

### Dominion Energy

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SIMULATION 24 Date: 8/11/2022 Time: 10:15 am Direction: South







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SIMULATION 24 Date: 8/11/2022 Time: 10:15 am Direction: South



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SIMULATION 26 Date: 8/11/2022 Time: 10:22 am Direction: South



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SIMULATION 26 Date: 8/11/2022 Time: 10:22 am Direction: South



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SIMULATION 26 Date: 8/11/2022 Time: 10:22 am Direction: South



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SIMULATION 26 Date: 8/11/2022 Time: 10:22 am Direction: South



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SIMULATION 26 Date: 8/11/2022 Time: 10:22 am Direction: South





SIMULATION 26 Date: 8/11/2022 Time: 10:22 am Direction: South



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Right-of-Way Visualization

Route 5







**Route 6** 





### APPENDIX G STAGE 1 PRE-APPLICATION ANALYSIS OF CULTURAL RESOURCES





500-230 kV Wishing Star Substation, 500 kV and 230 kV Mars-Wishing Star Lines, 500-230 kV Mars Substation, and Mars 230 kV Loop

**Pre-Application Analysis** 

Archaeology Site Locations Redacted

21 October 2022 Project No.: 0505584



### Signature page

21 October 2022

### 500-230 kV Wishing Star Substation, 500 kV and 230 kV Mars-Wishing Star Lines, 500-230 kV Mars Substation, and Mars 230 kV Loop

**Pre-Application Analysis** 

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### **Executive Summary**

This report presents the findings of the pre-application analysis for Dominion Energy Virginia's proposed 500-230 kV Wishing Star Substation, 500-230 kV Mars - Wishing Star Lines, 500-230 kV Mars Substation, and Mars 230 kV Loop Project in Loudoun County, Virginia. For this Project, Virginia Electric and Power Company (Dominion Energy Virginia or the Company) is proposing to construct and operate the following new facilities:

- a new 500-230 kV substation, referred to as Wishing Star Substation, to be built east of and adjacent to Dominion's existing 500 kV Brambleton-Mosby Lines (#546 and #590) and 230 kV Brambleton-Loudoun Lines (#2094 and #2045), south of the existing Brambleton Substation, within existing Company-owned right-of-way and on property obtained by the Company;
- a new 500-230 kV substation, referred to as Mars Substation, to be built near the intersection of Carters School and West Perimeter roads on property obtained by the Company northwest of Washington Dulles International Airport (Dulles Airport);
- a new overhead 500 kV single circuit transmission line (#527) with a new 230 kV single circuit transmission line (#2291) underbuilt on the same structures, referred to as the Mars-Wishing Star Lines, between the proposed Wishing Star and Mars Substations; and
- two new 230 kV double circuit transmission lines, referred to as the Mars 230 kV Loop, from the proposed Mars Substation to the Company's existing 230 kV Cabin Run-Shellhorn Road Line (#2095) and 230 kV Poland Road-Shellhorn Road Line (#2137).

The Wishing Star Substation, Mars-Wishing Star Lines, Mars Substation, Mars 230 kV Loop and related substation work are collectively referred to as the "Project."

For the Mars to Wishing Star Lines, the Company identified six alternative routes (Routes 1 through 6). For the Mars 230 kV Loop the Company identified one route (Mars 230 kV Loop).

This pre-application analysis assesses and compares potential impacts on previously recorded historic and archaeological resources in relation to each alternative route. Environmental Resources Management, Inc. (ERM) conducted the analysis on behalf of Dominion Energy Virginia to assist in the development of a feasible Project design that minimizes impacts to historic resources. The pre-application analysis is a required study for transmission line projects regulated by the Virginia State Corporation Commission (SCC). The study was completed in accordance with the Virginia Department of Historic Resources' *Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia* (VDHR 2008) (Guidelines).

Eight known archaeological sites are located in the right-of-way of the alternative routes for the Mars to Wishing Star Lines discussed in this study. Two sites fall within the right-of-way for Route 1, four sites fall within the right-of-way for Route 2, one site falls within the right-of-way for Route 3, three sites fall within the right-of-way for Route 4, and five sites fall within the right-of-way for Routes 5 and 6. Additionally, the Mars 230 kV Loop and the Wishing Star Substation each contain one archaeological site within their boundaries. A confident determination regarding the nature of archaeological deposits at each site and impacts on the sites from prior land use activities would require a survey to verify the results for this desktop analysis.

Three previously recorded historic architectural resources meeting criteria specified in the Guidelines fall within study tiers defined by the VDHR for identifying aboveground historic sites along and near transmission line routes. Since portions of some alternative routes use common alignments, impacts on

several resources would be identical regardless of the route option selected for the Project. The likely impacts on individual historic resources associated with each route are presented in the table below.

For the Mars to Wishing Star Lines, all three previously recorded historic architectural resources are located in the same VDHR study tiers for all six routes. For Routes 1 through 6, ERM recommends a finding of no impact on two resources, and a minimal impact on one resource. The substations are near one resource each. ERM recommends a finding of no impact for the resource associated with the Wishing Star Substation. However, ERM recommends a minimal impact on the resource associated with the Mars Substation. There are no considered resources along the Mars 230 kV Loop.

**EXECUTIVE SUMMARY** 

I Analysis 2

Exec	utive Summ	ary of Statu	s of Archa	eological F	sesources in	the Study Ar	ea of the P	roposed Rou	ltes
Considered		Mars	to Wishing St	ar Alternative	Routes		Mars	Substat	ions
Resource	Route 1	Route 2	Route 3	Route 4	Route 5	Route 6	Loop	Wishing Star	Mars
44LD0167	Not Evaluated	Not Evaluated			I	I			
44LD0168	Not Eligible	Not Eligible	Not Eligible	Not Eligible	Not Eligible	Not Eligible	ı		
44LD0173	I	Not Eligible		Not Eligible	Not Eligible	Not Eligible	I		·
44LD0174				I	Not Eligible	Not Eligible	T		
44LD0609	I		ı	I	Not Evaluated	Not Evaluated	I		
44LD0970	I	Not Evaluated	ı	Not Evaluated	Not Evaluated	Not Evaluated	·		

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Not Eligible

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44LD1280 44LD1742

Not Eligible

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# Executive Summary of Project Impacts to Considered Aboveground Historic Resources in the Study Area of the **Alternative Routes**

	Substations	Mars	Minimal		
		Wishing Star		None	
	Mars 230 kV	Loop	ı	ı	ı
	Mars to Wishing Star Alternative Routes	Route 6	Minimal	None	None
		Route 5	Minimal	None	None
		Route 4	Minimal	None	None
		Route 3	Minimal	None	None
		Route 2	Minimal	None	None
		Route 1	Minimal	None	None
	Considered Resource		053-0008	053-0982	053-0984

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### **Acronyms and Abbreviations**

Name	Description				
3D	three dimensional				
ABPP	American Battlefield Protection Program				
CMOS	complementary metal-oxide-semiconductor				
ERM	Environmental Resources Management				
ESRI	Environmental Systems Research Institute				
GNSS	Global Navigation Satellite System				
ISO	International Organization for Standardization				
JPEG	Joint Photographic Experts Group format				
kV	kilovolt				
MP	milepost				
NHL	National Historic Landmark				
NPS	National Park Service				
NRHP	National Register of Historic Places				
PBR	physically based rendering				
PDF	portable document format				
Project	Mars to Wishing Star 500 kV Transmission Line Project				
PWA	Public Works Administration				
RAW	an unprocessed image				
ROW	right-of-way				
SCC	State Corporation Commission				
SLR	single-lens reflex				
SP	Simulation Point				
USGS	United States Geological Survey				
UTM	Universal Transverse Mercator				
V-CRIS	Virginia Cultural Resource Information System				
VDHR	Virginia Department of Historic Resources				
VLR	Virginia Landmarks Register				

### 1. INTRODUCTION

This report presents the findings of the pre-application analysis prepared by Environmental Resources Management, Inc. (ERM) on behalf of Virginia Electric and Power Company (Dominion Energy Virginia or the Company) for the proposed 500-230 kV Wishing Star Substation, 500-230 kV Mars - Wishing Star Lines,500-230 kV Mars Substation, and Mars 230 kV Loop Project in Loudoun County, Virginia. For this Project, Virginia Electric and Power Company (Dominion Energy Virginia or the Company) is proposing to construct and operate the following new facilities:

- a new 500-230 kV substation, referred to as Wishing Star Substation, to be built east of and adjacent to Dominion's existing 500 kV Brambleton-Mosby Lines (#546 and #590) and 230 kV Brambleton-Loudoun Lines (#2094 and #2045), south of the existing Brambleton Substation, within existing Company-owned right-of-way and on property obtained by the Company;
- a new 500-230 kV substation, referred to as Mars Substation, to be built near the intersection of Carters School and West Perimeter roads on property obtained by the Company northwest of Washington Dulles International Airport (Dulles Airport);
- a new overhead 500 kV single circuit transmission line (#527) with a new 230 kV single circuit transmission line (#2291) underbuilt on the same structures, referred to as the Mars-Wishing Star Lines, between the proposed Wishing Star and Mars Substations; and
- two new 230 kV double circuit transmission lines, referred to as the Mars 230 kV Loop, from the proposed Mars Substation to the Company's existing 230 kV Cabin Run-Shellhorn Road Line (#2095) and 230 kV Poland Road-Shellhorn Road Line (#2137).

The Wishing Star Substation, Mars-Wishing Star Lines, Mars Substation, Mars 230 kV Loop and related substation work are collectively referred to as the "Project." As discussed in more detail below, several alternative routes are currently under consideration for the Mars to Wishing Star Lines, while only one route has been deemed feasible for the Mars 230 kV Loop.

The pre-application analysis assesses potential impacts on previously recorded historic and archaeological resources relative to each alternative route. ERM conducted the pre-application analysis on behalf of Dominion Energy Virginia to assist in the development of a feasible Project design that minimizes impacts on historic resources. The study was completed in accordance with the Virginia Department of Historic Resources' (VDHR's) *Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia* (VDHR 2008) (Guidelines).

### **1.1 Overview**

A number of route options are currently under consideration for the new overhead transmission lines associated with the Project. For the Mars to Wishing Star Lines, the Company identified six alternative routes (Routes 1 through 6). For the Mars 230 kV Loop the Company identified one route (Mars 230 kV Loop). A map depicting each alternative route and the proposed Wishing Star and Mars substations is provided as Figure 1.1-1.

The Mars to Wishing Star Lines will consist of a single-circuit 500 kilovolt (kV) overhead transmission line and 230 kV single-circuit transmission line underbuilt on the same structures, extending from the proposed Wishing Star Substation to the Mars Substation. The Mars 230 kV Loop will be a double-circuit 230 kV overhead transmission line running from the proposed Mars Substation to the Company's existing 230 kV Cabin Run-Shellhorn Road Line (#2095) and 230 kV Poland Road-Shellhorn Road Line (#2137).

All required materials for the Project's 500-230 kV structures would be delivered and assembled at each structure location in the proposed right-of-way. Detailed foundation design would not be completed until prior to construction; however, foundation design could include poured concrete requiring excavation or steel piles or caissons that might be vibrated, drilled, or driven into place depending on soil conditions. Structures would be erected with a crane and anchored to the foundation during final assembly. If there is excess soil from foundation construction, it would be evenly distributed at each structure, and the soil would be replanted and stabilized. In wetland areas, excess soil would be removed and evenly distributed on an upland site within Dominion's proposed right-of-way. Typical construction equipment may include hole diggers or drilling equipment, cranes, wire stringing rigs, tensioners, backhoes, and trucks.

All conductors and shield wires would be strung under tension. This system involves stringing a "lead line" between structures for the conductors and ground wires. The rope pulls a steel cable that is connected to the conductors and shield wires, which are pulled through neoprene stringing blocks to protect the conductor and shield wire from damage. Stringing the conductors and shield wires under tension protects the wires from possible damage should they be allowed to touch the ground, fences, or other objects.

Maintaining the right-of-way under the transmission lines is essential for the reliable operation of the line, as well as for public safety. Operation and maintenance of the Project would include periodic inspections of the line and the right-of-way; occasional replacement of hardware as necessary; periodic clearing of vegetation, either mechanically or by selective, low-volume application of approved herbicides within the corridor; and the cutting of danger trees outside the right-of-way. Danger trees are trees outside the cleared corridor that are sufficiently tall enough to fall into the right-of-way and potentially impact the transmission line. Periodic inspections would use both aerial and walking patrols. Normal operation and maintenance would require only infrequent visits by Dominion Energy Virginia or its contractors.

### 1.1.1 Route 1

This route would construct an overhead 500 kV single circuit transmission line with a 230 kV single circuit transmission line underbuilt between the proposed Wishing Star Substation and Mars Substation.

Beginning at the proposed Wishing Star Substation site, Route 1 travels east for about 0.3 mile along the south side of Broad Run before crossing a future VDOT right-of-way associated with the Northstar Boulevard extension project. The route then continues east for 0.3 mile along an undeveloped parcel before crossing Belmont Ridge Road. After crossing the road, Route 1 parallels the south side of the Company's existing right-of-way for Lines #2172 and #2183 for 0.2 mile to the east on an undeveloped tract. The route then turns north, crossing the existing right-of-way and Broad Run, and continues another 0.2 mile onto an undeveloped parcel. Route 1 then turns east for 0.5 mile along the south side of a stormwater retention pond before turning slightly to the northeast and continuing for 0.3 mile, crossing a parcel dedicated as an open space proffer for the Brambleton Community Association.

At a point just south of the intersection of Evergreen Mills Road and Loudoun County Parkway, Route 1 crosses the parkway before turning southeast and continuing across Broad Run. The route then continues southeast along the southwestern edge of an undeveloped tract for 0.3 mile, rejoining the Company's existing right-of-way for Lines #2137 and #2213. Route 1 then continues 0.2 mile across NOVEC-owned land before crossing Old Ox Road and spanning Lines #2137 and #2213. The route then continues southeast for 0.7 mile across a surface parking lot, paralleling the north side of MWAA's West Perimeter Road.

About 0.2 mile west of the proposed Mars Substation site, Route 1 splits into two separate rights-of-way, one for the 500 kV line and the other for the 230 kV line. The right-of-way for the 500 kV line turns east for 0.2 mile before crossing Carters School Road and terminating on the west side of the proposed Mars Substation site. The right-of-way for the 230 kV line continues southeast for 0.2 mile before crossing

Carters School Road, then turns north to terminate on the south side of the proposed Mars Substation site.

Route 1 measures 3.63 miles in length, including the approximately 0.34-mile-long split of the 230 kV line from the 500 kV line in the approach to the Mars Substation site.

### 1.1.2 Route 2

This route would construct an overhead 500 kV single circuit transmission line with a 230 kV single circuit transmission line underbuilt between the proposed Wishing Star Substation and Mars Substation.

Beginning at the proposed Wishing Star Substation site, Route 2 travels east for about 0.3 mile along the south side of Broad Run before crossing a future VDOT right-of-way associated with the Northstar Boulevard extension project. The route then continues east for 0.3 mile along an undeveloped parcel before crossing Belmont Ridge Road. After crossing the road, Route 2 parallels the south side of the Company's existing right-of-way for Lines #2172 and #2183 for 0.2 mile across an undeveloped tract. It then turns north, crossing Lines #2172 and #2183 and Broad Run, before continuing about 0.2 mile onto another undeveloped parcel. The route then turns east for 0.5 mile along the south side of stormwater retention pond before turning to the southeast and again crossing Broad Run. The route then turns east for 0.3 mile to parallel the north side of the existing right-of-way for Lines #2137 and #2131.

Prior to crossing Loudoun County Parkway, Route 2 turns slightly northeast away from the existing Dominion right-of-way to avoid land owned by MWAA. It then turns southeast and continues about 0.3 mile along the southwestern edge of an undeveloped parcel before rejoining the existing Company's existing right-of-way for Lines #2137 and #2213. Route 2 then continues for 0.2 mile across NOVEC-owned land before crossing Old Ox Road and spanning Lines #2137 and #2213. The route continues southeast for another 0.7 mile across a surface parking lot, paralleling the north side of MWAA's West Perimeter Road.

About 0.2 mile west of the proposed Mars Substation site, Route 2 splits into two separate rights-of-way, one for the 500 kV line and the other for the 230 kV line. The right-of-way for the 500 kV line turns east for 0.2 mile before crossing Carters School Road and terminating on the west side of the Mars Substation site. The right-of-way for the 230 kV line continues southeast for 0.2 mile before crossing Carters School Road and turning north to terminate on the south side of the proposed Mars Substation site.

Route 2 measures 3.64 miles in length, including the approximately 0.34-mile-long split of the 230 kV line from the 500 kV line in the approach to the Mars Substation site.

### 1.1.3 Route 3

This route would construct an overhead 500 kV single circuit transmission line with a 230 kV single circuit transmission line underbuilt between the proposed Wishing Star Substation and Mars Substation.

