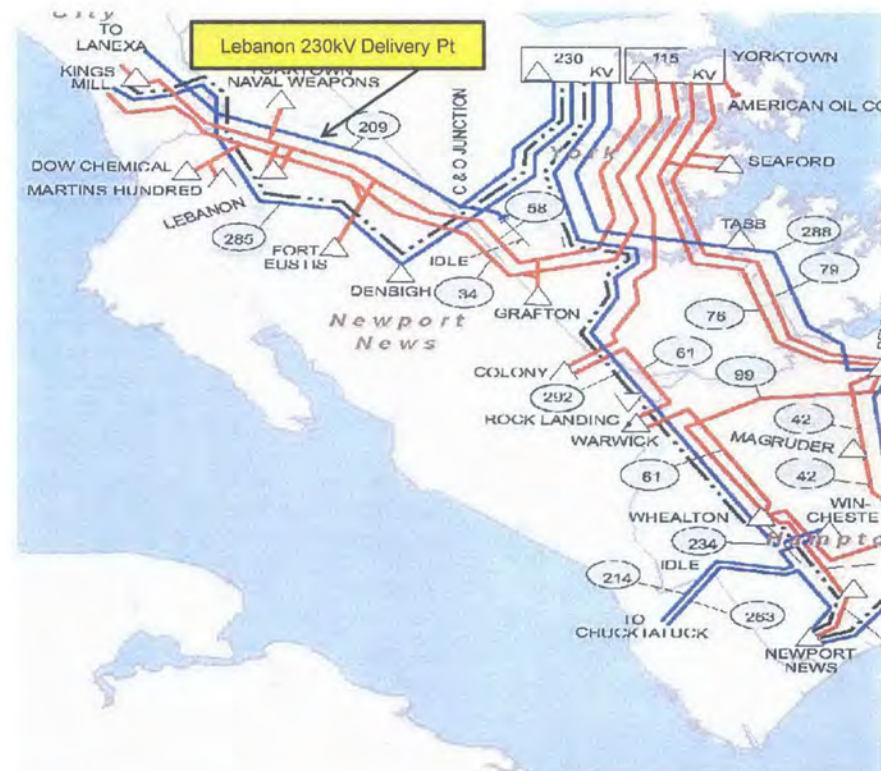
### Proposed Solution:

- Tap the 209 Line

**Estimated Project Cost:** \$600K

**Projected IS Date:** 5/1/2016

## Dominion Transmission Zone





## Haymarket 230kV DP

### Problem

- Dominion Distribution (DVP) has submitted a Delivery Point (DP) Request for a proposed Haymarket Substation (site to be acquired) with an energization date of 05/15/2017. The main driver for the new substation is a block load addition. Initial load will be approximately 85 MVA, growing to over 100 MVA by 2018.

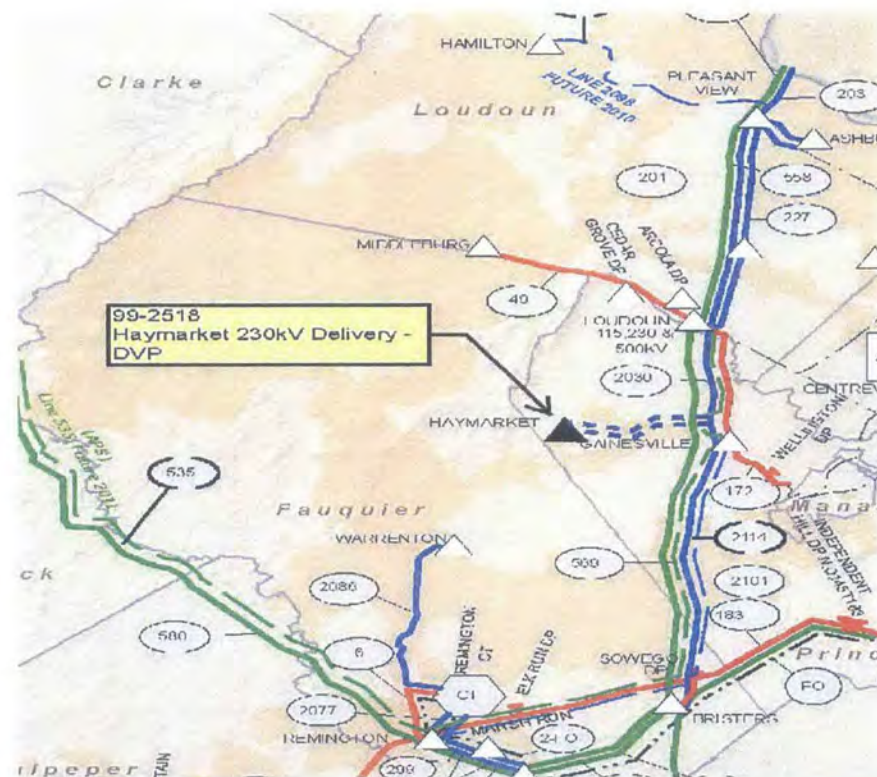
### Proposed Solution:

- Loop (in-and-out) an overhead, double-circuit, 230kV transmission line extension approximately 6 miles (along new right-of-way) from a point in the corridor north of Gainesville to the proposed Haymarket Substation site. Install four 230kV breakers in a ring arrangement to accommodate the connection of DVP's 84 MVA, 230-34.5kV transformers (two initial, three ultimate).

**Estimated Project Cost:** \$45M

**Projected IS Date:** 5/1/2017

## Dominion Transmission Zone





## **I. NECESSITY FOR THE PROPOSED PROJECT**

- B. Describe the present system and detail how the proposed project will effectively satisfy present and future demand requirements. Provide pertinent load growth data (at least five years of historical and ten years of projected loads where applicable). Provide all assumptions inherent within the projected data and why existing right-of-way cannot adequately serve the needs of the Company if that is the case. Indicate when the existing system is projected to be inadequate. If the existing system is, or will at some future time be inadequate in a contingency situation, describe this critical contingency. Detail what might cause such situation. Where appropriate, provide historical incidence of similar situations which would be avoided by the proposed construction.**

Response: Attachment I.E.1 shows the portion of the Company's transmission system in the area of the proposed Rebuild Project. Existing Harmony Village-Northern Neck Line #65 is part of the Company's 230 and 115 kV network, which supports the delivery of generation to retail and wholesale customers. This line supports the network in the Northern Neck area and provides direct delivery to the customers served out of the Company's White Stone, Ocran, and Lancaster Substations, as well as the 115 kV NNEC Garner DP. There are presently almost 19,000 customers served, including over 6,200 NNEC customers.

The table in Attachment I.B.1 provides historical and projected system peak loads for Company's Northern Neck Load Area, which includes Line #65, as well as the DPs at the White Stone, Ocran, and Lancaster Substations and the Garner DP. This area includes all or parts of King George, Westmoreland, Essex, Northumberland, Middlesex, Gloucester, Lancaster, Richmond, King and Queen, King William, New Kent, Mathews and Caroline Counties and is shown on Attachment I.B.2. The load for this area grew from 439 MW to 466 MW, an increase of 6.2% over the period 2005 to 2015. This table also provides the anticipated summer peak loads from 2016 to 2025 for this area. The projected loads in Attachment I.B.1 represent the Company's forecasted peaks based on actual loads and the 2016 PJM Load Forecast and demonstrate the continued growth that is expected to occur. Over the period from 2016 to 2025, peak electrical demand for this area is projected to grow from 489 MW to 551 MW, an increase of 12.7%.

The structures to be replaced through the Rebuild Project cannot be repaired and the structures currently attached to the Norris Bridge must be removed to relieve operational issues. Therefore, it is necessary for the Company to rebuild 2.2 miles of existing Line #65 between White Stone and Harmony Village Substations to assure that Dominion Virginia Power can continue to provide reliable electric service to customers consistent with the Company's obligation under Virginia law.

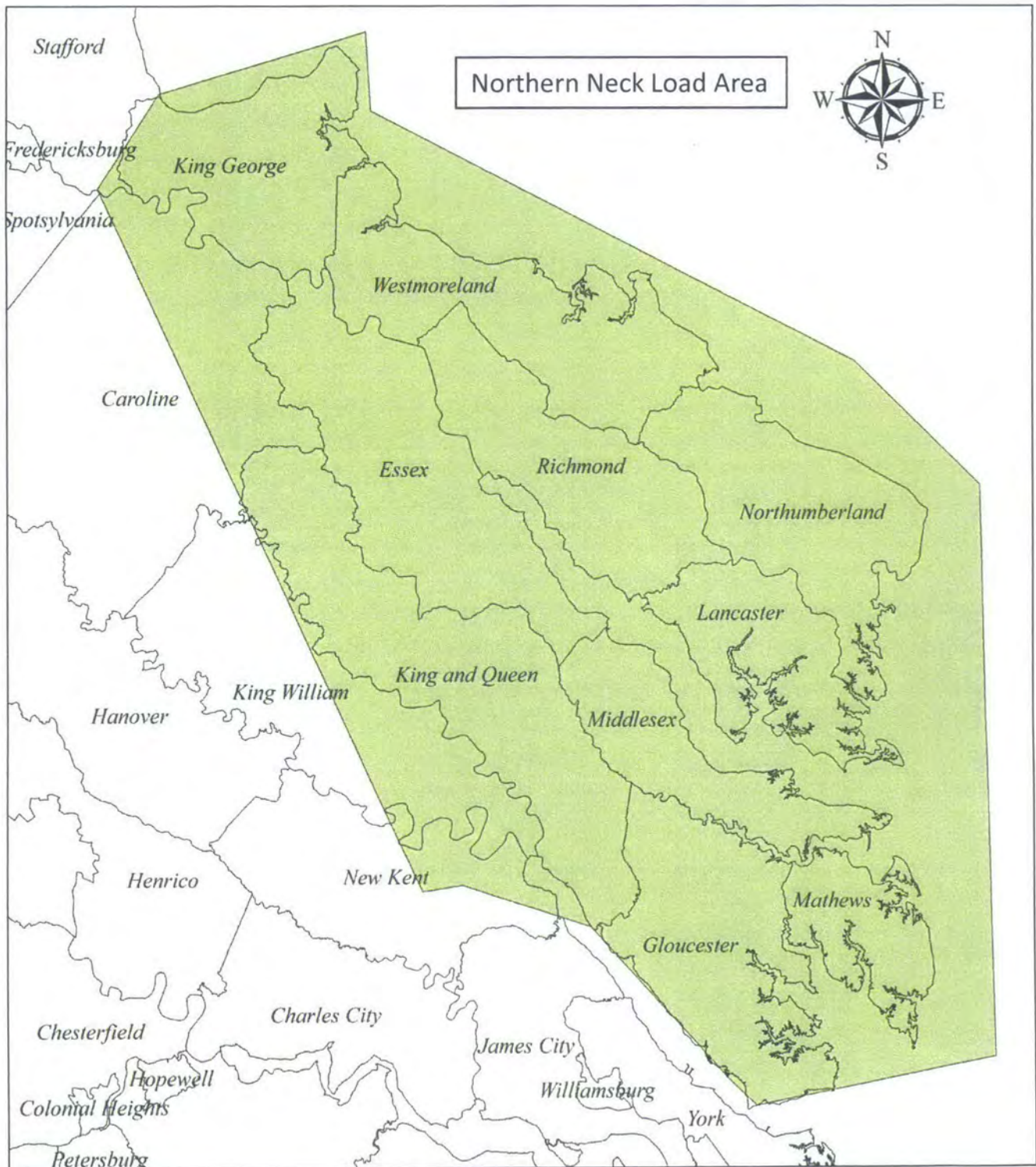
### Attachment I.B.1

	Historical Summer Peak Loads (MW)										
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Northern Neck	439	445	483	457	431	471	501	475	449	470	466

	Projected Summer Peak Loads (MW)*									
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Northern Neck	489	500	510	517	520	524	530	536	544	551

\*Forecasted values are based on the PJM 2016 Load Forecast.





## **I. NECESSITY FOR THE PROPOSED PROJECT**

### **C. Describe the feasible alternatives, if any, for meeting the identified need without constructing the proposed project. Explain why these alternatives were rejected.**

Response: The existing 115 kV single circuit Harmony Village-Northern Neck Line #65 plays an important role in the reliable operation of the Company's electric transmission system. As detailed in Section I.A, the Company has recognized that the Rebuild Project is necessary to replace aging infrastructure at the end of its service life with infrastructure built to today's standards, as well as remove impediments that are presently degrading the integrity of the entire Line #65.

#### **Transmission Alternatives**

Discussion of the routing associated with each alternative is presented in the alternatives analysis ("Alternatives Analysis") prepared by Natural Resources Group, LLC ("NRG") on behalf of the Company.

#### **(1) Construct a 230 kV Overhead Alternative along the Proposed Route ("230 kV Overhead Alternative"):**

The 230 kV Overhead Alternative would rebuild a portion of the existing single circuit 115 kV transmission line, Harmony Village-Northern Neck Line #65, along the same 2.2-mile route as the Proposed 115 kV Overhead Route. Unlike the Proposed Route, this alternative would utilize 230 kV design for the entire Rebuild Project, and would require slightly taller structures. The right-of-way configuration would be similar to that described for the Proposed 115 kV Overhead Route, utilizing the same right-of-way over the river, and the on-land crossing in Lancaster County; however, along the on-land crossing in Middlesex County, a slightly wider right-of-way would be necessary to accommodate the horizontal clearance required for 230 kV to the edge of the right-of-way.

Because there is no foreseeable need for 230 kV operations, this segment of Line #65 will be capable of operating at 230 kV, but will be operated at 115 kV. The 230 kV Overhead Alternative would provide incrementally-improved reliability and operational benefits compared to the Proposed 115 kV Overhead Route of the Rebuild Project and would replace the same aging infrastructure. It would also provide a 230 kV water crossing for Line #65 should the unforeseen need develop in the future to convert the entire Line #65 to 230 kV. This alternative is estimated to cost approximately \$26.3 million, which is approximately \$0.1 million more than the Rebuild Project utilizing the Proposed 115 kV Overhead Route.

The 230 kV Overhead Alternative was not selected by the Company as the proposed route because there is no foreseeable need for 230 kV operations.



In addition, the Proposed Route offers reduced structure heights compared to the 230 kV Overhead Alternative. Finally, the 230 kV Overhead Alternative would also require additional right-of-way on the Middlesex County side of the river. However, the Company does not oppose this alternative.

Additional detailed discussion of the routing associated with this electrical alternative is presented in the Alternatives Analysis.

**(2) Construct a 115 kV Underground Transmission Line (“Underground Option”):**

This option would replace approximately 2.3 miles of the existing single circuit 115 kV transmission line, Harmony Village-Northern Neck Line #65, with underground and overhead construction generally following along the centerline of the Proposed Route, utilizing approximately 0.4 mile of land in Lancaster and Middlesex Counties, and 1.9 miles under the Rappahannock River. The Underground Option has been identified as the only viable location for an underground alternative. Additional right-of-way and permitting would be required for this option, including the following:

- There is an existing 75 foot wide right-of-way on north side of Rappahannock River. An additional 25 feet of right-of-way will be required for a 100-foot-wide right-of-way on land. This new right-of-way would be reduced in some areas to avoid crossing homes.
- There is an 80-foot VMRC permitted right-of-way across the river (which expands to 200 feet at two sections in the center span of the Norris Bridge). An additional 20 feet of permitted right-of-way will be required for a 100-foot-wide right-of-way, as well as at the locations where the temporary splice locations extend beyond the 100-foot-wide right-of-way. A total of 5.2 additional acres of Baylor Oyster Grounds will need to be vacated for the Underground Option. This would require a new permit from the VMRC for the larger right-of-way width required for the cables and the splice locations. A new United States Army Corps of Engineers (“Corps”) permit will be required for the splice locations. Also new Baylor Ground legislation will be required, which would necessitate additional action by the General Assembly.
- There is an overhead pole line easement<sup>2</sup> on the Middlesex County (south) side of the river, which is maintained at a total of 45 feet. An additional 55 feet of right-of-way will be required for a 100-foot-wide right-of-way.

---

<sup>2</sup> A pole line easement is an easement or right-of-way to construct, operate, and maintain a pole line for transmitting and distributing electric power. This easement includes all wires, poles, attachments, ground connections, equipment, accessories, and appurtenances. This pole line easement is designated as the centerline on the plat, where a line can be rebuilt.

The construction of the Underground Option would involve, among other things, significant horizontal directional drilling (“HDD”) to install the pipes needed to contain underground electric cables, and dredging large pits in the river bed to allow for underground electric cables to be spliced together. The Alternatives Analysis includes an evaluation of the potential impacts of the Underground Option on potable groundwater sources from the proposed Underground Option.

The Underground Option would also require two transition stations, one on each side of the river crossing, to connect the underground cable to the existing overhead 115 kV transmission line. The transition stations would consist of approximately 80-foot-tall H-frame structures and an ancillary building to house equipment. The northern transition station, which would be located on the Lancaster County side of the Rappahannock River, would consist of two high-pressure fluid-filled (“HPFF”) pipes (single circuit), and would require a graveled, fenced area approximately 155 feet by 248 feet (0.9 acre). The Company would need to acquire additional land to accommodate the northern transition station, which would include setbacks and possible stormwater facilities, for a total of 2.0 acres. The southern transition station, which would be located on the Middlesex County side of the Rappahannock River entirely on property owned by Dominion Virginia Power, would consist of two HPFF pipes (single circuit), and would require a graveled, fenced area approximately 80 feet by 120 feet (0.2 acre). The Company’s existing property is large enough to address setbacks and possible stormwater facilities (totaling 0.9 acre).

Each of the underground cables would terminate in a large porcelain bushing-type insulator that is approximately two feet in diameter and 10 feet tall. These cable terminations are necessary to transition from the cable insulation to air insulation for the outdoor overhead components. To the average person, this facility would look like a conventional electric substation.

The construction time for this option is approximately 18 months and is estimated to cost approximately \$83.6 million, which is \$57.4 million more than the Rebuild Project utilizing the Proposed Route. In addition to the increase in construction time for the Underground Option, the Company will be required to submit a new Joint Permit Application to the Corps and the VMRC, as well as vacating additional Baylor Grounds through passage of legislation by the Virginia General Assembly. This will add approximately eight months before construction can begin. Total time to complete the Underground Option is approximately 36 months.

Additionally, the Underground Option directly impacts approximately 6.0 acres of the river bottom, including the cumulative impacts from the two splicing stations, whereas the Proposed 115 kV Overhead Route and 230 kV Overhead Alternative directly impact less than 0.1 acre of the river bottom,



including the cumulative impacts of the structure foundations and fender system.

Finally, any time the Company is determining whether to build overhead or underground transmission lines, reliability is a major concern. Overhead and underground lines each have reliability challenges, but a problem on an overhead line is easier to locate than on an underground line, and underground line outages are significantly longer than those on overhead lines. On average, most repairs on an overhead line can be completed within hours, but repairs to underground lines take days to weeks. The Company understands that lengthy power outages are unacceptable, and therefore, when considering customer reliability, overhead lines are preferred.

This option was not selected as the proposed Rebuild Project due to decreased reliability in comparison to the overhead options, significantly increased costs, additional impacts to the Rappahannock River bottom compared to the overhead options and significantly longer time to complete.

Additional detailed discussion of the routing associated with this electrical alternative is presented in the Alternatives Analysis.

**(3) Replace existing Line #65 Rappahannock River Crossing Structures and Norris Bridge Attachments along the Existing Route (“115 kV Bridge Attachment Option”):**

This option would replace the Rappahannock River crossing 115 kV structures and Norris Bridge attachments with new 115 kV structures and bridge attachments built to today’s standards within the existing route of the 2.2-mile segment of the single circuit 115 kV transmission line, Harmony Village-Northern Neck Line #65.

The Company rejected the 115 kV Bridge Attachment Option for a variety of reasons. First, VDOT does not support this segment of Line #65 remaining attached to the Norris Bridge, as demonstrated by correspondence and comments contained in Attachments I.C.1 through I.C.4.

Second, it does not address the need for the Rebuild Project to address the compromised reliability and operational problems on the entire Line #65 due to the impact of the Norris Bridge line attachment, as discussed in Section I.A. Additionally, it does not resolve the NERC violations starting as soon as 2018 if VDOT outages longer than six months on the Line #65 bridge attachment are modeled as normal system conditions in the future years.

Third, having this segment of Line #65 attached to the Norris Bridge has caused operational issues for both the Company and VDOT. In the beginning planning stages, the Company did consider as one of the alternatives, rebuilding this segment of Line #65 on the bridge; however, it was determined that other than extending the life of the attachments, the

operational and reliability issues would still exist. Additionally, the weight of any modified attachments would increase due to new clearance requirements and heavier conductors, which could have an impact on the bridge structure. Also, while the Company and VDOT are not certain of future plans related to the Norris Bridge, removing the segment of Line #65 from Norris Bridge will prevent any future complications and reliability concerns for the Northern Neck area associated with the bridge attachments and accommodate VDOT plans over the long-term.

Additionally, this segment of Line #65 cannot be rebuilt on the underside of Norris Bridge. This would require the installation of underground cable in conduit on the underside of the bridge structure and would require transition stations at each end of the bridge. Drilling and/or trenching would be required from the transition station to the bridge. The additional weight and modifications to the bridge would be significant, if even possible on a bridge of this age. The cable would weigh 16.5 pounds per foot and would require two cables per phase for a total of 6 cables plus a spare resulting in a bridge loading of 115 pounds per foot just due to the cable installation. In comparison, the existing overhead wire weighs 0.619 pounds per foot with only one conductor per phase required or a total of 1.86 pounds per foot.

While the Company has not performed a detailed study of this approach, there are other considerations that make this alternative on the underside of the bridge impractical. The ambient air temperature and solar radiation could negatively affect the line rating, possibly requiring even larger underground conductor. Typical underground installations are installed in the ground in thermal backfill that maintains the desired cable rating. Such thermal control is not possible for an air type installation as would be required for placement on the underside of the bridge. Since the cable must be installed in approximately 2000 foot lengths, as many as five splices would be required for such an installation. Splicing under the bridge would be very difficult and require some type of temporary platform attached to the bridge to facilitate the splice. All such mechanical loading additions to the bridge including cable and platforms would have to be evaluated by VDOT. In addition, any underground cable installation on the bridge would still incorporate many of the operational issues mentioned previously.

For these reasons, the Company rejected the 115 kV Bridge Attachment Option and did not develop a cost estimate.

**(4) Rebuild the existing 115 kV Line #224 between Northern Neck and White Stone Substations and rebuild the existing 230 kV Line #224 between Lanexa and Northern Neck Substations ("Lanexa-Northern Neck-White Stone Rebuild Option"):**

This option would rebuild approximately 29.4 miles of the single circuit 115 kV Line #65 between Northern Neck Substation and White Stone Substation



with a double circuit 115 kV line that would terminate at the Northern Neck and White Stone Substations. This double circuit would provide a network transmission line to maintain reliability to the area and allow for de-energization of the existing single circuit 115 kV Line #65 between the White Stone and Harmony Village Substations and the removal of the Line #65 Rappahannock River crossing. The de-energization of the existing Line #65 between the White Stone and Harmony Village Substations and the removal of the Line #65 river crossing would also require the following system improvement to avoid a NERC violation that would occur with this configuration.

- Rebuild approximately 41.3 miles of the single circuit 230 kV Line #224 between Lanexa and Northern Neck Substations with a double circuit 230 kV line that would terminate at the Lanexa and Northern Neck Substations to avoid a N-1-1 NERC violation (300 MW load loss) that occurs in 2018 for the loss of Line #2083 and Line #224 based on 2016 load projections from PJM. This rebuild would include rebuilding approximately 1.2 miles across the Rappahannock River with a double circuit 230 kV line between the existing Dunnsville Substation and Northern Neck Substation.

In total, the Lanexa-Northern Neck-White Stone Rebuild Option would involve the construction, entirely along and within existing 230 kV and 115 kV transmission rights-of-way, of 70.7 miles of new 230 kV and 115 kV double circuit transmission lines in New Kent, King William, King and Queen, Essex, Richmond, and Lancaster Counties. Attachment I.C.5 provides a map of this option. While no new right-of-way would be required for the transmission line right-of-way, necessary upgrades at the Northern Neck, White Stone, and Lanexa Substations would require expansion of the substation footprints in order to terminate the additional transmission lines. In addition, existing tower heights would increase, including a 30-foot height increase for the on-land structures along Line #224, a 10-foot height increase for the structures crossing the Rappahannock River, and a 25-foot height increase for the structures along Line #65. Additionally, this option has greater impacts to water bodies, as it crosses three rivers, including the Pamunkey River, the Rappahannock River, and the Mattaponi River.

The Lanexa-Northern Neck-White Stone Rebuild Option is estimated to cost approximately \$234.9 million, which is \$208.7 million more than the cost estimate for the Rebuild Project utilizing the Proposed Route.

While the Lanexa-Northern Neck-White Stone Rebuild Option uses 100 percent of the existing right-of-way and minimizes the need for permanent new right-of-way (0.8 acre), this option has several drawbacks.

First, the Lanexa-Northern Neck-White Stone Rebuild Option would be 70.7 miles long and cross a total of 404 private parcels. While the majority of

impacts to landowners would be incurred during construction, this option would require the installation of taller structures along the entire length of the route, including rebuilding the crossings of the Mattaponi, Pamunkey, and Rappahannock Rivers, which would increase the visual impact of the transmission line to the surrounding area.

Second, the Lanexa-Northern Neck-White Stone Rebuild Option requires 3.8 miles of surface water crossings and 5.8 miles of wetland crossings. These wetlands are mostly adjacent to the 114 perennial streams (3.8 miles) crossed by the existing right-of-way, three of which are crossings of major rivers: the Mattaponi, Pamunkey, and Rappahannock.

Third, the construction of the Lanexa-Northern Neck-White Stone Rebuild Option would impact a wide variety of environmental features, albeit in several cases temporarily, along its 70.7 mile length. These impacts include the crossing of four Scenic Byways, 63 roads, several areas of ecological significance, conservations easements, recreational areas, and 211 residences that lie within 500 of the right-of-way centerline.

When compared to the Rebuild Project utilizing the Proposed Route, this option represents a less reliable electrical solution, has significant cost and schedule constraints (including VDOT outages noted in Attachment I.A.2) with no obvious environmental benefit, and has a higher impact due to approximately 70.7 miles of wreck and rebuild of existing lines crossing two additional rivers and expansion of three substations; therefore, the Lanexa-Northern Neck-White Stone Rebuild Option was rejected from further consideration.

Additional detailed discussion of the routing associated with this electrical alternative is presented in Appendix B to the Alternatives Analysis.





NOTED FEB 08 1988 J.C.B.

## COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION

P. O. BOX 808  
FREDERICKSBURG, 22404

February 3, 1988

RAY D. PETHTEL  
COMMISSIONER

H. L. CHRYSSIKOS  
DISTRICT ENGINEER

Transmission Power Line  
Robert O. Norris Bridge  
Rappahannock River  
Middlesex & Lancaster Counties

Mr. R. M. Gibson  
Director, Transmission Maintenance  
Virginia Power  
7500 W. Broad Street  
Richmond, Virginia 23229

Dear Mr. Gibson:

Thank you for hosting our meeting on February 2 to discuss Virginia Power's transmission line adjoining our Robert O. Norris Bridge over the Rappahannock River between Gray's Point and Whitestone. Virginia Power's cooperation in working with our consultants, Baker and Associates, in the de-energizing of the power line while they perform inspections of the superstructure, is indeed appreciated. I believe the safe and successful completion of this work can be accomplished with the daily communications between our consultants and Larry Shaffer, Virginia Power's Operations Supervisor, in Lively.

As I indicated, this hands-on inspection procedure is required by the Federal Highway Administration and will be a yearly requirement. We understand your need to schedule these in early spring and will certainly try to accommodate this.

As our District Bridge Engineer, R. H. Morecock, gets closer to the time and amount of repainting the steel on the bridge, he will contact Mr. Robert Lamey, Virginia Power's Construction Supervisor, for scheduling of any necessary de-energizing of the transmission line. It would be appreciated if Mr. Lamey would schedule an on-site review with Mr. Morecock (703-899-4293) to inspect the existing grounding systems of the transmission line as it affects the metal guardrail and structural steel.

Our long term problem is, of course, the deteriorating concrete bridge deck which, in our opinion, needs to be totally replaced and widened. This, obviously, is a very major construction concept and we are currently seeking proposals from

Mr. R. M. Gibson

-2-

February 3, 1988

consultants to investigate the deck and provide us with an analysis of the problems and solutions. At such time as we select a consultant, we will inform Mr. Chris Behrens, Virginia Power's Transmission Engineer, and suggest a meeting between interested parties to review the project.

It is my understanding that Virginia Power is considering additional transmission power through this corridor which could require additional towers and separation of the power line from the bridge.

Considering the age of our structure, the future widening possibilities, and what appears to be yearly inspection and maintenance problems associated with this structure requiring interruption of power service through the corridor, I strongly urge that Virginia Power consider now alternate methods of crossing the river.

Sincerely,

H. L. Chryssikos  
District Engineer

*D.R. Askew*

BY: D. R. Askew  
Assistant District Engineer

XC: Mr. Robert R. Lammey, Jr.)  
Mr. Larry Shaffer ) Virginia Power  
~~Mr. Chris Behrens~~ )  
Mr. Paul Royer, Baker & Associates  
Mr. R. H. Morecock, VDOT  
Mr. D. M. Wagner, VDOT  
Mr. E. J. Fisher, VDOT



**VIRGINIA:**  
**STAKEHOLDERS MEETING: THE TIDES INN**

August 25, 2015

CRANE-SNEAD & ASSOCIATES, INC.  
4914 Fitzhugh Avenue, Suite 203  
Richmond, Virginia 23230  
Tel. No. (804) 355-4335

**APPEARANCES:**

Jason Bellows, Chairman Lancaster Board of Supervisors

Greg Mathe, Communications Manager

Wes Keck, Project Engineer

William Lee, Lancaster County Commissioner

Hilda Page, Resident, White Stone, Virginia

Fran Westbrook, City Council, Irvington, Virginia

Bruce Sanders, Owner, Rappahannock Yachts

Greg Henion, District Maintenance Engineer

Virginia Department of Transportation

Emily Davies, Resident, Urbanna, Virginia

Jimmy Carter, Realtor, Carter Real Estate

George Bott, Chair, Turkey Shoot Hospice Regatta

Roger Martin, Resident, Urbanna, Virginia

Frank Pleva, Administrator, Lancaster County

Carl Smith, President

Dymer Creek Environmental Preservation Association

Charlie Costello, President, Friends of Lancaster Country

Joy Gwaltney, Resident, White Stone, Virginia

Bruce Sanders, Resident, Irvington, Virginia

David Dew, Realtor, White Stone, Virginia

Jack Miller, Middlesex County Commissioner



1 meantime, we will obviously continue to be out there doing  
2 patching work.

3           We're aware that probably in the not too distant  
4 future there's going to need to be a structural steel repair  
5 contract on that bridge. If I had to hazard a guess, you're  
6 probably talking sometime in 2018 or so. It probably would  
7 not be a major significant rehab, it probably would be  
8 something we'll try to take care of with essentially our own  
9 maintenance funding just to kind of hit the, the key here is  
10 that we'd be concerned primarily related to the fatigue critical  
11 elements of the bridge.

12           I was also asked a question, plans for replacement.  
13 Right now there are no plans for replacement. You know,  
14 we're hoping to get a good few more years out of this. There's  
15 no plans for replacement but we do know that on the horizon  
16 at some point in time it does need to be replaced. As far as a  
17 rough order of magnitude cost, it will probably cost you today  
18 \$250-\$300 million. That is not an engineered number. That  
19 is not a cost estimate. That is essentially a back of a cocktail  
20 napkin or milk napkin or whatever you like to drink napkin  
21 estimate of just a swag of what the cost would be.

22           Let me see if there is anything else here that I can  
23 share with you that I have on my questions here. I will, I  
24 guess, briefly address the concept of connecting to our bridge.  
25 You know, it's not something that we've had a lot of

1 discussions with Dominion about. Certainly, for some reasons  
2 I've discussed and some reasons that was raised earlier, it's  
3 not even going to be particularly enjoyed going down that  
4 path. Just for market of concept, we have this cusp project.  
5 We have fatigue critical elements. We have supplemental  
6 inspections we need to do to them. The concept of adding  
7 dead-load to this structure, significant dead-load, and then in  
8 addition to that, you know, drilling into either our deteriorated  
9 concrete or drilling through our concrete for making additional  
10 connections into our structure of steel is something that we  
11 absolutely, positively would, you know, all things being equal  
12 avoid. And then as far as the view-sheds go, as long as you're  
13 not trying to look at them if you're driving on our bridge, we  
14 don't have a whole lot of comments on view-sheds. Any  
15 questions?

16 MR. BOTT: Yes, I have one. There's really two  
17 parts, do either you or Dominion know why the power lines  
18 were hung off of the bridge to begin with, that's one question.  
19 And two, given your outlook and the costs involved for a  
20 replacement bridge, how long could you keep this bridge  
21 viable?

22 MR. HENION: We can certainly keep the bridge  
23 viable for an extended period of time, you know, somebody  
24 asked me that earlier. It might have been you that asked me  
25 that earlier. You might be asking me in public now. I think





# COMMONWEALTH of VIRGINIA

## DEPARTMENT OF TRANSPORTATION

87 Deacon Road  
Fredericksburg, Virginia 22405

Charles A. Kilpatrick, P.E.  
COMMISSIONER

February 19, 2016

Ms. Amanda Mayhew  
Senior Siting and Permitting Specialist  
Dominion Virginia Power  
P.O. Box 26666  
Richmond, VA 23261

Dear Ms. Mayhew,

Thank you for your continued coordination with the Virginia Department of Transportation as Dominion Virginia Power considers replacing the transmission lines attached to the Robert O. Norris Bridge on Route 3 over the Rappahannock River.

While any transmission line replacement project must be submitted to the agency for a review, it is unlikely we would approve additional weight or a reconfiguration of the attachments on the bridge. Anything that would increase the loading on the bridge would need to be analyzed, and any additional work would require funding by Virginia Dominion Power. We have done our best to describe what modifications could be expected if a transmission line were to be replaced on the bridge. We hope the enclosed information is useful as you consider your next steps.

The latest bridge safety inspection report indicates there is continued deterioration of the structure. VDOT is evaluating the detailed inspection notes to determine if a restricted weight limit will be needed to keep the bridge in service. Currently, trucks weighing more than 90,000 pounds and carrying overweight permits are not allowed to cross the bridge. This weight may need to be lowered. Gauges have been placed on the bridge to constantly monitor the strain on the structure. This step was taken to monitor ongoing impacts to the bridge's steel structure, and schedule repairs as needed.

The bridge is in fair condition, which is defined as a score of 5 on a 0-9 scale. A score of 4 would qualify the bridge for structurally deficient status. Due to the fracture-critical nature of this bridge, its condition could be downgraded quickly.

The bridge's structure type limits the locations where a replacement transmission line could be attached. It is our understanding that several pull boxes would be required to locate transmission lines under the bridge deck. The spacing between the stringers that support the bridge deck range

from 7 feet to 7 feet, 8 inches. We have been informed that pull boxes are traditionally 6 feet by 8 feet. Any pull boxes would have to be attached to the structure, no lower than the lowest member at that location, and could not interfere with annual safety inspections. We anticipate that local strengthening would be required to place each pull box, and this weight would need to be incorporated into the structure's load rating.

We are about to embark on a project to paint the bridge's three channel spans, which are spans 16, 17, and 18. The project has been advertised to potential bidders. Work is anticipated to begin in the summer of 2016 with a contract completion date of March 2018. The transmission lines will be de-energized for the majority of this contract time.

The bridge is inspected annually in October. We will continue to require the attached transmission lines to be de-energized for approximately three weeks during the inspection.

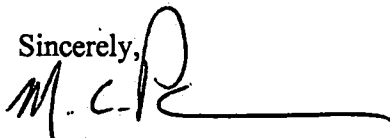
For several continuous years, a nesting pair of peregrine falcons have located on the underside of the channel span between February and July. During the nesting period, no work activities shall occur within 600 feet of the nest, according to guidelines provided by the Virginia Department of Game and Inland Fisheries.

As additional background, the Norris Bridge opened to traffic in 1957. As the structure ages, maintenance requirements will increase. The overlay on top of the bridge's steel grid deck is experiencing distress and is debonding from the steel grid in multiple locations. VDOT is repairing these areas as they appear. We anticipate future structural steel repairs will be needed in the next 18 months, which may include the truss members with the transmission line connections.

Finally, it is important to note that there is a 10 foot width restriction on the bridge, and a vertical height restriction of 14 feet, 3 inches.

Thank you for the opportunity to update you on the bridge's condition as you embark on this utility infrastructure project. If you or a member of your team is interested in meeting to further to discuss these details, please contact me directly at [Marcie.Parker@VDOT.Virginia.Gov](mailto:Marcie.Parker@VDOT.Virginia.Gov) or (540) 899-4200.

Sincerely,

A handwritten signature in black ink, appearing to read 'M. C. Parker', with a long horizontal line extending to the right.

Marcie Parker  
Fredericksburg District Administrator

cc: Mr. Wes Keck, Dominion Virginia Power





# COMMONWEALTH of VIRGINIA

## DEPARTMENT OF TRANSPORTATION

87 Deacon Road

Fredericksburg, Virginia 22405

Charles A. Kilpatrick, P.E.  
COMMISSIONER

February 26, 2016

Ms. Amanda Mayhew  
Senior Siting and Permitting Specialist  
Dominion Virginia Power  
P.O. Box 26666  
Richmond, VA 23261

Dear Ms. Mayhew,

As an addendum to our letter of February 19, 2016, the Virginia Department of Transportation (VDOT) would like to provide greater detail about how our work zones affect the existing Dominion Virginia Power (DVP) transmission line placed on the Robert O. Norris Bridge over the Rappahannock River, and how upcoming bridge maintenance work could affect future line placement on the bridge.

Bridge maintenance work frequently requires DVP to de-energize the existing transmission line for the safety of our workers and contractor crews.

We are grateful for DVP's ongoing assistance and cooperation as we schedule necessary bridge repairs. However, we expect the number of requests for de-energization will only increase as the bridge ages and requires additional maintenance.

As we described in our previous letter, a painting project is scheduled to begin on the bridge in summer 2016 with a contract completion date of March 2018. This project will require the transmission lines to be de-energized for the majority of this contract time.

An annual bridge inspection is performed in the fall. VDOT requires the transmission line to be de-energized for this three-week inspection.

In other instances, the presence of the transmission line on the bridge has delayed urgent bridge maintenance, or put project schedules and budget at risk.

During the most recent bridge painting project in 2011, Hurricane Irene and Tropical Storm Lee halted construction work on the bridge for several days. Resulting power outages led to the

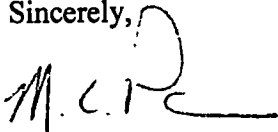
activation of the transmission line on the bridge, which had been de-energized due to the project. Painting work was delayed for several weeks due to the transmission line being energized.

Unexpected bridge inspection or maintenance needs also require de-energization of the transmission line. While DVP has provided outstanding coordination to accommodate these requests, making arrangements to de-energize the line has caused slight delays to urgent bridge work. VDOT has waited several weeks to perform work we otherwise would have preferred to complete within days.

Additionally, when DVP performs maintenance to their transmission line, VDOT staff are frequently asked to provide traffic control for lane closures, which diverts our resources.

Thank you for the opportunity to expand on the work zone coordination between VDOT and DVP on the Norris Bridge.

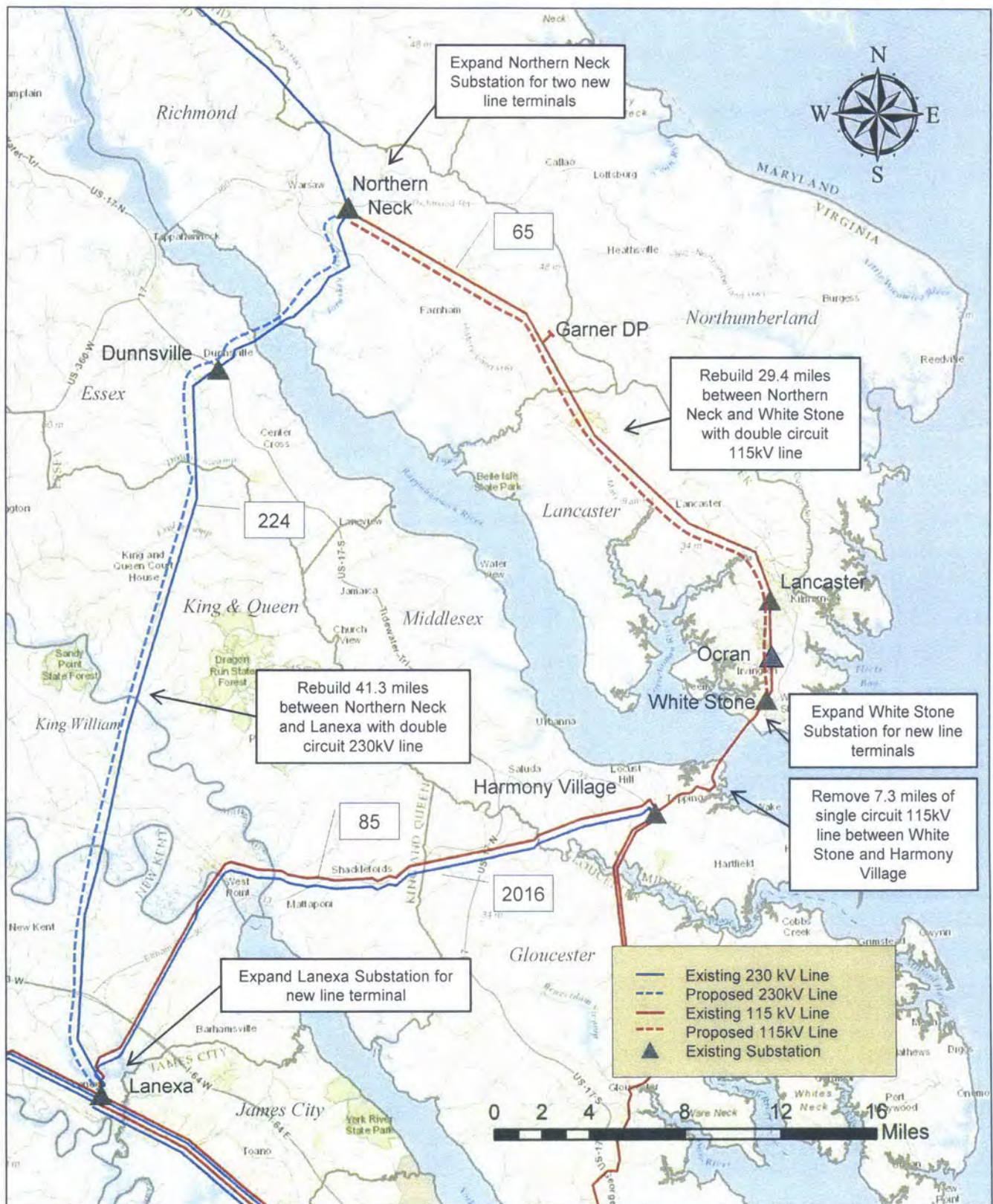
Sincerely,

A handwritten signature in black ink, appearing to read 'M. C. Parker', with a large loop at the end.

Marcie Parker  
Fredericksburg District Administrator

cc: Mr. Wes Keck, Dominion Virginia Power





**I. NECESSITY FOR THE PROPOSED PROJECT**

**D. Describe any lines or facilities which will be removed, replaced, or taken out of service upon completion of the proposed project.**

Response: Upon completion of the Rebuild Project, the seven existing 115 kV wooden H-frames, 14 davit arm style bridge attachments, and all associated hardware assemblies currently supporting Line #65 as it traverses the Rappahannock River will be removed and replaced with 10 galvanized steel H-frame structures on concrete foundations in the Rappahannock River approximately 100 feet east of the Norris Bridge. On the Lancaster County side of the river, one existing wooden three-pole structure will be removed and replaced by a galvanized steel three-pole double deadend structure. On the Middlesex County side of the river, one existing wooden monopole structure will be eliminated entirely and three existing monopoles will be removed and replaced with one double deadend galvanized steel monopole and two weathering steel monopoles.

Approximately 2.2 miles of existing 477 ACSR (24/7) three-phase conductor and one 3#6 static wire will be removed between the existing river bank three-pole structure in Lancaster County and existing monopole on the Middlesex County bank. Approximately 2.2 miles of 900 ACSS/TW/HS-285/MM (20/7) three-phase conductor and two shield wires will be installed between the new three-pole double deadend in Lancaster County and the existing double deadend monopole in Middlesex County.

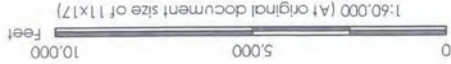
See Attachment I.D for the location of existing and proposed facilities. For detailed descriptions of the existing and proposed facilities, see Section II.A.3.



