Dominion Energy®

Application, Direct Testimony, Appendices, and Schedules of Virginia Electric and Power Company

Before the State Corporation Commission of Virginia

For approval and certification of the Coastal Virginia Offshore Wind Commercial Project and Rider Offshore Wind, pursuant to § 56-585.1:11, § 56-46.1, § 56-265.1 *et seq.*, and § 56-585.1 A 6 of the Code of Virginia

Volume 8 of 11
PUBLIC ONLY VERSION

Case No. PUR-2021-00142

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TABLE OF CONTENTS

Application of Virginia Electric and Power Company
For approval and certification of the Coastal Virginia Offshore Wind Commercial Project, and Rider Offshore Wind, pursuant to § 56-585.1:11, § 56-46.1, § 56-265.1 *et seq.*, and § 56-585.1 A 6 of the Code of Virginia
Case No. PUR-2021-00142

TABLE OF CONTENTS

Application of Virginia Electric and Power Company
For approval and certification of the Coastal Virginia Offshore Wind Commercial Project, and Rider Offshore Wind, pursuant to § 56-585.1:11, § 56-46.1, § 56-265.1 *et seq.*, and § 56-585.1 A 6 of the Code of Virginia
Case No. PUR-2021-00142

TABLE OF CONTENTS

PUBLIC AND EXTRAORDINARILY SENSITIVE VOLUMES 11 of 11

Application of Virginia Electric and Power Company
For approval and certification of the Coastal Virginia Offshore Wind Commercial Project, and Rider Offshore Wind, pursuant to § 56-585.1:11, § 56-46.1, § 56-265.1 *et seq.*, and § 56-585.1 A 6 of the Code of Virginia
Case No. PUR-2021-00142

TABLE OF CONTENTS

Environmental
Routing Study

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Environmental Routing Study

Coastal Virginia Offshore Wind Commercial Project

November 2021

Project No.: 0522898

The business of sustainability

ERM

Signature Page

November 2021

Environmental Routing Study

Coastal Virginia Offshore Wind Commercial Project

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CONTENTS

APPENDICES

List of Tables

List of Figures in Appendix A

Acronyms and Abbreviations

Name	Description
§	Section
3D	three dimensional
ABPP	American Battlefield Protection Program
ADP	Area Development Plan
AFD	Virginia Agricultural and Forestal Districts
AICUZ	Air Installations Compatible Use Zones Program
AMSL	above mean sea level
APZ	accident potential zones
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BGEPA	Bald and Golden Eagle Protection Act
BLM	U.S. Bureau of Land Management
BOEM	Bureau of Ocean Energy Management
CAPZ	Coastal Avian Protection Zone
CBG	Census Block Group
CCB	Center for Conservation Biology
CFR	Code of Federal Regulations
CLH	Cable Landing to Harpers
COP	Construction and Operation Plan
CPCN	Certificate of Public Convenience and Necessity
CWA	Clean Water ACT
CVOW	Coastal Virginia Offshore Wind
DMA	Virginia's Department of Military Affairs
DMME	Virginia Department of Mines, Minerals, and Energy
DOD	Department of Defense
Dominion	Virginia Electric and Power Company
DPS	distinct population segments
E2EM	estuarine
EJ	environmental justice
EJSCREEN	EPA's EJ mapping and screening tool
EPISA	Virginia Endangered Plant and Insect Species Act
EMF	electromagnetic field
ERM	Environmental Resources Management, Inc.
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FHA	Federal Highway Administration
FWS	United States Fish and Wildlife Service
GEMS	Geospatial and Education Mapping System
GIS	Geographic Information Systems
GPS	Global Positioning System
Guidelines	VDHR Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia
H&A	Haley & Aldridge
ha	hectare
HDD	horizontal directional drilling
HDPE	high density polyethylene
HF	Harpers to Fentress
IBA	Important Bird Area
ID	identification
IPaC	Information for Planning and Consultation System
ITA	Interfacility Traffic Area
KOP	Key Observation Point
kV	kilovolt
LCA	Landscape Charter Area
LEDPA	least environmentally damaging practicable alternative
LLC	Limited Liability Company
LZ	landing zone

Name	Description
MBTA	Migratory Bird Treaty Act
MP	milepost
NA	not applicable
NAIP	National Agricultural Imagery Program
NALF	Naval Auxiliary Landing Field
NAS	Naval Air Station
NHD	National Hydrography Dataset
NHDE	Natural Heritage Data Explorer
NHI	Natural Heritage Inventory
NHL	National Historic Landmark
NHP	Natural Heritage Program
NLEB	northern long-eared bat
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRCS	National Resource Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O&M	Operations and Maintenance
OCS	Outer Continental Shelf
PVC	polyvinyl chloride
PDR	Purchase of Development Rights
PEM	palustrine emergent
PFO	palustrine forested
PMT	Portsmouth Marine Terminal
Project	Coastal Virginia Offshore Wind Commercial Project
PSS	palustrine scrub-shrub
PUB	Palustrine Unconsolidated Bottom
ROW	right-of-way
RUE	Restrictive Use Easements
SCC	State Corporation Commission of Virginia
SCL	Seashore to Cypress Loop Trail
SCUs	Stream Conservation Units
SECT	Southeast Coast Saltwater Paddling Trail
SEPG	Southeastern Parkway and Greenbelt
SLVIA	seascape and landscape visual impact assessment
SMR	State Military Reservation
SOC	species of concern
SSURGO	Soil Survey Geographic
TERPS	terminal instrument procedures
TJBs	transition joint bays
TNC	The Nature Conservancy
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
USN	United States Navy
Va., VA	Virginia
VAB	City of Virginia Beach
VAC	Virginia Administrative Code
VaFWIS	Virginia Fish and Wildlife Information Service
VaNLA	Virginia Natural Landscape Assessment
VCRIS	Virginia Cultural Resource Information System
VDACS	Virginia Department of Agriculture and Consumer Services
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality
VDHR	Virginia Department of Historic Resources
VDOT	Virginia Department of Transportation
VDWR	Virginia Department of Wildlife Resources
VOF	Virginia Outdoors Foundation
VPA	Virginia Port Authority
VRM	Visual Resource Management
WERMS	Wildlife Environmental Review Map Service
XLPE	cross-linked polyethylene

1. INTRODUCTION

This report presents the results of an environmental constraint identification and routing study prepared by Environmental Resources Management, Inc. (ERM), on behalf of Virginia Electric and Power Company (Dominion or the Company) for the onshore facilities associated with the proposed Coastal Virginia Offshore Wind (CVOW) Commercial Project (Project).

1.1 Project Description

Dominion is proposing to construct and operate a commercial offshore wind generating facility and associated infrastructure connecting the facility to the electric transmission grid in Tidewater, Virginia. The wind generating facility would be built within the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS) Offshore Virginia (Lease No. OCS-A-0483), approximately 27 miles east of the City of Virginia Beach, Virginia. An offshore subsea transmission line would be built from the wind generating facility to the shoreline of Virginia Beach, coming ashore east of Lake Christine in the Virginia State Military Reservation (SMR), near the U.S. Navy's (USN's) Dam Neck Annex. From this location, an onshore underground transmission line would be built to a point near Harpers Road in the City of Virginia Beach. An overhead or a hybrid (i.e., part underground/part overhead) transmission line would then be built from this point to Dominion's existing Fentress Substation in the City of Chesapeake.

Dominion considered multiple alternatives for the onshore portion of the Project (referred to as the onshore Virginia Facilities) that would integrate the energy output of the Project into Dominion's existing transmission system while maintaining the structural integrity and reliability of the system in compliance with mandatory North American Electric Reliability Corporation Reliability Standards.

The onshore Virginia Facilities would include:

- Cable Landing Location for Offshore Export Circuits: Nine new 230 kilovolt (kV) submarine export circuits coming ashore at the Cable Landing Location in the SMR in the City of Virginia Beach;
- Onshore Export Circuits: Nine new 230 kV circuits extending underground from the Cable Landing Location to a new switching station in the City of Virginia Beach;
- Switching Station: A new 25-breaker, 230 kV switching station at a site near Harpers Road or an alternate site near Princess Anne Road in the City of Virginia Beach;
- Overhead Transmission Circuits: Three new overhead 230 kV transmission circuits, each with a rating of approximately 1,500 megavolt-amperes, along the same corridor and using a combination of new and expanded rights-of-way (ROWs) from the new switching station in the City of Virginia Beach to the Company's existing Fentress Substation in the City of Chesapeake; and
- Fentress Substation Expansion: Expansion of the Company's existing 500 kV Fentress Substation to accommodate the new transmission circuits.

In developing potential alternatives, the Company considered the onshore facilities required to construct and operate the Project, the length and width of new and expanded ROWs that would be required, the amount of existing development in the area, the potential for environmental impacts, and the relative cost of each alternative.

All of the routing alternatives identified for the onshore infrastructure would include underground transmission circuits (nine circuits installed in separate duct banks within a single corridor) from the Cable Landing Location to a point near Harpers Road in Virginia Beach (Cable Landing to Harpers Route [CLH

Route]). From this point, the Company identified three overhead route alternatives and one hybrid route alternative to the existing Fentress Substation in Chesapeake (Harpers to Fentress [HF] Routes 1, 2, and 5[1] and the HF Hybrid Route). Each of the three overhead alternatives would require a new switching station, referred to as the Harpers Switching Station, at the point near Harpers Road. From there, the configuration of the overhead transmission alternatives would consist of three 230 kV circuits using both double-circuit structure and single-circuit structure configurations.

Unlike the overhead alternatives, the HF Hybrid Route would not require a switching station at the site near Harpers Road. Instead, it would continue from this point in an underground configuration to an alternate site for the new switching station, referred to as the Chicory Switching Station, near Princess Anne Road in Virginia Beach. The HF Hybrid Route would then continue in an overhead configuration from the Chicory Switching Station to the existing Fentress Substation in Chesapeake.

1.2 Objectives of the Study

The Company requested the services of ERM to define a study area for routing the onshore Virginia Facilities, collect information on routing constraints and opportunities within the study area, identify and compare alternative transmission line routes, and document the routing efforts. ERM's scope of work for this effort consisted of the following activities:

- Define and describe a study area for the onshore Virginia Facilities based on the Company's transmission and service needs.
- Participate in public outreach efforts (e.g., stakeholder meetings and open houses) to gather information regarding constraints and opportunities to be considered as part of the routing process.
- Identify and map routing constraints and opportunities within the study area.
- Identify buildable potential routes for the transmission lines, each of which meets the Project's objective as well as the siting criteria provided in the Code of Virginia (Va. Code) and included in the Virginia State Corporation Commission's (SCC's) minimum filing guidelines for transmission projects.
- Compare the potential routes based on an analysis of environmental impacts and utilization of routing opportunities.
- Recommend a preferred route.

[1] HF Routes 3 and 4 were eliminated as routes and portions of those routes, to the extent they differ from other routes, appear as route variations in certain areas.

2. METHODOLOGY

ERM defined a study area for identifying potential alternatives for the onshore Virginia Facilities, then mapped environmental resources, other routing constraints, and routing opportunities within this area. Data on the study area were compiled through publicly available Geographic Information System (GIS) databases, internet research, and agency and stakeholder engagement. The purpose of this work was to characterize the environmental resources and conditions that could be affected by construction and operation of the onshore Virginia Facilities, and to identify possible route alternatives for the proposed three 230 kV transmission line circuits. The analysis considered land ownership, existing and potential future land uses, existing utilities and ROWs, recreational facilities, natural resources including wetlands and habitats for sensitive species, historic resources, the presence of environmental justice communities, visual resources, and community feedback.

2.1 Study Area

As a first step in identifying potential transmission line routes, ERM defined a study area for the onshore Virginia Facilities based on Dominion Generation's interconnection needs for the Project. The study area was identified to encompass areas around and between Naval Air Station (NAS) Oceana and Dominion's existing Fentress Substation, which is planned to be expanded to accommodate the necessary infrastructure for the Project. Figure 2.1-1 in Appendix A depicts the study area boundary, Cable Landing Location, alternate switching station sites, existing Fentress Substation, and Dominion's existing transmission lines. The study area encompasses an approximately 170-square-mile area generally defined by Dominion's Atlantic and Lynnhaven Substations to the north; the Atlantic Ocean coastline to the east; the Green Run, Stumpy Lake, and Thrasher Substations to the west; and the Hickory Substation to the south. Within this study area lies existing Dominion transmission lines and a well-developed road infrastructure that both offered possibilities for routing opportunities.

The study area for the onshore Virginia Facilities includes heavily developed portions of the Cities of Virginia Beach and Chesapeake to the north and west, as well as the extensive Gum Swamp and associated North Landing River wetlands complex and more rural areas to the south. It encompasses very dense residential and commercial developments, large and numerous publicly owned lands, forested wetlands, major watercourses and associated floodplains, the Intracoastal Waterway, agricultural fields, military airport facilities, sports complexes, and recreational areas such as golf courses.

2.2 Inventory of Constraints and Opportunities

ERM identified and mapped existing land uses, planned developments, and environmental, visual, and cultural features within the study area. To complete this work, the routing team obtained, reviewed, and utilized the following data sources:

- City of Virginia Beach open GIS datasets online portal (City of Virginia Beach 2019a)
- City of Virginia Beach 2017 Interfacility Traffic Area (ITA) and Vicinity Master Plan (City of Virginia Beach 2017a)
- City of Virginia Beach Comprehensive Plan: Policy Document (City of Virginia Beach 2016a)
- City of Chesapeake geospatial data portal (City of Chesapeake 2018a)
- Virginia Department of Transportation (VDOT) Projects and Studies database (VDOT 2021)
- National Conservation Easement database (NCED 2021)

- Virginia Department of Conservation and Recreation (VDCR) – Virginia Conservation Lands Database (VDCR 2021a) and Natural Heritage Data Explorer (VDCR 2021b)
- Virginia Department of Historical Resources (VDHR) Virginia Cultural Resources Information System (VCRIS) (VDHR 2020)
- United States Environmental Protection Agency's Environmental Justice Screening and Mapping Tool (EJSCREEN; USEPA 2020)
- U.S. Fish and Wildlife Service (FWS) National Wetland Inventory (NWI) mapping (FWS 2021a)
- Recent aerial imagery taken in March 2020 (Pictometry International 2020; ptrimble 2020)
- Recent aerial imagery taken in August 2021 (Planet Imagery 2021)

From these and other sources, environmental or other features potentially affecting the constructability of the onshore Virginia Facilities within the study area were defined as routing constraints.

ERM identified existing electric transmission lines, pipelines, roads, and other ROWs within the study area using a variety of digital map sources, current aerial imagery, and data provided by Dominion for its existing transmission facilities. These existing linear corridor features were defined as potential opportunities for routing/siting transmission infrastructure. ERM layered the routing opportunities over the constraints in GIS to identify potential routes/sites for the onshore Virginia Facilities.

Table 2.2-1 provides a list of the features considered as routing constraints and opportunities within the study area.

Table 2.2-1: Features Considered for Routing

Feature Type	Description
Engineering	
Transportation infrastructure	■ Roads or railroads
Riverine construction	■ Federal navigation and shipping channels ■ Clearances and restricted areas
Greenfield construction	■ New corridor (i.e., not adjacent to existing corridor)
Existing Corridors	
Existing electric facilities	■ Transmission or distribution lines
Other utilities	■ Pipelines
Transportation infrastructure	■ Roads, railroads, and related corridors
Land Ownership	■ Federal, state, and local lands ■ Private lands
Land Uses	
Existing land use and land cover	■ Existing subdivisions ■ Land cover types (e.g., forested, agricultural, developed) ■ Residences, churches, schools, cemeteries
Recreational areas	■ Federal, state, county, or municipal parks ■ Federal-, state-, county- or municipal-managed recreation areas ■ Golf courses ■ Recreation trails (biking, hiking, birding, wildlife)

Feature Type	Description
Land use planning and zoning	■ Zoning districts
Planned developments	■ Planned, proposed, or conceptual residential, commercial, or industrial developments
Conservation lands and easements	■ VOF and VDCR conservation land and easements ■ TNC lands ■ City of Virginia Beach easements ■ City of Chesapeake easements ■ NAS Oceana and NALF Fentress restrictive easements ■ Wetland mitigation banks ■ National Wildlife Refuge ■ NRCS Wetland Reserve Program ■ Other conservation lands
Airport facilities	■ Restricted airspace ■ Airports, heliports, and private airstrips
Transportation infrastructure	■ Roads and railroads
Natural Resources	
Surface waters	■ Wetlands ■ Waterbodies
Protected or managed areas	■ Resource protection areas ■ Wildlife management areas
Protected species	■ Natural heritage resources ■ Threatened and endangered species ■ Bald Eagles
Vegetation	■ Vegetation characteristics ■ Forested land and urban tree canopy
Soils	■ Soil characteristics
Visual Resources	
Visually sensitive areas	■ Viewsheds to and from visually sensitive areas ■ Scenic rivers ■ Scenic byways
Cultural Resources	
Cultural resource sites	■ Archaeological sites ■ Historical or architectural sites and districts ■ National Register of Historic Places listed and eligible properties ■ Battlefields ■ VDHR protected easements
Geological Resources	
Mineral resources	■ Mines or quarries

Feature Type	Description
Environmental Justice	■ Low-income populations ■ Minority populations ■ Age groups (under age 5 and over age 64) ■ Linguistically isolated communities

NRCS = Natural Resources Conservation Service; NAS = Naval Air Station; NALF = Naval Auxiliary Landing Field; TNC = The Nature Conservancy; VDCR = Virginia Department of Conservation and Recreation; VOF = Virginia Outdoors Foundation; VDHR = Virginia Department of Historical Resources

A number of routing constraints and opportunities are present in the area between the Cable Landing Location and existing Fentress Substation. The following is a summary of the major constraints and opportunities that affect transmission line routing in the study area:

- Naval Air Station Oceana: NAS Oceana is over 8 square miles in area and includes several major runways, an extensive airbase and military support facilities, and Aeropines Golf Course. NAS Oceana is one of three USN master jet bases that provides permanent basing and homeporting of carrier-based tactical jet squadrons, carrier air wings, and the provision of jet-capable Naval outlying fields or auxiliary landing fields nearby for use in concentrated field carrier landing practice (e.g., Naval Auxiliary Landing Field [NALF] Fentress, located near the Fentress Substation).

  As a routing constraint, NAS Oceana must consent to any routing opportunities from the Cable Landing Location to the northwest and west, while existing nearby development limits routing opportunities in this area to the south and southeast. The route identified in this northern portion of the study area (i.e., the CLH Route) would cross the eastern and southeastern edge of NAS Oceana (along or near Bells Road, Oceana Boulevard, and Harpers Road).

- Residential Areas: The high density of residential development to the south, east, and west of the Harpers Switching Station site—and throughout this area of Virginia Beach—severely limits routing alternatives in all directions. All routes presented in this study would avoid residential areas as much as practicable to limit new ROW acquisition on residential lots.

- City of Virginia Beach-owned Property: The City of Virginia Beach owns multiple land parcels throughout the study area. For example, south and west of NAS Oceana is a large area of City-owned land described in the 2017 Virginia Beach Master Plan as the ITA, where the City purchased multiple tracts of undeveloped lands to manage development within the high-noise, level jet flight path area connecting NAS Oceana and NALF Fentress (City of Virginia Beach 2017a). Holdings by the City also include parcels acquired for construction and operation of the Southeastern Parkway and Greenbelt (SEPG), discussed in more detail below.

  Other City-owned lands in the area include large, wooded lots as well as large agricultural and forested land holdings southwest of the Virginia Beach National Golf Course. Conceptual development plans for City-owned lands in these areas are described in the above-mentioned Virginia Beach Master Plan (City of Virginia Beach 2017a). It should be noted that in Virginia, publicly owned lands can constrain transmission line routing because these lands can only be used for electric transmission lines with the consent of the public land owner. These publicly owned lands are not subject to the land acquisition provided through the rights of a Certificate of Public Convenience and Necessity granted by the SCC.

- City of Virginia Beach Parks: Several City-owned parks, including several large parks, are present in the study area. These include North Landing Park, Virginia Beach National Golf Course, Princess Anne Athletic Complex, Virginia Beach Sportsplex, and the U.S. Field Hockey National Training Center and Hockey Complex. Other less developed City-owned parks in the routing area include Holland Pines Park, West Neck Creek Natural Area, Rolling Woods Park, and Litchfield Manor Park.

- Back Bay National Wildlife Refuge: Back Bay National Wildlife Refuge is located in the southeastern portion of the study area. Numerous federally owned parcels make up the refuge, which extends from Lake Tecumseh in the north to Back Bay in the south. All routes identified in this study would avoid the protected refuge.
- North Landing River: The VDCR's North Landing River Natural Area Preserve is one of Virginia's largest natural area preserves, consisting of an extensive wetland complex including the forested swamps and tidal marshes of the lower North Landing River. In addition to the Commonwealth of Virginia's land holdings (3,441 acres), The Nature Conservancy (TNC) owns an additional 7,500 acres of land along the Intracoastal Waterway and North Landing River known as the North Landing Preserve.
- United States Army Corps of Engineers Intracoastal Waterway: The United States Army Corps of Engineers (USACE) has jurisdiction over this federally owned waterway, which is also an historic site (Albemarle & Chesapeake Canal Historic District) listed on the National Register of Historic Places (NRHP). The canal connects the South Branch of the Elizabeth River to the west with North Landing River to the east.
- Forested Wetlands, Streams, and Rivers: South and east of the developed areas of the Cities of Virginia Beach and Chesapeake is an expansive network of wetlands and waterbodies associated with Gum Swamp. This largely undeveloped area is characterized by forested wetlands and flowing waters. Landowners in the Gum Swamp area include the City of Virginia Beach, TNC, and the USACE.
- Existing Transmission Lines and Other Collocation Opportunities: Several existing transmission line corridors, primarily operated by Dominion, cross the study area. It is often beneficial to build new transmission lines adjacent to existing utility corridors to minimize impacts on environmental and other resources. The Virginia SCC requires that existing transmission lines be considered as routing opportunities to the fullest extent when planning new transmission lines. Many of the existing transmission line corridors within the study area are in heavily developed areas where homes and other buildings have been built to the edge of the existing ROW. Where feasible, however, portions of these corridors were considered as potential routing opportunities during routing of the onshore transmission lines.
- Southeastern Parkway and Greenbelt Study Corridor: Another major routing opportunity in the study area is the SEPG, a once-proposed 21.4 mile-long highway designed to provide an east-west connection between the Cities of Virginia Beach and Chesapeake. The project was jointly planned by VDOT and the Federal Highway Administration (FHA) with a Final Environmental Impact Statement completed in 2008, but since then was terminated.

  Prior to the project being terminated, the City of Virginia Beach (and to a lesser extent, the City of Chesapeake) acquired undeveloped lands that form a partial corridor from the NAS Oceana area to an interconnect with Interstate 64 and Interstate 464, near the Dozier Corner area in Chesapeake. Some of this corridor is adjacent to Dominion's existing transmission Lines #2118/147. In other areas, residential developments have been built around the SEPG corridor or within it. Part of the undeveloped corridor crosses the Princess Anne Athletic Complex. Much of the land within the SEPG corridor that could be used to support a transmission line is owned by the City of Virginia Beach.

In addition to the major routing constraints and opportunities described above, the study area contains other federally owned lands, Commonwealth-owned lands, lands and parklands owned by the cities, privately owned conservation lands, and city-designated historical districts.

A list of land managing agencies and other stakeholders with significant landholdings in the study area is presented in Table 2.2-2.

Table 2.2-2: Key Stakeholders and Land Managing Agencies

Stakeholder	Landholdings
USN	■ NAS Oceana ■ NALF Fentress
USACE	■ USACE-owned land along the north and south side of the Intracoastal Waterway
Commonwealth of Virginia	■ SMR ■ North Landing River Natural Area Preserve
City of Virginia Beach	■ City-owned parcels associated with the SEPG study corridor and other road extension and widening projects ■ City-owned parklands associated with Princess Anne Athletic Complex and Virginia Beach National Golf Course ■ Other City-owned parcels and parklands
City of Chesapeake	■ City-owned parcels and parklands
TNC	■ TNC-owned lands associated with the North Landing River and Gum Swamp (North Landing Preserve)
U.S. Fish and Wildlife Service	■ Back Bay National Wildlife Refuge

NAS = Naval Air Station; NALF = Naval Auxiliary Landing Field; SEPG = Southeastern Parkway and Greenbelt; SMR = State Military Reservation; TNC = The Nature Conservancy; USACE = United States Army Corps of Engineers; USN = United States Navy; VDOT = Virginia Department of Transportation

2.3 Route Identification

Once the routing opportunities and constraints were identified and assessed, potential overhead and hybrid routes were identified within the study area between the Cable Landing Location and Fentress Substation. Efforts were made to collocate routes with existing transmission lines and other linear corridor features, such as roads. In most cases, however, large scale (i.e., point-to-point) collocation opportunities with existing transmission lines and other features were determined to be not viable due to bottlenecks caused by residential developments, city parks, and other constraints. The various existing transmission lines in the study area cross numerous residential developments and commercial areas where residential lots or commercial buildings have been built up to the edge of the existing ROWs on one or both sides. These developments generally preclude the expansion of the ROWs to accommodate development of a new transmission line entirely collocated with an existing line.

Three existing transmission line corridors offer opportunities for collocation within the study area. These include Lines #2118/147, which extend between Dominion's existing Virginia Beach and Landstown Substations; Lines #271/I-74 and #2240/I-74, which extend between Dominion's existing Landstown and Fentress Substations; and Line #2085, which extends between Dominion's existing Landstown and West Landing Substations. Each of these areas was incorporated into alternative routes identified for the onshore Virginia Facilities.