Beginning at the proposed Wishing Star Substation site, Route 3 travels east for about 0.3 mile along the south side of Broad Run before crossing a future VDOT right-of-way associated with the Northstar Boulevard extension project. Route 3 the continues east for 0.3 mile along an undeveloped parcel before crossing Belmont Ridge Road and paralleling the south side of the Company's existing right-of-way for Lines #2172 and #2183. Continuing along an undeveloped parcel for about 0.5 mile, Route 3 then turns northeast for 0.7 mile, crossing the existing Company right-of-way for Lines #2172 and #2183, Broad Run, and a parcel dedicated as open space proffer for the neighboring homeowners' association.

At a point just south of the intersection of Evergreen Mills Road and Loudoun County Parkway, Route 3 crosses the parkway before turning southeast and crossing Broad Run. It then continues southeast for 0.3 mile along the southwestern edge of an undeveloped parcel before rejoining the existing right-of-way

for Lines #2137 and #2213. The route continues another 0.2 mile across NOVEC-owned land before crossing Old Ox Road and spanning Lines #2137 and #2213. Route 3 the continues southeast for 0.7 mile across a surface parking lot, paralleling the north side of MWAA's West Perimeter Road.

About 0.2 mile west of the proposed Mars Substation site, Route 3 splits into two separate rights-of-way, one for the 500 kV line and the other for the 230 kV line. The right-of-way for the 500 kV line turns east for 0.2 mile before crossing Carters School Road and terminating on the west side of the Mars Substation site. The right-of-way for the 230 kV line continues southeast for 0.2 mile before crossing Carters School Road and turning north to terminate on the south side of the proposed Mars Substation site.

Route 3 measures 3.62 miles in length, including the split of the proposed 500 kV and 230 kV lines into separate corridors in the approach to the Mars Substation site.

### 1.1.4 Route 4

This route would construct an overhead 500 kV single circuit transmission line with a 230 kV single circuit transmission line underbuilt between the proposed Wishing Star Substation and Mars Substation.

Beginning at the proposed Wishing Star Substation site, Route 4 travels east for about 0.3 mile along the south side of Broad Run before crossing a future VDOT right-of-way associated with the Northstar Boulevard extension project. The route the continues east for 0.3 mile along an undeveloped parcel before crossing Belmont Ridge Road and paralleling the south side of the Company's existing right-of-way for Lines #2172 and #2183. Continuing along an undeveloped parcel for 0.5 mile, Route 4 the turns northeast for 0.4 mile, crossing the existing Company right-of-way, Broad Run, and an undeveloped parcel. The route then turns back to the southeast for 0.2 mile, again crossing Broad Run, then turns east for 0.3 mile to parallel the north side of the existing right-of-way for Lines #2137 and #2213.

Before crossing Loudoun County Parkway, Route 4 turns slightly northeast away from the existing rightof-way to avoid land owned by MWAA. The route then turns and continues southeast for 0.3 mile along the southwestern edge of an undeveloped parcel before rejoining the Company's existing right-of-way for another 0.3 mile. Route 4 then continues 0.2 mile across NOVEC-owned land before crossing Old Ox Road and spanning Lines #2137 and #2213. The route next continues southeast for 0.7 mile across a surface parking lot, paralleling the north side of MWAA's West Perimeter Road.

About 0.2 mile west of the proposed Mars Substation site, Route 4 splits into two separate rights-of-way, one for the 500 kV line and the other for the 230 kV line. The right-of-way for the 500 kV line turns east for 0.2 mile before crossing Carters School Road and terminating on the west side of the Mars Substation site. The right-of-way for the 230 kV line continues southeast for 0.2 mile before crossing Carters School Road and turning north to terminate on the south side of the proposed Mars Substation site.

Route 4 measures 3.63 miles in length, including the split of the proposed 500 kV and 230 kV lines into separate corridors in the approach to the Mars Substation site.

### 1.1.5 Route 5

This route would construct an overhead 500 kV single circuit transmission line with a 230 kV single circuit transmission line underbuilt between the proposed Wishing Star Substation and the proposed Mars Substation.

Beginning at the proposed Wishing Star Substation, Route 5 travels east for about 0.3 mile along the south side of Broad Run before crossing a future VDOT right-of-way associated with the Northstar Boulevard extension project. Route 5 then continues east for 0.3 mile along an undeveloped parcel before crossing Belmont Ridge Road and paralleling the south side of the Company's existing right-of-way of Lines #2172 and #2183. Continuing along an undeveloped parcel for 0.5 mile, the route then turns

north to cross the Company's existing right-of-way then east to parallel the north side of the existing rightof-way. For approximately 0.5 mile, the route continues east along Broad Run, paralleling the north side of the Company's existing transmission corridor.

Before crossing Loudoun County Parkway, the route turns slightly northeast away from the existing rightof-way to avoid crossing land owned by MWAA. After crossing the parkway, Route 5 turns southeast for 0.3 along the southwestern edge of an undeveloped parcel, rejoining the existing right-of-way for Lines #2137 and #2213. The route then continues 0.2 mile across NOVEC-owned land before crossing Old Ox Road and spanning Lines #2137 and #2213. Route 5 then continues southeast for 0.7 mile across a surface parking lot, paralleling the north side of MWAA's West Perimeter Road.

About 0.2 mile west of the proposed Mars Substation site, Route 5 splits into two separate rights-of-way, one for the 500 kV line and the other for the 230 kV line. The right-of-way for the 500 kV line turns east for 0.2 mile before crossing Carters School Road and terminating on the west side of the Mars Substation site. The right-of-way for the 230 kV line continues southeast for 0.2 mile before crossing Carters School Road and turning north to terminate on the south side of the proposed Mars Substation site.

Route 5 measures 3.55 miles in length, including the split of the proposed 500 kV and 230 kV lines into separate corridors in the approach to the Mars Substation site.

### 1.1.6 Route 6

This route would construct an overhead 500 kV single circuit transmission line with a 230 kV single circuit transmission line underbuilt between the proposed Wishing Star Substation and Mars Substation.

Beginning at the proposed Wishing Star Substation, Route 6 travels east for about 0.3 mile along the south side of Broad Run before crossing a future VDOT right-of-way associated with the Northstar Boulevard extension project. Route 6 then continues east for 0.3 mile along an undeveloped parcel before crossing Belmont Ridge Road and paralleling the south side of the Company's existing right-of-way for Lines #2172 and #2183. Continuing along an undeveloped parcel for 0.2 mile, Route 6 turns north to cross the existing right-of-way then east again to parallel the north side of the existing right-of-way. For approximately 0.9 mile, the route continues east along Broad Run, paralleling the north side of the existing right-of-way.

Before crossing Loudoun County Parkway, Route 6 turns slightly northeast away from the Company's existing right-of-way to avoid land owned by MWAA. After crossing the parkway, Route 6 turns southeast and continues for 0.3 mile along the southwestern edge of undeveloped parcel, then rejoins the existing Company right-of-way for Lines #2137 and #2213. The route continues 0.2 mile across NOVEC-owned land before crossing Old Ox Road and spanning the Lines #2137 and #2213. Route 6 then continues southeast for 0.7 mile across a surface parking lot, paralleling the north side of MWAA's West Perimeter Road.

About 0.2 mile west of the proposed Mars Substation site, Route 5 splits into two separate rights-of-way, one for the 500 kV line and the other for the 230 kV line. The right-of-way for the 500 kV line turns east for 0.2 mile before crossing Carters School Road and terminating on the west side of the Mars Substation site. The right-of-way for the 230 kV line continues southeast for 0.2 mile before crossing Carters School Road and turning north to terminate on the south side of the proposed Mars Substation site.

Route 6 measures 3.56 miles in length, including the split of the proposed 500 kV and 230 kV lines into separate corridors in the approach to the Mars Substation site.

### 1.1.7 Mars 230 kV Loop

This route would construct two new overhead 230 kV double circuit lines on two sets of double circuit structures from Mars Substation to cut in locations on the Company's existing 230 kV Cabin Run-Shellhorn Road Line #2095 and 230 kV Poland Road-Shellhorn Road Line #2137.

The proposed Mars 230 kV Loop measures approximately 0.57 mile in length. It originates at proposed cut-in locations on the Company's existing 230 kV Cabin Run-Shellhorn Lines #2095 and Poland Road-Shellhorn Line #2137 at the southeast corner of the intersection of Old Ox Road and Carters School Roads. From here, the route heads south paralleling the east side of Carters School Road, crossing mostly forested lands between Old Ox Road and terminating at the proposed Mars Substation site.

The route uses a greenfield alignment and the new right-of-way would be 160 feet.

### 1.1.8 Wishing Star Substation

The proposed Wishing Star Substation site is located east and north of the intersection of Briarfield and Youngwood Lanes and about 0.5 mile south of the Company's existing Brambleton Substation. The site is adjacent to (east of) and partially overlaps the Company's existing right-of-way for Lines #546, #590, #2045, and #2094. The existing right-of-way also contains two natural gas transmission pipelines: a 24-inch-diameter pipeline owned by Berkshire Hathaway and operated by Eastern Gas Transmission and Storage, Inc., and a 36-inch-diameter pipeline owned by Dominion Energy and operated by Cove Point LNG, LP. The substation footprint encompasses approximately 20 acres of a 41-acre parcel. About 85 percent of the site is forested, with the remainder consisting of maintained Company right-of-way.

### 1.1.9 Mars Substation

The Mars Substation site is located just east of Carters School Road, approximately 0.5 mile south of the intersection of Carters School and Old Ox Roads. The substation footprint occupies approximately 10 acres (of a 22-acre parcel) of which about 20 percent is forested and 80 percent is open space. An existing parking lot is located west of the site on the west side of Carters School Road.

### **1.2 Management Recommendations**

Eight known archaeological sites are located in the right-of-way of the alternative routes for the Mars to Wishing Star Lines discussed in this study. Two sites fall within the right-of-way for Route 1, four sites fall within the right-of-way for Route 2, one site falls within the right-of-way for Route 3, three sites fall within the right-of-way for Route 4, and five sites fall within the right-of-way for Routes 5 and 6. Additionally, the Mars 230 kV Loop and the Wishing Star Substation each contain one archaeological site within their boundaries. Proposed transmission structures for the Project alternative routes are planned to be placed within three of the eight sites, and thus, the archaeological deposits at the sties could be impacted by construction of the poles or clearing within the right-of-way. However, a confident determination regarding the nature of archaeological deposits at each site and impacts on the sites from prior land use activities would require field survey.

Three previously recorded historical architectural resources meeting criteria specified in the Guidelines fall within study tiers established by the VDHR for identifying aboveground historic sites along and near the transmission line routes and proposed substations. For the Mars to Wishing Star Lines, ERM recommends that all six routes (Routes 1 through 6) would result in a finding of no impact on two resources, and a minimal impact on one resource. Although the routes would result in the same impact finding, Route 1, in comparison to the other routes, is farthest away from two of the resources.

ERM recommends a finding of no impact for the resource associated with the Wishing Star Substation and a minimal impact on the resource associated with the Mars Substation. There are no resources along the Mars 230 kV Loop.

Based on the above discussion, Mars to Wishing Star Route 1 would have the least impact on previously recorded historical architectural resources meeting criteria specified in the Guidelines compared to its respective alternative routes. The Mars 230 kV Loop is the only option extending from the Company's existing transmission lines to the Mars Substation. Likewise, the two substations have no alternative options.



# Figure 1.1-1: Overview of Transmission Line Segments under Consideration for the Project Alternative Routes

INTRODUCTION

500-230 KV WISHING STAR SUBSTATION, 500 KV AND 230 KV MARS-WISHING STAR LINES, 500-230 KV MARS SUBSTATION, AND MARS 230 KV LOOP

Pre-Application Analysis

### 2. **RECORDS REVIEW**

### 2.1 Data Collection Approach

ERM conducted an analysis of potential cultural resource impacts for the alternative routes under consideration in accordance with the VDHR Guidelines. For each route, this analysis identified and considered the following previously recorded resources:

- National Historic Landmarks (NHLs) within a 1.5-mile radius of each centerline;
- National Register of Historic Places (NRHP)-listed properties, NHLs, battlefields, and historic landscapes within a 1.0-mile radius of each centerline;
- NRHP-eligible and NRHP-listed properties, NHLs, battlefields, and historic landscapes within a 0.5-mile radius of each centerline; and
- All of the above qualifying resources as well as archaeological sites within the right-of-way for each alternative route.

Information on the considered resources in each study tier was collected from the Virginia Cultural Resource Information System (V-CRIS).

In addition to the V-CRIS, ERM collected information from the Loudoun Preservation Society (2022) to find locally significant resources within a 1.0-mile radius of each centerline. ERM also collected information on battlefields surveyed and assessed by the National Park Service's (NPS) American Battlefield Protection Program (ABPP) (NPS 1995, 2022). No additional resources (locally significant sites and ABPP study areas, core areas, or potential NRHP boundaries for battlefields) were identified within the relevant study tiers for the various alternative routes.

Along with the records review, ERM conducted field assessments of the considered aboveground resources along each alternative route in accordance with the Guidelines. Digital photographs of each architectural resource and views to the proposed transmission line were taken, except in the case of the Dulles International Airport Historic District (053-0008), as photo permission was not granted. Photosimulations were then prepared to assess the potential for visual impacts of the new transmission infrastructure on the resources. For previously recorded archaeological sites under consideration, aerial photographs were examined to assess the current land condition and the spatial relationship between the sites and any existing or planned transmission lines.

### 2.2 Archaeological Resources

Crossings of archaeological sites were considered a constraint in this study due to the potential for an electric transmission line to impact archaeological deposits in these areas (for example, due to transmission structure placement, tree clearing, or heavy equipment traffic within a site). The known archaeological sites in the right-of-way for each alternative transmission line route are summarized in Table 2.2-1 and their locations are depicted on Figure 2.2-1. Individual maps for each proposed alternative route are provided in Attachment 1. The sites are presented in the order they occur from the Mars to Wishing Star Alternative routes to the Mars 230 kV Line Loop, and lastly the substations. Because portions of the alternative routes use common alignments, the same resources may be subject to potential impacts from more than one route.

Out of the eight archaeological resources within the rights-of-way for the various alternative routes, five have been determined not eligible for the NRHP, while three have not been evaluated for NRHP eligibility. However, a confident and complete assessment of the integrity of each site would require archaeological field investigations, which will take place pursuant to SCC review and their approval of a route.

### Table 2.2-1: Archaeological Resources in the Right-of-Way for Each Alternate Route

Route Alternative/ Substation	ROW Description	Site Number	Description	NRHP Status
Mars to Wishing Star	Alternative Routes and	Facilities	•	•
Pouto 1	Greenfield	44LD0167	Temporary camp (Pre-Contact)	Not Evaluated
Route 1	Greenfield	44LD0168	Temporary camp (Pre-Contact)	Not Eligible
	Greenfield	44LD0167	Temporary camp (Pre-Contact)	Not Evaluated
	Greenfield	44LD0168	Temporary camp (Pre-Contact)	Not Eligible
Route 2	Greenfield	44LD0173	Temporary camp and Lithic scatter (Pre-Contact)	Not Eligible
	Greenfield	44LD0970	Lithic scatter (Late Archaic Period)	Not Evaluated
Route 3	Greenfield	44LD0168	Temporary camp (Pre-Contact)	Not Eligible
	Greenfield	44LD0168	Temporary camp (Pre-Contact)	Not Eligible
Route 4	Greenfield	44LD0173	Temporary camp and Lithic scatter (Pre-Contact)	Not Eligible
	Greenfield	44LD0970	Lithic scatter (Late Archaic Period)	Not Evaluated
	Greenfield	44LD0168	Temporary camp (Pre-Contact)	Not Eligible
	Greenfield	44LD0173	Temporary camp and Lithic scatter (Pre-Contact)	Not Eligible
Route 5	Greenfield	44LD0174	Temporary camp (Pre-Contact)	Not Eligible
	Greenfield	44LD0609	Base camp (Early Woodland)	Not Evaluated
	Greenfield	44LD0970	Lithic scatter (Late Archaic Period)	Not Evaluated
	Greenfield	44LD0168	Temporary camp (Pre-Contact)	Not Eligible
	Greenfield	44LD0173	Temporary camp and Lithic scatter (Pre-Contact)	Not Eligible
Route 6	Greenfield	44LD0174	Temporary camp (Pre-Contact)	Not Eligible
	Greenfield	44LD0609	Base camp (Early Woodland)	Not Evaluated
	Greenfield	44LD0970	Lithic scatter (Late Archaic Period)	Not Evaluated
Mars 230 kV Loop	Greenfield	44LD1742	Carter Schoolhouse (World War I to World War II)	Not Eligible
Wishing Star Substation	Greenfield	44LD1280	Railroad bed (Antebellum Period, Civil War, Early National Period, Reconstruction and Growth)	Not Eligible
Mars Substation	-	-	-	-

Pre-Application Analysis

Figure 2.2-1: Locations of Archaeological Resources in the Right-of-Way for Each Alternative Route

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Project No.: 0505584

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### 2.3 Historic Resources

Each alternative under consideration has the potential to impact a number of historic and architectural resources. The following discussion summarizes the known resources in the vicinity of each Project alternative according to VDHR's tiered study area model defined in the Guidelines. The locations of the considered architectural resources and the proposed alternative routes are shown in Figure 2.3-1. Individual maps for each proposed alternative are located in Attachment 1.