Figure No. 3

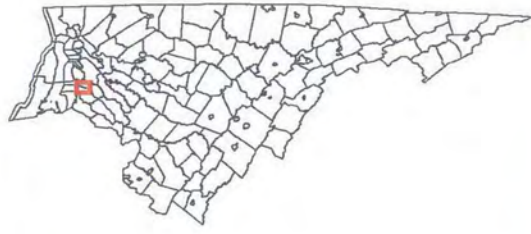
Project Map

Client/Project  
Dominion Virginia Power  
Line #65 115 kV Rebuild at  
Norris Bridge  
Project Location  
Lancaster and Middlesex  
Counties, Virginia  
Prepared by CWC on 2015-04-06  
Technical Review by TFS on 2015-04-13  
Independent Review by CPG on 2015-04-13  
203400254



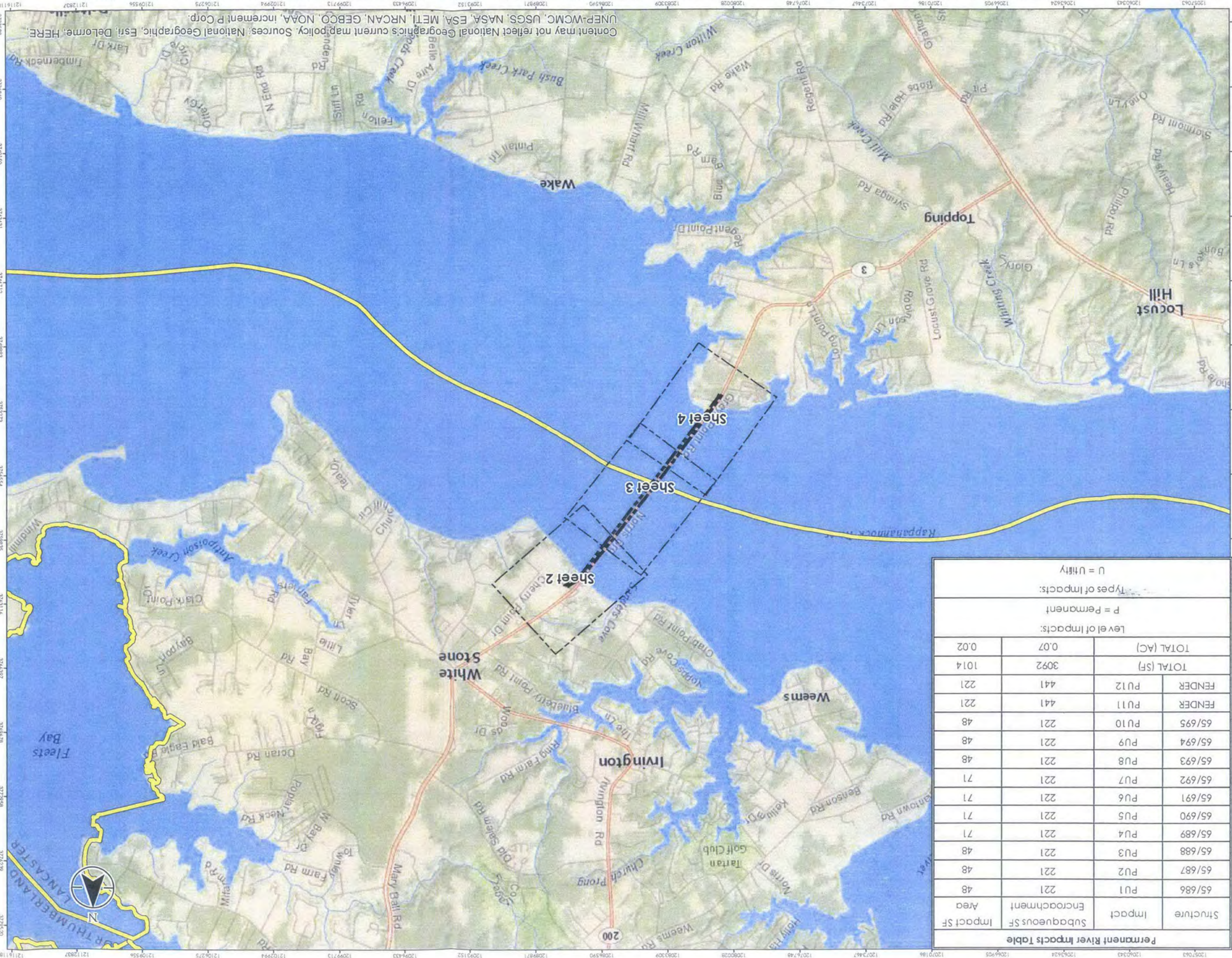
Legend  
Project Limits  
Sheet Index

Site Data  
Project Area 47.45 Acres ±  
Project Length 2.37 Miles ±  
Jurisdictional Areas  
Emergent Wetland 0.39 Acres ±  
Scrub Shrub Wetland 0.10 Acres ±  
Tidal Waters 41.44 Acres ± (201 L.F. ±)



Notes

1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet
2. Right-of-way Limits and Project Limits digitized from aerials
3. Topography generated from USGS 1/3 arc second digital elevation model raster dataset
4. Orthorectified Bing Maps and National Geographic
5. Tower locations and Bayler Easements provided by Dominion Virginia Power
6. The limits of the waters of the U.S., including wetlands, confirmed by the U.S. Army Corps of Engineers. Confirmation #NAO-2014-02118
7. Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation
8. Parcel data provided by Lancaster and Middlesex Counties GIS April 2015
9. SAV is merged from 2012 and 2013 VIMS data
10. Private oyster leases and Bayler Survey provided by VMRC (October 2014)



Permanent River Impacts Table				
Structure	Subaqueous SF	Impact SF	Area	
65/686	PU1	221	48	48
65/687	PU2	221	48	48
65/688	PU3	221	48	48
65/689	PU4	221	71	71
65/690	PU5	221	71	71
65/691	PU6	221	71	71
65/692	PU7	221	71	71
65/693	PU8	221	48	48
65/694	PU9	221	48	48
65/695	PU10	221	48	48
FENDER	PU11	441	221	221
FENDER	PU12	441	221	221
TOTAL (SF)		3092	1014	1014
TOTAL (AC)		0.07	0.02	0.02
Level of Impacts:				
P = Permanent				
Types of Impacts:				
U = Utility				

Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, DeLorme, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.



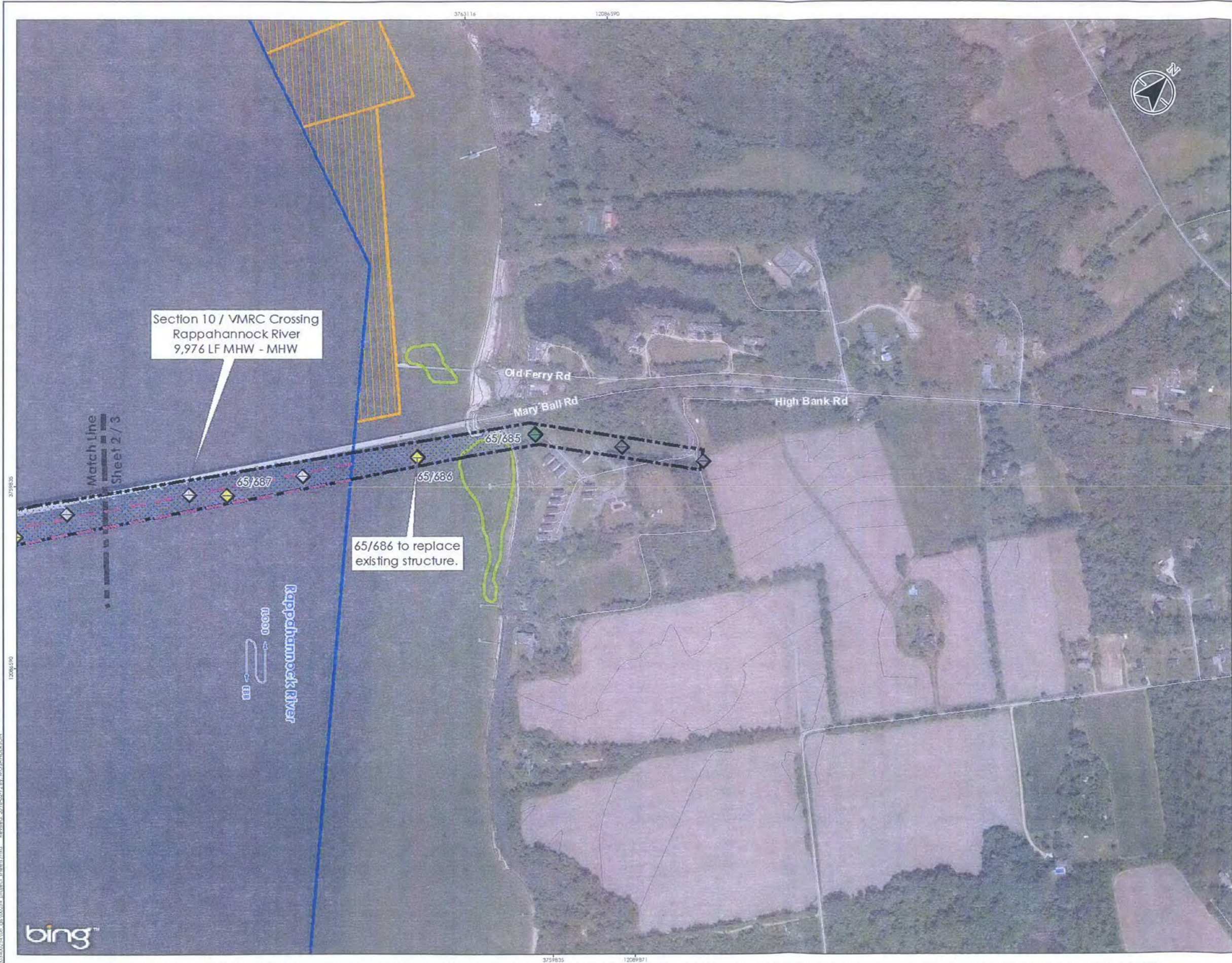
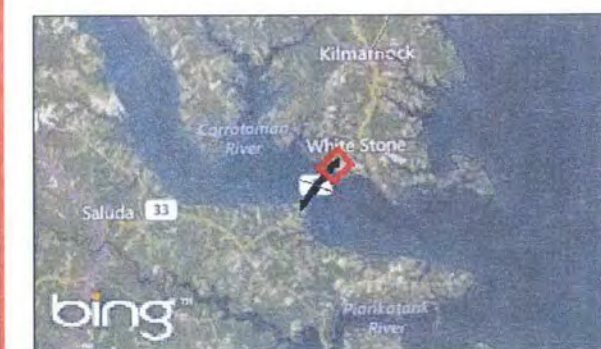


Figure No.  
**3**  
Title  
**Project Map**  
Submitted: 2015-04-16  
Revised: 2015-06-22  
Revised: 2016-02-12

Client/Project  
Dominion Virginia Power  
Line #65 115 kV Rebuild at  
Norris Bridge  
203400254  
Project Location  
Lancaster and Middlesex  
Counties, Virginia  
Prepared by GWC on 2015-04-06  
Technical Review by TPS on 2015-04-13  
Independent Review by CPG on 2015-04-13

0 500 1,000 Feet  
1:6,000 (At original document size of 11x17)

- Legend**
- Proposed Structures**
- Monopole
  - H-Frame 2-Pile Foundations
  - H-Frame 3-Pile Foundations
- Existing Structures**
- To Remain
  - To Be Removed
- Project Limits**
- Approximate Wetland Limits
  - Approximate Tidal Waters Limits
  - Proposed Fender Location
  - Baylor Ground Easements (SB 1030)
  - 2-Foot Contours
  - SAV
  - Baylor Grounds Survey
  - Private Oyster Lease



- Notes**
1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet
  2. Right-of-way Limits and Project Limits digitized from aerials
  3. Topography generated from USGS 1/3 arc second digital elevation model raster dataset
  4. Orthimagery © Bing Maps and National Geographic
  5. Tower locations and Baylor Easements provided by Dominion Virginia Power
  6. The limits of the waters of the U.S., including wetlands, confirmed by the U.S. Army Corps of Engineers, Confirmation #NAO-2014-02118
  7. Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation
  8. Parcel data provided by Lancaster and Middlesex Counties GIS April 2015
  9. SAV is merged from 2012 and 2013 VIMS data
  10. Private oyster leases and Baylor Survey provided by VMRC (October 2014)



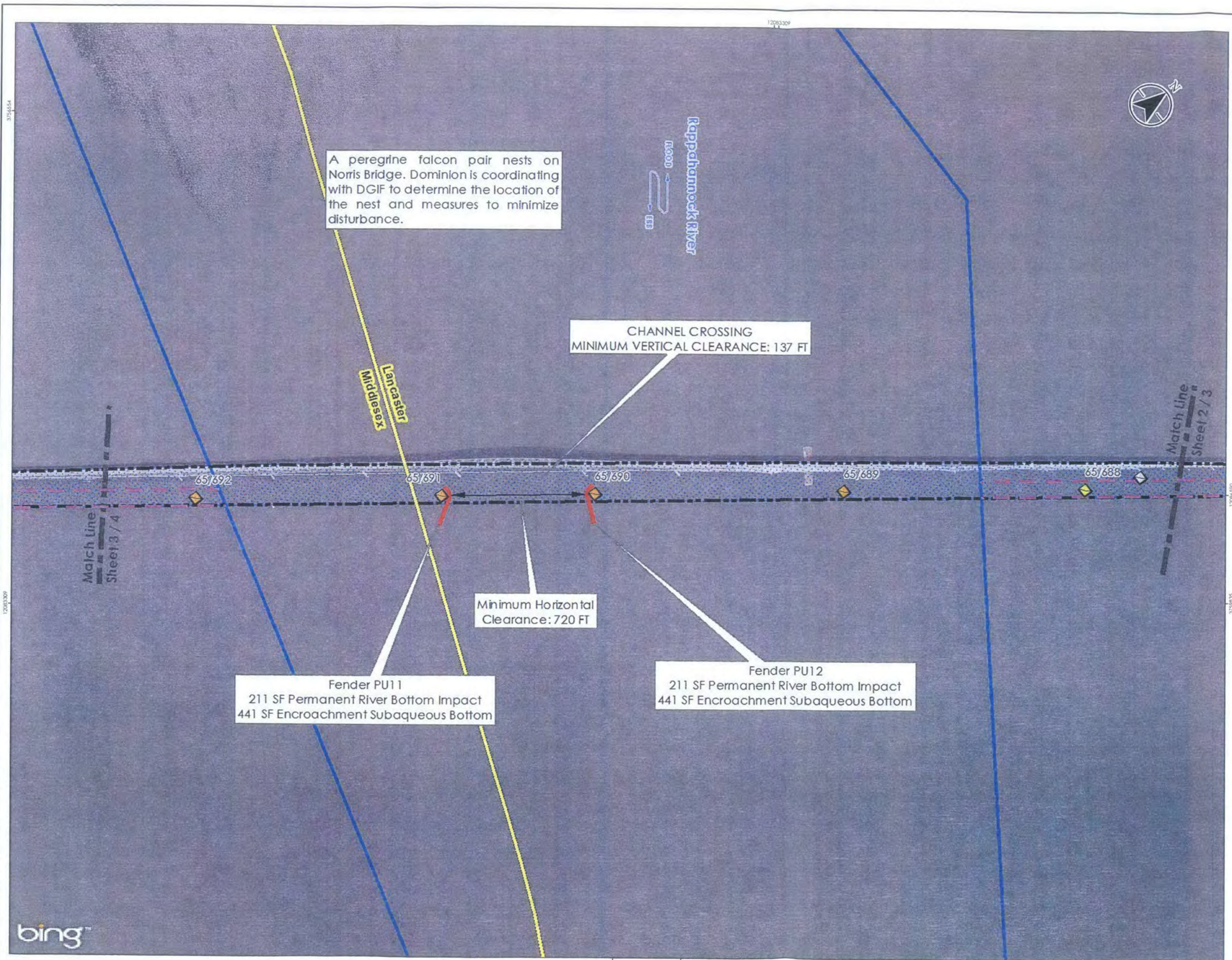


Figure No.  
**3**

# Title **Project Map**

Submitted: 2015-04-16  
Revised: 2015-06-22  
Revised: 2016-02-12

Client/Project  
Dominion Virginia Power  
Line #65 115 kV Rebuild at  
Norris Bridge

Project Location  
Lancaster and Middlesex  
Counties, Virginia

203400254  
Prepared by GWC on 2015-04-06  
Technical Review by TPS on 2015-04-13  
Independent Review by CPG on 2015-04-13

0 500 1,000 Feet  
1:6,000 (At original document size of 11x17)

## Legend

### Proposed Structures

- Monopole
- H-Frame 2-Pile Foundations
- H-Frame 3-Pile Foundations

### Existing Structures

- To Remain
- To Be Removed

### Project Limits

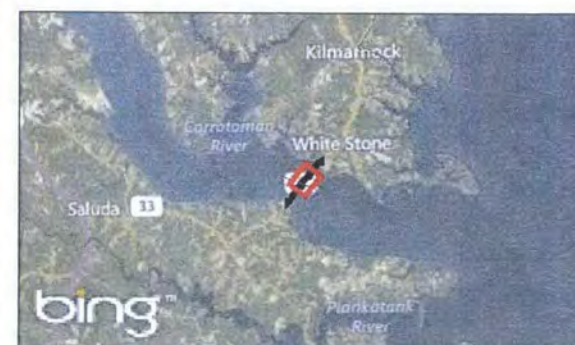
- Approximate Wetland Limits
- Approximate Tidal Waters Limits

### Proposed Fender Location

- Baylor Ground Easements (SB 1030)

### 2-Foot Contours

- SAV
- Baylor Grounds Survey
- Private Oyster Lease



### Notes

- Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet
- Right-of-way Limits and Project Limits digitized from aerials
- Topography generated from USGS 1/3 arc second digital elevation model raster dataset
- Orthoimagery © Bing Maps and National Geographic
- Tower locations and Baylor Easements provided by Dominion Virginia Power
- The limits of the waters of the U.S., including wetlands, confirmed by the U.S. Army Corps of Engineers, Confirmation #NAO-2014-02118
- Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation
- Parcel data provided by Lancaster and Middlesex Counties GIS April 2015
- SAV is merged from 2012 and 2013 VIMS data
- Private oyster leases and Baylor Survey provided by VMRC (October 2014)





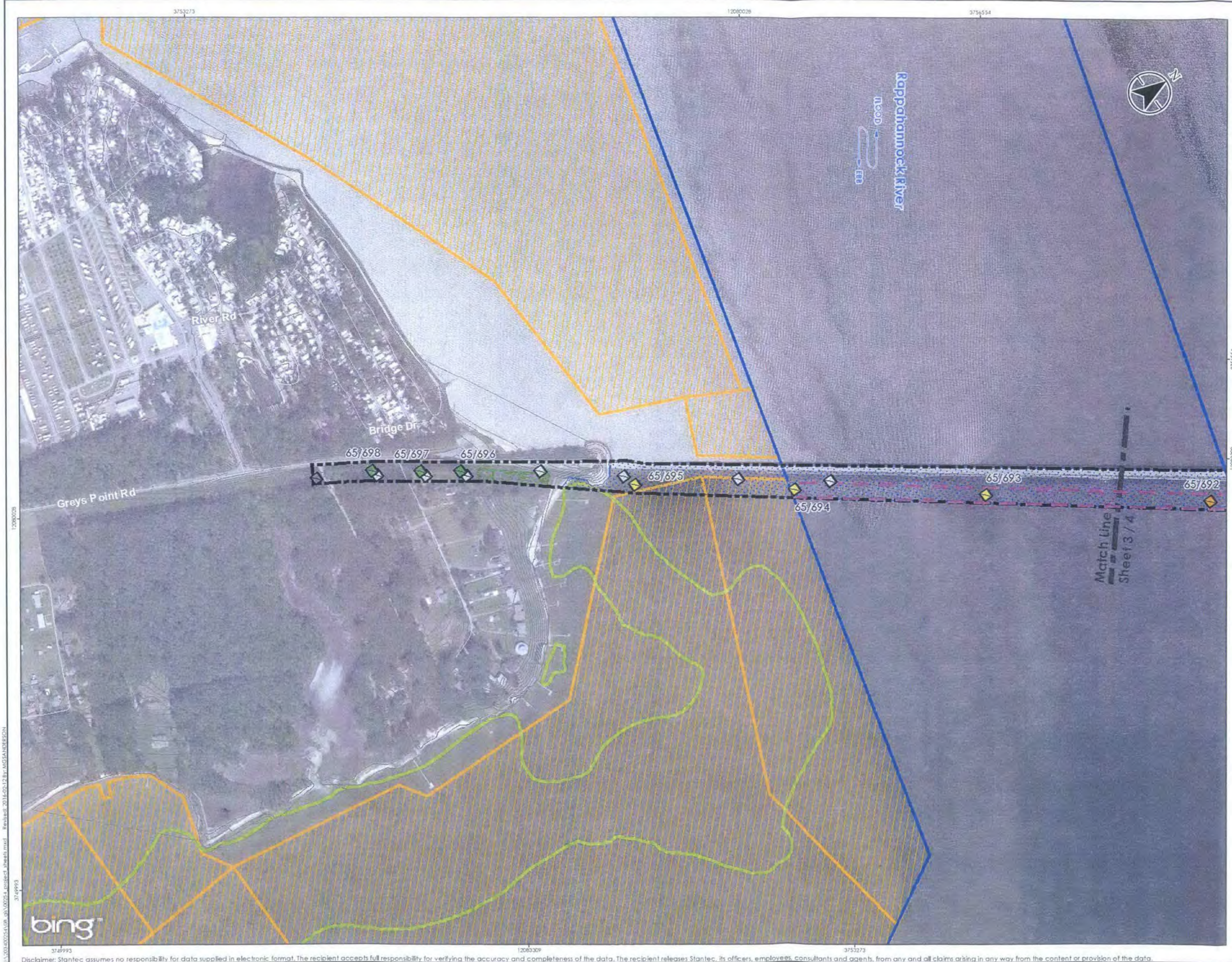


Figure No.

3

Title

## Project Map

Submitted: 2015-04-16  
Revised: 2015-06-22  
Revised: 2016-02-12

Client/Project

Dominion Virginia Power  
Line #65 115 kV Rebuild at  
Norris Bridge

Project Location  
Lancaster and Middlesex  
Counties, Virginia

203400254  
Prepared by GWC on 2015-04-06  
Technical Review by TPS on 2015-04-13  
Independent Review by CPG on 2015-04-13

0 500 1,000 Feet  
1:6,000 (At original document size of 11x17)

### Legend

#### Proposed Structures

- Monopole
- H-Frame 2-Pile Foundations
- H-Frame 3-Pile Foundations

#### Existing Structures

- To Remain
- To Be Removed

#### Project Limits

- Approximate Wetland Limits
- Approximate Tidal Waters Limits
- Proposed Fender Location

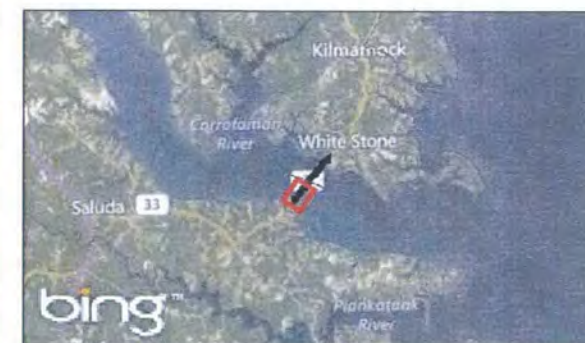
Baylor Ground Easements (SB1030)

2-Foot Contours

SAV

Baylor Grounds Survey

Private Oyster Lease



### Notes

1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet
2. Right-of-way Limits and Project Limits digitized from aerials
3. Topography generated from USGS 1/3 arc second digital elevation model raster dataset
4. Orthimagery © Bing Maps and National Geographic
5. Tower locations and Baylor Easements provided by Dominion Virginia Power
6. The limits of the waters of the U.S., including wetlands, confirmed by the U.S. Army Corps of Engineers, Confirmation #NAO-2014-02118
7. Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation
8. Parcel data provided by Lancaster and Middlesex Counties GIS April 2015
9. SAV is merged from 2012 and 2013 VIMS data
10. Private oyster leases and Baylor Survey provided by VMRC (October 2014)

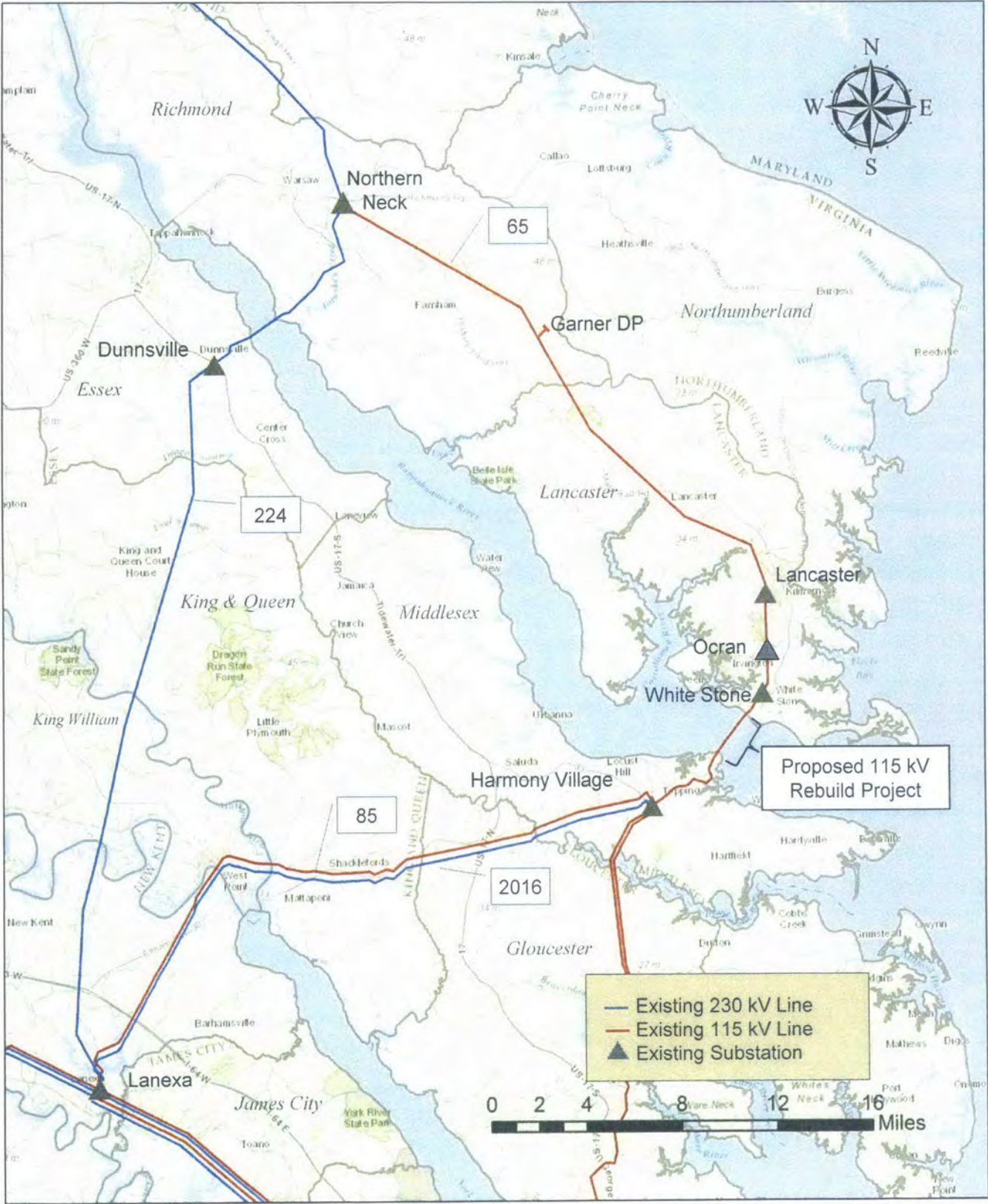




**I. NECESSITY FOR THE PROPOSED PROJECT**

- E. Provide a system map of suitable scale showing the location and voltage of the Company's transmission lines, substations, generating facilities, etc., which would affect or be affected by the new transmission line and are relevant to the necessity for the proposed line. Clearly, label on this map all points referenced in the necessity statement.**

Response: See Attachment I.E.1.





## **I. NECESSITY FOR THE PROPOSED PROJECT**

### **F. Provide the desired in-service date of the proposed project and the estimated construction time.**

Response: There is a current and immediate need for the Rebuild Project. If the Company can obtain a Commission Final Order by November 1, 2016, and the necessary outages, then the Company anticipates that the Rebuild Project could be in service by December 2017, consistent with PJM's energization date.

The estimated construction time for this Rebuild Project is 14 months. Included in the construction schedule are time-of-year restrictions per the Corps and the VMRC permit conditions. The time-of-year restrictions preclude work within 600 feet of the peregrine falcon nest located at the center span of the bridge from February 15 to July 15. Also, no pile driving is permitted between February 15 and June 30 to protect anadromous fish.

Additionally, the Company received approval from the Corps that the Rebuild Project meets the requirements of the Nationwide Permit #12 in 2015 (see Attachment I.F). As indicated in Attachment I.F, the Nationwide Permit is reviewed and updated every five years with the next review scheduled for March 18, 2017. If the Company does not commence work on the Rebuild Project prior to this date, then the Company will be required to obtain a new Corps approval for the Rebuild Project.



**DEPARTMENT OF THE ARMY**  
 NORFOLK DISTRICT, CORPS OF ENGINEERS  
 FORT NORFOLK, 803 FRONT STREET  
 NORFOLK, VIRGINIA 23510-1011

REPLY TO  
 ATTENTION OF:

August 20, 2015

CENAO-WRR-N (Rappahannock River)  
 15-0533/NAO-2015-00676

Virginia Electric Power Company (Amanda Mayhew)  
 c/o Stantec Consulting Services, Inc. (Corey Gray)  
 5209 Center Street  
 Williamsburg, Virginia 23188

Dear Ms. Mayhew:

This is in regard to your request for a Department of Army Nationwide Permit verification for the proposed replacement of the existing 115kv aerial transmission line, including open pile towers, in/over the Rappahannock River and adjacent to the Route 3/Robert O. Norris bridge, located in the Counties of Middlesex and Lancaster, Virginia.

The Norfolk District's review of the proposed removal of the existing 115kv aerial transmission line(s), including the (7) existing open pile towers, and their proposed replacement with an upgraded 115kv transmission line(s), including a total of (10) open pile support towers, the (2) proposed fender systems adjacent to the (2) proposed towers at the navigation channel near the center of the bridge, with all work being described in your permit application letter dated "June 25, 2015", your permit application drawing(s) dated "5/5/2015" and "6/9/2015", and including the Special Conditions listed below reveals that the work satisfies the criterion contained in the Corps Nationwide Permit #12 (attached). The Corps Nationwide Permits were published in the February 21, 2012 Federal Register notice (77 FR 10184) and the regulations governing their use can be found in 33 CFR 330 published in Volume 56, Number 226 of the Federal Register dated November 22, 1991. No further authorization is required from this agency.

**Special Condition:**

1. The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.
2. The National Marine Fisheries Service (NMFS) recommends adherence to a Time of Year Restriction for Anadromous Fish, for all pile driving activities, from February 15 to June 30 of any year. Outside of that period, the NMFS recommends using a soft-start



procedure for all piles to be driven, whereby; the first three hammer strikes on each pile are 10% energy with a 1-minute waiting period, followed by another sequence of three reduced-energy strikes at 25% energy with a 1-minute waiting period, followed by a third sequence of reduced-energy strikes at 40% energy with a 1-minute waiting period, before continued driving of the pile at 100% energy. This technique is to minimize the acoustic shock to fish by causing them to move away from the work area.

This authorization does not relieve your responsibility to comply with all local requirements pursuant to the Chesapeake Bay Preservation Act (CBPA), nor does it supersede local government authority and responsibilities pursuant to the Act. You should contact your local government before you begin work to find out how the CBPA applies to your project.

The Virginia Department of Environmental Quality (DEQ) has waived its 401 certification for Corps of Engineers Nationwide Permit #12 activities. The DEQ waiver is contingent upon compliance with the Nationwide Permit general and special conditions.

This verification is valid until the NWP is modified, reissued, or revoked. All of the existing NWPs are scheduled to be modified, reissued, or revoked prior to March 18, 2017. It is incumbent upon you to remain informed of changes to the NWPs. We will issue a public notice when the NWPs are reissued. Furthermore, if you commence or are under contract to commence this activity before the date that the relevant nationwide permit is modified or revoked, you will have twelve (12) months from the date of the modification or revocation of the NWP to complete the activity under the present terms and conditions of this nationwide permit unless discretionary authority has been exercised on a case-by-case basis to modify, suspend, or revoke the authorization in accordance with 33 CFR 330.4(e) and 33 CFR 330.5 (c) or (d). Project specific conditions listed in this letter continue to remain in effect after the NWP verification expires, unless the District Commander removes those conditions. Activities completed under the authorization of an NWP which was in effect at the time the activity was completed continue to be authorized by that NWP.

If you have any questions, please contact Mr. Adrian R. Jennings at 804-435-9362 or at [adrian.r.jennings@usace.army.mil](mailto:adrian.r.jennings@usace.army.mil)

Sincerely,

**JENNINGS.ADRIAN.R.1229671223**

Adrian R. Jennings  
Environmental Scientist  
Northern Virginia Regulatory Section

Digitally signed by  
JENNINGS.ADRIAN.R.1229671223  
DN: c=US, o=U.S. Government, ou=DoD,  
ou=PKI, ou=USA,  
cn=JENNINGS.ADRIAN.R.1229671223  
Date: 2015.08.20 11:24:21 -04'00'

**I. NECESSITY FOR THE PROPOSED PROJECT**

**G. Provide the estimated cost of the project.**

Response: The estimated cost for the Rebuild Project utilizing the Proposed Route is approximately \$26.2 million. All costs are in 2016 dollars.

There is no station work needed for or associated with the Rebuild Project.

## **I. NECESSITY FOR THE PROPOSED PROJECT**

**H. In addition to all other information required by these guidelines, applications for approval to construct facilities and transmission lines inter-connecting a Non Utility Generator (NUG) and a utility shall include the following information.**

- 1. The full name of the NUG as it appears in its contract with the utility and the dates of the initial contract and any amendments;**
- 2. A description of the arrangements for financing the facilities, including information on the allocation of costs between the utility and the NUG:**
- 3. a. For Qualifying Facilities (QFs) certificated by Federal Energy Regulatory Commission (FERC) order, provide the QF or docket number, the dates of all certification or recertification orders, and the citation to FERC Reports, if available;**  
**b. For self-certificated QFs, provide a copy of the notice filed with the FERC;**
- 4. In addition to the information required in 3a or 3b, provide the project number and project name used by the FERC in licensing hydroelectric projects, also provide the dates of all orders and citations to FERC Reports, if available; and**
- 5. If the name provided in 1 above differs from the name provided in 3 above, give a full explanation.**

**Response:** Not applicable.



**I. NECESSITY FOR THE PROPOSED PROJECT**

- I. Describe the new 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.**

Response: There are no new or existing generating facilities associated with the Rebuild Project, and no new substations, switching stations or distribution facilities associated with the Rebuild Project.

There is an existing approximately 0.2-mile distribution line on the Middlesex County side of the Rebuild Project which is currently underbuilt on three transmission structures. The Company plans to relocate this distribution line as part of the Rebuild Project.

For a description of the load centers to be served, see Sections I.A and I.B.

## **II. DESCRIPTION OF THE PROPOSED PROJECT**

### **A. Right-of-way (ROW)**

#### **1. Provide the length of the proposed corridor and viable alternatives;**

Response: A description of the Proposed 115 kV Overhead Route, 230 kV Overhead Alternative and Underground Option is provided below.

#### **Proposed 115 kV Overhead Route**

The Proposed 115 kV Overhead Route of the Rebuild Project is a 2.2-mile segment of an existing single circuit 115 kV transmission line, Harmony Village-Northern Neck Line #65. The Proposed Route begins east of Mary Ball Road (State Route 3) in Middlesex County and heads northeast for approximately 0.3 mile, where it crosses the Rappahannock River for approximately 1.9 miles utilizing an 80-foot-wide right-of-way permitted by the VMRC. VMRC also permitted two 200-foot-wide sections at the river channel to accommodate the fender system. The centerline of the proposed structures in the river will be located approximately 100 feet east of Norris Bridge. Once coming ashore on the northern bank of the Rappahannock River in Lancaster County, the Proposed Route travels less than 0.1 mile in a northeasterly direction before ending at the first structure on land in Lancaster County.

#### **230 kV Overhead Alternative**

The 230 kV Overhead Alternative would rebuild a portion of the existing single circuit 115 kV transmission line, Harmony Village-Northern Neck Line #65, along the same 2.2-mile route as the Proposed 115 kV Overhead Route, utilizing 230 kV design for the entire Rebuild Project. The right-of-way configuration would be similar to that described for the Proposed 115 kV Overhead Route, utilizing the same right-of-way over the river, and the on-land crossing in Lancaster County; however, along the on-land crossing in Middlesex County, a slightly wider right-of-way would be necessary (three feet) to accommodate the operation of a 230 kV transmission line.

#### **Underground Option**

The Underground Option would replace approximately 2.3 miles of the existing single circuit 115 kV transmission line, Harmony Village-Northern Neck Line #65, with underground and overhead construction. The Underground Option begins east of Mary Ball Road (State Route 3) at the transition station site in Middlesex County and heads northeast for approximately 0.3 mile, where it crosses the Rappahannock River for approximately 1.9 miles and would require a 100-foot right-of-way and two splice locations measuring 650-feet long and 200-feet wide. The centerline



of the cables beneath the river will be located approximately 100 feet east of Norris Bridge. Once coming ashore on the northern bank of the Rappahannock River, the Underground Option travels 0.2 mile in a northeasterly direction before ending at the transition station site in Lancaster County.

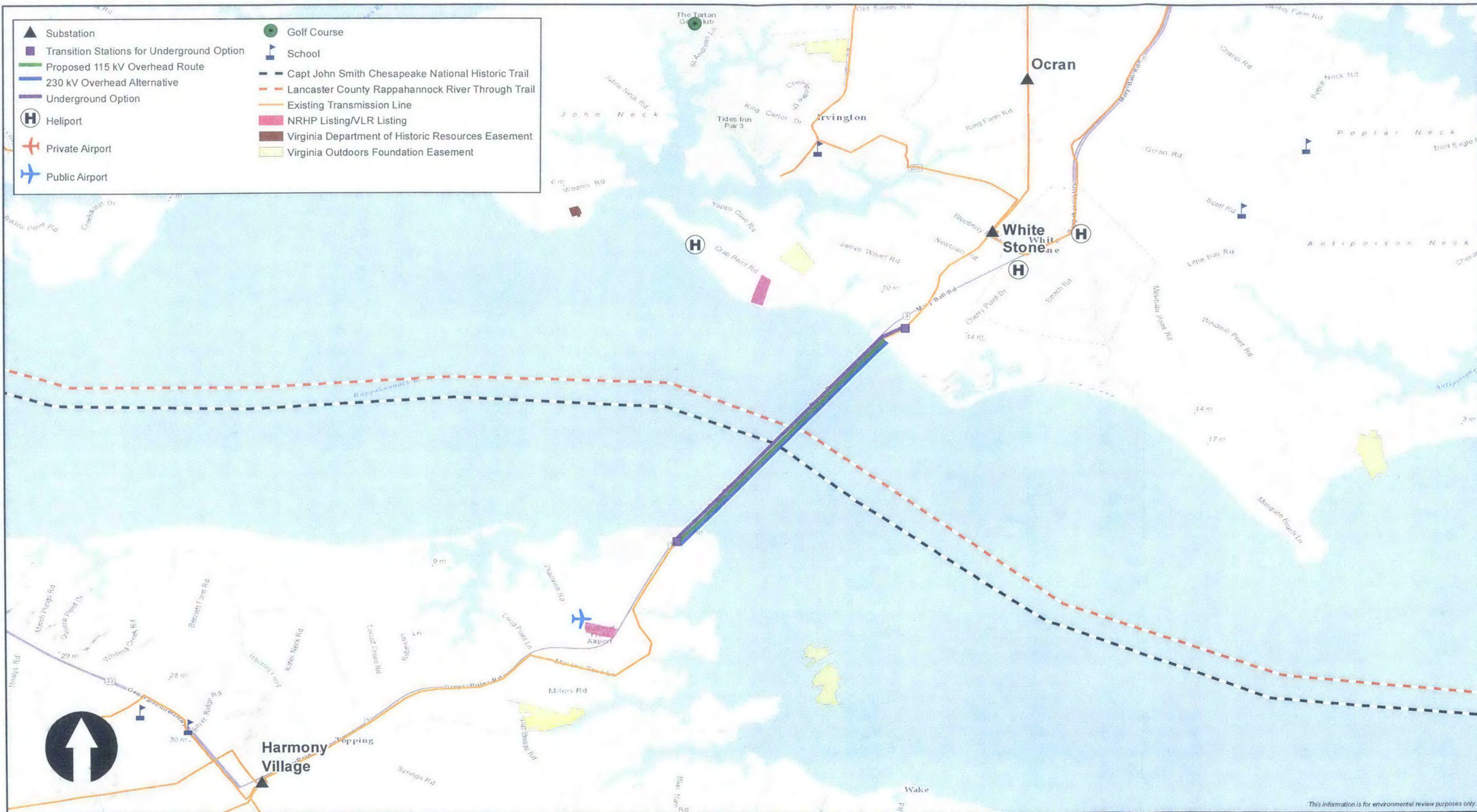
## **II. DESCRIPTION OF THE PROPOSED PROJECT**

### **A. Right-of-way (ROW)**

- 2. Provide a map of suitable scale showing the route of the proposed line and its relation to: the facilities of other public utilities which could influence the route selection, highways, streets, parks and recreational areas, scenic and historic areas, schools, convalescent centers, hospitals, airports and other notable structures close to the proposed project. Indicate the existing facilities which the line is proposed to follow, such as existing ROW, railroad tracks, etc.;**

Response: See Attachment II.A.2.





This information is for environmental review purposes only.

**Line #65 115 kV  
Rebuild at Norris Bridge Project  
Dominion Virginia Power  
Attachment II.A.2**





## **II. DESCRIPTION OF THE PROPOSED PROJECT**

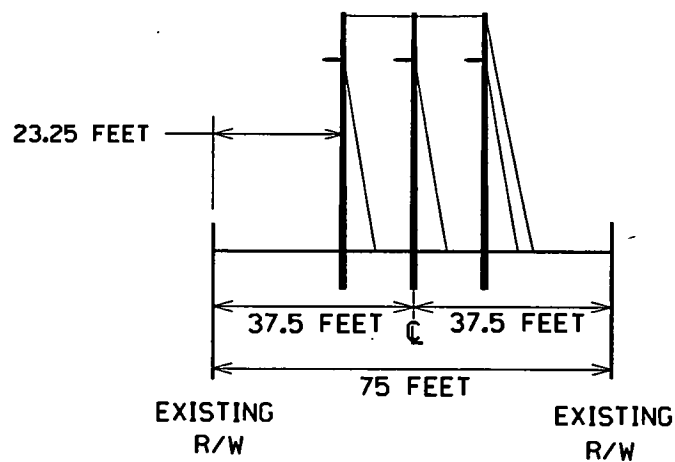
### **A. Right-of-way (ROW)**

- 3. Provide a drawing(s) of the ROW cross section showing typical transmission line structure placements referenced to the edge of the right-of-way. This drawing should include:**
  - a. ROW width for each cross section drawing;**
  - b. Lateral distance between the conductors and edge of ROW; and**
  - c. Existing utility facilities on the ROW.**

Response: See Attachments II.A.3.a through d for the existing 115 kV structures; Attachments II.A.3.e through h for the 115 kV proposed structures along the Proposed 115 kV Overhead Route; and Attachments II.A.3.i through l for the 230 kV alternative structures along the 230 kV Overhead Alternative. See Attachment II.A.3.m for the design of the fender system in the Rappahannock River.