The routing constraints identified in the study area limited the availability of potential route corridors, particularly in the heavily developed parts of the City of Virginia Beach (generally, the portion of the study area located north of Nimmo Parkway, Princess Anne Road, and Dam Neck Road). Existing development in this area was the major constraint, followed by public land ownership and wetlands. Lands to the east and south of the proposed Harpers Switching Station site (generally east of London Bridge Road and Sandbridge Road) were also investigated for potential routes in an effort to avoid the congested municipal, commercial, and residential areas of Virginia Beach. However, existing residential

development that backs right up to the Back Bay National Wildlife Refuge, along with the large expanses of tidal wetlands making up the Refuge, prohibited the development of routes through or around this area.

As noted previously, the presence of NAS Oceana and extensive development severely limit routing options in the north/northwestern portions of the study area. Essentially, almost all of the lands between the proposed Harpers Switching Station site and Princess Anne Athletic Complex are fully developed or publicly owned, or consist of forested or tidal wetland areas. Where sufficient space is available and constraints are absent, however, ERM identified potential routes through or around these constraints to provide as many potential route alternatives as possible and facilitate productive discussions with stakeholders regarding routing.

2.4 Field Reconnaissance and Stakeholder Engagement

ERM conducted several site visits to assess local conditions and confirm routing around or through constraints and sensitive areas. Additionally, Dominion engaged extensively with the public, elected officials, and regulatory, planning, and land managing agencies to gather feedback on the various route alternatives. In addition to various stakeholder meetings, virtual open houses were held in June 2021 and both virtual and in-person open houses were held in June and August 2021. Some of the feedback provided by the public and agency officials resulted in adjustments being made to optimize routes.

2.5 Route Comparison and Identification of a Proposed Route

To the extent practicable, ERM identified routes that both avoid constraints and utilize routing opportunities. ERM conducted an analysis using GIS to quantify potential impacts associated with constraints and the use of opportunities for each route. Crossings of sensitive features were measured and tabulated to facilitate route comparisons. Other factors, such as visual impacts and engineering or constructability issues, were also considered. A proposed route was then selected based on a comparison of the advantages and disadvantages of each route relative to the sensitivity and extent of constraints affected and opportunities utilized.

3. ONSHORE VIRGINIA FACILITIES

As noted above, the proposed onshore Virginia Facilities include:

- The Cable Landing Location where the submarine export circuits would come ashore;
- 27 new 230 kV XLPE export circuits extending underground from the Cable Landing Location to a new switching station;
- A new 230 kV switching station;
- Three new overhead 230 kV transmission circuits (located in part within the same ROWs of existing transmission Lines #271/I-74 and Lines #2240/I-74, which would be rebuilt as part of this colocation); and,
- Expansion of Dominion's existing Fentress Substation.

A single underground route alternative was identified for the proposed underground transmission circuits between the Cable Landing Location and a point near Harpers Road in the City of Virginia Beach, which is one of two potential sites for the new switching station (discussed in detail below). This route segment is referred to as the CLH Route. From here, ERM identified three overhead route alternatives and one hybrid route alternative for the transmission line to Dominion's existing Fentress Substation in the City of Chesapeake; these are referred to as HF Routes 1, 2, and 5, and the HF Hybrid Route. HF Routes 1, 2, and 5 would each require a switching station at a site on USN lands near Harpers Road, whereas the HF Hybrid Route would require a switching station at an alternate site on private lands near Princess Anne Road (State Route 165). Both potential switching station sites would be located in the City of Virginia Beach. ERM additionally identified and evaluated two route variations, the Dam Neck Route Variation and Line #2085 Route Variation.

A description of the proposed onshore Virginia Facilities, including alternative transmission line routes and route variations, is provided in Section 3.1. Aerial photo-based route maps depicting the alternative transmission line routes and other facilities are provided in Appendix B, Aerial and Topographic Photo-based Route Map Sets. Dominion considered additional alternative transmission line routes, a route variation, and another switching station site, but rejected these from further consideration based on constructability, impacts, costs, or other factors; these are discussed in Section 3.2, Routes and Sites Identified and Eliminated from Further Consideration. Descriptions of typical ROW configurations for the transmission lines are provided in Section 3.3, Structure Types and Right-of-Way Widths.

3.1 Onshore Transmission Circuit Routes and Associated Facilities

3.1.1 Cable Landing to Harpers Road

3.1.1.1 Cable Landing Location

The intersection of the proposed Offshore and Onshore Export Circuits would occur at the Cable Landing Location at the SMR. The site would measure approximately 293 feet by 430 feet in size, encompassing about 2.8 acres, plus additional temporary workspace that would be used during construction. For the landing design, Dominion proposes to use either the horizontal directional drill (HDD) or direct pipeline installation method to excavate nine subsurface holes or tunnels through which the circuits would be installed under the beach and associated dunes to a location approximately 1,800 feet offshore.[2] After

[2] HDD is a trenchless installation method that uses a steerable drilling machine to drill a hole through the ground along pre-determine path and then pull steel casing pipelines through the hole (see additional discussion of this method in Section 3.4, Construction, Operation, and Maintenance Processes). Direct pipe is a trenchless installation method that uses a steerable boring

each hole/tunnel is completed, a 32-inch-diameter, high-density polyethylene (HDPE) casing would be installed within the hole/tunnel. Nine three-core, XLPE submarine circuits would be installed within the HDPE-cased drills, terminating in nine transition joint bays (TJBs) within the Cable Landing Location. The TJBs would be underground, pre-cast reinforced concrete vaults used to house the submarine circuit to onshore circuit transition splices. The TJB splicing operation would break out each of the nine three-core circuits into three separate, single-core, XLPE circuits, totaling 27 onshore XLPE circuits, which would exit the TJBs within nine concrete-encased, underground duct banks, with three circuits per duct bank.

3.1.1.2 Cable Landing to Harpers Route

The CLH Route for the Onshore Export Circuits would include both HDD and surface trench installation of the proposed underground circuits between the Cable Landing Location and the switching station site near Harpers Road. After exiting the TJBs, the nine concrete-encased, underground duct banks would transition to five HDDs for crossing Lake Christine. The HDDs would extend for approximately 0.3 mile (1,540 feet) passing beneath two branches of the lake separated by a peninsula of USN land at Dam Neck Annex. The HDDs would terminate on the west side of the lake just north of a helicopter landing pad at the north end of Lake Road on the SMR. From here, the underground circuits would be installed by surface trenching in a typical, three-wide, nine-circuit, duct bank configuration. The route would head generally west for about 0.6 mile, mostly crossing parade and training grounds within the SMR.

At a point just east of General Booth Boulevard, the typical, three-wide, duct bank configuration would diverge into five HDDs for crossing General Booth Boulevard, Owl Creek, and associated wetlands. The HDDs would extend approximately 0.4 mile (2,200 feet) to the northwest, leaving the SMR, crossing a parcel owned by the City of Virginia Beach along the creek, and exiting onto USN land at NAS Oceana near Bells Road. The underground circuits would then converge into the typical, three-wide, duct bank configuration and continue west and south on USN land for about 1.0 mile, paralleling Bells Road for 0.6 mile and crossing Birdneck Road and Dominion's existing ROW for Lines #2118/78. The CLH Route would then turn south to parallel the east side of Oceana Boulevard for about 1.1 miles, all on USN land. At the intersection of Oceana Boulevard and Harpers Road, the route for the underground circuits would head west to parallel the north side of Harpers Road for about 1.0 mile, terminating at the Harpers Switching Station site on the north side of Harpers Road.

State Military Reservation

The CLH Route would cross approximately 0.8 mile of state land within the SMR. The Company worked cooperatively with staff from the SMR through regular meetings and weekly calls to identify a route that would minimize impacts on military training/readiness, natural and cultural resources, and future development plans at the base. One factor considered in this process was the historical significance of the base, which is listed in the NRHP as a historic district. Installation of the underground transmission circuits along the CLH Route would require the demolition of two structures, Buildings 410 and 59, which are considered contributing elements of the historic district. SMR staff indicated preference for a route requiring the demolition of these buildings to preserve other elements of the historic district, including trees and landscape features also considered as contributing elements to the district. The route across the SMR was also designed to overlap with portions of two potential future developments (parking lots) at the base that would be compatible with an underground electric transmission line.

In a letter to Dominion dated April 13, 2021, the Office of the Adjutant General of the Commonwealth of Virginia's Department of Military Affairs (DMA) agreed in principle with the alignment of the CLH Route across the SMR. In a second letter to Dominion dated June 24, 2021, the DMA provided an overview of

machine to excavate a tunnel through the ground along a pre-determined path, while simultaneously pushing steel casing pipes through the tunnel.

the route selection process, including a discussion of factors affecting SMR's identification of a preferred route. Copies of both letters are provided in Appendix C, Correspondence.

Naval Air Station Oceana

The CLH Route would cross approximately 3.6 miles of USN land within NAS Oceana. Additionally, the Harpers Switching Station would be built on USN land at NAS Oceana, part of which would be within the USN's Aeropines Golf Course. Similar to the SMR, the Company worked cooperatively with staff from NAS Oceana to identify a transmission line route and switching station site that would minimize impacts on military training/readiness, natural and cultural resources, and future planned developments on the base. A key factor in developing the route across NAS Oceana (and one reason why the CLH Route would be underground) is limitations associated with airspace and flight paths to and from the runways at NAS Oceana. In particular, and as discussed in more detail in Section 4.2.9, Airports, overhead electric transmission infrastructure is prohibited in areas around the base designated as Accident Protection Zone (APZ) 1 under the USN's Air Installation Compatible Use Zones (AICUZ) program.

In a letter to Dominion dated August 17, 2021, the Department of the Navy supported the alignment of the CLH Route and siting of the Harpers Switching Station within NAS Oceana. A copy of this letter is provided in Appendix C, Correspondence.

3.1.2 Harpers to Fentress Alternatives

ERM identified three overhead transmission line routes and one hybrid route for the transmission facilities from a common point near Harpers Road (i.e., the Harpers Switching Station site) to Fentress Substation. For each alternative, a switching station would be required to consolidate the nine onshore export circuits down to three transmission circuits and to electrically adjust the facilities to transition from an underground to an overhead transmission configuration. HF Routes 1, 2, and 5 would each require a switching station at the common point near Harpers Road (Harpers Switching Station), while the HF Hybrid Route would require a switching station near Princess Anne Road (Chicory Switching Station). More information on the switching station sites is provided in Section 3.1.3, Switching Station.

Except as noted in the subsections below, HF Routes 1, 2, and 5 and the overhead segment of the HF Hybrid Route would each require sets of three single-circuit monopole structures to carry the three proposed 230 kV circuits. For the underground segment of the HF Hybrid Route, the typical three-wide, duct bank configuration described above for the CLH Route would continue from the common point north of Harpers Road to the Chicory Switching Station.

3.1.2.1 Harpers to Fentress Route 1

After exiting the Harpers Switching Station, HF Route 1 would proceed generally southwest for about 2.3 miles across both private lands and lands owned by the City of Virginia Beach adjacent to or within the SEPG study corridor. This segment of the route would cross Dam Neck and London Bridge roads and pass between the Prince George Estates, Mayberry, Pine Ridge, and Castleton residential subdivisions. The route would then intersect and parallel Dominion's existing Lines #2118/147 corridor for a distance of approximately 1.8 miles, mostly crossing City-owned lands within or adjacent to the SEPG corridor. This segment would pass south of the Castleton residential subdivision and between the Buyrn Farm North, Holland Pines, and Woods of Piney Grove residential subdivisions near Holland Road.

After leaving Dominion's existing transmission line corridor, HF Route 1 would continue in a southwesterly direction for about 2.1 miles, mostly crossing City-owned lands within the SEPG corridor, including an undeveloped portion of the Princess Anne Athletic Complex. This segment would cross Dominion's existing ROW for Line #2085 just east of Landstown Road and intersect with the existing ROW for Line

#271 north of the intersection of Salem and Landstown roads. The existing lattice structures for Line #271 also support the idle Line #I-74.

At the intersection with Line #271, the three proposed circuits would join and follow the Line #271 corridor for 6.1 miles to the south/southwest to Dominion's existing Pocaty Substation in Chesapeake. This section of the route would require a wreck-and-rebuild of the existing double-circuit lattice structures for Lines #271/I-74 with new double-circuit monopole structures (to carry Line #271 and one Overhead Transmission Circuit), plus the construction of either an additional double-circuit monopole structure or two additional single-circuit monopole structures (to carry two Overhead Transmission Circuits). As discussed in more detail in Section 3.3.2, Overhead Transmission Configuration, the double circuit monopole structures would be installed in the route segments crossing the Highland Meadows/Highland Acres subdivisions from approximate MPs 6.6 to 7.0 and the Indian River Woods/Indian River Farms subdivisions from approximate MPs 7.3 to 7.7 in Virginia Beach where there is limited space to expand the existing ROW. Two new single-circuit monopole structures would be installed elsewhere along this segment (i.e., from approximate MPs 6.2 to 6.7, MPs 7.0 to 7.3, and MPs 7.7 to 12.3).

The route segment along Line #271 would enter the City of Chesapeake southwest of Indian River Farms Park. The Chesapeake portion of the route initially would cross mostly forested lands, including private lands, parcels owned by the City of Chesapeake, and two tracts owned by TNC. This segment would also cross USACE-owned lands along the Intracoastal Waterway canal. South of the canal, the route would mostly cross privately-owned agricultural lands in addition to crossing Mt. Pleasant and Blue Ridge roads.

From the Pocaty Substation, HF Route 1 would follow Dominion's existing ROW for Lines #2240/I-74 for 0.7 mile to the south, crossing Whittamore Road and passing along the east side of the Battlefield Golf Club. The route would then head west for 1.1 miles along the south side of the golf club before entering Fentress Substation. The route segment from the Pocaty Substation to the Fentress Substation would require a wreck-and-rebuild of the existing double-circuit lattice structures for Lines #271/I74 and their replacement with new double-circuit, monopole structures plus the construction of two additional single-circuit structures. The new double-circuit structures would carry Line #2240 and one Overhead Transmission Circuit, and the new single-circuit monopole structures would each carry one Overhead Transmission Circuit.

City of Virginia Beach

In a letter to Dominion dated October 22, 2021, Mayor Dyer of the City of Virginia Beach, on behalf of the City, indicated support for the Project, its willingness to cooperate and collaborate with Dominion in obtaining the necessary real estate rights from the City to locate the Project's transmission route over City-owned property, and importantly, the City's urging Dominion to minimize routing over private land, and instead use open space and collocate with existing infrastructure. A copy of this letter is provided in Appendix C, Correspondence

3.1.2.2 Harpers to Fentress Route 2

HF Route 2 would follow the same alignment as HF Route 1 for approximately 5.5 miles from the Harpers Switching Station site to a point just east of Landstown Road in the Princess Anne Athletic Complex. The route would then head south/southwest for about 1.8 miles across sparsely developed forested and agricultural lands primarily owned by the City of Virginia Beach and managed as part of the City's ITA. This segment of the route would cross Salem Road and Indian River Road and pass west of North Landing Road. After crossing Indian River Road, the route would continue about 1.0 mile to the south across mostly forested private lands to the boundary between Virginia Beach and Chesapeake.

Once in Chesapeake, HF Route 2 would head southwest for approximately 0.9 mile, crossing the Intracoastal Waterway and adjacent federal lands managed by the USACE at a point about 0.6 mile

northwest of the North Landing River Bridge. It would then proceed west for 2.6 miles across privately owned forested and agricultural parcels along the south side of the Intracoastal Waterway to an intersection with Dominion's existing ROW for Lines #271/I-74. From here, the route would follow the same alignment as HF Route 1 for about 3.5 miles to the Fentress Substation.

3.1.2.3 Harpers to Fentress Route 5

HF Route 5 would follow the same alignment as HF Routes 1 and 2 for approximately 5.5 miles from the Harpers Switching Station site to Dominion's existing ROW for Line #2085 near Landstown Road at the Princess Anne Athletic Complex. It would then follow the west side of Line #2085 for approximately 2.8 miles to the south. About 2.5 miles of this route segment would cross primarily undeveloped (agricultural) lands owned by the City of Virginia Beach adjacent to (but on the opposite side of the existing transmission line from) the Courthouse Woods and Courthouse Estates residential subdivisions. The remainder of this segment, about 0.3 mile on the south side of Indian River Road, would continue along Line #2085 across mostly forested, privately owned parcels. The route would then head southwest away from Line #2085 for about 1.0 mile, where it would cross the Intracoastal Waterway (North Landing River) about 0.1 mile downstream of the North Landing River Bridge and enter the City of Chesapeake.

South of the river, HF Route 5 would cross Mt. Pleasant Road and a short segment (about 320 feet) of USACE land before heading generally south for about 3.9 miles, crossing 1.9 miles of undeveloped USN land along the edge of NALF Fentress and agricultural and forested private lands further south. This segment of the route would cross Mt. Pleasant, Blackwater, and Fentress Airfield roads, pass to the west of North Landing Farms, and parallel Blackwater Road for about 0.8 mile. HF Route 5 would then cross the state-designated scenic Pocaty River, turn southwest, and generally parallel the river through forested private lands for about 2.2 miles. It would then head west/northwest for about 4.6 miles across sparsely populated, privately owned, agricultural lands. HF Route 5 would then follow Dominion's existing ROW for Lines #2240/I-74 for about 0.1 mile west to Fentress Substation.

3.1.2.4 Harpers to Fentress Hybrid Route

The HF Hybrid Route would not have a switching station at Harpers Road. Instead, the route would continue underground in a typical, three-wide, nine-circuit, duct bank configuration following, with one minor exception, the same alignment as HF Routes 1, 2, and 5 to the Chicory Switching Station site near Princess Anne Road in Virginia Beach, a distance of about 4.5 miles. The exception would be an approximately 0.25-mile deviation, starting at a point about 0.3 mile southeast of Harpers Road, where the underground alignment would follow the edge of an agricultural field.

While the majority of the underground segment of the HF Hybrid Route would be installed by surface trenching, this alternative would also require two microtunnels to install the transmission line beneath Dam Neck and London Bridge roads and an HDD to install the transmission line beneath a large wetland complex east of Chestwood Drive.[3] For each of the trenchless installations, the three-wide, nine-circuit, duct bank configuration would diverge into six HDDs/microtunnels to complete the crossing, then converge back to the standard underground configuration.

At the Chicory Switching Station, the HF Hybrid Route would transition to a typical, three-circuit, overhead configuration, and follow the same path as HF Route 1 to Fentress Substation in Chesapeake.

[3] Microtunneling is a trenchless installation method that uses a steerable tunneling machine to excavate a tunnel through the ground along a pre-determined path, while simultaneously pulling steel casing pipes through the tunnel.

3.1.2.5 Route Variations

The Dam Neck Route Variation was identified as an alternative to the common segment of HF Routes 1, 2, and 5 in the area between Dam Neck Road and West Neck Creek in Virginia Beach. The Line #2085 Route Variation was identified as an alternative to HF Route 2 in the area between Landstown Road in Virginia Beach and the crossing of the Intracoastal Waterway canal in Chesapeake. Descriptions of these route variations are provided below.

Dam Neck Route Variation

The Dam Neck Route Variation provides an alternative to the alignment of HF Routes 1, 2, and 5 where they pass between the residential developments of Prince George Estates, Mayberry, Castleton, and Pine Ridge (and are within the SEPG study corridor and/or adjacent to Dominion's existing ROW for Lines #2118/147) in Virginia Beach. This route variation was considered because it would collocate part of the route with Dam Neck Road and avoid passing between residential developments while being located within the City of Virginia Beach's SEPG corridor (as HF Routes 1, 2, and 5 would do). Rather than continuing to the southwest after crossing Dam Neck Road, the route variation would instead turn west to parallel the south side of Dam Neck Road for approximately 1.8 miles, primarily crossing privately owned agricultural and forested lands. At a point about 0.4 mile west of the crossing of London Bridge Road, the route would turn south and continue for approximately 1.0 mile across private and City-owned forested lands, including an approximately 0.5-mile-long crossing of City-owned undeveloped parkland at Holland Pines Park and a crossing of West Neck Creek. The route variation would end at its intersection with Dominion's existing ROW for Lines #2118/147, where it would rejoin the alignment of HF Routes 1, 2, and 5.

Line #2085 Route Variation

The Line #2085 Route Variation provides an alternative to HF Route 2 in the area between the Princess Anne Athletic Complex and the crossing of the Intracoastal Waterway canal. This route variation was considered because it would utilize the Line #2085 corridor as a routing opportunity. The route variation would deviate from HF Route 2 near Landstown Road on the south side of the Princess Anne Athletic Complex and U.S. Field Hockey Complex. It would then follow the west side of Line #2085 for approximately 2.8 miles to the south following the same alignment as HF Route 5 across agricultural and forested lands on the west side of the Courthouse Woods and Courthouse Estates subdivisions. At a point about 0.3 mile south of Indian River Road, the route variation would turn away from the Line #2085 corridor and continue southwest and west for approximately 1.6 miles, crossing North Landing Road, North Landing River, and the Intracoastal Waterway canal before rejoining HF Route 2 on the west side of the waterway.

3.1.3 Switching Station

The switching station required for the Project would be comprised of circuit breakers, gas-insulated switchgear, shunt reactors, and static synchronous compensators. The primary purpose of the switching station would be to consolidate the nine Onshore Export Circuits down to three transmission circuits that would then travel to Fentress Substation to connect to the existing transmission grid. The transition from an underground to an overhead transmission configuration would also occur at the switching station. The facility would generally have the appearance of a typical Dominion substation.

For HF Routes 1, 2, and 5, the Harpers Switching Station would be built on USN lands at NAS Oceana north of Harpers Road. The northeast corner of the site includes portions of two fairways within the Aeropines Golf Course and the central portion of the site includes maintenance structures associated with the golf course, which would be removed from the site during construction of the switching station. The

site would encompass approximately 21.0 acres, all of which would be fenced and maintained for operations. Locations of stormwater management facilities have not yet been determined. As noted in Section 3.1.1.2, Cable Landing to Harpers Route, the USN supports the alignment of the CLH Route and siting of the Harpers Switching Station within NAS Oceana.

For the HF Hybrid Route, the Chicory Switching Station would be built at an alternate site on mostly private lands on the north side of Princess Anne Road adjacent to Dominion's existing ROW for Lines #2118/147, just south of the existing Princess Anne Substation.[4] The site would encompass approximately 31.5 acres, of which approximately 17.1 acres would be fenced and maintained for operations. The remainder of the site would be used for stormwater management and temporary construction workspace.

3.1.4 Fentress Substation

Dominion's existing 500 kV Fentress Substation is situated on a Company-owned parcel in Chesapeake east of Fentress Loop Road, south of the Fentress Lakes subdivision, north of the Carriage House Commons subdivision, and west of the Chesapeake & Albemarle Railroad. The existing facility measures approximately 705 feet by 755 feet, encompassing about 11.7 acres. Surrounding lands are predominantly forested (and mostly wetland), with the exception of existing transmission ROWs entering and exiting the facility.

For the CVOW Project, Dominion proposes to expand the existing facility footprint on Company-owned land, convert the 500 kV portion of the substation into a 10-breaker, gas insulated station, and install three 500-230 kV transformer banks and associated equipment to interconnect each of the proposed 230 kV circuits. The expansion would extend the boundary of the existing station about 490 feet to the north, encompassing an additional approximately 9.0 acres for a total (post-Project) station footprint of about 20.7 acres, all remaining on Company-owned land.

3.2 Routes and Sites Identified and Eliminated from Further Consideration

ERM investigated and subsequently rejected additional alternative routes or route segments as well as another alternate site for the switching station. Descriptions of these alternatives and the rationale for eliminating them from further consideration are provided in the subsections below.

3.2.1 Princess Anne Municipal Center Alternative Route

ERM identified the Princess Anne Municipal Center Alternative Route to traverse and connect the area between Dominion's existing ROW for Lines #2118/147 near the Lake Placid subdivision and the intersection of Salem and North Landing roads in Virginia Beach (Figure 3.2-1 in Appendix A, Figures). This route was identified as an alternative to following the City of Virginia Beach's SEPG corridor south of the Holland Pines and Woods of Piney Grove subdivisions to the Princess Anne Athletic Complex, which is the alignment followed by HF Routes 1, 2, and 5 and the HF Hybrid Route.

The Princess Anne Municipal Center Alternative Route initially would follow the same alignment as HF Routes 1, 2, and 5, and the HF Hybrid Route from the Harpers Switching Station site for approximately 3.1 miles to the south/southwest. Beginning at a point just east of Holland Pines Park, the alternative route would depart the ROW for Lines #2118/147 and head southwest for about 1.0 mile. This segment would cross a wetland and pass between two ponds near Holland Woods Park, cross Holland Road, and continue across open fields and woods to the intersection of Nimmo Parkway and Princess Anne Road. From here, the route would head west/southwest for about 0.9 mile, crossing Princess Anne

[4] Approximately 0.6 acre would be on City of Virginia Beach lands.

Road, the Courthouse Marketplace parking lot, George Mason Drive, and a new extension of Nimmo Parkway near the front entrance to a new Veterans Care Center (currently under construction). The route would then head west for about 1.4 miles, following the same alignment as a planned future extension of Nimmo Parkway, crossing Kings Highway, Dominion's existing ROW for Line #2085, and Two Farms Lane. It would intersect HF Route 2 north of the junction of Salem and North Landing roads and follow the same alignment as this route to Fentress Substation.