The resources located within the right-of-way of a proposed route may be subject to both direct impacts from placement of the line across the property as well as visual impacts from changes to the viewshed introduced by the new transmission line structures and conductors. Resources in the 0.5-mile tier would not be directly impacted, but are likely to be visually impacted, unless topography, vegetation, or the built environment obscures the view to the transmission line. At a distance of over 0.5 mile, it becomes less likely that a resource would be within line-of-sight of the proposed transmission line. However, the full architectural survey mandated in the second stage of VDHR's transmission line review process would determine which resources actually would be visually impacted. Beyond 1.0 mile, it becomes less likely that a given resource would be within line-of-sight of the proposed Project.

Because parts of several routes share common alignments, some of the same resources would be impacted regardless of the alternative selected. The nature of the impacts, while estimated in this study with the assistance of photosimulations, will depend on the final Project design in which the exact placement and height of transmission structures is determined. Once a route is selected for the Project, that route will be subject to a full architectural survey, actual Project impacts will be assessed, and additional (as of yet, unrecorded) historic properties may be identified in the survey area. The survey area will be defined based on the height of the proposed transmission line structures, topography, tree cover, and other factors impacting the line-of-sight to the Project.

### 2.3.1 Route 1

The considered resources that lie within the VDHR study tiers for Wishing Star–Mars Route 1 are presented in Table 2.3-1 and depicted in Attachment 1, Sheet 1. Three aboveground historic properties were identified within the VDHR tiers for Route 1. The three considered resources were subjected to field reconnaissance and a preliminary assessment of impacts, discussed in the next chapter.

Buffer (miles)	Resource Category	Resource Number	Description
0.5 to 1.0	National Register	053-0982	Arcola Elementary School
	Properties (Listed)	053-0984	Arcola Slave Quarters
0.0 to 0.5	National Register Properties (Eligible)	053-0008	Dulles International Airport Historic District

Table 2.3-1: Historic Resources in the VDHR Study	/ Tiers for Route 1
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### 2.3.2 Route 2

The considered resources that lie within the VDHR study tiers for Route 2 are presented in Table 2.3-2 and depicted in Attachment 1, Sheet 2. Three aboveground historic properties were identified within the VDHR tiers for Route 2. The three considered resources were subjected to field reconnaissance and a preliminary assessment of impacts, discussed in the next chapter.



# Figure 2.3-1: Locations of Considered Historic Resources Along and Near Alternative Routes

**RECORDS REVIEW** 

500-230 KV WISHING STAR SUBSTATION, 500 KV AND 230 KV MARS-WISHING STAR LINES, 500-230 KV MARS SUBSTATION, AND MARS 230 KV LOOP Pre-Application Analysis

Buffer (miles)	Resource Category	Resource Number	Description
0.5 to 1.0	National Register	053-0982	Arcola Elementary School
	Properties (Listed)	053-0984	Arcola Slave Quarters
0.0 to 0.5	National Register Properties (Eligible)	053-0008	Dulles International Airport Historic District

### Table 2.3-2: Historic Resources in the VDHR Study Tiers for Route 2

### 2.3.3 Route 3

The considered resources that lie within the VDHR study tiers for Route 3 are presented in Table 2.3-3 and depicted in Attachment 1, Sheet 3. Three aboveground historic properties were identified within the VDHR tiers for Route 3. The three considered resources were subjected to field reconnaissance and a preliminary assessment of impacts, discussed in the next chapter.

### Table 2.3-3: Historic Resources in the VDHR Study Tiers for Route 3

Buffer (miles)	Resource Category	Resource Number	Description
0.5 to 1.0	National Register	053-0982	Arcola Elementary School
	Properties (Listed)	053-0984	Arcola Slave Quarters
0.0 to 0.5	National Register Properties (Eligible)	053-0008	Dulles International Airport Historic District

### 2.3.4 Route 4

The considered resources that lie within the VDHR study tiers for Route 4 are presented in Table 2.3-4 and depicted in Attachment 1, Sheet 4. Three aboveground historic properties were identified within the VDHR tiers for Route 4. The three considered resources were subjected to field reconnaissance and a preliminary assessment of impacts, discussed in the next chapter.

Buffer (miles)	Resource Category	Resource Number	Description
0.5 to 1.0	National Register	053-0982	Arcola Elementary School
	Properties (Listed)	053-0984	Arcola Slave Quarters
0.0 to 0.5	National Register Properties (Eligible)	053-0008	Dulles International Airport Historic District

### Table 2.3-4 Historic Resources in the VDHR Study Tiers for Route 4

### 2.3.5 Route 5

The considered resources that lie within the VDHR study tiers for Route 5 are presented in Table 2.3-5 and depicted in Attachment 1, Sheet 5. Three aboveground historic properties were identified within the VDHR tiers for Route 5. The three considered resources were subjected to field reconnaissance and a preliminary assessment of impacts, discussed in the next chapter.

Buffer (miles)	Resource Category	Resource Number	Description
0.5 to 1.0	National Register	053-0982	Arcola Elementary School
	Properties (Listed)	053-0984	Arcola Slave Quarters
0.0 to 0.5	National Register Properties (Eligible)	053-0008	Dulles International Airport Historic District

### Table 2.3-5: Historic Resources in the VDHR Study Tiers for Route 5

### 2.3.6 Route 6

The considered resources that lie within the VDHR study tiers for Route 6 are presented in Table 2.3-6 and depicted in Attachment 1, Sheet 6. Three aboveground historic properties were identified within the VDHR tiers for Route 6. The three considered resources were subjected to field reconnaissance and a preliminary assessment of impacts, discussed in the next chapter.

### Table 2.3-6: Historic Resources in the VDHR Study Tiers for Route 6

Buffer (miles)	Resource Category	Resource Number	Description
0.5 to 1.0	National Register	053-0982	Arcola Elementary School
	Properties (Listed)	053-0984	Arcola Slave Quarters
0.0 to 0.5	National Register Properties (Eligible)	053-0008	Dulles International Airport Historic District

### 2.3.7 Mars 230 kV Loop

No historic architectural resources fall within the study tiers for this route (Attachment 1, Sheet 7).

### 2.3.8 Wishing Star Substation

The one considered resource that lies within the VDHR study tiers for the Wishing Star Substation is presented in Table 2.3-7 and depicted in Attachment 1, Sheet 8. This considered resource was subjected to field reconnaissance and a preliminary assessment of impacts, discussed in the next chapter.

# Table 2.3-7: Historic Resources in the VDHR Study Tiers for the Wishing Star Substation

Buffer (miles)	Resource Category	Resource Number	Description
0.5 to 1.0	National Register Properties (Listed)	053-0982	Arcola Elementary School

### 2.3.9 Mars Substation

The one considered resource that lies within the VDHR study tiers for the Mars Substation is presented in Table 2.3-8 and depicted in Attachment 1, Sheet 9. This considered resource was subjected to field reconnaissance and a preliminary assessment of impacts, discussed in the next chapter.

### Table 2.3-8: Historic Resources in the VDHR Study Tiers for the Mars Substation

Buffer (miles)	Resource Category	Resource Number	Description	
0.0 to 0.5	National Register	053-0008	Dulles International Airport Historic District	
	Properties (Eligible)			

### 2.4 Previous Surveys

Portions of the various alternative routes have previously been surveyed for cultural resources. Fourteen previous cultural resource surveys intersect at least one of the alternative routes under consideration. Information on these previous surveys—including VDHR survey number, report title, report authors, and report date—is provided in Table 2.4-1. The extent of the previous survey coverage is depicted on maps provided in Attachment 2. Below is a summary of the survey coverage as it pertains to the alternative routes discussed in the study:

- Several surveys overlap portions of Wishing Star-Mars Routes 1, 2, and 3 (Fuess and Butina 2003; Parson's Management Consultants 1989; Gardner et al. 1999; Gardner, et al. 2001; Mueller 1979; Goode and Traum 2012; Goode and Traum 2013; Buchanan 2005).
- One survey, associated with the Brambleton-Greenway Transmission Line in Loudoun County, crosses through Routes 1, 2, 3, and the Mars 230 kV Loop (Butler et al. 2006).
- Two surveys overlap portions of Wishing Star-Mars Routes 1, 2, and 3, as well as the Wishing Star Substation. The surveys were completed in 2013 and 2018. The 2013 survey is an environmental assessment for the Dulles Air Cargo, Passenger, and Metro Access Highway (Deetz et al. 2013). The other survey is for the Northstar Boulevard Project (Callaway et al. 2018).
- A 2013 survey and a 2005 survey overlap the Mars 230 kV Loop. The survey completed in 2013 was a supplemental survey for the Dulles Loop-Route 606 Project (Goode and Traum 2013). The survey completed in 2005 is a Phase I archeological investigation of 82.9 acres on Old Ox Road in Loudoun County (Buchanan 2005).
- A survey for the CNG Natural Gas Pipeline and Facilities within Prince William and Loudoun counties crosses through the footprint of the Wishing Star Substation (Rosenthal et al. 1992). A second survey for the improvements to the Dominion Power 500 kV transmission line from the Brambleton Substation to the Loudoun Substation also overlaps the substation (Stewart et al. 2014).
- One survey crosses through the Mars Substation (Parsons Management Consultants 1989).
   The survey took place in 1989 and covered portions of Loudoun and Fairfax counties.
- A survey from 2016 intersects all three Wishing Star-Mars routes, the Mars 230 kV Loop, and the Mars Substation. That project included Phase I and II archaeological investigations conducted for Washington Dulles International Airport (Ward et al. 2016).

# Table 2.4-1: Cultural Resource Surveys Covering Portions of the Marsh toWishing Star Alternative Routes and Mars 230 kV Loop

VDHR Survey #	Title	Author	Date
LD-144	Phase I Archaeological Survey of the Washington Dulles International Airport Portion of the Proposed W-132, Route 606 Water Main, Route 50 to Dulles Trade Center II	Fuess and Butina	2003
LD-191	Cultural Resource Survey of the Proposed 230 kV Brambleton-Greenway Transmission Line, Loudoun County, Virginia	Butler, Moore, and Rupnik	2006
LD-053	Historic and Archaeological Survey Report Washington Dulles International Airport, Loudoun and Fairfax Counties, VA.	Parsons Management Consultants	1989
LD-249	A Phase I Archeological Study of Circa 119 Acres Proposed for Development as Wetland Mitigation Area, Loudoun County, Virginia	Gardner, Clem, and Hurst	1999
LD-250	A Phase I Archeological Study of Circa 1300 Acres Proposed for Development as Part of the Brambleton Planned Community, Loudoun County, Virginia	Gardner, Snyder, and Hurst	2001
LD-027	A Phase I Cultural Resources Reconnaissance of the Route 621 Modernization Project, Loudoun County, Virginia	Mueller	1979
LD-323	Cultural Resources Survey for the Dulles Loop-Route 606 Project, Loudoun County, Virginia	Goode and Traum	2012
LD-333	Supplemental Cultural Resources Survey for the Dulles Loop-Route 606 Project, Loudoun County, Virginia	Goode and Traum	2013
LD-334	Cultural Resources Survey Environmental Assessment for the Proposed Dulles Air Cargo, Passenger, and Metro Access Highway, Loudoun County, Virginia	Deetz, van den Hurk, Flood, D. Poyner, Keeny, and Bamann	2013
LD-472	Cultural Resources Survey of Unsurveyed Portion of the Northstar Boulevard Project, Loudoun County, Virginia	Callaway, Monroe, and Hanbury	2018
LD-365	Phase I Archeological Investigations of the 82.9 Acre Property at 43461 Old Ox Road, Loudoun County, Virginia	Buchanan	2005
LD-356	A Phase I Cultural Resources Survey of Approximately 5.0 Miles of Proposed Improvements to the Dominion Virginia Power 500 kV Transmission Line From the Brambleton Substation to the Loudoun Substation, Loudoun County, Virginia	Stewart, DeChard, and Brady	2014
LD-420	Phase I and Phase II Archeological Investigations for Western Lands Area, Washington Dulles International Airport, Loudoun County, Virginia	Ward, Read, Wanner, and Seiter	2016
PW-174	Phase I Survey and Phase II Testing Along the CNG Natural Gas Pipeline (TL-465) and Facilities, Prince William and Loudoun Counties, Virginia	Rosenthal, Elena, Petraglia, Pappas, and Martin	1992

Route 50 = U.S. Route 50; VDHR = Virginia Department of Historic Resources

# 3. STAGE I PRE-APPLICATION ANALYSIS FINDINGS

# 3.1 Methods for Analysis

Fieldwork for the pre-application analysis was conducted by Secretary of the Interior Qualified architectural historians Emily Dodson and MacKenzie Carroll on August 12, 2022. The fieldwork involved photographing three resources requiring visual assessment according to the Guidelines and examining potential line-of-sight views from each resource toward the alternative routes. For resources where property owner approval was granted for historic resource documentation, photographs were taken toward the proposed transmission line(s) from the property at the most prominent view of the landscape. When such permission was not available, photographs were taken from the public right-of-way (typically a road) nearest to the resource facing toward the applicable route(s). However, Dulles International Airport Historic District (053-0008) serves as an exception. Due to restrictions that limit photographing an airport, photographs documenting the historic district itself were not possible at the time of the survey.

Panoramic photographs were taken from each resource, with an effort to capture the direction with the clearest, most unobstructed view toward the applicable route or routes. The precise location of the photograph was captured with a mobile tablet device connected to a sub-meter accurate Global Navigation Satellite System (GNSS) receiver, the Trimble DA2. The locations where photographs were taken were noted as Simulation Points (SP). Site visits to the SPs were prioritized based on their location relative to the resource, so that viewpoints east of the resource were visited in the morning and viewpoints west of the resource were visited in the afternoon. This helped ensure, where possible, that the sun was behind the photographer at the time the viewpoint photography was captured. Additionally, minor adjustments to position were made to obtain as clear a view to the site center as possible, avoiding trees, landscaping, or built obstructions. Tablets recorded the center bearing, angle of view, altitude, and camera lens height. Upon receipt of the viewpoint location information, the viewpoints were plotted onto open source mapping from the Environmental Systems Research Institute (ESRI) using the Universal Transverse Mercator (UTM) 18N coordinate system.

The process of taking panoramas included setting up the tripod and camera. The camera was placed on the panoramic head in a portrait orientation where its lens height was confirmed and set at 1.5 meters (note: a portrait camera orientation was sometimes used in situations where the viewpoint is very close to a development so that the top of the development is not cut off by the image boundaries). The tripod head and camera combination was then leveled. With the camera's viewfinder centered on the perceived site center, exposure and focus settings were taken. These were then fixed manually on the camera so that they could not be inadvertently altered. The head was rotated 90 degrees to the left where the first frame of the 360-degree sequence was then taken. Each subsequent frame was taken using a 50 percent overlap of the previous frame until the full 360-degree sequence was captured. The camera was then removed from the tripod and a viewpoint location photograph was captured showing the tripod in its position.

The following camera and tripod configuration was used:

- Camera body: Nikon D800 professional specification digital SLR (full frame CMOS sensor)
- Camera lens: Nikkor AF 50mm f1.8 prime
- Tripod: Manfrotto 055MF4 with Manfrotto 438 ball leveller
- Panoramic head: Manfrotto 303SPH

- The following camera settings were used for all photography:
- Camera mode: Manual Priority
- ISO: 100
- Aperture: f13
- Image format: RAW

After the photos were complete, they were uploaded to a server to begin the simulation/visualization process. The single-frame photographs were opened in Adobe Photoshop CC 2022, where they were checked and any camera sensor dust spots were removed before being saved as high-resolution JPEG images. If required, discrete color and tonal adjustments were made to each frame before they were saved. The single-frame photographs were stitched together in PTGui Pro version 12.11 professional photographic stitching software using cylindrical projection settings. The camera locations were plotted in Global Mapper version 23.1. Digital models of the transmission line structures were provided by Dominion, then cleaned up and textured in Autodesk 3DS Max 2021. The positions of each structure were provided by Dominion for all routes. The transmission structures along each route were rendered in Vray version 5.2 from each SP camera location. 3D imagery was produced at the field of view using camera matching. Renderings for each route and each tower combination were then exported for use as an overlay.