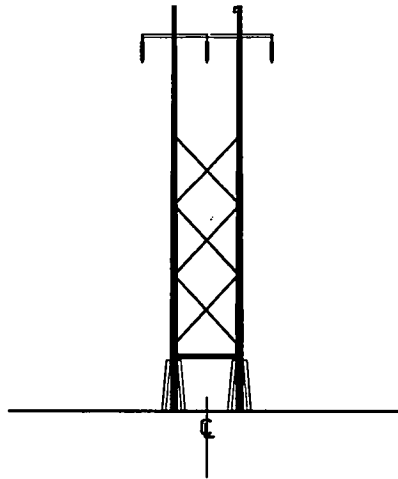


## EXISTING STRUCTURE 65/685

EXISTING 115KV CONFIGURATIONTYPICAL RIGHT OF WAY LOOKING TOWARD HARMONY VILLAGE

TYPE OF STRUCTURE :	WOODEN 3-POLE
FOUNDATION :	DIRECT BURIED
APPROX. AVERAGE HEIGHT :	48 FEET
WIDTH AT CROSSARM :	N/A
WIDTH AT BASE :	29 FEET
AVERAGE SPAN LENGTH :	594 FEET
CONDUCTOR TYPE :	477 ACSR 24/7 'FLICKER'
RIGHT-OF-WAY WIDTH :	75 FEET
APPROXIMATE LENGTH:	0.11 MILE

EXISTING STRUCTURES 65/686 THROUGH 65/689  
AND 65/704 THROUGH 65/706

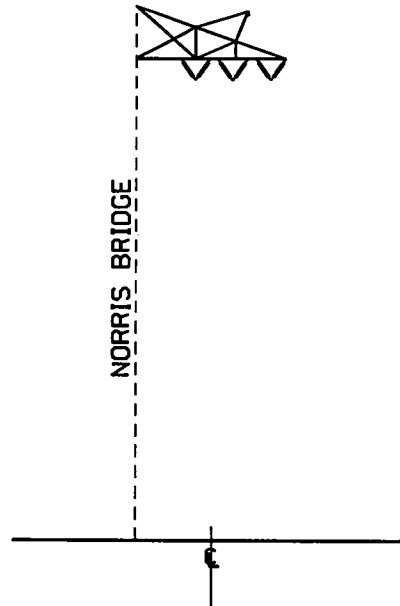


EXISTING 115KV CONFIGURATION

TYPICAL RIGHT OF WAY LOOKING TOWARD HARMONY VILLAGE

TYPE OF STRUCTURE :	WOODEN H-FRAME
FOUNDATION :	WOODEN PILES
APPROX. AVERAGE HEIGHT :	83 FEET
WIDTH AT CROSSARM :	26.5 FEET
WIDTH AT BASE :	13.25 FEET
AVERAGE SPAN LENGTH :	523 FEET
CONDUCTOR TYPE :	477 ACSR 24/7 'FLICKER'
RIGHT-OF-WAY WIDTH :	N/A
APPROXIMATE LENGTH:	0.69 MILES



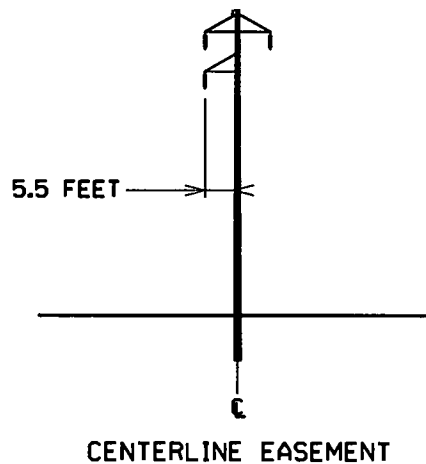


TYPICAL RIGHT OF WAY LOOKING TOWARD HARMONY VILLAGE

TYPE OF STRUCTURE :	GALVANIZED STEEL DAVIT ARM
FOUNDATION :	N/A (ATTACHED TO BRIDGE)
APPROX. AVERAGE HEIGHT :	99 FEET
WIDTH AT CROSSARM :	30 FEET
WIDTH AT BASE :	N/A
AVERAGE SPAN LENGTH :	450 FEET
CONDUCTOR TYPE :	477 ACSR 24/7 'FLICKER'
RIGHT-OF-WAY WIDTH :	N/A
APPROXIMATE LENGTH:	1.19 MILES

מחלקת המבחנים

## EXISTING STRUCTURES 65/707 THROUGH 65/710



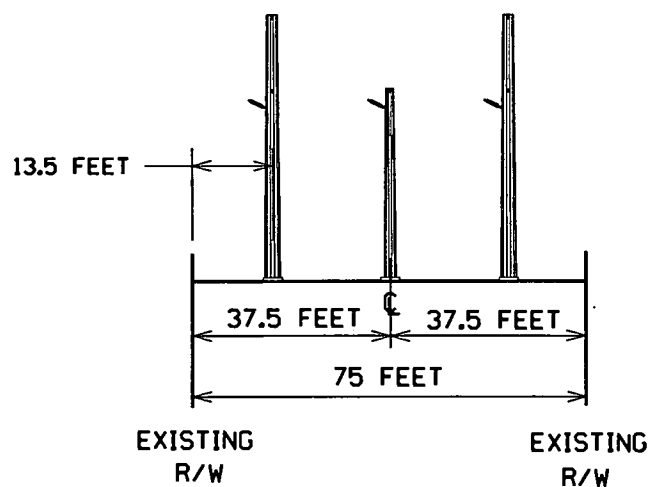
### EXISTING 115KV CONFIGURATION

#### TYPICAL RIGHT OF WAY LOOKING TOWARD HARMONY VILLAGE

TYPE OF STRUCTURE :	WOODEN MONOPOLE
FOUNDATION :	DIRECT EMBEDDED
APPROX. AVERAGE HEIGHT :	65 FEET
WIDTH AT CROSSARM :	12 FEET
WIDTH AT BASE :	1.35 FEET
AVERAGE SPAN LENGTH :	286.25 FEET
CONDUCTOR TYPE :	477 ACSR 24/7 'FLICKER'
RIGHT-OF-WAY WIDTH :	CENTERLINE EASEMENT
APPROXIMATE LENGTH:	0.21 MILE

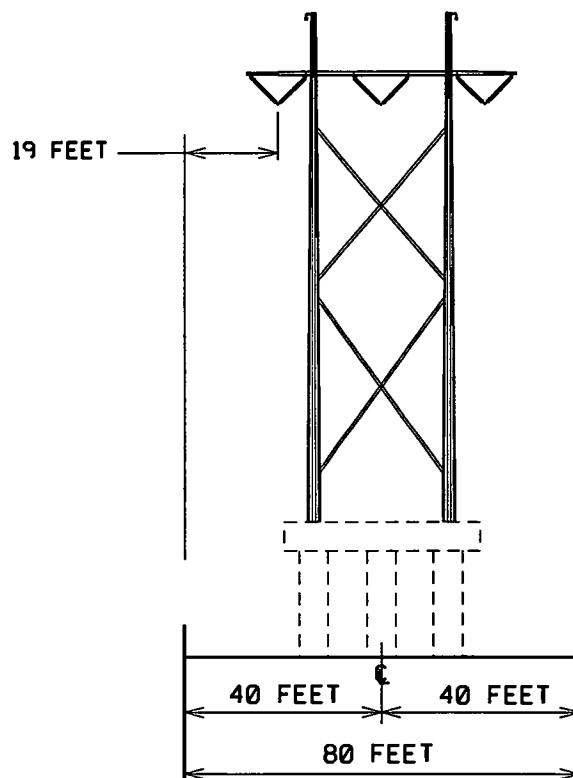


## PROPOSED STRUCTURE 65/685

PROPOSED 115KV CONFIGURATIONTYPICAL RIGHT OF WAY LOOKING TOWARD HARMONY VILLAGE

TYPE OF STRUCTURE :	GALVANIZED STEEL 3-POLE
FOUNDATION :	CONCRETE DRILLED PIER
APPROX. AVERAGE HEIGHT :	54.5 FEET
WIDTH AT CROSSARM :	N/A
WIDTH AT BASE :	48 FEET
AVERAGE SPAN LENGTH :	599 FEET
CONDUCTOR TYPE :	900 ACSS/TW/HS285/MM 20/7
RIGHT-OF-WAY WIDTH :	75 FEET
APPROXIMATE LENGTH:	0.11 MILE

PROPOSED STRUCTURES 65/686 THROUGH 65/695



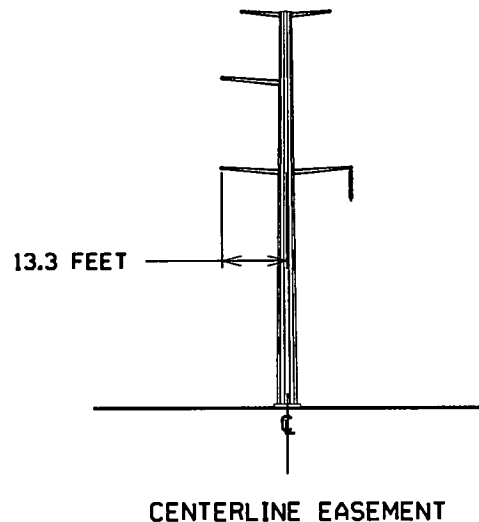
PROPOSED 115KV CONFIGURATION

TYPICAL RIGHT OF WAY LOOKING TOWARD HARMONY VILLAGE

TYPE OF STRUCTURE :	GALVANIZED STEEL H-FRAME
FOUNDATION :	CONCRETE PILES AND CAP
APPROX. AVERAGE HEIGHT :	124 FEET
WIDTH AT CROSSARM :	54.7 FEET
WIDTH AT BASE :	27.5 FEET
AVERAGE SPAN LENGTH :	1034 FEET
CONDUCTOR TYPE :	900 ACSS/TW/HS285/MM 20/7
RIGHT-OF-WAY WIDTH :	80 FEET (VMRC PERMITTED)
APPROXIMATE LENGTH:	1.95 MILES



PROPOSED STRUCTURE 65/696

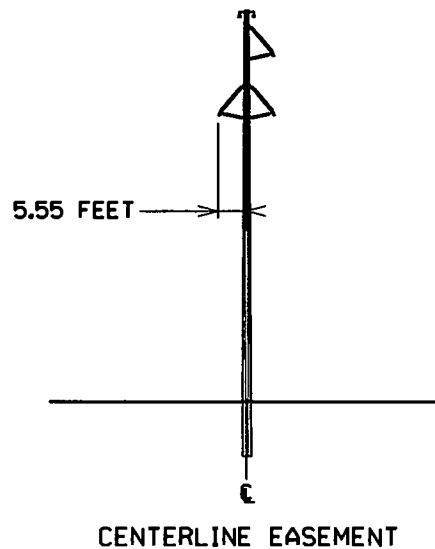


PROPOSED 115KV CONFIGURATION

TYPICAL RIGHT OF WAY LOOKING TOWARD HARMONY VILLAGE

TYPE OF STRUCTURE :	GALVANIZED STEEL MONOPOLE
FOUNDATION :	CONCRETE DRILLED PIER
APPROX. AVERAGE HEIGHT :	81.5 FEET
WIDTH AT CROSSARM :	26.6 FEET
WIDTH AT BASE :	4.8 FEET
AVERAGE SPAN LENGTH :	186 FEET
CONDUCTOR TYPE :	900 ACSS/TW/HS285/MM 20/7
RIGHT-OF-WAY WIDTH :	CENTERLINE EASEMENT
APPROXIMATE LENGTH:	0.04 MILES

PROPOSED STRUCTURES 65/697 THROUGH 65/698



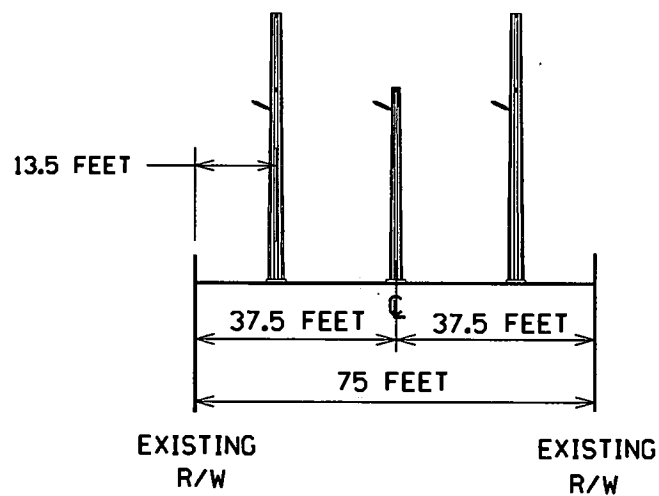
PROPOSED 115KV CONFIGURATION

TYPICAL RIGHT OF WAY LOOKING TOWARD HARMONY VILLAGE

TYPE OF STRUCTURE :	WEATHERING STEEL MONOPOLE
FOUNDATION :	DIRECT EMBEDDED
APPROX. AVERAGE HEIGHT :	79 FEET
WIDTH AT CROSSARM :	11.1 FEET
WIDTH AT BASE :	1.96 FEET
AVERAGE SPAN LENGTH :	276.5 FEET
CONDUCTOR TYPE :	900 ACSS/TW/HS285/MM 20/7
RIGHT-OF-WAY WIDTH :	CENTERLINE EASEMENT
APPROXIMATE LENGTH:	0.1 MILE

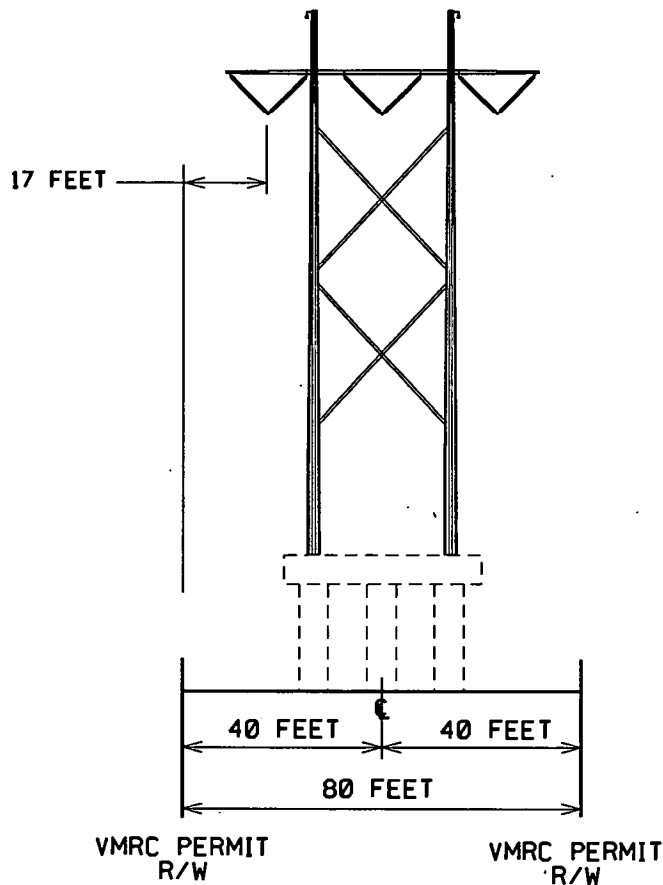


## ALTERNATIVE STRUCTURE 65/685

ALTERNATIVE 230KV CONFIGURATIONTYPICAL RIGHT OF WAY LOOKING TOWARD HARMONY VILLAGE

TYPE OF STRUCTURE :	GALVANIZED STEEL 3-POLE
FOUNDATION :	CONCRETE DRILLED PIER
APPROX. AVERAGE HEIGHT :	54.5 FEET
WIDTH AT CROSSARM :	N/A
WIDTH AT BASE :	48 FEET
AVERAGE SPAN LENGTH :	599 FEET
CONDUCTOR TYPE :	900 ACSS/TW/HS285/MM 20/7
RIGHT-OF-WAY WIDTH :	75 FEET
APPROXIMATE LENGTH:	0.11 MILE

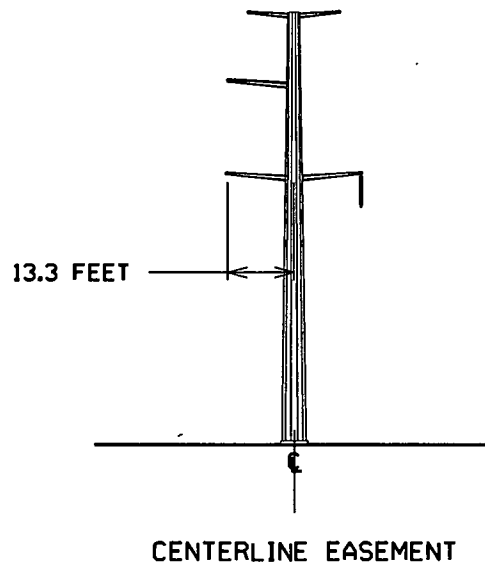
## ALTERNATIVE STRUCTURES 65/686 THROUGH 65/695

ALTERNATIVE 230KV CONFIGURATIONTYPICAL RIGHT OF WAY LOOKING TOWARD HARMONY VILLAGE

TYPE OF STRUCTURE :	GALVANIZED STEEL H-FRAME
FOUNDATION :	CONCRETE PILES AND CAP
APPROX. AVERAGE HEIGHT :	129 FEET
WIDTH AT CROSSARM :	63 FEET
WIDTH AT BASE :	27.5 FEET
AVERAGE SPAN LENGTH :	1034 FEET
CONDUCTOR TYPE :	900 ACSS/TW/HS285/MM 20/7
RIGHT-OF-WAY WIDTH :	80 FEET (VMRC PERMITTED)
APPROXIMATE LENGTH:	1.95 MILES

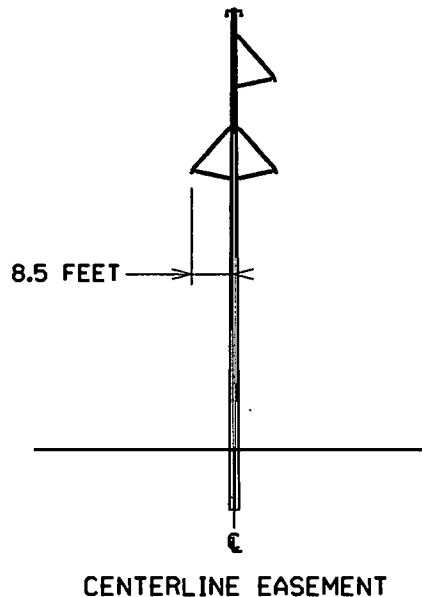


## ALTERNATIVE STRUCTURE 65/696

ALTERNATIVE 230KV CONFIGURATIONTYPICAL RIGHT OF WAY LOOKING TOWARD HARMONY VILLAGE

TYPE OF STRUCTURE :	GALVANIZED STEEL MONOPOLE
FOUNDATION :	CONCRETE DRILLED PIER
APPROX. AVERAGE HEIGHT :	86.5 FEET
WIDTH AT CROSSARM :	26.6 FEET
WIDTH AT BASE :	4.8 FEET
AVERAGE SPAN LENGTH :	186 FEET
CONDUCTOR TYPE :	900 ACSS/TW/HS285/MM 20/7
RIGHT-OF-WAY WIDTH :	CENTERLINE EASEMENT
APPROXIMATE LENGTH:	0.04 MILES

## ALTERNATIVE STRUCTURES 65/697 THROUGH 65/698

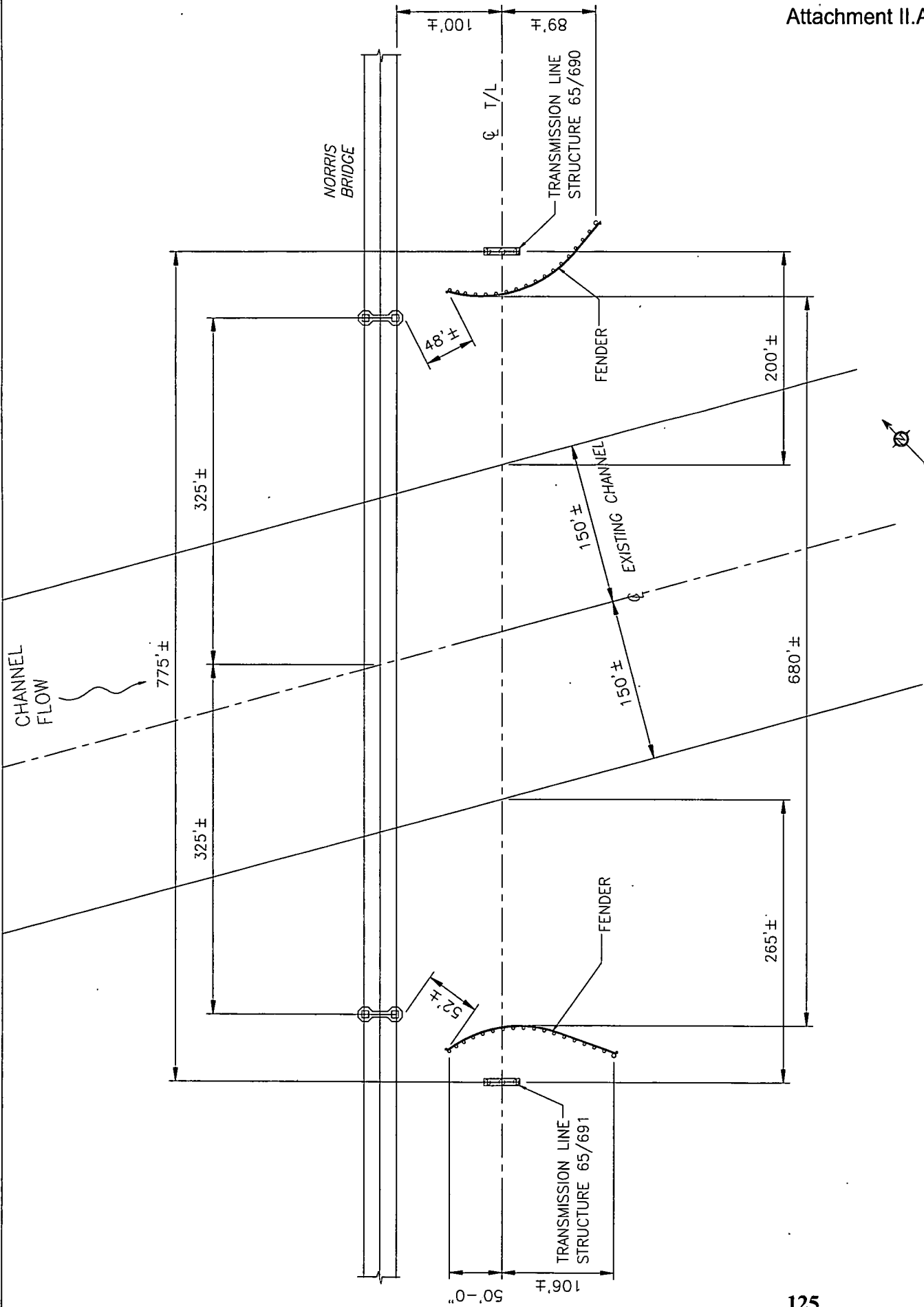


## ALTERNATIVE 230KV CONFIGURATION

TYPICAL RIGHT OF WAY LOOKING TOWARD HARMONY VILLAGE

TYPE OF STRUCTURE :	WEATHERING STEEL MONOPOLE
FOUNDATION :	DIRECT EMBEDDED
APPROX. AVERAGE HEIGHT :	83.5 FEET
WIDTH AT CROSSARM :	17 FEET
WIDTH AT BASE :	1.96 FEET
AVERAGE SPAN LENGTH :	276.5 FEET
CONDUCTOR TYPE :	900 ACSS/TW/HS285/MM 20/7
RIGHT-OF-WAY WIDTH :	CENTERLINE EASEMENT
APPROXIMATE LENGTH:	0.1 MILE





ENLARGED PLAN DETAIL  
SCALE: 1" = 30'  
T/L 65/691 & 65/690 RAPPAHANNOCK RIVER FENDER

## **II. DESCRIPTION OF THE PROPOSED PROJECT**

### **A. Right-of-way (ROW)**

#### **4. Detail what portions of the ROW are subject to existing easements and over what portions easements will be needed;**

Response: The existing 1.9-mile line segment of the Rebuild Project crossing the Rappahannock River is comprised of seven existing wooden H-frame structures in the river and 14 davit arm style structures currently attached to the Norris Bridge. The Rebuild Project will replace these 21 water-crossing structures with a total of 10 galvanized H-frame structures in the water, thereby adding a total of three structures in the water and eliminating all 14 attached bridge structures. Rebuilding the line across the river required legislative action to vacate public oyster grounds, also known as Baylor Grounds. The Company's request to vacate the Baylor Grounds occurred during the 2015 Session of the Virginia General Assembly and the bill was signed by the Governor on March 19, 2015.<sup>3</sup> A copy of Chapter 377 of the 2015 Session of the Virginia Acts of Assembly (effective Mar. 19, 2015) is provided in Attachment II.A.4.a. After the Baylor Grounds were vacated, the Company filed an application with VMRC to permit the rebuilt line to cross the river within an 80-foot wide right-of-way, with 200-foot-wide sections at the river channel to accommodate the fender system. The VMRC approved the application at its July 2015 hearing.

For the land portion of the Rebuild Project, the Company proposes to replace structures along an existing right-of-way for approximately 0.3 mile combined in both Lancaster and Middlesex Counties. In total, four of the five existing structures on land will be replaced and one land structure will be eliminated.

In Lancaster County, one existing wooden three-pole structure will be replaced with a galvanized steel three-pole structure in approximately the same location within the existing 75-foot wide easement.

In Middlesex County, one existing wooden monopole will be eliminated and three existing wooden monopoles will be replaced with one galvanized steel monopole and two weathering steel monopoles in approximately the same location within the pole line easement.

See Attachment II.A.4.b for charts containing the existing and proposed heights of the structures.

---

<sup>3</sup> See Chapter 377 of the 2015 Session of the Virginia Acts of Assembly (effective Mar. 19, 2015).



## VIRGINIA ACTS OF ASSEMBLY -- 2015 SESSION

## CHAPTER 377

*An Act to authorize the Virginia Marine Resources Commission to convey a permanent easement and rights-of-way across the Rappahannock River, including a portion of the Baylor Survey, to Virginia Electric and Power Company (Dominion Virginia Power), for the purpose of installing, constructing, maintaining, repairing, and operating an overhead electric transmission line.*

[S 1030]

Approved March 19, 2015

**Be it enacted by the General Assembly of Virginia:**

1. § 1. *The Virginia Marine Resources Commission is hereby authorized to grant and convey to Virginia Electric and Power Company, its successors and assigns, upon such terms and conditions as the Commission, with the approval of the Governor and the Attorney General, shall deem proper, a permanent easement and right-of-way of 80 feet of width, a right-of-way of 200 feet of width section at the navigational channel, and a temporary right-of-way of a reasonable width as needed for the purpose of installing, constructing, maintaining, repairing, and operating an overhead electric transmission line across the Rappahannock River, including a portion of the Baylor Survey, the center line of such easement being described as follows:*

*Beginning at a point on the mean low water mark on the south side of the Rappahannock River and east of the Robert O. Norris Bridge, State Route 3, said point also being on the southerly line of the Commonwealth of Virginia and being N 14°48'58" W, a distance of 13.51' from the northwesterly property corner of a parcel of land owned by David B. Wallace and Heidi M. Ott as recorded in Deed Book 282, page 699 in the Clerk's Office of the Circuit Court of Middlesex County, Virginia, said point having a coordinate value of North 3,753,495.48, East 12,081,488.92 based on the Virginia State Plane Coordinate System, South Zone, NAD 1983(2011), thence continuing in the waters of the Rappahannock River, N 40°00'45" E, a distance of 316.22' to a point having a coordinate value of North 3,753,737.68, East 12,081,692.23, thence N 36°59'28" E, a distance of 9889.26' ending at a point on the mean low water mark on the north side of the Rappahannock River and east of the Robert O. Norris Bridge, State Route 3, said point also being on the northerly line of the Commonwealth of Virginia and being S 77°21'59" E, a distance of 53.10' from the southwesterly property corner of a parcel of land owned by Highbank Association Incorporated as recorded in instrument number LR20080000163 in the Clerk's Office of the Circuit Court of Lancaster County, Virginia, and also being on the northerly line of the Commonwealth of Virginia, having a coordinate value of North 3,761,636.52, East 12,087,642.51 and containing 18.95 acres more or less.*

§ 2. *The portion of the property described in § 1 that lies within the Baylor Survey shall not be considered part of the natural oyster beds, rocks, and shoals in the waters of the Commonwealth and is described as follows:*

*Area within Public Ground No. 1 Middlesex County*

*Beginning at a point on the southerly line of the Baylor Survey Grounds of Public Ground No. 1 in the waters of the Rappahannock River, located in Middlesex County, Virginia (119.001.0300). Said point also being along the centerline of a proposed 80' Virginia Electric and Power Company right-of-way, having a coordinate value of North 3,754,367.78, East 12,082,166.90, based on the Virginia State Plane Coordinate System, South Zone, NAD1983(2011) and being the point of beginning: thence, from said point of beginning along the southerly line of the Baylor Survey Grounds of Public Ground No. 1, N 75°00'02" W, a distance of 43.14' to a point having a coordinate value of North 3,754,378.94, East 12,082,125.23, thence leaving the aforesaid southerly line, N 36°59'28" E, a distance of 2257.07' to a point on the northerly line of the Baylor Survey Grounds of Public Ground No. 1 having a coordinate value of North 3,756,181.73, East 12,083,483.29, thence along the aforesaid northerly line, S 73°58'25" E, a distance of 42.84' to a point, said point being along the centerline of a proposed 80' Virginia Electric and Power Company right-of-way, having a coordinate value of North 3,756,169.90, East 12,083,524.46, thence S 73°58'25" E, a distance of 42.84' to a point having a coordinate value of North 3,756,158.08, East 12,083,565.63, thence leaving the aforesaid northerly line, S 36°59'28" W, a distance of 2255.41' to a point, said point being on the southerly line of the aforesaid Public Ground No. 1 having a coordinate value of North 3,754,356.61, East 12,082,208.57, thence along the aforesaid southerly line, N 75°00'02" W, a distance of 43.14' to the point of beginning, containing 4.14 acres.*

*Area within Public Ground No.1 Lancaster County*

*Beginning at a point on the northerly line of the Baylor Survey Grounds of Public Ground No. 1 in the waters of the Rappahannock River, located in Lancaster County, Virginia (103.001.0300). Said point also being along the centerline of a proposed 80' Virginia Electric and Power Company right-of-way, having a coordinate value of North 3,761,010.52, East 12,087,170.94 based on the Virginia State Plane*

Coordinate System, South Zone, NAD1983(2011) and being the point of beginning: thence, from said point of beginning along the northerly line of the Baylor Survey Grounds of Public Ground No. 1, S 36°47'27" E, a distance of 41.66' to a point, having a coordinate value of North 3,760,977.16, East 12,087,195.89, thence leaving the aforesaid northerly line, S 36°59'28" W, a distance of 2235.02' to a point on the southerly line of the Baylor Survey Grounds of Public Ground No. 1, having a coordinate value of North 3,759,191.98, East 12,085,851.10, thence along the aforesaid southerly line, N 55°16'47" W, a distance of 40.03' to a point, said point being along the centerline of a proposed 80' Virginia Electric and Power Company right-of-way, having a coordinate value of North 3,759,214.78, East 12,085,818.19, thence N 55°16'47" W, a distance of 40.03' to a point having a coordinate value of North 3,759,237.58, East 12,085,785.29, thence leaving the aforesaid southerly line N 36°59'28" E, a distance of 2261.46' to a point, said point being on the northerly line of the aforesaid Public Ground No. 1 having a coordinate value of North 3,761,043.88, East 12,087,145.99, thence along the aforesaid northerly line S 36°47'27" E, a distance of 41.66' to the point of beginning, containing 4.13 acres.

§ 3. The instruments granting and conveying the easement and rights-of-way from the Commonwealth to Virginia Electric and Power Company shall be in a form approved by the Attorney General. The legal descriptions above may be modified to correct any errors discovered during the process of finalizing these instruments. The appropriate officials of the Commonwealth are hereby authorized to prepare, execute, and deliver such deed and other documents as may be necessary to accomplish the conveyance.

**2. That an emergency exists and this act is in force from its passage.**

Existing 115 kV Line #65 at Norris Bridge						
Structure Number	Structure Type	Structure Height	Comments	Conductor	Land or Water?	County
		(FT)				
65/685	Wooden 3-Pole	48		Conductor Type: 477 ACSR 24/7 'Flicker'	Land	Lancaster
65/686	Wooden H-Frame	83	*		Water	
65/687	Wooden H-Frame	83	*		Water	
65/688	Wooden H-Frame	83	*		Water	
65/689	Wooden H-Frame	83	*		Water	
65/690	Steel Bridge Attach.	72	**		Water	
65/691	Steel Bridge Attach.	81	**		Water	
65/692	Steel Bridge Attach.	89	**		Water	
65/693	Steel Bridge Attach.	98	**		Water	
65/694	Steel Bridge Attach.	106	**		Water	
65/695	Steel Bridge Attach.	138	**		Water	
65/696	Steel Bridge Attach.	160	**		Water	
65/697	Steel Bridge Attach.	138	**		Water	
65/698	Steel Bridge Attach.	106	**		Water	
65/699	Steel Bridge Attach.	98	**		Water	
65/700	Steel Bridge Attach.	89	**		Water	
65/701	Steel Bridge Attach.	81	**		Water	
65/702	Steel Bridge Attach.	72	**		Water	
65/703	Steel Bridge Attach.	63	**		Water	
65/704	Wooden H-Frame	83	*		Water	
65/705	Wooden H-Frame	83	*		Water	
65/706	Wooden H-Frame	83	*		Water	
65/707	Wooden Monopole	67			Land	Middlesex
65/708	Wooden Monopole	61			Land	Middlesex
65/709	Wooden Monopole	62			Land	Middlesex
65/710	Wooden Monopole	70			Land	Middlesex

\* = Measured from EL = 0.00' to top of structure; includes portion of foundation above EL = 0.00'

\*\* = Measured from EL = 0.00' to top of bridge attachment structure.



Proposed 115 kV Line #65 Rebuild Project						
Structure Number	Structure Type	Structure Height (FT)	Comments	Conductor	Land or Water?	County
65/685	Galv. Steel 3-Pole	2 - 54.5'	*	Conductor Type: 900 ACSS/TW/HS285/MM 'Canary'	Land	Lancaster
		1 - 39.5'	*			
65/686	Galv. Steel H-Frame	101.75	**		Water	
65/687	Galv. Steel H-Frame	101.75	**		Water	
65/688	Galv. Steel H-Frame	121.75	**		Water	
65/689	Galv. Steel H-Frame	121.75	**		Water	
65/690	Galv. Steel H-Frame	172.75	**		Water	
65/691	Galv. Steel H-Frame	172.75	**		Water	
65/692	Galv. Steel H-Frame	121.75	**		Water	
65/693	Galv. Steel H-Frame	121.75	**		Water	
65/694	Galv. Steel H-Frame	101.75	**		Water	
65/695	Galv. Steel H-Frame	101.75	**		Water	
65/696	Galv. Steel Monopole	81.5	*		Land	Middlesex
65/697	Weathering Steel Monopole	79			Land	Middlesex
65/698	Weathering Steel Monopole	79			Land	Middlesex

\* = Measured from ground to top of structure; includes 1.5' portion of foundation above ground.

\*\* = Measured from EL = 0.00' to top of structure; includes 21.75' portion of foundation above EL = 0.00'

## II. DESCRIPTION OF THE PROPOSED PROJECT

### A. Right-of-way (ROW)

#### 5. Detail the proposed ROW clearing methods to be used and the ROW restoration and maintenance practices planned for the proposed project;

Response: The entire 75-foot wide easement in Lancaster County and 45 foot wide pole line easement in Middlesex County of the existing transmission line corridor are currently maintained for operation of the existing transmission facilities. Some trimming of tree limbs along the edge of the upland right-of-way may be conducted to support construction activities for the Rebuild Project. For any such minimal clearing, trees will be cut to no more than three inches above ground level. Trees located outside of the right-of-way that are tall enough to potentially impact the transmission facilities, commonly referred to as “danger trees,” may also need to be cut. Danger trees will be cut to be no more than three inches above ground level, limbed, and will remain where felled. Debris that is adjacent to homes will be disposed of by chipping or removal. In other areas, debris may be mulched or chipped as practicable. Danger tree removal will be accomplished by hand in wetland areas and within 100 feet of streams, if applicable. Care will be taken not to leave debris in streams or wetland areas. Matting may be used for heavy equipment in these areas. Erosion control devices will be used on an ongoing basis during all clearing and construction activities.

Erosion control will be maintained and temporary stabilization for all soil disturbing activities will be used until the right-of-way has been restored. Upon completion of the Rebuild Project, the Company will restore the right-of-way utilizing site rehabilitation procedures outlined in the Company’s *General Erosion and Sedimentation Control Specifications for the Construction and Maintenance of Electric Transmission Lines* that is approved yearly by the Virginia Department of Environmental Quality (“DEQ”). Time of year and weather conditions may affect when permanent stabilization takes place.

This right-of-way will continue to be maintained on a regular cycle to prevent interruptions to electric service and provide ready access to the right-of-way in order to patrol and make emergency repairs. Periodic maintenance to control woody growth will consist of hand cutting, machine mowing and herbicide application.

## **II. DESCRIPTION OF THE PROPOSED PROJECT**

### **A. Right-of-way (ROW)**

#### **6. Indicate the permitted uses of the ROW;**

Response: Any non-transmission use will be permitted that:

- is in accordance with the terms of the easement agreement for the right-of-way;
- is consistent with the safe maintenance and operation of the transmission lines;
- will not restrict future line design flexibility; and
- will not permanently interfere with future construction.

Typical permitted uses, with conditions, of the rights-of-way include:

- 1) Agriculture
- 2) Nurseries
- 3) Bicycle trails
- 4) Parking lots
- 5) Other utility facilities
- 6) Recreational areas
- 7) Roadways
- 8) Fences with gates



## **II. DESCRIPTION OF THE PROPOSED PROJECT**

### **A. Right-of-way (ROW)**

- 7. Describe the Company's route selection procedures. Detail alternative routes considered. Describe the Company's efforts in considering these alternatives. Detail why the proposed route was selected and other alternatives were rejected.**

Response: The Company's route selection for transmission line rebuilds begins with a review of existing rights-of-way. This approach generally minimizes impacts on the natural and human environments and is consistent with FERC Guideline #1, which states that existing rights-of-way should be given priority when adding new transmission facilities, and §§ 56-46.1 and 56-529 of the Code of Virginia, which also promote the use of existing rights-of-way for new transmission facilities. For the proposed Rebuild Project utilizing the Proposed Route, the existing right-of-way that currently contains the land portion of the line is adequate. For the river crossing portion of the Rebuild Project, the Company is able to remove the line from its existing location and rebuild it in a newly permitted easement from VMRC. Two potential alternatives (Proposed 115 kV Overhead Route and 230 kV Overhead Alternative) and two options (Underground Option and Lanexa-Northern Neck-White Stone Rebuild Option) were also originally identified; ultimately, only two alternatives one option were considered as viable electrical solutions for the Rebuild Project, as discussed further in the Alternatives Analysis.

See Section I.C for a discussion of alternatives and options to the Rebuild Project.

## **II. DESCRIPTION OF THE PROPOSED PROJECT**

### **A. Right-of-way (ROW)**

- 8. Indicate how the construction of this transmission line complies with “Guidelines for the Protection of Natural, Historic, Scenic, and Recreational Values in the Design and Location of Rights-of-Way and Transmission Facilities” adopted by the Federal Power Commission in Order No. 414 issued November 27, 1970, and now applied by the Federal Energy Regulatory Commission. These guidelines may be found in Volume 44 of the Federal Power Commission Reports, page 1,491, or Volume 35 of the Federal Register, page 18,585 (December 8, 1970). Copies of the Guidelines may also be obtained from the Office of Public Information, Federal Energy Regulatory Commission, Washington, D.C. 20426. For reference purposes a copy of the guidelines is included.**

**Response:** The FERC guidelines are a tool routinely used by the Company in routing its transmission line projects.

The Company utilized FERC Guideline #1 (existing rights-of-way should be given priority when adding additional facilities) by siting the proposed Rebuild Project within and adjacent to the existing transmission corridor. The land portion of this Rebuild Project is within existing right-of-way and the river crossing portion is adjacent to the existing infrastructure and will be within a newly permitted easement from VMRC.

The existing transmission line right-of-way does not cross any sites listed on the National Register of Historic Places. Thus, the Rebuild Project is consistent with Guideline #2 (where practical, rights-of-way should avoid sites listed on the National Register of Historic Places).

The Company follows FERC construction methods on a site specific basis for typical construction projects (Guidelines #8, 10, 11, 15, 16, 18 and 22).

The Company also utilizes FERC guidelines in the clearing of right-of-way, constructing facilities and maintaining rights-of-way after construction. Moreover, secondary uses of right-of-way that are consistent with the safe maintenance and operation of facilities are permitted.

## **II. DESCRIPTION OF THE PROPOSED PROJECT**

### **A. Right-of-way (ROW)**

9. a. **Detail counties and localities through which the line will pass. If any portion of the line will be located outside of the applicant's certificated service area: (1) advise of each electric utility affected; (2) whether any affected electric utility objects to such construction and (3) the length of line proposed to be located in the service area of an electric utility other than the applicant;**
- b. **Provide three (3) copies of the Virginia Department of Transportation "General Highway Map" of each county and city through which the line will pass. On the maps show the proposed line and all previously approved and certificated facilities of the applicant. Also where the line will be located outside of the applicant's certificated service area; show the boundaries between the applicant and each affected electric utility. On each map showing the line outside of the applicant's certificated service area, have the appropriate individual of the affected electric utility sign if his/her company is not opposed to the proposed construction.**

- Response:
- a. The proposed Rebuild Project extends less than 0.1 mile within Lancaster County, 1.9 miles over the Rappahannock River, and approximately 0.3 mile over Middlesex County. The Rebuild Project is wholly located within the Company's service territory.
  - b. Three copies of the map of the VDOT "General Highway Map" for Lancaster and Middlesex Counties (three maps of each) are marked as required and have been submitted to the Commission's Division of Energy Regulation. These maps reflect the VDOT and other road data obtained from Navteq and County data. Reduced copies of these maps are provided as Attachment II.A.9.b.

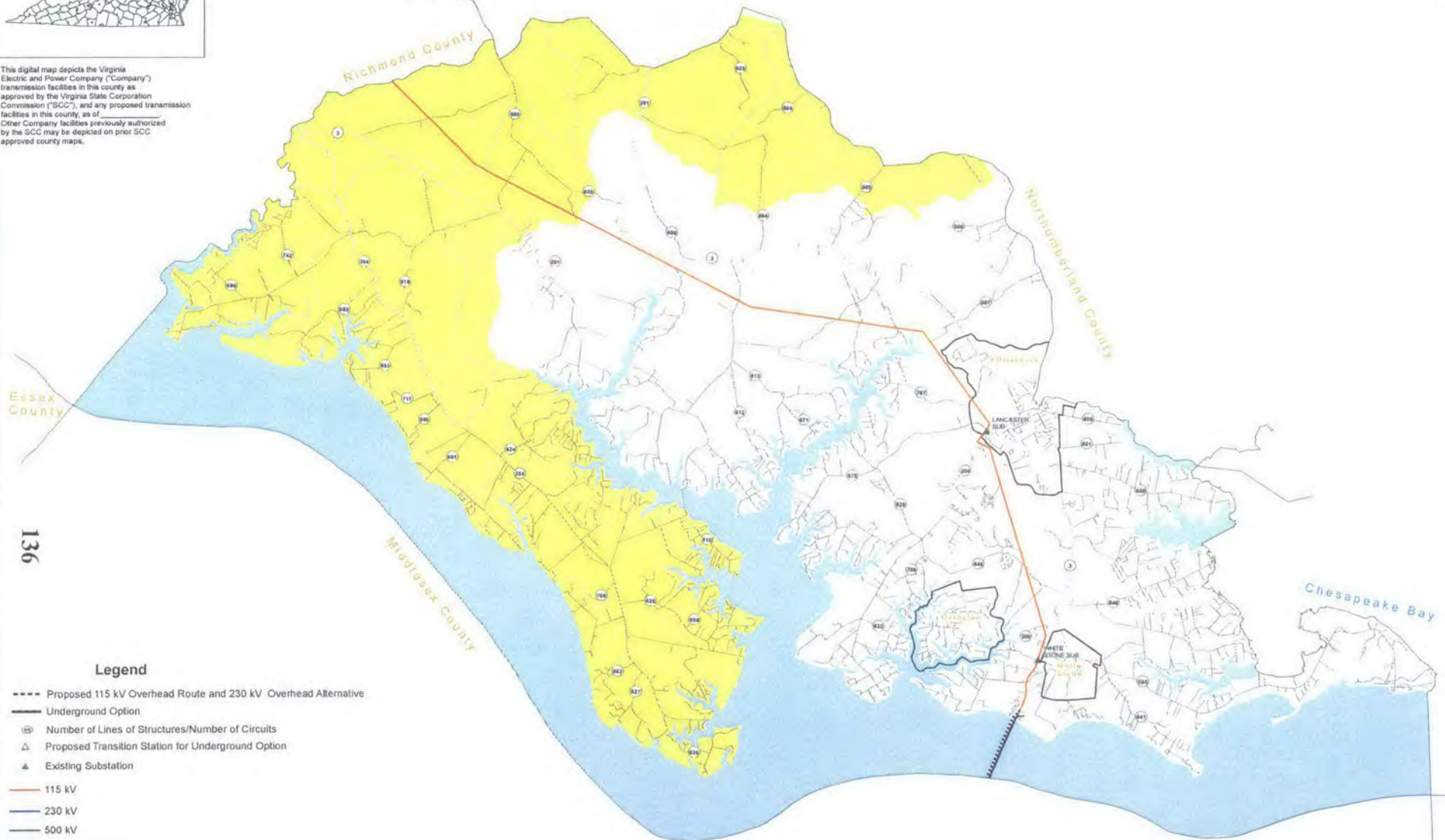


# Lancaster County Road Map



This digital map depicts the Virginia Electric and Power Company ("Company") transmission facilities in this county as approved by the Virginia State Corporation Commission ("SCC"), and any proposed transmission facilities in this county, as of \_\_\_\_\_.

Other Company facilities previously authorized by the SCC may be depicted on prior SCC approved county maps.



## Legend

- Proposed 115 kV Overhead Route and 230 kV Overhead Alternative
- Underground Option

- ⊞ Number of Lines of Structures/Number of Circuits
- △ Proposed Transition Station for Underground Option
- ▲ Existing Substation

- 115 kV
- 230 kV
- 500 kV

## Provider Service Territory

- NNEC
- VEPCO



\*VDOT and other road data obtained from Navteq and County data, current as of September 2011.