As the Princess Anne Municipal Center Alternative Route was studied in detail, the following issues were identified:

- Buyrn Farm North and Holland Woods Subdivisions: Because of limited available space, the route would cross the edge of a pond and require clearing of the entire area (currently forested) between two ponds adjacent to and between the Buyrn Farm North and Holland Woods subdivisions. It additionally would pass within approximately 100 feet of the new Forefront Church at the crossing of Holland Road.
- Historically Significant Areas: The route would be adjacent to a historic cemetery west of Holland Road and pass within about 85 feet of the Buyrningwood Farms/Cedar Grove/John Burroughs House historic site, which the VDHR has determined to be eligible for listing on the NRHP.
- Future Planned and Approved Developments: The route would cross through several lots associated with a planned residential development at the intersection of Nimmo Parkway and George Wythe Drive (The Enclave at Courthouse Landing) and pass in front of a new Veterans Care Center (currently under construction) along a new extension of Nimmo Parkway.
- Virginia Beach National Golf Course: The route would cross approximately 1,300 feet of the southern edge of the Virginia National Golf Course north of Nimmo Parkway.
- Limitations on Available Space for New Infrastructure: Multiple locations along the route have limited space for a new transmission line, including:
  - The area between Forefront Church and the Holland Woods subdivision along Holland Road;
  - Developed commercial lands along both sides of Nimmo Parkway east of Princess Anne Road, including the commercial center and parking lot at the Courthouse Marketplace shopping center; and
  - New or planned developments along Nimmo Parkway, including The Enclave at Courthouse Landing and the Veterans Care Center.

For the reasons listed above, the Princess Anne Municipal Center Alternative Route was eliminated from further consideration.

3.2.2 Line #271 Route Variation

ERM identified the Line #271 Route Variation to provide an alternative to HF Route 1 and the HF Hybrid Route where these routes would cross or pass between the Highland Meadows, Highland Acres, Indian River Woods, and Indian River Farms subdivisions along Dominion's existing ROW for Lines #271/I-74. Under the alternative scenario, Dominion would wreck and relocate Line #271 and install the relocated Line #271 and three new Overhead Transmission Circuits in a new corridor north of the existing ROW using double-circuit, monopole structures (to carry Line #271 and one Overhead Transmission Circuit) and single-circuit, monopole structures (to carry two Overhead Transmission Circuits) (Figure 3.2-2 in Appendix A, Figures).

Beginning at the point where HF Route 1 and the HF Hybrid Route would intersect Line #271/I-74 near the Princes Anne Athletic Complex, the route variation would follow an alternate alignment to the

west/southwest for about 2.0 miles, crossing a mix of private land and land owned by the City of Virginia Beach, and passing around or between the Highland Acres, Highland Parish, Dewberry Farm, Indian River Woods, and Indian River Farms subdivisions. The route variation would intersect Salem Road, City-owned parkland at the Dewberry Farms Parcel and Indian River Farms Park, and a tributary to North Landing River. The route variation would intersect and rejoin the HF Route 1/HF Hybrid Route alignment near the Virginia Beach/Chesapeake boundary.

Upon detailed study and comparison with the corresponding segment of HF Route 1 and the HF Hybrid Route, the following potential impacts were identified with this route variation:

- Creation of New, Greenfield ROW: The route variation would require a new greenfield ROW approximately 0.2 mile longer than the corresponding segment of HF Route 1 and the HF Hybrid Route. Because the route variation would replace the existing Line #271 ROW, there would be no use of existing transmission line corridor. This, together with its additional length, would disturb approximately 6.4 more acres than use of the existing Line #271 ROW along the HF Route 1 and HF Hybrid Route corridor. Land disturbed as a result of the new ROW required by this variation would be approximately 38.2 acres while the corresponding segment of HF Route 1 and the HF Hybrid Route would only require about 4.2 acres of new ROW. Additionally, while the route variation would cross less private land, the corresponding segment of HF Route 1 and the HF Hybrid Route would mainly be within existing ROWs, which would significantly reduce the amount of new ROW required on private lands.
- Crossing of Planned Subdivisions: The Line #271 Route Variation would cross one new planned development along Salem Road (i.e., the Salem Road Subdivision[5]), cross a potential future residential development identified by a landowner (i.e., Gum Swamp, LLC[6]), and require the purchase and removal of a rental home owned by the City of Virginia Beach.
- Visual Effects to Residences: The Line #271 Route Variation would pass within 100 feet of 32 residences and within 250 feet of 102 residences, whereas the corresponding segment of HF Route 1 and the HF Hybrid Route would pass within 100 feet of 31 residences and within 250 feet of 78 residences. While the route variation is a greenfield corridor, because it passes near Line #271, several houses along the route are also proximate to the existing transmission line. In fact, many of the same houses along the route variation are also along the corresponding segment of HF Route 1 and the HF Hybrid Route. Thirty of the 31 houses within 100 feet and 78 of the 102 houses within 250 feet of the Line #271 Route Variation are in areas near Line #271. Because of this, these residences would be near transmission infrastructure regardless of the route selected (though existing conditions would change with the relocation of Line #271). For the other houses near the Line #271 Route Variation (i.e., 1 house within 100 feet and 24 houses within 250 feet), the Overhead Transmission Circuits would represent a new impact.

  In contrast to the route variation, all of the houses near the corresponding segment of HF Route 1 and the HF Hybrid Route are in areas adjacent to the existing Line #271 corridor. The houses in this area (specifically where the corresponding segment of HF Route 1 and the HF Hybrid Route would pass through or between the Highland Meadows, Highland Acres, Indian River Woods, and Indian River Farms subdivisions) were built after the installation of Line #271. Construction along HF Route 1 and the HF Hybrid Route through this area would be a wreck-and-rebuild of Line #271 with the installation of additional double-circuit or single-circuit monopoles for the Overhead Transmission

[5] The developer of the Salem Road Subdivision has filed a development plan with the City of Virginia Beach. Based on the current development plan, the Line #271 Route Variation would cross an area of the development to be used for open space.

[6] The owner of the Gum Swamp, LLC parcel advised Dominion of the plan to subdivide and develop the property in the future; however, no development plan has been submitted to the City of Virginia Beach. The Line #271 Route Variation would cross the parcel along its southern boundary.

Circuits, mainly within the existing ROW. While this would result in a change in existing viewshed conditions, it would not be a new impact on the houses.

- Clearing of Forested Lands and Wetlands: The Line #271 Route Variation would require the clearing of 24.6 acres of forested lands, while the corresponding segment of HF Route 1 and the HF Hybrid Route would only clear 3.8 acres of forest. Similarly, the route variation would require the clearing of 22.0 acres of forested wetlands as part of its new ROW, while the corresponding segment of HF Route 1/HF Hybrid Route would only require the clearing of 7.6 acres along an existing ROW.

Because of the disadvantages and impacts of the Line #271 Route Variation described above when compared to HF Route 1/ HF Hybrid Route, Dominion eliminated this variation from further consideration.

3.2.3 Underground Crossings of the Intracoastal Waterway/North Landing River

The Intracoastal Waterway/North Landing River is a key constraint in the study area, as all potential transmission line routes between the Harpers Switching Station site or the Chicory Switching Station site and Fentress Substation would cross this feature. Moreover, a number of other constraints along the waterway narrow the range of potential crossing locations, including:

- Deed-restricted lands under the ownership of TNC along both sides of the waterway;
- Federal lands managed by the USACE along both sides of the waterway;
- The historical significance of the Intracoastal Waterway canal, which is listed in the NRHP as the Albemarle & Chesapeake Canal Historic District;
- Scenic values associated with the historic district and areas along North Landing River, which the VDCR has designated as scenic downstream (southeast) of the North Landing River Bridge; and
- Extensive forested wetlands and associated habitats on both sides of the waterway.

As discussed in Section 3.1, Onshore Transmission Circuit Routes and Associated Facilities, ERM identified three potential locations for an Overhead Transmission Circuit to cross the Intracoastal Waterway/North Landing River while avoiding or minimizing impacts on the constraints listed above to the extent practicable. The following locations were identified:

- Adjacent to Dominion's existing Lines #271/I-74 corridor (HF Route 1 and the HF Hybrid Route)
- Approximately 0.6 mile upstream (northwest) of the North Landing River Bridge (HF Route 2)
- Approximately 0.1 mile downstream (southeast) of the North Landing River Bridge (HF Route 5)

In addition to these overhead crossings, Dominion evaluated the feasibility of an underground crossing of the Intracoastal Waterway/North Landing River by HDD in the areas immediately upstream and downstream of the North Landing River Bridge.[7] If feasible, a successful HDD crossing would avoid tree clearing and other surface-disturbing activities in the area between the drill entry and exit sites on either side of the waterway/river. However, potential crossing locations for an HDD are limited by the constraints listed above, as well as the maximum possible length of an HDD installation of the cables required for each 230 kV circuit. This is approximately 4,000 linear feet, which is an estimate of the amount of cable that would fit on one cable spool. Longer crossings requiring multiple cable spools were not considered because they would require an inaccessible cable splice along the HDD, which the Company would not accept for reliability reasons. Other significant constraints include:

[7] An additional underground crossing adjacent to Dominion's existing ROW for Lines #271/I-74 was evaluated as part of an all-underground alternative route (see Section 3.2.5, All-Underground Route, and Appendix D, Assessment of All-Underground Route).

- The need to split the transmission circuits into six separate drills to complete the crossing (similar to the HDD described above for the HF Hybrid Route crossing of a wetland complex);
- Subsurface geotechnical conditions at the drill site, which could cause instability in the drill hole, potentially resulting in drill hole collapse and/or the inability to control the drill hole location;
- Risk of an inadvertent release of drilling fluid near the entry and exit locations for the HDD; and
- Challenges with drilling fluid management, containment, and cleanup due to the difficulty in accessing certain areas along the alignment.

Installation of the three proposed 230 kV circuits via HDD would require that HDD entry and exit locations be identified and developed prior to drilling. The HDD contractor would set up an entry drill pad on one side of the crossing to contain all the drilling equipment (e.g., drill rig, operations trailers, drilling fluid cleaning and containment tanks, and other drill materials). On the opposite side of the crossing, the contractor would set up an exit drill pad for fabricating the casing pull sections that would be pulled back through the drill hole. Typically, on a project that uses linear ROWs to approach and leave the drill area, the space cleared for the ROW can also be used to set up and fabricate the conduit pull sections.

In addition to the HDD entry and exit locations, the approaching Overhead Transmission Circuits would have to be transitioned to an underground configuration for the HDD, and then transitioned back to an overhead configuration on the opposite side of the crossing. For each transition, a permanent transition station would be required at both ends of the HDD. The transition stations would encompass approximately 10 to 12 acres, would be built on permanent gravel fill, and would be fenced. For a typical HDD, clearing of entry and exit sites is temporary; however, the need for permanent transition stations would require permanent clearing, with permanent fill required in graded or wetland areas.

Dominion identified a potential underground crossing location approximately 0.7 mile upstream of the North Landing River Bridge (see Figure 3.2-3 in Appendix A, Figures). Because of the length limitations described above, an underground crossing of the Intracoastal Waterway upstream of the bridge would require back-to-back HDDs to span the large forested wetland expanses on both sides of the waterway and to avoid nearby houses and other structures along both sides of North Landing Road. Two back-to-back HDDs, one measuring about 3,700 feet and the other about 3,500 feet in length, would require that a permanent underground splicing vault be built within forested wetland on the south side of the waterway to allow the electric conductor cables to be spliced together between each HDD. A permanent access road to the splicing vault would be required during operation of such underground facilities for inspection and maintenance purposes.

Dominion's contractor, Haley & Aldridge (H&A), conducted a geotechnical review of this potential crossing (see Attachment 2 to Appendix D, Assessment of All-Underground Route) and determined that a very high level of risk would be associated with the back-to-back drills at this location. H&A found that the subsurface in this area mainly consists of very loose to medium dense silty sands which could result in: (1) the potential for localized drill hole instability due to difficulty in drilling/steering; (2) increased risk of an inadvertent release of drilling fluid near the entry and exit locations; and, (3) challenges with drilling fluid management, containment, and cleanup. Technical and logistical constraints include: (1) the required clearance under critical features, such as the waterway, adjacent wetlands, and tree root systems; and, (2) the overall length of each crossing, which would be challenging for the installation of 48-inch-diameter conduit in the expected soil conditions (i.e., unstable muddy topsoil and very loose to medium dense silty sands in the subsurface).

On a scale of 1 to 10, with 10 being defined as "Not Feasible", H&A assessed the feasibility risks associated with a successful HDD crossing at this location as a 9, defined as "anticipate numerous issues with respect to crossing feasibility" because of the risks listed above. Dominion subsequently determined that this location for an underground crossing of the Intracoastal Waterway is not practicable or feasible

due to the geotechnical risks, lack of space on the north side of the crossing for a drill pad and permanent transition station outside forested wetlands, and the excessive length required to complete the crossing.

A second possible crossing location for an HDD immediately downstream of the North Landing River Bridge also was identified and assessed (Figure 3.2-3 in Appendix A, Figures). Dominion found a possible drill entry/transition station site on the north side of North Landing River/Intracoastal Waterway far enough from the waterbody to avoid riparian forested wetlands (as well as nearby homes along North Landing Road). However, the drill exit/transition station site on the south side of the river would have to be located within a forested wetland. Additionally, the transition station would require a permanent access road from Mt. Pleasant Road in a wetland area. Because the south side of the river consists of extensive forested wetlands, impacts on wetlands could not be avoided in this area.

As with the first potential crossing site, Dominion investigated the possibility of back-to-back HDDs at this location to avoid having a permanent transition station in the forested wetlands on the south side of the river. Similar to the site upstream of the bridge, the forested wetlands in this area are too extensive to accommodate a second, back-to-back, approximately 4,000-foot-long HDD. A second HDD connected directly to the first would not be long enough to cross the forested wetland area and would still require locating a transition station within wetlands. Additionally, a manhole/splicing vault at the cable splice location would be required, effectively increasing the amount of wetland clearing, grading, and filling within the forested wetland complex.

Finally, an additional constraint associated with an underground HDD crossing immediately downstream of the North Landing River Bridge is the future plan by the USACE to replace the bridge just downstream of its current location.[8] While planning is not yet complete, review of the preliminary design suggests that the locations of pilings for the future new bridge would prohibit an HDD at this location.

For the reasons described above, Dominion concluded that an underground crossing of the North Landing River/Intracoastal Waterway in the vicinity of the North Landing River Bridge is not practical, feasible, or viable and eliminated this option from further consideration.

3.2.4 Additional Hybrid Route Alternatives

In addition to the HF Hybrid Route described in Section 3.1.2.4, ERM identified and evaluated two additional hybrid route alternatives for the onshore transmission line (Hybrid Routes 10 and 11) (Figures 3.2-4 and 3.2-5 in Appendix A, Figures). These routes would use portions of city streets, road shoulders, and road medians, within which conduit and cables could be trenched and buried through the densely populated sections of eastern Virginia Beach (generally, the area east of Holland and West Neck roads and north of Indian River Road). Starting at a common point at the junction of Oceana Boulevard and Harpers Road in Virginia Beach, the routes initially would head generally south in an underground configuration toward Pungo. Once past the developed lands and residential subdivisions in this area (e.g., Dam Neck Corner, Upton Estates, South Shore Estates, Woodhouse Corner, Nimmo, and Red Mill Farms), the routes would transition to overhead configurations and continue west to Fentress Substation.

3.2.4.1 Hybrid Route 10

Beginning at the intersection of Oceana Boulevard and Harpers Road, the underground segment of Hybrid Route 10 would head west for about 1.1 miles along the north side of Harpers Road similar to the CLH Route. It would then continue about 1.8 miles to the south along the same alignment as HF Routes 1, 2, and 5, crossing Harpers and Dam Neck roads. After passing west of the Mayberry subdivision, Hybrid Route 10 would turn east and enter London Bridge Road. It would continue to the east/southeast

[8] For additional information on the future bridge replacement project, see Section 4.2.7.14, North Landing Bridge Replacement.

within London Bridge Road for about 0.7 mile, then head southeast within Strawbridge Road for about 0.6 mile to an intersection with General Booth Boulevard. Hybrid Route 10 would enter General Booth Boulevard and continue within this road for about 0.4 mile to the south/southwest to an intersection with Princess Anne Road. It would enter Princess Anne Road and continue within the road for about 3.7 miles to the south, passing through the village of Pungo. The route would then leave the road and head east for about 0.3 mile to a new switching station site south of North Muddy Creek Road and transition from an underground to an overhead configuration.

The overhead segment of Hybrid Route 10 would exit the switching station site and continue for about 2.0 miles to the south/southwest across agricultural fields and wooded areas, crossing Princess Anne and West Neck roads, and intersecting Dominion's existing Line #2085 corridor at the West Landing Substation. It would then follow Line #2085 for about 4.0 miles to the west and north crossing mostly forested lands on the northeast side of North Landing River, as well as West Neck Creek and associated wetlands. The route would leave the Line #2085 corridor and head about 2.2 miles west, crossing the Intracoastal Waterway canal at a point approximately 0.4 mile northwest of the North Landing River Bridge. On the south side of the Intracoastal Waterway, the route would then follow the same alignment as HF Route 2 for 6.1 miles to Fentress Substation.

3.2.4.2 Hybrid Route 11

Starting at the junction of Oceana Boulevard and Harpers Road, the underground segment of Hybrid Route 11 initially would head south/southeast for 0.6 mile along the east side of Oceana Boulevard, then cross over to follow the east side of Eaglewood Drive for about 0.3 mile. It would then enter General Booth Boulevard and head south for about 0.1 mile to Dam Neck Station Road. It would head east for about 0.2 mile along the south side of Dam Neck Station Road, then southeast for about 0.2 mile across an open field to the intersection of Dam Neck Road and Upton Drive. From here, Hybrid Route 11 would continue south for 2.6 miles within Upton Drive, passing through residential areas and crossing several roads, including but not limited to, Old Dam Neck Road, Culver Lane, Nimmo Parkway, and Elson Green Avenue. It would enter Sandbridge Road and continue south/southeast for about 2.0 miles, where it would enter Flanagan's Lane and head west for about 0.2 mile. It would enter and continue within Ashville Park Boulevard for about 0.2 mile to the south. Hybrid Route 11 would then leave Ashville Park Boulevard and continue south for about 0.8 mile across a mix of forested and agricultural lands to a transition station site north of Indian River Road, where the route would change from an underground to an overhead configuration.

The overhead segment of Hybrid Route 11 would exit the transition station site to the south and continue for about 1.5 miles to the southwest across a mix of agricultural and forested parcels. This route segment would cross Indian River and North Muddy Creek roads. It would then intersect Hybrid Route 10 and follow the same alignment as Hybrid Route 10 (including the crossing of the Intracoastal Waterway) for approximately 14.3 miles to Fentress Substation.

3.2.4.3 Hybrid Routes 10 and 11 Analysis

Both Hybrid Routes 10 and 11 were identified in an attempt to find an underground hybrid route solution from the NAS Oceana area through the more congested eastern portion of Virginia Beach to areas where the landscape is less developed, providing more routing opportunities for an overhead transmission configuration. Each route would require construction within existing roadways to utilize existing ROWs through developed areas. As the underground portions of these routes were examined more closely, however, several issues that would impact their viability became apparent.

- Traffic Impacts and Accessibility: Underground construction of the three 230 kV circuits proposed for the Overhead Transmission Circuits would require ROWs measuring 65 feet wide in greenfield areas and 45 feet wide within roadways for trench excavation and installation of conduits and cable. For route segments within major roadways (e.g., General Booth Boulevard, London Bridge Road, Princess Anne Road, Upton Drive, and Sandbridge Road), at least one lane of traffic (and possibly the entire roadway, including median, depending on the extent of existing utilities within the roadway) would be subject to rolling temporary closures during construction. In divided four-lane highways, two of four lanes would likely be closed with detours to reroute traffic. In smaller roads, the entire roadway would have to be closed in places where there is no room for workspace adjacent to the road.

  Because all of the roadways along the two routes are part of major commuter corridors, traffic impacts on the Virginia Beach commuter population would be significant. Impacts could also occur during construction due to reduced accessibility to the significant number of businesses along General Booth Boulevard, London Bridge Road, and Princess Anne Road, and to residential subdivisions along Upton Drive and Sandbridge Road.

- Existing Underground Utilities: Dominion requested and received from the City of Virginia Beach georeferenced location data for City-owned underground utilities (water and sewer lines) in the roadways considered for underground cable corridors. Review of this data showed that all major roadways in the routing analysis contain major trunk lines and/or feeder laterals to provide local water and sewer service in these areas. Construction in areas with utilities could require a wider ROW and/or removal and relocation of the existing utilities, either of which would result in more disruption to the roadway during construction.

Because of the congested nature of the roadways considered as potential routing corridors (i.e., the limited space for in-road construction, high density commercial and residential development adjacent to the roads, local traffic use and patterns, particularly during commuting, and potentially significant impacts on existing utilities in these areas), Dominion concluded that it would not be practical or feasible to use these existing corridors for the underground segments of a transmission corridor containing three 230 kV circuits. For these reasons, Hybrid Routes 10 and 11 were eliminated from further consideration.

It should be noted that early in the routing process, Dominion considered several other conceptual alternative corridors for underground segments using portions of the same roadways as Hybrid Routes 10 and 11. No feasible alternative routes that resolved the issues described above were identified, however, and the conceptual alternative corridors were abandoned.

3.2.5 All-Underground Route

ERM identified and evaluated an all-underground route alternative between the Harpers Switching Station site and the Fentress Substation using essentially the same alignment as HF Route 1. The All-Underground Route would include several HDD and microtunnel crossings, including the crossing of the Intracoastal Waterway canal. A comparison of these two routes addressing engineering design, equipment needs, construction schedule, environmental impacts, and cost is provided in Appendix D, Assessment of the All-Underground Route. Based on this analysis, the Company concluded that the additional materials and equipment, construction risks associated with HDD and microtunnel installations, impacts on sensitive lands and environmental resources (including the placement of permanent fill in wetlands), cost, and time to construct associated with the All-Underground Route make this alternative not practicable or feasible. For these reasons, the All-Underground Route was eliminated from further consideration.

3.2.6 Oceana Switching Station Site

Early in the routing process for the onshore Virginia Facilities, and in coordination with USN staff, the Company identified a potential site for the proposed switching station on USN lands at NAS Oceana east of Oceana Boulevard (Figure 3.2-6 in Appendix A, Figures). Like the Harpers Switching Station, the switching station at this site, referred to as the Oceana Switching Station, would be dual purpose: (1) to consolidate the nine Onshore Export Circuits down to three transmission circuits; and (2) to transition the transmission line from an underground to an overhead configuration. Because all potential Overhead Transmission Circuit routes exiting the Oceana Switching Station would have to cross through areas within and around NAS Oceana designated as APZ 1 under the USN's AICUZ program, this switching station location was found to be not practicable or feasible because overhead transmission lines are not permitted in APZ 1 designated areas.[9] Dominion subsequently considered an alternative design where the transmission line would exit the Oceana Switching Station in an underground configuration and continue to a separate transition station at a site south of Harpers Road, where overhead transmission circuits could exit from the transition station without crossing APZ 1. This two-station scenario would result in an additional approximately 10.0 acres of impact and cost approximately $55 million more to construct relative to a one-station design. For this reason, Dominion abandoned the Oceana Switching Station in favor of the Harpers Switching Station discussed in Section 3.1.3, Switching Station.

3.3 Structure Types and Right-of-Way Widths

3.3.1 Underground Transmission Configuration

The ROW for underground segments installed by surface trenching would measure 65 feet wide with duct banks for each circuit installed within three parallel trenches excavated within the corridor. Where manholes/splicing vaults are installed, the width of the ROW would expand to 86 feet. For underground segments installed by HDD or microtunnel, the duct banks would transition to five or six individual drills/tunnels in ROWs measuring between 200 feet and 250 feet wide (Figure 3.3-1 in Appendix A, Figures).

3.3.2 Overhead Transmission Configuration

With some exceptions (for example, see Sections 3.3.2.4 and 3.3.2.5, below, regarding the wreck and rebuild of Lines #271 and #2240, respectively), Dominion typically would use sets of three single-circuit, monopole structures for the overhead portion of the onshore transmission line to carry the three new Overhead Transmission Circuits from the proposed switching station to Fentress Substation (see Appendix E, Structure Types). The new structures would be composed of weathering steel (COR-TEN®) with heights ranging from 75 to 170 feet and an average height of 120 feet. Structures would be installed at all points of intersection and along tangents with spans typically ranging between 700 and 900 feet.[10] The configuration of the new structures and associated ROW requirements would vary between route segments requiring all new ROW (greenfield) and route segments that would be collocated with existing Dominion overhead transmission lines, as described below.

3.3.2.1 Greenfield Areas

The typical construction and operational ROW for all routes in greenfield areas would measure 140 feet wide (Figure 3.3-2 in Appendix A, Figures) with one exception. The ROW for the Line #2085 Route

[9] As noted in Section 3.1.1.2, Cable Landing to Harpers Route, overhead electric transmission lines are a prohibited land use in APZ 1.

[10] Spans could be greater or less than typical based on site-specific conditions.

Variation would be 250 feet wide at the crossing of the Intracoastal Waterway canal due the crossing length and need to use H-frame structures rather than monopole structures at this location.

3.3.2.2 Collocation with Lines #2118/147

HF Routes 1, 2, and 5 would each collocate with the existing Lines #2118/147 for approximately 1.8 miles in Virginia Beach. The existing ROW for Lines #2118/147 is 120 feet wide. An additional 105 feet of new ROW on either the north or south sides of the existing corridor would be required to accommodate the three single-circuit, monopole structures proposed for the Overhead Transmission Circuits, for a total expanded ROW width of 225 feet (Figure 3.3-3 in Appendix A, Figures). Construction of the Overhead Transmission Circuits would use the additional 105 feet of expanded ROW plus 35 feet of the existing ROW.

3.3.2.3 Collocation with Line #2085

HF Route 5 and the Line #2085 Route Variation would each collocate with the existing Line #2085 for approximately 2.8 miles in Virginia Beach. The existing ROW for Line #2085 is 120 feet wide. An additional 90 feet of new ROW on the west side of the existing corridor would be required to accommodate the three single-circuit structures proposed for the Overhead Transmission Circuits, for a total expanded ROW width of 210 feet (Figure 3.3-4 in Appendix A, Figures). Construction of the Overhead Transmission Circuits would use the additional 90 feet of expanded ROW plus 50 feet of the existing ROW.