Detailed, correctly dimensioned 3D computer models of the transmission structures along each route were generated using Autodesk 3DS Max 2021 and iToo RailClone. The virtual 3D model of the structures was created using real-world measurements and elevation drawings provided by the Company. These were textured using Vray PBR materials to simulate the weathering steel texture. The detailed, textured models were rendered to a digital image using a simulated physical camera and a sun and sky simulation lighting model in the computer software consistent with conditions within the original viewpoint photography.

Photomontages were produced by overlaying the rendered image on the photograph, using known control points and the wireline imagery showing the tower columns at the correct height and distance. Final adjustments were then made to the brightness and contrast of the rendered images to match them to the photograph. Final photomontages were prepared from each viewpoint for each route. These were then opened in Adobe Photoshop CC 2022 where minor changes were made such as placing relevant tree/building/hedge screening or telegraph wires over the proposed development renders where necessary. Finally, the final images were prepared to the proportions required for the visual simulation figures, and the visualization figures were prepared in Adobe InDesign CC2022 and exported in a PDF format.

One simulation was completed through 3D rendering, as the location of the simulation could not be accessed due to lack of permission. An existing conditions 3D model of the study area, including terrain, vegetation, and structures, was created from Google Earth data. The 3D model was geo-referenced and compiled with aerial imagery and available lidar data to create a polymodal from RGB colored point cloud information to ensure spatial accuracy. Structures, vegetation clusters, and skylines were cross referenced with lidar data and reference imagery to ensure accurate representation of scale and placement within the 3D rendering. In addition, atmospheric data were imported into the 3D model to develop a sun and atmospheric system that matches the location specific reference data. Based on computer aided design, GIS, and power line systems computer-aided design data provided by the client, a 3D model of the Project was constructed. All information was imported into the 3D existing conditions model using the same geo-reference and projection and then validated for accuracy. 3D materials and associated specular reflectance information were applied to the proposed 3D information. Easement right-of-way (ROW) expansion was created by deleting 3D trees from the existing conditions model that

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fall within this expansion. After all of the information was property aligned, atmospherics checked, and materials applied, the 3D information was then rendered using highly accurate raytraced render engines. Finally, photo editing software was used to color correct the final images and export them out in a PDF format.

# 3.2 Structure Types and Right-of-Way Widths

Dominion Energy Virginia proposes to use several structure and right-of-way configurations for the Project. For the Mars-Wishing Star Lines, the routes will be constructed on new right-of-way predominantly 150 feet wide to support a 5-2 configuration primarily on double circuit three-pole or two-pole H-frame structures with a minimum structure height of approximately 90 feet, a maximum structure height of approximately 190 feet, and an average proposed structure height of approximately 148 feet.

The Mars 230 kV Loop will be constructed on new 160-foot-wide right-of-way supported by a combination of double circuit monopoles and 2-pole structures situated side-by-side in the right-of-way. The new right-of-way will support two double circuit configurations on twelve tubular pole structures with a minimum structure height of approximately 100 feet, a maximum structure height of approximately 115 feet, and an average proposed structure height of approximately 103 feet.

It should be noted that the planned structure design and locations are preliminary and subject to change pending final engineering. Final engineering will be completed after a Certificate for Public Convenience and Necessity is issued for the project by the Virginia State Corporation Commission.

### **3.3 Assessment of Potential Impacts**

The assessment of potential Project impacts on individual resources made use of the visual assessment findings and categorized the severity level of impacts according to the following scale devised by VDHR:

- **None**–Project is not visible from the resource.
- Minimal–Viewsheds have existing transmission lines, there would be only a minor change in height, and/or other views are partially obscured by topography or vegetation.
- Moderate-Viewsheds have more expansive views of the transmission line, more dramatic changes in height are proposed, and/or the overall visibility of the Project would be greater.
- Severe-Existing viewshed contains no transmission line, the view to the Project would be relatively unobstructed, the new transmission line would introduce a significant change to the setting of historic properties, and/or a dramatic change in the height of an existing transmission line would take place in close proximity to historic properties.

### **3.4 Historic Resource Descriptions**

# 3.4.1 053-0008, Dulles International Airport Historic District

053-0008 is located on the west side of Sully Road/Route 28, and south of the Dulles Greenway (Toll Road)/Route 267 in the area of Dulles Airport. The resource encompasses 1,726.60 acres and is occupied by portions of the airport that were constructed in the late 1980s. At least one new runway as well as taxiways and other facilities have been constructed since the district was defined. These facilities are located outside the district boundaries to the west and south. Much of the area surrounding the district is occupied by residential, commercial, and light industrial development. However, some forested and agricultural land lie outside of the district to the south and west. Due to lack of access from airport security restrictions, ERM's architectural historians were not able to obtain photos of the historic district at the time

of the survey. Consequently, an aerial image is used for the purposes of this report (Attachment 4, Figure 1).

053-0008 originally was surveyed in 1978 by the Federal Aviation Administration (FAA). The resource subsequently was surveyed by Parsons Management Group in 1988 (FAA 1978; Parsons Management Group 1988). The district was determined eligible for listing in the NRHP by the FAA in 1978 under Criterion A, B, and C, referencing Criteria Consideration G for exceptional buildings less than 50 years old. The airport was designed by Eero Saarinen and is considered one of his most significant works. It represents the first airport designed for jet travel. The goal was to move people to planes, starting with their approach to the terminal, with the construction of a dedicated access road, through the onboarding and deplaning/baggage claim processes. The airport opened in 1962, and as of 1989, included the following contributing structures: 13 structures, 18 mobile lounges, the landscaping plan, and approach road.

Aerial imagery shows at least two runways that have been added or expanded at the airport since the time of the original survey and NRHP eligibility determination—likely between 2003 and 2008 (Google Earth 2022). However, due to lack of access and FAA policy, ERM could not photograph the airport or its ancillary structures. The district lies within the study area for Routes 1, 2, 3, 4, 5, and 6, as well as the Mars Substation.

# 3.4.2 053-0982, Arcola Elementary School

053-0982 is located at 24244 Gum Spring Road/Route 659 on the east side of the road in the town of Sterling. It is situated on a 10-acre parcel with dense woodlands bordering the northern, eastern, and southern edges of the parcel. The resource is located about 100 feet from the nearest public right-of-way, with a large gravel parking lot at the northwest corner of the structure and a long circular drive at the rear of the building.

053-0982 originally was recorded by David Edwards in 1982, and subsequently was revisited by Patrick Thompson with AECOM Germantown in 2019 (Thompson 2019a). Edwards described the school as a one-story, circa 1939, rectangular brick school with a hipped roof and projecting central pavilion. Edwards noted that the entrance was recessed within the central pavilion and was framed by a pedimented frontispiece, and the building corners featured quoining. The windows were described paired and tripled double-hung sashes, with six-over-six arrangements. Additionally, Edwards identified a ca. 1950 brick addition to the north elevation and another ca. 1956 addition that contained more classrooms and a gym/auditorium (Edwards 1982a).

The Arcola Elementary School was the fifth Public Works Administration (PWA) construction project in Loudoun County and the first all-white school with individual classrooms for the various grades. Prior to its opening, most of the schools in the area had been one-room schoolhouses. In 2013, Arcola Elementary School was recommended eligible for listing in the NRHP under Criterion A under the theme of Education for its association with the PWA's history of educational reform and Loudoun County's transition to modern educational standards (Covington 2012). The resource was also recommended eligible under Criterion C as an example of PWA architecture of the Colonial Revival style and as an example of the New Deal Public Works Administration building design at the time. It was formally listed in the NRHP in 2013.

ERM photographed the resource from the closest access point of the public right-of-way. ERM's observations are consistent with the findings of the 2019 survey, which found that the school remains mostly intact, other than plywood covering the windows, and no substantial changes have been noted (Attachment 4, Figures 2 and 3). The resource was determined eligible by the VDHR in 2012, listed in the NRHP in 2013. It lies within the study area for Routes 1, 2, 3, 4, 5, and 6, as well as the Wishing Star Substation.

### 3.4.3 053-0984, Arcola Slave Quarters

053-0982 is located at approximately 42575 Arcola Boulevard, on the northwest side of the road in the town of Sterling. It is situated on a 4.42-acre parcel with dense woodlands bordering the northern, western, and southern edges of the parcel. The resource is located at the end of a 396-foot-long dirt drive.

053-0982 was previously surveyed at least seven times between 1982 and 2020 and the historic context information for the resource was updated at least twice during that time (Andre 2007, 2008; Edwards 1982b; History Matters 2004; Taylor 2020; Thompson 2019b; URS Corporation 2003). Most recently, the resource was surveyed by Robert Taylor with Dutton + Associates, LLC in 2020. Taylor described the slave quarters as a one-and-one-half-story, circa 1800 structure with two attached double-pen blocks, each with a central chimney (Attachment 4, Figure 4). He also noted the exterior walls are random coursed stone on a continuous foundation, and the roof is side-gable, clad in rolled asphalt. Previous surveys examining the building's interior noted original split wood shakes beneath standing seam metal roofing added at a later date. At the time of the current survey, the roof was clad in wood shingles, representing an authentic restoration of the building's the original roofing material. Finally, all the openings had been covered with plywood (Taylor 2020), which remains the case to the present. The property is listed in the NRHP under Criterion A for its significance relating to local history, slavery, and African-American heritage; and under Criterion C as an embodiment of distinctive characteristics of both early Virginia architecture and methods of slave quarter construction. It is a rare example of a stone slave quarters in Virginia. The property is also listed on the Virginia Landmarks Register (VLR).

Physical evidence suggests that the stone slave quarters were constructed in the late eighteenth or early nineteenth century (Andre 2008). The original construction consisted of the westerly portion, with the easterly portion being added later. There is no passageway between the two blocks, suggesting separate functions, such as a kitchen space or housing for a separate family. The proximity of the building to the main house suggests that it served as a dwelling for the domestic house slaves. At some point, likely during the early twentieth century, the former slave quarters were used for various other functions, including storage for farm equipment, resulting in the changes in the eastern fenestration of the entry bay to accommodate the equipment entry and exit from the building (Andre 2008).

The other dwelling on the parcel, noted in the previous surveys as the "main house," is described as a two-and-one-half-story, ca. 1930 American Foursquare dwelling with a metal hipped roof, wood weatherboards, and a rough-cut, random rubble-stone foundation. The foundation originally belonged to a ca. 1820 central passage, double-pile dwelling; although no information is provided about the fate of the ca. 1820 dwelling, it was reported that the extant 1930 American Foursquare dwelling was constructed on the same foundation. Two corbeled brick chimneys and a wrap-around porch with Tuscan columns also were described in the 2007 survey. At the time that ERM architectural historians visited the site in 2022, all of the window and door openings were covered with plywood (Attachment 4, Figures 5 and 6).

ERM photographed the resource from multiple points within the parcel and determined there were no changes from the 2020 survey, other than a previously described shed that could not be located and is possibly no longer extant. The resource was determined eligible by the VDHR in 2007, listed in the NRHP in 2008. It lies within the study area for Wishing Star–Mars Routes 1, 2, and 3.

### 3.5 Historic Resource Findings for Route 1

The impacts to each resource in the Route 1 study tiers are discussed below. Photosimulations are provided in Attachment 5 and 3D renderings of the district are located in Attachment 6.

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### 3.5.1 053-0008, Dulles International Airport Historic District

053-0008 is located approximately 0.38 mile to the south of Route 1 along a greenfield segment of the route (Attachment 5, Figure 1). One photosimulation was prepared from SP 3, which was located on Beaver Meadow Road, which represents the public road nearest to the resource in the vicinity of the route (Attachment 5, Figures 2 and 3). This point was chosen since Dulles Airport would not grant access for photography within the limits of the airport. However, this SP is located approximately 1.35 mile to the west of the district and only a portion of the proposed route is visible behind the trees, at the intersection of Beaver Meadow Road and the transmission line. The route is likely to only be visible during leaf-off seasons (fall and winter).

Given the absence of accessible viewpoints from the airport historic district, ERM created a simulated Google Earth 3D rendering of existing and future conditions (Attachment 6, Figure 1). While the proposed route would be visible from the runway, only the tops of the structures would be visible from the tree line (Attachment 6, Figures 2 and 3). However, they are likely to be visible only during leaf-off seasons. In addition, the recorded boundary for the resource encompasses 1,726.60 acres, and only a small portion of the district is located in the half-mile study tier for the route. Furthermore, mature vegetation surrounding the district blocks visibility of the transmission line structures from many vantage points. Thus, ERM recommends that the proposed route would have a **Minimal Impact** on the Dulles International Airport Historic District.

### 3.5.2 053-0982, Arcola Elementary School

053-0982 is located approximately 0.66 mile to the south of Route 1 along a greenfield segment of the route (Attachment 5, Figure 4). Due to intervening vegetation, residential development, and distance, there would be no view of the route from this resource as shown in the simulation from SP 1 (Attachment 5, Figure 5). Because the view from Arcola Elementary School would be entirely screened, there would be **No Impact** on this resource from Route 1.

### 3.5.3 053-0984, Arcola Slave Quarters

053-0984 is located approximately 0.71 mile to the south of Route 1 along a greenfield segment of the route (Attachment 5, Figure 6). Due to intervening vegetation, commercial development, and distance, there would be no view of the route from this resource as shown in the simulation from SP 5 (Attachment 5, Figure 7). Because the view from Arcola Slave Quarters would be entirely screened, there would be **No Impact** on this resource from Route 1.

### 3.6 Historic Resource Findings for Route 2

The impacts on each resource in the Route 2 study tiers are discussed below. Photosimulations are provided in Attachment 5 and 3D renderings of the district are located in Attachment 6.

### 3.6.1 053-0008, Dulles International Airport Historic District

053-0008 is located approximately 0.38 mile to the south of Route 2 along a greenfield segment of the route (Attachment 5, Figure 8). One photosimulation was prepared from SP 3, which was located on Beaver Meadow Road, which represents the public road nearest to the resource in the vicinity of the route (Attachment 5, Figures 9 and 10). This point was chosen since Dulles Airport would not grant access for photography within the limits of the airport. However, this SP is located approximately 1.35 mile to the west of the district and only a portion of the proposed route is visible behind the trees, at the intersection of Beaver Meadow Road and the transmission line. The route is likely to only be visible during leaf-off seasons (fall and winter).

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Given the absence of accessible viewpoints from the airport historic district, ERM created a simulated Google Earth 3D rendering of existing and future conditions (Attachment 6, Figure 4). While the proposed route would be visible from the runway, only the tops of the structures would be visible from the tree line (Attachment 6, Figures 5 and 6). However, the structures are likely to be visible only during leaf-off seasons. In addition, the recorded boundary for the resource encompasses 1,726.60 acres, and only a small portion of the district is located in the half-mile study tier for the route. Furthermore, mature vegetation surrounding the district blocks visibility of the transmission line structures from many vantage points. Thus, ERM recommends that the proposed route would have a **Minimal Impact** on the Dulles International Airport Historic District.

# 3.6.2 053-0982, Arcola Elementary School

053-0982 is located approximately 0.66 mile to the south of Route 2 along a greenfield segment of the route (Attachment 5, Figure 11). Due to intervening vegetation, residential development, and distance, there would be no view to the route from this resource, as shown in the simulation from SP 1 (Attachment 5, Figure 12). Because the view from Arcola Elementary School would be entirely screened, there would be **No Impact** on this resource from Route 2.

### 3.6.3 053-0984, Arcola Slave Quarters

053-0984 is located approximately 0.64 mile to the southwest of Route 2 along a greenfield segment of the route (Attachment 5, Figure 13). Due to intervening vegetation, commercial development, and distance, there would be no view to the route from this resource, as shown in the simulation from SP 5 (Attachment 5, Figure 14). Because the view from Arcola Slave Quarters would be entirely screened, there would be **No Impact** on this resource from Route 2.

# 3.7 Historic Resource Findings for Route 3

The impacts to each resource in the Route 3 study tiers are discussed below. Photosimulations are provided in Attachment 5 and 3D renderings of the district are located in Attachment 6.

# 3.7.1 053-0008, Dulles International Airport Historic District

053-0008 is located approximately 0.38 mile to the south of Route 3 along a greenfield segment of the route (Attachment 5, Figure 15). One photosimulation was prepared from SP 3, which was located on Beaver Meadow Road, which represents the public road nearest to the resource in the vicinity of the route (Attachment 5, Figures 16 and 17). This point was chosen since Dulles Airport would not grant access for photography within the limits of the airport. However, this SP is located approximately 1.35 mile to the west of the district and only a portion of the proposed route is visible behind the trees, at the intersection of Beaver Meadow Road and the transmission line. The route is likely to only be visible during leaf-off seasons (fall and winter).