# Middlesex County Road Map



This digital map depicts the Virginia Electric and Power Company ("Company") transmission facilities in this county as approved by the Virginia State Corporation Commission ("SCC"), and any proposed transmission facilities in this county, as of \_\_\_\_\_ Other Company facilities previously authorized by the SCC may be depicted on prior SCC approved county maps.

137



## Legend

- Proposed 115 kV Overhead Route and 230 kV Overhead Alternative
- Underground Option
- ⊗ Number of Lines of Structures/Number of Circuits
- △ Proposed Transition Station for Underground Option
- ▲ Existing Substation
- 115 kV
- 230 kV
- 500 kV
- Provider Service Territory
- VEPSCO

2 1 0 2 4 6 Miles

\*VDOT and other road data obtained from Havleq and County data, current as of October 2012.

Middlesex

## **II. DESCRIPTION OF THE PROPOSED PROJECT**

### **B. Line Design and Operational Features**

- 1. Detail number of circuits and their design voltage and transfer capabilities.**

Response: The Rebuild Project proposes to rebuild 2.2 miles of the existing single circuit 115 kV Line #65 with a minimum transfer capability of 217 MVA.



## **II. DESCRIPTION OF THE PROPOSED PROJECT**

### **B. Line Design and Operational Features**

#### **2. Detail number, size(s), type(s), and typical configurations of conductors;**

Response: The 115 kV single circuit will have 900 ACSS/TW/HS-285/MM (20/7) three-phase conductors. The 900 ACSS/TW/HS-285/MM (20/7), a trapezoidal conductor, was selected for the mechanical properties conducive for river crossings including decreased sag, increased self-damping properties, and improved corrosion resistance. In addition to the phase conductor, the shield wires will be replaced.

## **II. DESCRIPTION OF THE PROPOSED PROJECT**

### **B. Line Design and Operational Features**

3. With regard to the proposed supporting structures over each portion of the ROW provide:
- a. types of structures;
  - b. length of ROW with each type of structure;
  - c. material for typical structure (steel, oxidizing steel, etc.);
  - d. foundation material;
  - e. width at cross arms of typical structure;
  - f. width at base of typical structures;
  - g. typical span length;
  - h. approximate average heights of structures;
  - i. a schematic drawing of each typical structure; and
  - j. minimum conductor-to-ground clearance under maximum operating conditions

Response: **Proposed 115 kV Overhead Route**

(Attachment II.A.3.e – Proposed Structure 65/685)

- a. Structure type — Steel 3-Pole
- b. ROW length — approximately 0.11 mile
- c. Structure material — Galvanized Steel
- d. Foundation material — Concrete and Steel
- e. Cross arm width of typical structure — N/A
- f. Base width of typical structure — 48 feet
- g. Average span length — 599 feet
- h. Approximate average structure height (above grade) — 54.5 feet
- i. Typical structure — see Attachment II.A.3.e
- j. Minimum clearance *over ground*— 23.5 feet

(Attachment II.A.3.f – Proposed Structures 65/686 through 65/695)

- a. Structure type — Steel H-Frame

- b. Approximate length — 1.95 miles
- c. Structure material — Galvanized Steel
- d. Foundation material — Concrete and Steel
- e. Cross arm width of typical structure — 54.7 feet
- f. Base width of typical structure — 27.5 feet
- g. Average span length — 1034 feet
- h. Approximate average structure height (above elev. 0.0) — 124 feet
- i. Typical structure — see Attachment II.A.3.f
- j. Minimum clearance *over Mean High Water* — 45.5 feet  
Minimum clearance *over Mean High Water at Navigational Channel* — 130.14 feet (or 20 feet over bottom of bridge deck)

(Attachment II.A.3.g – Proposed Structure 65/696)

- a. Structure type — Steel Monopole
- b. ROW length — approximately 0.04 mile
- c. Structure material — Galvanized Steel
- d. Foundation material — Concrete and Steel
- e. Cross arm width of typical structure — 26.6 feet
- f. Base width of typical structure — 4.8 feet
- g. Average span length — 186 feet
- h. Approximate average structure height (above grade) — 81.5 feet
- i. Typical structure — see Attachment II.A.3.g
- j. Minimum clearance *over ground* — 23.5 feet

(Attachment II.A.3.h – Proposed Structures 65/697 through 65/698)

- a. Structure type — Steel Monopole
- b. ROW length — approximately 0.1 mile
- c. Structure material — Weathering Steel
- d. Foundation material — not applicable (Direct Embedded)
- e. Cross arm width of typical structure — 11.1 feet
- f. Base width of typical structure — 1.96 feet



- g. Average span length — 276.5 feet
- h. Approximate average structure height (above grade) — 79 feet
- i. Typical structure — see Attachment II.A.3.h
- j. Minimum clearance *over ground* — 23.5 feet

### **230 kV Overhead Alternative**

#### **(Attachment II.A.3.i – Alternative Structure 65/685)**

- a. Structure type — Steel 3-Pole
- b. ROW length — approximately 0.11 mile
- c. Structure material — Galvanized Steel
- d. Foundation material — Concrete and Steel
- e. Cross arm width of typical structure — N/A
- f. Base width of typical structure — 48 feet
- g. Average span length — 599 feet
- h. Approximate average structure height (above grade) — 54.5 feet
- i. Typical structure — see Attachment II.A.3.i
- j. Minimum clearance *over ground* — 25.5 feet

#### **(Attachment II.A.3.j – Alternative Structures 65/686 through 65/695)**

- a. Structure type — Steel H-Frame
- b. Approximate length — 1.95 miles
- c. Structure material — Galvanized Steel
- d. Foundation material — Concrete and Steel
- e. Cross arm width of typical structure — 63 feet
- f. Base width of typical structure — 27.5 feet
- g. Average span length — 1,034 feet
- h. Approximate average structure height (above elev. 0.0) — 129 feet
- i. Typical structure — see Attachment II.A.3.j
- j. Minimum clearance *over Mean High Water* — 47.5 feet

Minimum clearance *over Mean High Water at Navigational Channel* — 136.14 feet (or 26 feet over bottom of bridge deck)

(Attachment II.A.3.k – Alternative Structure 65/696)

- a. Structure type — Steel Monopole
- b. ROW length — approximately 0.04 mile
- c. Structure material — Galvanized Steel
- d. Foundation material — Concrete and Steel
- e. Cross arm width of typical structure — 26.6 feet
- f. Base width of typical structure — 4.8 feet
- g. Average span length — 186 feet
- h. Approximate average structure height (above grade) — 86.5 feet
- i. Typical structure — see Attachment II.A.3.k
- j. Minimum clearance *over ground* — 25.5 feet

(Attachment II.A.3.l – Alternative Structures 65/697 through 65/698)

- a. Structure type — Steel Monopole
- b. ROW length — approximately 0.1 mile
- c. Structure material — Weathering Steel
- d. Foundation material — N/A (Direct Embedded)
- e. Cross arm width of typical structure — 17 feet
- f. Base width of typical structure — 2.125 feet
- g. Average span length — 276.5 feet
- h. Approximate average structure height (above grade) — 83.5 feet
- i. Typical structure — see Attachment II.A.3.l
- j. Minimum clearance *over ground* — 25.5 feet

## **II. DESCRIPTION OF THE PROPOSED PROJECT**

### **B. Line Design and Operational Features**

#### **4. Describe why the proposed structure type(s) was selected for this line.**

**Response:** The H-frame structure was selected for the river crossing due to high wave loading on foundations and wind loadings on the structures, and in order to provide rigidity in the transverse direction as well as stability longitudinally. Additionally, the use of H-frame structures will reduce the anticipated impact to the river bottom caused by the structure foundations in comparison to a single circuit monopole structure and associated foundations. Lastly, H-frame structures allow for an overall reduction in structure height because of the horizontal configuration of conductor, rather than stacked vertically. The Company also considered the minimum clearances previously authorized by the Corps, while attempting to reasonably minimize the visual impact to the crossing. The required conductor clearances across the main river channel will be maintained; however, the new structures will be taller overall than the current structures. The proposed structures in the river will range in height from 101.8 feet to 172.8 feet; the two tallest structures are on either side of the navigational channel. See Attachment II.A.4.b for approximate heights of the proposed structures, subject to final engineering design.

To allow the rebuild of the existing 115 kV single circuit line in the existing pole line easement on the Middlesex County (south) side of the river, the proposed land structures will be monopoles, similar to what currently exists; however, the proposed structures will be steel rather than wood. Additionally, the monopole type structure was selected to limit the impact of the foundation, structure footprint on land and require fewer danger trees to be cut.

On the Lancaster County (north) side of the river, the proposed three-pole structure has a wider pole spacing than the existing three-pole structure. This will aid in the sequence of construction of the Rebuild Project. Specifically, it allows for the ability to both install the new structure in the same angle location, or point of intersection, and for the back spans of conductor to be transferred easily.



## **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.**

Response: Not applicable.

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

- A. Describe the character of the area which will be traversed by this line, including, land use, wetlands, etc. Provide the number of dwellings within 500 feet of the line for each route considered.**

**Response: Proposed 115 kV Overhead Route**

The Proposed Route is expected to have minimal incremental environmental impacts, since it largely represents the wreck and rebuild of a transmission line in existing right-of-way.

The Proposed Route will cross 2.2 miles in Lancaster and Middlesex Counties and traverse an area that is characterized by low density residential land use and a 1.9-mile-wide tidal portion of the Rappahannock River. The Proposed Route crosses one residential subdivision in Lancaster County and one residential subdivision in Middlesex County, totaling 0.3 mile of residential land crossed.

The Proposed Route would extend across 1.9 miles of the Rappahannock River. The portion of the Proposed Route that crosses the river will be located adjacent to the Norris Bridge (SR 3), which carries traffic between Lancaster and Middlesex Counties. The Norris Bridge was completed in 1957. No other waterbodies are crossed by the Proposed Route.

The Proposed Route will cross a total of 0.3 acre of palustrine emergent/scrub-shrub wetlands. These wetlands currently are crossed by the existing right-of-way of Line #65 and, therefore, previously have been disturbed. No clearing of the wetlands would be required during the construction of the Proposed Route, since the wetlands are palustrine emergent/scrub-shrub wetlands. In addition, no structures would be placed in the wetlands and the wetlands would be spanned by the transmission line. The construction of the Proposed Route would result in no impacts to wetlands. The Proposed Route would span the Submerged Aquatic Vegetation ("SAV") beds in the Rappahannock River. No structures would be located within SAV; therefore, this route would have no impacts to SAV.

Construction of the Proposed Route will require encroachment over 3,092 square feet (less than 0.1 acre) of state-owned subaqueous bottomlands associated with the structure foundations, concrete caps, and fender system. Direct impact on the river bottom associated with the installation of the piles used to support the structure foundations and fender system is 1,014 square feet (less than 0.1 acre) of permanent impact. Temporary impacts associated with the Proposed Route would include less than 0.01 acre of direct impact on the riverbed due to the placement of temporary piles required to construct the structure foundations and fender system. Temporary noise and increased

sedimentation and turbidity are expected for the duration of the construction of the Rebuild Project. Approximately 8.3 acres of right-of-way for the Proposed Route would occupy land that was previously Baylor Oyster Grounds which was vacated through legislative action in the 2015 Session of Virginia General Assembly. The right-of-way for the Proposed Route would cross two private oyster leases. However, there would be no direct impacts to these oyster beds since no structures would be placed in the lease areas and the transmission line would span the lease locations.

There are 62 homes and one business located within 500 feet of the centerline of the Proposed Route. Additionally, there is one residence within 60 feet of the edge of the right-of-way of the Proposed Route.

### **230 kV Overhead Alternative**

The 230 kV Overhead Alternative would follow the same alignment as the Proposed Route. The design of the 230 kV Overhead Alternative substantially would be the same as the Proposed Route, except it would require slightly taller structures and a minor expansion of the right-of-way in Middlesex County to accommodate the horizontal clearance required for 230 kV to the edge of the right-of-way.

The 230 kV Overhead Alternative is expected to have minimal incremental environmental impacts, since it largely represents the wreck and rebuild of a transmission line in existing right-of-way. New, incremental impacts would occur in those areas along the route in Middlesex County where the existing right-of-way would be expanded from 42 to 45 feet.

The 230 kV Overhead Alternative will cross 2.2 miles in Lancaster and Middlesex Counties in an area that is largely characterized by low density residential land use and a wide tidal portion of the Rappahannock River. The 230 kV Overhead Alternative would require an additional 0.1 acre of additional permanent right-of-way on land in Middlesex County to accommodate the 230 kV structures. The 230 kV Overhead Alternative crosses one residential subdivision in Lancaster County and one residential subdivision in Middlesex County, totaling 0.3 mile of residential land crossed.

The 230 kV Overhead Alternative would extend across 1.9 mile of the Rappahannock River. The portion of the 230 kV Overhead Alternative that crosses the river would be immediately adjacent to the Norris Bridge (SR 3), which conveys traffic between Lancaster and Middlesex Counties. The Norris Bridge was completed in 1957. No other waterbodies would be crossed by the 230 kV Overhead Alternative.

The 230 kV Overhead Alternative will cross a total of 0.4 acre of palustrine emergent/scrub-shrub wetlands. A total of 0.3 acre of these wetlands



currently are crossed by the existing right-of-way for Line #65 and, therefore, previously has been disturbed. Almost zero (approximately 0.01 acre) wetlands occur along the portion of the route in Middlesex County where the right-of-way would need to be expanded by three feet to accommodate the operation of a 230 kV transmission line. No clearing of the wetlands would be required during the construction of the 230 kV Overhead Alternative, since the wetlands are palustrine emergent/scrub-shrub wetlands. In addition, no structures would be placed in the wetlands and the wetlands would be spanned by the transmission line. The construction of the 230 kV Overhead Alternative would result in no impacts to wetlands. The 230 kV Overhead Alternative would span the SAV beds in the Rappahannock River. No structures would be located within SAV; therefore, this route would have no impacts to SAV.

Construction of the 230 kV Overhead Alternative will require encroachment over 3,092 square feet (less than 0.1 acre) of state-owned subaqueous bottomlands associated with the structure foundations, concrete caps, and fender system. Direct impact on the river bottom associated with the installation of the piles use to support the structure foundations and fender system is 1,014 square feet (less than 0.1 acre) of permanent impact. Temporary impacts associated with the Proposed Route would include less than 0.01 acre of direct impact on the riverbed due to the placement of temporary piles required to construct the structure foundations and fender system. Temporary noise and increased sedimentation and turbidity are expected for the duration of project construction. Approximately 8.3 acres of right-of-way for the 230 kV Overhead Alternative would occupy land that was previously Baylor Oyster Grounds which was vacated through legislative action in the 2015 Session of Virginia General Assembly. The right-of-way for the 230 kV Overhead Route would cross two private oyster leases. However, there would be no direct impacts to these oyster beds since no structures would be placed in the lease areas and the transmission line would span the lease locations.

The construction of the 230 kV Overhead Alternative would require the clearing of less than 0.1 acre of forest in Middlesex County to accommodate the expanded permanent right-of-way required for this route.

There are 62 homes and one business located within 500 feet of the centerline of the 230 kV Overhead Alternative. Additionally, there is one residence within 60 feet of the edge of the right-of-way of the 230 kV Overhead Alternative.

### **Underground Option**

The Underground Option would follow a similar alignment to the Proposed Route, except that it would be installed underground utilizing the HDD method. The Underground Option would cross a 2.3-mile-long area in

Lancaster and Middlesex Counties and traverse a landscape that is largely characterized by low density residential land use and a wide tidal portion of the Rappahannock River. Although the Underground Option would be installed beneath the surface, an 80 to 100 foot wide right-of-way would be maintained on land for the route.

The Underground Option would cross a total of 0.5 acre of palustrine emergent/scrub-shrub wetlands. A total of 0.3 acre of these wetlands currently are crossed by the existing right-of-way for Line #65 and, therefore, previously has been disturbed. Approximately 0.2 acre of additional wetlands would be included within the expanded permanent right-of-way that would be required for the Underground Option. However, since the transmission line would be horizontally directional drilled below the wetlands, no vegetation clearing would be required. Therefore, no wetlands would be impacted by the Underground Option.

The right-of-way for the Underground Option will cross three private oyster leases. The expanded right-of-way for the Underground Option would encroach on 0.4 acre of a new, private oyster lease near the north bank of the river. However, since the transmission line will be directionally drilled under the river, there will be no direct impacts to these oyster leases. The Underground Option also would cross below the SAV beds in the Rappahannock River. Therefore, this route would have no impacts to SAV.

Construction within the two splice locations will affect approximately 6.0 acres of river bottom, and dredging within these locations will result in the removal and redistribution of approximately 24,566 cubic yards of river bottom substrate. Temporary noise and increased sedimentation and turbidity are expected during construction. Impacts to the river substrate from the splice pit are expected to be temporary as the benthic environment recovers over time. Approximately 8.3 acres of right-of-way for the Underground Option would occupy land that was previously Baylor Oyster Grounds which was vacated through legislative action in the 2015 Session of Virginia General Assembly. To accommodate a 100-foot-wide right-of-way and two splice locations, an additional 5.2 acres of Baylor Oyster Grounds would need to be vacated.

The construction of the Underground Option would require the clearing of 1.3 acres of forest in Middlesex County to accommodate the expanded permanent right-of-way and transition station required for this option. No forest would need to be cleared for the Lancaster County portion of the Underground Route. Coordination would need to occur with U.S. Fish and Wildlife Service to determine whether the project may adversely affect the northern long-eared bat.

There are 62 homes and one business located within 500 feet of the centerline of the Underground Option. Additionally, there are four residences within 60 feet of the edge of the right-of-way of the Underground Option.



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

- B. Advise of any public meetings the Company has had with neighborhood associations and officials of local, state or federal governments who would have an interest or responsibility with respect to affected area or areas.**

Response: In accordance with Va. Code § 15.2-2202 D, letters dated January 8, 2016, included as Attachment III.B.1, were delivered to administrators of the Counties of Middlesex and Lancaster advising of the Company's intention to file this application and inviting the counties to consult with the Company about the Rebuild Project.

Beginning in September 2014, Company representatives began to meet or speak with a number of local, state, and federal officials to inform them of this Rebuild Project in Virginia. Company representatives also held and participated in many meetings, presentations and phone conversations to discuss the Rebuild Project. In addition, the Company met with and engaged in numerous communications with the No Towers Coalition (now known as The Save the Rappahannock Coalition), a coalition formed during the public engagement efforts. A timeline of key public communications related to the Project is as follows:

- September 2014 – Briefed Lancaster County and Middlesex County staff and officials;
- November 2014 – Met with Private Oyster Bed Lease holders;
- January 2015 – Legislation was introduced in the General Assembly addressing vacating Baylor Grounds along the Rebuild Project area and easement needed for VMRC permit consideration;
- April 16, 2015 – Project Public Announcement (see Attachment III.B.2) mailed to approximately 70 landowners;
- May 5, 2015 – Presented at the Middlesex County Board of Supervisors Meeting;
- May 28, 2015 – Presented at the Lancaster County Board of Supervisors meeting;
- July 28, 2015 – Presented at the VMRC public hearing to review the Company's permit application;
- August 25, 2015 – Presented slides at stakeholder meeting at the Tides Inn (see Attachment III.B.3). Approximately 25 total participants included representatives from Middlesex and Lancaster Counties, leadership and members of the No Towers Coalition, VDOT project

manager responsible for Norris Bridge operations, and Dominion Virginia Power project team members;

- September 1, 2015 – Presented Rebuild Project update at the Middlesex County Board of Supervisors Meeting;
- September 15, 2015 – Presented to the Lancaster County GOP Committee Meeting, approximately 50 people in attendance;
- September 16, 2015 – Mailing to approximately 16,000 community members in Middlesex, Lancaster and Northumberland Counties explaining Rebuild Project details (see [Attachment III.B.4](#));
- September 21, 2015 – Meeting with Sen. McDougle and Del. Ransone, including Dominion Virginia Power leadership, No Towers Coalition leadership and VDOT leadership;
- September 28, 2015 – Presented to the Lancaster County Democratic Committee Meeting, approximately 30 people in attendance;
- October 8 and 15, 2015 – Full page advertisement in the weekly publications of the Rappahannock Record and the Southside Sentinel (see [Attachment III.B.5](#))
- January/February 2016 – Notifications provided inviting the community to a public informational open house on February 11, 2016, from 5 – 7:30 pm at the Mount Vernon Baptist Church, White Stone
  - Letters sent to approximately 700 property owners (see [Attachment III.B.6](#))
  - Advertisements published in the Northern Neck News (weekly publication – circulation 4,637), Rappahannock Record (weekly publication – circulation 6,480), and Southside Sentinel (weekly publication – circulation: 3,598) (see [Attachment III.B.7](#))
- February 4, 2016 – Letters sent to the same mailing list as the January 26<sup>th</sup> notifications (see [Attachment III.B.8](#)), approximately 700 property owners, inviting them to a second informational open house on February 17, 2016, from 5-7:30 pm at The Freeshade Community Center, Topping, Virginia
- February 11, 2016 – Held Informational Open House, Mount Vernon Baptist Church, White Stone, Virginia – approximately 120 people attended
- February 17, 2016 – Held Informational Open House, The Freeshade Community Center, Topping, Virginia – approximately 20 people attended
- February 22, 2016 – Mailed post-card (see [Attachment III.B.9](#)) to community members informing them of the availability of visual simulations at the White Stone Town Hall for approximately three weeks

Additional information is provided to the public through a website dedicated to the Project, searchable on [www.dom.com](http://www.dom.com) using the search term “Norris Bridge”:

<https://www.dom.com/corporate/what-we-do/electricity/transmission-lines-and-projects/norris-bridge-115kv-transmission-line-rebuild-and-relocation-project>

The website includes maps, an explanation of need, a description of the Rebuild Project and its benefits, information on the Commission review process, structure diagrams and answers to frequently asked questions.





**Dominion Virginia Power**  
701 East Cary Street, Richmond, VA 23219  
Mailing Address: P.O. Box 26666  
Richmond, VA 23261  
[dom.com](http://dom.com)

January 8, 2016

Mr. Frank Pleva  
Lancaster County  
County Administrator  
8311 Mary Ball Road  
Lancaster, Virginia 22503

**Reference: Proposed Rappahannock River Transmission Line Rebuild Project**

Dear Mr. Pleva,

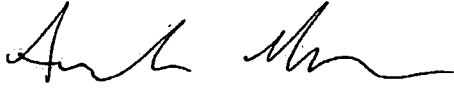
Dominion Virginia Power (Dominion) is proposing to rebuild approximately 2.2 miles of its existing overhead 115 kV transmission line (Line #65) which crosses the Rappahannock River between Lancaster and Middlesex counties. The line is partially attached to the Norris Bridge (Route 3). The two-mile river crossing is part of a single 115 kV transmission line that runs for about 38 miles between our Northern Neck Substation in Richmond County and our Harmony Village Substation in Middlesex County. This transmission line provides critical electric service to supply bulk electricity to the area and is a primary source of electric power to the Northern Neck peninsula. The portion of the transmission line that crosses the river has been in operation since 1962 and is nearing its end-of-life and needs to be replaced.

The portion of Line #65 that crosses the Rappahannock River will be upgraded and relocated off the Norris Bridge. The current transmission line includes seven wooden H-frame structures in the water and 14 attachments to the bridge. The proposed project will replace the wooden poles and bridge attachments with 10 steel H-frame structures that will sit on concrete foundations in the water. The line will remain on the bridge's east side, slightly east of its current alignment. No new right-of-way on land is required as part of this project.

Four of the five structures on land will be replaced and one land structure will be eliminated. In Lancaster, one three-pole structure will be replaced with a three-pole structure in approximately the same location. In Middlesex, one monopole will be eliminated and three monopoles will be replaced in approximately the same location.

As required by the State Corporation Commission of Virginia, Dominion anticipates filing an application in the first quarter of 2016. At this time, in accordance with §15.2-2202 of the Code of Virginia, Dominion respectfully requests that you submit any comments or share any additional interests you feel would have bearing on the proposed project. If you would like to receive a GIS shapefile of the transmission line route to assist in your project review or if you have any questions, please do not hesitate to contact me at (804) 771-6145 or [Amanda.M.Mayhew@dom.com](mailto:Amanda.M.Mayhew@dom.com).

Regards,

A handwritten signature in black ink, appearing to read 'Amanda Mayhew', with a long horizontal flourish extending to the right.

Amanda Mayhew  
Sr. Siting and Permitting Specialist

Attachment: Project Overview Map



**Dominion Virginia Power**  
701 East Cary Street, Richmond, VA 23219  
  
Mailing Address: P.O. Box 26666  
Richmond, VA 23261  
  
dom.com

January 8, 2016

Mr. Matt Walker  
Middlesex County Administrator  
P.O. Box 428  
Saluda Virginia 23149

**Reference: Proposed Rappahannock River Transmission Line Rebuild Project**

Dear Mr. Walker,

Dominion Virginia Power (Dominion) is proposing to rebuild approximately 2.2 miles of its existing overhead 115 kV transmission line (Line #65) which crosses the Rappahannock River between Lancaster and Middlesex counties. The line is partially attached to the Norris Bridge (Route 3). The two-mile river crossing is part of a single 115 kV transmission line that runs for about 38 miles between our Northern Neck Substation in Richmond County and our Harmony Village Substation in Middlesex County. This transmission line provides critical electric service to supply bulk electricity to the area and is a primary source of electric power to the Northern Neck peninsula. The portion of the transmission line that crosses the river has been in operation since 1962 and is nearing its end-of-life and needs to be replaced.

The portion of Line #65 that crosses the Rappahannock River will be upgraded and relocated off the Norris Bridge. The current transmission line includes seven wooden H-frame structures in the water and 14 attachments to the bridge. The proposed project will replace the wooden poles and bridge attachments with 10 steel H-frame structures that will sit on concrete foundations in the water. The line will remain on the bridge's east side, slightly east of its current alignment. No new right-of-way on land is required as part of this project.

Four of the five structures on land will be replaced and one land structure will be eliminated. In Lancaster, one three-pole structure will be replaced with a three-pole structure in approximately the same location. In Middlesex, one monopole will be eliminated and three monopoles will be replaced in approximately the same location.

As required by the State Corporation Commission of Virginia, Dominion anticipates filing an application in the first quarter of 2016. At this time, in accordance with §15.2-2202 of the Code of Virginia, Dominion respectfully requests that you submit any comments or share any additional interests you feel would have bearing on the proposed project. If you would like to receive a GIS shapefile of the transmission line route to assist in your project review or if you have any questions, please do not hesitate to contact me at (804) 771-6145 or [Amanda.M.Mayhew@dom.com](mailto:Amanda.M.Mayhew@dom.com).



Regards,

A handwritten signature in black ink, appearing to read 'Amanda Mayhew', written in a cursive style.

Amanda Mayhew  
Sr. Siting and Permitting Specialist

Attachment: Project Overview Map



Dominion Virginia Power  
701 East Cary Street, Richmond, VA 23219  
Mailing Address: P.O. Box 26666  
Richmond, VA 23261  
Web Address: [www.dom.com](http://www.dom.com)

April 16, 2015

Re: **Project Notification – Norris Bridge, Whitestone, Virginia**

Dear Neighbor / Property Owner:

In the coming months, Dominion Virginia Power plans to upgrade its existing electric transmission line currently crossing the Rappahannock River which is partially attached to the Norris Bridge along Rt. 3 between Middlesex and Lancaster Counties. We are currently going through the Virginia Marine Resources Commission (VMRC), U.S. Army Corps of Engineers, and other federal agencies permitting review process.

The existing transmission line has been in place since 1962 and the existing structures, conductors and electrical-related materials attached to the bridge and in the river are nearing its end-of-life. These facilities have also been damaged at times as a result of debris from bridge traffic. Rebuilding this transmission line off the bridge has become a necessity to maintain reliable electric service to the area.

For an overview of the project, please see the enclosed Project Fact Sheet.

We understand how important the waterways are to this community. We are currently reviewing the environmental, cultural, and historical and fish/wildlife assets in the area to reduce any potential impacts of this project. We are working with the relevant state and federal agencies on the required permits to proceed with this project and under what conditions. Providing safe and reliable electricity to the area in an environmentally friendly manner has and continues to be Dominion's steadfast commitment to you.

Community outreach is an important part of our project planning and development. As this project progresses, our goal is to help our neighbors better understand what we are planning and why this project is important.

Thank you for your patience as we undertake this important project. Dominion is committed to bringing you safe and reliable electricity.

For on-going updates on this project, visit our website, [www.dom.com](http://www.dom.com), keyword: *Norris Bridge*. You may also contact us by sending an email to [powerline@dom.com](mailto:powerline@dom.com) or calling 1-888-291-0190, Monday – Friday, 7:00 a.m. to 5:00 p.m.

Sincerely,

A handwritten signature in black ink, appearing to read "Greg Mathe", written over a horizontal line.

Greg Mathe  
Manager, Electric Transmission Communications

Enclosures

## NORRIS BRIDGE - 115 kV TRANSMISSION LINE REBUILD PROJECT

Dominion Virginia Power is planning to rebuild its transmission line that crosses the Rappahannock River adjacent to the Norris Bridge between Lancaster and Middlesex Counties

Dominion Virginia Power currently operates an overhead 115 kilovolt (kV) transmission line that crosses the Rappahannock River via a combination of structures in the river and attachments to the Norris Bridge (Route 3). This transmission line provides critical electric service to supply bulk electricity to the area and is a primary source of electric power to the Northern Neck peninsula. This transmission line has been in operation since 1962 and is nearing its end-of-life.

### What is the project?

Dominion is planning to rebuild approximately two miles of this existing transmission line at the point that it crosses the Rappahannock River. The project will replace the existing seven wood structures that are currently in the water and remove the 14 bridge attachments. The line will be upgraded and relocated onto 10 steel structures with concrete foundations spanning the river approximately 100 feet from the bridge. The line will remain on the bridge's east side.

### What are the needs and benefits of the project?

- Replace aging infrastructure that has been in place since 1962 and has reached its "end-of-life"
- Gain increased reliability and operational efficiencies by upgrading and relocating the line – rebuilding the line to meet current standards and clearances will reduce vulnerabilities of an aging line lessening the risk of outages – this will help maintain reliability and reduce the restoration time in the event of an outage
- Maintain safety for Dominion and VDOT crews and lessen potential hazards to the public and watermen – relocating off the bridge will lessen the frequency that Dominion and road crews will need to coordinate for line outages or lane closures and reduce road debris from impacting the line. The line will also be built to current Army Corps of Engineers clearances and codes, maintaining up-to-date safety standards for navigable waters.

### Preliminary Schedule

<b>Spring 2015</b>	Public Announcement via community letters and website
<b>Spring 2015</b>	Submit permit applications to the Virginia Marine Resources Commission (VMRC) and the Army Corps of Engineers (ACOE)
<b>Fall 2015</b>	Begin preliminary construction work ( <i>pending necessary approvals</i> )
<b>End of 2017</b>	Energize line and complete project



## NORRIS BRIDGE - 115 kV TRANSMISSION LINE REBUILD PROJECT



For on-going updates, please visit our website at [www.dom.com](http://www.dom.com), keyword:  
**Norris Bridge**

Contact our dedicated transmission team by sending an email to [powerline@dom.com](mailto:powerline@dom.com),  
or call 1-888-291-0190, Monday through Friday, 7am to 5pm.



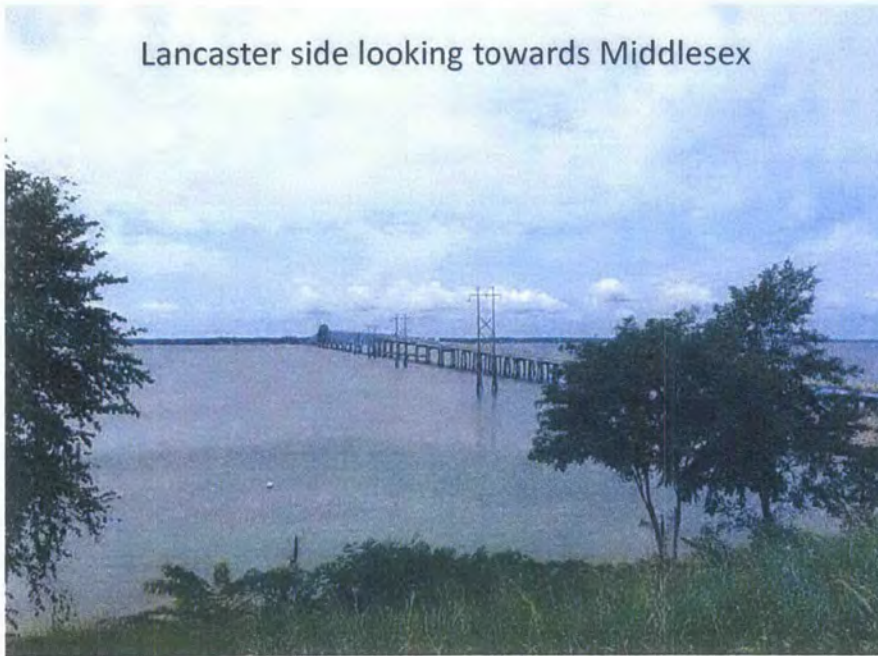




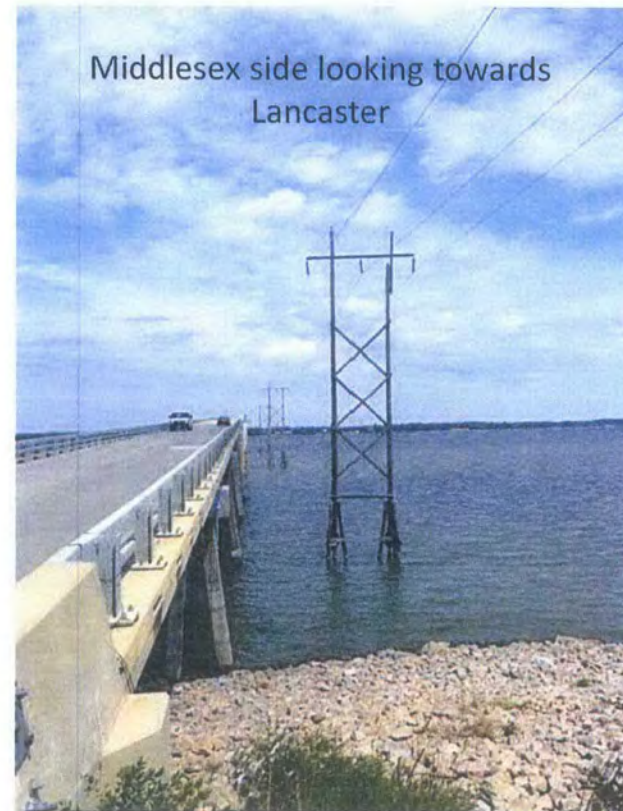
**Dominion®**

# Norris Bridge Transmission Project August 25, 2015

Lancaster side looking towards Middlesex



Middlesex side looking towards  
Lancaster





# Dominion's Responsibility: Electric Transmission Infrastructure Investments

Above all, providing reliable and safe electricity at a reasonable cost lays the foundation in which projects are developed. Customers and ratepayers always come first in the equation.

How do we solve for necessary infrastructure investments while meeting our obligation responsibly?

State Corporate Commission and other Regulatory agencies (VMRC, Army Corps, etc.) evaluate projects on:

- Need, Electrically viable
- Directness of Route, using existing ROW
- Cost
- Environmental Impacts
- Among others



Community evaluates projects on impact to:

- Quality of life/view shed
- Environment
- Reliability
- Among others

Dominion's approach reflects varying considerations, balancing impacts in an appropriate and prudent manner.

The proposed solution cannot remove impacts, but attempts to lessen them.



## Problem: Line #65 at River Crossing

- ☐ Replace aging infrastructure that has been in place since 1962 and has reached its “end-of-life”
- ☐ Gain increased reliability and operational efficiencies by upgrading and relocating the line
  - rebuilding the line to meet current standards and clearances will reduce vulnerabilities of an aging line lessening the risk of outages
  - this will help maintain reliability and reduce the restoration time in the event of an outage
- ☐ Maintain safety for Dominion and VDOT crews and lessen potential hazards to the public and watermen
  - relocating off the bridge will lessen the frequency that Dominion and road crews will need to coordinate for line outages or lane closures and reduce road debris from impacting the line.
  - The line will also be built to current Army Corps of Engineers clearances and codes, maintaining up-to-date safety standards for navigable waters.

# Planning: Project Considerations

- ☐ Environmental considerations
  - SAV
  - Oyster beds
  - Wetlands
- ☐ Operational efficiencies
- ☐ Restoration times
- ☐ Life-span
- ☐ Use of existing right of way
- ☐ Existing overhead line
- ☐ Existing infrastructure in landscape (Norris Bridge)
- ☐ Cost



## Solution:

# Norris Bridge Transmission Project

### ❑ Project details:

- Rebuild ~2 miles of line across the Rappahannock River.
- Replace/remove the existing 7 wood structures currently in the water and remove the 14 bridge attachments.
- Upgrade and relocate onto 10 steel structures/concrete foundations in the water.
- Average structures heights between 120' and 180'
- Remain on same side as the current transmission line alignment.
  - Approx. 100' east of bridge
- Span lengths vary between 800- 1300 feet
- No additional land required to rebuild line

### ❑ Dominion sought state and federal authority to cross the river.

- Secured all permit approvals through VMRC and US Army Corps of Engineers.



# Community Outreach

- ☐ September 2014 – Briefed Lancaster Co. and Middlesex Co. staff and officials
- ☐ November 2014, Met with Private Oyster Bed Lease Holders
  - A new transmission line would not impact private oyster grounds.
- ☐ January 2015, Legislation was introduced in the General Assembly addressing Baylor Grounds in the project area – needed for VMRC permit consideration (whether installed aboveground or submerged)
- ☐ January 15, 2015 – Rappahannock Record covers introduction of Baylor Ground legislation
- ☐ January 30, 2015 - Property owner outreach regarding soil testing work for project
- ☐ February 12, 2015 – Rappahannock Record covers passage of Baylor Ground legislation
- ☐ April 16, 2015 - Public Announcement
  - Mailed letters and fact sheets to ~70 landowners
    - Included all parcels ½ mile up and down stream and 500 feet inland from centerline
  - Project web page on dom.com, keyword “Norris Bridge”
  - Email address for on-going contact - [powerline@dom.com](mailto:powerline@dom.com)
    - Received less than five inquires going into the VMRC permit review hearing
- ☐ May 2015 – Presented at the Lancaster and Middlesex Board of Supervisors meetings
- ☐ May 7, 12 – VMRC print advertisements regarding permit application
- ☐ May 14 – Continuing coverage - news articles cover project
- ☐ April - July 2015 – Direct stakeholder outreach regarding project-related questions
- ☐ On- going - Maintain open lines for communications throughout project

## Facts

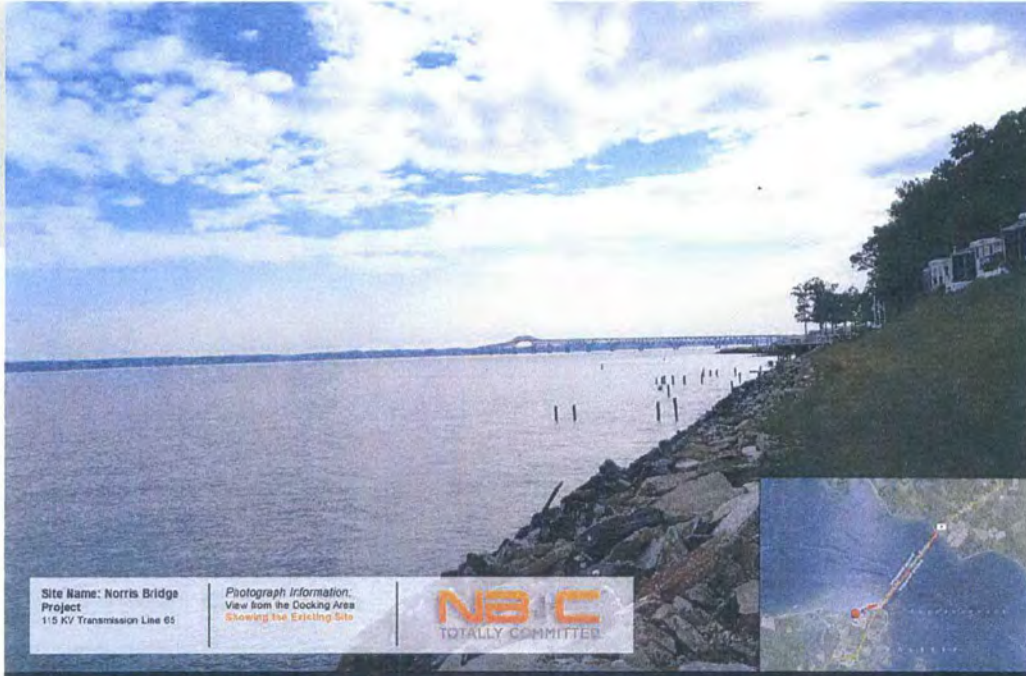
- ☐ Followed all necessary regulatory reviews
- ☐ Fully disclosed project details as early as Sept. 2014
- ☐ Primary source of power to Northern Neck
  - Typical power flows from Harmony Village substation in Middlesex to White Stone and Lancaster Substations in Lancaster
- ☐ No aviation markers or lights on top of structures required
- ☐ SCC reviews projects costs at time of annual review of all transmission related expenditures





**Norris Bridge Project  
Location Map**  
● not visible ● visible

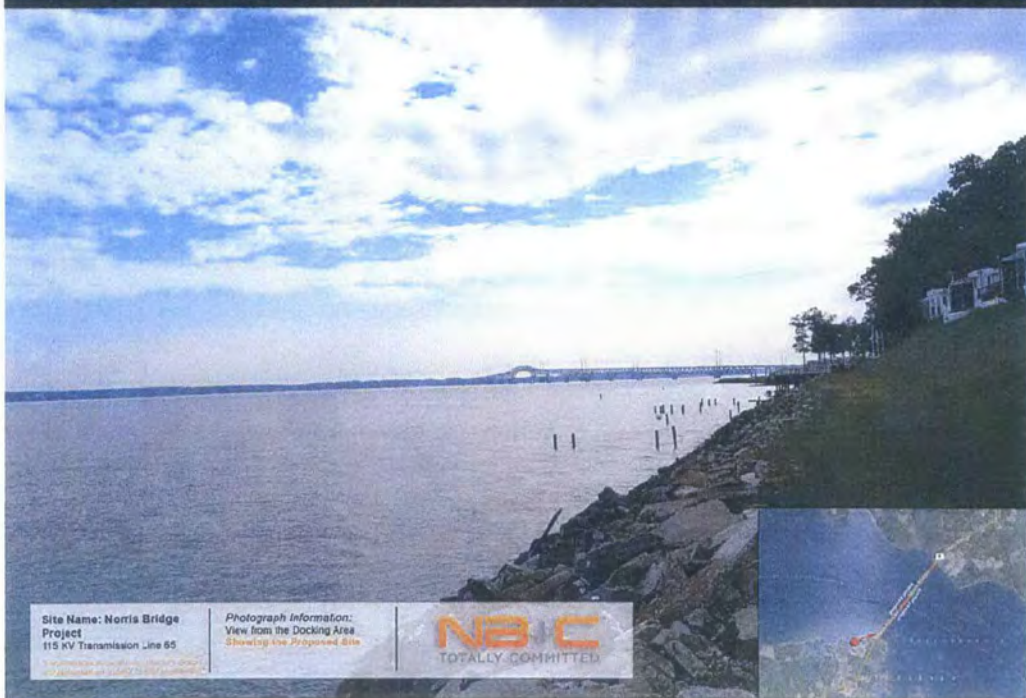




Site Name: Norris Bridge Project  
115 KV Transmission Line 65

Photograph Information:  
View from the Docking Area  
Showing the Existing Site

**NBIC**  
TOTALLY COMMITTED



Site Name: Norris Bridge Project  
115 KV Transmission Line 65

Photograph Information:  
View from the Docking Area  
Showing the Proposed Site

**NBIC**  
TOTALLY COMMITTED







**Dominion**

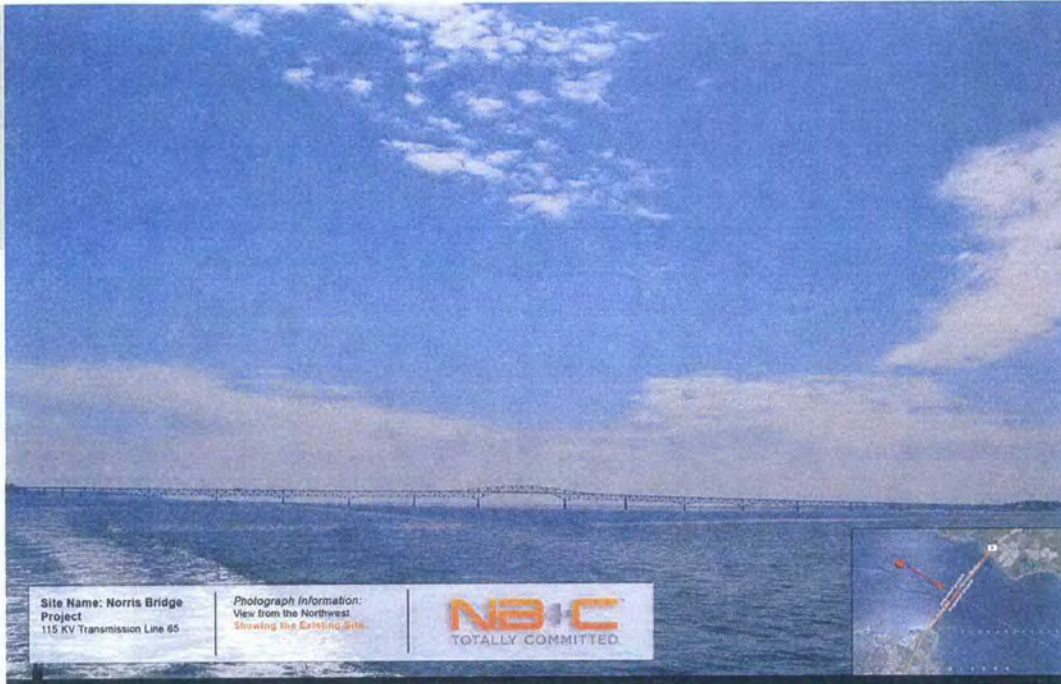








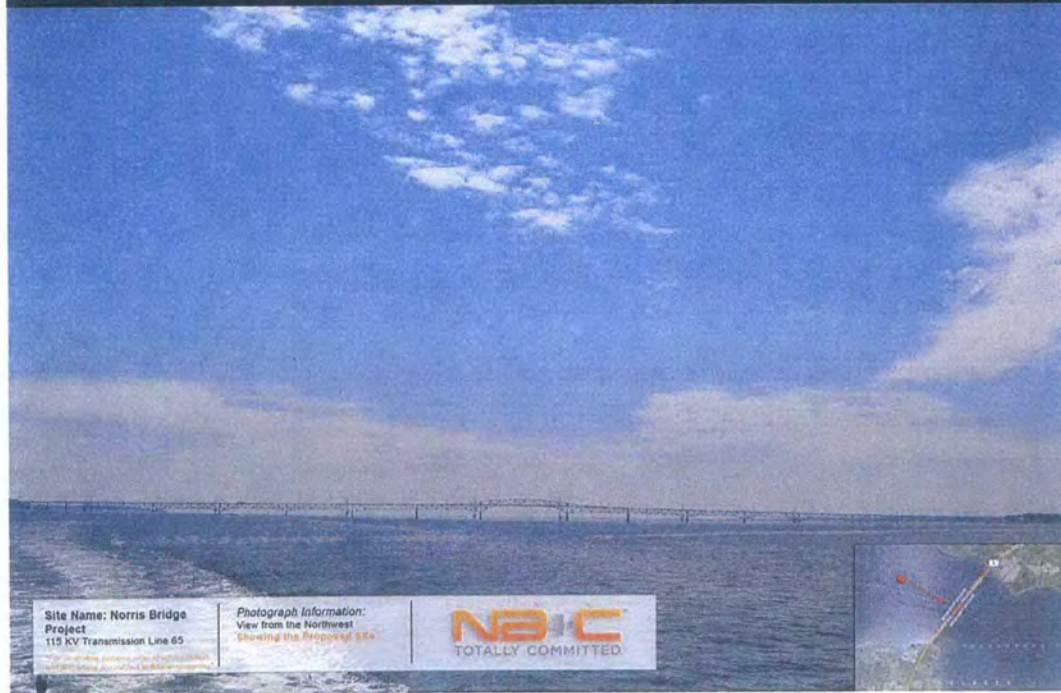




Site Name: Norris Bridge Project  
115 KV Transmission Line 65

Photograph Information:  
View from the Northwest  
Showing the Existing Site

**NBIC**  
TOTALLY COMMITTED



Site Name: Norris Bridge Project  
115 KV Transmission Line 65

Photograph Information:  
View from the Northwest  
Showing the Proposed Site

**NBIC**  
TOTALLY COMMITTED



**Dominion**

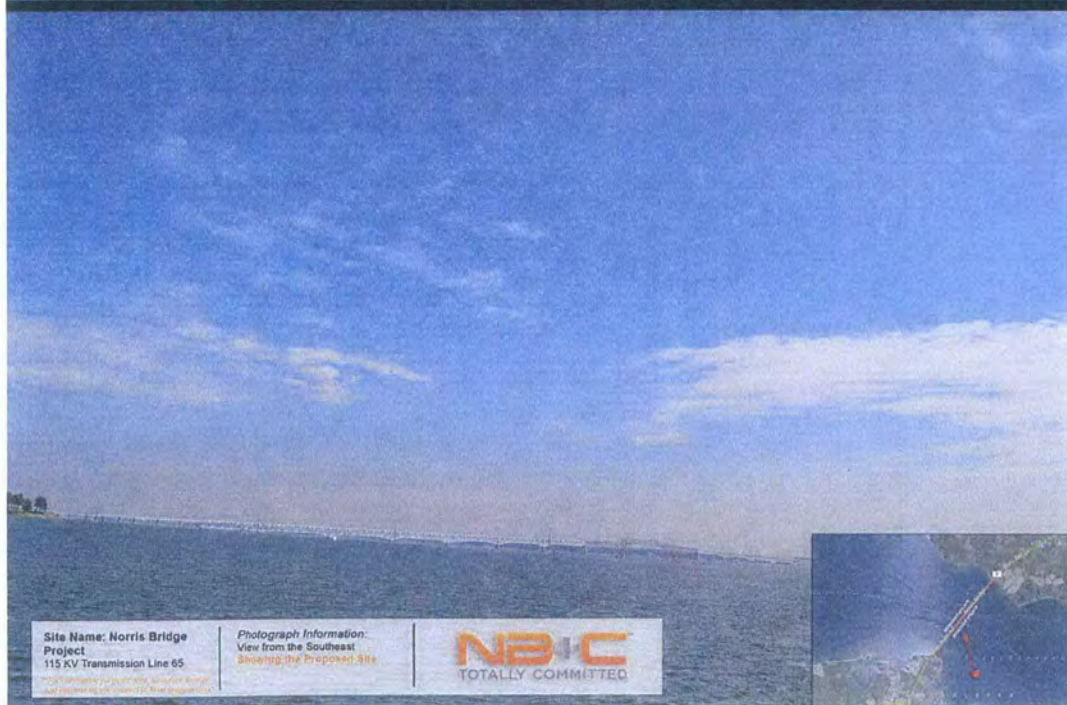




Site Name: Norris Bridge  
Project  
115 KV Transmission Line 65

Photograph Information:  
View from the Southeast  
Showing the Existing Site

**NBIC**  
TOTALLY COMMITTED



Site Name: Norris Bridge  
Project  
115 KV Transmission Line 65

Photograph Information:  
View from the Southeast  
Showing the Proposed Site

**NBIC**  
TOTALLY COMMITTED







# Norris Bridge Transmission Project

**Thank You**

[www.dom.com](http://www.dom.com), keyword "Norris Bridge"

E-mail: [powerline@dom.com](mailto:powerline@dom.com)







September 16, 2015

Dear Neighbor/Property Owner:

Dominion Virginia Power will soon be performing work in your community to ensure you have safe, reliable electric service. This packet contains information, answers to commonly asked questions and resources about a project to upgrade an electric transmission line that was built more than 50 years ago.