3.3.2.4 Wreck and Rebuild Line #271

HF Route 1 and the overhead portion of the HF Hybrid Route would each collocate with Dominion's existing ROW for Lines #271/I-74 for about 1.7 miles in Virginia Beach and 4.4 miles in Chesapeake. In these areas, Dominion would wreck the existing double-circuit lattice structures for Lines #271/I-74 and replace them with new double-circuit monopole structures to carry Line #271 and one CVOW Project circuit. Dominion additionally would either install new single-circuit or double-circuit monopole structures to carry the two remaining Overhead Transmission Circuits.

The existing ROW for Lines #271/I-74 is 120 feet wide. In most places, an additional 40 feet of new ROW would be needed for the Overhead Transmission Circuits for a total expanded ROW width of 160 feet, with the additional 40 feet generally be on the west side of the existing corridor (Figure 3.3-5 in Appendix A, Figures). The Overhead Transmission Circuits would typically utilize sets of two new single-circuit monopole structures in addition to the rebuilt double-circuit monopole structures for Line #271. Construction of the Overhead Transmission Circuits would use the existing 120-foot-wide ROW plus the 40 feet of expanded ROW.

There are three exceptions to the typical configuration for the wreck and rebuild segment of Lines #271/I-74, discussed below:

- Existing residential development would preclude the expansion of the existing ROW for Lines #271/I-74 at the following locations in Virginia Beach: (1) where the routes would cross the Highland Acres and Highland Meadows subdivisions (approximately 0.5 mile in the area between Salem Road and Highland Drive) and (2) where the routes would cross the Dewberry Farms, Indian River Woods, and Indian River Farms subdivisions (approximately 0.5 mile in the area between North Landing River and the Virginia Beach/Chesapeake boundary). In these two places, the ROW would be limited to the existing 120-foot width for Lines #271/I-74 (Figure 3.3-6 in Appendix A, Figures) (i.e., no new ROW would be needed). The existing double-circuit lattice structures would be wrecked and replaced with two double-circuit monopole structures (one to carry Line #271 and one Overhead Transmission Circuit) and another to carry two Overhead Transmission Circuits).

- Where HF Route 1 and the HF Hybrid Route would cross Mt. Pleasant Road in Chesapeake, a non-typical structure or structure configuration will be used along a 0.3-mile-long segment within the existing 120-foot-wide ROW to avoid impacts on a home.
- Where HF Route 1 and the HF Hybrid Route would cross the Bedford Solar Center, the additional 40 feet of new ROW would be on the east side of the existing ROW for an approximately 0.4-mile-long segment in the area immediately north of the existing Pocaty Substation.[11] Dominion would use the entire width of the existing ROW (120 feet) plus the additional 40 feet of new ROW for construction of the Overhead Transmission Circuits.

3.3.2.5 Wreck and Rebuild Line #2240

For route segments adjacent to Lines #2240/I-74, Dominion is proposing to wreck and rebuild the existing Line #2240 double-circuit structures with new double-circuit, monopole structures, and construct two new single-circuit structures for a total of three new structures. The new double-circuit structures would carry Line #2240 and one of the new Overhead Transmission Circuits. The two new single-circuit structures would each carry one new Overhead Transmission Circuit.

The existing ROW for Lines #2240/I-74 is 120 feet wide. An additional 40 feet of new ROW would be required for the Overhead Transmission Circuits for a total expanded ROW width of 160 feet.[12] The additional 40 feet would be on the east side of the existing ROW between the Pocaty Substation and Whittamore Road. From Whittamore Road south to the Fentress Substation, the additional 40 feet of new ROW would be on the west side of the existing ROW. Construction of the Overhead Transmission Circuits would use the existing 120-foot-wide ROW plus the 40 feet of expanded ROW.

3.4 Construction, Operation, and Maintenance Processes

Construction of the new transmission line, the wreck-and-rebuild of a portion of Line #271, and the wreck-and-rebuild of Line #2240 may involve some or all of the following steps:

1. Detailed survey of the route alignment
2. ROW acquisition and clearing
3. Construction of access roads, where necessary
4. Surface trenching and trenchless installations (underground segments)
5. Installation of tower foundations (overhead segments)
6. Assembly and erection of new structures and/or removal of existing structures (overhead segments and rebuilds)
7. Construction of temporary power lines (rebuilds)
8. Stringing and tensioning of the conductors (overhead segments)
9. Final cleanup and land restoration

For the underground transmission line segments installed by surface trenching, Dominion would excavate three parallel trenches, each measuring approximately 7.75 feet deep by 5.25 feet wide. Duct banks and associated cables would be installed within each trench with a minimum of 3 feet of cover. Most backfill in the trenches would consist of non-native materials, including crushed rock in the trench bottom,

[11] For additional information on the Bedford Solar Center development, see Section 4.2.7.15, Bedford Solar Center.

[12] The typical ROW configuration for route segments adjacent to Line #2240 would be identical to the typical ROW segments adjacent to Line #271 as shown on Figure 3.3-5 in Appendix A, Figures).

3,000 pounds per square inch concrete around the duct bank, flowable thermal backfill in the top half of the trench up to about 1 foot below the surface, and excavated spoil or topsoil at the surface. Excavated spoil not used in backfilling/restoration (i.e., most of the excavated material) would be hauled off to an appropriate disposal location.

Manholes/splicing vaults would be installed in each trench at approximately 2,500-foot intervals. A typical manhole/splicing vault would be constructed of pre-cast reinforced concrete and measure approximately 27 feet long by 11 feet wide by 9 feet high. The manholes would provide access to the splicing vaults for periodic maintenance.

The CLH Route would require two HDD installations and the underground portion of the HF Hybrid Route would require one HDD and two microtunnel installations. HDD is a trenchless installation method for underground utilities that involves drilling a small-diameter pilot hole along a predetermined path, enlarging the pilot hole to the required diameter, and pulling a prefabricated segment of conduit through the hole. Microtunneling is a trenchless installation method for underground utilities that involves excavating a tunnel while simultaneously pulling a prefabricated segment of conduit through the tunnel. In both HDD and microtunnel installations, drilling fluid is used to return cuttings to the drill/microtunnel entry site.

For the underground portions of the Virginia Facilities, five or six individual drills would be required at each HDD location and six individual tunnels would be required at each microtunnel location to accommodate the required circuits. Conduits and associated cables would be installed through each drill/tunnel as appropriate. The maximum depth of the HDDs would range from about 70 to 95 feet with the maximum depth of the microtunnels ranging from 30 to 35 feet.

For the Overhead Transmission Circuits, all required materials for the proposed 230 kV structures would be delivered and assembled at each structure location in the ROW. Detailed foundation design would not be completed until prior to construction. Depending on soil conditions, the foundation design could include poured concrete that requires excavation or steel piles or caissons that might be vibrated, drilled, or driven into place. Structures would be erected with a crane and anchored to the foundation during final assembly. Any excess soil from foundation construction would be evenly distributed at each structure and the soil replanted and stabilized. In wetland areas, excess soil would be removed and evenly distributed on an upland site within Dominion's ROW.

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

ROW maintenance is essential for the reliable operation of the transmission line as well as public safety. Operation and maintenance of the line would consist of periodic inspections of the line and the ROW; occasional hardware replacement as necessary; periodic vegetation clearing, either mechanically or by selective, low-volume application of approved herbicides to vegetation within the corridor; and the cutting of danger trees outside the ROW for overhead transmission segments. Danger trees are trees outside the cleared corridor that are sufficiently tall to potentially strike the transmission line should the trees fall into the ROW. Periodic inspections would occur on a regular basis and use both aerial and walking patrols. Normal operation and maintenance would be conducted by Dominion or its contractors on a regular cycle.

4. EXISTING ENVIRONMENT

Once the study area for the onshore Virginia Facilities was defined, ERM developed a list of routing criteria to help guide the routing process and provide a basis for comparing potential transmission line routes (see Table 2.2-1). ERM inventoried existing conditions, routing constraints, and routing opportunities using information obtained from publicly available GIS databases; agency websites and databases; published documents, such as municipal land use plans; communications with agency and city staff and other stakeholders; and input from landowners. In instances where GIS data were not available for a particular resource or other feature, ERM obtained the best available hard-copy or online map and hand-digitized the information needed to complete the study.

Existing environmental conditions along the overhead and hybrid routes are discussed in the following sections. The potential environmental impacts of the onshore Virginia Facilities on these existing conditions are discussed in Section 5.0, Affected Environment.

4.1 Land Ownership

ERM quantified information on land ownership in the study area using publicly available GIS databases and digital tract data obtained from the City of Virginia Beach and City of Chesapeake. These data indicate that a majority of the lands crossed by the transmission line alternative routes are privately or city-owned with smaller crossings of federal and Commonwealth-owned lands as well as conservation easements and existing ROWs. Figure 4.1-1 in Appendix A, Figures, depicts land ownership along each alternative route.

4.1.1 Federal Lands

4.1.1.1 Naval Air Station Oceana/Dam Neck Annex

NAS Oceana is a large active naval station in the northern portion of the City of Virginia Beach. It encompasses about 5,331 acres with an additional 3,850 acres of restrictive easements, including encroachment and partnering easements, held on nearby private or City lands surrounding the base. Of the four runways at the station, three measure 8,000 feet and one measures 12,000 feet (Navy 2014). NAS Oceana is the USN's East Coast Master Jet Base and is home to 17 aviation squadrons. In addition to the runways, NAS Oceana contains maintenance facilities, office buildings, military housing, other ancillary buildings, and the Aeropines Golf Course (Navy 2021a).

Dam Neck Annex is a training facility located along 3.2 miles of the Atlantic Ocean coastline, occupying 1,372 acres. The Annex is under the operational control of NAS Oceana and includes training facilities, military housing, a rifle range, and office buildings. NAS Oceana and Dam Neck Annex typically have a combined population of approximately 25,000 people at any given time, which includes active military personnel, family members, and civilian staff (Navy 2021b).

The CLH Route would cross NAS Oceana and Dam Neck Annex. Short segments of HF Routes 1, 2, and 5 and the HF Hybrid Route would each cross NAS Oceana. The Harpers Switching Station would be built at NAS Oceana on the north side of Harpers Road and along the southern edge of the Aeropines Golf Course.

4.1.1.2 Naval Auxiliary Landing Field Fentress

NALF Fentress is a military airport in the City of Chesapeake, located approximately 7 miles southwest of NAS Oceana. It occupies about 2,560 acres, with an additional 8,980 acres of restrictive easements and 641 acres of encroachment easements held on nearby private or City lands around the base (Navy

2014). The facility is located south of the Intracoastal Waterway/Albemarle & Chesapeake Canal and the Chesapeake City boundary.

NALF Fentress is under the operational control of NAS Oceana. It is an active military airport with one 8,400-foot runway. The airport is primarily used to support USN and Marine Corps day and night field carrier landing practice operations. NALF Fentress had four additional runways constructed during World War II in the northern portion of the property, but those runways are now closed and abandoned (Navy 2014).

HF Route 5 would cross NALF Fentress.

4.1.1.3 U.S. Army Corps of Engineers

The USACE owns parcels along the north and south sides of the Intracoastal Waterway canal (as well as the canal itself) between Virginia State Route 168 (Great Bridge Bypass) to the west and Virginia State Route 165 (North Landing Road) to the east. The USACE manages the waterway, which is mainly used for commercial vessel traffic but also used for recreational boating. Part of the waterway and adjacent lands are located within the Albemarle & Chesapeake Canal Historic District, which is listed on the NRHP.[13] The district extends between Great Bridge Lock, which is operated by the City of Chesapeake, and the North Landing River Bridge, which is maintained by the USACE (USACE 2018a).

HF Routes 1, 2, and 5, the HF Hybrid Route, and the Line #2085 Route Variation would each cross USACE lands along or near the Intracoastal Waterway.

4.1.2 Commonwealth of Virginia

4.1.2.1 State Military Reservation

The SMR (formerly Camp Pendleton) is a Virginia Army National Guard facility on the shoreline of Virginia Beach just north of the USN's Dam Neck Annex. The SMR serves as a training installation for all four branches of the military for both active and reserve personnel. The reservation contains barracks, a headquarters office, rifle range, and facilities building (VDHR 2005). The base is part of the Camp Pendleton Historic District, which is listed on the NRHP.[14]

The Cable Landing Location would be located on the SMR and the CLH Route would cross it.

4.1.3 Local Government

4.1.3.1 City of Virginia Beach

The City of Virginia Beach owns multiple land parcels throughout the study area. South and west of NAS Oceana is a relatively large area described in the 2016 Virginia Beach Comprehensive Plan as the ITA (City of Virginia Beach 2016a). The City of Virginia Beach purchased multiple tracts of undeveloped lands in the ITA to control development within the jet flight path, a high-noise-level area between NAS Oceana and NALF Fentress. HF Routes 1, 2, and 5, the HF Hybrid Route, and the Line #2085 Route Variation would each cross City-owned parcels in this area.

Other holdings by the City include parcels acquired for construction of the SEPG, a once proposed 21-mile-long transportation corridor studied by VDOT and the FHA to address traffic congestion between

[13] For additional information on the historic district, see Section 4.5, Cultural Resources and Appendix H, Stage 1 Pre-Application Analysis of Cultural Resources.

[14] For additional information on the historic district, see Section 4.5, Cultural Resources and Appendix H, Stage 1 Pre-Application Analysis of Cultural Resources.

Virginia Beach and Chesapeake. The corridor studied for the project extended between the interchange of Interstates 64 and 464 in Chesapeake and Interstate 264 east of NAS Oceana in Virginia Beach. While the project was canceled, the City of Virginia Beach continues to review other options for transportation and recreational uses along the corridor. Portions of the CLH Route, HF Routes 1, 2, and 5, and the HF Hybrid Route are within the SEPG corridor.

The study area includes several City-owned parks, including several large ones, such as North Landing Park, Princess Anne Athletic Complex, Virginia Beach Sportsplex, and the U.S. Field Hockey National Training Center and Hockey Complex. Other less developed City parks in the routing area include Pine Ridge Park, Highland Meadows Park, and Holland Pines Park. City parkland would be crossed by all of the routes discussed in this study.

Other City-owned lands in the study area include large, wooded lots as well as large agricultural and forested land holdings southwest of the Virginia Beach National Golf Course.

4.1.3.2 City of Chesapeake

The City of Chesapeake owns lands north and south of the Intracoastal Waterway that are largely undeveloped open space and parkland. These parcels are within the heavily transited airspace area between NAS Oceana and NALF Fentress. HF Routes 1 and 2 and the HF Hybrid Route would each cross City parcels in areas adjacent to existing Dominion transmission ROWs (for Line #271/I-74 and/or Lines #2240/I-74).

4.1.4 The Nature Conservancy

TNC owns approximately 7,500 acres of land in multiple parcels collectively known as the North Landing Preserve along and near the Intracoastal Waterway / Albemarle & Chesapeake Canal. These lands provide habitat for rare plants and other species. The preserve contains tidal marshes and is a stopover point for migratory birds (TNC 2021). HF Route 1 and the HF Hybrid Route would each cross TNC lands adjacent to Dominion's existing ROW for Lines #271/I-74.

4.1.5 Private

Private lands in the vicinity of the various route alternatives include high-density residential development south and west of NAS Oceana and throughout Virginia Beach, agricultural parcels in the rural area south of the Intracoastal Waterway and around NALF Fentress, and pockets of undeveloped lands throughout. Each route discussed in this study would cross private lands.

4.2 Land Uses

4.2.1 Land Use/Land Cover

Land use and land cover within the study area were classified using a combination of local and state-wide datasets as well as aerial photo interpretation to identify the most current uses for a given area. Land use and land cover can be broken down into the following five main categories:[15]

- Developed Lands: These are areas characterized by medium- to high-density constructed buildings, such as certain residential subdivisions and commercial areas, and impervious surfaces. Additional information on residences and residential areas near the alternative transmission line routes is provided in Section 4.2.3, Residences, Residential Areas, and Commercial Structures.

[15] For purposes of land use/land cover, wetland areas have been classified as open space, forested land, or open water. Wetlands near the routes are discussed separately in Section 4.3.1, Wetlands.

- Open Space: These are areas primarily covered by planted grasses, including vegetation planted in developed settings for erosion control or aesthetic purposes, but also natural herbaceous vegetation and undeveloped land, parks, and open space recreational facilities. Additional information on recreation areas near the routes, including parks, golf courses, and trails, is provided in Section 4.2.2, Recreation Areas.
- Forested Lands: These are areas where land cover consists of natural or maintained woody vegetation. Additional information on forested lands near the routes is provided in Section 4.3.5.1, Forested Land.
- Agricultural Lands: These are areas used for commercial farming (e.g., commercial row crops or specialized agricultural activities) or grazing. Additional information on agricultural lands near the routes is provided in Section 4.2.4, Agricultural Areas.
- Open Water: These are open water features, including rivers, streams, lakes, canals, waterways, reservoirs, ponds, bays, estuaries, and ocean. Additional information on open water features near the routes is provided in Section 4.3.2, Waterbodies.

Figure 4.2-1 (Appendix A, Figures) depicts land use/land cover in the study area. Each of the land use/land cover categories described above would be crossed by the routes discussed in this report.

4.2.2 Recreation Areas

ERM reviewed digital datasets and maps, U.S. Geological Survey (USGS) topographic quadrangles, recent (2020) digital aerial photography, and city websites to identify recreation areas (i.e., parks, golf courses, trails, and other recreational facilities) in the study area. Figure 4.2-2 (Appendix A, Figures) depicts those recreation areas located within 0.25 mile of the alternative routes and other facilities discussed in this report. Descriptions of these recreation areas are provided in the subsections below.

4.2.2.1 Parks

ERM identified parks in the study area based on digital data obtained from the City of Virginia Beach and City of Chesapeake (City of Virginia Beach 2019b; City of Chesapeake 2021a). Eighteen parks are located within 0.25 mile of the alternative routes and other facilities discussed in this report. Descriptions of these parks are provided in Table 4.2-1, which is organized based on the following park classifications used by the City of Virginia Beach: *Neighborhood Parks, General Open Space Parks, Open Space Preservation Areas,* and *Sport Facilities/Athletic Fields*. The City of Chesapeake does not assign specific classifications to their parks, but all parks owned by the City within 0.25 mile of the alternative transmission line routes could be categorized as neighborhood parks using the Virginia Beach classification system.

The City of Virginia Beach (2016b) defines the different park classifications as follows:

- Neighborhood Parks are areas that provide for basic outdoor recreational facilities and may include athletic fields; basketball, tennis, and/or volleyball courts; playground equipment; open play areas; benches; and small shelters.
- General Open Space Parks provide a natural setting within the larger urban environment.
- Open Space Preservation Areas encompass dense forested areas for preservation of natural resources.
- Sport Facilities/Athletic Fields are parks designed for team sporting activities, such as field hockey, baseball/softball, soccer, and other team sports.

Of the 18 parks within 0.25 mile of the alternative transmission line routes, nine are classified as neighborhood parks, five as open space parks, one as an open space preservation area, and three as sporting facilities/athletic fields. All but two parks (Etheridge and Emerald Lakes parks) are located in the Virginia Beach. The parks are generally associated with residential subdivisions along and near the routes in the area between Dam Neck and Indian River roads in Virginia Beach. The three parks classified as sports facilities/athletic fields (Virginia Beach Sportsplex, U.S. Field Hockey Complex, and Princess Anne Athletic Complex) together encompass more than 600 contiguous acres in the Princess Anne Commons area of Virginia Beach, generally south and west of Princess Anne Road and south of Dam Neck Road.

Nine parks (Owl Creek Preservation Area, Holland Pines Park, Woods of Piney Grove Park, Highland Meadows Park, Virginia Beach Sportsplex, U.S. Field Hockey Complex, Princess Anne Athletic Complex, Dewberry Farms Parcel, and Indian River Farms Park) would be crossed by one or more of the alternative transmission line routes or route variations discussed in this study. One additional park (Pine Ridge Park) would be adjacent to the ROWs for several routes. None of the other parks described in Table 4.2-1 would be crossed by or near to the onshore Virginia Facilities; these parks are not discussed further in this study.

Table 4.2-1: Parks within 0.25 Mile of an Alternative Transmission Line Route or Facility

Name	Park Description	Approximate Distance and Direction from each Alternative Route or Facility
Neighborhood Parks		
Pine Ridge Park	This is a 4.1-acre park in the northwest corner of the Pine Ridge subdivision north of the intersection of Piney Woods Lane and Forest Brook Circle in Virginia Beach. It contains a playground and basketball court as well as areas of woodland and marshland.	HF Route 1: Adjacent to the ROW from MPs 1.9 to 2.0 HF Route 2: Adjacent to the ROW from MPs 1.9 to 2.0 HF Route 5: Adjacent to the ROW from MPs 1.9 to 2.0 HF Hybrid Route: Adjacent to the ROW from MPs 2.1 to 2.2
Lake Placid Park	Located at the intersection of London Bridge Road and Mirror Lake Drive on the east side of the Lake Placid subdivision in Virginia Beach, this park encompasses 5.1 acres of wetland and marshland and has two tennis courts and a playground.	Dam Neck Route Variation: 525 feet south of MP 1.4
Rolling Woods Park	This park encompasses about 59.3 acres of marshland north of Nimmo Parkway and east of the Hollands Wood and Rollingwood subdivisions in Virginia Beach.	HF Route 1: 800 feet south of MP 2.9 HF Route 2: 800 feet south of MP 2.9 HF Route 5: 800 feet south of MP 2.9 HF Hybrid Route: 800 feet south of MP 3.1
Buyrn Farms Park	Located north of the intersection of Buyrn Circle and Calm Wood Lane and east of the Buyrn Farm North subdivision in Virginia Beach, this park encompasses 5.0 acres of wetland and marshland.	HF Route 1: 250 feet south of MP 3.4 HF Route 2: 250 feet south of MP 3.4 HF Route 5: 250 feet south of MP 3.4 HF Hybrid Route: 250 feet south of MP 3.6
Landstown Meadows Park	Located west of Holland Road near the Landstown Meadows subdivision in Virginia Beach, this park encompasses	HF Route 1: 600 feet north of MP 4.0 HF Route 2: 600 feet north of MP 4.0 HF Route 5: 600 feet north of MP 4.0 HF Hybrid Route: 600 feet north of MP 4.2

Name	Park Description	Approximate Distance and Direction from each Alternative Route or Facility
	about 4.9 acres of woodland and a playground.	
Woods of Piney Grove	This park encompasses 1.8 acres of open field and some forest within the Woods of Piney Grove subdivision, south of Damascus Trail and west of Holland Road, in Virginia Beach. Dominion's existing Lines #2118/147 cross the park.	HF Route 1: Crossed from MPs 4.0 to 4.1 HF Route 2: Crossed from MPs 4.0 to 4.1 HF Route 5: Crossed from MPs 4.0 to 4.1 HF Hybrid Route: Crossed from MPs 4.2 to 4.3 Chicory Switching Station: 800 feet northeast of the facility
Highland Meadows Park	This park encompasses about 4.4 acres of mostly forested wetland east of Highland Meadows Way in the Highland Meadows subdivision of Virginia Beach. Dominion's existing Lines #271/I-74 cross the northwest corner of the park.	HF Route 1: Crossed from MPs 6.7 to 6.8 HF Hybrid Route: Crossed from MPs 6.9 to 7.0
Etheridge Park	The park encompasses approximately 12.4 acres of mostly forested land in the southeast corner of the intersection of Fentress Loop Road and Pacels Way, south of the Etheridge Lakes subdivision in Chesapeake. The park also contains a shelter and playground at the north end. Dominion's existing Line #588 crosses the park.	HF Route 1: 1,150 feet west/northwest of MP 14.2 HF Route 2: 1,150 feet west/northwest of MP 15.2 HF Route 5: 1,150 feet west/northwest of MP 20.2 HF Hybrid Route: 1,150 feet west/northwest of MP 14.3 Fentress Substation: 380 feet west of the expanded substation
Emerald Lakes Park	Encompassing about 7.4 acres of mostly forested land, this park is northeast of the intersection of Stoneleigh Road and Etheridge Manor Boulevard near the Carriage House Commons subdivision in Chesapeake. This park has one playground at its south end along Etheridge Manor Boulevard.	HF Route 1: 825 feet south/southwest of MP 14.0 HF Route 2: 825 feet south/southwest of MP 15.0 HF Route 5: 225 feet west of MP 19.8 HF Hybrid Route: 825 feet south/southwest of MP 14.2 Fentress Substation: 900 feet south of the existing substation
Open Space Parks		
Owls Creek Preservation Area	This area encompasses about 38.6 acres of City-owned parkland along Owl Creek, west of and adjacent to, the Virginia Aquarium and Marine Science Center in Virginia Beach. The area is composed of undeveloped forested areas, including wetlands.	CLH Route: Crossed at MP 1.0
Holland Pines Park	Encompassing about 15.8 acres of forested wetland and marshland, this park is east of the Holland Pines and Holland Oak subdivisions and west of the Lake Placid subdivision in Virginia Beach. Dominion's existing Lines #2118/147 cross the southern park boundary.	HF Route 1: Crossed from MPs 3.4 to 3.6 HF Route 2: Crossed from MPs 3.4 to 3.6 HF Route 5: Crossed from MPs 3.4 to 3.6 HF Hybrid Route: Crossed from MPs 3.6 to 3.8 Dam Neck Route Variation: Crossed from MPs 2.4 to 2.8
Dewberry Farms Parcel	This park contains about 10.4 acres of forested wetlands northeast of Dewberry Lane and Boysenberry Court and east of the Dewberry Farm subdivision in Virginia Beach.	HF Route 1: Crossed from MPs 7.2 to 7.3 HF Hybrid Route: Crossed from MPs 7.4 to 7.5

Name	Park Description	Approximate Distance and Direction from each Alternative Route or Facility
Indian River Farms Park	This park encompasses about 37.0 acres of forested wetland and marshland west of Kentucky Derby and Belmont Stakes drives on the southwest side of the Indian River Farms subdivision in Virginia Beach. It is part of the Stumpy Lake Natural Area system (Aerial Imagery 2020). Dominion's existing Lines #271/I-74 bisects the park.	HF Route 1: Crossed from MPs 7.7 to 7.9 HF Hybrid Route: Crossed from MPs 7.9 to 8.1
River Oaks Park	Located west and south of the River Oaks subdivision in Virginia Beach, this park encompasses about 69.5 acres of wetland and marshland within the Stumpy Lake watershed.	HF Route 1: 1,150 feet southeast of MP 7.9 HF Hybrid Route: 1,150 feet southeast of MP 8.1
Open Space Preservation Area		
North Landing Park	This park encompasses approximately 796.6 acres of mostly forested, City-owned land between North Landing River and Indian River Road in Virginia Beach. Dominion's existing Line #2085 crosses the center of the park.	HF Route 5: 1,000 feet east of MP 8.3 Line #2085 Route Variation: 1,000 feet east of MP 2.7
Sporting Facility/Athletic Field		
Virginia Beach Sportsplex	This park is located southwest of Princess Anne Road and south of Landstown Centre Way in Virginia Beach. It encompasses about 136.9 acres and contains a field house, stadium, and parking area as well as undeveloped open space. It abuts the U.S. Field Hockey Complex to the south and the Princess Anne Athletic Complex to the west.	HF Route 1: Crossed from MPs 4.7 to 5.0 HF Route 2: Crossed from MPs 4.7 to 5.0 HF Route 5: Crossed from MPs 4.7 to 5.0 HF Hybrid Route: Crossed from MPs 4.9 to 5.2 Chicory Switching Station: 1,100 feet east of the facility
U.S. Field Hockey Complex	This park is located south of the Virginia Beach Sportsplex and northwest of the Virginia National Golf Course. It encompasses 130.1 acres and contains two field hockey fields and undeveloped lands (including land set aside for the Bio-tech Park planned development discussed in Section 4.2.7.6).	HF Route 1: Crossed from MPs 5.0 to 5.5 HF Route 2: Crossed from MPs 5.0 to 5.6 HF Route 5: Crossed from MPs 5.0 to 5.9 HF Hybrid Route: Crossed from MPs 5.2 to 5.7 Line #2085 Route Variation: Crossed from MPs 0.0 to 0.3
Princess Anne Athletic Complex	This park is an athletic complex at the center of Princess Anne Commons encompassing more than 350 acres. It includes eight softball fields and eight multi-purpose playing fields as well as undeveloped land. This complex is located along Dam Neck and Landstown roads.	HF Route 1: Crossed from MPs 5.5 to 6.2 HF Hybrid Route: Crossed from MPs 5.7 to 6.4

CLH = Cable Landing to Harpers; HF = Harpers to Fentress; MP = milepost; ROW = right-of-way

4.2.2.2 Golf Courses

As shown on Figure 4.2-2 (Appendix A. Figures), three golf courses–Aeropines Golf Course, Virginia Beach National Golf Course, and Battlefield Golf Club–are located within 0.25 mile of the alternative routes and other onshore Virginia Facilities discussed in this report. Descriptions of these courses are provided in Table 4.2-2. Each of the courses would be crossed or affected by one or more of the alternative transmission line routes or associated facilities. Specifically, a portion of the Harpers Switching Station site would be within the Aeropines Golf Course; HF Routes 1, 2, and 5 and the HF Hybrid Route would each cross undeveloped lands on the periphery of the Virginia Beach National Golf Course; and HF Routes 1 and 2 and the HF Hybrid Route would each cross the Battlefield Golf Club.