Given the absence of accessible viewpoints from the airport historic district, ERM created a simulated Google Earth 3D rendering of existing and future conditions (Attachment 6, Figure 7). While the proposed route would be visible from the runway, only the tops of the structures would be visible from the tree line (Attachment 6, Figures 8 and 9). However, the structures are likely to be visible only during leaf-off seasons. In addition, the recorded boundary for the resource encompasses 1,726.60 acres, and only a small portion of the district is located in the half-mile study tier for the route. Furthermore, mature vegetation surrounding the district blocks visibility of the transmission line structures from many vantage points. Thus, ERM recommends that the proposed route would have a **Minimal Impact** on the Dulles International Airport Historic District.

### 3.7.2 053-0982, Arcola Elementary School

053-0982 is located approximately 0.64 mile to the south-southwest of Route 3 along a greenfield segment of the route (Attachment 5, Figure 18). Due to intervening vegetation, residential development, and distance, there would be no view to the route from this resource, as shown in the simulation from SP 1 (Attachment 5, Figure 19). Because the view from Arcola Elementary School would be entirely screened, there would be **No Impact** on this resource from Route 3.

### 3.7.3 053-0984, Arcola Slave Quarters

053-0984 is located approximately 0.55 mile to the south of Route 3 along a greenfield segment of the route (Attachment 5, Figure 20). Due to intervening vegetation, commercial development, and distance, there would be no view to the route from this resource, as shown in the simulation from SP 5 (Attachment 5, Figure 21). Because the view from Arcola Slave Quarters would be entirely screened, there would be **No Impact** on this resource from Route 3.

### 3.8 Historic Resource Findings for Route 4

The impacts to each resource in the Route 4 study tiers are discussed below. Photosimulations are provided in Attachment 5 and 3D renderings of the district are located in Attachment 6.

### 3.8.1 053-0008, Dulles International Airport Historic District

053-0008 is located approximately 0.38 mile to the south of Route 4 along a greenfield segment of the route (Attachment 5, Figure 22). One photosimulation was prepared from SP 3, which was located on Beaver Meadow Road, which represents the public road nearest to the resource in the vicinity of the route (Attachment 5, Figures 23 and 24). This point was chosen since Dulles Airport would not grant access for photography within the limits of the airport. However, this SP is located approximately 1.35 mile to the west of the district and only a portion of the proposed route is visible behind the trees, at the intersection of Beaver Meadow Road and the transmission line. The route is likely to only be visible during leaf-off seasons (fall and winter).

Given the absence of accessible viewpoints from the airport historic district, ERM created a simulated Google Earth 3D rendering of existing and future conditions (Attachment 6, Figure 10). While the proposed route would be visible from the runway, only the tops of the structures would be visible from the tree line (Attachment 6, Figures 11 and 12). However, the structures are likely to be visible only during leaf-off seasons. In addition, the recorded boundary for the resource encompasses 1,726.60 acres, and only a small portion of the district is located in the half-mile study tier for the route. Furthermore, mature vegetation surrounding the district blocks visibility of the transmission line structures from many vantage points. Thus, ERM recommends that the proposed route would have a **Minimal Impact** on the Dulles International Airport Historic District.

### 3.8.2 053-0982, Arcola Elementary School

053-0982 is located approximately 0.64 mile to the south-southwest of Route 4 along a greenfield segment of the route (Attachment 5, Figure 25). Due to intervening vegetation, residential development, and distance, there would be no view to the route from this resource, as shown in the simulation from SP 1 (Attachment 5, Figure 26). Because the view from Arcola Elementary School would be entirely screened, there would be **No Impact** on this resource from Route 4.

### 3.8.3 053-0984, Arcola Slave Quarters

053-0984 is located approximately 0.55 mile to the south of Route 4 along a greenfield segment of the route (Attachment 5, Figure 27). Due to intervening vegetation, commercial development, and distance, there would be no view to the route from this resource, as shown in the simulation from SP 5 (Attachment 5, Figure 28). Because the view from Arcola Slave Quarters would be entirely screened, there would be **No Impact** on this resource from Route 4.

### 3.9 Historic Resource Findings for Route 5

The impacts to each resource in the Route 5 study tiers are discussed below. Photosimulations are provided in Attachment 5 and 3D renderings of the district are located in Attachment 6.

# 3.9.1 053-0008, Dulles International Airport Historic District

053-0008 is located approximately 0.38 mile to the south of Route 5 along a greenfield segment of the route (Attachment 5, Figure 29). One photosimulation was prepared from SP 3, which was located on Beaver Meadow Road, which represents the public road nearest to the resource in the vicinity of the route (Attachment 5, Figures 30 and 31). This point was chosen since Dulles Airport would not grant access for photography within the limits of the airport. However, this SP is located approximately 1.35 mile to the west of the district and only a portion of the proposed route is visible behind the trees, at the intersection of Beaver Meadow Road and the transmission line. The route is likely to only be visible during off-leaf seasons.

Given the absence of accessible viewpoints from the airport historic district, ERM created a simulated Google Earth 3D rendering of existing and future conditions (Attachment 6, Figure 13). While the proposed route would be visible from the runway, only the tops of the structures would be visible from the tree line (Attachment 6, Figures 14 and 15). However, the structures are likely to be visible only during leaf-off seasons. In addition, the recorded boundary for the resource encompasses 1,726.60 acres, and only a small portion of the district is located in the half-mile study tier for the route. Furthermore, mature vegetation surrounding the district blocks visibility of the transmission line structures from many vantage points. Thus, ERM recommends that the proposed route would have a **Minimal Impact** on the Dulles International Airport Historic District.

### 3.9.2 053-0982, Arcola Elementary School

053-0008 is located approximately 0.64 mile to the south-southwest of Route 5 along a greenfield segment of the route (Attachment 5, Figure 32). Due to intervening vegetation, existing infrastructure, and distance, there will be no view to the route from this resource, as shown in the simulation from SP 1 (Attachment 5, Figure 33). Because the view from Arcola Elementary School would be entirely screened, there would be **No Impact** on this resource from Route 5.

### 3.9.3 053-0984, Arcola Slave Quarters

053-0984 is located approximately 0.55 mile to the south of Route 5 along a greenfield segment of the route (Attachment 5, Figure 34). Due to intervening vegetation, commercial development, and distance, there would be no view to the route from this resource, as shown in the simulation from SP 5 (Attachment 5, Figure 35). Because the view from Arcola Slave Quarters would be entirely screened, there would be **No Impact** on this resource from Route 5.

### 3.10 Historic Resource Findings for Route 6

The impacts to each resource in the Route 6 study tiers are discussed below. Photosimulations are provided in Attachment 5 and 3D renderings of the district are located in Attachment 6.

### 3.10.1 053-0008, Dulles International Airport Historic District

053-0008 is located approximately 0.38 mile to the south of Route 6 along a greenfield segment of the route (Attachment 5, Figure 36). One photosimulation was prepared from SP 3, which was located on Beaver Meadow Road, which represents the public road nearest to the resource in the vicinity of the route (Attachment 5, Figures 37 and 38). This point was chosen since Dulles Airport would not grant access for photography within the limits of the. However, this SP is located approximately 1.35 mile to the west of the district and only a portion of the proposed route is visible behind the trees, at the intersection of Beaver Meadow Road and the transmission line. The route is likely to only be visible during leaf-off seasons (fall and winter).

Given the absence of accessible viewpoints from the airport's historic district, ERM created a simulated Google Earth 3D rendering of existing and future conditions (Attachment 6, Figure 16). While the proposed route would be visible from the runway, only the tops of the structures would be visible from the tree line (Attachment 6, Figures 17 and 18). However, the structures are likely to be visible only during leaf-off seasons. In addition, the recorded boundary for the resource encompasses 1,726.60 acres, and only a small portion of the district is located in the half-mile study tier for the route. Furthermore, mature vegetation surrounding the district blocks visibility of the transmission line structures from many vantage points. Thus, ERM recommends that the proposed route would have a **Minimal Impact** on the Dulles International Airport Historic District.

### 3.10.2 053-0982, Arcola Elementary School

053-0982 is located approximately 0.66 mile to the south of Route 6 along a greenfield segment of the route (Attachment 5, Figure 39). Due to intervening vegetation, residential development, and distance, there would be no view to the route from this resource, as shown in the simulation from SP 1 (Attachment 5, Figure 40). Because the view from Arcola Elementary School would be entirely screened, there would be **No Impact** on this resource from Route 6.

### 3.10.3 053-0984, Arcola Slave Quarters

053-0984 is located approximately 0.57 mile to the south of Route 6 along a greenfield segment of the route (Attachment 5, Figure 41). Due to intervening vegetation, commercial development, and distance, there would be no view to the route from this resource, as shown in the simulation from SP 5 (Attachment 5, Figure 42). Because the view from Arcola Slave Quarters would be entirely screened, there would be **No Impact** on this resource from Route 6.

# 3.11 Historic Resource Findings for Mars 230 kV Loop

There are no historic architectural resources in the study tiers for this route.

### 3.12 Historic Resource Findings for Wishing Star Substation

The impact to the resource in the Wishing Star Substation study tiers is discussed below. Photosimulations are provided in Attachment 5

### 3.12.1 053-0982, Arcola Elementary School

053-0982 is located approximately 0.83 mile to the southeast of the proposed Wishing Star Substation (Attachment 5, Figure 43). Due to intervening vegetation, residential development, and distance, there would be no view to the substation from this resource, as shown in the simulation from SP 1 (Attachment 5, Figure 44). Because the view from Arcola Elementary School would be entirely screened, there would be **No Impact** on this resource from the Wishing Star Substation.

### 3.13 Historic Resource Findings for Mars Substation

The impact to the resource in the Mars Substation study tiers is discussed below. Photosimulations are provided in Attachment 5 and the 3D renderings for the district are located in Attachment 6.

### 3.13.1 053-0008, Dulles International Airport Historic District

053-0008 is located approximately 0.42 mile to the south of the proposed Mars Substation (Attachment 5, Figure 45). One photosimulation was prepared from SP 3, which was located on Beaver Meadow Road, the public road nearest to the resource in the vicinity of the substation (Attachment 5, Figures 46 and 47). This point was chosen since Dulles Airport would not grant access for photography within the limits of the airport. However, this SP is located approximately 1.35 mile to the west of the district and none of the proposed Mars Substation would be visible from this point. However, since the substation will be constructed along with one of the proposed transmission line routes, both the substation and the associated line must be included in the analysis of viewshed impacts for the Project alternatives. Routes 1 through 6 all present equal, albeit minimal, potential for viewshed impacts. Only a portion of each alternative route (Routes 1 through 6) is visible beyond the trees, at the intersection of Beaver Meadow Road and the proposed transmission line. The route is likely to be visible only during off-leaf seasons.

Given the absence of accessible viewpoints from the airport's historic district, ERM created a simulated Google Earth 3D rendering of existing and future conditions (Attachment 6, Figure 19). This rendering shows that the proposed substation would be visible from the runway. However, as stated previously, the substation would be built in conjunction with one of the routes (which are the same in the area surrounding the substation), and thus, impacts from the substation and transmission line collectively are reviewed here. While all of the alternative routes would be visible from the runway, only the tops of the structures would be visible from the tree line (Attachment 6, Figures 20 and 21). However, the structures are likely to be visible only during leaf-off seasons. In addition, the recorded boundary for the resource encompasses 1,726.60 acres, and only a small portion of the district is located in the half-mile study tier for the routes. Furthermore, mature vegetation surrounding the district blocks visibility of the transmission line structures from many vantage points. Thus, ERM recommends that the proposed Mars Substation and any associated transmission line under consideration would have a **Minimal Impact** on the Dulles International Airport Historic District.

# 3.14 Archaeology Findings

Eight known archaeological sites are located in the right-of-way for the proposed transmission line alternative routes and the proposed substations (Table 3.14-1). Only one site was recorded within the area of the proposed Wishing Star Substation (44LD1280), while no sites were present within the right-of-way of the proposed Mars Substation. Additionally, only one site was recorded within the right-of-way of the proposed Mars 230 kV Loop.

The sites that would be impacted by each alternative route are described below. The descriptions include information on the eligibility of each site for listing in the NRHP as well as an assessment of each site's condition based on desktop review. A confident determination about the nature of archaeological deposits

at each site and impacts from prior land use activities would require a field survey to verify the desktop analysis.

Considered	Proposed Mars to Wishing Star Alternative Routes <sup>a</sup>					Mars	Proposed Substations <sup>b</sup>		
Resource	Route 1	Route 2	Route 3	Route 4	Route 5	Route 6	Loop	Wishing Star	Mars
44LD0167	Х	Х	-	-	-	-	-	-	-
44LD0168	Х	Х	Х	Х	Х	Х	-	-	-
44LD0173	-	Х	-	Х	Х	Х	-	-	-
44LD0174	-	-	-	-	Х	Х	-	-	-
44LD0609	-	-	-	-	Х	Х	-	-	-
44LD0970	-	Х	-	Х	Х	Х	-	-	-
44LD1280	-	-	-	-	-	-	-	Х	-
44LD1742	-	-		-	-	-	Х	-	-

# Table 3.14-1: Archaeological Resources within the Right-of-way for the Alternative Routes

<sup>a</sup> "X" indicates that the resource is within the right-of-way of the proposed route.

<sup>b</sup> "X" indicates that the resource is within the footprint of the proposed substation.

### 3.14.1 Route 1

Two archaeological sites are crossed by the right-of-way for Route 1: 44LD0167 and 44LD0168. Route 1 crosses the southwestern half of 44LD0168. 44LD0168 is a Pre-Contact temporary camp, primarily consisting of a quartz lithic scatter. The site has been determined not eligible for the NRHP and, therefore, requires no further consideration. 44LD0167 is a Pre-Contact temporary camp site, consisting of one quartz shallow side-notched point. The site has not been formally evaluated for NRHP and the overall integrity of the site is unknown. Route 1 extends across the length of 44LD0167 (approximately 719 feet). The construction of the proposed route would include clearing of the right-of-way and the placement of a structure in the boundary of the site. Because the resource has not been formally evaluated, further survey would need to occur in order to determine NRHP eligibility of the resource. If the site is found to be eligible, the route or structure placement may need to be altered protect the site, or the site might require further archaeological investigation to recover information that could be lost as a result of construction impacts.

# 3.14.2 Route 2

Four archaeological sites lie within the right-of-way for Route 2: 44LD0167, 44LD0168, 44LD0173, and 44LD0970. Two of these sites (44LD0168 and 44LD0173) have been determined not eligible for the NRHP and require no further consideration. 44LD0168 is a Pre-Contact temporary camp that primarily consists of a quartz lithic scatter. Route 2 crosses the southwestern half of the site. 44LD0173 consists of a Pre-Contact temporary camp and lithic scatter that included a quartzite late-stage biface fragment, a quartz early to middle stage biface fragment, quartz flakes, rhyolite flakes, a quartz cobble fragment, a stoneware sherd, and a glass shard. Route 2 intersects the northern section of 44LD0173's boundary. The current design of the route would include the placement of a transmission structure within the site.

The route also crosses 44LD0167 and 44LD0970. 44LD0167 is a Pre-Contact temporary camp site, consisting of one quartz shallow side-notched point. The overall integrity of the site is unknown and it has not been formally evaluated for NRHP eligibility. Route 2 crosses the length of 44LD0167 (approximately 719 feet). The construction of the proposed route would include clearing of the right-of-way which could impact the archaeological deposits at the site. However, because the resource is not evaluated for NRHP eligibility; further survey will need to occur in order to determine its eligibility. If the site is found to be eligible, the route may need to be altered in order to protect the site, or the site might require further archaeological investigation to recover information that could be lost as a result of construction impacts. 44LD0970 is a Late Archaic period lithic scatter consisting of two quartz flakes, a quartzite projectile point fragment, two rhyolite flakes, and a chert flake. The site has suffered significant disturbance but has not been formally evaluated for NRHP eligibility. The southern half of the right-of-way for Route 2 crosses 44LD0970. The site could be impacted by the clearing of the right-of-way and associated construction activities. However, since the site has been previously disturbed, it is anticipated that the construction of Route 2 would have minimal impacts on the site.

### 3.14.3 Route 3

One archaeological site lies within the right-of-way for Route 3: 44LD0168. Route 3 crosses the southwestern half of 44LD0168. The site is a Pre-Contact temporary camp that primarily consists of a quartz lithic scatter. As the site has been determined not eligible for the NRHP, it requires no further consideration.

### 3.14.4 Route 4

Three archaeological sites lie within the right-of-way for Route 4: 44LD0168, 44LD0173, and 44LD0970. Two of these sites (44LD0168 and 44LD0173) have been determined not eligible for the NRHP and require no further consideration. Route 4 crosses the southwestern half of 44LD0168. The site is a Pre-Contact temporary camp that primarily consists of a quartz lithic scatter. 44LD0173 consists of a Pre-Contact temporary camp and lithic scatter that includes a quartzite late-stage biface fragment, a quartz early to middle stage biface fragment, quartz flakes, rhyolite flakes, a quartz cobble fragment, a stoneware sherd, and a glass shard. Route 4 crosses the northern portion of the site.