The line is an overhead 115-kilovolt transmission line that crosses the Rappahannock River and is now partially attached to the Norris Bridge on Route 3. This line provides critical electric service to residents and businesses in the Northern Neck region served by Dominion Virginia Power and the Northern Neck Electric Cooperative.

Our plan is to restructure about two miles of this line where it crosses the Rappahannock River. The project will replace seven aging wooden structures in the water east of the bridge and remove 14 attachments on the bridge. We will relocate the line onto 10 new steel structures with concrete foundations spanning the river approximately 100 feet from the east side of the bridge. A visual example of the new line is included in this packet. Photo simulations of the new line from different locations can be found at [dom.com/Norris Bridge](http://dom.com/Norris Bridge).

By replacing equipment that is nearing the end of its life and rebuilding the line to current standards, we can lessen the risk of power outages in your region. This project also will reduce traffic impacts on the bridge when electric repairs need to be done and eliminate any future needs to displace the line if/when the Virginia Department of Transportation (VDOT) upgrades Norris Bridge.

A great deal of thought and planning has gone into our decision to rebuild this line. Our first and foremost goal is to meet, if not exceed, your expectation for high reliability and reasonable costs. We also want to guarantee safety for our crews and VDOT workers, minimize impacts to tidal wetlands and ensure no disturbances to river habitats. We know the importance of these waterways to private oyster farms and the recreation and tourism that are so vital to your local economy.

We know that some have asked if the line can be buried under the river. While technology to do this exists, this approach would create environmental, logistical and cost concerns that make an underwater option unacceptable. Depending on the method used, submerged construction could require more acreage to be removed from the Baylor Grounds; impact on the riverbed, tidal wetlands, aquatic vegetation and water quality. From a logistical standpoint, a change in project design would delay our ability to



perform the needed work, endangering our ability to maintain reliable service. From a cost standpoint, the estimated \$30 million price tag of the project would increase by three to five times.

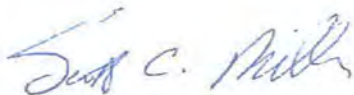
We met with your elected officials numerous times over the past year to seek input and concerns and no objections were raised. Lancaster and Middlesex counties have since however, passed a resolution asking Dominion to bury the line. While we try our best to coordinate with our local government partners, we cannot fulfill this request for the reasons previously stated.

We are required to have federal, state and environmental permissions to rebuild the line. The General Assembly overwhelmingly passed legislation which the Governor signed into law in March that 1) authorized Dominion to cross Commonwealth-controlled oyster grounds at the river crossing 2) certified the Virginia Marine Resource Commission (VMRC) to hear Dominion's request for a permit. The hearing took place in July with the VMRC board voting unanimously to approve our request. Earlier this summer the U.S. Army Corps of Engineers also gave us the needed permits to proceed.

We are now ready to begin rebuilding this line. You will see construction activity in mid to late October, and we expect to complete the project by the end of 2016. You have our commitment to keep you informed of our progress, work safely and diligently, minimize any disruption to your community and complete the project on time. We will be good stewards to the environment and conscientious in our spending to keep your rates reasonable. If at any time you have questions about the work we are doing or our schedule, please feel free to contact us by email at [powerline@dom.com](mailto:powerline@dom.com) or call us toll free at 1-888-291-0190.

We thank you in advance for your patience.

Respectfully,

A handwritten signature in blue ink, appearing to read "Scott C. Miller".

Scott Miller  
Vice President of Electric Transmission  
Dominion Virginia Power

Enclosures



## Norris Bridge Transmission Line Project

### Frequently Asked Questions

**1. *Why is it necessary to rebuild this transmission line?***

This 115-kilovolt transmission line needs to be rebuilt to ensure safe, reliable electric service to the Northern Neck region. The line was built in 1962 and is nearing its designed end-of-life.

**2. *What happens if the line is not replaced?***

If the line is not replaced, Dominion Virginia Power and Northern Neck Electric Cooperative customers could face a greater potential for unplanned, lengthy power outages.

**3. *What process did Dominion follow to receive needed permissions to rebuild this line?***

Dominion used a transparent, public process in advance of getting the permits needed to rebuild this line. We met with federal, state, and local officials in 2014 to discuss the project and seek input and then communicated our plans to the surrounding counties in advance of submitting the applications for various permits needed. As a courtesy, we also sent letters to residents living in the vicinity of the line, informing them of our plans and asking those with questions to contact us.

**4. *What permits did you have to secure?***

Three main steps were required. Each one was publicized to encourage community engagement.

- a. The General Assembly passed legislation in 2015 authorizing a new transmission line to cross state-controlled oyster grounds (formally known as Baylor Grounds) at the river crossing. This same legislation enabled Dominion to apply for a permit with the Virginia Marine Resource Commission (VMRC). The legislation passed 132-0.
- b. A permit from the VMRC, which regulates encroachment on Virginia's bottomlands, was received in the summer of 2015.
- c. A permit from the Army Corps of Engineers (ACOE) was also received late summer of 2015. The joint application through the ACOE facilitated and coordinated review from the National Oceanic and Atmospheric Administration, Coast Guard, and the Environmental Protection Agency, among others.

**5. *Has the project been approved?***

Yes, this project has received all the necessary approvals.

**6. *Why not bury this line under the river and out of sight?***

Dominion considered many factors, weighing environmental impact, cost and reliability. The approved plan provides for adequate, secure and dependable electric service at a reasonable cost for addressing aging infrastructure of an existing overhead transmission line.

The cost to bury the line is substantially higher. The estimated \$30 million to rebuild the line above ground would increase by three to five times if placed under the river.

Restoration, and therefore, reliability would also be compromised with an underground line. When failures do occur, it would take more time for Dominion to locate the problem and require us to use specialized machines and techniques to make repairs. No matter how careful and precise, the nature of work required would result in disturbances to the river bottom, tidal wetlands, vegetation and aquatic life.

**7. What are the submerged construction methods and their potential environmental impacts?**

There are two types of construction methods to submerge a transmission line. One is to directional bore the transmission line and the other is to plow the line into the river bed.

Directional boring is a technique whereby the three phases (or wires) that make up a single transmission circuit, in addition to a fiber optics communications cable, are placed in a conduit, surrounded by oil as insulation, and drilled under the riverbed from the shore. This technique does limit the potential environmental impacts but is the more expensive option. Good undergrounding engineering practices dictate that a second circuit also be laid as backup in case something happens to the primary circuit.

The other method is plowing the wires directly into the river bed. These wires would lay in a shallow trench, 25 feet apart to use the soil as insulation. Again, we would lay a back up circuit. This means that there would be six wires, three for each circuit, plus a fiber optics communications cable, each 25 feet apart. This option is the most environmental intrusive to the river bottom but a lower cost method than directional boring.

An additional consideration to note is that regardless of construction method, if there are issues in a submerged line, it will need to be pulled from beneath the riverbed onto a barge for repairs, creating a disruption to the river bottom as the circuit is dug up.

Submerging or undergrounding a transmission line requires two transition stations, one on each side of the river, in order to facilitate the aboveground/underground orientation. These stations would require about two to three acres and potentially additional right of way easements from landowners.

There are pros and cons to both methods, each are more expensive than the overhead option with no additional reliability benefits to the system.

**8. Why not rebuild the line on the bridge?**

Rebuilding the transmission line with attachments to the bridge does not meet the U.S. Army Corps of Engineer regulations, federal clearance standards or Dominion's best practices. Stringing the wires underneath the bridge roadbed does not resolve the maintenance issues or coordination efforts with VDOT to ensure the safety of our respective crews. Moving our line 100 feet away from the east side of the bridge provides flexibility for any future plans VDOT may have for Norris Bridge.

**9. How tall will the new structures be for an overhead line?**

Currently, the structures are 83 feet above mean sea level. The new structures will be between 112 feet and 179 feet above mean sea level. Generally, the structure heights follow the rise and fall of the bridge, with the shorter structures near the shoreline and the two tallest structures (179 feet) spanning the navigation channel at the bridge's tallest point. The reason the structures need to increase in height is to bring the line into compliance with current federal electrical and Coast Guard navigation clearances.

**10. Is this project to serve the Northern Neck only?**

No. Although the transmission line is a primary source of power to the Northern Neck, power can flow in both directions on transmission lines. This means the line is critical for residents and businesses on both sides of the Rappahannock River served by Dominion Virginia Power and the Northern Neck Electric Cooperative.



**11. What is the cost of this project and who pays for it?**

The cost of this project as approved is estimated at \$30 million. In general, the cost of electric transmission facilities is passed on to Dominion ratepayers. We are prudent with our ratepayer's money and work hard to keep costs reasonable and reliability high.

**12. Will there be an impact to air or boat navigation if the line is built above ground?**

There will be no impact to either air or boat traffic. Aviation markers or lights on top of the structures are not required. We did our best to line up the new concrete structure foundations with the bridge pilings. As part of the U.S. Army Corps of Engineer application, the Coast Guard reviewed the specifications and determined no mitigation or changes to the project plans.

**13. Can this project be compared with the York River crossing?**

The only comparison is that each project involves a river crossing. However, every transmission project is different. As with any construction project, variables exist including availability of resources, materials, soil composition – which impacts complexity of construction methods – time of year, and other unforeseen obstacles or opportunities that can adjust a project's scope, budget and schedule. Even similar projects over land can have very little in common. This is even more so with river crossings, especially when it comes to final project costs.

**14. Since we are also fed from a line from Fredericksburg, why do we need this line at all?**

Federal reliability standards, as well as good engineering practices, require redundant sources of power to a region based on the amount of load. If there is a loss of power, the redundant line picks up the load so there is no service disruption.

**15. When will you start construction?**

We plan to begin construction very soon and will keep residents and businesses in the Northern Neck region informed about our progress and timeline.

**16. If the region wanted to, could we pay the cost of undergrounding the line and if so about how much would it cost?**

Virginia law sets a process for localities to pay the incremental costs of undergrounding larger transmission lines. While this statute does not apply to 115 kV lines such as this project, it does illustrate how the process would work. It would require that a locality request that a line be placed underground and that all of the additional costs of undergrounding be borne by utility customers in the jurisdictions making the request. Given that the additional incremental cost of undergrounding this project would be in the range of \$90 to \$150 million or more, this would likely prove infeasible and unaffordable for Lancaster and Middlesex Counties, given the relatively small populations of both counties.

**17. How can Dominion be contacted for questions or concerns?**

We welcome feedback from our customers. We can be reached at 1-888-291-0190, Monday through Friday, 7am to 5pm, or by email at [powerline@dom.com](mailto:powerline@dom.com).







## NORRIS BRIDGE - 115 kV TRANSMISSION LINE REBUILD PROJECT

---

Dominion Virginia Power is planning to rebuild its transmission line that crosses the Rappahannock River adjacent to the  
Norris Bridge between Lancaster and Middlesex Counties

---

Dominion Virginia Power currently operates an overhead 115 kilovolt (kV) transmission line that crosses the Rappahannock River via a combination of structures in the river and attachments to the Norris Bridge (Route 3). This transmission line provides critical electric service to supply bulk electricity to the area and is a primary source of electric power to the Northern Neck peninsula. This transmission line has been in operation since 1962 and is nearing its designed end-of-life.

### **What is the project?**

Dominion is planning to rebuild approximately two miles of this existing transmission line at the point that it crosses the Rappahannock River. The project will replace the existing seven wood structures that are currently in the water and remove the 14 bridge attachments. The line will be upgraded and relocated onto 10 steel structures with concrete foundations (heights ranging from 112' to 179') spanning the river approximately 100 feet from the bridge. The line will remain on the bridge's east side.

### **What are the needs and benefits of the project?**

- Replace aging infrastructure that has been in place since 1962 and has reached its designed "end-of-life"
- Gain increased reliability and operational efficiencies by upgrading and relocating the line – rebuilding the line to meet current standards and clearances will reduce vulnerabilities of an aging line lessening the risk of outages – this will help maintain reliability and reduce the restoration time in the event of an outage
- Maintain safety for Dominion and VDOT crews and lessen potential hazards to the public and watermen – relocating off the bridge will lessen the frequency that Dominion and road crews will need to coordinate for line outages or lane closures and reduce road debris from impacting the line. The line will also be built to current Army Corps of Engineers clearances and codes, maintaining up-to-date safety standards for navigable waters.

### **Preliminary Schedule**

<b>Fall 2014</b>	First briefing to federal and state officials as well as Lancaster and Middlesex Counties on project details
<b>Spring 2015</b>	Public Announcement via community letters and website
<b>Spring 2015</b>	Submit permit applications to the Virginia Marine Resources Commission (VMRC) and the Army Corps of Engineers (ACOE)
<b>Summer 2015</b>	Received all necessary approvals
<b>Fall 2015</b>	Begin preliminary construction work
<b>End of 2016</b>	Energize line and complete project





## NORRIS BRIDGE - 115 kV TRANSMISSION LINE REBUILD PROJECT



**For on-going updates, please visit our website at [www.dom.com](http://www.dom.com), keyword:  
*Norris Bridge***

Contact our dedicated transmission team by sending an email to [powerline@dom.com](mailto:powerline@dom.com), or call  
1-888-291-0190, Monday through Friday, 7am to 5pm.

**To our neighbors in the Northern Neck:**

Every water crossing and open pasture has unique qualities. Dominion keeps this in mind when building facilities that ensure our customers have the electricity they need when they want it. We do our best to balance environmental impact, reliability, safety and cost—as we are doing when rebuilding an important electric transmission line crossing the Rappahannock River alongside the Norris Bridge.

This transmission line was built more than 50 years ago and is nearing the end of its expected lifespan. It's time to modernize and rebuild the line to today's standards. Our planners and engineers worked with key environmental authorities and other stakeholders to develop options for the replacement line and its supporting structures.

The current line crosses the river using a combination of 14 connections to the bridge and seven H-frame structures in the water. In rebuilding the line, we considered three alternatives:

1. keeping the line attached to the bridge;
2. placing the section of the line that crosses the river underground, and
3. rebuilding the entire line overhead.

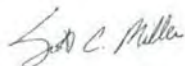
Technical and regulatory requirements and safety concerns ruled out options to reattach any part of the line to the bridge. Burying the lines under the river bed would require complex and disruptive construction that could damage oyster beds and other river habitats that are important to the local economy. We estimate the underground construction work would cost three to five times more than the approximate \$30 million to keep the line above ground.

The only option that meets all the requirements is to place the line over the river and separate from the bridge. It requires increasing the structure height to comply with current federal electrical and Coast Guard navigation clearances. It also results in the least impact to the environment, keeping costs low for our ratepayers and ensuring safety for work crews. And it ensures our customers can count on reliable service for years to come.

In formulating our final and approved plan, we worked with the U.S. Army Corps of Engineers, the Virginia Marine Resource Commission, VDOT and federal navigation authorities and successfully gained the approval of all parties, including the Virginia Legislature, which signed off on this project earlier this year.

We believe that this is the best option for our customers and our ratepayers. It will provide the safest, most cost-effective, and most efficient solution for long-term electric reliability in the region.

Sincerely,



**Scott Miller**

Vice President of Electric Transmission

To learn more visit [dom.com/NorrisBridge](http://dom.com/NorrisBridge)

**Dominion Virginia Power**  
701 East Cary Street, Richmond, VA 23219  
Mailing Address: P.O. Box 26666  
Richmond, VA 23261  
dom.com



January 26, 2016

**RE: Project Update: Norris Bridge Electric Transmission Rebuild and Relocation Project**

Dear Neighbor,

As you may know, Dominion Virginia Power is planning a project to address the aging 2.2 miles of its electric transmission line that crosses the Rappahannock River.

This segment of the transmission line is partially attached to the Norris Bridge (Route 3). The river crossing is part of a single 115 kV transmission line that runs for about 38 miles between our Northern Neck Substation in Richmond County and our Harmony Village Substation in Middlesex County. This transmission line provides critical electric service to supply bulk electricity to the area and is a primary source of electric power to approximately 19,000 customers on the Northern Neck peninsula. The portion of the transmission line that crosses the river has been in operation since 1962 and is nearing its end-of-life and needs to be replaced.

On December 11, 2015, the Virginia State Corporation Commission (SCC) ruled that Dominion is required to seek SCC review of this transmission project. Construction-related activities are on hold pending review and approval through the SCC process.

In advance of Dominion filing an application before the SCC, we would like to take this opportunity to share more information about this project and the options we have reviewed to address the aging infrastructure and our reliability concerns for the area.

We invite the community to join us at our informational open house where you will have an opportunity to speak with our electric transmission experts about the project. There will not be a formal presentation; please feel free to attend as your time allows - the format is open, with various informational stations to visit.

We hope you can join us.

**Thursday, February 11, 2016, 5:00pm – 7:30pm**  
Mount Vernon Baptist Church (basement)  
269 James Wharf Road, White Stone, VA 22578

In the meantime, please visit our website, [www.dom.com](http://www.dom.com), keyword: *Norris Bridge*. You may also contact us by sending an email to [powerline@dom.com](mailto:powerline@dom.com) or calling 1-888-291-0190, Monday – Friday, 7:00 a.m. to 5:00 p.m.

Sincerely,

Greg Mathe  
Manager, Electric Transmission Communications





**Dominion®**

# INFORMATIONAL OPEN HOUSE

## *Norris Bridge Electric Transmission Rebuild and Relocation Project*

Dominion Virginia Power is planning a project to address the aging 2.2 miles of its electric transmission line that crosses the Rappahannock River. This segment of our 38 mile transmission line is partially attached to the Norris Bridge (Route 3) and is nearing its end-of-life and needs to be replaced. This transmission line provides critical electric service to supply bulk electricity to the area and is a primary source of electric power to approximately 19,000 customers on the Northern Neck peninsula.

### OPEN HOUSE

Thursday  
February 11, 2016  
5:00 p.m. - 7:30 p.m.

Mount Vernon  
Baptist Church  
(basement)

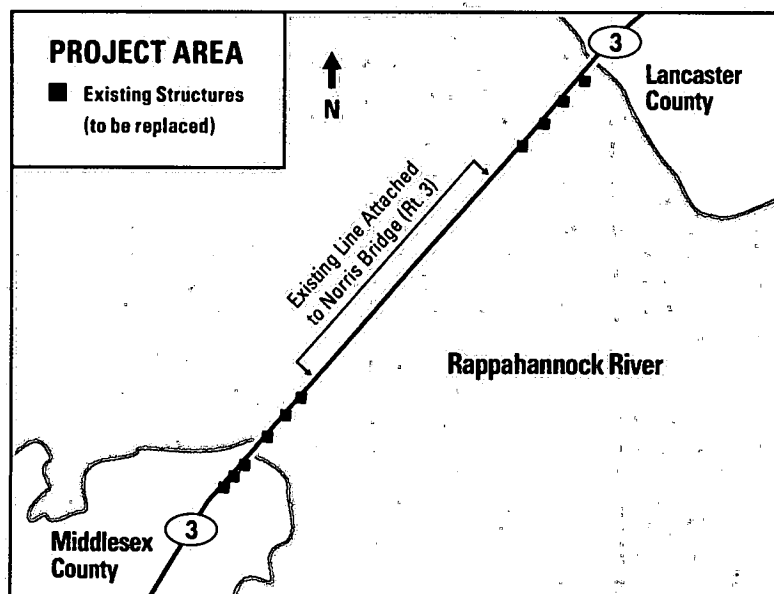
269 James Wharf Road  
White Stone, VA 22578

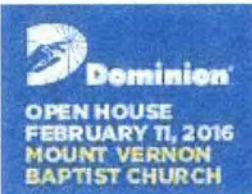
#### PROJECT NEED AND BENEFITS

- Replace aging infrastructure that has been in place since 1962
- Gain increased reliability and operational efficiencies by upgrading and relocating the line. Rebuilding the line to current standards will reduce vulnerabilities of an aging line lessening the risk of outages — this will help maintain reliability and reduce the restoration time in the event of an outage
- Maintain safety for Dominion and VDOT crews and lessen potential hazards to the public — relocating off the bridge will lessen the frequency that Dominion and road crews will need to coordinate for line outages or lane closures and reduce road debris from impacting the line

We invite the community to join us at our Informational Open House where you will have an opportunity to speak with our electric transmission experts about the project. There will not be a formal presentation; please feel free to attend as your time allows — the format is open, with various informational stations to visit.

To learn more, please visit our website, [www.dom.com](http://www.dom.com), keyword: Norris Bridge. You may also contact us by sending an email to [powerline@dom.com](mailto:powerline@dom.com).





 <b>Dominion</b>	<b>INFORMATIONAL OPEN HOUSE</b> Dominion Virginia Power is planning a project to address the aging 2.2 miles of its electric transmission line crossing the Rappahannock River at Norris Bridge.	<div data-bbox="1375 841 1526 987"><b>CLICK HERE FOR DETAILS</b></div> <div data-bbox="1548 841 1811 987"><b>THURSDAY FEB. 11, 2016</b> 5:00 - 7:30 p.m. Mount Vernon Baptist Church White Stone, Virginia</div>
---	---	--

**Dominion®**

**Dominion Virginia Power**  
701 East Cary Street, Richmond, VA 23219  
Mailing Address: P.O. Box 26666  
Richmond, VA 23261  
Web Address: [www.dom.com](http://www.dom.com)

February 4, 2016

**RE: Project Update:** Norris Bridge Electric Transmission Line Rebuild and Relocation Project  
Dear Neighbor,

On January 26, Dominion Virginia Power sent letters to property owners about an informational open house we are hosting to provide the community with information regarding our Norris Bridge Electric Transmission Line Rebuild and Relocation Project. The event will be held:

Thursday, February 11, 2016, 5:00pm – 7:30pm  
Mount Vernon Baptist Church (basement)  
269 James Wharf Road, White Stone, VA 22578

For those that cannot make the February 11 event, we have scheduled another opportunity for the public to speak with Dominion about this project:

**Wednesday, February 17, 2016, 5:00pm – 7:30pm**  
The Freeshade Community Center 1544 Regent Road, Topping, VA 23169

As previously communicated, Dominion is planning a project to address the aging 2.2 miles of its electric transmission line that crosses the Rappahannock River.

This segment of the transmission line is partially attached to the Norris Bridge (Route 3). The river crossing is part of a single 115 kV transmission line that runs for about 38 miles between our Northern Neck Substation in Richmond County and our Harmony Village Substation in Middlesex County. This transmission line provides critical electric service to supply bulk electricity to the area and is a primary source of electric power to approximately 19,000 customers on the Northern Neck peninsula. The portion of the transmission line that crosses the river has been in operation since 1962, is nearing its end-of-life and needs to be replaced.

During these two events, you will have an opportunity to speak with our electric transmission experts and learn more about the options we have reviewed to address the aging infrastructure and our reliability concerns for the area. There will not be a formal presentation; please feel free to attend as your time allows - the format is open, with various informational stations to visit.

We hope you can join us.

In the meantime, please visit our website, [www.dom.com](http://www.dom.com), keyword: *Norris Bridge*. You may also contact us by sending an email to [powerline@dom.com](mailto:powerline@dom.com) or calling 1-888-291-0190, Monday – Friday, 7:00 a.m. to 5:00 p.m.

Sincerely,

Greg Mathe  
Manager, Electric Transmission Communications



## Visual Simulations

### *Norris Bridge Rebuild and Relocation Project*

During the February 11th informational open house for this project, Dominion unintentionally printed and displayed photo simulations depicting an earlier version of the overhead transmission line design. We apologize for this mistake and regret that the public was not able to view the most up-to-date information.

The current and proposed plan includes shorter structures than originally designed – however, the structure locations have not changed over the course of our planning.

The current renderings have also been posted to the Project's webpage on [www.dom.com](http://www.dom.com) (which include closer views and the fender system flanking the navigational channel). We understand not everyone has access to the internet and that viewing these documents on a computer screen may be difficult. Therefore, we have also made arrangements with the Town of White Stone to display the renderings in the Town Hall, 433 Rappahannock Drive, White Stone VA 22578.

Their office is open Monday – Wednesday and Friday, 9 a.m. – 12 p.m. We plan to leave these displays in the Town Hall for three weeks, beginning Monday, February 22nd. Again, we apologize for any confusion this caused.

For project information, please visit [www.dom.com](http://www.dom.com) and search "Norris Bridge." If you have any questions, please contact Dominion at [powerline@dom.com](mailto:powerline@dom.com) or (888) 291-0190, Monday – Friday, 7 a.m.– 5 p.m. You can also write us at PO Box 26666, Richmond, VA 23261.



**Dominion<sup>®</sup>**

Dominion Virginia Power  
P.O. Box 26666  
Richmond, VA 23261

Presorted  
First Class  
U.S. Postage  
**PAID**  
Richmond, VA  
Permit No. 729

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

- C. Detail the nature, location, and ownership of all buildings which would have to be demolished or relocated if the project is built as proposed.**

**Response:** The Company is not aware of any residences encroaching within the existing corridor and does not expect to have any residences demolished or relocated in connection with the Rebuild Project utilizing either the Proposed 115 kV Overhead Route, the 230 kV Overhead Alternative or the Underground Option.



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

- D. What existing physical facilities will the line 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 right-of-way that would be paralleled. How long has the right-of-way been in use?**

Response: A portion of Line #65, which was constructed in 1962, traverses the Rappahannock River. In this river-crossing segment of Line #65, there are currently 14 davit arm style structures attached to Norris Bridge (SR 3) and seven structures in the water that parallel SR3.

An existing distribution line is currently underbuilt on Line #65 up to the second structure in from the river on the Middlesex County (south) side. The Company plans to relocate this distribution line as part of the Rebuild Project.

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

**E. Has the Company investigated land use plans in the areas of the proposed route? How would the building of the proposed line effect future land use of the areas affected?**

- 1. Has the Company 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 Virginia Code Section 3.2-205 B?**
- 2. If so, and if any portion of the proposed facilities will be located on any such important farmland, please:**
  - 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.**
  - c. Describe the applicant's proposals to minimize the impact of the facilities on the affected farmland.**

**Response:** According to the Comprehensive Plan for Lancaster County, the Rebuild Project is located near a Planned Growth Area ("PGA"), White Stone. The siting and construction of electric transmission lines is not addressed in the Comprehensive Plan. The Comprehensive Plan addresses current and future development of the County, including the preservation of farmland and agriculture. The Rebuild Project would represent a rebuild of an existing transmission corridor, with a change to the structure heights; however it is not anticipated to impact future development in Lancaster County given the need for maintaining and improving the reliability of the electric transmission service to the County this Rebuild Project is addressing.

According to the Comprehensive Plan for Middlesex County, the Rebuild Project is located in an agricultural area. Middlesex County aims to promote a strong and diversified industrial and commercial base which does not create significant adverse impacts on residential areas, prime agricultural lands or public facilities. The Rebuild Project represents a rebuild of an existing transmission line and will not impact future development in the County.

1. Lancaster County has identified Prime Farmland throughout the County, including farmland within the Rebuild Project area. Lancaster County's Comprehensive Plan encourages a balance of preservation and

development of these areas to create opportunities to residents. Preservation of these farmlands is encouraged to keep an aesthetically pleasing landscape. As the Rebuild Project represents the rebuild of an existing transmission line, it would result in minimal disturbance to farmland.

In its Comprehensive Plan, Middlesex County has identified prime agricultural areas throughout the County. Currently, the Rebuild Project traverses an area with prime agricultural soils; however, the area is currently in residential development and is reflected as such in the Comprehensive Plan.

Impacts to Prime Farmland and Farmland of Statewide Importance were calculated using the Virginia Agricultural Model provided by the Virginia Department of Conservation and Recreation.

### **Proposed 115 kV Overhead Route**

The terrestrial portion of the Proposed Route is located entirely within the existing right-of-way for Line #65. The Proposed Route crosses less than 0.1 mile of Farmland of Statewide Importance and <0.1 mile of Prime Farmland, impacting 1.6 acres and 0.1 acres, respectively.

### **230 kV Overhead Alternative**

The portion of the 230 kV Overhead Alternative located within the existing right-of-way for Line #65 crosses 1.6 acres of Farmland of Statewide Importance and less than 0.1 acre of Prime Farmland. An additional <0.01 acres of Farmland of Statewide Importance would be impacted by the additional permanent right-of-way required in Middlesex County for the 230 kV Overhead Alternative.

### **Underground Option**

The portion of the Underground Option located within the existing right-of-way for Line #65 crosses 0.01 mile of Farmland of Statewide Importance and <0.01 mile of Prime Farmland impacting 1.8 acres and 0.1 acre, respectively.

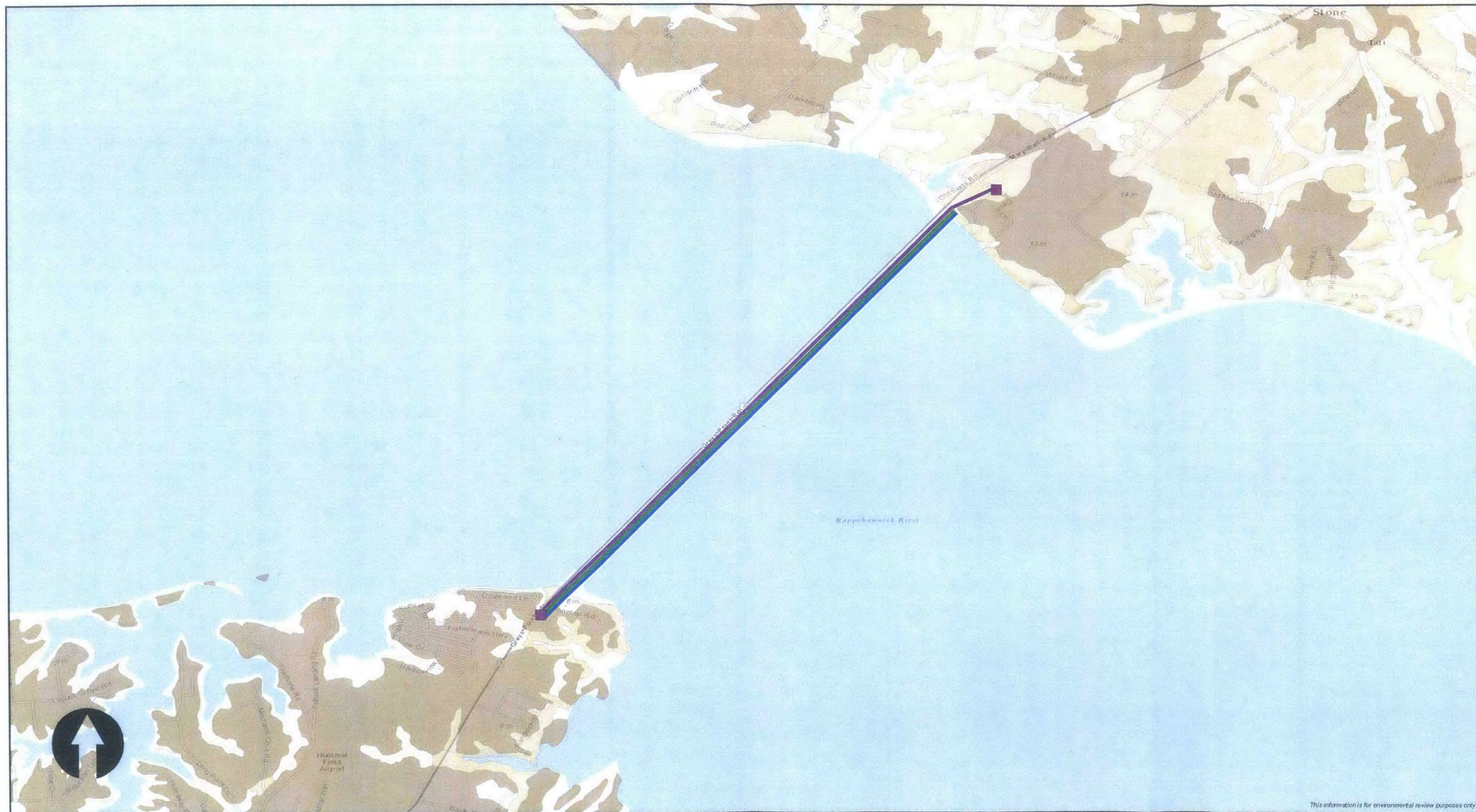
The new permanent right-of-way required for the Underground Option would cross an additional 2.7 acres of Farmland of Statewide Importance and less than 0.1 acre of Prime Farmland. In total, the Underground Option would impact approximately 0.1 acre of Prime Farmland and 4.5 acres of Farmland of Statewide Importance.

2. a. See Attachment III.E.2.a.



- b. The Company is proposing to rebuild a portion of an existing single circuit line. The land portion of this Rebuild Project is within existing right-of-way and the river crossing portion is adjacent to the existing infrastructure and will be within a newly permitted easement from VMRC. See Section I.C for a discussion of the alternatives considered and rejected.
- c. As the proposed Rebuild Project involves rebuilding a portion of an existing line and is consistent with Lancaster and Middlesex Counties' Comprehensive Plans, no significant impacts to Prime Farmland are anticipated. Impacts to Prime Farmland are minimized through the use of existing right-of-way.





This information is for environmental review purposes only.

<p>0 0.25 0.5 Miles 1:24,000</p>	<p>▲ Substation</p> <p>■ Transition Station for Underground Route Option</p> <p>— Proposed 115 kV Overhead Route</p> <p>— 230 kV Overhead Alternative</p> <p>— Underground Route Option</p>	<p><b>Agricultural Value</b></p> <p>■ Class V: Prime Farmland</p> <p>■ Class IV: Statewide Importance</p>
--	---	---



**Line #65 115 kV**  
**Rebuild at Norris Bridge Project**  
 Dominion Virginia Power  
 Attachment III.E.2.a



an ERM Group company

DRAWN BY: JPB



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

**F. Identify the following that lie within or adjacent to the proposed right-of-way:**

- 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 landmark, site, building, structure, district or object included in the Virginia Landmarks Register maintained by the Virginia Board of Historic Resources;**
- 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 Virginia Department of Historic Resources, or his predecessor, and any site designated by a local archaeological commission, or similar body;**
- 5. Any underwater historic property designated by the Virginia Department of Historic Resources, 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;**
- 8. Any area accepted by the Director of the Virginia Department of Conservation and Recreation for the Virginia Natural Area Preserves System;**
- 9. Any conservation easement qualifying under Sections 10.1-1009 to -1016 of the Code of Virginia, or prior provision of law;**
- 10. Any state scenic river;**
- 11. Any federal state, or local park, forest, game or wildlife preserve, recreational area, or similar facility; Features, sites, and the like listed in 1 through 10 above need not be identified again.**



Response: 1. **National Register of Historic Places (“NRHP”)**

There are no NRHP-listed and -eligible resources located within or adjacent to the right-of-way for the Proposed 115 kV Overhead Route, the 230 kV Overhead Alternative, or the Underground Option.

2. **Virginia Landmarks Register (“VLR”)**

There are no VLR-listed properties located within or adjacent to the right-of-way for the Proposed 115 kV Overhead Route, the 230 kV Overhead Alternative, or the Underground Option.

3. **Historic Districts**

There are no historic districts located within or adjacent to the right-of-way for the Proposed 115 kV Overhead Route, the 230 kV Overhead Alternative, or the Underground Option.

4. **Archaeological Sites**

There are no archaeological sites located within or adjacent to the right-of-way for the Proposed 115 kV Overhead Route, the 230 kV Overhead Alternative, or the Underground Option.

5. **Underwater Historic Property**

There are no underwater historic properties located within or adjacent to the right-of-way for the Proposed 115 kV Overhead Route, the 230 kV Overhead Alternative, or the Underground Option.

6. **National Natural Landmarks**

There are no national natural landmarks located within or adjacent to the right-of-way for the Proposed 115 kV Overhead Route, the 230 kV Overhead Alternative, or the Underground Option.

7. **Virginia Registry of Natural Areas**

The Proposed 115 kV Overhead Route, 230 kV Overhead Alternative, and Underground Option are located within the Norris Bridge Conservation Site, per a May 18, 2015 letter from the Virginia Department of Conservation and Recreation, which is included in the DEQ Supplement as Attachment 2.F.1. This conservation site is ranked G5 and corresponds to a peregrine falcon nest located on the bridge.

8. **Virginia Natural Area Preserves System**

There are no Virginia Natural Area Preserves Systems located within or

adjacent to the right-of-way for the Proposed 115 kV Overhead Route, the 230 kV Overhead Alternative, or the Underground Option.

#### **9. Conservation Easements**

There are no conservation easements located within or adjacent to the right-of-way for the Proposed 115 kV Overhead Route, the 230 kV Overhead Alternative, or the Underground Option.

#### **10. Scenic Rivers**

The portion of the Rappahannock River that would be crossed by the Proposed 115 kV Overhead Route, the 230 kV Overhead Alternative, and Underground Option is listed as a Potential Scenic River by the Virginia Department of Conservation and Recreation's Scenic River Program. See DEQ Supplement Attachment 2.F.1. Potential Scenic River Designation identifies areas identified as being worthy of future study for qualification and possible designation in the Scenic River Program.

#### **11. Recreational Areas**

The existing corridor, Proposed 115 kV Overhead Route, 230 kV Overhead Alternative and Underground Option all cross the Captain John Smith Chesapeake National Historic Trail and the Lancaster County Rappahannock River Through Trail along the Rappahannock River. Neither construction nor operation of the project facilities will impede the use of either water trail.

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

- G. List any airports where the proposed route would place a structure or conductor within the glide path of the airport. Advise of contacts and results of contacts made with appropriate officials regarding the effect on the airport's 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 nearest airport is Hummel Field (W75), which is located about 1 mile southwest of the Rebuild Project area.

#### **Proposed 115 kV Overhead Route**

Based on the current plans, the proposed transmission line structures for the Proposed Route will range in height from 40 to 173 feet in height. Dominion Virginia Power evaluated the Part 77 civil airport imaginary surfaces associated with Hummel Field and determined that the heights of the proposed structures will not penetrate any of the civil airport imaginary surfaces associated with Hummel Field.

The Company submitted a Notice of Proposed Construction or Alteration to the FAA for the 115 kV Transmission Line Rebuild structures and received a *Determination of No Hazard to Air Navigation* from the FAA for all the structures.

#### **230 kV Overhead Alternative**

Based on the current plans, the proposed transmission line structures for the 230 kV Alternate Route will range in height from 40 to 180 feet in height. Dominion Virginia Power evaluated the Part 77 civil airport imaginary surfaces associated with Hummel Field and determined that the heights of the proposed structures will not penetrate any of the civil airport imaginary surfaces associated with Hummel Field.

#### **Underground Option**

Based on the current plans, the proposed transmission line structures associated with the Transition Stations for the Underground Option will be approximately 80 feet in height. Dominion Virginia Power evaluated the Part 77 civil airport imaginary surfaces for the existing facilities and determined that the heights of the proposed structures will not exceed the most restrictive obstacle clearance surface.