Table 4.2-2: Golf Courses within 0.25 Mile of an Alternative Transmission Line Route or Facility

Name	Golf Course Description	Approximate Distance and Direction from each Alternative Route or Facility
Aeropines Golf Course	Located on USN land at the southern end of NAS Oceana in Virginia Beach, this facility has two 18-hole courses: Hornet and Tomcat. It also includes a pro shop, restaurant, driving range, putting greens, and practice areas. It is a private course serving the NAS Oceana community.	CLH Route: 575 feet south of MP 4.4 HF Route 1: 100 feet west of MP 0.0 HF Route 2: 100 feet west of MP 0.0 HF Route 5: 100 feet west of MP 0.0 HF Hybrid Route: 350 feet west of MP 0.0 Harpers Switching Station: Located on property
Virginia Beach National Golf Course	Located on City of Virginia Beach-owned land just southeast of the Virginia Beach Sportsplex and U.S. Field Hockey Complex, this 18-hole golf course includes a restaurant, practice tees, pro shop, and event space.	HF Route 1: Crossed at MPs 4.6 and 4.7 HF Route 2: Crossed at MPs 4.6 and 4.7 HF Route 5: Crossed at MPs 4.6 and 4.7 HF Hybrid Route: Crossed at MP 4.9 Chicory Switching Station: 375 feet southwest of this facility
Battlefield Golf Club	This 18-hole public golf course on privately-owned land has a driving range and putting green. It is located east of Centerville Turnpike South and south of Whittamore Road in Chesapeake. Dominion's existing ROW for Lines #2240/I-74 crosses the golf course along its eastern and southern boundaries.	HF Route 1: Crossed from MPs 12.6 to 13.8 HF Route 2: Crossed from MPs 13.7 to 14.9 HF Route 5: 525 feet east of MP 19.9 HF Hybrid Route: Crossed from MPs 12.8 to 14.0 Fentress Substation: 850 feet east of the expanded substation

CLH = Cable Landing to Harpers; HF = Harpers to Fentress; MP = milepost; NAS = Naval Air Station; USN = U.S. Navy

4.2.2.3 Trails

Four trails or trail networks—the Seashore to Cypress Loop (SCL) of the Virginia Birding and Wildlife Coastal Trail, the Rudee Inlet Water Trail, the Southeast Coast Saltwater Paddling Trail (SECT), and the ITA Trail Network—are located within 0.25 mile of the alternative routes and other facilities discussed in this report (see Figure 4.2-2 in Appendix A, Figures). Descriptions of these trails are provided in Table 4.2-3. The SCL and Rudee Inlet Trail would each be crossed by the CLH Route, and the SECT and ITA Trail Network would be crossed by HF Routes 1, 2, and 5, the HF Hybrid Route, and the Line #2085 Route Variation.

Table 4.2-3: Trails within 0.25 Mile of an Alternative Transmission Line Route or Facility

Name	Description	Approximate Distance and Direction from each Alternative Route or Facility
Seashore to Cypress Loop of the Virginia Birding and Wildlife Coastal Trail	The SCL connects historic and natural areas in Virginia Beach and Norfolk, providing a variety of year-round birding and wildlife viewing opportunities for the public. The only trail of its kind in the United States, the Virginia Birding and Wildlife Coastal Trail provides drivable routes through various habitats and wildlife viewing areas as well as links to walking and biking trails. Other recreational areas along the trail include historic lighthouses, parks, gardens, and an aquarium (VDWR 2021a). The trail is managed by the VDWR under the Virginia Bird and Wildlife Trail network (VDWR 2021a).	CLH Route: Crossed at MP 0.9 HF Route 1: Crossed at MP 7.5 HF Route 2: Crossed at MP 7.3 HF Route 5: Crossed at MP 8.0 HF Hybrid Route: Crossed at MP 7.7 Line #2085 Route Variation: Crossed at MP 2.4
Rudee Inlet Water Trail	The Rudee Inlet Water Trail is an approximately 2.0-mile-long water trail extending from the Atlantic Ocean to the Owl Creek Preservation Area, passing through Lake Rudee, in Virginia Beach. Designated by the VDCR, water trails (also known as blueways) are meant to provide a destination for water enthusiasts and ecotourists. Virginia's water trails typically are locally or regionally managed. The Rudee Inlet is maintained by the City of Virginia Beach (City of Virginia Beach 1988).	CLH Route: Crossed at MP 1.0
Southeast Coast Saltwater Paddling Trail	The SECT extends from Chesapeake Bay to the Georgia-Florida border. For over 800 miles, it follows coastal waters of Virginia, North Carolina, South Carolina, and Georgia, providing an opportunity for paddlers to experience an unbroken trail through tidal marshes and rivers. The trail system was developed through the combined efforts of the VDCR, South Carolina Department of Natural Resources, Georgia Department of Natural Resources, and the Conservation Fund of North Carolina (SECT 2013). In the study area, designated SECT waterways include North Landing River and West Neck Creek.	HF Route 1: Crossed at MP 3.3 HF Route 2: Crossed at MP 3.3 HF Route 5: Crossed at MP 3.3 and 9.2 HF Hybrid Route: Crossed at MP 3.5 Dam Neck Route Variation: Crossed at MP 2.5
ITA Trail Network	The ITA's Final Plan identifies a bike trail along Princess Anne Boulevard.	HF Route 1: Crossed at MP 4.6 HF Route 2: Crossed at MP 4.6 HF Route 5: Crossed at MP 4.6 HF Hybrid Route: Crossed at MP 4.8

CLH = Cable Landing to Harpers; HF = Harpers to Fentress; ITA = Interfacility Traffic Area; MP = milepost; SCL = Seashore to Cypress Loop; SECT = Southeast Coast Saltwater Paddling Trail; USN =U.S. Navy; VDCR =Virginia Department of Conservation and Recreation; VDWR = Virginia Department of Wildlife Resources

4.2.2.4 Other Recreation Areas

Other recreational areas identified within 0.25 mile of the alternative transmission line routes and other Virginia Facilities include an aquarium, a water park, and the Albemarle & Chesapeake Canal, as well as the North Landing River, a portion of which is designated as scenic (see Figure 4.2-2 in Appendix A, Figures). Descriptions of these recreational areas are provided in Table 4.2-4. Because the Ocean Breeze Waterpark would not be crossed by the alternative transmission line routes and associated facilities, it is not discussed further in this study.

Table 4.2-4: Other Recreational Areas within 0.25 Mile of an Alternative Transmission Line Route or Facility

Name	Description	Approximate Distance and Direction from each Alternative Route or Facility
Virginia Aquarium and Marine Science Center	This facility occupies approximately 38.0 acres of City-owned land on the west side of General Booth Boulevard, near the SMR, in Virginia Beach. It contains two main buildings connected by a 0.3-mile-long nature walkway. The aquarium is home to more than 12,000 animals and contains over 800,000 gallons of saltwater and freshwater tanks. It also includes a nature walk and adventure park (zip-line course) and provides boat tours of the adjacent sound and Atlantic Ocean (Virginia Aquarium 2017).	CLH Route: Crossed from MPs 0.9 to 1.0
Ocean Breeze Waterpark	Built in 1974, this facility has grown to include over 30 aquatic rides, slides, and various attractions in the waterpark grounds, including a 1-million-gallon wave pool, a quarter mile of tubing, and numerous water parks. The park is located south of the Virginia Aquarium and Marine Science Center west of General Booth Boulevard in Virginia Beach (Ocean Breeze Waterpark 2021).	CLH Route: 475 feet south of MP 1.8
North Landing River	North Landing River provides a variety of water-based recreational activities in the study area. Approximately 26.7 miles of the river have been designated as part of the Virginia Scenic Rivers System by the VDCR (VDCR 2021c). This designation extends from the border of North Carolina to North Landing Road and also includes portions of West Neck Creek and Pocaty River within the study area. The North Landing River and adjacent lands contain a number of historic, geologic, and ecological values that support a variety of recreational uses such as kayaking, canoeing, boating, fishing, hiking, picnicking, bicycling, birdwatching, and historic tours. The river is also part of the Intracoastal Waterway, a heavily trafficked commercial inland waterway.	C

Name	Description	Approximate Distance and Direction from each Alternative Route or Facility
Albemarle & Chesapeake Canal	This is a historic canal (listed in the NRHP as the Albemarle & Chesapeake Canal Historic District), first built in the late 1700s, primarily for commercial uses. To this day, the primary use of the canal remains commercial (USACE 2018b).	HF Route 1: Crossed at MP 10.4 (adjacent to Line #271/I-74) HF Route 2: Crossed at MP 8.5 HF Hybrid Route: Crossed at MP 10.6 (adjacent to Lines #271/I-74) Line #2085 Route Variation: Crossed at MP 4.1

CLH = Cable Landing to Harpers; HF = Harpers to Fentress; MP = milepost; NRHP National Register of Historic Places; SMR State Military Reservation; VDCR =Virginia Department of Conservation and Recreation

4.2.3 Residences, Residential Areas, and Commercial Structures

In accordance with SCC requirements, ERM identified residences (multi-unit-dwellings, single-family-dwellings, and mobile homes) and commercial or military structures within 100 feet, 250 feet, and 500 feet of the centerline of each alternative transmission line route through review of various digital datasets and maps, USGS topographic quadrangles, and recent (2020) digital aerial photography (Aerial Imagery 2020; Pictometry International Corp. 2020). Table 4.2-5 lists the number of dwellings by type within these tiers for each route. The locations of dwellings along the routes are depicted in Figure 4.2-3 (Appendix A, Figures). Additional information on the residential areas along each route is provided in the subsections below.

Table 4.2-5: Residences and Other Structures within 100 Feet, 250 Feet, and 500 Feet of the Centerline of Each Alternative Transmission Line Route

Route Name	Type	Structures within 100 Feet	Structures within 250 Feet	Structures within 500 Feet
CLH Route	Dwellings - Total	3	23	108
	Multi-unit Dwellings	0	11	53
	Single Family Dwellings	3	12	31
	Mobile Homes	0	0	24
	Commercial/Military	10	36	85
HF Route 1	Dwellings - Total	32	176	572
	Multi-unit Dwellings	0	0	0
	Single Family Dwellings	32	176	560
	Mobile Homes	0	0	12
	Commercial	4	6	11
HF Route 2	Dwellings - Total	1	101	419
	Multi-unit Dwellings	0	0	0
	Single Family Dwellings	1	101	407
	Mobile Homes	0	0	12
	Commercial	4	6	7
HF Route 5	Dwellings - Total	0	163	619
	Multi-unit Dwellings	0	0	0
	Single Family Dwellings	0	163	607

Route Name	Type	Structures within 100 Feet	Structures within 250 Feet	Structures within 500 Feet
	Mobile Homes	0	0	12
	Commercial	3	7	15
HF Hybrid Route	Dwellings - Total	32	181	571
	Multi-unit Dwellings	0	0	0
	Single Family Dwellings	32	181	563
	Mobile Homes	0	0	8
	Commercial	4	10	17
Dam Neck Route Variation	Dwellings - Total	0	11	60
	Multi-unit Dwellings	0	0	0
	Single Family Dwellings	0	11	60
	Mobile Homes	0	0	0
	Commercial	0	2	5
Line #2085 Route Variation	Dwellings – Total	0	57	188
	Multi-unit Dwellings	0	0	0
	Single Family Dwellings	0	57	188
	Mobile Homes	0	0	0
	Commercial	1	4	6

CLH = Cable Landing to Harpers; HF = Harpers to Fentress

ERM additionally identified residences (multi-unit-dwellings, single-family-dwellings, and mobile homes) and commercial structures within 100 feet, 250 feet, and 500 feet of what would be the fence line surrounding the Harpers Switching Station, Chicory Switching Station, and expanded footprint at Fentress Substation using the same sources enumerated above. Table 4.2-6 lists the number of dwellings by type within these tiers for each facility.[16] The locations of dwellings near the switching station sites and Fentress Substation are included in Figure 4.2-3 (Appendix A, Figures).

Table 4.2-6: Residences and Other Structures within 100 Feet, 250 Feet, and 500 Feet of the Fence Line at the Harpers Switching Station, Chicory Switching Station, and Expanded Fentress Substation

Route Name	Type	Structures within 100 Feet	Structures within 250 Feet	Structures within 500 Feet
Harpers Switching Station	Dwellings – Total	0	0	19
	Multi-unit Dwellings	0	0	0
	Single Family Dwellings	0	0	0
	Mobile Homes	0	0	19

[16] Some of the dwellings listed in Table 4.2-6 would also be within 500 feet of one or more alternative transmission line route. At the Harpers Switching Station, this would include one commercial structure within 100 feet, one commercial structure within 250 feet, and three commercial structures and 12 mobile homes within 500 feet of the fence line for this facility. At the Chicory Switching Station, this would include four single-family dwellings within 500 feet of the fence line for this facility. At the expanded Fentress Substation, this would include three single-family dwellings within 250 feet and four single-family dwellings within 500 feet of the fence line of this facility.

Route Name	Type	Structures within 100 Feet	Structures within 250 Feet	Structures within 500 Feet
	Commercial	3	3	5
Chicory Switching Station	Dwellings – Total	0	0	17
	Multi-unit Dwellings	0	0	0
	Single Family Dwellings	0	0	17
	Mobile Homes	0	0	0
	Commercial	0	0	1
Expanded Fentress Substation	Dwellings – Total	0	5	23
	Multi-unit Dwellings	0	0	0
	Single Family Dwellings	0	5	23
	Mobile Homes	0	0	0
	Commercial	0	0	0

4.2.3.1 CLH Route

Two residential subdivisions (Owls Creek Estates and Bellwood Park) and 108 residential dwellings would be within 500 feet of the CLH Route centerline, with a majority of the dwellings (n=85; 79 percent) between 250 and 500 feet of the centerline (Figure 4.2-3 in Appendix A, Figures). All of the multi-family dwellings would occur in the area approximately between mileposts (MPs) 3.8 and 4.1 with single family residences approximately between MPs 1.6 and 2.1. The tally of dwellings includes 24 mobile homes that would be within 250 and 500 feet of the centerline.

The CLH Route centerline additionally would pass within 500 feet of 85 structures classified as commercial or military use buildings, with the majority (n=49; 58 percent) between 250 and 500 feet of the centerline. Two military structures at SMR would be within the ROW for the CLH Route. These structures, which are part of the Camp Pendleton/State Military Reservation Historic District, would be demolished. Additional information on these structures is provided in Section 5.5.2, Historic Architecture and Other Sites.

4.2.3.2 HF Route 1

Eighteen residential subdivisions (Mayberry, Prince George Estates, Pine Ridge, Castleton, Buyrn Farm North, Holland Pines, Woods of Piney Grove, Highland Meadows, Highland Acres, Highland Parish, Dewberry Farm, Indian River Woods, Indian River Farms, Carriage House Commons, Stratford Terrace, Etheridge Lakes Sections, Fentress & Roach, and Green Haven) and 572 residential dwellings would be within 500 feet of the HF Route 1 centerline, with the majority of dwellings (n=396; 69 percent) between 250 and 500 feet of the centerline (Figure 4.2-3 in Appendix A, Figures). The tally of dwellings includes 12 mobile homes that would be within 250 and 500 feet of the route.

In Virginia Beach, most of the dwellings would occur in the following locations:

- Between MPs 1.5 and 2.8 (near London Bridge Road) where the route would pass between the Mayberry, Prince George Estates, Pine Ridge, and Castleton subdivisions within the SEPG corridor
- Between MPs 3.4 and 4.3 (near Holland Road) where the route would pass north of the Buyrn Farm North subdivision and south of the Holland Pines and Woods of Piney Grove subdivisions within the SEPG corridor, mostly adjacent to Lines #2118/147

- Between MPs 6.7 and 7.7 (near Highland Meadows Way and Indian River Road) where the route would pass through and between the Highland Meadows, Highland Acres, Highland Parish, Dewberry Farm, Indian River Woods, and Indian River Farms subdivisions, mostly within or adjacent to Lines #271/I-74

In Chesapeake, clusters of residences would be near the route in two locations: a) where it would cross Mt. Pleasant Road; and b) where it would pass along the south edge of the Battlefield Golf Club near the Green Haven subdivision. In these areas, the route would be along an existing Dominion transmission corridor (Lines #271/I-74 or Lines #2240/I-74).

In addition to residences, the HF Route 1 centerline would pass within 500 feet of 11 commercial buildings, with approximately half of these (n=5) between 250 and 500 feet of the centerline.

4.2.3.3 HF Route 2

Twelve residential subdivisions (Mayberry, Prince George Estates, Pine Ridge, Castleton, Buyrn Farm North, Holland Pines, Woods of Piney Grove, Stratford Terrace, Fentress & Roach, Green Haven, Carriage Estates, and Etheridge Lakes Sections) and 419 residential dwellings would be within 500 feet of the HF Route 2 centerline, with the majority of dwellings (n=318; 76 percent) between 250 and 500 feet of the centerline (Figure 4.2-3 in Appendix A, Figures). The tally of dwellings includes 12 mobile homes that would be within 250 and 500 feet of the route.

In Virginia Beach, most of the dwellings would occur in the following locations:

- Between MPs 1.5 and 2.8 (near London Bridge Road) where the route would pass between the Mayberry, Prince George Estates, Pine Ridge, and Castleton subdivisions within the SEPG corridor
- Between MPs 3.4 and 4.3 (near Holland Road) where the route would pass north of the Buyrn Farm North subdivision and south of the Holland Pines and Woods of Piney Grove subdivisions within the SEPG corridor, mostly adjacent to Lines #2118/147

In Chesapeake, clusters of residences would be near the route in two locations: a) where it would cross Mt. Pleasant Road; and b) where it would pass along the south edge of the Battlefield Golf Club near the Green Haven subdivision. In both of these areas, the route would be along an existing Dominion transmission corridor (Lines #271/I-74 or Lines #2240/I-74).

In addition to residences, the HF Route 2 centerline would pass within 500 feet of seven commercial buildings, all but one of which would be within 250 feet of the centerline.

4.2.3.4 HF Route 5

Seventeen residential subdivisions (Mayberry, Prince George Estates, Pine Ridge, Castleton, Buyrn Farm North, Holland Pines, Woods of Piney Grove, Courthouse Woods, Courthouse Estates, North Landing Farms, King James Colony Section, Long Ridge Woods, Walnut Green, Centerville Farms, Green Haven, Carriage Estates, and Etheridge Estates Sections) and 619 residential dwellings would be within 500 feet of the HF Route 5 centerline, with the majority of dwellings (n=456; 74 percent) between 250 and 500 feet of the centerline (Figure 4.2-3 in Appendix A, Figures). The tally of dwellings includes 12 mobile homes that would be within 250 and 500 feet of the route.

In Virginia Beach, most of the dwellings would occur at the following locations:

- Between MPs 1.5 and 2.8 (near London Bridge Road) where the route would pass between the Mayberry, Prince George Estates, Pine Ridge, and Castleton subdivisions within the SEPG corridor

- Between MPs 3.4 and 4.3 (near Holland Road) where the route would pass north of the Buyrn Farm North subdivision and south of the Holland Pines and Woods of Piney Grove subdivisions within the SEPG corridor, mostly adjacent to Lines #2118/147
- Between MPs 7.0 and 8.3 where the route would pass west of the Courthouse Woods and Courthouse Estates subdivisions adjacent to Line #2085

In Chesapeake, clusters of residences would be near the route where it would parallel Fentress Airfield Road near the North Landing Farms subdivision and where the route would parallel Blackwater Road near the King James Colony subdivision (Figure 4.2-3 in Appendix A, Figures).

In addition to residences, the HF Route 5 centerline would pass within 500 feet of 15 commercial buildings, with approximately half of these (n=8) between 250 and 500 feet of the centerline.

4.2.3.5 HF Hybrid Route

Eighteen residential subdivisions (Mayberry, Prince George Estates, Pine Ridge, Castleton, Buyrn Farm North, Holland Pines, Woods of Piney Grove, Highland Parish, Highland Meadows, Highland Acres, Dewberry Farm, Indian River Woods, Indian River Farms, Green Haven, Stratford Terrace, Fentress & Roach, Carriage Estates, and Etheridge Estates Sections) and 571 residential dwellings would be within 500 feet of the HF Hybrid Route centerline, with the majority of dwellings (n=390; 68 percent) between 250 and 500 feet of the route (Figure 4.2-3 in Appendix A, Figures). The tally of dwellings includes 8 mobile homes that would be within 250 and 500 feet of the route.

In Virginia Beach, most of the dwellings would occur in the following locations:

- Between MPs 1.7 and 3.0 (near London Bridge Road) where the route would pass between the Mayberry, Prince George Estates, Pine Ridge, and Castleton subdivisions within the SEPG corridor
- Between MPs 3.6 and 4.5 (near Holland Road) where the route would pass north of the Buyrn Farm North subdivision and south of the Holland Pines and Woods of Piney Grove subdivisions within the SEPG corridor, mostly adjacent to Lines #2118/147
- Between MPs 6.9 and 7.9 (near Highland Meadows Way and Indian River Road) where the route would pass through and between the Highland Meadows, Highland Acres, Highland Parish, Dewberry Farm, Indian River Woods, and Indian River Farms subdivisions, mostly within or adjacent to Lines #271/I-74

In Chesapeake, clusters of residences would be near the route in two locations: a) where it would cross Mt. Pleasant Road; and b) where it would pass along the south edge of the Battlefield Golf Club near the Green Haven subdivision. In these areas, the route would be along an existing Dominion transmission corridor (Lines #271/I-74 or Lines #2240/I-74).

In addition to residences, the HF Hybrid Route centerline would pass within 500 feet of 17 commercial buildings, with all but four of these between 100 and 500 feet of the centerline.

4.2.3.6 Dam Neck Route Variation

Two subdivisions (Lake Placid and Holland Pines) and 60 residential dwellings would be within 500 feet of the Dam Neck Route Variation centerline, with most of the dwellings (n=49; 82 percent) between 250 and 500 feet of the centerline (Figure 4.2-3 in Appendix A, Figures). The houses would mostly be within the Lake Placid or Holland Pines subdivisions or along Dam Neck Road. The Dam Neck Route Variation centerline additionally would pass within 500 feet of five commercial buildings, with all five of these between 100 and 500 feet of the centerline.

4.2.3.7 Line #2085 Route Variation

Two subdivisions (Courthouse Woods and Courthouse Estates) and 188 residential dwellings would be within 500 feet of the Line #2085 Route Variation centerline, with a majority of the dwellings (n=131; 70 percent) between 250 and 500 feet of the centerline (Figure 4.2-3 in Appendix A, Figures). Most of the dwellings would be within the Courthouse Woods and Courthouse Estates subdivisions. The Line #2085 Route Variation centerline additionally would pass within 500 feet of six commercial buildings, with five of these between 100 and 500 feet of the centerline.