44LD0970 is a Late Archaic period lithic scatter consisting of two quartz flakes, a quartzite projectile point fragment, two rhyolite flakes, and a chert flake. The site has suffered significant disturbance, but has not been formally evaluated for NRHP eligibility. The southern half of the right-of-way for Route 4 crosses 44LD0970. The site could be impacted by clearing of the right-of-way and associated construction activities. However since the site has been previously disturbed, it is anticipated that the construction of Route 4 would have minimal impacts on the site

### 3.14.5 Route 5

Five archaeological sites are crossed by the right-of-way for Route 5: 44LD0168, 44LD0173, 44LD0174, 44LD0609, and 44LD0970. Three of these sites (44LD0168, 44LD0173, and 44LD0174) have been determined not eligible for the NRHP and require no further consideration. The right-of-way for Route 5 crosses the southwestern portion of 44LD0168's. The site is a Pre-Contact temporary camp that primarily consists of a quartz lithic scatter. 44LD0173 consists of a Pre-Contact temporary camp and lithic scatter that includes a quartz lithic scatter. 44LD0173 consists of a Pre-Contact temporary camp and lithic scatter that includes a quartz to ble fragment, a quartz early to middle stage biface fragment, quartz flakes, rhyolite flakes, a quartz cobble fragment, a stoneware sherd, and a glass shard. Route 5 crosses the northern section of the site. Finally, 44LD0174 is a Pre-Contact temporary camp containing a lithic scatter with two stemmed points suggesting a Late Archaic component. The right-of-way for Route 5 crosses a very small portion of the northern boundary of 44LD0174.

500-230 KV WISHING STAR SUBSTATION, 500 KV AND 230 KV MARS-WISHING STARSTAGE I PRE-APPLICATION ANALYSISLINES, 500-230 KV MARS SUBSTATION, AND MARS 230 KV LOOPFINDINGSPre-Application AnalysisFINDINGS

Route 5 also crosses 44LD0609 and 44LD0970. 44LD0609 is an Early Woodland base camp consisting of a Susquehanna broadspear point, a chert bifacial tool, a grit-tempered Marcey Creek variant ceramic sherd, and five quartz flakes. The integrity of 44LD0609 is unknown, and it has not been formally evaluated for NRHP eligibility. The right-of-way for Route 5 abuts the northern boundary of 44LD0609. The clearing of the right-of-way and associated construction activities could impact the site. Because the resource has not been formally evaluated, further survey would need to occur in order to determine the NRHP eligibility of the site. If the site is found to be eligible, the alignment of the route may need to be modified to protect the site or the site might require further archaeological investigation to recover information that could be lost as a result of construction impacts. 44LD0970 is a Late Archaic period lithic scatter consisting of two quartz flakes, a quartzite projectile point fragment, two rhyolite flakes, and a chert flake. The site has suffered significant disturbance but has not been formally evaluated for the NRHP. The southern half of the right-of-way crosses 44LD0970. The clearing of the right-of-way and associated construction activities could impact the site. However, since the site has been previously disturbed, it is anticipated that the construction of Route 5 would have minimal impacts on the site.

### 3.14.6 Route 6

Five archaeological sites lie within the right-of-way for Route 6: 44LD0168, 44LD0173, 44LD0174, 44LD0609, and 44LD0970. Three of these sites (44LD0168, 44LD0173, and 44LD0174) have been determined not eligible for the NRHP and require no further consideration. The right-of-way for Route 6 crosses the southwestern half of 44LD0168's. The site is a Pre-Contact temporary camp that primarily consists of a quartz lithic scatter. 44LD0173 consists of a Pre-Contact temporary camp and lithic scatter that includes a quartzite late-stage biface fragment, a quartz early to middle stage biface fragment, quartz flakes, rhyolite flakes, a quartz cobble fragment, a stoneware sherd, and a glass shard. Route 6 crosses the northern section of the site. 44LD0174 is a Pre-Contact temporary camp containing a lithic scatter with two stemmed points suggesting a Late Archaic component. The right-of-way for Route 6 crosses a very small portion of the northern portion of 44LD0174.

Route 6 also crosses 44LD0609 and 44LD0970. 44LD0609 is an Early Woodland base camp consisting of a Susquehanna broadspear point, a chert bifacial tool, a grit-tempered Marcey Creek variant ceramic sherd, and five quartz flakes. The integrity of 44LD0609 is unknown, and it has not been formally evaluated for NRHP eligibility. The right-of-way for Rout 6 abuts the northern boundary of the site. The clearing of the right-of-way and associated construction activities could impact the site. Because the resource has not been formally evaluated, further survey would need to occur in order to determine the NRHP eligibility of the site. If the alignment of the route may need to be modified to protect the site or the site might require further archaeological investigation to recover information that could be lost as a result of construction impacts. 44LD0970 is a Late Archaic period lithic scatter consisting of two quartz flakes, a quartzite projectile point fragment, two rhyolite flakes, and a chert flake. The site has suffered significant disturbance, but has not been formally evaluated for NRHP eligibility. The southern half of the right-of-way for Route 6 crosses 44LD0970. The clearing of the right-of-way and associated construction activities could impact the site. The site could be impacted by construction traffic or clearing within the new right-of-way or structure placement. However since the site has been previously disturbed, it is anticipated that the construction of Route 6 would have minimal impacts on the site.

### 3.14.7 Mars 230 kV Loop

One archaeological site lies within the right-of-way for Mars 230 kV Loop. Site 44LD1742, the Carter Schoolhouse, consists of the burned remains of the school building built ca. 1920 and closed between 1936 and 1939. The remains consist of a stone rubble foundation and brick chimney fall. A total of 385 artifacts are reported from previous investigations, including porcelain, whiteware, glass fragments, metal

500-230 KV WISHING STAR SUBSTATION, 500 KV AND 230 KV MARS-WISHING STARSTAGE I PRE-APPLICATION ANALYSISLINES, 500-230 KV MARS SUBSTATION, AND MARS 230 KV LOOPFINDINGSPre-Application AnalysisFINDINGS

nails, and a decorative plate. The right-of-way for the Mars 230 kV Loop crosses the site. However, as the site has been determined not eligible for the NRHP, it requires no further consideration.

### 3.14.8 Wishing Star Substation

One archaeological site lies within the footprint of the proposed Wishing Star Substation: 44LD1280. Site 44LD1280 is a historic railroad bed. The site is approximately 1.7 miles long and consists of cuts and berms associated with the proposed Loudoun Branch of the Manassas Gap Rail Company. Construction of the railroad began in 1853 but was abandoned prior to the Civil War and never completed. An approximately 0.21 mile segment of the railroad crosses the northern portion of the proposed substation site. However, as the site has been determined not eligible for the NRHP, it requires no further consideration.

### 3.14.9 Mars Substation

No archaeological sites fall within the footprint of the proposed Mars Substation.

### 4. CONCLUSIONS AND RECOMMENDATIONS

The pre-application analysis gathered information on archaeological and historic architectural resources that qualify for consideration according to the VDHR Guidelines for transmission line projects.

Eight known archaeological sites are located within the right-of-way of the proposed transmission line alternative routes. An assessment of the condition and research potential of those sites is contingent upon archaeological field investigations, which will be conducted at relevant sites once a preferred alternative is selected by the SCC. Potential impacts to sites along the preferred route will be assessed as part of the field survey.

Three aboveground historic resources fall within the VDHR study tiers for the alternative routes under consideration. Since portions of several routes use common alignments, some resources would be affected regardless of the alternative route selected by the SCC for the Project. A comparison of the number of resources impacted and the degree of impact for each alternative route is presented in Table 4-1. The specific resources affected by each alternative are covered in the subsections that follow.

# Table 4-1: Comparison of Project Impacts on Historic Resources in the Study Areas of the Alternative Routes

	Number of Considered Resources in Each Impact Category							
Route Alternative	None	Minimal	Moderate	Severe	Total			
Route 1	2	1	0	0	3			
Route 2	2	1	0	0	3			
Route 3	2	1	0	0	3			
Route 4	2	1	0	0	3			
Route 5	2	1	0	0	3			
Route 6	2	1	0	0	3			
Mars 230 kV Loop	0	0	0	0	0			
Wishing Star Substation	1	0	0	0	1			
Mars Substation	0	1	0	0	1			

Final assessments of Project impacts will be dependent on the completion of identification-phase archaeological and historic structure surveys along the routes selected by the SCC and review of survey results by VDHR and other consulting parties. For any resources where the agencies concur in a finding of moderate or severe impact, the Company will propose treatments to avoid, minimize, or mitigate those impacts. Treatment options for archaeological sites could include selective structure placement to avoid direct impacts on sites, minor route adjustments to avoid crossing sites, or archaeological data recovery. Treatment options for aboveground historic resources could include detailed site documentation, historic research, and historic preservation studies; preparation of digital media or museum-type exhibits on sites for public interpretation; installation of historic markers or signs; installation of vegetative screening; or contributions to historical preservation organizations or specific preservation projects. Additional mitigation options could be identified through consultation with VDHR and other consulting parties.

# 4.1 Route 1

Three previously recorded historic architectural resources meet the criteria specified in the Guidelines and fall within the VDHR study tiers for Route 1 (Table 4.1-1), although the route would have no impact on two of these and a minimal impact on one.

Buffer (miles)	Resource Category	Resource Number	Description	Impact
1.0 to 1.5	National Historic Landmarks	-	-	-
0.5 to 1.0	National Register Properties	053-0982	Arcola Elementary School	None
	(listed)	053-0984	Arcola Slave Quarters	None
0.0 to 0.5	National Register-eligible	053-0008	Dulles International Airport Historic District	Minimal
0.0 (within ROW)	National Historic Landmarks, National Register Properties (listed and eligible)	-	-	-

### Table 4.1-1: Impacts to Historic Resources in the VDHR Study Tiers for Route 1

# 4.2 Route 2

Three previously recorded historic architectural resources meet the criteria specified in the Guidelines and fall within the VDHR study tiers for Route 2 (Table 4.2-1), although the route would have no impact on two of these and a minimal impact on one.

Table 4.2-1: Im	pacts to Historic	Resources in the	<b>VDHR Study</b>	Tiers for Route 2

Buffer (miles)	Resource Category	Resource Number	Description	Impact
1.0 to 1.5	National Historic Landmarks	-	-	-
0.5 to 1.0	National Register Properties	053-0982	Arcola Elementary School	None
(listed)	(listed)	053-0984	Arcola Slave Quarters	None
0.0 to 0.5	National Register-eligible	053-0008	Dulles International Airport Historic District	Minimal
0.0 (within ROW)	National Historic Landmarks, National Register Properties (listed and eligible)	-	-	-

### 4.3 Route 3

Three previously recorded historic architectural resources meet the criteria specified in the Guidelines and fall within the VDHR study tiers for Route 3 (Table 4.3-1), although the route would have no impact on two of these and a minimal impact on one.

Buffer (miles)	Resource Category	Resource Number	Description	Impact
1.0 to 1.5	National Historic Landmarks	-	-	-
0.5 to 1.0	National Register Properties	053-0982	Arcola Elementary School	None
	(listed)	053-0984	Arcola Slave Quarters	None
0.0 to 0.5	National Register-eligible	053-0008	Dulles International Airport Historic District	Minimal
0.0 (within ROW)	National Historic Landmarks, National Register Properties (listed and eligible)	-	-	-

### Table 4.3-1: Impacts to Historic Resources in the VDHR Study Tiers for Route 3

### 4.4 Route 4

Three previously recorded historic architectural resources meet the criteria specified in the Guidelines and fall within the VDHR study tiers for Route 4 (Table 4.4-1), although the route would have no impact on two of these and a minimal impact on one.

Buffer (miles)	Resource Category	Resource Number	Description	Impact
1.0 to 1.5	National Historic Landmarks	-	-	-
0.5 to 1.0	National Register Properties	053-0982	Arcola Elementary School	None
(listed)	053-0984	Arcola Slave Quarters	None	
0.0 to 0.5	National Register-eligible	053-0008	Dulles International Airport Historic District	Minimal
0.0 (within ROW)	National Historic Landmarks, National Register Properties (listed and eligible)	-	-	-

### Table 4.4-1: Impacts to Historic Resources in the VDHR Study Tiers for Route 4

# 4.5 Route 5

Three previously recorded historic architectural resources meet the criteria specified in the Guidelines and fall within the VDHR study tiers for Route 5 (Table 4.5-1), although the route would have no impact on two of these and a minimal impact on one.

### Table 4.5-1: Impacts to Historic Resources in the VDHR Study Tiers for Route 5

Buffer (miles)	Resource Category	Resource Number	Description	Impact
1.0 to 1.5	National Historic Landmarks	-	-	-
0.5 to 1.0	National Register Properties	053-0982	Arcola Elementary School	None
	(listed)	053-0984	Arcola Slave Quarters	None
0.0 to 0.5	National Register-eligible	053-0008	Dulles International Airport Historic District	Minimal

Buffer (miles)	Resource Category	Resource Number	Description	Impact
0.0 (within ROW)	National Historic Landmarks, National Register Properties (listed and eligible)	-	-	-

### 4.6 Route 6

Three previously recorded historic architectural resources meet the criteria specified in the Guidelines and fall within the VDHR study tiers for Route 6 (Table 4.6-1), although the route would have no impact on two of these and a minimal impact on one.

### Table 4.6-1: Impacts to Historic Resources in the VDHR Study Tiers for Route 6

Buffer (miles)	Resource Category	Resource Number	Description	Impact
1.0 to 1.5	National Historic Landmarks	-	-	-
0.5 to 1.0	National Register Properties	053-0982	Arcola Elementary School	None
(listed)	(listed)	053-0984	Arcola Slave Quarters	None
0.0 to 0.5	National Register-eligible	053-0008	Dulles International Airport Historic District	Minimal
0.0 (within ROW)	National Historic Landmarks, National Register Properties (listed and eligible)	-	-	-

### 4.7 Mars 230 kV Loop

No previously recorded historic architectural resources meeting the criteria specified in the Guidelines were identified within the study tiers for this route.

### 4.8 Wishing Star Substation

One previously recorded historic architectural resource meets the criteria specified in the Guidelines and falls within the VDHR study tiers for the proposed Wishing Star Substation (Table 4.8-1), although the route would have no impact on it.

# Table 4.8-1: Impacts to Historic Resources in the VDHR Study Tiers for theWishing Star Substation

Buffer (miles)	Resource Category	Resource Number	Description	Impact
1.0 to 1.5	National Historic Landmarks	-	-	-
0.5 to 1.0	National Register Properties (listed)	053-0982	Arcola Elementary School	None
0.0 to 0.5	National Register-eligible	-	-	-
0.0 (within ROW)	National Historic Landmarks, National Register Properties (listed and eligible)	-	-	-

### 4.9 Mars Substation

One previously recorded historic architectural resource meets the criteria specified in the Guidelines and falls within the VDHR study tiers for the proposed Mars Substation (Table 4.9-1), although the route would have a minimal impact on it.

# Table 4.9-1: Impacts to Historic Resources in the VDHR Study Tiers for the Mars Substation

Buffer (miles)	Resource Category	Resource Number	Description	Impact
1.0 to 1.5	National Historic Landmarks	-	-	-
0.5 to 1.0	National Register Properties (listed)	-	-	-
0.0 to 0.5	National Register-eligible	053-0008	Dulles International Airport Historic District	Minimal
0.0 (within ROW)	National Historic Landmarks, National Register Properties (listed and eligible)	-	-	-

### **4.10 Future Investigations**

The next stage of assessing impacts on historic resources will be to conduct an identification-phase field survey to identify and assess resources along the route selected by the SCC that could be impacted by the Project. Survey will be conducted in accordance with the following guidelines:

- Guidelines for Assessing Impacts of Proposed Electrical Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia (VDHR 2008);
- National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation (NPS 1995).

The survey teams will be led by individuals meeting the Secretary of the Interior's professional qualifications standards for architectural history. Teams will traverse the length of the Project corridor(s), revisiting previously recorded historic architectural resources and documenting additional as-of-yet unrecorded historic resources in the survey area. During the course of the survey, all structures determined to be of age will be photographed and marked on the applicable U.S. Geological Survey (USGS) quadrangle map. While the NPS Bulletin 15 (NPS 1995) defines a historic property as a resource that is 50 years or older, for the purposes of this Project, survey will include those 45 years or older to accommodate the length of time needed to complete the permitting phase for the Project. Furthermore, the survey will also record those resources that may have reached significance prior to the 50 (45) year age in accordance with NPS guidance, if they are integral parts of districts, or have merit to be considered eligible for the NRHP on their own.

Archaeological survey of the preferred alternative will be led by an individual meeting the Secretary of the Interior's professional qualifications standards for Archaeology. All areas that will be impacted by construction including the proposed right-of-way, towers, associated facilities, staging areas, etc. will be surveyed. In those cases where the right-of-way can be cleared without ground disturbance, archaeological survey will not be necessary, however a right-of-way clearing plan will need to be approved.