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

- H. Advise of any scenic byways that are in close proximity to or 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 highway's crossings.**

**Response:** No scenic byways are crossed by the Proposed 115 kV Overhead Route, the 230 kV Overhead Alternative, or the Underground Option.

#### IV. HEALTH ASPECTS OF EMF

- A. State the calculated maximum electric and magnetic field (EMF) levels that are expected to occur at the edge of the right-of-way. If the new transmission line is to be constructed on an existing electric transmission line right-of-way, provide the present EMF levels as well as the maximum levels calculated at the edge of right-of-way after the new line is operational.

Response: Public exposure to magnetic fields is best estimated by field levels from power lines 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 transmission line and the rebuilt 115 kV transmission line. EMF levels are provided for both historical (2015) and future (2017) annual average and maximum (peak) loading conditions.

EMF levels at the edge of the rights-of-way for the proposed Rebuild Project at historical average loading:

##### Existing lines – Average historical loading in 2015

EMF levels were calculated for the existing lines at the *historical average* load condition (78 amps for Line #65) and at an operating voltage of 115 kV when supported on existing structures – see Attachments II.A.3.a through d.

These field levels are calculated at mid-span where the conductors are closest to the ground and the conductors are at an average historical load operating temperature and at a clearance to mean high water and ground respectively of 45.5 feet and 23.5 feet for Line #65.

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

	<u>Eastern Edge</u>		<u>Western Edge</u>	
	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)
<u>Attachment II.A.3.a</u>	0.439	3.611	0.439	3.611
<u>Attachment II.A.3.b</u>	0.416	3.185	0.427	3.185
<u>Attachment II.A.3.c</u>	0.184	1.287	0.307	2.942
<u>Attachment II.A.3.d</u>	0.277	2.131	0.230	2.023

### Existing lines – Peak historical loading in 2015

EMF levels were calculated for the existing lines at the **historical peak** load condition (509 amps for Line #65) and at an operating voltage of 115 kV when supported on existing structures – see Attachments II.A.3.a, through d.

These field levels are calculated at mid-span where the conductors are closest to the ground and the conductors are at a peak historical load operating temperature and at a clearance to mean high water and ground respectively of 45.5 feet and 23.5 feet for Line #65.

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

	<u>Eastern Edge</u>		<u>Western Edge</u>	
	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)
<u>Attachment II.A.3.a</u>	0.442	23.695	0.471	23.770
<u>Attachment II.A.3.b</u>	0.418	20.848	0.428	20.848
<u>Attachment II.A.3.c</u>	0.185	8.416	0.309	19.288
<u>Attachment II.A.3.d</u>	0.277	13.942	0.231	12.232

### Proposed Rebuild Project – Average historical loading in 2015

EMF levels were calculated for the proposed Rebuild Project at the **historical average** load condition (78 amps for Line #65) and at an operating voltage of 120.75 kV when supported on the proposed Rebuild Project structures – see Attachments II.A.3.e through h.

These field levels are calculated at mid-span where the conductors are closest to the ground and the conductors are at a historical average load operating temperature and at a clearance to mean high water and ground respectively of 45.5 feet and 23.5 feet for Line #65.

EMF levels at the edge of the rights-of-way for the proposed Rebuild Project at historical average loading:



	<u>Eastern Edge</u>		<u>Western Edge</u>	
	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)
<u>Attachment II.A.3.e</u>	0.277	2.95	0.277	2.95
<u>Attachment II.A.3.f</u>	0.432	3.742	0.432	3.742
<u>Attachment II.A.3.g</u>	0.340	2.963	0.401	2.886
<u>Attachment II.A.3.h</u>	0.265	1.696	0.167	1.675

### **Proposed Rebuild Project – Peak historical loading in 2015**

EMF levels were calculated for the proposed Rebuild Project at the *historical peak* load condition (509 amps for Line #65) and at an operating voltage of 115 kV when supported on existing structures – see Attachments II.A.3.e through h.

These field levels are calculated at mid-span where the conductors are closest to the ground and the conductors are at a peak historical load operating temperature and at a clearance to mean high water and ground respectively of 45.5 feet and 23.5 feet for Line #65.

EMF levels at the edge of the rights-of-way for the proposed Rebuild Project at historical peak loading:

	<u>Eastern Edge</u>		<u>Western Edge</u>	
	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)
<u>Attachment II.A.3.e</u>	0.275	19.612	0.279	19.629
<u>Attachment II.A.3.f</u>	0.442	24.852	0.442	24.852
<u>Attachment II.A.3.g</u>	0.341	19.437	0.402	18.928
<u>Attachment II.A.3.h</u>	0.267	11.181	0.168	11.045

### **Proposed Rebuild Project – Projected average loading in 2017**

EMF levels were calculated for the Rebuild Project at the *projected average* load condition (88 amps for Line #65) and at an operating voltage of 120.75 kV when supported on existing structures – see Attachments II.A.3.e through h.

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

operating temperature and at a clearance to mean high water and ground respectively of 45.5 feet and 23.5 feet for Line #65.

EMF levels at the edge of the rights-of-way for the proposed Rebuild Project at projected average loading:

	<u><b>Eastern Edge</b></u>		<u><b>Western Edge</b></u>	
	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)
<u>Attachment II.A.3.e</u>	0.273	3.373	0.277	3.376
<u>Attachment II.A.3.f</u>	0.433	4.223	0.433	4.223
<u>Attachment II.A.3.g</u>	0.340	3.345	0.401	3.258
<u>Attachment II.A.3.h</u>	0.265	1.914	0.167	1.890

#### **Proposed Rebuild Project – Peak loading in 2017**

EMF levels were calculated for the Rebuild Project at the *projected peak* load condition (561 amps for Line #65) and at an operating voltage of 115 kV when supported on existing structures – see Attachments II.A.3.e through h.

These field levels are calculated at mid-span where the conductors are closest to the ground and the conductors are at an average historical load operating temperature and at a clearance to mean high water and ground respectively of 45.5 feet and 23.5 feet for Line #65.

EMF levels at the edge of the rights-of-way for the proposed Rebuild Project at projected peak loading:

	<u><b>Eastern Edge</b></u>		<u><b>Western Edge</b></u>	
	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)
<u>Attachment II.A.3.e</u>	0.275	21.643	0.279	21.661
<u>Attachment II.A.3.f</u>	0.445	27.504	0.445	27.504
<u>Attachment II.A.3.g</u>	0.342	21.444	0.403	20.883
<u>Attachment II.A.3.h</u>	0.268	12.350	0.169	12.200

#### IV. HEALTH ASPECTS OF EMF

- B. If Company 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 foundation of the Company's opinion is the conclusions of expert panels formed by national and international scientific agencies; 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.

Major reviews on this topic, in order of their most recent publication, include those published by the European Health Risk Assessment Network on Electromagnetic Fields Exposure (EFHRAN),<sup>4</sup> the International Commission on Non-Ionizing Radiation Protection (ICNIRP), the Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR), the World Health Organization (WHO), and the International Committee on Electromagnetic Safety (ICES) (EFHRAN, 2010; ICNIRP, 2003, 2010; SCENIIR 2007, 2009; WHO, 2007; ICES, 2002).

Research on this topic varies widely in its approach. Some studies evaluate the effects of high EMF exposures not typically found in peoples' day-to-day lives, while others evaluate the effects of common EMF exposures. The studies evaluate long-term effects (e.g., cancer, neurodegenerative diseases, and reproductive effects) and short-term biological responses. This research includes hundreds of epidemiology studies of people in their natural environment and laboratory studies of animals (*in vivo*) and isolated cells and tissues (*in vitro*). Standard scientific procedures are used by the expert panels to identify, review and summarize this large and diverse research area.

The general scientific consensus of the health agencies reviewing this research is that at levels associated with the operation of the proposed transmission line, or other common sources of EMF in the environment, the research does not support the conclusion that EMF causes any long-term, adverse health effects.

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

---

<sup>4</sup> EFHRAN is funded by the European Commission's Executive Agency for Health and Consumers.



#### **IV. HEALTH ASPECTS OF EMF**

**C. Describe any research studies the Company 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 previously been reported and/or provide substantial additional insight into previous findings; and**
- 3. Have been subjected to peer review.**

**Response:** The Virginia Department of Health's most recent review of studies on EMF was completed in 2000; many peer-reviewed research studies have become available since that time and were reviewed by the scientific organizations discussed above. The WHO recently conducted one of the most comprehensive and detailed reviews, which summarized peer-reviewed research published through early 2006 (WHO, 2007).

Research published in the peer-reviewed literature subsequent to the WHO report has been reviewed by several scientific organizations, all of which support the conclusions of the WHO (2007) report, including:

- The Health Council of the Netherlands (HCN) reviewed new research in 2007.
- SCENIHR, a committee of the European Commission, published their most recent assessment in 2009.
- The Swedish Radiation Protection Authority (SSI) updates their review annually; their most recent review evaluated research through 2007 (SSI, 2008).
- EFHRAN published the most recent review in February 2010.

These reviews can be consulted for commentary on recent studies. In addition, other recent peer-reviewed studies (e.g., Chung et al., 2010; Coble et al., 2009; Kheifets et al., 2010a, 2010b; Kroll et al., 2010; McNamee et al., 2010) provide evidence that clarifies previous findings.

- Chung et al. (2010) found no difference in lymphoma rates between cancer-prone mice exposed long-term to strong magnetic fields and an unexposed control group. Mice were exposed 21 hours per day for 40 weeks to magnetic fields up to 5,000 mG, which is hundreds to thousands of times greater than routine residential exposures. This study

is consistent with previous *in vivo* studies that found no evidence that magnetic fields promote the development of lymphoma or leukemia in laboratory animals.

- Coble et al. (2009) conducted a case-control study in the United States of brain tumors (gliomas and meningiomas) in U.S. workers. This study was advanced because several different measures were used to assess individual exposure, and exposure duration was incorporated into lifetime magnetic-field exposure. No association was reported between any of the exposure metrics and brain tumors. This study's strengths are its large size and advanced exposure assessment.
- Kheifets et al. (2010a) conducted a pooled analysis of epidemiologic studies of childhood brain tumors and magnetic fields to explore the association in the larger pooled population. Ten case-control studies of childhood brain tumors were identified that met the inclusion criteria. No statistically significant associations with brain tumors were found in any of the three exposure levels, compared to average exposure less than 1 mG. A sub-group of five studies with information on calculated or measured magnetic fields greater than 3-4 mG reported a combined odds ratio that was elevated but not statistically significant.
- Kheifets et al (2010b) pooled data from studies of childhood leukemia and magnetic fields to update the previous meta-analyses on this topic published in 2000. The authors identified seven subsequent case-control studies of childhood leukemia that included measured or calculated magnetic field levels. Results showed an overall weak association with leukemia for the highest estimated long-term average exposure level (4 mG or higher) that was slightly elevated, but could not be distinguished from chance. This study confirms a positive association between average magnetic field levels greater than 3 mG and childhood leukemia, but the association could not be distinguished from chance due to small numbers.
- Kroll et al. (2010) re-evaluated a previous study in the United Kingdom that had reported childhood leukemia was associated with distance of a child's home at birth from a power line (Draper et al, 2005). Distance is considered a poor estimate of magnetic field exposure; therefore, Kroll et al. repeated the study using calculated magnetic field levels from nearby power lines. The results showed a weak, non-significant association between leukemia and the calculated magnetic fields from high-voltage power lines. As a result of small numbers and incomplete information, no strong conclusions can be drawn from this study.
- Recent research by McNamee et al. (2010a) examined how acute exposure of human subjects to 60-Hz magnetic fields affected human heart rate, heart rate variability and skin blood perfusion; no effects of

exposure to an 18,000 mG magnetic field on these measures were reported. A similar study by these investigators also reported no effects of these parameters at a lower magnetic field intensity of 2,000 mG (McNamee et al., 2010b).

## References

Chung M-K, Yu W-J, Kim Y-B, Myung S-H. Lack of a co-promotion effect of 60 Hz circularly polarized magnetic fields on spontaneous development of lymphoma in AKR mice. *Bioelectromagnetics* 31:130-139, 2010.

Coble JB, Dosemeci M, Stewart PA, Blair A, Bowman J, Fine HA, Shapiro WR, Selker RG, Loeffler JS, Black PM, Linet MS, Inskip PD. Occupational exposure to magnetic fields and the risk of brain tumors. *Neuro Oncol*, 2009. Epub in advance of publication DOI:10.1215/15228517-2009-002

European Health Risk Assessment Network on Electromagnetic Fields Exposure (EFHRAN). Risk Analysis of Human Exposure to Electromagnetic Fields. Executive Agency for Health and Consumers, February 2010.

<http://efhran.polimi.it/dissemination.html>

International Commission on Non-Ionizing Radiation Protection (ICNIRP). Exposure to Static and Low Frequency Electromagnetic Fields, Biological Effects and Health Consequences (0-100 kHz) – Review of the Scientific Evidence on Dosimetry, Biological Effects, Epidemiological Observations, and Health Consequences Concerning Exposure to Static and Low Frequency Electromagnetic Fields (0-100 kHz). Matthes R, McKinlay AF, Bernhardt JH, Vecchia P, Beyret B (eds.). International Commission on Non-Ionizing Radiation Protection, 2003.

<http://www.icnirp.net/documents/RFReview.pdf>

Kheifets L, Ahlbom A, Crespi CM, Feychting M, Johanson C, Monroe J, Murphy MFG, Oksuzyan S, Preston-Martin S, Roman E, Saito T, Savitz D, Schuz J, Simpson J, Swanson J, Tynes T, Verkasalo P, Mezei G. A pooled analysis of extremely low-frequency magnetic fields and childhood brain tumors. *American Journal of Epidemiology* 172:752-761, 2010a.

Kheifets L, Ahlbom A, Crespi CM, Draper G, Hagihara J, Lowenthal RM, Mezei G, Oksuzyan S, Schuz J, Swanson J, Titarelli A, Vinceti M, Wunsch Filho V. Pooled analysis of recent studies on magnetic fields and childhood leukemia. *Br J Cancer* 103:1128-1135, 2010b.

Kroll ME, Swanson J, Vincent TJ, Draper GJ. Childhood cancer and magnetic fields from high-voltage power lines in England and Wales: a case-control study. *Br J Cancer* 103:1122-1127, 2010.



McNamee DA, Corbacio M, Weller JK, Brown S, Prato FS, Thomas AW, Legros AG. The cardiovascular response to an acute 1800- $\mu$ T, 60-Hz magnetic field exposure in humans. *Int Arch Occup Environ Health* 83:441-454, 2010a.

McNamee DA, Corbacio M, Weller JK, Brown S, Stodilka RZ, Prato FS, Bureau Y, Thomas AW, Legros AG. The response of the human circulatory system to an acute 200- $\mu$ T, 60-Hz magnetic field exposure. *Int Arch Occup Environ Health*. DOI 10.1007/s00420-010-0543-1. 4 May 2010b.

Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR). Possible Effects of Electromagnetic Fields (EMF) on Human Health. European Commission. Directorate C – Public Health and Risk Assessment, 2007.

[http://ec.europa.eu/health/ph\\_risk/committees/04\\_scenihhr/docs/scenihhr\\_o\\_007.pdf](http://ec.europa.eu/health/ph_risk/committees/04_scenihhr/docs/scenihhr_o_007.pdf)

Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) for the Directorate-General for Health & Consumers of the European Commission. Health Effects of Exposure to EMF. January 2009.

[http://ec.europa.eu/health/archive/ph\\_risk/committees/04\\_scenihhr/docs/scenihhr\\_o\\_022.pdf](http://ec.europa.eu/health/archive/ph_risk/committees/04_scenihhr/docs/scenihhr_o_022.pdf)

Swedish Radiation Protection Authority (SSI). Fifth annual report from SSI's Independent Expert Group on Electromagnetic Fields, 2007: Recent Research on EMF and Health Risks. SSI Rapport 2008:12.

[http://www.who.int/peh-emf/publications/reports/SWEDENssi\\_rapp\\_2007.pdf](http://www.who.int/peh-emf/publications/reports/SWEDENssi_rapp_2007.pdf)

World Health Organization (WHO). Environmental Health Criteria 238: Extremely Low Frequency (ELF) Fields. WHO, Geneva, Switzerland, ISBN 978-92-4-157238-5, 2007.

[http://www.who.int/peh-emf/publications/elf\\_ehc/en/index.html](http://www.who.int/peh-emf/publications/elf_ehc/en/index.html)

## 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.**

Response: A map showing the route to be used for the Rebuild Project is provided as Attachment V.A. A written description of the route is as follows:

### Proposed 115 kV Overhead Route

The Proposed 115 kV Overhead Route of the Rebuild Project is a 2.2-mile segment of an existing single circuit 115 kV transmission line, Harmony Village-Northern Neck Line #65. The Proposed Route originates east of Mary Ball Road (State Route 3) in Middlesex County and heads northeast for approximately 0.3 mile, where it crosses the Rappahannock River for approximately 1.9 miles utilizing an 80-foot right-of-way permitted by the VMRC, which expands to 200 feet to at two sections in the center span of the Robert O. Norris Bridge ("Norris Bridge") to accommodate the fender system on either side of the navigation channel in the river. The centerline of the proposed structures in the river will be located approximately 100 feet east of Norris Bridge. Once coming ashore on the northern bank of the Rappahannock River, the Proposed Route travels less than 0.1 mile (150 feet) in a northeasterly direction before ending at the first structure on land in Lancaster County.

### 230 kV Overhead Alternative

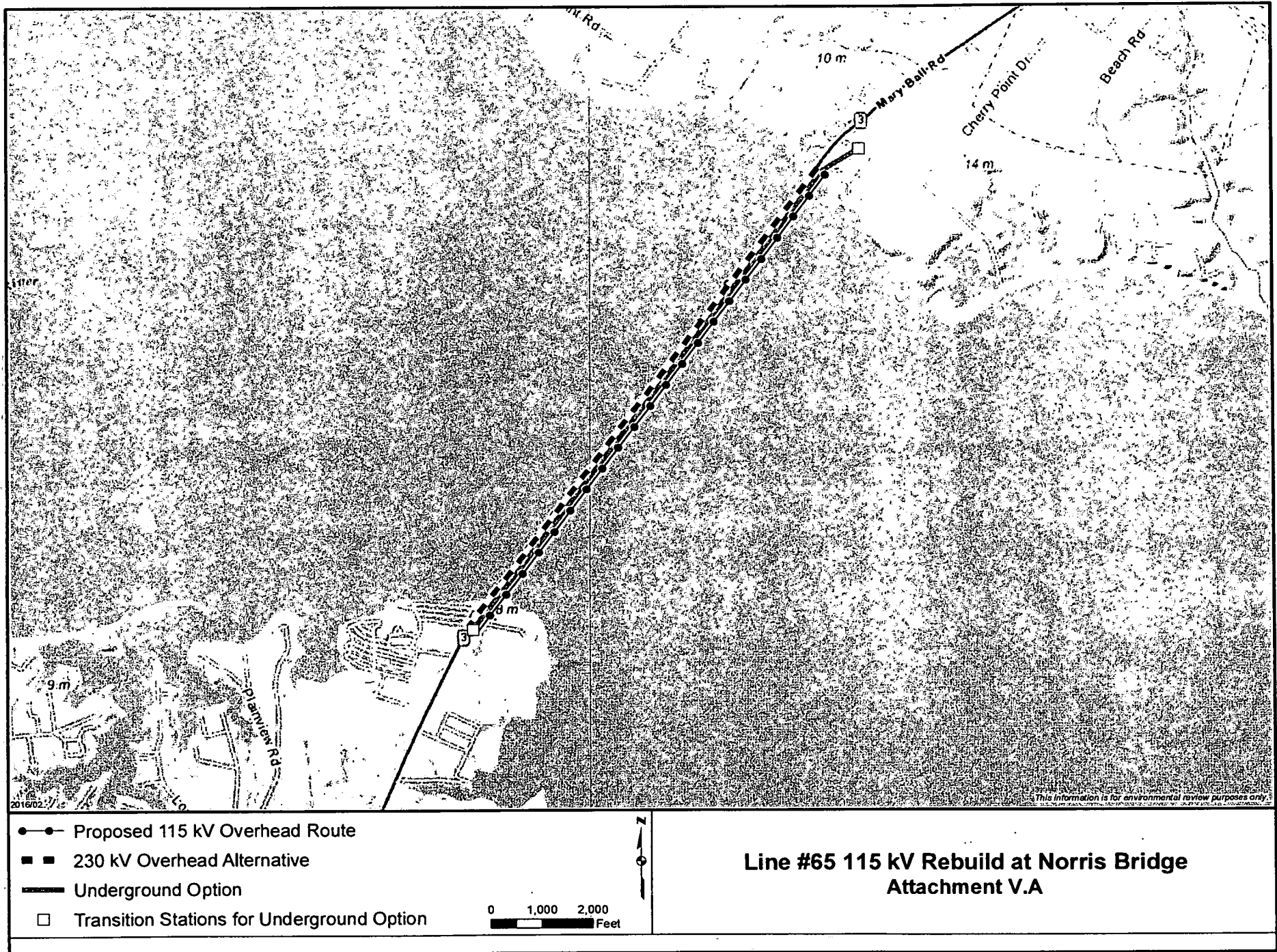
The 230 kV Overhead Alternative would rebuild a portion of the existing single circuit 115 kV transmission line, Harmony Village-Northern Neck Line #65, along the same 2.2-mile Proposed 115 kV Overhead Route described above, except that the right-of-way would need to be expanded by three feet in Middlesex County to accommodate the operation of a 230 kV transmission line.

### Underground Option

The Underground Option would replace approximately 2.3 miles of the existing single circuit 115 kV transmission line, Harmony Village-Northern Neck Line #65, with underground and overhead construction. The Underground Option begins east of Mary Ball Road (State Route 3) at the transition station site in Middlesex County and heads northeast for approximately 0.3 mile, where it crosses the Rappahannock River for approximately 1.9 miles and would require an 80 to 100-foot right-of-way and two splice locations measuring 650-feet long and 200-feet wide. The centerline of the cables beneath the river will be located approximately 100 feet east of Norris Bridge. Once coming ashore on the northern bank of the Rappahannock River, the Underground Option travels 0.2 mile in a

northeasterly direction before ending at the transition station site in Lancaster County.





**V. NOTICE**

**B. List Company offices at which members of the public may inspect the application.**

Response: The application is available at the following locations:

Dominion Virginia Power  
701 East Cary Street, 12th Floor  
Richmond, Virginia 23219  
Attn: Amanda Mayhew

Lancaster County  
8311 Mary Ball Road  
Lancaster, Virginia 22503  
Attn: Mr. Frank Pleva

Middlesex County  
877 General Puller Highway  
Saluda, Virginia 23149  
Attn: Mr. Matt Walker

**V. NOTICE**

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

Response: Ms. Bettina Sullivan, Manager *[2 electronic]*  
(Via Ms. Valerie Fulcher, Executive Secretary Senior)  
Office of Environmental Impact Review  
Department of Environmental Quality  
629 East Main Street  
Richmond, Virginia 23219

Robbie Rhur *[electronic]*  
Department of Conservation and Recreation  
600 E Main Street, 17<sup>th</sup> floor  
Richmond, Virginia 23219

Ms. Rene Hypes *[electronic]*  
Virginia Natural Heritage Program  
Virginia Department of Conservation and Recreation  
600 East Main Street, 24th Floor  
Richmond, Virginia 23219

Ms. Julie Langan, Director *[electronic]*  
Virginia Department of Historic Resources  
2801 Kensington Avenue  
Richmond, Virginia 23221

Ms. Amy M. Ewing *[electronic]*  
Environmental Services Biologist  
Virginia Department of Games and Inland Fisheries  
7870 Villa Park Dr.  
Suite 400  
Henrico, Virginia 23228

Mr. Keith Tignor  
Endangered Species Coordinator  
Virginia Department of Agriculture and Consumer Affairs  
102 Governor Street  
Richmond, Virginia 23219



Mr. Todd Groh *[electronic]*  
Virginia Department of Forestry  
Fontaine Research Park  
900 Natural Resources Drive, Suite 800  
Charlottesville, Virginia 22903

John Bull, Commissioner  
(Via Ms. Jane McCroskey, Commission Secretary)  
Virginia Marine Resources Commission Main Office  
2600 Washington Avenue, 3<sup>rd</sup> Floor  
Newport News, Virginia 23607

Mr. Frank Pleva  
Lancaster County  
County Administrator  
8311 Mary Ball Road  
Lancaster, Virginia 22503

Mr. Don Gill  
Lancaster Planning and Land Use Director  
8311 Mary Ball Road  
Lancaster, Virginia 22503

Mr. Wally Horton  
Middlesex Director of Planning and Community Development  
P.O Box 428  
Saluda, Virginia 23149

Mr. Matt Walker  
Middlesex County Administrator  
877 General Puller Highway  
Saluda Virginia 23149

Karen Mayne, Supervisor  
Virginia Field Office  
US Fish and Wildlife Service  
Ecological Services  
6669 Short Lane  
Gloucester, Virginia 23061

Tucker Smith, Northern Section Chief  
US Army Corps of Engineers  
Norfolk District – Main Office  
803 Front Street  
Norfolk, Virginia 23510



## **WITNESS DIRECT TESTIMONY SUMMARY**

**Witness:** Dennis D. Kaminsky

**Title:** Consulting Engineer – Electric Transmission Planning

**Summary:**

In order to maintain the structural integrity and reliability of its transmission system and perform needed maintenance on its existing facilities, the Company proposes to rebuild an approximately 2.2-mile segment of an existing single circuit 115 kV transmission line, Harmony Village-Northern Neck Line #65, including (1) approximately 0.3 mile on land entirely within the existing right-of-way on both sides of the Rappahannock River in Lancaster County (less than 0.1 mile) and Middlesex County (approximately 0.3 mile); and (2) a 1.9-mile section of Line #65 in the Rappahannock River utilizing an 80-foot right-of-way permitted by the Virginia Marine Resources Commission, which expands to 200 feet at two sections in the center span of the Robert O. Norris Bridge to accommodate the fender system on either side of and parallel to the navigational channel in the river. Collectively, this 2.2-mile segment of Line #65 between White Stone Substation and Harmony Village Substation in Lancaster and Middlesex Counties, respectively, is the proposed Rebuild Project.

Company Witness Dennis D. Kaminsky provides an overview of the Company's transmission system and its obligations as a member of PJM.

Mr. Kaminsky next describes how the proposed Rebuild Project will replace aging infrastructure at the end of its service life with infrastructure built to today's standards and remove impediments that are presently degrading the integrity of the entire Line #65. Mr. Kaminsky describes the issues with outages and damage that have occurred on Line #65 as a result of its partial attachment to Norris Bridge.

Mr. Kaminsky explains how after several years of compromised reliability and operational problems on the entire Line #65 due to the impact of the Norris Bridge line attachment and the condition of the associated facilities, the Rebuild Project was submitted by the Company to PJM in the spring of 2014, as an Operational Performance upgrade and accepted by PJM as such on November 5, 2014.



**DIRECT TESTIMONY  
OF  
DENNIS D. KAMINSKY  
ON BEHALF OF  
VIRGINIA ELECTRIC AND POWER COMPANY  
BEFORE THE  
STATE CORPORATION COMMISSION OF VIRGINIA  
CASE NO. PUE-2016-00021**

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

3   A.   My name is Dennis D. Kaminsky, and I am a Consulting Engineer in the Electric  
4       Transmission Planning Department for Dominion Virginia Power. My office is located  
5       at One James River Plaza, 701 East Cary Street, Richmond, Virginia 23219.

6   **Q.    What is your educational and professional background?**

7   A.   I am a 1982 graduate of Western Michigan University with a Bachelor’s Degree in  
8       Electrical Engineering. I started with the Company in May 1983 as an Associate  
9       Engineer in the System Protection Department, and since then my experience has  
10      included System Protection, Transmission and Distribution Projects, Substation  
11      Construction and Maintenance, Distribution Planning, Regional Operations, and  
12      Transmission Planning. I was promoted to Consulting Engineer in April 2007 and then  
13      transferred to my present position in the Electric Transmission Planning Department in  
14      October 2008.

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

16   A.   I am responsible for planning the Company’s electric transmission system in the central  
17      region of Virginia for voltages 115 kV through 230 kV.

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

2    A.    In order to maintain the structural integrity and reliability of its transmission system and  
3           perform needed maintenance on its existing facilities, the Company proposes to rebuild  
4           an approximately 2.2-mile segment of an existing single circuit 115 kV transmission line,  
5           Harmony Village-Northern Neck Line #65, including (1) approximately 0.3 mile on land  
6           entirely within the existing right-of-way on both sides of the Rappahannock River in  
7           Lancaster County (less than 0.1 mile) and Middlesex County (approximately 0.3 mile);  
8           and (2) a 1.9-mile section of Line #65 in the Rappahannock River utilizing an 80-foot  
9           right-of-way permitted by the Virginia Marine Resources Commission (“VMRC”), which  
10          expands to 200 feet at two sections in the center span of the Robert O. Norris Bridge  
11          (“Norris Bridge”) to accommodate the fender system on either side of and parallel to the  
12          navigational channel in the river. Collectively, this 2.2-mile segment of Line #65  
13          between White Stone Substation and Harmony Village Substation in Lancaster and  
14          Middlesex Counties, respectively, is the proposed rebuild project (the “Rebuild Project”).

15         The purpose of my testimony is to discuss the need for, and benefits of, the proposed  
16         Rebuild Project. I am also sponsoring Sections I.B, I.C and I.E, I.F, I.H and I.I of the  
17         Appendix. I am also co-sponsoring Section I.A with Company Witness Jacob G. Heisey.

18   **Q.    Please provide an overview of the Company’s transmission system and transmission**  
19   **planning process.**

20    A.    Dominion Virginia Power’s transmission system is responsible for providing  
21           transmission service to the Company’s retail customers and also to Appalachian Power  
22           Company (APCo), Old Dominion Electric Cooperative (ODEC), Northern Virginia  
23           Electric Cooperative (NOVEC), Central Virginia Electric Cooperative (CVEC), and

1 Virginia Municipal Electric Association (VMEA) for redelivery to their retail customers  
2 in Virginia, as well as to North Carolina Electric Membership Corporation (NCEMC) and  
3 North Carolina Eastern Municipal Power Agency (NCEMPA) for redelivery to their  
4 customers in North Carolina. The Company needs to be able to maintain the overall,  
5 long-term reliability of its transmission system, as its customers require more power in  
6 the future.

7 Dominion Virginia Power is part of the Eastern Interconnection transmission grid,  
8 meaning it is interconnected, directly or indirectly, with all of the other transmission  
9 systems in the U.S. and Canada between the Rocky Mountains and the Atlantic coast,  
10 except Quebec and most of Texas. All of the transmission systems in the Eastern  
11 Interconnection are dependent on each other for support in moving bulk power through  
12 the transmission system and for reliability support. Dominion Virginia Power's service to  
13 its customers is extremely reliant on a robust and reliable regional transmission system.

14 Dominion Virginia Power also is part of the PJM regional transmission organization  
15 (RTO) providing service to a large portion of the eastern United States. PJM is currently  
16 responsible for ensuring the reliability and coordinating the movement of electricity  
17 through all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New  
18 Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the  
19 District of Columbia. This service area has a population of about 60 million and on July  
20 21, 2011, set a record high of 158,450 MW for summer peak demand, of which  
21 Dominion Virginia Power's load portion was approximately 19,636 MW serving 2.4  
22 million customers. On July 22, 2011, the Company set a record high of 20,061 MW for  
23 summer peak demand. On February 20, 2015, the Company set a winter and all-time



1 record demand of 21,651 MW. Moreover, based on the 2016 PJM Load Forecast, the  
2 Dominion Zone is expected to be one of the fastest growing zones in PJM with an  
3 average summer peak load growth rate of 1.2% over the next 10 years compared to the  
4 PJM average of 0.6% over the same period.

5 **Q. Please describe the present transmission system in the vicinity of the proposed**  
6 **Rebuild Project.**

7 A. Existing Harmony Village-Northern Neck Line #65 is part of the Company's 230 and  
8 115 kV network, which supports the delivery of generation to retail and wholesale  
9 customers. This line supports the network in the Northern Neck area and provides direct  
10 delivery to the customers served out of the Company's White Stone, Ocran, and  
11 Lancaster Substations, as well as the 115 kV NNEC Garner DP. There are presently  
12 almost 19,000 customers served, including over 6,200 NNEC customers.

13 **Q. Why do the proposed facilities need to be built at this time?**

14 A. The Rebuild Project is necessary to assure that Dominion Virginia Power can maintain  
15 and improve reliable electric service consistent with the Company's obligation under  
16 Virginia law to serve retail electric customers in its exclusive service territory.  
17 Specifically, the proposed Rebuild Project will replace aging infrastructure at the end of  
18 its service life with infrastructure built to today's standards and remove impediments that  
19 are presently degrading the integrity of the entire Line #65, thereby enabling the  
20 Company to maintain and improve the overall long-term reliability of its transmission  
21 system.

1 This segment of Line #65 was built in 1962, is nearing its anticipated lifespan and has  
2 been damaged in the past as a result of debris from bridge traffic. Moving this line  
3 segment to structures in the river built to today's standards will result in better clearances  
4 for safety and reliability. Keeping Line #65 in a network configuration by avoiding  
5 planned VDOT bridge outages will maintain the strength of the local network and allow  
6 for quicker restoration when unplanned outages occur. Compared to the system rate, a  
7 significant number of unplanned outages affecting the entire Line #65 due to the bridge  
8 attachment have occurred. Since 2010 there have been seven unplanned outage events  
9 that occurred on the Norris Bridge water crossing. This is 30 times the annual rate/mile  
10 that Dominion Virginia Power has set for its goal for its entire overhead transmission  
11 system of approximately 6,400 miles. This large number of outages has occurred even  
12 though this segment of line has been de-energized over 50% of the time since 2010 due to  
13 VDOT maintenance. This outage number would likely be much higher if this segment  
14 had been in service the entire time. Insulators on the bridge attachments have also  
15 reached the end of their service lives. Damaged insulators attached to the Norris Bridge  
16 reduce the integrity of the insulators and can lead to electrical flashover from the line to  
17 ground due to the reduced insulation value, which will result in unplanned outages on the  
18 entire Line #65.

19 Any Company work on the remainder of Line #65, including upgrades or repairs, needs  
20 to be scheduled during times when VDOT is not performing bridge maintenance. VDOT  
21 bridge maintenance between 2010 and 2012 resulted in a two-year delay to a NERC  
22 Reliability project to upgrade Line #65 between Garner DP and Lancaster Substation.  
23 The North American Reliability Corporation ("NERC") Reliability Standard TPL-001-4

1 effective January 1, 2015, now requires that planned outages to the transmission system  
2 longer than six months in duration be modeled as normal system conditions as noted in  
3 Section B under Requirement R1, item 1.1.2 (see [http://www.nerc.com/files/TPL-001-](http://www.nerc.com/files/TPL-001-4.pdf)  
4 4.pdf). This requirement states that System models shall be maintained for performing  
5 the studies needed to complete the Planning assessment. This requirement will result in  
6 NERC violations starting as soon as 2018, if VDOT outages longer than six months on  
7 the Line #65 bridge attachment are modeled as normal system conditions in the future  
8 years.

9 The radial configuration of Line #65 (in which the segment of Line #65 between  
10 Harmony Village and White Stone Substations is de-energized and isolated from the rest  
11 of Line #65) during unplanned and planned outages, including VDOT bridge  
12 maintenance, results in compromise to the reliability of the local transmission network.  
13 Unplanned outages that occur on the remainder of Line #65 during this configuration will  
14 be longer in duration and result in less reliable delivery of electric power to the four  
15 distribution DPs (i.e., Garner DP (feeds NNEC), Lancaster Substation, Ocran Substation,  
16 White Stone Substation) fed from Line #65. This radial configuration occurs during  
17 outages on the segment of Line #65 attached to the Norris Bridge for VDOT  
18 maintenance. Since 1999, there have been 21 planned outages for VDOT bridge  
19 maintenance on this line segment for a total of 2,175 days, which averages to over 135  
20 days per year or 37% of the time that this line has been in a radial configuration.

21 Accordingly, after several years of compromised reliability and operational problems on  
22 the entire Line #65 due to the impact of the Norris Bridge line attachment and the  
23 condition of the associated facilities, the Rebuild Project was submitted by the Company



1 to PJM Interconnection L.L.C. ("PJM") in June 2014, as an Operational Performance  
2 upgrade and accepted by PJM as such on November 5, 2014. The failure to address the  
3 critical structural and operational deficiencies associated with the existing structures and  
4 bridge attachments identified in the Rebuild Project will limit the Company's ability to  
5 maintain reliable transmission service.

6 **Q. Did the Company consider whether there are feasible alternatives to construction of**  
7 **the proposed transmission facilities?**

8 A. The existing 115 kV single circuit Harmony Village-Northern Neck Line #65 plays an  
9 important role in the reliable operation of the Company's electric transmission system.  
10 As detailed in Section I.A of the Appendix, the Company has recognized that the Rebuild  
11 Project is necessary to replace aging infrastructure at the end of its service life with  
12 infrastructure built to today's standards, as well as remove impediments that are presently  
13 degrading the integrity of the entire Line #65.

14 Discussion of the routing associated with alternatives or options to the Rebuild Project is  
15 presented in Section I.C of the Appendix and in the Alternatives Analysis, and is  
16 addressed by Company Witnesses Amanda Mayhew and Jon Berkin in their pre-filed  
17 direct testimony.

18 **Q. Have you reviewed the demand-side resources incorporated in the Company's**  
19 **planning studies used in support of this application, as directed by the Commission**  
20 **in its Order issued on November 26, 2013 in Case No. PUE-2012-00029?**

21 A. No, not for the proposed Rebuild Project. The need for this Rebuild Project is not based  
22 on the planning studies of the Company or PJM but rather on the need to replace aging

1 infrastructure at the end of its service life with infrastructure built to today's standards  
2 and remove impediments that are presently degrading the integrity of the entire Line #65.

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

4 A. Yes, it does.





### WITNESS DIRECT TESTIMONY SUMMARY

Witness: Jacob G. Heisey

Title: Transmission Line Engineer II

Summary:

In order to maintain the structural integrity and reliability of its transmission system and perform needed maintenance on its existing facilities, the Company proposes to rebuild an approximately 2.2-mile segment of an existing single circuit 115 kV transmission line, Harmony Village-Northern Neck Line #65, including (1) approximately 0.3 mile on land entirely within the existing right-of-way on both sides of the Rappahannock River in Lancaster County (less than 0.1 mile) and Middlesex County (approximately 0.3 mile); and (2) a 1.9-mile section of Line #65 in the Rappahannock River utilizing an 80-foot right-of-way permitted by the Virginia Marine Resources Commission, which expands to 200 feet at two sections in the center span of the Robert O. Norris Bridge to accommodate the fender system on either side of and parallel to the navigational channel in the river. Collectively, this 2.2-mile segment of Line #65 between White Stone Substation and Harmony Village Substation in Lancaster and Middlesex Counties, respectively, is the proposed Rebuild Project.

Mr. Heisey details the engineering considerations driving the need for the Rebuild Project, including the age and degradation of this 2.2 mile segment of Line #65.

Mr. Heisey describes how the seven existing 115 kV wooden H-frames, 14 davit arm style bridge attachments, and all associated hardware assemblies currently supporting Line #65 as it traverses the Rappahannock River will be removed and replaced with 10 galvanized steel H-frame structures on concrete foundations in the Rappahannock River approximately 100 feet east of the Norris Bridge. On the Lancaster County side of the river, one existing wooden three-pole structure will be removed and replaced by a galvanized steel three-pole double deadend structure. On the Middlesex County side of the river, one existing wooden monopole structure will be eliminated entirely and three existing monopoles will be removed and replaced with one double deadend galvanized steel monopole and two weathering steel monopoles. The line will also be re-conducted.

Mr. Heisey explains that the proposed structures were chosen due to specific characteristics making them well-suited for this river crossing. He explains that Rebuild Project is estimated to cost approximately \$26.2 million and take approximately 14 months to construct, subject to time-of-year restrictions per the Corps and VMRC.

Finally, Mr. Heisey provides EMF calculations for the Rebuild Project.

**DIRECT TESTIMONY  
OF  
JACOB G. HEISEY  
ON BEHALF OF  
VIRGINIA ELECTRIC AND POWER COMPANY  
BEFORE THE  
STATE CORPORATION COMMISSION OF VIRGINIA  
CASE NO. PUE-2016-00021**

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

3    A.     My name is Jacob G. Heisey, and I am a Transmission Line Engineer II for the  
4           Company. My office is located at One James River Plaza, 701 East Cary Street,  
5           Richmond, Virginia 23219.

6    **Q.     What is your educational and professional background?**

7    A.     I graduated from Virginia Polytechnic Institute and State University in 2013 with a  
8           Bachelor of Science degree in Civil and Environmental Engineering and a minor in  
9           Green Engineering. Since that time, I have held various engineering titles with the  
10          Company in the Electric Transmission Line Engineering department.

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

12   A.     I am responsible for developing detailed design, material requirements and  
13          construction specifications for new projects and modifications to existing  
14          infrastructure with voltages ranging from 115 kV to 500 kV.

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

16   A.     In order to maintain the structural integrity and reliability of its transmission system  
17          and perform needed maintenance on its existing facilities, Virginia Electric and  
18          Power Company (“Dominion Virginia Power” or the “Company”) proposes to rebuild

1 an approximately 2.2-mile segment of an existing single circuit 115 kV transmission  
2 line, Harmony Village-Northern Neck Line #65, including (1) approximately 0.3 mile  
3 on land entirely within the existing right-of-way on both sides of the Rappahannock  
4 River in Lancaster County (less than 0.1 mile) and Middlesex County (approximately  
5 0.3 mile); and (2) a 1.9-mile section of Line #65 in the Rappahannock River utilizing  
6 an 80-foot right-of-way permitted by the Virginia Marine Resources Commission  
7 ("VMRC"), which expands to 200 feet at two sections in the center span of the Robert  
8 O. Norris Bridge ("Norris Bridge") to accommodate the fender system on either side  
9 of and parallel to the navigational channel in the river. Collectively, this 2.2-mile  
10 segment of Line #65 between White Stone Substation and Harmony Village  
11 Substation in Lancaster and Middlesex Counties, respectively, is the proposed rebuild  
12 project (the "Rebuild Project").

13 The purpose of my testimony is to describe the design characteristics of the  
14 transmission facilities proposed in the Application, and also to provide electric and  
15 magnetic field ("EMF") data for the proposed facilities. I am sponsoring Sections  
16 I.D, I.F, I.G, II.A.3, II.B, II.C and IV of the Appendix. I am also co-sponsoring  
17 Section I.A with Company Witnesses Dennis D. Kaminsky.

18 **Q. What are the transmission engineering considerations driving the need for the**  
19 **Rebuild Project?**

20 **A.** The proposed Rebuild Project will replace aging infrastructure at the end of its  
21 service life with infrastructure built to today's standards and remove impediments  
22 that are presently degrading the integrity of the entire Line #65, thereby enabling the  
23 Company to maintain and improve the overall long-term reliability of its transmission



1 system. In the spring of 2014, this 2.2-mile segment of Line #65 was identified for  
2 removal.

3 This segment of Line #65 was built in 1962, is nearing its anticipated lifespan and has  
4 been damaged in the past as a result of debris from bridge traffic. The close  
5 proximity of this segment of Line #65 to the Norris Bridge deck requires that it be de-  
6 energized anytime bridge maintenance is performed by the Virginia Department of  
7 Transportation (“VDOT”), resulting in compromised reliability of the entire Line #65.  
8 Company maintenance of Line #65 where it is attached to the bridge requires  
9 significant traffic control due to the narrow width of the bridge, putting Company  
10 personnel at risk while performing work in an already difficult environment.

11 Moving this line segment to structures in the river built to today’s standards will  
12 result in better clearances for safety and reliability.

13 According to a Wood Piles Inspection conducted in July 2015, on behalf of the  
14 Company by Crofton Industries, the wooden pile foundations in the river crossing  
15 segment of the Rebuild Project have reached the end of their service lives, exhibiting  
16 hour glassing that results in reduced section, checking and splitting. Insulators on the  
17 bridge attachments have also reached the end of their service lives. Damaged  
18 insulators attached to the Norris Bridge reduce the integrity of the insulators and can  
19 lead to electrical flashover from the line to ground due to the reduced insulation  
20 value, which will result in unplanned outages on the entire Line #65. Accordingly,  
21 after several years of compromised reliability and operational problems on the entire  
22 Line #65 due to the impact of the Norris Bridge line attachment and the condition of

1 the associated facilities, the Rebuild Project was submitted by the Company to PJM  
2 Interconnection L.L.C. ("PJM") in June 2014, as an Operational Performance upgrade  
3 and accepted by PJM as such on November 5, 2014.

4 **Q. Please describe the design of the transmission lines for the proposed Rebuild**  
5 **Project.**

6 A. As part of the Rebuild Project, the seven existing 115 kV wooden H-frames, 14 davit  
7 arm style bridge attachments, and all associated hardware assemblies currently  
8 supporting Line #65 as it traverses the Rappahannock River will be removed and  
9 replaced with 10 galvanized steel H-frame structures on concrete foundations in the  
10 Rappahannock River approximately 100 feet east of the Norris Bridge. On the  
11 Lancaster County side of the river, one existing wooden three-pole structure will be  
12 removed and replaced by a galvanized steel three-pole double deadend structure. On  
13 the Middlesex County side of the river, one existing wooden monopole structure will  
14 be eliminated entirely and three existing monopoles will be removed and replaced  
15 with one double deadend galvanized steel monopole and two weathering steel  
16 monopoles.