4.2.3.8 Harpers Switching Station

Nineteen residential dwellings would be within 500 feet of the Harpers Switching Station, all between 250 and 500 feet of the fence line (Figure 4.2-3 in Appendix A, Figures). The dwellings are all mobile homes within NAS Oceana providing housing for military personnel assigned to the base. The Harpers Switching Station site additionally would encompass three commercial-type buildings (used for maintenance activities at the Aeropines Golf Course) which would need to be removed from the site. Two other commercial buildings would be within 250 and 500 feet of the fence at the site. As noted elsewhere in this study, the USN supported the use of the proposed site for the Harpers Switching Station in a letter to Dominion dated August 17, 2021, a copy of which is provided in Appendix C, Correspondence.

4.2.3.9 Chicory Switching Station

Seventeen residential dwellings and one commercial building would be within 500 feet of the Chicory Switching Station, with all of these structures between 250 and 500 feet of the fence line (Figure 4.2-3 in Appendix A, Figures). Most of the dwellings would be within the Woods of Piney Grove subdivision or a recent residential development on the north side of Princess Anne Road just west of the Christopher Farms subdivision. One commercial structure would be within 250 and 500 feet of the fence at this site.

4.2.3.10 Expanded Fentress Substation

Twenty-three residential dwellings would be within 500 feet of the expanded footprint at Fentress Substation, with five dwellings between 100 and 250 feet of the fence line and 17 dwellings between 250 and 500 feet of the fence line (Figure 4.2-3 in Appendix A, Figures). Most of the dwellings would be north of the substation in the Etheridge Lakes subdivision. No commercial buildings would be within 500 feet of the fence around the expanded part of the substation.

4.2.4 Agricultural Areas

Agricultural land use is limited in the vicinity of the alternative transmission line routes (Figure 4.2-1 in Appendix A, Figures). Three main agricultural areas would be crossed by the routes in the study area. Two of these are in Virginia Beach, including: a) fields adjacent to NAS Oceana and the Aeropines Golf Course; and b) areas within the ITA, which prioritizes rural and agricultural land uses between NAS Oceana and NALF Fentress. The third agricultural area is near NALF Fentress in Chesapeake. Much of the land in Chesapeake between North Landing River to the east and the Fentress residential subdivision to the west is agricultural. Each of the alternative transmission line routes would cross agricultural lands in one or more of these areas.

4.2.5 Cemeteries, Schools, and Places of Worship

ERM identified cemeteries, schools, and places of worship within 0.25 mile of the alternative transmission line routes and other onshore Virginia Facilities by reviewing digital data from the Environmental Systems Research Institute (ESRI 2021), the Virginia Cultural Resource Information System (VDHR 2021), the cities of Virginia Beach and Chesapeake (City of Virginia Beach 2019b; Chesapeake 2021a), and recent

(2020) digital aerial photography (Aerial Imagery 2020). Information on cemeteries additionally was obtained from the Find a Grave website (findagrave.com 2021). Figure 4.2-4 (Appendix A, Figures) depicts the cemeteries, schools, and places of worship along and near the routes.

4.2.5.1 Cemeteries

Eight cemeteries ranging from isolated burials and family plots to church cemeteries are located along and near the alternative transmission line routes. Descriptions of these cemeteries are provided in Table 4.2-7. Of the cemeteries listed in the table, five (James Etheridge Cemetery, Reid's Cemetery, Land Cemetery [No. 2], Fentress-Shipp Cemetery, and Wormington Cemetery) would be located greater than 500 feet from the ROWs associated with the alternative transmission line routes and associated facilities discussed in this study. These five cemeteries are not discussed further in this report.

Table 4.2-7: Cemeteries within 0.25 Mile of an Alternative Transmission Line Route or Facility

Name	Description	Approximate Distance and Direction from each Alternative Route or Facility
Jerome Etheridge Cemetery	This burial site, located at the intersection of Holland Drive and Pleasant Acres Drive in the Christopher Farms subdivision of Virginia Beach, consists of a single concrete marker with no inscription. The site is believed to be the grave of Jerome Etheridge, who owned the property in the late nineteenth and early twentieth centuries. The grave likely dates from the first decade of the twentieth century.	HF Route 1: 575 feet south of MP 3.7 HF Route 2: 575 feet south of MP 3.7 HF Route 5: 575 feet south of MP 3.7 HF Hybrid Route: 600 feet south of MP 3.9
Piney Grove Baptist Church Cemetery	This cemetery, located near the intersection of Holland Drive and Damascus Trail in the Woods of Piney Grove subdivision of Virginia Beach, is associated with the Piney Grove Baptist Church, a historically African-American congregation. The cemetery contains upward of 120 burials, most dating from the second half of the twentieth century with a few dating from as early as the late nineteenth century.	HF Route 1: 150 feet north of MP 4.0 HF Route 2: 150 feet north of MP 4.0 HF Route 5: 150 feet north of MP 4.0 HF Hybrid Route: 160 feet north of MP 4.2
Reid's Cemetery	This is an African-American family cemetery situated on the east side of Holland Road in the Woods of Piney Grove subdivision in Virginia Beach. It contains approximately 20 interments with most dating from the second half of the twentieth century or later. At least one burial dates from the 1930s.	HF Route 1: 775 feet north of MP 4.1 HF Route 2: 775 feet north of MP 4.1 HF Route 5: 775 feet north of MP 4.1 HF Hybrid Route: 800 feet north of MP 4.2
Land Family Cemetery (No. 1)	This is a family cemetery along Landstown Road just south of the Princess Anne Athletic Complex in Virginia Beach. The cemetery contains approximately 20 interments ranging in date from the mid-nineteenth to the late twentieth century.	HF Route 1: 75 feet south of MP 5.8 HF Hybrid Route: 75 feet south of MP 6.0
Land Family Cemetery (No. 2)	This family cemetery, also along Landstown Road south of the Princess Anne Athletic Complex, contains approximately 10 interments. The dates of the burials are	HF Route 1: 575 feet south of MP 5.9 HF Hybrid Route: 575 feet south of MP 6.1

Name	Description	Approximate Distance and Direction from each Alternative Route or Facility
	unknown, but one source (Traver and Ralph 1989) describes the cemetery as "modern."	
Fentress-Shipp Cemetery[17]	This is a small family cemetery on the south side of Salem Road just west of its intersection with Highland Meadows Way in Virginia Beach. At least 10 burials are present at the site, all dating from the late nineteenth century.	HF Route 1: 850 feet northwest of MP 6.7 HF Hybrid Route: 850 feet northwest of MP 6.9
Wormington Cemetery	This burial site, located in an agricultural field east of Pinedale Lane in the Stratford Terrace neighborhood of Chesapeake, contains at least one grave dating from the late eighteenth century. A headstone at the site identifies the decedent as Mary Wormington.	HF Route 1: 675 feet west of MP 11.6 HF Hybrid Route: 675 feet west of MP 11.8
Mercer Family Cemetery	This cemetery is situated on the west side of North Landing Road about 600 feet north of the North Landing River Bridge. It contains five interments dating from the twentieth century (Goode et al. 2019).	HF Route 5: 1,200 feet northwest of MP 9.1 Line #2085 Route Variation: 5 feet south of MP 3.7

HF = Harpers to Fentress; MP = milepost

Potential Cemetery

A potential cemetery was identified on the property of the Kempsville Mennonite Church along North Landing Road in Virginia Beach. A small cemetery was recorded as an archaeological site (44VB0280) at this location as part of a survey completed in 1996 (Stuck and Higgins 1997). The site was defined on the basis of surface observation ("some fallen stones") and informant testimony. The cemetery reportedly contained 12 graves dating from the late nineteenth/early twentieth centuries associated with the Bell family. The VCRIS indicates that the site was revisited in 2020, but no evidence of headstones, depressions, or other signs of burials were observed within the site. Field survey would be required to confirm if burials are present at the site. The potential cemetery area would be crossed by HF Route 5 (approximate MP 7.1) and the Line #2085 Route Variation (approximate MP 1.6).

4.2.5.2 Schools

Two schools are located within 0.25 mile of the alternative routes and associated facilities discussed in this report, all in Virginia Beach. Descriptions of these places are provided in Table 4.2-8. Because both schools would be greater than 500 feet from the ROWs associated with each alternative route, they are not discussed further in this report.

[17] Some map sources indicate that burials may be present on both sides of Salem Road in the vicinity of the Fentress-Shipp Cemetery. The 1948 and 1955 issues of the 1:24,000 USGS *Princess Anne* topographic quadrangle show a burial ground labeled "Lame Cemetery" south of Salem Road, but subsequent issues of the map (1965, 1970, 1979, 1986, and 1989) depict cemeteries labeled "Cem" on both sides of the road. More recent digital maps and data layers depict a burial ground named "Lane Cemetery" on either the north or south sides of Salem Road. These sources notwithstanding, two previously completed archaeological surveys examined both sides of the road in the vicinity of the Fentress-Shipp Cemetery (Traver and Ralph 1989; Baicy et al. 2005), but no burials were reported on the north side of the road by these surveys.

Table 4.2-8: Schools within 0.25 Mile of an Alternative Transmission Line Route or Facility

Name	Description	Approximate Distance and Direction from each Alternative Route or Facility
Commonwealth Challenge Youth Academy	This private school is located at the intersection of C Street and 4th Street on the SMR in Virginia Beach. The school's website describes the academy as "a 17-and-a-half month program, which includes a five-and-a-half month residential phase, followed by a 12-month post-residential and mentoring phase" (Commonwealth Challenge Youth Academy 2021).	CLH Route: 1,000 feet south of MP 0.8
Christopher Farms Elementary School	This school occupies an approximately 15.1 acre parcel of City-owned land west of Holland Drive and north of Pleasant Acres Drive on the north side of the Christopher Farms subdivision in Virginia Beach. The campus includes an 80,000-square-foot building, parking lots, ball fields, and various courts.	HF Route 1: 725 feet south of MP 3.8 HF Route 2: 725 feet south of MP 3.8 HF Route 5: 725 feet south of MP 3.8 HF Hybrid Route: 725 feet south of MP 4.0

CLH = Cable Landing to Harpers; HF = Harpers to Fentress; MP = milepost; SMR = State Military Reservation

4.2.5.3 Places of Worship

Six places of worship were identified within 0.25 mile of the alternative routes and facilities discussed in this report. Descriptions of these places are provided in Table 4.2-9. Two churches listed in the table (Christian Chapel Assembly of God Church and United House of Prayer for All People) would be located greater than 500 feet from the ROWs associated with the alternative transmission line routes and associated facilities discussed in this study; these two churches are not discussed further in this report.

Table 4.2-9: Places of Worship within 0.25 Mile of an Alternative Transmission Line Route or Facility

Name	Description	Approximate Distance and Direction from each Alternative Route or Facility
Piney Grove Baptist Church	This church includes a 14,500-square-foot building and a parking lot northeast of the intersection of Chestwood Drive and Holland Road on the west side of the Holland Pines subdivision in Virginia Beach.	HF Route 1: 475 feet north of MP 4.0 HF Route 2: 475 feet north of MP 4.0 HF Route 5: 475 feet north of MP 4.0 HF Hybrid Route: 475 feet north of MP 4.2
Christian Chapel Assembly of God Church	This church includes an 18,000-square-foot building and a parking lot on the west side of Salem Road about 0.4 mile northwest of the intersection of Salem and North Landing roads in Virginia Beach.	HF Route 2: 950 feet northwest of MP 6.9
Kempsville Mennonite Church	This church includes an 8,000-square-foot building, a second 7,500-square-foot building, and a parking lot located south of North Landing Road (near the intersection with Two Farms Lane) on the west side of the Courthouse Estates subdivision in Virginia Beach.	HF Route 5: Crossed at MP 7.1 Line #2085 Route Variation: Crossed at MP 1.6

Name	Description	Approximate Distance and Direction from each Alternative Route or Facility
True Way Evangelistic Mission	This church includes a 12,000-square-foot building and a parking lot on the south side of Mt. Pleasant Road east of the Ravenna East subdivision in Chesapeake.	HF Route 1: 475 feet east of MP 11.0 HF Route 2: 475 feet east of MP 12.1 HF Hybrid Route: 475 feet east of MP 11.2
United House of Prayer for All People	This church includes an 11,500-square-foot building and a parking lot on the east side of Whittamore Road east of the Battlefield Golf Club in Chesapeake.	HF Route 1: 975 feet east of MP 12.7 HF Route 2: 975 feet east of MP 13.8 HF Hybrid Route: 975 feet east of MP 12.9
Pleasant Valley Baptist Church	This church includes a 4,850-square-foot building and a parking lot located in the southwest corner of the intersection of Land of Promise and Long Ridge roads in Chesapeake.	HF Route 5: 275 feet north of MP 16.1

HF = Harpers to Fentress; MP = milepost

4.2.6 Land Use Planning and Zoning

4.2.6.1 Military Installations and Local Zoning

As part of its land planning objectives, NAS Oceana and NALF Fentress work to "protect (the) public's health, safety and welfare, and to prevent incompatible development from degrading operation capability" (City of Virginia Beach 2005). A key component of land use planning for the bases is the AICUZ Program, which was established in 1973 by the U.S. Department of Defense (DOD) in response to increasing urban development around military airfields. At the core of the AICUZ Program is the development of land use guidelines that promote compatible uses in neighboring communities. Control over land use and development in the areas surrounding the airfields is the responsibility of local governments, but the USN works with neighboring communities to encourage compatible development in the APZs established under the AICUZ as well as designated noise zones around the airfields. Section 4.2.9.2, Accident Potential Zones, provides additional discussion of the APZs in the study area relative to the alternative transmission line routes and other onshore Virginia Facilities discussed in this report.

4.2.6.2 Land Use Planning

Va. Code Section (§) 15.2-2223 requires local planning commissions to adopt comprehensive plans to guide the physical development of territory within its jurisdiction. These plans consider existing and future land uses, anticipate development trends, and make recommendations for guiding long-term development decisions in a city or county. To implement the objectives of a comprehensive plan, local governments use zoning. A zoning ordinance creates land use categories that separate incompatible uses and establishes development standards to guide orderly and efficient land use. Virginia requires that a comprehensive plan be reviewed at least once every 5 years to adjust to actual or projected changes in land use conditions or needs. Zoning ordinances may be modified by the local land manager and governing bodies or through requests from residents or businesses to change zoning designations or approve new uses. The City of Virginia Beach and City of Chesapeake have each adopted comprehensive plans and zoning ordinances within their jurisdictions.

City of Virginia Beach

The City of Virginia Beach Comprehensive Plan, adopted in 2016, lays out the plan for the City to grow and build while still maintaining the character of land use that has been prioritized (City of Virginia Beach 2016c). Urban development is concentrated north of an urban growth boundary known as the "Green

Line" that lies about 2 miles south of NAS Oceana and divides the northern urban area from the rural southern portion of the city. However, more recent development has occurred in the area south of the Green Line known as the Princess Anne Commons and Transition Area (City of Virginia Beach 2016c). The 2016 comprehensive plan emphasizes the importance of sustainability, especially when it comes to land use planning and zoning south of the Green Line. The comprehensive plan also includes Strategic Growth Areas, which are areas of the City allocated for increased density in the future to accommodate population growth. These areas are already developed and are designed to conserve some of the limited undeveloped land in the City.

Portions of the Princess Anne Commons and Transition Area lie between NAS Oceana and NALF Fentress under heavily transited airspace. This area has been designated by the USN and the City of Virginia Beach as the ITA, which occupies about 3,000 acres (Figure 4.2-5 in Appendix A, Figures). The ITA is bordered on the north by Princess Anne Road, on the south by Indian River Road and the Virginia Beach–Chesapeake border, on the west by South Independence Boulevard, and on the east by the Historic Princess Anne Center. Due to the high noise levels within the ITA, the City of Virginia Beach implements land use policies through zoning ordinances, by defining zoning districts, and by permitting different development densities in different parts of the City. The City of Virginia Beach developed an ITA Master Plan that describes land use planning and zoning within the ITA. The ITA Master Plan was updated in 2017 and identifies four main priorities for the ITA, including economic development, agricultural research, quality municipal services, and conservation (Urban Design Associates 2017). The ITA Master Plan identifies "initiative areas" for various types of development such as recreational, economic, and infrastructure improvements.

Land uses within the NAS Oceana AICUZ are also constrained by the City's AICUZ Overlay Ordinance. This zoning ordinance attempts to regulate development within the AICUZ in a way that balances the priorities of individual property owners and the military installations that are part of the AICUZ (City of Virginia Beach 2005). Land uses within the NAS Oceana AICUZ include densely developed residential and resort areas north of the Green Line and along the Atlantic coast. Business, commercial, and residential uses are concentrated on the major east-west highways north of NAS Oceana. Lower density, suburban land uses, including residential, business, recreational, and light industrial, occur within the remainder of the AICUZ footprint.

The City of Virginia Beach has also developed an Urban Forest Management Plan that has been incorporated into the City's Comprehensive Plan. The Urban Forest Management Plan aims to increase the urban tree canopy in Virginia Beach from approximately 36 percent to 50 percent by 2040 (City of Virginia Beach 2013). Most of the plan focuses on the education of residents and encouraging tree planting within private residential areas, but it includes tree planting on public lands as well. See Section 4.3.5.2, Urban Tree Canopy Conservation, for additional discussion of the Urban Forest Management Plan.

City of Chesapeake

The City of Chesapeake Comprehensive Plan was adopted in 2014 and amended in 2016 and 2018. It plans for the future of the City to 2035. The plan focuses on responsible growth management, community preservation and development, and the preservation and access of natural amenities (City of Chesapeake 2016a). Some land use classifications in this plan are updated from previous plans to reflect changing priorities, and some zoning districts have been changed to allow for more economic development and urban growth. All parcels within the city include a specific zoning district classification (e.g., residential, business, industrial, and agricultural use). Chesapeake divided all lands within its boundary into three overlay zoning districts of urban, suburban, and rural. In general, the northern part of the city is urban and zoning progresses southward to rural. The urban portion of the city is primarily north of the Albemarle & Chesapeake Canal.

NALF Fentress, which is south of the Albemarle & Chesapeake Canal, is largely within the rural overlay district. South of the canal, the most common land uses within the AICUZ footprint for NALF Fentress are rural, residential, forest, and conservation lands. North of the canal, the suburban overlay overlaps with a portion of the NALF Fentress AICUZ. Land uses in this area include residential neighborhoods with commercial development and retail.

State Military Reservation

The SMR, also referred to as Camp Pendleton, developed an Installation Master Plan for the site in 2018. The plan identifies future needs and development, with long-term strategic goals in mind, through 2043 (SMR 2018). The plan divides the SMR property into three planning areas—North Area Development Plan (ADP), South ADP, and East ADP. The CLH Route is confined to the South ADP and East ADP areas. The SMR was designated a historic district and listed on the NRHP in 2005. This designation, along with other factors, limits the development area of the SMR. Future development is proposed in the western half of the SMR property. Future development plans call for some buildings to be removed, while new buildings would be constructed in areas where historic structures once stood.

4.2.6.3 Local Zoning

As outlined above, the cities of Virginia Beach and Chesapeake have developed Comprehensive Plans for their cities. The Comprehensive Plans are typically implemented through zoning ordinances that dictate the type of development permissible in different areas of the city. To implement a zoning use in a district that currently does not allow a specific use, an application for a Conditional Use Permit is typically submitted to the zoning department for review and approval. Under Virginia law, public utilities planning to construct any transmission line of 138 kV or higher are required to either obtain a Certificate of Public Convenience and Necessity (CPCN) from the SCC, or obtain any and all applicable local zoning ordinance approvals. Va. Code § 56-265.2 preempts the local zoning ordinances. Therefore, the SCC's issuance of a CPCN would satisfy the requirements of all local zoning ordinances (Va. Code § 56-265.2). Because Dominion is applying to the SCC for a CPCN for the onshore Virginia Facilities, no additional discussion of local zoning or local zoning requirements is included in this study.

4.2.7 Planned Developments

ERM obtained information on planned future developments through publicly available data on city websites and consultations with city planning officials and other stakeholders. Planned developments within 0.25 mile of the alternative routes and associated facilities discussed in this report are listed in Table 4.2-10. The table additionally includes information on the status of the planned developments and their locations relative to the onshore Virginia Facilities. Descriptions of each development are provided in the subsections below. A map depicting the locations of the planned developments is provided as Figure 4.2-6 (Appendix A, Figures). As discussed in more detail in Section 5.2.7, Planned Developments, Dominion reviewed the routes across the planned developments with staff from the City of Virginia Beach's planning, transportation, and/or economic development departments.

Three of the planned developments listed in Table 4.2-10 and described below (i.e., McQ Single Family Home Lot 2A and 2B, Nimmo Quay, and Salem Road Subdivision) would not be crossed or affected by the alternative transmission line routes and associated facilities discussed in the report. These planned developments are not discussed further in this study.

Table 4.2-10: Planned Developments within 0.25 Mile of an Alternative Transmission Line Route

Development Name	Status	Approximate Distance and Direction from each Alternative Route or Facility
State Military Reservation Development Plan	Unconstructed, project in planning stages	CLH Route: Crossed at MPs 0.7 to 0.9
McQ Single Family Home Lot 2A and 2B	Unconstructed, proposed project	CLH Route: 475 feet northwest of MP 2.0
Sunny Farms Hydroponic Greenhouse	Unconstructed, proposed project	HF Route 1: Crossed at MPs 0.1 to 0.3 HF Route 2: Crossed at MPs 0.1 to 0.3 HF Route 5: Crossed at MPs 0.1 to 0.3 HF Hybrid Route: Crossed at MPs 0.3 to 0.5
Creech Outside Storage	Unconstructed, proposed project	Dam Neck Route Variation: Crossed at MPs 0.6 to 0.8
Nimmo Quay	Unconstructed, proposed project	HF Route 1: 975 feet south of MP 2.3 HF Route 2: 975 feet south of MP 2.3 HF Route 5: 975 feet south of MP 2.3 HF Hybrid Route: 975 feet south of MP 2.5
Trail Network in the ITA	Unconstructed, proposed project	HF Route 1: Crossed at MPs 3.9, 4.3, 5.5, 6.6, and 7.5 HF Route 2: Crossed at MPs 3.9, 4.3, 6.3, 6.5, 6.9, 7.3, 7.4, and 7.7 HF Route 5: Crossed at MPs 3.9, 4.3, 6.7, 7.1, and 7.9 HF Hybrid Route: Crossed at MPs 4.1, 4.5, 5.7, 6.8, and 7.7 Line #2085 Route Variation: Crossed at MPs 1.1, 1.5, and 2.4
Bio-Tech Park	Unconstructed, proposed project	HF Route 1: Crossed at MPs 4.7 to 4.9 HF Route 2: Crossed at MPs 4.7 to 4.9 HF Route 5: Crossed at MPs 4.7 to 4.9 HF Hybrid Route: Crossed at MPs 4.9 to 5.1
Virginia Beach Sports Center	Constructed, future updates/ alterations may occur regarding additional fields	HF Route 1: Crossed at MPs 4.9 to 6.2 HF Route 2: Crossed at MPs 4.9 to 5.6 HF Route 5: Crossed at MPs 4.9 to 5.8 HF Hybrid Route: Crossed at MPs 5.1 to 6.4 Line #2085 Route Variation: Crossed at MPs 0.0 to 0.2
Expanded Road Network in the ITA	Unconstructed, proposed project	HF Route 2: Crossed at MP 5.6 (Landstown Road) and 6.7 (Nimmo Parkway) HF Route 5: Adjacent between MPs 5.5 and 8.0 (Landstown Road) and crossed at MP 6.8 (Nimmo Parkway) Line #2085 Route Variation: Adjacent between MPs 0.0 and 2.4 (Landstown Road) and crossed at MP 1.2 (Nimmo Parkway)
City Municipal Services Facilities	Unconstructed, proposed project	HF Route 1: 150 feet south of MP 5.6 HF Route 2: Crossed at MPs 5.6 to 6.3 HF Route 5: Crossed at MPs 5.7 to 6.7 HF Hybrid Route: 150 feet south of MP 5.6 Line #2085 Route Variation: Crossed at MPs 0.2 to 1.1

Development Name	Status	Approximate Distance and Direction from each Alternative Route or Facility
Preservation and Passive Recreation in the ITA	Active with future updates/ additions	HF Route 1: 325 feet southeast of MP 6.6 HF Route 2: Crossed at MPs 6.4 to 7.3 HF Hybrid Route: 325 feet southeast of MP 6.8
Agricultural Production Areas in the ITA	Active with future updates/ additions	HF Route 2: Crossed at MPs 6.3 to 6.4 HF Route 5: Crossed at MPs 6.7 to 8.0 Line #2085 Route Variation: Crossed at MPs 1.1 to 2.5
Salem Road Subdivision	Unconstructed, proposed project	HF Route 1: 1,200 feet northwest of MP 6.7 HF Hybrid Route: 1,200 feet northwest of MP 6.9
North Landing Bridge Replacement	Unconstructed, proposed project	HF Route 5: Crossed at MP 9.4 Line #2085 Route Variation: Crossed at MP 3.7
Bedford Solar Center	Under Construction	HF Route 1: Crossed at MPs 11.9 to 12.5 HF Route 2: Crossed at MPs 13.0 to 13.6 HF Hybrid Route: Crossed at MPs 12.1 to 12.7

CLH = Cable Landing to Harpers; HF = Harpers to Fentress; ITA = Interfacility Traffic Area; MP = milepost

4.2.7.1 State Military Reservation Development Plan

As discussed in Section 3.1.1.2, Cable Landing to Harpers Route, the CLH Route was developed in coordination with SMR staff. The route would overlap with portions of two potential future developments (parking lots) at the base that would be compatible with an underground electric transmission line. The DMA concurred in principle with the route in a letter to Dominion dated April 13, 2021, and provided an overview of the route selection process, including a discussion of factors affecting SMR's identification of the CLH as its preferred route, in a letter dated June 24, 2021. Copies of both letters are provided in Appendix C, Correspondence.