Cultural resources identified in the field effort will be reported to the VDHR. Sufficient information will be collected to make recommendations for each identified resource regarding eligibility for listing on the

NRHP. Any resources identified that have potential for listing on the NRHP may require intensive architectural inventory or phase II testing to assess project impacts. For any resource negatively impacted by the project, avoidance of the impact should be considered. If the impact cannot be avoided, then a mitigation plan will be needed. Both minimization and mitigation plans should be developed in consultation with the VDHR.

### 5. **REFERENCES**

Andre, Mary Elizabeth

- 2007 VCRIS Architecture Form, 053-0984. On file, Virginia Department of Historic Resources.
- 2008 National Register of Historic Places Registration Form: Arcola Slave Quarters. On file, Virginia Depart of Historic Resources, Richmond.

Buchanan, Brian

2005 Phase I Archeological Investigations of the 82.9 Acre Property at 43461 Old Ox Road, Loudoun County, Virginia. Prepared by Thunderbird Archaeology, Chantilly, Virginia. On file, Virginia Department of Historic Resources.

Butler, Todd L., Edward Moore, and Megan Rupnik

2006 Cultural Resource Survey of the Proposed 230 kV Brambleton-Greenway Transmission Line, Loudoun County, Virginia. Prepared by The Louis Berger Group, Richmond, Virginia. On file, Virginia Department of Historic Resources.

Callaway, Graham A., Elizabeth Monroe, and Mary Ruffin Hunbury

2018 *Cultural Resources Survey of Unsurveyed Portion of the Northstar Boulevard Project, Loudoun County, Virginia.* Prepared by William and Mary Center for Archaeological Research, Williamsburg, Virginia. On file, Virginia Department of Historic Resources.

Covington, Jane

2012 National Register of Historic Places Registration Form: Arcola Elementary School. On file, Virginia Depart of Historic Resources, Richmond.

Deetz, J. Eric, Jeroen van der Hurk, Lindsay Flood, D. Allen Poyner, Amanda Keeny, and Susan E. Bamann

2013 Cultural Resources Survey Environmental Assessment for the Proposed Dulles Air Cargo, Passenger, and Metro Access Highway, Loudoun County, Virginia. Prepared by Coastal Carolina Research, Tarboro, North Carolina. On file, Virginia Department of Historic Resources.

Edwards, David A.

- 1982a VCRIS Architecture Form, 053-0982. On file, Virginia Department of Historic Resources.
- 1982b VCRIS Architecture Form, 053-0984. On file, Virginia Department of Historic Resources.

FAA

- 1978 VCRIS Architecture Form, 053-0008. On file, Virginia Department of Historic Resources.
- Fuess, Martin, and Bryan Butina
- 2003 Phase I Archaeological Survey of the Washington Dulles International Airport Portion of the Proposed W-132, Route 606 Water Main, Route 50 to Dulles Trade Center II. Prepared by Michael Baker Jr., Moon Township, Pennsylvania and Virginia Beach, Virginia. On file, Virginia Department of Historic Resources.

Gardner, William M., Michael Clem, and Gwen J. Hurst

1999 A Phase I Archeological Study of Circa 119 Acres Proposed for Development as Wetland Mitigation Area, Loudoun County, Virginia. Prepared by Thunderbird Archaeological Associates, Woodstock, Virginia. On file, Virginia Department of Historic Resources.

Gardner, William M., Kimberly A. Snyder, and Gwen J. Hurst

2001 A Phase I Archeological Study of Circa 1300 Acres Proposed for Development as Part of the Brambleton Planned Community, Loudoun County, Virginia. Prepared by Thunderbird

Archaeological Associates, Woodstock, Virginia. On file, Virginia Department of Historic Resources.

- Goode, Charles E., and Sarah Traum
- 2012 *Cultural Resources Survey for the Dulles Loop-Route 606 Project, Loudoun County, Virginia.* Prepared by John Milner Associates, Alexandria, Virginia. On file, Virginia Department of Historic Resources.

Goode, Charles E., and Sarah Traum

2013 Supplemental Cultural Resources Survey for the Dulles Loop-Route 606 Project, Loudoun County, Virginia. Prepared by John Milner Associates, Alexandria, Virginia. On file, Virginia Department of Historic Resources.

Google Earth Pro

2022. Aerial Imagery. Accessed September 2022. https://www.google.com/earth/.

Loudoun Preservation Society

2022 Accessed September 2022. https://preserveloudoun.org/

Mueller, James W.

1979 A Phase I Cultural Resources Reconnaissance of the Route 621 Modernization Project, Loudoun County, Virginia. On file, Virginia Department of Historic Resources.

NPS (National Park Service).

- 1995 National Register Bulletin: How to Apply the National Register Criteria for Evaluation (NRB 15). Revised for Internet 1995. Accessed: June 25, 2021. https://www.nps.gov
- 2022 American Battlefield Protection Program. Accessed July 2022. Retrieved from: nps.org.

Parsons Management Consultants

1989 *Historic and Archaeological Survey Report Washington Dulles International Airport, Loudoun and Fairfax Counties, VA.* Prepared by Parsons Management Consultants. On file, Virginia Department of Historic Resources.

Parson's Management Group

1988 VCRIS Architecture Form, 053-0008. On file, Virginia Department of Historic Resources.

Rosenthal, Mara Elena, Michael D. Petraglia, Madeleine Pappas, and Christopher Martin

1992 Phase I Survey and Phase II Testing Along the CNG Natural Gas Pipeline (TL-465) and Facilities, Prince William and Loudoun Counties, Virginia. Prepared by Engineering-Science, Washington, DC. On file, Virginia Department of Historic Resources.

Stewart, Brynn, Sandra Dechard, and Ellen Brady

2014 A Phase I Cultural Resources Survey of Approximately 5.0 Miles of Proposed Improvements to the Dominion Virginia Power 500 kV Transmission Line From the Brambleton Substation to the Loudoun Substation, Loudoun County, Virginia. Prepared by Cultural Resources, Glen Allen, Virginia. On file, Virginia Department of Historic Resources.

Taylor, Robert

2020 VCRIS Architecture Form, 053-0984. On file, Virginia Department of Historic Resources.

Thompson, Patrick

2019a VCRIS Architecture Form, 053-0982. On file, Virginia Department of Historic Resources.

2019b VCRIS Architecture Form, 053-0984. On file, Virginia Department of Historic Resources.

### URS Corporation

2003 VCRIS Architecture Form, 053-0984. On file, Virginia Department of Historic Resources.

### VDHR (Virginia Department of Historic Resources)

- 2008 Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia. Accessed: June 2022. Retrieved from: https://www.dhr.virginia.gov/wpcontent/uploads/2018/08/DHR\_Guidelines\_for\_Transmission\_Line\_Assessment.pdf
- Ward, Henry, Esther Read, Rob Wanner, and Jane Seiter
- 2016 Phase I and Phase II Archeological Investigations for Western Lands Area, Washington Dulles International Airport, Loudoun County, Virginia. Prepared by WSP Parsons Brinckerhoff, and EAC/ Archaeology, Baltimore, Maryland. On file, Virginia Department of Historic Resources.

# ATTACHMENT 1 LOCATIONS OF CONSIDERED HISTORIC RESOURCES ASSOCIATED WITH PROPOSED PROJECT ALTERNATIVES




















500-230 KV WISHING STAR SUBSTATION, 500 KV AND 230 KV MARS-WISHING STAR LINES, 500-230 KV MARS SUBSTATION, AND MARS 230 KV LOOP

## ATTACHMENT 2 CULTURAL RESOURCE SURVEYS COVERING PORTIONS OF ALTERNATIVE ROUTE



Attachment 2: Previous Cuttural Resource Surveys Covering Portions of Alternative Routes 500-230 kV Wishing Star Substation, 500-230 kV Mars - Wishing Star Lines,500-230 kV Mars Substation, and Mars 230 kV Loop Project

500-230 KV WISHING STAR SUBSTATION, 500 KV AND 230 KV MARS-WISHING STAR LINES, 500-230 KV MARS SUBSTATION, AND MARS 230 KV LOOP

ATTACHMENT 3 TYPICAL DESIGN AND LAYOUT



Figure 1

















500-230 KV WISHING STAR SUBSTATION, 500 KV AND 230 KV MARS-WISHING STAR LINES, 500-230 KV MARS SUBSTATION, AND MARS 230 KV LOOP

ATTACHMENT 4 HISTORIC RESOURCE PHOTOS



Figure 1: 053-0008, aerial view.

Attachment 4: 500-230 kV Wishing Star Substation, 500 kV and 230 kV Mars-Wishing Star Lines, 500-230 kV Mars Substation, and Mars 230 kV Loop



Figure 2: 053-0982, Arcola Elementary, west elevation entrance, view to the southeast.



Figure 3. 053-0982, Arcola Elementary, west and south elevations, view to the northeast.

Attachment 4: 500-230 kV Wishing Star Substation, 500 kV and 230 kV Mars-Wishing Star Lines, 500-230 kV Mars Substation, and Mars 230 kV Loop



Figure 4. 053-0984, Arcola Slave Quarters, slave dwelling, south elevation, view to the north.



Figure 5. 053-0984, Arcola Slave Quarters, main dwelling, north and east elevation, view to the southwest.



Figure 6. 053-0984, Arcola Slave Quarters, parcel overview, view to the northwest.

500-230 KV WISHING STAR SUBSTATION, 500 KV AND 230 KV MARS-WISHING STAR LINES, 500-230 KV MARS SUBSTATION, AND MARS 230 KV LOOP

ATTACHMENT 5 PHOTOSIMULATIONS

## PHOTOSIMULATIONS FOR MARS TO WISHING STAR LINES

Route 1



Figure 1: Aerial photograph depicting land use and photo view for 053-0008.





Proposed view showing location of hidden transmission line structures (yellow)



Viewpoint Location UTM Zone 18N: 284701E 4316196N View Direction: 300 degrees Viewpoint Elevation: 276 feet Distance to Development: 1764 feet Horizontal Field of View: 90 degrees

12th August 2022 11:38 Nikon D800 Nikkor 50mm 1.4 5 feet

Figure 2 Viewpoint SP 03 Beaver Meadow Rd NE of Rock Haven Way 053-0008

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VIEWPOINT CONTEXT

Date of Photography: Camera: Lens: Camera Height:

ERM

Existing View





Proposed view showing location of transmission line structures



Figure 3 Viewpoint SP 03 Beaver Meadow Rd NE of Rock Haven Way 053-0008

PrevelphtiatationAmatypeits Colatist MiggStiar Offsmars Wind

Date of Photography: Camera: Lens: Camera Height:

Viewpoint Location UTM Zone 18N: 284701E 4316196N View Direction: 300 degrees Viewpoint Elevation: 276 feet Distance to Development: 1764 feet Horizontal Field of View: 90 degrees





Figure 4: Aerial photograph depicting land use and photo view for 053-0982.





Proposed view showing location of hidden transmission line structures (yellow)



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Viewpoint Location UTM Zone 18N: 280095E 4314092N View Direction: 350 degrees Viewoint Elevation: 337 feet Distance to Development: 5173 feet Horizontal Field of View: 100 degrees

Date of Photography: Camera: Lens: Camera Height:

12th August 2022 09:33 Nikon D800 Nikkor 50mm 1.4 5 feet

PrevelphtiatationAmatypeits Colatist MiggStiar Offsmars Wind

Figure 5 Viewpoint SP 01 Stone Springs Blvd SW of Ibex Dr 053-0982





Figure 6: Aerial photograph depicting land use and photo view for 053-0984.





Proposed view showing location of hidden transmission line structures (yellow)



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Viewpoint Location UTM Zone 18N: 280927E 4313853N View Direction: 70 degrees Viewpoint Elevation: 307 feet Distance to Development: 9787 feet Horizontal Field of View: 100 degrees

Date of Photography: Camera: Lens: Camera Height:

12th August 2022 10:34 Nikon D800 Nikkor 50mm 1.4 5 feet

VIEWPOINT CONTEXT

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Figure 7 Viewpoint SP 05 Arcola Blvd N of Grand Fork Dr 053-0984

## PHOTOSIMULATIONS FOR MARS TO WISHING STAR LINES

Route 2



Figure 8: Aerial photograph depicting land use and photo view for 053-0008.





Proposed view showing location of hidden transmission line structures (yellow)





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Figure 9 Viewpoint SP 03 Beaver Meadow Rd NE of Rock Haven Way 053-0008 a the second sec

12th August 2022 11:38 Nikon D800 Nikkor 50mm 1.4 5 feet

VIEWPOINT CONTEXT

Existing View





Proposed view showing location of transmission line structures



Figure 10 Viewpoint SP 03 Beaver Meadow Rd NE of Rock Haven Way 053-0008

PrevelphtiatationAmatypeits Colatist MiggStiar Offsmars Wind

12th August 2022 11:38 Nikon D800 Nikkor 50mm 1.4 5 feet

Date of Photography: Camera: Lens: Camera Height:

Viewpoint Location UTM Zone 18N: 284701E 4316196N View Direction: 300 degrees Viewpoint Elevation: 276 feet Distance to Development: 1764 feet Horizontal Field of View: 90 degrees





Figure 11: Aerial photograph depicting land use and photo view for 053-0982.







Viewpoint Location UTM Zone 18N: 280095E 4314092N View Direction: 350 degrees Viewoint Elevation: 337 feet Distance to Development: 5173 feet Horizontal Field of View: 100 degrees

ERM Energy 8

PrevelphtiatationAmatypeits Colatist MiggStiar Offsmars Wind Figure 12 Viewpoint SP 01 Stone Springs Blvd SW of Ibex Dr 053-0982

VIEWPOINT CONTEXT

12th August 2022 09:33 Nikon D800 Nikkor 50mm 1.4 5 feet

Date of Photography: Camera: Lens: Camera Height:

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Figure 13: Aerial photograph depicting land use and photo view for 053-0984.





Proposed view showing location of hidden transmission line structures (yellow)



Viewpoint Location UTM Zone 18N: 280927E 4313853N View Direction: 70 degrees Viewpoint Elevation: 307 feet Distance to Development: 9787 feet Horizontal Field of View: 100 degrees



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Figure 14 Viewpoint SP 05 Arcola Blvd N of Grand Fork Dr 053-0984



12th August 2022 10:34 Nikon D800 Nikkor 50mm 1.4 5 feet

Date of Photography: Camera: Lens: Camera Height:

## PHOTOSIMULATIONS FOR MARS TO WISHING STAR LINES

Route 3



Figure 15: Aerial photograph depicting land use and photo view for 053-0008.





Proposed view showing location of hidden transmission line structures (yellow)



PrevelphtiatationAmatypeits Colatist MiggStiar Offsmars Wind

12th August 2022 11:38 Nikon D800 Nikkor 50mm 1.4 5 feet

Date of Photography: Camera: Lens: Camera Height:

Viewpoint Location UTM Zone 18N: 284701E 4316196N View Direction: 300 degrees Viewpoint Elevation: 276 feet Distance to Development: 1764 feet Horizontal Field of View: 90 degrees

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Proposed view showing location of transmission line structures



Figure 17 Viewpoint SP 03 Beaver Meadow Rd NE of Rock Haven Way 053-0008

PrevelphtiatationAmatypeits Colatist MiggStiar Offsmars Wind

Date of Photography: Camera: Lens: Camera Height:

Viewpoint Location UTM Zone 18N: 284701E 4316196N View Direction: 300 degrees Viewpoint Elevation: 276 feet Distance to Development: 1764 feet Horizontal Field of View: 90 degrees





Figure 18: Aerial photograph depicting land use and photo view for 053-0982.





Proposed view showing location of hidden transmission line structures (yellow)



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Viewpoint Location UTM Zone 18N: 280095E 4314092N View Direction: 350 degrees Viewoint Elevation: 337 feet Distance to Development: 5173 feet Horizontal Field of View: 100 degrees

Date of Photography: Camera: Lens: Camera Height:

12th August 2022 09:33 Nikon D800 Nikkor 50mm 1.4 5 feet

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Figure 19 Viewpoint SP 01 Stone Springs Blvd SW of Ibex Dr 053-0982





Figure 20: Aerial photograph depicting land use and photo view for 053-0984.





Proposed view showing location of hidden transmission line structures (yellow)



VIEWPOINT CONTEXT

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Figure 21 Viewpoint SP 05 Arcola Blvd N of Grand Fork Dr 053-0984

12th August 2022 10:34 Nikon D800 Nikkor 50mm 1.4 5 feet

Date of Photography: Camera: Lens: Camera Height:

Viewpoint Location UTM Zone 18N: 280927E 4313853N View Direction: 70 degrees Viewpoint Elevation: 307 feet Distance to Development: 9787 feet Horizontal Field of View: 100 degrees

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## PHOTOSIMULATIONS FOR MARS TO WISHING STAR LINES

Route 4



Figure 22: Aerial photograph depicting land use and photo view for 053-0008.