17 Approximately 2.2 miles of existing 477 ACSR (24/7) three-phase conductor and one  
18 3#6 static wire will be removed between the existing river bank three-pole structure  
19 in Lancaster County and existing monopole on the Middlesex County bank.  
20 Approximately 2.2 miles of 900 ACSS/TW/HS-285/MM (20/7) three-phase  
21 conductor and two shield wires will be installed between the new three-pole double  
22 deadend in Lancaster County and the existing double deadend monopole in  
23 Middlesex County.

1     **Q.     Why were the proposed structures chosen?**

2     A.     The H-frame structure was selected for the river crossing due to high wave loading on  
3           foundations and wind loadings on the structures, and in order to provide rigidity in  
4           the transverse direction as well as stability longitudinally.  Additionally, the use of H-  
5           frame structures will reduce the anticipated impact to the river bottom caused by the  
6           structure foundations in comparison to a single circuit monopole structure and  
7           associated foundations.  Lastly, H-frame structures allow for an overall reduction in  
8           structure height because of the horizontal configuration of conductor, rather than  
9           stacked vertically.  The Company also considered the minimum clearances previously  
10          authorized by the Corps, while attempting to reasonably minimize the visual impact  
11          to the crossing.  The required conductor clearances across the main river channel will  
12          be maintained; however, the new structures will be taller overall than the current  
13          structures.  The proposed structures in the river will range in height from 101.8 feet to  
14          172.8 feet; the two tallest structures are on either side of the navigational channel.  
15          Attachment II.A.4.b of the Appendix provides approximate heights of the proposed  
16          structures, subject to final engineering design.

17          To allow the rebuild of the existing 115 kV single circuit line in the existing pole line  
18          easement on the Middlesex County (south) side of the river, the proposed land  
19          structures will be monopoles, similar to what currently exists; however, the proposed  
20          structures will be steel rather than wood.  Additionally, the monopole type structure  
21          was selected to limit the impact of the foundation, structure footprint on land and  
22          require fewer danger trees to be cut.

23          On the Lancaster County (north) side of the river, the proposed three-pole structure



1 has a wider pole spacing than the existing three-pole structure. This will aid in the  
2 sequence of construction of the Rebuild Project. Specifically, it allows for the ability  
3 to both install the new structure in the same angle location, or point of intersection,  
4 and for the back spans of conductor to be transferred easily.

5 **Q. Is there any substation work required as part of the Rebuild Project?**

6 A. No, there is no station work needed for or associated with the Rebuild Project.

7 **Q. What is the estimated construction cost for the proposed Rebuild Project?**

8 A. The estimated total cost of the proposed Rebuild Project, which assumes completion  
9 by December 2017, is approximately \$26.2 million (2016 dollars). This includes the  
10 cost to relocate an existing approximately 0.2-mile distribution line on the Middlesex  
11 County side of the Rebuild Project, which is currently underbuilt on three  
12 transmission structures.

13 **Q. How long will it take to construct the proposed Rebuild Project?**

14 A. There is a current and immediate need for the Rebuild Project. If the Company can  
15 obtain a Commission Final Order by November 1, 2016 and the necessary outages,  
16 then the Company anticipates that the Rebuild Project could be in service by  
17 December 2017, consistent with PJM's energization date.

18 The estimated construction time for this Rebuild Project is 14 months. Included in  
19 the construction schedule are time-of-year restrictions per the Corps and the VMRC  
20 permit conditions. The time-of-year restrictions preclude work within 600 feet of the  
21 peregrine falcon nest located at the center span of the bridge from February 15 to July  
22 15. Also, no pile driving is permitted between February 15 and June 30 to protect

1           anadromous fish.

2   **Q.    Have you made calculations of the EMF for the proposed lines?**

3   A.    Yes, and they are shown in Section IV.A of the Appendix for various loading  
4           conditions expected to occur at the edges of the right-of-way. Magnetic field levels  
5           ranging from 1.287 milligauss (“mG”) to 23.770 mG were calculated for existing  
6           lines at the edges of the right-of-way based on historical average and peak loading. In  
7           comparison, magnetic field levels ranging from 1.675 mG to 27.504 mG were  
8           calculated for the proposed Rebuild Project at the edges of the right-of-way based on  
9           average and peak loading expected to occur in 2017 with the Rebuild Project in  
10          service.

11   **Q.    The information you have provided in Section IV.A of the Appendix shows the**  
12          **calculated maximum EMF at the edge of the rights-of-way. How do the**  
13          **strengths of the maximum magnetic fields at the edge of the right-of-way**  
14          **compare to magnetic fields found elsewhere?**

15   A.    Although I did not produce the field strength readings, information and calculations  
16           shown in Appendix Section IV.A can be compared to those created by other electrical  
17           sources. For example, a hair dryer produces 300 mG or more, a copy machine can  
18           produce 90 mG or more, and an electric power saw can produce 40 mG or more,  
19           depending on the circumstances and operation of these devices. The strength of the  
20           field received by the person operating these devices would, of course, depend on the  
21           distance between the device and the person operating it. Magnetic field strength  
22           diminishes rapidly as distance from the source increases. The decrease is  
23           proportional to the inverse square of the distance. For example, a hypothetical

1 magnetic field strength of 10 mG at the edge of the right-of-way (defined as 50 feet  
2 from the centerline) would decrease to 2.5 mG at a point 50 feet outside of the right-  
3 of-way.

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

5 **A.** Yes, it does.





### **WITNESS DIRECT TESTIMONY SUMMARY**

Witness: Amanda M. Mayhew

Title: Senior Siting and Permitting Specialist

Summary:

In order to maintain the structural integrity and reliability of its transmission system and perform needed maintenance on its existing facilities, the Company proposes to rebuild an approximately 2.2-mile segment of an existing single circuit 115 kV transmission line, Harmony Village-Northern Neck Line #65, including (1) approximately 0.3 mile on land entirely within the existing right-of-way on both sides of the Rappahannock River in Lancaster County (less than 0.1 mile) and Middlesex County (approximately 0.3 mile); and (2) a 1.9-mile section of Line #65 in the Rappahannock River utilizing an 80-foot right-of-way permitted by the Virginia Marine Resources Commission, which expands to 200 feet at two sections in the center span of the Robert O. Norris Bridge to accommodate the fender system on either side of and parallel to the navigational channel in the river. Collectively, this 2.2-mile segment of Line #65 between White Stone Substation and Harmony Village Substation in Lancaster and Middlesex Counties, respectively, is the proposed Rebuild Project.

Company Witness Amanda M. Mayhew discusses the right-of-way required for the Rebuild Project and details the Company's initial outreach on the Rebuild Project. She explains that the Proposed Route is expected to have minimal incremental environmental impacts, since it largely represents the wreck and rebuild of a transmission line in existing right-of-way.

Ms. Mayhew describes how, in addition to the Rebuild Project, the Company also considered a 230 kV Overhead Alternative along the Proposed route and a 115 kV Underground Transmission Line Alternative. She explains that the 230 kV Overhead Alternative was not selected by the Company as the proposed route because there is no foreseeable need for 230 kV operations. The Underground Option was not selected as the proposed Rebuild Project due to the longer construction time, significantly increased costs, additional impacts to the Rappahannock River bottom compared to the overhead options, and decreased reliability in comparison to the overhead options.

Ms. Mayhew notes that DEQ will conduct an environmental and permitting review of the Company's application, including the solicitation of comments from relevant agencies. She describes the permitting activities the Company has undertaken with the VMRC. Finally, she details the contacts the Company has made with the impacted localities, including letters delivered to administrators of the Counties of Middlesex and Lancaster advising of the Company's intention to file this application and inviting the counties to consult with the Company about the Rebuild Project, in compliance with Va. Code § 15.2-2202.

**DIRECT TESTIMONY  
OF  
AMANDA M. MAYHEW  
ON BEHALF OF  
VIRGINIA ELECTRIC AND POWER COMPANY  
BEFORE THE  
STATE CORPORATION COMMISSION OF VIRGINIA  
CASE NO. PUE-2016-00021**

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

3   A.   My name is Amanda M. Mayhew, and I am a Senior Siting and Permitting Specialist for  
4       the Company. My office is located at One James River Plaza, 701 East Cary Street,  
5       Richmond, Virginia 23219.

6   **Q.   What is your educational and professional background?**

7   A.   I graduated from the University of Connecticut 2003 with a Bachelor of Science in  
8       Environmental Science. I also obtained a Master of Business Administration from  
9       Quinnipiac University in 2013. I joined the Company’s Transmission Right-of-Way  
10      group in May 2014 as a Senior Siting and Permitting Specialist, the position I presently  
11      hold. Prior to working for the Company, I worked as an environmental scientist for the  
12      Northeast Utilities Service Company in Connecticut. I worked in the Transmission Siting  
13      and Permitting group from 2003 to 2014, obtaining environmental permits and assisting  
14      in siting proceedings with the Connecticut Siting Council.

15   **Q.   What are your responsibilities as Senior Siting and Permitting Specialist?**

16   A.   My responsibilities include identification of appropriate routes for transmission lines and  
17      obtaining necessary federal, state, and local approvals, and environmental permits for  
18      those facilities. In this position, I work closely with government officials, permitting



1 agencies, property owners, and other interested parties, as well as with other Company  
2 personnel, to develop facilities needed by the public so as to reasonably minimize  
3 environmental and other impacts on the public in a reliable, cost-effective manner.

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

5 A. In order to maintain the structural integrity and reliability of its transmission system and  
6 perform needed maintenance on its existing facilities, Virginia Electric and Power  
7 Company (“Dominion Virginia Power” or the “Company”) proposes to rebuild an  
8 approximately 2.2-mile segment of an existing single circuit 115 kV transmission line,  
9 Harmony Village-Northern Neck Line #65, including (1) approximately 0.3 mile on land  
10 entirely within the existing right-of-way on both sides of the Rappahannock River in  
11 Lancaster County (less than 0.1 mile) and Middlesex County (approximately 0.3 mile);  
12 and (2) a 1.9-mile section of Line #65 in the Rappahannock River utilizing an 80-foot  
13 right-of-way permitted by the Virginia Marine Resources Commission (“VMRC”), which  
14 expands to 200 feet at two sections in the center span of the Robert O. Norris Bridge  
15 (“Norris Bridge”) to accommodate the fender system on either side of and parallel to the  
16 navigational channel in the river. Collectively, this 2.2-mile segment of Line #65  
17 between White Stone Substation and Harmony Village Substation in Lancaster and  
18 Middlesex Counties, respectively, is the proposed rebuild project (the “Rebuild Project”).

19 The purpose of my testimony is to discuss the route for the Rebuild Project presented in  
20 Attachment II.A.2 of the Appendix. In addition, I am sponsoring Sections II.A.1, 2, 4-9;  
21 III and V of the Appendix, and co-sponsoring the Department of Environmental Quality  
22 (“DEQ”) Supplement with Company Witness Jon Berkin.

1   **Q.    Please provide a description of the existing right-of-way to be used for the Rebuild**  
2       **Project.**

3    A.   The proposed route of the Rebuild Project begins in Middlesex County and heads  
4       northeast for approximately 0.3 mile, where it crosses the Rappahannock River for  
5       approximately 1.9 miles before coming ashore on the northern bank of the river, where it  
6       then travels less than 0.1 mile in a northeasterly direction before ending at the first  
7       structure on land in Lancaster County (“Proposed 115 kV Overhead Route” or “Proposed  
8       Route”).

9       The existing 1.9-mile line segment of the Rebuild Project crossing the Rappahannock  
10      River is comprised of seven existing wooden H-frame structures in the river and 14 davit  
11      arm style structures currently attached to the Norris Bridge. The Rebuild Project will  
12      replace these 21 water-crossing structures with a total of 10 galvanized H-frame  
13      structures in the water, thereby adding a total of three structures in the water and  
14      eliminating all 14 attached bridge structures. Rebuilding the line across the river required  
15      legislative action to vacate public oyster grounds, also known as Baylor Grounds. The  
16      Company’s request to vacate the Baylor Grounds occurred during the 2015 Session of the  
17      Virginia General Assembly and the bill was signed by the Governor on March 19, 2015.<sup>1</sup>  
18      After the Baylor Grounds were vacated, the Company filed an application with VMRC to  
19      permit the rebuilt line to cross the river within an 80-foot wide right-of-way, with 200-  
20      foot-wide sections at the river channel to accommodate the fender system. The VMRC  
21      approved the application at its July 2015 hearing.

---

<sup>1</sup> See Chapter 377 of the 2015 Session of the Virginia Acts of Assembly (effective Mar. 19, 2015).

1 For the land portion of the Rebuild Project, the Company proposes to replace structures  
2 along an existing right-of-way for approximately 0.3 mile combined in both Lancaster  
3 and Middlesex Counties. In total, four of the five existing structures on land will be  
4 replaced and one land structure will be eliminated. In Lancaster County, one existing  
5 wooden three-pole structure will be replaced with a galvanized steel three-pole structure  
6 in approximately the same location within the existing 75-foot wide easement. In  
7 Middlesex County, one existing wooden monopole will be eliminated and three existing  
8 wooden monopoles will be replaced with one galvanized steel monopole and two  
9 weathering steel monopoles in approximately the same location within the pole line  
10 easement.<sup>2</sup>

11 **Q. Please describe the Company's initial outreach on the Rebuild Project.**

12 A. Beginning in September 2014, Company representatives began to meet or speak with a  
13 number of local, state, and federal officials to inform them of this Rebuild Project in  
14 Virginia. Company representatives also held and participated in many meetings,  
15 presentations and phone conversations to discuss the Rebuild Project. In addition, the  
16 Company met with and engaged in numerous communications with the No Towers  
17 Coalition (now known as The Save the Rappahannock Coalition), a coalition formed  
18 during the public engagement efforts.

---

<sup>2</sup> A pole line easement is an easement or right-of-way to construct, operate, and maintain a pole line for transmitting and distributing electric power. This easement includes all wires, poles, attachments, ground connections, equipment, accessories, and appurtenances. This pole line easement is designated as the centerline on the plat, where a line can be rebuilt.



1    **Q.    What are the environmental impacts of the Rebuild Project?**

2    A.    The Proposed Route of the Rebuild Project is expected to have minimal incremental  
3           environmental impacts, since it largely represents the wreck and rebuild of a transmission  
4           line in existing right-of-way.

5           The Proposed Route will cross 2.2 miles in Lancaster and Middlesex Counties and  
6           traverse an area that is characterized by low density residential land use and a 1.9-mile-  
7           wide tidal portion of the Rappahannock River. The Proposed Route crosses one  
8           residential subdivision in Lancaster County and one residential subdivision in Middlesex  
9           County, totaling 0.3 mile of residential land crossed.

10          The Proposed Route would extend across 1.9 miles of the Rappahannock River. The  
11          portion of the Proposed Route that crosses the river will be located adjacent to the Norris  
12          Bridge (SR 3), which carries traffic between Lancaster and Middlesex Counties. The  
13          Norris Bridge was completed in 1957. No other waterbodies are crossed by the Proposed  
14          Route, and no scenic byways are crossed.

15   **Q.    Did the Company consider any alternate routes for the Rebuild Project?**

16   A.    Yes. As discussed in Section I.C of the Appendix, the Company considered a 230 kV  
17          Overhead Alternative along the proposed route (“230 kV Overhead Alternative”) and a  
18          115 kV Underground Transmission Line Alternative (“Underground Option”).  
19          Additional discussion of the routing associated with each alternative or option is  
20          presented in the Alternatives Analysis.

21   **Q.    Please describe the Company’s 230 kV Overhead Alternative.**

22   A.    The 230 kV Overhead Alternative would rebuild a portion of the existing single circuit

1 115 kV transmission line, Harmony Village-Northern Neck Line #65, along the same 2.2-  
2 mile route as the Proposed 115 kV Overhead Route. Unlike the Proposed Route, this  
3 alternative would utilize 230 kV design for the entire Rebuild Project, and would require  
4 slightly taller structures. The right-of-way configuration would be similar to that  
5 described for the Proposed 115 kV Overhead Route, utilizing the same right-of-way over  
6 the river, and the on-land crossing in Lancaster County; however, along the on-land  
7 crossing in Middlesex County, a slightly wider right-of-way would be necessary to  
8 accommodate the horizontal clearance required for 230 kV to the edge of the right-of-  
9 way.

10 Because there is no foreseeable need for 230 kV operations, this segment of Line #65 will  
11 be capable of operating at 230 kV, but will be operated at 115 kV. The 230 kV Overhead  
12 Alternative would provide incrementally-improved reliability and operational benefits  
13 compared to the Proposed 115 kV Overhead Route of the Rebuild Project and would  
14 replace the same aging infrastructure. It would also provide a 230 kV water crossing for  
15 Line #65 should the unforeseen need develop in the future to convert the entire Line #65  
16 to 230 kV. This alternative is estimated to cost approximately \$26.3 million, which is  
17 approximately \$0.1 million more than the Rebuild Project utilizing the Proposed 115 kV  
18 Overhead Route.

19 The 230 kV Overhead Alternative was not selected by the Company as the proposed  
20 route because there is no foreseeable need for 230 kV operations. In addition, the  
21 Proposed Route offers reduced structure heights compared to the 230 kV Overhead  
22 Alternative. Finally, the 230 kV Overhead Alternative would also require additional

1 right-of-way on the Middlesex County side of the river. However, the Company does not  
2 oppose this alternative.

3 **Q. Please describe the Company's Underground Option.**

4 A. The Underground Option would replace approximately 2.3 miles of the existing single  
5 circuit 115 kV transmission line, Harmony Village-Northern Neck Line #65, with  
6 underground and overhead construction generally following along the centerline of the  
7 Proposed Route, utilizing approximately 0.4 mile of land in Lancaster and Middlesex  
8 Counties, and 1.9 miles under the Rappahannock River. The Underground Option has  
9 been identified as the only viable location for an underground alternative. Additional  
10 right-of-way and permitting would be required for this option, including the following:

- 11 • There is an existing 75-foot wide right-of-way on north side of Rappahannock  
12 River. An additional 25 feet of right-of-way will be required for a 100-foot-wide  
13 right-of-way on land. This new right-of-way would be reduced in some areas to  
14 avoid crossing homes.
- 15 • There is an 80-foot VMRC permitted right-of-way across the river (which  
16 expands to 200 feet at two sections in the center span of the Norris Bridge). An  
17 additional 20 feet of permitted right-of-way will be required for a 100-foot-wide  
18 right-of-way, as well as at the locations where the temporary splice locations  
19 extend beyond the 100-foot-wide right-of-way. A total of 5.2 additional acres of  
20 Baylor Oyster Grounds will need to be vacated for the Underground Option. This  
21 would require a new permit from the VMRC for the larger right-of-way width  
22 required for the cables and the splice locations. A new United States Army  
23 Corps of Engineers ("Corps") permit will be required for the splice locations.



1           Also, new Baylor Ground legislation will be required, which would necessitate  
2           additional action by the General Assembly.

- 3           • There is an overhead pole line easement on the Middlesex County (south) side of  
4           the river, which is maintained at a total of 45 feet. An additional 55 feet of right-  
5           of-way will be required for a 100-foot-wide right-of-way.

6           The construction of the Underground Option would involve, among other things,  
7           significant horizontal directional drilling (“HDD”) to install the pipes needed to contain  
8           underground electric cables, and dredging large pits in the river bed to allow for  
9           underground electric cables to be spliced together. The Alternatives Analysis includes an  
10          evaluation of the potential impacts of the Underground Option on potable groundwater  
11          sources from the proposed Underground Option.

12          The Underground Option would also require two transition stations, one on each side of  
13          the river crossing, to connect the underground cable to the existing overhead 115 kV  
14          transmission line. The transition stations would consist of approximately 80-foot-tall H-  
15          frame structures and an ancillary building to house equipment. The northern transition  
16          station, which would be located on the Lancaster County side of the Rappahannock  
17          River, would consist of two high-pressure fluid-filled (“HPFF”) pipes (single circuit), and  
18          would require a graveled, fenced area approximately 155 feet by 248 feet (0.9 acre). The  
19          Company would need to acquire additional land to accommodate the northern transition  
20          station, which would include setbacks and possible stormwater facilities, for a total of 2.0  
21          acres. The southern transition station, which would be located on the Middlesex County  
22          side of the Rappahannock River entirely on property owned by Dominion Virginia

1 Power, would consist of two HPFF pipes (single circuit), and would require a graveled,  
2 fenced area approximately 80 feet by 120 feet (0.2 acre). The Company's existing  
3 property is large enough to address setbacks and possible stormwater facilities (totaling  
4 0.9 acre).

5 Each of the underground cables would terminate in a large porcelain bushing-type  
6 insulator that is approximately two feet in diameter and 10 feet tall. These cable  
7 terminations are necessary to transition from the cable insulation to air insulation for the  
8 outdoor overhead components. To the average person, this facility would look like a  
9 conventional electric substation.

10 The construction time for this option is approximately 18 months and is estimated to cost  
11 approximately \$83.6 million, which is \$57.4 million more than the Rebuild Project  
12 utilizing the Proposed Route. In addition to the increase in construction time for the  
13 Underground Option, the Company will be required to submit a new Joint Permit  
14 Application to the Corps and the VMRC, as well as vacating additional Baylor Grounds  
15 through passage of legislation by the Virginia General Assembly. This will add  
16 approximately eight months before construction can begin. Total time to complete the  
17 Underground Option is approximately 36 months.

18 Additionally, the Underground Option directly impacts approximately 6.0 acres of the  
19 river bottom, including the cumulative impacts from the two splicing stations, whereas  
20 the Proposed 115 kV Overhead Route and 230 kV Overhead Alternative directly impact  
21 less than 0.1 acre of the river bottom, including the cumulative impacts of the structure  
22 foundations and fender system.

1 Finally, any time the Company is determining whether to build overhead or underground  
2 transmission lines, reliability is a major concern. Overhead and underground lines each  
3 have reliability challenges, but a problem on an overhead line is easier to locate than on  
4 an underground line, and underground line outages are significantly longer than those on  
5 overhead lines. On average, most repairs on an overhead line can be completed within  
6 hours, but repairs to underground lines take days to weeks. The Company understands  
7 that lengthy power outages are unacceptable, and therefore, when considering customer  
8 reliability, overhead lines are preferred.

9 This option was not selected as the proposed Rebuild Project due to decreased reliability  
10 in comparison to the overhead options, significantly increased costs, additional impacts to  
11 the Rappahannock River bottom compared to the overhead options and significantly  
12 longer time to complete.

13 **Q. Please discuss the resources in the Rebuild Project area and the activities that have**  
14 **been and will be undertaken to reasonably minimize adverse impacts of the**  
15 **proposed lines on the environment.**

16 A. The Proposed Route will cross a total of 0.3 acre of palustrine emergent/scrub-shrub  
17 wetlands. These wetlands currently are crossed by the existing right-of-way of Line #65  
18 and, therefore, previously have been disturbed. No clearing of the wetlands would be  
19 required during the construction of the Proposed Route, since the wetlands are palustrine  
20 emergent/scrub-shrub wetlands. In addition, no structures would be placed in the  
21 wetlands and the wetlands would be spanned by the transmission line. The construction  
22 of the Proposed Route would result in no impacts to wetlands. The Proposed Route  
23 would span the Submerged Aquatic Vegetation (“SAV”) beds in the Rappahannock



1 River. No structures would be located within SAV; therefore, this route would have no  
2 impacts to SAV.

3 Construction of the Proposed Route will require encroachment over 3,092 square feet  
4 (less than 0.1 acre) of state-owned subaqueous bottomlands associated with the structure  
5 foundations, concrete caps, and fender system. Direct impact on the river bottom  
6 associated with the installation of the piles used to support the structure foundations and  
7 fender system is 1,014 square feet (less than 0.1 acre) of permanent impact. Temporary  
8 impacts associated with the Proposed Route would include less than 0.01 acre of direct  
9 impact on the riverbed due to the placement of temporary piles required to construct the  
10 structure foundations and fender system. Temporary noise and increased sedimentation  
11 and turbidity are expected for the duration of the construction of the Rebuild Project.  
12 Approximately 8.3 acres of right-of-way for the Proposed Route would occupy land that  
13 was previously Baylor Oyster Grounds which was vacated through legislative action in  
14 the 2015 Session of Virginia General Assembly. The right-of-way for the Proposed Route  
15 would cross two private oyster leases. However, there would be no direct impacts to  
16 these oyster beds since no structures would be placed in the lease areas and the  
17 transmission line would span the lease locations.

18 There are 62 homes and one business located within 500 feet of the centerline of the  
19 Proposed Route. Additionally, there is one residence within 60 feet of the edge of the  
20 right-of-way of the Proposed Route.

1   **Q.    What activities have been or will be undertaken to reasonably minimize the**  
2       **environmental impact of the proposed line, and describe the environmental**  
3       **permitting process that will follow Commission approval of the Rebuild Project?**

4    A.    DEQ will conduct an environmental and permitting review of the Company's application,  
5       including the solicitation of comments from relevant agencies. The Company developed  
6       the DEQ Supplement that is attached to this Application based on previous Company  
7       coordination with the DEQ. The DEQ Supplement contains, in addition to a brief  
8       description of the Rebuild Project, information on impacts and the status of agency  
9       review with respect to the following: air quality; water withdrawals and discharges;  
10      wetlands; solid and hazardous waste; natural heritage and threatened and endangered  
11      species; erosion and sediment control; archeological, historic, scenic, cultural and  
12      architectural resources; use of pesticides and herbicides; geology and mineral resources;  
13      wildlife resources; recreation, agricultural and forest resources; and transportation  
14      infrastructure. The Rebuild Project is located entirely on within existing rights-of-way so  
15      impacts will be reasonably minimized. The appropriate environmental studies will be  
16      made of these areas before construction begins. Clearing and maintenance of the rights-  
17      of-way will be done in such a manner that low buffers of vegetation will be retained as  
18      much as possible. The DEQ Supplement also discusses the permits that will be required  
19      and comment letters and other materials the Company has obtained regarding the Rebuild  
20      Project from relevant agencies as a result of its own efforts.

21   **Q.    When will the Company apply for the required permits?**

22    A.    By legislative action during the 2015 Session of the Virginia General Assembly, the  
23      Company has already secured an 80-foot right-of-way in the Rappahannock River

1 permitted by the VMRC for the Rebuild Project, which includes two 200-foot-wide  
2 sections at the river channel to accommodate the fender system. Additionally, the  
3 Company received approval from the Corps that the Rebuild Project meets the  
4 requirements of the Nationwide Permit #12 in 2015 (see Attachment I.F to the  
5 Appendix). As indicated in Appendix Attachment I.F, the Nationwide Permit is reviewed  
6 and updated every five years with the next review scheduled for March 18, 2017. If the  
7 Company does not commence work on the Rebuild Project prior to this date, then the  
8 Company will be required to obtain a new approval for the Rebuild Project.

9 After approval by the Commission, the Company will survey the existing rights-of-way  
10 and then perform the necessary environmental surveys (wetlands, cultural resources and  
11 rare species). After these surveys are complete, any required applications to the DEQ and  
12 the Virginia Department of Transportation will be submitted.

13 **Q. What contacts has the Company made with impacted localities?**

14 A. As discussed in Section III.B of the Appendix, the following is a timeline of key public  
15 communications related to the Rebuild Project:

- 16 • September 2014 – Briefed Lancaster County and Middlesex County staff and  
17 officials;
- 18 • November 2014 – Met with Private Oyster Bed Lease holders;
- 19 • January 2015 – Legislation was introduced in the General Assembly  
20 addressing vacating Baylor Grounds along the Rebuild Project area and  
21 easement needed for VMRC permit consideration;
- 22 • April 16, 2015 – Project Public Announcement (see Appendix Attachment  
23 III.B.2) mailed to approximately 70 landowners;
- 24 • May 5, 2015 – Presented at the Middlesex County Board of Supervisors  
25 Meeting;
- 26 • May 28, 2015 – Presented at the Lancaster County Board of Supervisors  
27 meeting;



- 1 • July 28, 2015 – Presented at the VMRC public hearing to review the  
2 Company’s permit application;
- 3 • August 25, 2015 – Presented slides at stakeholder meeting at the Tides Inn  
4 (see Appendix Attachment III.B.3). Approximately 25 total participants  
5 included representatives from Middlesex and Lancaster Counties, leadership  
6 and members of the No Towers Coalition, VDOT project manager responsible  
7 for Norris Bridge operations, and Dominion Virginia Power project team  
8 members;
- 9 • September 1, 2015 – Presented Rebuild Project update at the Middlesex  
10 County Board of Supervisors Meeting;
- 11 • September 15, 2015 – Presented to the Lancaster County GOP Committee  
12 Meeting, approximately 50 people in attendance;
- 13 • September 16, 2015 – Mailing to approximately 16,000 community members  
14 in Middlesex, Lancaster and Northumberland Counties explaining Rebuild  
15 Project details (see Appendix Attachment III.B.4);
- 16 • September 21, 2015 – Meeting with Sen. McDougle and Del. Ransone,  
17 including Dominion Virginia Power leadership, No Towers Coalition  
18 leadership and VDOT leadership;
- 19 • September 28, 2015 – Presented to the Lancaster County Democratic  
20 Committee Meeting, approximately 30 people in attendance;
- 21 • October 8 and 15, 2015 – Full page advertisement in the weekly publications  
22 of the Rappahannock Record and the Southside Sentinel (see Appendix  
23 Attachment III.B.5)
- 24 • January/February 2016 – Notifications provided inviting the community to a  
25 public informational open house on February 11, 2016, from 5 – 7:30 pm at  
26 the Mount Vernon Baptist Church, White Stone
  - 27 ○ Letters sent to approximately 700 property owners (see Appendix  
28 Attachment III.B.6)
  - 29 ○ Advertisements published in the Northern Neck News (weekly  
30 publication – circulation 4,637), Rappahannock Record (weekly  
31 publication – circulation 6,480), and Southside Sentinel (weekly  
32 publication – circulation: 3,598) (see Appendix Attachment III.B.7)
- 33 • February 4, 2016 – Letters sent to the same mailing list as the January 26<sup>th</sup>  
34 notifications (see Appendix Attachment III.B.8), approximately 700 property  
35 owners, inviting them to a second informational open house on February 17,  
36 2016, from 5-7:30 pm at The Freeshade Community Center, Topping,  
37 Virginia
- 38 • February 11, 2016 – Held Informational Open House, Mount Vernon Baptist  
39 Church, White Stone, Virginia – approximately 120 people attended

- 1                   • February 17, 2016 – Held Informational Open House, The Freeshade  
2                   Community Center, Topping, Virginia – approximately 20 people attended
- 3                   • February 22, 2016 – Mailed post-card (see Appendix Attachment III.B.9) to  
4                   community members informing them of the availability of visual simulations  
5                   at the White Stone Town Hall for approximately three weeks.

6                   Additional information was provided to the public through a website dedicated to the  
7                   Project, searchable on www.dom.com using the search term “Norris Bridge.”

8   **Q.     Has the Company complied with Va. Code § 15.2-2202 D?**

9   A.     Yes. In accordance with Va. Code § 15.2-2202 D, letters dated January 8, 2016, included  
10         as Attachment III.B.1 to the Appendix, were delivered to administrators of the Counties  
11         of Middlesex and Lancaster advising of the Company’s intention to file this application  
12         and inviting the counties to consult with the Company about the Rebuild Project.

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

14 A.     Yes, it does.





**WITNESS DIRECT TESTIMONY SUMMARY**

Witness: Jon M. Berkin

Title: Principal Environmental Consultant with Natural Resource Group, LLC

Summary:

Company Witness Jon Berkin explains NRG's extensive experience in the routing and feasibility assessments of energy transportation projects and describes how NRG was engaged on behalf of the Company to assist it in the identification and evaluation of route alternatives to resolve the identified electrical need that would meet the applicable criteria of Virginia law and the Company's operating needs.

Mr. Berkin sponsors the Alternatives Analysis included as part of the Company's application, and co-sponsors certain sections of the Appendix and the DEQ Supplement.

**DIRECT TESTIMONY  
OF  
JON M. BERKIN  
ON BEHALF OF  
VIRGINIA ELECTRIC AND POWER COMPANY  
BEFORE THE  
STATE CORPORATION COMMISSION OF VIRGINIA  
CASE NO. PUE-2016-00021**

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

3   A.   My name is Jon M. Berkin. I am employed as a Principal Environmental  
4       Consultant with Natural Resource Group, LLC ("NRG"). My business address is  
5       1000 IDS Center, 80 South Eighth Street, Minneapolis, Minnesota 55402.

6   **Q.   What is your educational and professional background?**

7   A.   I earned a Bachelor of Arts degree from Boston University and a Master of Arts  
8       and Doctoral degree from Bryn Mawr College. I have 22 years of experience  
9       working in the energy-related consulting field working with the siting and  
10      regulatory permitting of major linear energy facilities, including both interstate  
11      and intrastate electric transmission lines and gas and oil pipelines throughout the  
12      United States. During this time I was employed for 5 years with R. Christopher  
13      Goodwin and Associates, Inc. and 17 years with NRG, a privately-owned  
14      consulting company specializing in the siting, licensing and environmental  
15      construction compliance of large, multi-state energy transportation facilities.

16      My professional experience related to electric transmission line projects includes  
17      the direct management of field studies, impact assessments and agency  
18      negotiations associated with the routing and licensing of multiple transmission

1 line projects in the mid-Atlantic region, including the management and/or  
2 supervision of the routing and permitting. Work on these projects included  
3 studies to identify and delineate routing constraints and options; identification and  
4 evaluation of route alternatives; and the direction of field studies to inventory  
5 wetlands, stream crossings, and sensitive habitats and land uses. Within the last  
6 several years I have managed or directed the identification and evaluation of over  
7 100 miles of 230 and 500 kV transmission line route alternatives in the  
8 Commonwealth for Virginia Electric and Power Company ("Dominion Virginia  
9 Power" or the "Company").

10 **Q. What professional experience does NRG have with the routing of linear**  
11 **energy transportation facilities?**

12 A. NRG has extensive experience in the routing and feasibility assessments of  
13 energy transportation projects. It has assisted its clients in the identification,  
14 evaluation and selection of linear energy facilities for the past 21 years. During  
15 this time it has developed a consistent approach for linear facility routing and  
16 route selection based on the identification, mapping and comparative evaluation  
17 of routing constraints and opportunities within defined study areas. NRG uses  
18 data-intensive Geographic Information System spatial and dimensional analysis  
19 and the most current and refined data layers and aerial photography resources  
20 available in the identification, evaluation and selection of transmission line routes.  
21 In addition to Dominion Virginia Power, its clients include some of the largest  
22 energy companies in the United States, Canada and the world, including  
23 ExxonMobil, TransCanada, NVEnergy, Niagara Mohawk, Kinder Morgan,

1 British Petroleum, Enbridge Energy and others. NRG also routinely assists the  
2 staff of the Federal Energy Regulatory Commission and the U.S. Forest Service in  
3 the identification and/or evaluation of linear energy routes to support federal  
4 National Environmental Policy Act evaluations. NRG works on both small and  
5 large energy projects and has assisted in or conducted the routing and route  
6 evaluation of some of the largest electric transmission line and pipeline facilities  
7 in North America.

8 In Virginia, we served as routing consultant to the Company for its Cannon  
9 Branch-Cloverhill 230 kV transmission line project in the City of Manassas and  
10 Prince William County, approved by the Commission in Case No. PUE-2011-  
11 00011. We similarly served as the routing consultant for the Company's  
12 Dahlgren 230 kV double circuit transmission line project in King George County,  
13 approved by the Commission in Case No. PUE-2011-00113. NRG also served as  
14 the routing consultant for the Company's Surry-Skiffes Creek-Wheaton 500 and  
15 230 kV transmission lines in Case No. PUE-2012-00029; for the Company's  
16 Remington CT-Warrenton 230 kV Double Circuit transmission line, approved by  
17 the Commission in Case No. PUE-2014-00025; for the Haymarket 230kV Line  
18 and Substation Project pending in Case No. PUE-2015-00107; and most recently  
19 for the Company's Remington-Gordonsville Electric Transmission Project  
20 pending in Case No PUE-2015-00117.

21 NRG's role as routing consultant for each of these transmission line projects  
22 included preparation of an Environmental Routing Study for the project and  
23 submission of testimony sponsoring it.



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

2    A.    In order to maintain the structural integrity and reliability of its transmission  
3           system and perform needed maintenance on its existing facilities, Dominion  
4           Virginia Power proposes to rebuild an approximately 2.2-mile segment of an  
5           existing single circuit 115 kV transmission line, Harmony Village-Northern Neck  
6           Line #65, including (1) approximately 0.3 mile on land entirely within the  
7           existing right-of-way on both sides of the Rappahannock River in Lancaster  
8           County (less than 0.1 mile) and Middlesex County (approximately 0.3 mile); and  
9           (2) a 1.9-mile section of Line #65 in the Rappahannock River utilizing an 80-foot  
10          right-of-way permitted by the Virginia Marine Resources Commission, which  
11          expands to 200 feet at two sections in the center span of the Robert O. Norris  
12          Bridge to accommodate the fender system on either side of and parallel to the  
13          navigational channel in the river. Collectively, this 2.2-mile segment of Line #65  
14          between White Stone Substation and Harmony Village Substation in Lancaster  
15          and Middlesex Counties, respectively, is the proposed rebuild project.

16         NRG was engaged on behalf of the Company to assist it in the identification and  
17         evaluation of route alternatives to resolve the identified electrical need that would  
18         meet the applicable criteria of Virginia law and the Company's operating needs.

19         The purpose of my testimony is to introduce and sponsor the Alternatives  
20         Analysis, which is included as part of the application materials filed by the  
21         Company in this proceeding. I am also co-sponsoring, with Company Witness  
22         Amanda Mayhew, portions of Sections II and III of the Appendix, as well as the  
23         Department of Environmental Quality Supplement.

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

2 A. Yes, it does.



COMMONWEALTH OF VIRGINIA  
BEFORE THE  
STATE CORPORATION COMMISSION

APPLICATION OF  
VIRGINIA ELECTRIC AND POWER COMPANY  
FOR APPROVAL AND CERTIFICATION  
OF ELECTRIC FACILITIES

Line #65 115 kV Rebuild at Norris Bridge

Application No. 276

DEQ Supplement

Case No. PUE-2016-00021

Filed: February 29, 2016



## Table of Contents

	<b>Page</b>
1. Project Description.....	1
2. Environmental Analysis .....	2
A. Air Quality .....	2
B. Water Source.....	2
C. Discharge of Cooling Waters .....	5
D. Tidal and Non-tidal Wetlands .....	5
E. Solid and Hazardous Waste.....	7
F. Natural Heritage, Threatened and Endangered Species .....	9
G. Erosion and Sediment Control .....	12
H. Archaeological, Historic, Scenic, Cultural or Architectural Resources .....	12
I. Chesapeake Bay Preservation Areas .....	13
J. Recreation, Agricultural, and Forest Resources.....	14
K. Use of Pesticides and Herbicides .....	15
L. Geology and Mineral Resources .....	16
M. Transportation Infrastructure.....	16
<b>Attachments.....</b>	<b>18</b>

Based on consultations with the Department of Environmental Quality (“DEQ”), Virginia Electric and Power Company (“Dominion Virginia Power” or the “Company”) has developed this DEQ Supplement to facilitate review and analysis of the proposed Rebuild Project by DEQ and other relevant agencies.

## **1. Project Description**

In order to maintain the structural integrity and reliability of its transmission system and perform needed maintenance on its existing facilities, Dominion Virginia Power proposes to rebuild an approximately 2.2-mile segment of an existing single circuit 115 kV transmission line, Harmony Village-Northern Neck Line #65, including (1) approximately 0.3 mile on land entirely within the existing right-of-way on both sides of the Rappahannock River in Lancaster County (less than 0.1 mile) and Middlesex County (approximately 0.3 mile); and (2) a 1.9-mile section of Line #65 in the Rappahannock River utilizing an 80-foot right-of-way permitted by the Virginia Marine Resources Commission (“VMRC”), which expands to 200 feet at two sections in the center span of the Robert O. Norris Bridge (“Norris Bridge”) to accommodate the fender system on either side of and parallel to the navigational channel in the river. Collectively, this 2.2-mile segment of Line #65 between White Stone Substation and Harmony Village Substation in Lancaster and Middlesex Counties, respectively, is the proposed rebuild project (the “Rebuild Project”).

The Company considered two overhead alternatives that involve rebuilding a total of approximately 0.3 mile of Line #65 on land on both sides of the Rappahannock River in Lancaster and Middlesex Counties, and a rebuild and relocation of a 1.9-mile section of Line #65 in the Rappahannock River. These two overhead alternatives are referred to as the Proposed 115 kV Overhead Route and the 230 kV Overhead Alternative (collectively, the “Overhead Alternatives”). A 2.3-mile underground option along a similar route as the Overhead Alternatives was also considered (the Underground Option).

### Proposed 115 kV Overhead Route (Proposed Route)

The Proposed 115 kV Overhead Route of the Rebuild Project is a 2.2-mile segment of an existing single circuit 115 kV transmission line, Harmony Village-Northern Neck Line #65. The Proposed Route originates east of Mary Ball Road (State Route 3) in Middlesex County and heads northeast for approximately 0.3 mile, where it crosses the Rappahannock River for approximately 1.9 miles utilizing an 80-foot right-of-way permitted by the VMRC, which expands to 200 feet to at two sections in the center span of the Robert O. Norris Bridge (“Norris Bridge”) to accommodate the fender system on either side of the navigation channel in the river. The centerline of the proposed structures in the river will be located approximately 100 feet east of Norris Bridge. Once coming ashore on the northern bank of the Rappahannock River, the Proposed Route travels less than 0.1 mile (0.03 mile) in a northeasterly direction before ending at the first structure on land in Lancaster County.

### 230 kV Overhead Alternative

The 230 kV Overhead Alternative would rebuild a portion of the existing single circuit 115 kV transmission line, Harmony Village-Northern Neck Line #65, along the same 2.2-mile Proposed 115 kV Overhead Route described above, except that the right-of-way would need to be expanded by 3 feet in Middlesex County to accommodate the operation of a 230 kV transmission line.

## Underground Option

The Underground Option would replace approximately 2.3 miles of the existing single circuit 115 kV transmission line, Harmony Village-Northern Neck Line #65, with underground and overhead construction. The Underground Option begins east of Mary Ball Road (State Route 3) at the transition station site in Middlesex County and heads northeast for approximately 0.3 mile, where it crosses the Rappahannock River for approximately 1.9 miles and would require a 100-foot right-of-way and two splice locations measuring 650-feet long and 200-feet wide. The centerline of the cables beneath the river will be located approximately 100 feet east of Norris Bridge. Once coming ashore on the northern bank of the Rappahannock River, the Underground Option travels 0.2 mile in a northeasterly direction before ending at the transition station site in Lancaster County.

## **2. Environmental Analysis**

### **A. Air Quality**

Construction of the Proposed 115 kV Overhead Route will not require that trees be cleared on the right-of way. Construction of either the 230 kV Overhead Alternative or the Underground Option would require the clearing of a small amount of trees. Merchantable logs from those trees would be removed or stacked along the edge of the right-of-way and the remaining limbs and branches typically chipped and spread on the upland portions of the right-of-way. The Company will not expect to burn the cleared material. Equipment and vehicles that are powered by gasoline or diesel motors will be used during the construction of the line so there will be exhaust from those motors. During construction, if the weather is dry for an extended period of time, there will be airborne particles from the use of vehicles and equipment within the right-of-way. However, minimal earth disturbance will take place and vehicle speed, which is often a factor in airborne particulate, will be kept to a minimum. Erosion and sedimentation control is addressed in Section 2.G of this Supplement.

### **B. Water Source**

Natural Resources Group, LLC (“NRG”) identified and mapped waterbodies in the Rebuild Project area using publicly-available GIS databases, U.S. Geological Survey (“USGS”) topographic maps, recent (2011) digital aerial photography, and a wetland delineation conducted by Stantec Consulting Services, Inc. (“Stantec”). Waterbodies in the Rebuild Project area are shown on Figure 3.2.1-1 of Appendix A in the alternatives analysis prepared by NRG on behalf of the Company (“Alternatives Analysis”). The only waterbody in the Rebuild Project area is the Rappahannock River.

According to the United States Army Corps of Engineers (“USACE”) documentation, one waterbody considered navigable under Section 10 of the Rivers and Harbors Act is crossed by the Rebuild Project, the Rappahannock River. The waterbody is crossed by the alternatives and option under consideration.



### Proposed Route

The Proposed 115 kV Overhead Route would cross the Rappahannock River, which is approximately 10,000 feet (1.91 miles) wide at the crossing. The Rappahannock River is identified as a Section 10 Navigable Water. As part of the river crossing along the Proposed Route, 10 transmission structures will be placed in the Rappahannock River. The structures would be steel pole H-frames ranging in height from approximately 102 to 173 feet tall. The structures would be constructed from a barge and erected on concrete pilings capped with a concrete foundation. Installation of the concrete pilings to support the structures and fender system would result in 1,014 square feet (.02 acre) direct impact on the river bottom. The foundations would measure 34 feet by 6.5 feet (221 square feet). Anticipated maximum dimensions for the concrete cap are 34-feet long by 6.5-feet wide by 5-feet thick. The top of the concrete cap will be installed approximately 21 feet 9 inches above the zero elevation water line. Additionally, a fender system will be constructed to protect the two structures on either side of the navigational channel. Each fender will be approximately 170 feet long and will consist of timber wales constructed on fiber piles. Construction of the Proposed Route would require encroachment over 3,092 square feet (0.07 acre) of state-owned subaqueous bottomlands. These permanent impacts required the payment of royalties to the VMRC. Direct impact on the river bottom associated with the installation of the piles used to support the structure foundations and fender system is 1,014 square feet (.02 acre) of permanent impact. Temporary impacts associated with the Proposed Route would include 0.02 acre of direct impact on the riverbed due to the placement of temporary piles required to construct the structure foundations and fender system.