4.2.7.2 McQ Single Family Homes

The McQ Single Family Home Lots 2A and 2B are proposed single family residential developments currently under review by the City of Virginia Beach. The lots are located on the south side of Bells Road east of Oceana Boulevard. These two planned developments are within a larger residential development (Bellwood Park) constructed in the 1980s. None of the alternative transmission line routes would cross this development.

4.2.7.3 Sunny Farms Hydroponic Greenhouse

The Sunny Farms Hydroponic Greenhouse Development is a proposed hydroponic greenhouse complex southeast of Harpers Road in Virginia Beach near the existing Pupil Transportation Services Maintenance Facility (Virginia Pilot 2021). Four greenhouses are proposed for the initial development, called Phase 1. Future buildout of the development is planned in Phase 2 and 3, and will be located southeast of the Phase 1 area. HF Routes 1, 2, and 5 and the HF Hybrid Route would each pass along the western boundary of the proposed complex. Dominion coordinated with the developer to avoid conflicts with this planned development.

4.2.7.4 Creech Outside Storage

Creech Outside Storage is a planned outdoor storage facility adjacent to, and on the south side of, Dam Neck Road in Virginia Beach. A dry stormwater detention pond additionally is proposed between the edge

of the road and the fence line of the planned facility. The Dam Neck Route Variation would cross this development at approximately MPs 0.6 to 0.8.

4.2.7.5 Nimmo Quay

The Nimmo Quay is a planned 130-unit residential development along the north side of Nimmo Parkway in Virginia Beach. The development would consist of single family residential dwellings, parks, open space, and residential streets. None of the alternative transmission line routes would cross this development.

4.2.7.6 Bio-Tech Park

Bio-Tech Park, originally referred to as Princess Anne Corporate Park, is a proposed corporate park in Virginia Beach designed to take advantage of the SEPG corridor. If constructed, this complex would complement existing medical and research institutions in nearby areas to the northwest. The proximity of the proposed development to the Princess Anne Athletic Complex additionally would provide an opportunity for health and wellness related businesses to locate in the corporate park. Based on review of the conceptual development plan, HF Routes 1, 2, and 5 and the HF Hybrid Route would each cross the proposed development area.

In October 2021, staff with the City of Virginia Beach shared with Dominion a conceptual site plan for a new development within the Bio-Tech Park area. Based on the site plan, the ROW for HF Routes 1, 2, and 5 (approximate MPs 4.9 to 5.1) and the HF Hybrid Route (approximate MPs 5.1 to 5.3) would cross a parking lot and stormwater management pond and be adjacent to a building in the area just east of Princess Anne Road should this planned development move forward.

4.2.7.7 Virginia Beach Sports Center Expansion

The ITA outlines future expansion of the Virginia Beach Sports Center, which encompasses the Princess Anne Athletic Complex, the Sportsplex, and the U.S. Field Hockey Complex (Urban Design Associates 2017). The first sports fields associated with the Virginia Beach Sports Center were constructed in the late 1990s and early 2000s. Since then, additional sports fields have been constructed as needs have grown. The Sport Center plans to continue to develop the area with additional fields in the future. Based on review of conceptual development plans, four additional multi-use soccer fields would be constructed on the north side of the SEPG, and an additional 11 baseball/softball fields would be constructed on the south side of the SEPG. HF Routes 1, 2, and 5 and the HF Hybrid Route would each cross the proposed development.

4.2.7.8 City Municipal Services Facilities

The City Municipal Services Facilities is a proposed development to be built in the ITA as a new solid waste transfer station in Virginia Beach. The planned development is located south of the proposed expansion of the Virginia Beach Sports Center and east of the proposed extension of Landstown Road (see Section 4.2.7.12, Expanded Road Network in the ITA). The property for the waste transfer station is large enough to create an undeveloped buffer between the station and adjacent lands and roads to the west. HF Route 2 would cross the western portion of the proposed development while HF Route 5 and the Line #2085 Route Variation would cross the eastern portion of the proposed development.

4.2.7.9 Agricultural Production Areas

Agricultural Production Areas occur in the southern portion of the ITA in Virginia Beach. As outlined in the ITA, continued agricultural production is considered essential for this area. The City has plans to create a research farm, educational facility, and visitor center specializing in agricultural studies. Experimentation

of new agricultural products and farming techniques additionally are planned for the area. Short segments of HF Route 2 would be adjacent to the planned agricultural areas where the routes parallel the proposed extension of Landstown Road (see Section 4.2.7.12, Expanded Road Network in the ITA). HF Route 5 and the Line #2085 Route Variation would be adjacent to the planned agricultural areas for longer distances where these routes are adjacent to the Courthouse Estates residential subdivision (along Dominion's existing Line #2085).

4.2.7.10 Preservation and Passive Recreation Area

The Preservation and Passive Recreation Area is an area identified in the ITA between the future Landstown Road, Salem Road, and Nimmo Parkway extensions (see Section 4.2.7.12, Expanded Road Network in the ITA). The area is home to a plethora of natural resources, including wetlands and habitat for native wildlife. City planners envision that the area could store rainwater and act as flood prevention. Wetland restoration, enhancement projects, canals, and other improvements could improve drainage and expand the area's biodiversity. Recreational opportunities for the planned development include trails, canoeing, kayaking, fishing, hiking, and bird watching. HF Route 2 would cross the Preservation and Passive Recreation Area.

4.2.7.11 Trail Network in the Interfacility Traffic Area

The City of Virginia Beach plans to expand the trail network within the ITA. Trails would be a combination of expanded roadways with space for pedestrians and bikers as well as standalone trails. Multiple planned trails would be crossed by HF Routes 1, 2, and 5, the HF Hybrid Route, and the Line #2085 Route Variation.

4.2.7.12 Expanded Road Network in the Interfacility Traffic Area

The City of Virginia Beach Master Plan includes the buildout of roads in the ITA area. The Master Plan envisions the extension of Landstown Road to the south, a connection of Nimmo Parkway between the proposed Landstown Road extension and Salem Road, and improvements to Indian River Road and western extents of Nimmo Parkway. These additions and improvements would allow for improved access through the ITA. Plans for the road buildout are conceptual, subject to change, and dependent on other developments moving forward as well as ongoing assessments of the City's transportation needs.

Based on the most recent information shared by the City transportation department (current as of October 2021), the planned future extension of Landstown Road would follow the western side of Dominion's existing ROW for Line #2085 between the Princess Anne Athletic Complex and Indian River Road. City staff advised Dominion that under the current plan, the road extension would be immediately adjacent to the existing ROW for Line #2085 to minimize impacts on potentially developable land in the area immediately to the west. HF Route 5 and the Line #2085 Route Variation would each be within and adjacent to the Line #2085 ROW in this area.

The planned future extension of Nimmo Parkway would head west across the ITA between West Neck Road and Salem Road. HF Routes 2 and 5 and the Line #2085 Route Variation would each cross the road extension.

4.2.7.13 Salem Road Subdivision

The Salem Road Subdivision is a planned 113-unit residential development on the north side of Salem Road west of Lisban Road, currently under review by the City of Virginia Beach. The development would consist of single-family residential dwellings, a park and gathering space, tree-lined residential streets, and several water retention ponds. None of the routes would cross this development.

4.2.7.14 North Landing Bridge Replacement

The USACE prepared a feasibility study (USACE 2020) for replacing or improving the existing North Landing River Bridge, which is part of State Highway 165 and spans the federally owned and operated Intracoastal Waterway. The recommended plan consists of replacing the existing bridge with a fixed high-rise bridge with a maximum roadway elevation of 78 feet above sea level and a total bridge length of 3,360 feet. At these proposed dimensions, HF Route 5 and the Line #2085 Route Variation would each cross portions of the elevated bridge. Based on review of a preliminary profile drawing provided in the feasibility study, the Line #2085 Route Variation would cross the bridge where the bridge is at an elevated elevation of approximately 25 feet, while HF Route 5 would cross at an elevated elevation of approximately 50 feet. The USACE has not proposed a schedule for completing the bridge replacement, which would require funding approval from Congress.

4.2.7.15 Bedford Solar Center

The Bedford Solar Center is a photovoltaic solar farm northwest of NALF Fentress in Chesapeake that is currently under construction. When complete, the project will be a 70-megawatt solar farm covering approximately 566 acres composed of ground-mounted solar panels on a single axis tracking system, mounted approximately 10 feet above ground level. HF Routes 1, 2, and the HF Hybrid Route would each cross this solar facility.

4.2.8 Easements and Other Protected Lands

ERM coordinated with local, state, and federal agencies to identify all easement types and individual easements throughout the study area. Easements within the study area and their proximity to the overhead alternative routes and associated facilities are described below.

4.2.8.1 U.S. Navy Restrictive Use Easements

NAS Oceana Restrictive Use Easements

The USN has acquired Restrictive Use Easements (RUEs) on most parcels immediately surrounding NAS Oceana to provide a buffer between air operations at the base and nearby residential and commercial areas in Virginia Beach (Figure 4.2-7 in Appendix A, Figures). Most parcels covered by the RUEs are either open space/agricultural or contain commercial developments. The easements aim to reduce development that would be incompatible with uses of the air station and surrounding air space. In general, aboveground electric transmission structures and conductors are allowed on most encumbered parcels per easement provisions. However, most encumbered parcels have specified maximum height restrictions applicable to transmission structures. These generally range from 132 to 170 feet above sea level. HF Routes 1, 2, and 5 and the Dam Neck Route Variation would each cross parcels encumbered by these types of easements.[18]

NALF Fentress Restrictive Use Easements

Similar to NAS Oceana, the USN has acquired RUEs on most parcels immediately surrounding the airfield at NALF Fentress (generally areas within about 1.0 mile of the facility) to provide a buffer between USN air operations and existing and new development in Chesapeake (Figure 4.2-7 in Appendix A, Figures). Most land immediately surrounding the airfield is used for agricultural purposes or classified as conservation/open space. The easement program limits new residential and commercial development

[18] The CLH Route and underground portion of the HF Hybrid would also cross parcels subject to USN RUEs around NAS Oceana, but the transmission circuits for these routes would installed underground.

around the airfield. In general, aboveground electric transmission structures and conductors are allowed on encumbered parcels per the easement provisions. However, most parcels have specified maximum height restrictions applicable to transmission structures, which range from 120 to 170 feet above sea level along the routes. HF Routes 1, 2, and 5, the overhead portion of the HF Hybrid Route, and the Line #2085 Route Variation would each cross parcels encumbered by these types of easements.

4.2.8.2 City of Virginia Beach Easements

Agricultural Reserve Program Easements

The City of Virginia Beach enacted the Agricultural Lands Preservation Ordinances and the Virginia Beach Agricultural Reserve Program in 1995 (City of Virginia Beach 2017b). Since then, the City has purchased easements on dozens of parcels in the southern half of the city (see Figure 4.2-8 in Appendix A, Figures). The easements promote continued agricultural practices and limit development and alternative uses of encumbered parcels. Easements on lands are only granted if the parcel is greater than 10 acres. No easements of this type would be crossed by the alternative transmission line routes discussed in this report; however, HF Route 5 would pass within 150 feet of an Agricultural Reserve Program Easement near MP 14.4.

4.2.8.3 City of Chesapeake Easements

NALF Fentress Encroachment Protection Acquisition Program

In 2005, the City of Chesapeake began coordinating with the Commonwealth of Virginia and USN to acquire parcels not previously encumbered by the USN's RUEs in the City's Fentress Airfield Overlay District. The City, Commonwealth, and USN identified areas with no residential and commercial development where existing or future air space requirements may impact future development. The City offered fair market value to landowners for development rights. The easements prevent encroachment and incompatible uses of parcels while preserving rural and agricultural uses in the Fentress area (City of Chesapeake 2021b); however, utilities are an allowable use within parcels acquired under the program. HF Routes 1, 2, and 5 and the HF Hybrid Route would each cross one or more of these types of easements.

Multi-Year Encroachment Protection Easements

The City of Chesapeake partners with the USN to acquire or purchase easements on lands near NALF Fentress. Open Space and Agricultural Preserve Easements restrict the development of and preserve the ecological benefits and characteristics of encumbered parcels (City of Chesapeake 2021c). Once acquired, any future proposed work on encumbered parcels requires approval from both the City and USN. One easement of this type (referred to as the Sawyer Tract) would be crossed by HF Route 1 (at MP 7.9 and between MPs 8.7 and 9.9) and the HF Hybrid Route (at MP 8.2 and between MPs 8.9 and 10.1). In both cases, the crossing would be adjacent to Dominion's existing ROW for Lines #271/I-74. The affected parcel is owned in fee by the City of Chesapeake.

Purchase of Development Rights Easements

The City of Chesapeake implements a program where the City will, for fair market value, purchase the development rights on parcels in ecologically valuable areas and encumber the land under a conservation easement. Easements acquired under this program are contingent on City Council approval. Once approved, the easements are perpetual and non-revocable. No easements of this type would be crossed by or near the alternative transmission line routes and associated facilities discussed in this report.

4.2.8.4 Other Easements and Districts

National Resource Conservation Service Wetland Reserve Program Easements

The National Resource Conservation Service (NRCS) Wetland Reserve Program is a voluntary program that allows landowners the ability to enroll their property in an easement program aimed at enhancing and protecting wetlands on their property (NRCS 2021). Landowners who enroll in the program are provided technical and financial support from the United States Department of Agriculture (USDA) to aid in protecting and restoring wetlands on their property. The program also aims to create long-term conservation and wildlife practices among property owners. All easements are categorized as permanent easements, meaning they are an easement in perpetuity in which the USDA pays 100 percent of the easement value. No NRCS Wetland Reserve Program easements would be crossed by the alternative routes and associated facilities discussed in this report. HF Route 5 would pass within 470 feet of an easement near MP 15.2 (see Figure 4.2-8 in Appendix A).

Fish and Wildlife Service Conservation Easements

The FWS enters into conservation easements with willing landowners who want to preserve the habitat and natural features of their property. Typically, landowners are required to limit development and use of the property (FWS 2018). Currently, one FWS Conservation Easement is located in the study area; however, none of the alternative transmission line routes would cross or pass near this easement.

Virginia Outdoors Foundation Easements

The Virginia Outdoors Foundation (VOF) leads Virginia in land conservation, protecting over 850,000 acres across the state. The VOF was established in 1966 under the Virginia Open-Space Land Act, which provides for the creation of open-space easements by public bodies as a means of preserving open space or significant natural, cultural, and recreational resources on public or private lands (VOF undated). Most easements created under the Act are held by the VOF, but any state agency is authorized to create and hold an open-space easement. The easements are designed to preserve and protect open space or other resources in perpetuity. Easements negotiated with private landowners allow the lands to remain in private ownership, but with protections imposed to limit or restrict land uses and development on the property (VOF undated). No easements of this type would be crossed by or near the alternative transmission line routes and associated facilities.

Agricultural and Forestal Districts

The Virginia Local Agricultural and Forestal Districts (AFD) Act provides for the creation of conservation districts (Va. Code § 15.2-43). These districts are designed to conserve, protect, and encourage the development and improvement of a locality's agricultural and forested lands for the production of food and other products, while also conserving and protecting land as valued natural and ecological resources (Virginia Farm Bureau 2017). These districts are voluntary agreements between landowners and the locality, and offer benefits to landowners when they agree to keep their land in its current use for between 4 and 10 years. A district must contain at least 200 acres. No AFDs would be crossed by or near the alternative transmission line routes and associated facilities.

4.2.9 Airports

Transmission line towers have the potential to affect airspace in and around airports. In routing and building new overhead electric transmission lines, airports are an important consideration. This section provides a summary of the airports in the vicinity of the study area and the airspace regulations that could have an impact on the onshore Virginia Facilities.

4.2.9.1 Airports within or near the Study Area

ERM reviewed the Federal Aviation Administration's (FAA's) website to identify public use airports, airports operated by a federal agency or the DOD, airports or heliports with at least one FAA-approved instrument approach procedure, and public use or military airports under construction (FAA 2021). This review identified 15 airports, private airstrips, or heliports within 10 nautical miles of the alternative transmission line routes and associated facilities discussed in this study (see Figure 4.2-9 in Appendix A, Figures). Table 4.2-11 lists the airport, heliport, or private airstrip name and owner in the vicinity of each transmission line route, including airport identification number, distance and direction from the nearest onshore Virginia Facility, type of use, and maximum runway length.

Staff from SMR advised Dominion that there are helicopter landing locations on the base used for training exercises, including a helipad near the Lake Christine crossing along the CLH Route (this helipad is not included in Table 4.2-11). These landing locations and helipads are not registered with the FAA. Dominion worked with SMR staff to align the CLH Route to avoid conflicts with helicopter traffic and use of the helipad near the route.

Table 4.2-11: Airports, Heliports, and Private Airstrips in the Vicinity of the Onshore Virginia Facilities

Airport Name	Airport ID	Approximate Distance and Direction from each Alternative Route or Facility (nautical miles)	Use	Maximum Runway Length (feet)
NAS Oceana	NTU	0.4 west of CLH Route 1.2 northwest of all HF Routes 1.2 northwest of Harpers Switching Station	Military Use	12,008
NALF Fentress	NFE	1.3 east of HF Route 1 and HF Hybrid Route 1.1 south of HF Route 2 and Line #2085 Route Variation 0.6 west of HF Route 5	Military Use	8,004
Sentara Princess Anne Heliport	42VG	1.0 northwest of all HF Routes	Private Use	NA
Virginia Beach Municipal Heliport	56VA	1.2 south of all HF Routes	Private Use	NA
LZ Alfa Heliport	VA38	2.0 east of CLH Route	Military Use	NA
Virginia Beach Airport	42VA	3.0 east of HF Route 5	Private Use	4,845
Breeden Company Heliport	2VG5	3.0 northwest of CLH Route	Private Use	NA
Virginia Beach General Hospital Heliport	2VA7	3.0 north of CLH Route	Private Use	NA
Chesapeake General Hospital Heliport	11VA	4.3 northwest of all HF Routes	Private Use	NA
Armada/Hoffler Business Center Heliport	VA69	4.8 northwest of HF Route 1 and HF Hybrid Route 5.1 northwest of HF Route 2 6.2 north of HF Route 5	Private Use	NA
Division Five Heliport	47VA	5.5 northwest of HF Route 1 and HF Hybrid Route	Private Use	NA

Airport Name	Airport ID	Approximate Distance and Direction from each Alternative Route or Facility (nautical miles)	Use	Maximum Runway Length (feet)
		5.7 northwest of HF Route 2 6.8 north of HF Route 5		
Chesapeake Regional Airport	CPK	6.1 west of all HF Routes	Public Use	5,500
Sentara Leigh Hospital Heliport	VA15	6.6 northwest of HF Route 1 and HF Hybrid Route 7.2 northwest of HF Routes 2 and 5	Private Use	NA
Norfolk International Airport	ORF	8.8 northwest of HF Route 1 and HF Hybrid Route	Public Use	9,000
WAVY TV Heliport	10VG	9.0 northwest of HF Route 1 and HF Hybrid Route 9.1 northwest of HF Route 2	Private Use	NA

Source: FAA 2021, Virginia National Guard 2021.

CLH = Cable Landing to Harpers; E = east; HF = Harpers to Fentress; ID = identification; LZ = landing zone; NA = not applicable; NALF = Naval Auxiliary Landing Field; NAS = Naval Air Station; WAVY-TV = television station

4.2.9.2 Accident Potential Zones

As part of the USN and Virginia Beach/Chesapeake AICUZ Program, the USN has established APZs around both NAS Oceana and NALF Fentress. APZs are areas where an aircraft accident is most likely to occur if one should occur (City of Virginia Beach 2017c). APZs follow arrival, departure, and pattern flight tracks, and are found extending from the end of runways and around airfields. Three specific zones are defined: the clear zone, APZ 1, and APZ 2. The clear zone extends 3,000 feet beyond the runway and has the highest potential for an accident. APZ 1 generally extends 5,000 feet beyond the clear zone, and APZ 2 generally extends 7,000 feet beyond APZ 1. Figure 4.2-10 (Appendix A, Figures) shows the extents of the APZs.

Per USN restrictions, overhead electric transmission lines are prohibited in the clear zone and APZ 1, but allowed within APZ 2. Underground electric transmission lines are allowed in all three zones. None of the overhead segments of the alternative routes discussed in this report would cross areas within the clear zone or APZ 1.

4.2.9.3 Federal Aviation Regulations

The FAA is responsible for overseeing air transportation in the United States. The FAA focuses on air transportation safety, including the enforcement of safety standards for aircraft manufacturing, operation, and maintenance. The FAA also manages air traffic in the United States and evaluates physical objects that may affect the safety of aeronautical operations through an obstruction evaluation. The prime objective of the FAA in conducting an obstruction evaluation is to ensure the safety of air navigation and efficient utilization of navigable airspace by aircraft.

The regulations that govern objects that may affect navigable airspace are codified in the Code of Federal Regulations, Title 14, Part 77 (14 CFR Part 77). A summary of the final rule as it relates to the onshore Virginia Facilities is provided in Sections 4.2.9.4 and 4.2.9.5, Civil and DOD Airport Imaginary Surfaces.

4.2.9.4 Civil Airport Imaginary Surfaces

Civil airport imaginary surfaces have been established with relation to each airport and to each runway. The imaginary surfaces were developed to prevent existing or proposed objects from extending from the ground into navigable airspace. Following is a description of the civil imaginary surfaces:

- Horizontal surface: A horizontal plane 150 feet above the established airport elevation, the perimeter of which is constructed by swinging arcs of specified radii from the center of each end of the primary surface of each runway and connecting the adjacent arcs by lines tangent to those arcs.
- Conical surface: A surface extending outward and upward from the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet.
- Primary surface: A surface longitudinally centered on a runway. The primary surface extends 200 feet beyond the end of each runway. The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline.
- Approach surface: A surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface. An approach surface is applied to each end of each runway based upon the type of approach available or planned for that runway end (e.g., precision instrument approach, visual approach).
- Transitional surface: These surfaces extend outward and upward at right angles to the runway centerline and the runway centerline extended at a slope of 7 to 1 from the sides of the primary surface and from the sides of the approach surfaces. Transitional surfaces for those portions of the precision approach surface that project through and beyond the limits of the conical surface extend a distance of 5,000 feet measured horizontally from the edge of the approach surface and at right angles to the runway centerline.

4.2.9.5 Department of Defense Airport Imaginary Surfaces

DOD airport imaginary surfaces have been established with relation to each airport and to each runway. The imaginary surfaces were developed to prevent existing or proposed objects from extending from the ground into navigable airspace. Figures 4.2-11 and 4.2-12 (Appendix A, Figures) display the imaginary surfaces for both runways associated with NAS Oceana and NALF Fentress. Following is a description of the DOD imaginary surfaces:

- Inner horizontal surface: A plane that is oval in shape at a height of 150 feet above the established airfield elevation. The plane is constructed by scribing an arc with a radius of 7,500 feet about the centerline at the end of each runway and interconnecting these arcs with tangents.
- Conical surface: A surface extending from the periphery of the inner horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 7,000 feet to a height of 500 feet above the established airfield elevation.
- Outer horizontal surface: A plane, located 500 feet above the established airfield elevation, extending outward from the outer periphery of the conical surface for a horizontal distance of 30,000 feet.
- Primary surface: A surface located on the ground or water longitudinally centered on each runway with the same length as the runway. The width of the primary surface for runways is 2,000 feet. However, at established bases where substantial construction has taken place in accordance with a previous lateral clearance criteria, the 2,000-foot width may be reduced to the former criteria.
- Clear zone surface: A surface located on the ground or water at each end of the primary surface, with a length of 1,000 feet at the same width as the primary surface.

- Approach clearance surface: An inclined plane, symmetrical about the runway centerline extended, beginning 200 feet beyond each end of the primary surface at the centerline elevation of the runway end and extending for 50,000 feet. The slope of the approach clearance surface is 50 to 1 along the runway centerline extended until it reaches an elevation of 500 feet above the established airport elevation. It then continues horizontally at this elevation to a point 50,000 feet from the point of beginning. The width of this surface at the runway end is the same as the primary surface, it flares uniformly, and the width at 50,000 feet is 16,000 feet.
- Transitional surface: These surfaces connect the primary surface, the first 200 feet of the clear zone surfaces, and the approach clearance surfaces to the inner horizontal surface, conical surface, outer horizontal surface, or other transitional surfaces. The slope of the transitional surface is 7 to 1 outward and upward at right angles to the runway centerline.

4.2.9.6 Terminal Instrument Procedures

In addition to the civil and DOD airport imaginary surfaces, there are imaginary surfaces associated with terminal instrument procedures (TERPS). TERPS are procedures for instrument approach and departure of aircraft to and from civil and military airports. TERPS are used for airport obstruction analysis to protect airspace by establishing restrictions on the height of buildings, antennas, trees, and other objects as necessary to protect the airspace needed for aircraft during preparation for, and completion of, the landing or departure phases of flight. None of the alternative transmission line routes would have structures exceeding the TERPS surfaces of the airports identified in Table 4.2-11.

4.2.9.7 Federal Aviation Administration Notice Requirements and Timing

Based on the runway categories and dimensional standards described above, a notice must be filed with the FAA if:

- Any construction or alteration is more than 200 feet above ground level at its site.
- Any construction or alteration exceeds an imaginary surface extending outward and upward at the following slope:
  - 25 to 1 for a horizontal distance of 5,000 feet from the nearest point of the nearest landing and takeoff area of each heliport;
  - 50 to 1 for a horizontal distance of 10,000 feet from the nearest point of the nearest runway that is no more than 3,200 feet in actual length; and
  - 100 to 1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway that is more than 3,200 feet in actual length.
- Requested by the FAA.