Proposed view showing location of hidden transmission line structures (yellow)



Viewpoint Location UTM Zone 18N: 284701E 4316196N View Direction: 300 degrees Viewpoint Elevation: 276 feet Distance to Development: 1764 feet Horizontal Field of View: 90 degrees

12th August 2022 11:38 Nikon D800 Nikkor 50mm 1.4 5 feet

Figure 23 Viewpoint SP 03 Beaver Meadow Rd NE of Rock Haven Way 053-0008

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VIEWPOINT CONTEXT

Date of Photography: Camera: Lens: Camera Height:

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Proposed view showing location of transmission line structures



Figure 24 Viewpoint SP 03 Beaver Meadow Rd NE of Rock Haven Way 053-0008

PrevelphtiatationAmatypeits Colatist MiggStiar Offsmars Wind

Date of Photography: Camera: Lens: Camera Height:

Viewpoint Location UTM Zone 18N: 284701E 4316196N View Direction: 300 degrees Viewpoint Elevation: 276 feet Distance to Development: 1764 feet Horizontal Field of View: 90 degrees





Figure 25: Aerial photograph depicting land use and photo view for 053-0982.







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Viewpoint Location UTM Zone 18N: 280095E 4314092N View Direction: 350 degrees Viewoint Elevation: 337 feet Distance to Development: 5173 feet Horizontal Field of View: 100 degrees

Date of Photography: Camera: Lens: Camera Height:

12th August 2022 09:33 Nikon D800 Nikkor 50mm 1.4 5 feet

PrevelphtiatationAmatypeits Colatist MiggStiar Offsmars Wind Figure 26 Viewpoint SP 01 Stone Springs Blvd SW of Ibex Dr 053-0982





Figure 27: Aerial photograph depicting land use and photo view for 053-0984.





Proposed view showing location of hidden transmission line structures (yellow)



Viewpoint Location UTM Zone 18N: 280927E 4313853N View Direction: 70 degrees Viewpoint Elevation: 307 feet Distance to Development: 9787 feet Horizontal Field of View: 100 degrees



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Figure 28 Viewpoint SP 05 Arcola Blvd N of Grand Fork Dr 053-0984



12th August 2022 10:34 Nikon D800 Nikkor 50mm 1.4 5 feet

Date of Photography: Camera: Lens: Camera Height:

## PHOTOSIMULATIONS FOR MARS TO WISHING STAR LINES

Route 5



Figure 29: Aerial photograph depicting land use and photo view for 053-0008.





Proposed view showing location of hidden transmission line structures (yellow)





PrevelphtiatationAmatypeits Colatist MiggStiar Offsmars Wind

Figure 30 Viewpoint SP 03 Beaver Meadow Rd NE of Rock Haven Way 053-0008



12th August 2022 11:38 Nikon D800 Nikkor 50mm 1.4 5 feet

Date of Photography: Camera: Lens: Camera Height:





Proposed view showing location of transmission line structures



Figure 31 Viewpoint SP 03 Beaver Meadow Rd NE of Rock Haven Way 053-0008

PrevelphtiatationAmatypeits Colatist MiggStiar Offsmars Wind

12th August 2022 11:38 Nikon D800 Nikkor 50mm 1.4 5 feet

Date of Photography: Camera: Lens: Camera Height:

Viewpoint Location UTM Zone 18N: 284701E 4316196N View Direction: 300 degrees Viewpoint Elevation: 276 feet Distance to Development: 1764 feet Horizontal Field of View: 90 degrees





Figure 32: Aerial photograph depicting land use and photo view for 053-0982.









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Viewpoint Location UTM Zone 18N: 280095E 4314092N View Direction: 350 degrees Viewoint Elevation: 337 feet Distance to Development: 5173 feet Horizontal Field of View: 100 degrees

Date of Photography: Camera: Lens: Camera Height:

12th August 2022 09:33 Nikon D800 Nikkor 50mm 1.4 5 feet

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Figure 33 Viewpoint SP 01 Stone Springs Blvd SW of Ibex Dr 053-0982

VIEWPOINT CONTEXT



Figure 34: Aerial photograph depicting land use and photo view for 053-0984.





Proposed view showing location of hidden transmission line structures (yellow)



Viewpoint Location UTM Zone 18N: 280927E 4313853N View Direction: 70 degrees Viewpoint Elevation: 307 feet Distance to Development: 9787 feet Horizontal Field of View: 100 degrees



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Figure 35 Viewpoint SP 05 Arcola Blvd N of Grand Fork Dr 053-0984



12th August 2022 10:34 Nikon D800 Nikkor 50mm 1.4 5 feet

Date of Photography: Camera: Lens: Camera Height:

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## PHOTOSIMULATIONS FOR MARS TO WISHING STAR LINES

Route 6



Figure 36: Aerial photograph depicting land use and photo view for 053-0008.





Proposed view showing location of hidden transmission line structures (yellow)



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12th August 2022 11:38 Nikon D800 Nikkor 50mm 1.4 5 feet

Date of Photography: Camera: Lens: Camera Height:

Viewpoint Location UTM Zone 18N: 284701E 4316196N View Direction: 300 degrees Viewpoint Elevation: 276 feet Distance to Development: 1764 feet Horizontal Field of View: 90 degrees







Proposed view showing location of transmission line structures



Figure 38 Viewpoint SP 03 Beaver Meadow Rd NE of Rock Haven Way 053-0008

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Date of Photography: Camera: Lens: Camera Height:

Viewpoint Location UTM Zone 18N: 284701E 4316196N View Direction: 300 degrees Viewpoint Elevation: 276 feet Distance to Development: 1764 feet Horizontal Field of View: 90 degrees





Figure 39: Aerial photograph depicting land use and photo view for 053-0982.





Proposed view showing location of hidden transmission line structures (yellow)



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Viewpoint Location UTM Zone 18N: 280095E 4314092N View Direction: 350 degrees Viewoint Elevation: 337 feet Distance to Development: 5173 feet Horizontal Field of View: 100 degrees

Date of Photography: Camera: Lens: Camera Height:

12th August 2022 09:33 Nikon D800 Nikkor 50mm 1.4 5 feet

VIEWPOINT CONTEXT

PrevelphtiatationAmatypeits Colatist MiggStiar Offsmars Wind

Figure 40 Viewpoint SP 01 Stone Springs Blvd SW of Ibex Dr 053-0982



Figure 41: Aerial photograph depicting land use and photo view for 053-0984.





Proposed view showing location of hidden transmission line structures (yellow)



Viewpoint Location UTM Zone 18N: 280927E 4313853N View Direction: 70 degrees Viewpoint Elevation: 307 feet Distance to Development: 9787 feet Horizontal Field of View: 100 degrees



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Figure 42 Viewpoint SP 05 Arcola Blvd N of Grand Fork Dr 053-0984



12th August 2022 10:34 Nikon D800 Nikkor 50mm 1.4 5 feet

Date of Photography: Camera: Lens: Camera Height:

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# PHOTOSIMULATIONS FOR SUBSTATIONS

Wishing Star Substation



Figure 43: Aerial photograph depicting land use and photo view for 053-0982.




Proposed view showing location of hidden transmission line structures (yellow)



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Viewpoint Location UTM Zone 18N: 280095E 4314092N View Direction: 350 degrees Viewoint Elevation: 337 feet Distance to Development: 5173 feet Horizontal Field of View: 100 degrees

Date of Photography: Camera: Lens: Camera Height:

12th August 2022 09:33 Nikon D800 Nikkor 50mm 1.4 5 feet

PrevelphtiatationAmatypeits Colatist MiggStiar Offsmars Wind

Figure 44 Viewpoint SP 01 Stone Springs Blvd SW of Ibex Dr 053-0982



#### PHOTOSIMULATIONS FOR SUBSTATIONS

Mars Substation



Figure 45: Aerial photograph depicting land use and photo view for 053-0008.





Proposed view showing location of hidden transmission line structures (yellow)



PrevelphtiatationAmatypeits Colatist MiggStiar Offsmars Wind

12th August 2022 11:38 Nikon D800 Nikkor 50mm 1.4 5 feet

Date of Photography: Camera: Lens: Camera Height:

Viewpoint Location UTM Zone 18N: 284701E 4316196N View Direction: 300 degrees Viewpoint Elevation: 276 feet Distance to Development: 1764 feet Horizontal Field of View: 90 degrees







Proposed view showing location of transmission line structures



Figure 47 Viewpoint SP 03 Beaver Meadow Rd NE of Rock Haven Way 053-0008

PrevelphtiatationAmatypeits Colatist MiggStiar Offsmars Wind

Date of Photography: Camera: Lens: Camera Height:

Viewpoint Location UTM Zone 18N: 284701E 4316196N View Direction: 300 degrees Viewpoint Elevation: 276 feet Distance to Development: 1764 feet Horizontal Field of View: 90 degrees



500-230 KV WISHING STAR SUBSTATION, 500 KV AND 230 KV MARS-WISHING STAR LINES, 500-230 KV MARS SUBSTATION, AND MARS 230 KV LOOP

ATTACHMENT 6 3D RENDERINGS

#### 3D RENDERINGS FOR MARS TO WISHING STAR LINES



Figure 1: Aerial photograph depicting land use and photo view for 053-0008.





Proposed view showing location of hidden transmission line structures (yellow)



Viewpoint Location UTM Zone 18N: 294314E 4313395N View Direction: 319 degrees Viewoint Elevation: 305 feet Distance to Development: 5553 feet Horizontal Field of View: 60 degrees

A A A A X X X X

Date of Photography: Camera: Lens: Camera Height:



PrevelpptigtatacionAmatyseits Cotatisti MiggStiar@fsMars Wind

VIEWPOINT CONTEXT

Figure 2 Viewpoint 3D Rendering Washington Dulles International Airport 053-0008







PrevelpptigtatacionAmatyseits Cotatisti MiggStiar@fsMars Wind 

Figure 3 Viewpoint 3D Rendering Washington Dulles International Airport 053-0008



A A A A X X X X

Date of Photography: Camera: Lens: Camera Height:

Viewpoint Location UTM Zone 18N: 294314E 4313395N View Direction: 319 degrees Viewoint Elevation: 305 feet Distance to Development: 5553 feet Horizontal Field of View: 60 degrees



Existing View

### PHOTOSIMULATIONS FOR MARS TO WISHING STAR LINES



Figure 4: Aerial photograph depicting land use and photo view for 053-0008.







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Figure 5 Viewpoint 3D Rendering Washington Dulles International Airport 053-0008



A A A A X X X X

Date of Photography: Camera: Lens: Camera Height:

Viewpoint Location UTM Zone 18N: 294314E 4313395N View Direction: 319 degrees Viewoint Elevation: 305 feet Distance to Development: 5553 feet Horizontal Field of View: 60 degrees







PrevelpptigtatacionAmatyseits Cotatisti MiggStiar@fsMars Wind

Figure 6 Viewpoint 3D Rendering Washington Dulles International Airport 053-0008



A A A A X X X X

Date of Photography: Camera: Lens: Camera Height:

Viewpoint Location UTM Zone 18N: 294314E 4313395N View Direction: 319 degrees Viewoint Elevation: 305 feet Distance to Development: 5553 feet Horizontal Field of View: 60 degrees



Existing View

#### PHOTOSIMULATIONS FOR MARS TO WISHING STAR LINES



Figure 7: Aerial photograph depicting land use and photo view for 053-0008.







Viewpoint Location UTM Zone 18N: 294314E 4313395N View Direction: 319 degrees Viewoint Elevation: 305 feet Distance to Development: 5553 feet Horizontal Field of View: 60 degrees



PrevelpptigtatacionAmatyseits Cotatisti MiggStiar@fsMars Wind

Figure 8 Viewpoint 3D Rendering Washington Dulles International Airport 053-0008

VIEWPOINT CONTEXT

A A A A X X X X

Date of Photography: Camera: Lens: Camera Height:

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PrevelpptigtatacionAmatyseits Cotatisti MiggStiar@fsMars Wind Figure 9 Viewpoint 3D Rendering Washington Dulles International Airport 053-0008 VIEWPOINT CONTEXT

A A A A X X X X

Date of Photography: Camera: Lens: Camera Height:

Viewpoint Location UTM Zone 18N: 294314E 4313395N View Direction: 319 degrees Viewoint Elevation: 305 feet Distance to Development: 5553 feet Horizontal Field of View: 60 degrees



Existing View

#### PHOTOSIMULATIONS FOR MARS TO WISHING STAR LINES



Figure 10: Aerial photograph depicting land use and photo view for 053-0008.







Viewpoint Location UTM Zone 18

Viewpoint Location UTM Zone 18N: 284314E 4313395N View Direction: 319 degrees Viewpoint Elevalion: 305 feet Distance to Development: 5553 feet Horizontal Field of View: 60 degrees

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Date of Photography: Camera: Lens: Camera Height:



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VIEWPOINT CONTEXT

Figure 11 Viewpoint 3D Rendering Washington Dulles International Airport 053-0008

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PrevelpptigtatacionAmatyseits Cotatisti MiggStiar@fsMars Wind

Figure 12 Viewpoint 3D Rendering Washington Dulles International Airport 053-0008



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Date of Photography: Camera: Lens: Camera Height:

Viewpoint Location UTM Zone 18N: 294314E 4313395N View Direction: 319 degrees Viewoint Elevation: 305 feet Distance to Development: 5553 feet Horizontal Field of View: 60 degrees



#### PHOTOSIMULATIONS FOR MARS TO WISHING STAR LINES



Figure 13: Aerial photograph depicting land use and photo view for 053-0008.







Viewpoint Location UTM Zone 18N: 294314E 4313395N View Direction: 319 degrees Viewoint Elevation: 305 feet Distance to Development: 5553 feet Horizontal Field of View: 60 degrees

A A A A X X X X

Date of Photography: Camera: Lens: Camera Height:



Existing View

PrevelpptigtatacionAmatyseits Cotatisti MiggStiar@fsMars Wind

VIEWPOINT CONTEXT

Figure 14 Viewpoint 3D Rendering Washington Dulles International Airport 053-0008







PrevelpptigtatacionAmatyseits Cotatisti MiggStiar@fsMars Wind

Figure 15 Viewpoint 3D Rendering Washington Dulles International Airport 053-0008



A A A A X X X X

Date of Photography: Camera: Lens: Camera Height:

Viewpoint Location UTM Zone 18N: 294314E 4313395N View Direction: 319 degrees Viewoint Elevation: 305 feet Distance to Development: 5553 feet Horizontal Field of View: 60 degrees



Existing View

#### PHOTOSIMULATIONS FOR MARS TO WISHING STAR LINES



Figure 16: Aerial photograph depicting land use and photo view for 053-0008.







Viewpoint Location UTM

Viewpoint Location UTM Zone 18N: 284314E 4313395N View Direction: 319 degrees Viewpoint Elevation: 305 feet Distance to Development: 5553 feet Horizontal Field of View: 60 degrees

A A A A X X X X

Date of Photography: Camera: Lens: Camera Height:



Existing View

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VIEWPOINT CONTEXT

Figure 17 Viewpoint 3D Rendering Washington Dulles International Airport 053-0008







PrevelpptigtatacionAmatyseits Cotatisti MiggStiar@fsMars Wind

Figure 18 Viewpoint 3D Rendering Washington Dulles International Airport 053-0008



A A A A X X X X

Date of Photography: Camera: Lens: Camera Height:

Viewpoint Location UTM Zone 18N: 294314E 4313395N View Direction: 319 degrees Viewoint Elevation: 305 feet Distance to Development: 5553 feet Horizontal Field of View: 60 degrees



### PHOTOSIMULATIONS FOR SUBSTATION

Mars Substation



Figure 19: Aerial photograph depicting land use and photo view for 053-0008.





Proposed view showing location of hidden transmission line structures (yellow)



ERM

Viewpoint Location UTM Zone 18N: 294314E 4313395N View Direction: 319 degrees Viewoint Elevation: 305 feet Distance to Development: 5553 feet Horizontal Field of View: 60 degrees



A A A A X X X X

Date of Photography: Camera: Lens: Camera Height:

PrevelpptigtatacionAmatyseits Cotatisti MiggStiar@fsMars Wind

VIEWPOINT CONTEXT

Figure 20 Viewpoint 3D Rendering Washington Dulles International Airport 053-0008







PrevelpptigtatacionAmatyseits Cotatisti MiggStiar@fsMars Wind Figure 21 Viewpoint 3D Rendering Washington Dulles International Airport 053-0008 



A A A A X X X X

Date of Photography: Camera: Lens: Camera Height:

Viewpoint Location UTM Zone 18N: 294314E 4313395N View Direction: 319 degrees Viewoint Elevation: 305 feet Distance to Development: 5553 feet Horizontal Field of View: 60 degrees



Existing View

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