The right-of-way for the Proposed Route would cross two private oyster leases. However, there would be no direct impacts to these oyster leases since no structures would be placed in the lease areas and the transmission line would span the lease locations. Indirect impacts on leased areas may include temporary increased sedimentation and turbidity in the area immediately surrounding each structure during construction. Baylor Grounds are present in the Rappahannock River; however, Senate Bill 1030 adjusted the limits of the Baylor Grounds within the proposed right-of-way corridor for the Proposed Route. Therefore, no Baylor Grounds would be impacted by the Proposed Route.

Short-term, minor water quality impacts could occur during the construction of the Proposed Route. During construction in the uplands, such impacts would be associated with the soils from disturbed areas being transported by stormwater into adjacent waters during rain events. Increased turbidity and localized sedimentation of the stream bottom may occur as a result of the runoff. However, these impacts would be significantly reduced by the implementation of Dominion Virginia Power's erosion control measures, including the installation of erosion control structures and materials. The installation of the piles associated with the structure foundations and fender systems could result in short-term, minor water quality impacts during pile driving activities.

### 230 kV Overhead Alternative

The 230 kV Overhead Alternative would cross the Rappahannock River along the same alignment as the Proposed Route and have the same configuration of structures. As part of the river crossing along the 230 kV Overhead Alternative, 10 transmission structures of slightly taller height will be placed in the Rappahannock River at the same locations as the Proposed Route and affect the same resources as described above in the discussion of the Proposed Route. The construction of the 230 kV Overhead Alternative would require the clearing of less than 0.01 acre of trees in Middlesex County to accommodate the 230 kV structures.

### Underground Option

Similar to the two overhead routes, the Underground Option involves replacement and relocation of a section of Line #65 that parallels Route 3 and crosses the Rappahannock River; however at 2.3 miles long, this option would be slightly longer than the Overhead Alternatives. The Underground Option would be constructed with 230 kV insulation and operate at 115 kV. The Underground Option would involve installing the electrical line below the river surface using the horizontal directional drill (“HDD”) construction method. The Underground Option would require a nominally wider construction right-of-way, but given installation by HDD, a majority of the construction will occur at a minimum of 60 feet below the riverbed. While no tower construction would occur within the river, two sites will be required in the river as splice locations. In addition, where the line reaches the surface, transition stations will be constructed to transition the line back to the existing overhead route. Construction of the Underground Option will in general require a 100-foot-wide right-of-way across the river and on land.

Because the drill length is limited to an effective length of about 7,000 feet due to cable length and pull limitations of the cables, two splice locations will be required within the river for the transmission line conduit. The HDDs for both 8-inch conduits will be conducted with three separate drills, one from each shoreline to the nearest splice location and an intermediate drill between two temporary splice locations within the river. The splice locations once constructed and placed in the river bottom will each measure 200 feet by 650 feet in size. The two splice locations within the river will each contain a work platform set on 30 steel piles driven into the river bottom. After splicing, the two conduits will be welded together and laid into trenches that have been dredged on the bottom of the river at the tie-in location. The tie-in trenches for each 8-inch pipe would be dredged from the two platforms and will be approximately 15-feet deep below the river bed, 30 feet wide and 650 feet long and require the dredging of approximately 24,566 cubic yards of river bottom substrate. The dredge material will be placed on barges and re-used for backfill material over the conduits. This excavation will affect up to 5.97 acres of temporary impact to the subaqueous bottom.

The cables will be installed under three private oyster lease areas in the Rappahannock River. The 100-foot right-of-way across the river and the two 200-foot by 650-foot splice locations required for the Underground Option will require the vacation of additional Baylor

Grounds. Approximately 5.19 acres of Baylor Grounds would need to be vacated to accommodate the additional right-of-way required for the Underground Option. In addition, the expanded right-of-way for the Underground Option would encroach upon 0.41 acre of a new, private oyster lease near the north bank of the river.

Short-term, minor water quality impacts could occur during the construction of this proposed option. During construction in the uplands, such impacts would be associated with the soils from disturbed areas being transported by stormwater into adjacent waters during rain events. Increased turbidity and localized sedimentation of the stream bottom may occur as a result of the runoff. However, these impacts would be significantly reduced by the implementation of Dominion Virginia Power's erosion and sediment control measures, including the installation of erosion control structures and materials. The excavation of trenches associated with the splice areas could result in short-term, minor water quality impacts due to temporary increases in turbidity and suspended sediments.

The Underground Option will require an 80 to 100 foot-wide right-of-way on land and the construction of transition stations at either end of the route. The 100 foot-wide right-of-way would be reduced in some locations to avoid homes that are in close proximity to the Rebuild Project Area. Construction of the Underground Option would result in about 1.32 acres of tree clearing on land in Middlesex and Lancaster Counties where the right-of-way would be expanded and where the transition station would be built. During construction in the uplands, such impacts would be associated with the soils from disturbed areas being transported by stormwater into adjacent waters during rain events. Increased turbidity and localized sedimentation of the stream bottom may occur as a result of the runoff. However, these impacts would be significantly reduced by the implementation of Dominion Virginia Power's erosion control measures, including the installation of erosion control structures and materials.

### **C. Discharge of Cooling Waters**

No discharge of cooling waters is associated with the Rebuild Project.

### **D. Tidal and Non-tidal Wetlands**

Within the location of the currently maintained right-of-way for Line #65, Stantec delineated wetlands 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 Plain Region (Version 2.0). This delineation was confirmed by USACE by letter dated January 6, 2015. Copies of Stantec's report and the USACE confirmation letter are provided in Appendix E of the Alternatives Analysis.

An offsite desktop analysis was conducted for the additional right-of-way required for the 230 kV Overhead Alternative Route and the additional right-of-way required for the right-of-way and transition station locations for the Underground Option. Stantec reviewed existing data including aerial photography, topography, U.S. Fish and Wildlife Service National Wetlands Inventory ("NWI"), and National Resource Conservation Service ("NRCS") soil data to identify

areas of potential wetlands. No wetlands are likely to occur within the transition station limits in Lancaster County. Wetlands are unlikely to occur within the transition station limits in Middlesex County.

One wetland complex was identified in the Rebuild Project area during the wetland delineation. This wetland can be characterized as a palustrine emergent and scrub-shrub and is located on the south side of the Rappahannock River and extends into the additional right-of-way that would be required for the 230 kV Overhead Alternative and Underground Option. Wetland vegetation is typified by wax myrtle (*Morella cerifera*), swamp rose-mallow (*Hibiscus mocheutos*), and the invasive species common reed (*Phragmites australis*). This wetland complex does not receive daily inundation from tides; however, it is located within 1.5 times the mean high water (“MHW”) elevation of the Rappahannock River and would be classified as tidal wetlands for the purposes of VMRC and Middlesex County wetlands board jurisdiction. The wetlands are also under the jurisdiction of the USACE and the DEQ under Sections 404 and 401 of the Clean Water Act (“CWA”), respectively.

#### Proposed Route

Based on the confirmed wetland delineation, the Proposed Route would cross approximately 0.34 acres of wetland habitat within the maintained right-of-way for Line #65. No clearing would be required within this wetland. No transmission structures would be located within the wetland. This wetland would be spanned by the Proposed Route. If access within the wetland during construction is required to pull conductors, the wetland would be matted to support construction vehicles, equipment and materials. Wetland disturbance along the existing right-of-way should be minimal.

The rebuild activities occurring within the existing right-of-way would not require additional tree clearing within wetlands. Herbaceous vegetation would not be removed but could be temporarily affected by construction and vehicular movement. After construction, vegetation within the right-of-way would be allowed to revert to preconstruction conditions.

#### 230 kV Overhead Alternative

The effects on wetlands as a result of construction of the 230 kV Overhead Alternative would be substantially the same as discussed above for the Proposed Route. The construction of the 230 kV Overhead Alternative would require 3 feet of additional right-of-way on land in Middlesex County. This additional right-of-way would encroach an additional 0.01 acre on the wetland complex in this location. However, since no structures would be placed in the wetland and the wetland would be spanned by the transmission line, there would be no impact to the wetland complex. If access within the wetland during construction is required to pull conductors, the wetland would be matted to support construction vehicles, equipment and materials. Wetland disturbance along the existing right-of-way should be minimal.

The rebuild activities occurring within the existing right-of-way would not require additional tree clearing within wetlands. Herbaceous vegetation would not be removed but could



be temporarily affected by construction and vehicular movement. After construction, low vegetation within the right-of-way would be allowed to revert to preconstruction conditions.

#### Underground Option

Based on the wetland delineation, the right-of-way for the Underground Option would cross approximately 0.49 acre of palustrine emergent/scrub-shrub wetland habitat in Middlesex County. The construction of the Underground Option will require the expansion of the right-of-way by between 35 and 55 feet on the land portion of the route in Middlesex County. This additional right-of-way would encroach further on the wetland complex in this location. However, since the transmission line would be installed using horizontal directional drilling, wetland impacts would be avoided. The cable would be located at a sufficient depth underground to avoid impacts to the wetland.

The Underground Option will not require additional tree clearing within wetlands. Herbaceous vegetation will not be removed; however it could be temporarily affected by construction during the removal of the existing transmission line structures. If access through the wetland is required during construction, mats will be utilized to support construction vehicles, equipment, and materials. After construction, vegetation within the right-of-way will be allowed to revert to preconstruction conditions. Wetland disturbance along the right-of-way should be minimal.

### **E. Solid and Hazardous Waste**

#### Environmental Database Review

Environmentally regulated sites in the study area have been identified using publically available databases obtained from the U.S. Environmental Protection Agency (“EPA”) and the DEQ. The database provides “information about facilities, sites, or places subject to environmental regulation or of environmental interest”. These include sites that use and/or store hazardous materials, waste producing facilities operating under permits from the EPA or other regulatory authorities, Superfund sites, the storage of petroleum, petroleum release sites and solid waste sites. The identification of a site in the databases does not necessarily mean that the site has contaminated soil or groundwater.

Based on a review of the EPA’s Envirofacts and Cleanups in My Community databases, there are no Federal Superfund, Federal Brownfield, Resource Conservation and Recovery Act (RCRA) Corrective Action sites, or Federal Emergency Response sites located within 2 miles of the Rebuild Project. According to the DEQ database, there are no permitted solid waste facilities or Virginia Pollutant Discharge Elimination System (VPDES) sites located within 2 miles of the Rebuild Project area. The results of this review are depicted in Attachment 2.E.1.

Care will be taken to operate and maintain construction equipment to prevent any fuel or oil spills. Any waste created by the construction crews will be disposed of in a proper manner and recycled where appropriate and will be further detailed in the Company’s stormwater

pollution prevention plan, a component of the Virginia Stormwater Management Program, which will be prepared as required for the DEQ Construction General Permit.

#### Petroleum Release Site Review

To further evaluate the potential impact to the Proposed Route, NRG assessed petroleum facilities and petroleum release sites recorded in the DEQ database that are located within 1,000 feet of the route centerline. One documented petroleum release is located approximately 480 feet south of the west end of the Rebuild Project area in Middlesex County. The release was reported in June 1989 at the Greys Point Family Campground, and the case was closed in 1994. The DEQ deems a petroleum release closed once no further risk to the general public has been identified, although petroleum residue might remain. The risk assessment does not always consider the risk to subsurface utility work nor address additional costs associated with managing contaminated soil or groundwater. No additional information about the release is readily available in DEQ files. The depth to groundwater at the site is approximately 10 feet below ground surface, and the flow direction is estimated to be towards the southeast. As the petroleum release appears to be localized and is estimated to be hydraulically down-gradient of the project area, it is unlikely the release impacted soil and/or groundwater in the Rebuild Project area. NRG does not recommend further evaluation of the site. There are no petroleum releases within 1,000 feet of the east end of the Rebuild Project area in Lancaster County.

#### Contaminated Sediment Review: Rappahannock River

NRG completed a preliminary desktop evaluation to assess the presence of contaminated sediment in the Rappahannock River near the proposed Rebuild Project river crossing. In 1972, a sewage treatment plant released polychlorinated biphenyls ("PCBs") into Mountain Run Lake, a tributary to the Rappahannock River located approximately 130 miles upstream of the Norris Bridge crossing. A review of the Magnitude and Extent of Contaminated Sediment and Toxicity in Chesapeake Bay (Hartwell and Hameedi, 2007) indicates that sediment samples collected from the top 2 to 3 centimeters in the Rappahannock River ranging from approximately 30 miles to 2 miles upstream of the proposed Rebuild Project river crossing contained detected concentrations of polycyclic aromatic hydrocarbons ("PAHs"), PCBs, dichlorodiphenyl-trichloroethane ("DDT"), and metals. However, these contaminant concentrations were found to be below statistically derived levels where toxic effects would be rarely expected, which is referred to as the effects-range low ("ERL") concentrations.

NRG also reviewed the Chesapeake Bay Program's 2012 Chemical Contaminants map that illustrates impairments and percent contribution of contaminants to the Chesapeake Bay area. The Rappahannock River is depicted as contributing PCBs to the Chesapeake Bay area. However, sediment sampling conducted by the DEQ in 2013 indicated that PCBs were not detected in samples collected approximately 10 miles upstream and 5 miles downstream of the Norris Bridge crossing location.

NRG continues to gather data and evaluating the potential for the presence of contaminated sediments within the Rebuild Project area.

## **F. Natural Heritage, Threatened and Endangered Species**

In order to identify areas of ecological significance within the Rebuild Project area, Stantec conducted subwatershed queries of the Virginia Department of Conservation and Recreation (“VDCR”) Natural Heritage Resources (“NHR”) website, the VDGIF Virginia Fish and Wildlife Information Service (“VFWIS”) website, and the U.S. Fish and Wildlife Information for Planning and Conservation (“IPAC”) website. Additionally the VDCR provided comments in a May 18, 2015 letter and in a subsequent letter dated February 3, 2016 on the proposed overhead crossing during the VMRC permitting process. The College of William and Mary Center for Conservation Biology (“CCB”) Eagle Nest Locator was used to determine the presence of bald eagle nests and roosts within the Rebuild Project vicinity. Stantec also used the FWS Virginia Field Office’s Bald Eagle Map tool to review whether any eagle concentration areas occurred along the Rappahannock River within the Rebuild Project vicinity.

The data review identified several federally-listed species protected under the Federal Endangered Species Act (“ESA”) and the Virginia ESA, including the Atlantic sturgeon (*Acipenser oxyrinchus*), sensitive joint-vetch (*Aeschynomene virginica*), and the northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*). The northern long-eared bat (*Myotis septentrionalis*) is protected under the Federal ESA but is not state listed. The Atlantic sturgeon has been historically documented in the Rappahannock River, including in the vicinity of the proposed crossing. The sensitive joint-vetch has been documented in Middlesex County. Swamp pink has been documented in Charles City County. The northeastern beach tiger beetle observations were documented within Lancaster County at Cherry Point, approximately 0.7 mile from the proposed crossing. The FWS has identified habitat for the northern long-eared bat in Lancaster and Middlesex Counties.

The data review also identified the peregrine falcon (*Falco peregrinus*), a state-only listed species protected under the Virginia ESA. A pair of peregrine falcons nests on the Norris Bridge, between Lancaster and Middlesex Counties.

Species-specific surveys may be recommended prior to construction to determine whether a listed species exists within the Rebuild Project area. If identified, the Company will coordinate with the appropriate regulatory agencies to minimize any impacts on listed species and/or listed habitat(s).

The closest bald eagle nest is approximately 0.3 mile southeast of the southern terminus of the proposed Rebuild Project. A second bald eagle nest is located 0.7 mile east of the northern terminus of the Rebuild Project. The Proposed Route does not intersect the primary or secondary management zones for these nests. No bald eagle roosts occur within 5 miles of the Rebuild Project area. No eagle concentration areas occur within this portion of the Rappahannock River. If an eagle nest is identified within 660 feet of the Rebuild Project right-of-way prior to construction, the Company will work with the appropriate jurisdictional agencies to minimize impacts on this species.

Construction and maintenance of the new transmission line facilities could have some minor effects on wildlife; however, impacts on most species will be short-term in nature, and limited to the period of construction.

Correspondence from the Virginia Department of Conservation and Recreation dated May 18, 2015 and February 3, 2016 is provided as Attachment 2.F.1.

#### Proposed Route

Several federally-listed species were noted in the database searches for the Proposed Route. The FWS IPAC report identifies the federally-listed northern long-eared bat (*Myotis septentrionalis*) and northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*). The northern long-eared bat utilizes forest habitat. Since no clearing will be required for the Proposed Route, no adverse effects would be expected. Northeastern beach tiger beetles utilize wide beach habitat. The aerial crossing will span the Rappahannock River beach areas; therefore, no adverse effects would be expected.

The VDCR NHR subwatershed list identifies the federally-listed sensitive joint-vetch (*Aeschynomene virginica*) as occurring within the subwatershed of the Proposed Route. No appropriate tidal wetland habitat appears to occur within the Rebuild Project area. Additionally, VDCR did not identify the sensitive joint-vetch as a species of concern for the Rebuild Project in their May 18, 2015 letter and their subsequent February 3, 2016 letter. Therefore, no adverse effects would be expected to this species.

The VDGIF VAFWIS data identifies historical records of the federally-listed Atlantic sturgeon (*Acipenser oxyrinchus*) within the vicinity of the Rappahannock River crossing. The Company would adhere to a time-of-year restriction that would prohibit pile driving activities between February 15 and June 30. Additionally, the Company will utilize bubble curtains during pile driving activities in water depths less than 25 feet. With these measures, no adverse effects would be expected to this species.

The VDGIF VAFWIS database search identified the state-listed peregrine falcon (*Falco peregrinus*) within the project area. The VDCR letter indicated that there is a peregrine falcon nest on the Norris Bridge, which is associated with the Norris Bridge Conservation Site. The Company would adhere to the DGIF time-of-year restriction of no work between February 15 and July 15 within 600 feet of the nest. Therefore, no adverse effects would be expected to this species. The closest bald eagle nest is approximately 0.3 mile southeast of the southern terminus of the Proposed Route. A second bald eagle nest is located 0.7 mile east of the northern terminus of the Proposed Route. The proposed route does not intersect the primary or secondary management zones for these nests.

#### 230 kV Overhead Alternative

The same federally- and state-listed species identified for the Proposed Route could be present within the Rebuild Project area for the 230 kV Overhead Alternative. Minimal tree clearing may be required for the 230 kV Overhead Alternative in Middlesex County where the right-of-way for the route would need to be expanded. Coordination with the FWS would occur



as needed to ensure that the northern long-eared bat would not be adversely affected by the project

#### Underground Option

The same federally- and state-listed species identified for the Overhead Alternatives could be present within the Rebuild Project area for the Underground Option. Since the northern long-eared bat utilizes forested habitat, northern long-eared bat habitat may occur within the transition station location in Middlesex County, which is located in a forested area, and along the additional right-of-way required for the Underground Option that would require tree clearing. Additional coordination with USFWS may need to occur to determine whether the northern long-eared bat may be adversely affected by the Underground Option. As with the Overhead Alternatives, no beaches will be impacted during construction, so no adverse effects to the northeastern beach tiger beetle would be expected.

No appropriate habitat appears to occur for the sensitive joint-vetch and the DCR letter dated May 18, 2015 and their subsequent February 3, 2016 letter did not identify this species as a concern for the Rebuild Project. Therefore, the Underground Option is not expected to adversely affect the sensitive joint-vetch.

The installation of piles associated with the temporary work platforms at the splice locations may affect anadromous fish. The excavation of trenches associated with the splice locations may lead to temporary, localized turbidity that may affect the Atlantic sturgeon. Adherence to the time-of-year restriction of no pile driving or dredging activities between February 15 and June 30 should ensure that no adverse effects will occur to this species from construction. The proposed transmission line would emit magnetic and electric fields. The electric field is contained within the cable insulation; therefore, fisheries would not be affected by electrical fields.

The magnetic field at the splice locations is expected to be up to 0.33 mG at the river bottom above the cables and would decrease from this point with increasing distance. The National Oceanic and Atmospheric Administration, National Marine Fisheries Service concurred with a Biological Assessment that magnetic fields from an underwater HVDC transmission line calculated to be 162 mG at the river bottom-water interface would have an insignificant effect to the Atlantic sturgeon<sup>1</sup>. Since the magnetic field expected for the underground options is less than the 162 mG reviewed by NMFS, magnetic field effects to anadromous and other fish species would likely also be insignificant.

---

<sup>1</sup> NMFS. 2014. Letter from John K. Bullard to Brian Mills, U.S. Department of Energy. "Champlain Hudson Power Express project – Endangered Species Act Section 7 Consultation". September 18, 2014.

The peregrine falcon nest on the Norris Bridge is located greater than 2,000 feet from either splice location. Therefore, work at these locations would not be expected to adversely affect nesting falcons. The closest bald eagle nest is located approximately 1,500 feet from the Middlesex transition station. Both transition stations are located outside of the primary and secondary management zones for bald eagle nests.

#### **G. Erosion and Sediment Control**

Dominion Virginia Power is required to submit annual erosion and sediment control specifications and an anticipated list of transmission line projects to DEQ for review and approval. Dominion Virginia Power's annual submittal will follow DEQ guidelines, and the Project will be included in the submittal. These specifications are given to the Dominion Virginia Power's contractors and require erosion and sediment control measures to be in place before construction of the line begins and specify the requirements for rehabilitation of the right-of-way.

#### **H. Archaeological, Historic, Scenic, Cultural or Architectural Resources**

##### Proposed Route

No archaeological sites are documented in the right-of-way for the Proposed Route.

There are three considered resources relevant to the Proposed Route. They include two National Register of Historic Places (NRHP)-listed resources within a mile of the proposed routes, Pop Castle (VDHR #051-0075) and Grey's Point Plantation (VDHR #059-0025), and the Captain John Smith Chesapeake National Historic Trail, a national historic trail designated by the U.S. Congress. Based on line of sight analysis, there will be no impact to Grey's Point Plantation by the Proposed Route. There will be minimal impacts to both Pop Castle and the Captain John Smith Chesapeake National Historic Trail from the Proposed Route.

##### 230 kV Overhead Alternative

No archaeological sites are documented in the right-of-way for the 230 kV Overhead Alternative.

There are three considered resources relevant to the 230 kV Overhead Alternative. They include two National Register of Historic Places (NRHP)-listed resources within a mile of the proposed routes, Pop Castle (VDHR #051-0075) and Grey's Point Plantation (VDHR #059-0025), and the Captain John Smith Chesapeake National Historic Trail, a national historic trail designated by the U.S. Congress. Based on line of sight analysis, there will be no impact to Grey's Point Plantation by the 230 kV Alternative Route. There will be minimal impacts to both Pop Castle and the Captain John Smith Chesapeake National Historic Trail from the 230 kV Overhead Alternative.

### Underground Option

No archaeological sites are documented in the right-of-way for the Underground Option.

There are three considered resources relevant to the Underground Option. They include two NRHP-listed resources within a mile of the Underground Route Option, Pop Castle (VDHR #051-0075) and Grey's Point Plantation (VDHR #059-0025), and the Captain John Smith Chesapeake National Historic Trail, a national historic trail designated by the U.S. Congress. Based on line of sight analysis, there will be no impacts to Pop Castle and minimal impacts to Grey's Point Plantation, based on views of Transition Station structures. The Underground Option will have minimal visual impacts on the Captain John Smith Chesapeake National Historic Trail, based on views of the Transition Station structures in Middlesex County, and minimal direct impacts from installation of underground cabling.

Correspondence from the Virginia Department of Historic Resources ("VDHR") dated February 10, 2016 is provided as Attachment 2.H.1.

### **I. Chesapeake Bay Preservation Areas**

Construction, installation, operation and maintenance of electric transmission lines are conditionally exempt from the Chesapeake Bay Act as stated in the exemption for public utilities, railroads, public roads and facilities in 9 VAC 25-830-150. The Company will meet those conditions Wildlife Resources

As noted in Section 2.F, the FWS, VDCR and VDGIF databases were searched in order to assess the potential presence of any federal- or state-listed threatened or endangered species in the vicinity of the Rebuild Project. The search determined there is the potential presence of four federal- and state-listed endangered and threatened species within the Rebuild Project area.

### Proposed Route

In addition to the four listed species, the waters of the Rappahannock River are known anadromous fish waters and Essential Fish Habitat ("EFH"). It is expected that adherence to designated time-of-year restrictions and utilization of bubble curtains would minimize impacts on EFH and any listed fish species during construction. Due to the open design of the structure foundations (two to three concrete pile footings), the structures are not expected to serve as an impediment to fish movement. Other than the previously mentioned temporary impacts, the project is not expected to have any permanent impacts on EFH or fisheries managed in the area.

Since all upland work will be conducted within currently maintained right-of-way for Line #65, minimal impact to wildlife habitat would be expected.

### 230 kV Overhead Alternative

The 230 kV Overhead Alternative will affect the same species and EFH as described above in the discussion of the Proposed Route. Minimal tree clearing (less than 0.01 acres)

would be required where the right-of-way for the 230 kV Overhead Alternative would need to be expanded in Middlesex County. This should result in minimal, if any, impact to wildlife habitat.

#### Underground Option

The Underground Option would affect the same species and EFH as described for the Proposed Route and 230 kV Overhead Alternative. It is expected that adherence to designated time-of-year restrictions would minimize impacts on EFH and any listed fish species during construction. Since the cables would be installed below the bottom of the river, there would be no permanent impediment to fish movement. Other than the previously mentioned temporary impacts, the project is not expected to have any permanent impacts on EFH or fisheries managed in the area.

Clearing of 1.32 acre of forest within the additional right-of-way required for the Underground Option and for the transition station in Middlesex County would have localized impact to wildlife habitat. Clearing activities could result in mortality of sedentary or slow moving forest wildlife species. Mobile species would be able to avoid the construction activities and relocate to available forest habitat in the immediate vicinity.

### **J. Recreation, Agricultural, and Forest Resources**

#### Proposed Route

Land uses affected along the Proposed Route consists of 1.82 miles of open water (84 percent), 0.17 mile of developed, open space (8 percent), 0.10 mile of developed, low/medium intensity land (5 percent), 0.07 mile of forested land (3 percent), and 0.01 mile of marshland (>1 percent).

The Proposed Route crosses the Rappahannock River between MPs 0.0 and 1.9. For the Rappahannock River crossing, the Proposed Route requires 19.81 acres of new permanent right-of-way to accommodate the 80 foot-wide right of way and fender locations. This right-of-way was granted through the vacation of Baylor Grounds.

Along the Rappahannock River are the Captain John Smith Chesapeake National Historic Trail and the Lancaster County Rappahannock River Through Trail. Construction of the Proposed Route would not impede use of the water trails because boaters can be diverted from construction areas. The Proposed Route is within 0.25 mile of Grey's Point Camp (MP 2.1), Grey's Point Beach and Water Access (MP 2.1), Willaby's Café (MP 0.0) and Rivers Landing Bed and Breakfast (MP 0.0). No permanent or construction impacts are anticipated on these recreation areas.

Because the Proposed Route follows an existing an existing right-of-way on land, no impacts to agricultural or forest resources are anticipated.



### 230 kV Overhead Alternative

Since the 230 kV Overhead Alternative follows the same alignment as the Proposed Route, it would have the substantially the same impacts on land cover and recreational resources as the Proposed Route. The only difference would be that the 230 kV Overhead Alternative would require the clearing of less than 0.01 acre of forested land where the right-of-way for the 230 kV Overhead Alternative would need to be expanded in Middlesex County.

### Underground Option

Land uses affected along the Underground Option right-of-way would consist of 1.82 miles of open water (78 percent), 0.30 mile of developed, open space (13 percent), 0.10 mile of developed, low/medium intensity land (4 percent), 0.10 mile of forested land (4 percent), 0.01 mile of agricultural land (>1 percent), and 0.01 mile of marshland (>1 percent).

The Underground Option crosses the Rappahannock River between MPs 0.2 and 2.1. The Underground Option would require 26.50 acres of new permanent right-of-way along the river bottom to accommodate its 100-wide right-of-way and 200 feet wide by 650 feet long splice locations.

The Underground Option would cross both the Captain John Smith Chesapeake National Historic Trail and the Lancaster County Rappahannock River Through Trail. Use of the water trails would not be affected during construction of the Underground Option because boaters can be diverted from construction areas. The Underground Option is within 0.25 mile of Grey's Point Camp (MP 2.3), Grey's Point Beach and Water Access (MP 2.2), Willaby's Café (MP 0.0) and Rivers landing Bed and Breakfast (MP 0.0). No permanent or construction impacts are anticipated on these recreation areas.

The additional right-of-way required for the Underground Option would require the clearing of 1.32 acres of forest land and impact 1.98 acres of agricultural land.

### **K. Use of Pesticides and Herbicides**

Dominion Virginia Power typically maintains transmission right-of-way by means of selective, low volume applications of Environmental Protection Agency ("EPA")-approved, non-restricted use herbicides. The goal of this method is to exclude tall growing brush species from right-of-way by establishing early successional plant communities of native grasses, forbs, and low growing woody vegetation. "Selective" application means the Company sprays only the undesirable plant species (as opposed to broadcast applications). "Low volume" application means the Company uses only the volume of herbicide necessary to remove the selected plant species. These herbicides are routinely applied by hand. DEQ has made previous requests that only herbicides approved for aquatic use by the EPA or the FWS be used in or around any surface water; Dominion Virginia Power intends to comply with this request.

## **L. Geology and Mineral Resources**

### **Geological Constraints**

The Rebuild Project is located within the Coastal Plain geologic province, which consists of a terraced landscape that extends east of Richmond to the Atlantic Ocean. The majority of the province is covered by Quaternary and late Tertiary sand, silt, clay, and gravel that were deposited as a result of fluctuating sea levels during interglacial periods. The upland sub-province located on the western side of the Coastal Plain has an elevation range of 60 to 250 feet and is characterized by steep, stream-dissected slopes. In contrast, the lowland sub-province lies between the upland sub-province and the Atlantic Ocean and has an elevation range of 0 to 60 feet. The lowland sub-province is characterized by flat regions with low relief.

### **Mineral Resources**

NRG identified mineral resource areas through review of publically available Virginia Department of Mines, Minerals, and Energy datasets, USGS topographic quadrangles, and recent digital aerial photographs. There are no mineral resources identified in the rebuild Project vicinity. The closest sand and gravel pit is located approximately 2 miles north of the corridor, north of Irvington Road and east of Irvington Farm Road in Lancaster County.

## **M. Transportation Infrastructure**

Temporary closures of roads could be required during construction of the Proposed Route, the 230 kV Overhead Alternative or the Underground Option. No long term impacts to roads are anticipated. The Company will maintain proper clearances between all road surfaces and the conductors and will comply with Virginia Department of Transportation (“VDOT”) requirements for access to the right-of-ways from public roads as well as the aerial and HDD crossings of the roads. At the appropriate time, the Company will obtain the necessary VDOT permits as required.

The Proposed Route, the 230 kV Overhead Alternative, and the Underground Option cross the Rappahannock River, which is a Section 10 Navigable waterway. Vertical clearance of transmission lines over navigable water is defined in 33 CFR 322.5(i) (Special policies-Power transmission lines). In addition to the required minimum clearance of 100 feet at mean high water (“MHW”) as designated by the U.S. Coast Guard (“USCG”) Bridge Clearance Guide, a 115 kV line would have to have an additional 20 feet of clearance, while a 230 kV line would require an additional 26 feet of clearance. The minimum horizontal clearance is 250 feet for the project location in the Rappahannock River. The USCG Bridge Division is the advising agency for determining final required minimum clearances.

One USCG aid (marker) to navigation exists offshore of Grey’s Point within the Rebuild Project vicinity. This marker is named “9R” and includes a green flashing light.

### Proposed Route

The Proposed Route would cross one road, Pinetop Road, at MP 2.1.

### 230 kV Overhead Alternative

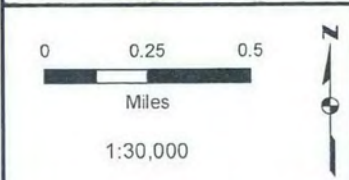
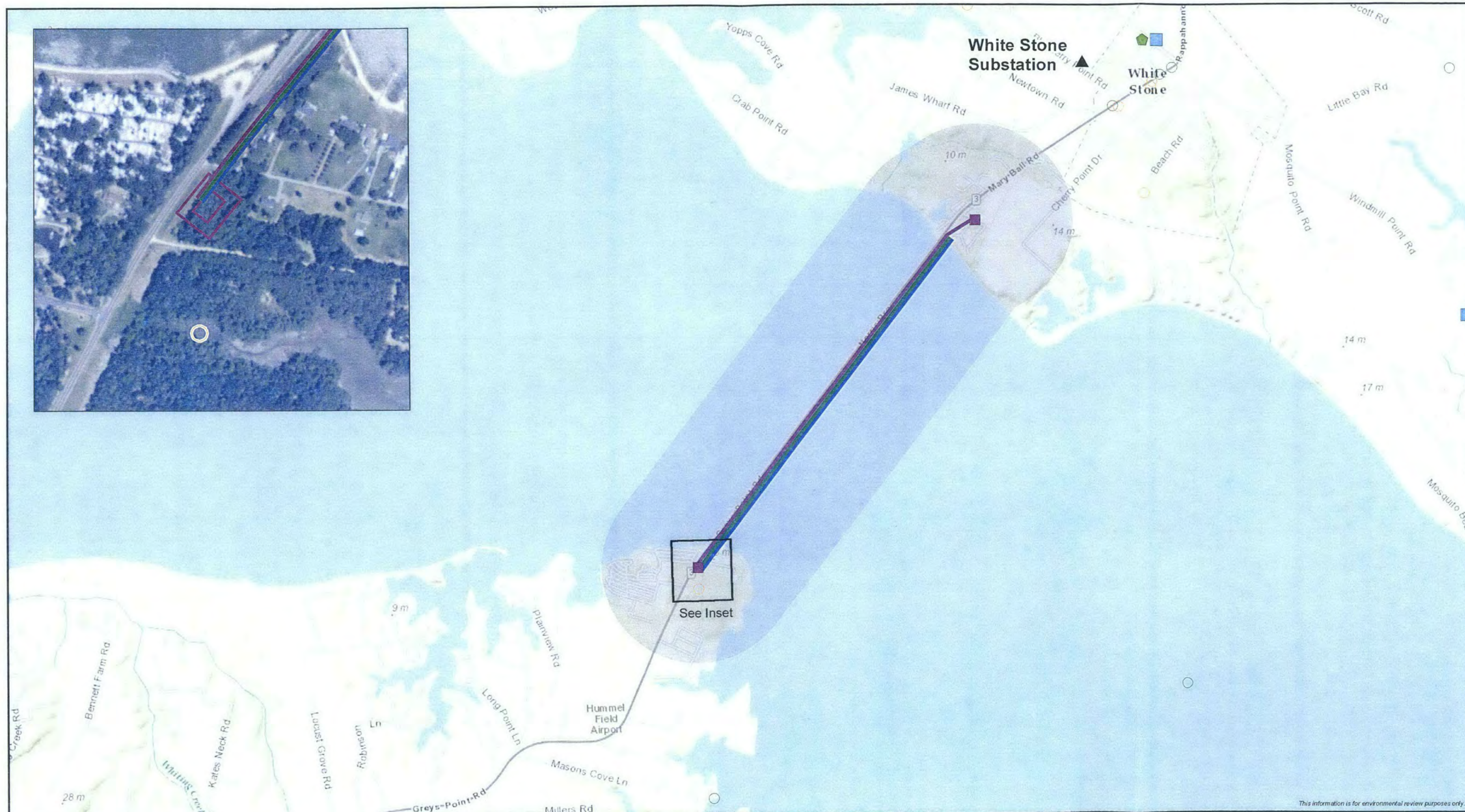
The 230 kV Overhead Alternative would cross one road, Pinetop Road, at MP 2.1.

### Underground Option

The Underground Option would cross three roads. Wray Davis Lane is crossed at MP 0.0, Highbank Road is crossed at 0.1, and Pinetop Road is crossed at MP 2.3.

## **Attachments**





- |   |   |   |   |
|---|---|---|---|
| <ul style="list-style-type: none"> <li>▲ Substation</li> <li>■ Transition Station for Underground Route Option</li> </ul> | <ul style="list-style-type: none"> <li>Proposed 115 kV Overhead Route</li> <li>230 kV Overhead Alternative</li> <li>Underground Option</li> <li>Route Buffer - Half Mile</li> </ul> | <ul style="list-style-type: none"> <li>Pollution Discharge Elimination System</li> <li>Solid Waste Facility</li> <li>Petroleum Release</li> <li>VDEQ Registered Petroleum Facility</li> </ul> | <b>EPA GeoData</b> <ul style="list-style-type: none"> <li>Air</li> <li>Water</li> <li>Waste</li> <li>Toxic</li> </ul> |
|---|---|---|---|

**Dominion**

**Line #65 115 kV Rebuild at Norris Bridge**

**Contaminated Sites**

Attachment 2.E.1

an ERM Group company

DRAWN BY: JPB



Molly Joseph Ward  
*Secretary of Natural Resources*

Clyde E. Cristman  
*Director*



Joe Elton  
*Deputy Director of Operations*

Rochelle Altholz  
*Deputy Director of  
Administration and Finance*

David Dowling  
*Deputy Director of  
Soil and Water and Dam Safety*

**COMMONWEALTH of VIRGINIA**  
**DEPARTMENT OF CONSERVATION AND RECREATION**

**MEMORANDUM**

DATE: February 3, 2016  
TO: Amanda Mayhew, DOM  
FROM: Roberta Rhur, Environmental Impact Review Coordinator  
SUBJECT: DCR 16-001; DOMINION POWER RAPPAHANNOCK RIVER CROSSING

**Division of Planning and Recreation Resources**

The Department of Conservation and Recreation (DCR), Division of Planning and Recreational Resources (PRR), develops the *Virginia Outdoors Plan* and coordinates a broad range of recreational and environmental programs throughout Virginia. These include the Virginia Scenic Rivers program; Trails, Greenways, and Blueways; Virginia State Park Master Planning and State Park Design and Construction.

This project crosses the Rappahannock River, a potential Scenic River. However, given the nature of the project, we do not anticipate any appreciable impacts to this potentially scenic resource. If you have any questions about scenic river designation, please see our web site at <http://www.dcr.virginia.gov/recreational-planning/document/srdoesdoesnt.pdf> or contact Lynn Crump at [lynn.crump@dcr.virginia.gov](mailto:lynn.crump@dcr.virginia.gov).

The remaining DCR divisions have no comments regarding the scope of this project. Thank you for the opportunity to comment.

Molly Joseph Ward  
Secretary of Natural Resources

Clyde E. Cristman  
Director

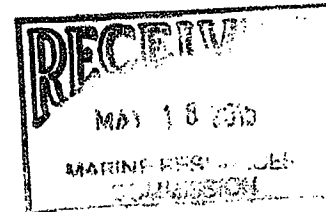


Joe Elton  
Deputy Director of Operations

Rochelle Altholz  
Deputy Director of Administration  
and Finance

**COMMONWEALTH of VIRGINIA**  
**DEPARTMENT OF CONSERVATION AND RECREATION**

600 East Main Street, 24<sup>th</sup> Floor  
Richmond, Virginia 23219  
(804)786-6124



MEMORANDUM

DATE: May 18, 2015  
TO: Jay Woodward, MRC  
FROM: Roberta Rhur, Environmental Impact Review Coordinator  
SUBJECT: MRC 15-0533, Line 65 Rebuild Utility Crossing

Division of Natural Heritage

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, the Norris Bridge Conservation Site is located within the project site. Conservation sites are tools for representing key areas of the landscape that warrant further review for possible conservation action because of the natural heritage resources and habitat they support. Conservation sites are polygons built around one or more rare plant, animal, or natural community designed to include the element and, where possible, its associated habitat, and buffer or other adjacent land thought necessary for the element's conservation. Conservation sites are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. Norris Bridge Conservation Site has been given a biodiversity significance ranking of B5, which represents a site of general significance. The natural heritage resource of concern at this site is:

*Falco peregrinus*

Peregrine falcon

G4/S1B,S2N/NL/LT

The Peregrine falcon nests on cliffs, bluffs, talus slopes, old tree hollows, and abandoned nests of other birds of prey (Byrd, 1991). The adult Peregrine Falcon has long and pointed wings, a dark blue or slate back, black on its head and cheeks and white on its throat and sides of its neck. Their belly is barred white and blackish brown and its long, narrow tail is blue-grey with rounded narrow black bands and a white tipped end (Byrd, 1991). The Peregrine Falcon declined dramatically worldwide as a result of pesticide use in the mid-1900's and was once extirpated from east of the Mississippi, including Virginia (CCB, 2006). Once nesting took place in mountainous areas with sheer cliffs (CCB, 2006); currently, nesting pairs in

*State Parks • Soil and Water Conservation • Outdoor Recreation Planning  
Natural Heritage • Dam Safety and Floodplain Management • Land Conservation*

Virginia use artificial structures such as tall buildings, bridge supports, and towers primarily in the coastal plain (Byrd, 1991; CCB, 2006). Intensive reintroduction efforts have been applied in Virginia since the 1970s, and currently the population in Virginia still warrants protection and management.

Threats to the Peregrine falcon include continued exposure to pesticides and human disruption of nesting attempts (Byrd, 1991). Please note that this species is currently classified as threatened by the Virginia Department of Game and Inland Fisheries (VDGIF).

DCR recommends a time of year restriction on all bridge work from 15 February to 15 July of any year. Due to the legal status of Peregrine falcon, DCR also recommends coordination with Virginia's regulatory authority for the management and protection of this species, the VDGIF, to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please re-submit project information and map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis/> or contact Angela Weller at 804-364-8747 or [Angela.Weller@dgif.virginia.gov](mailto:Angela.Weller@dgif.virginia.gov)).

The remaining DCR divisions have no comments regarding the scope of this project. Thank you for the opportunity to comment.

Cc: Amy Ewing, VDGIF



Literature Cited

Byrd, M.A. 1991. Peregrine Falcon. In Virginia's Endangered Species: Proceedings of a Symposium. K. Terwilliger ed. The McDonald and Woodward Publishing Company, Blacksburg, Virginia. p. 499-501.

Center for Conservation Biology. 2005. VAFalcons. Accessed at:  
<http://ccb-wm.org/vafalcons/species/species.htm> on April 22, 2010.



# COMMONWEALTH of VIRGINIA

Molly Joseph Ward  
Secretary of Natural Resources

**Department of Historic Resources**  
2801 Kensington Avenue, Richmond, Virginia 23221

Julie V. Langan  
Director

Tel: (804) 367-2323  
Fax: (804) 367-2391  
[www.dhr.virginia.gov](http://www.dhr.virginia.gov)

February 10, 2016

Ms. Amanda Mayhew  
Dominion Virginia Power  
P.O. Box 26666  
Richmond, VA 23261

Re: Rappahannock River Transmission Line (Line #65) Rebuild Project  
Lancaster and Middlesex Counties, VA  
DHR File No. 2015-0969

Dear Ms. Mayhew:

Thank you for initiating consultation with DHR on the project referenced above. The project, as presented, is the rebuild of 2.2 miles of existing transmission line across the Rappahannock River at the Route 3 (Norris) bridge. Our comments are provided as assistance to Dominion Virginia Power (Dominion) in the preparation of an application to the State Corporation Commission (SCC). We have previously provided comments to the Army Corps of Engineers on this project and reserve the right to provide additional comment through the Federal Section 106 process.

The Army Corps considered the project's impacts on Pops Castle (DHR ID #051-0075), which is listed in the National Register of Historic Places and concluded consultation with a finding of no adverse effect. The Army Corps' limited its analysis to Pops Castle and did not complete cultural resources survey. In accordance with Section I of the DHR's *Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia*, we recommend that a pre-application analysis be prepared and submitted to DHR. Once an alternative is approved by the SCC, we are likely to recommend full architectural and archaeological studies and mitigation of all moderate to severe impacts to VLR/NRHP-eligible resources.

We look forward to working with Dominion throughout this project. If you have any questions, please do not hesitate to contact me at [roger.kirchen@dhr.virginia.gov](mailto:roger.kirchen@dhr.virginia.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Roger W. Kirchen".

Roger W. Kirchen, Director  
Review and Compliance Division

Administrative Services  
10 Courthouse Ave.  
Petersburg, VA 23803  
Tel: (804) 862-6408  
Fax: (804) 862-6196

Eastern Region Office  
2801 Kensington Avenue  
Richmond, VA 23221  
Tel: (804) 367-2323  
Fax: (804) 367-2391

Western Region Office  
962 Kime Lane  
Salem, VA 24153  
Tel: (540) 387-5443  
Fax: (540) 387-5446

Northern Region Office  
5357 Main Street  
PO Box 519  
Stephens City, VA 22655  
Tel: (540) 868-7029  
Fax: (540) 868-7033