Construction or alteration of any structure that meets the notification requirements set forth above must submit an FAA Form 7460-1, Notice of Proposed Construction or Alteration (Notice), to the FAA Regional office having jurisdiction over the area within which the construction or alteration will be located or submitted electronically via the FAA website. The information that needs to be provided with the Notice includes the coordinates, site elevation, and structure height above ground level for each pole/structure and the height of construction equipment, such as cranes.

The transmission line structures for the alternative routes discussed in this study would be 120 feet tall on average with taller structures required when crossing various existing features (e.g., the Intracoastal Waterway). It is anticipated that cranes would be used to install the structures. Based on current plans, the onshore Virginia Facilities would exceed the FAA notification thresholds described above at two

airports. Table 4.2-12 identifies the airports that will require submitting a Notice to the FAA for the Virginia Facilities.

Table 4.2-12: Airports Where FAA Notification is Required for the Virginia Facilities

Nearest Airport	Airport ID	Approximate Distance and Direction from each Alternative Route or Facility (nautical miles)	Use
NAS Oceana	NTU	1.3 northwest of all HF routes 1.3 northwest of Harpers Switching Station	Military Use
NALF Fentress	NFE	1.3 east of HF Route 1 and HF Hybrid Route 1.1 south of HF Route 2 and Line #2085 Route Variation 0.6 west of HF Route 5	Military Use

HF = Harpers to Fentress; ID = identification; NALF = Naval Auxiliary Landing Field; NAS = Naval Air Station

4.2.9.8 State and Local Regulations

Commonwealth of Virginia Aviation Regulations

Va. Code § 5.1-25.1 establishes that it is unlawful for a person to erect any structure that penetrates into or through any licensed airport's clear zone, approach zone, imaginary surface, obstruction clearance surface, obstruction clearance zone, or surface or zone as described in regulations of the Virginia Department of Aviation or the FAA, without first securing a permit for its erection from the Board of Aviation. However, it also states that this requirement does not apply to any structure to be erected in a county, city, or town that has an ordinance regulating the height of such structures to prevent the penetration of zones and surfaces provided for in 14 CFR Part 77 and Rule 19 of the Virginia Department of Aviation.

Local Airport Regulations

Va. Code §§ 15.2-2280, 15.2-2282, 15.2-2293, and 15.2-2294 give local jurisdictions the power to establish and regulate zoning districts, make airspace subject to their zoning ordinance, and establish airport safety zoning. The following zoning regulations summary is applicable to the airports listed in Table 4.2-11.

City of Virginia Beach: The City of Virginia Beach established the AICUZ Overlay Ordinance. The AICUZ is described in more detail in Section 4.2.6.1, Military Installations and Local Zoning, but is intended to regulate land use in a manner consistent with the rights of property owners by restricting development of uses and structures that are incompatible with military operations. No further zoning regulations pertaining to airspace are referenced in the City's zoning ordinance or Code of Ordinances.

City of Chesapeake: The City of Chesapeake has established restricted-use zones to regulate the use of property in the vicinity of NALF Fentress. Airport Safety Zones are part of a zoning overlay district administered by the City's Zoning Department. The zones include the Airport Zone, Approach Zone, Transitional Zone, and the Conical Zone. The geometric standards for the zones are found in 14 CFR Part 77 as outlined above in Sections 4.2.9.4 and 4.2.9.5 (Civil and DOD Imaginary Surfaces). No structure is permitted to be constructed in these zones unless permitted by the Department. Should a structure be proposed to be constructed in these zones, the City manager would consult with the Virginia Department of Aviation, and a permit would only be granted if there is an unnecessary hardship to the public interest and the structure would not create a hazard to air navigation. The airport owner must receive a copy of the permit application to provide advice and insight to the City manager.

4.2.10 Transportation—Roads and Railroads

As discussed in previous sections, the study area is densely populated in the north with more rural areas in the south. The more densely populated areas in the north contain many more highways and residential roads while the southern areas have fewer roadways. The CLH Route would cross a total of nine roads, with General Booth Boulevard and Oceana Boulevard being the major trunk roads and the remainder consisting of smaller tertiary and residential roads. From the Harpers Switching Station site to the point where the alternative routes diverge from one another, HF Routes 1, 2, and 5 and the HF Hybrid Route would each cross six roads, with the major trunk roads being Dam Neck Road, London Bridge Road, Holland Road, and Princess Anne Road.

South of Princess Anne Road, the alternative routes would follow different alignments to Fentress Substation. HF Route 1 and the HF Hybrid Route would cross eight roads, with the major crossings being Landstown Road, Salem Road, Indian River Road, Mt. Pleasant Road, and Centerville Turnpike. HF Route 2 would cross six roads, with major crossings at Salem Road, Indian River Road, Mt. Pleasant Road, and Centerville Turnpike. HF Route 5 would cross 13 roads, including North Landing Road, Indian River Road, Mt. Pleasant Road (twice), Blackwater Road (thrice), Land of Promise Road (twice), and Centerville Turnpike. All of these routes additionally would cross the Chesapeake & Albemarle Railroad before entering the Fentress Substation.

The Dam Neck Route Variation would only cross two roads, Harpers Road and London Bridge Road. The Line #2085 Route Variation would cross four roads, including North Landing Road (twice), Indian River Road, and Upton's Lane.

4.3 Natural Resources

Natural resources in the study area include wetlands, waterbodies, areas of ecological significance, protected species, and vegetation. ERM used multiple desktop data sources to map wetlands and waterbodies within the ROW corridors for each alternative transmission line route as discussed in Section 4.3.1. For areas of ecological significance and protected species, ERM used data from the FWS (2021a), VDCR Natural Heritage Program (NHP) (VDCR 2021b), and Virginia Department of Wildlife Resources (VDWR) (VDWR 2021b) web services. ERM evaluated vegetation communities using ArcGIS aerial imagery from March 2020 to assess vegetative cover types along the alternative transmission line routes. ERM reviewed publicly available GIS data layers and NHP data to conduct a preliminary review of areas of ecological significance, potential protected species locations, and vegetative communities in the study area along and near the alternative transmission line routes and other onshore Virginia Facilities discussed in this report.

4.3.1 Wetlands

ERM identified and mapped wetlands in the study area using publicly available data, including:

- USGS 7.5-minute series topographic mapping (USGS 2021b)
- FWS NWI mapping (FWS 2021a)
- Soils data from the U.S. Department of Agriculture Natural Resources Conservation Service (USDA-NRCS) Soil Survey Geographic database (USDA 2021a)
- The National Hydrography Dataset (NHD) (USGS 2021a)
- National Agricultural Imagery Program Digital Ortho-Rectified Images (NAIP 2019)
- Recent (2020) digital aerial photography
- City of Virginia Beach stream GIS data layers (City of Virginia Beach 2019a,c)
- City of Chesapeake stream GIS data layers (City of Chesapeake 2018b)

For reference, an overview map illustrating the location of NWI wetlands in the study area is provided as Figure 4.3-1 (Appendix A, Figures). A complete desktop Wetland and Waterbody Report, including wetland mapping based on the sources listed above, is attached as Appendix F. That report quantifies the wetland types that would be crossed by each alternative transmission line route.

The majority of the wetlands in the study area are adjacent to, or contiguous with, rivers, streams, and associated tributaries regulated by the USACE and Virginia Department of Environmental Quality (VDEQ) under Sections 404 and 401 of the Clean Water Act (CWA), respectively. Based on the wetland classification system defined by Cowardin et al. (1979), wetlands in the Project area primarily are classified as palustrine emergent (PEM), palustrine scrub-shrub (PSS), and palustrine forested (PFO). PEM wetlands are characterized by erect, rooted, herbaceous hydrophytes (i.e., aquatic plants), excluding mosses and lichens; PSS wetlands are characterized by woody vegetation less than 20 feet tall; and PFO wetlands are characterized by woody vegetation that is at least 20 feet tall.

The subsections below identify areas along each route where longer crossings of wetlands or wetland complexes would occur. In addition to these areas, each route would cross more isolated occurrences of PEM, PSS, or PFO wetlands as well as numerous drainage ditches in agricultural fields along the routes. Parts of the Harpers Switching Station site and expanded area at Fentress Substation would encompass PFO and/or PEM wetlands, and all of the Chicory Switching Station site would be in a PFO wetland area.

4.3.1.1 Cable Landing to Harpers Route

Crossings of larger expanses of wetlands would occur in the following locations along the CLH Route:

- Predominantly PFO wetlands surrounding Lake Christine in the area generally between Regulus Avenue and Lake Road (approximate MPs 0.0 to 0.3); this crossing would be by HDD;
- Estuarine (E2EM), PFO and PSS wetlands associated with Owl Creek in the area generally between General Booth Boulevard and Birdneck Road (approximate MPs 0.9 to 2.0); the crossing of Owl Creek and adjacent wetlands (including the estuarine wetlands) would be by HDD;
- Predominantly PFO wetlands where the route would parallel the east side of Oceana Boulevard (approximate MPs 2.6 to 3.4); and
- Predominantly PFO wetlands where the route would parallel the north side of Harpers Road (approximate MPs 3.7 to 4.4).

4.3.1.2 Harpers to Fentress Route 1

Crossings of longer expanses of wetlands would occur in the following locations along HF Route 1:

- Predominantly PFO wetlands in an area north of Dam Neck Road (approximate MPs 0.6 to 0.9);
- Predominantly PFO wetlands with smaller areas of PEM and PSS wetlands associated with West Neck Creek in the area generally between London Bridge Road and Princess Anne Road (approximate MPs 1.7 to 4.7); most of this segment would be within the SEPG corridor, including 1.8 miles that would also be within and adjacent to Dominion's existing transmission ROW for Lines #2118/147;
- Predominantly PFO wetlands with smaller areas of PEM and PSS wetlands in the area generally between Landstown Road in Virginia Beach and Mt. Pleasant Road in Chesapeake (approximate MPs 5.5 to 10.8), where the route would be within and adjacent to Dominion's existing ROW for Lines #271/I-74; this part of the route would cross a channelized segment of the North Landing River (approximate MP 7.2) and the Intracoastal Waterway canal (approximate MP 10.4); the area between the river and the waterway is generally referred to as Gum Swamp; and

- PEM, PSS, and PFO wetlands in the area generally between Whittamore Road and Centerville Turnpike (approximate MPs 12.6 to 13.8) across the eastern and southern edges of the Battlefield Golf Club, where the route would be within and adjacent to an existing Dominion transmission ROW (for Lines #2240/I-74).

4.3.1.3 Harpers to Fentress Route 2

HF Route 2 would cross the same wetlands as HF Route 1 in the area between approximate MPs 0.0 and 5.5 (including the PFO and PEM wetlands associated with West Neck Creek) and between approximate MPs 11.8 and 15.2 (including the PEM, PSS, and PFO wetlands at the Battlefield Golf Club). Other wetland crossings would occur in the following locations along HF Route 2:

- Predominantly PFO wetlands along a greenfield alignment in an area north of Indian River Road (approximate MPs 6.6 to 7.2); and
- Predominantly PFO wetlands along a greenfield alignment in the area general between Indian River Road in Virginia Beach and Mt. Pleasant Road in Chesapeake (approximate MPs 7.3 to 11.9); this route segment would cross North Landing River (approximate MP 8.2) and the Intracoastal Waterway canal (approximate MP 8.5) as well as the large expanse of swampland referred to as Gum Swamp.

4.3.1.4 Harpers to Fentress Route 5

HF Route 5 would cross the same wetlands as HF Route 1 in the area between approximate MPs 0.0 and 5.5 (including the PFO and PEM wetlands associated with West Neck Creek). Other wetland crossings would occur in the following locations along the route:

- Predominantly PFO wetlands along a greenfield alignment in the area generally between Indian River Road in Virginia Beach and Fentress Airfield Road in Chesapeake (approximate MPs 8.0 to 11.3); this route segment would cross North Landing River (approximate MP 9.2) and the large expanse of swampland referred to as Gum Swamp.
- Predominantly PFO wetlands along a greenfield alignment in the area adjacent to Blackwater Road (approximate MPs 12.1 to 12.5); and
- Predominantly PFO wetlands along a greenfield alignment in the area generally between Pocaty Road and Land of Promise Road (approximate MPs 12.7 to 15.9); part of this route segment would parallel the south side of Pocaty River.

4.3.1.5 Harpers to Fentress Hybrid Route

The HF Hybrid Route would have a nearly identical alignment as HF Route 1, crossing the same wetland areas as described above in Section 4.3.1.2, Harpers to Fentress Route 1.[19]

4.3.1.6 Dam Neck Route Variation

The Dam Neck Route Variation would cross longer expanses of wetlands in the following locations:

- Predominantly PFO wetlands in an area south of Dam Neck Road near the intersection with Harpers Road (approximate MPs 0.8 to 1.2);

[19] The approximate milepost crossings for these areas would be as follows: predominantly PFO wetlands north of Dam Neck Road–MPs 0.8 to 1.1; predominantly PFO wetland complexes associated with West Neck Creek–MPs 1.9 to 4.9; predominantly PFO wetland complexes between Salem Road and Mt. Pleasant Road–MPs 6.4 to 11.0; and PEM, PSS, and PFO wetlands between Whittamore Road and Centerville Turnpike–MPs 12.8 to 14.0.

- Predominantly PFO wetlands associated with West Neck Creek along a greenfield alignment approximately between London Bridge Road and the point where the route variation would intersection Dominion's existing transmission ROW for Lines #2118/147 (approximate MPs 1.6 to 2.8).

4.3.1.7 Line #2085 Route Variation

The Line #2085 Route Variation would cross the same wetlands as HF Route 5 in the area between approximate MPs 0.0 and 3.3 (including the predominantly PFO wetlands in the area generally between Indian River Road and Upton Lane). Other wetland crossings would occur in the following locations along the route:

- Predominantly PFO wetlands in the area generally between Upton's Lane and the Intracoastal Waterway (approximate MPs 3.3 to 4.3), including the large expanse of swampland referred to as Gum Swamp.

4.3.2 Waterbodies

ERM identified and mapped waterbodies in the Virginia Facilities study area using similar publicly available GIS databases as those used to identify and map wetlands. All of the alternative transmission line routes would cross perennial and intermittent waterbodies (rivers, streams, and tributaries). The former include the Intracoastal Waterway canal and North Landing River, which are both considered navigable waters by the USACE, regulated under Section 10 of the Rivers and Harbors Act. Activities within and over state-owned subaqueous lands of Virginia are regulated by the Virginia Marine Resources Commission pursuant to Va. Code § 28.2-1205. For reference, an overview map illustrating the location of waterbodies in the study area is provided as Figure 4.3-2 (Appendix A, Figures). A map set illustrating the waterbodies that would be crossed by each alternative route is included as Figure 2 in Appendix F, Wetland and Waterbody Report. The Wetland and Waterbody Report quantifies the waterbody types that would be crossed by each alternative transmission line route.

Descriptions of the larger, named perennial waterbodies that would be crossed by each route are provided in the subsections below. In addition to these waterbodies, each route would cross smaller tributaries as well as drainage ditches at road crossings and within agricultural fields along the routes.

4.3.2.1 Cable Landing to Harpers Route

The CLH Route would cross two fingers of Lake Christine (at approximate MPs 0.1 and 0.2) in a mostly forested area within the SMR. The route additionally would cross Owl Creek, an estuary connected to Rudee Inlet, in a mostly forested area west of General Booth Boulevard (approximate MP 1.0). The crossings of these waterbodies would occur along a greenfield alignment; however, installation of the circuits at each crossing would be by HDD.

4.3.2.2 Harpers to Fentress Route 1

HF Route 1 would cross a tributary to West Neck Creek at approximate MP 2.9 and West Neck Creek at approximate MP 3.3 in a mostly forested area where the route would be within the SEPG corridor and within and adjacent to an existing Dominion transmission ROW (Lines #2118/147). The route would cross an unnamed tributary to the North Landing River in three places, at approximate MPs 5.9, 6.2 and 6.6, and parallel the tributary in the area in between, where the route would be within and adjacent to an existing Dominion transmission ROW (Lines #271/I-74). Other than the existing corridor, surrounding lands in this area are mostly forested. HF Route 1 would cross a channelized segment of the North Landing River at approximate MP 7.2 in the area between the Highland Acres/Highland Meadows and Dewberry Farm/Indian River Woods subdivisions in a mostly forested area where the route would be

within and adjacent to an existing Dominion transmission ROW (Lines #271/I-74). The route would cross the Intracoastal Waterway canal on USACE lands at approximate MP 10.4 north of Mt. Pleasant Road and east of Centerville Turnpike in a heavily forested area where the route would be within and adjacent to an existing Dominion ROW (Lines #271/I-74).

4.3.2.3 Harpers to Fentress Route 2

HF Route 2 would cross West Neck Creek and its tributary at the same locations (and the same MPs) as HF Route 1. The route would cross a perennial tributary to the North Landing River (approximate MP 6.6), North Landing River (approximate MP 8.2), and the Intracoastal Waterway canal (approximate MP 8.5) along a heavily forested greenfield alignment west of the North Landing River Bridge. The route additionally would parallel the south side of the Intracoastal Waterway canal between approximate MPs 8.6 and 11.8 in a mostly forested area with an offset of up to about 1,000 feet from the channel.

4.3.2.4 Harpers to Fentress Route 5

HF Route 5 would cross West Neck Creek and its tributary at the same locations (and the same MPs) as HF Routes 1 and 2. HF Route 5 would cross two tributaries to North Landing River (approximate MPs 6.9 and 9.1) and North Landing River (approximate MP 9.2) east of the North Landing River Bridge in a heavily forested area along a greenfield alignment. The route would cross two tributaries to Pocaty River at approximate MPs 12.4 and 12.8; the Pocaty River in three locations, at approximate MPs 13.1, 15.3, and 15.7; and would parallel the south side of the river between approximate MPs 13.1 and 15.3, in a mostly forested area along a greenfield alignment.

4.3.2.5 HF Hybrid Route

The HF Hybrid Route would have a nearly identical alignment as HF Route 1, crossing the same waterbodies described above in Section 4.3.2.2, Harpers to Fentress Route 1.[20]

4.3.2.6 Dam Neck Route Variation

The Dam Neck Route Variation would cross two tributaries of West Neck Creek (at approximate MPs 0.8 and 0.9) in a mostly forested area where the route would be adjacent to Dam Neck Road. The route would cross West Neck Creek at approximate MP 2.5 along a greenfield alignment in a mostly forested area within Holland Pines Park.

4.3.2.7 Line #2085 Route Variation

The Line #2085 Route Variation would cross two tributaries to North Landing River (approximate MPs 1.4 and 3.5), North Landing River (approximate MP 3.8), and the Intracoastal Waterway canal (approximate MP 4.1) west of the North Landing River Bridge along a greenfield alignment in a mostly forested area.

4.3.2.8 Reservoirs, Ponds, and Other Waterbodies

In addition to wetlands and waterbodies, ERM identified open water features (e.g., reservoirs, lakes, and ponds) along and near the routes through a desktop review of the NWI/NHD datasets and/or aerial imagery. Lake Christine, located between Owl Creek and the Atlantic Ocean, would be crossed by the CLH Route (using HDD). Small palustrine unconsolidated bottom (PUB) waterbodies would be crossed by or adjacent to each alternative route in various locations. PUB waterbodies are characterized by areas of open water that are less than 20 acres in size, are not saline in nature, reach depths of less than 2 meters

[20] The approximate MPs for these crossings are: tributary to West Neck Creek–MP 3.1; West Neck Creek–MP 3.5; tributary to North Landing River–MPs 6.2 and 6.6; North Landing River–MP 7.4; and Intracoastal Waterway–MP 10.6.

(6.5 feet) at low water, and lack wave-formed shoreline features (Cowardin et al. 1979). No reservoirs would be crossed by the routes.

4.3.3 Areas of Ecological Significance

ERM reviewed available datasets, consulted the VDCR's NHP, and requested formal review of the routes from the VDCR to identify areas of ecological significance along and near the alternative transmission line routes, including natural area preserves, conservation sites, stream conservation units, ecological cores, and general location areas for natural heritage resources. These areas collectively delineate habitats containing rare, threatened, or endangered plants and animals, unique or exemplary natural communities, and/or significant geologic formations (VDCR 2014a).

The VDCR responded to Dominion's request for formal review of the routes and provided an Environmental Review letter, a copy of which is provided in Appendix C, Correspondence. Based on that response and research conducted by ERM, no natural area preserves, stream conservation units, or general location areas for natural heritage resources would be present along or near the alternative transmission line routes (Appendix C, Correspondence) and no further discussion of these resource types is provided in this study. Conservation sites and ecological cores are discussed in Sections 4.3.3.1, Conservation Sites, and 4.3.5.3, Ecological Cores and Habitat Fragmentation, respectively. A discussion of federal and state-protected species found within the natural heritage resources that would be crossed by the routes is provided in Section 4.3.4, Protected Species.

4.3.3.1 Conservation Sites

The VDCR's response letter defines conservation sites as "tools for representing key areas of the landscape that warrant further review for conservation action because of the natural heritage resources and habitat they support" (Appendix C, Correspondence; see also VDCR 2016). The sites are defined by a planning boundary that delineates the NHP's best determination of the land and water area occupied by one or more natural heritage resources (exemplary natural communities and rare species). The size of a conservation site is based on the habitat requirements of the natural heritage resources present and the physical features of the surrounding landscape. Conservation sites are "built around one or more rare plant, animal, or natural community designed to include the element and, where possible, its associated habitat, and buffer or other adjacent land thought necessary for the element's conservation" (Appendix C, Correspondence).

Features taken into consideration in defining the boundaries and assessing the value of conservation sites include hydrology, slope, aspect, vegetation structure, current land uses, and potential threats from invasive species. Some conservation sites may require ecological management, such as invasive species control or water management, to maintain or enhance their viability. The VDCR assigns each conservation site a biodiversity significance ranking (B1 to B5 with B1 being the most significant) based on rarity, quality, and the number of natural heritage resources present within a site (VDCR 2018).

Four conservation sites are found along the alternative transmission line routes discussed in this report (see Figure 4.3-3; Appendix A, Figures). Neither the Harpers Switching Station or Chicory Switching Station sites nor the expanded Fentress Substation would be within conservation sites.

Camp Pendleton Dam Neck Dunes and Swales Conservation Site

Camp Pendleton Dam Neck Dunes and Swales is an 863-acre conservation site in Virginia Beach. Found within the Back Bay watershed, it is composed of intertidal swales, ponds, and dune systems, which support a variety of rare plant species in Virginia, such as the bluejack oak (*Quercus incana*), American *halfchaff* sedge (*Lipocarpha maculata*), and long beach seedbox (*Ludwigia brevipes*) (RGH and CE 1988). The VDCR has assigned the site a biodiversity ranking of B3 (High Significance) due to the rare

vascular plant species present. The site is found on the coastline adjacent to the Atlantic Ocean on SMR lands. A portion of the Cable Landing Location and adjacent temporary workspace (associated with an HDD at the transition point where the submarine export circuits would come ashore) would be within the conservation site; however, these areas are heavily disturbed as they are within the rifle range at the base.

Oceana Ponds and Forest Conservation Site

Oceana Ponds and Forest is a 221-acre conservation site located west of Lake Rudee and east of Oceana Boulevard in Virginia Beach. Approximately two-thirds of the site is within USN land at NAS Oceana. The site supports a significant natural community encompassing a saturated swamp-forest and pond supporting rare terrestrial species, including the state-ranked long beach seedbox (*Ludwigia brevipes*), the southeastern cane borer moth (*Papaipema* sp.), and the state endangered tri-colored bat (*Perimyotis subflavus pipistrelle*) (VDCR 2021b; VDWR 2021c).[21] Habitats in this conservation site are also important for maintaining animal species movement and genetic diversity. The VDCR has assigned a biodiversity significance ranking of B2 (Very High Significance) to the site.

The CLH Route would cross the Oceana Ponds and Forest from approximate MPs 1.8 to 3.0 along the northern and western boundaries of the site. The route across the site mostly would be within agricultural (plowed) lands or forested areas immediately adjacent to Oceana Boulevard. The route would not cross the pond at the site.

West Neck Creek Conservation Site

West Neck Creek is a 468-acre conservation site in Virginia Beach with a biodiversity ranking of B4 (Moderate Significance). This site is located predominately on privately owned land; however, portions of the site are within two City-owned parks: Rolling Woods Park and Holland Pines Park. The site encompasses a portion of the Southern Coastal Plain Mesic Mixed Hardwood Forest vegetation community that provides habitat and buffer for one or more rare terrestrial plants or animals (for further information on this community, see Section 4.3.5, Vegetation). The south side of the natural area opens to a swamp fed by West Neck Creek and several drainage channels that run south from Princess Anne Road (VDWR 2021d; Birding Virginia 2021). The main species of concern within this conservation site is the plant Virginia least trillium (*Trillium pusillum* var. *virginianum*). This species is a state rare herbaceous species, found within saturated acidic soils on the edges of marshes/wetlands; it cannot survive in fully submerged habitat.

HF Routes 1, 2, and 5 (approximate MPs 2.1 to 3.3) and the HF Hybrid Route (approximate MPs 2.3 to 3.5) would each cross the conservation site where the route would be within the SEPG corridor and within and adjacent to Dominion's existing ROW for Lines #2118/147. Land cover within the existing ROW is open space, with surrounding areas characterized as forest. The Dam Neck Route Variation would cross the conservation site between approximate MPs 1.6 and 2.6 along a greenfield alignment in a forested area, including a segment within Holland Pines Park (see Section 4.2.2.1, Parks).

North Landing River Conservation Site

North Landing River is a 33,259-acre conservation site in Chesapeake and Virginia Beach with a biodiversity ranking of B1 (Outstanding Significance). The site follows the Intracoastal Waterway canal and North Landing River south to the Virginia/North Carolina state line. It is one of Virginia's largest conservation sites, composed of multiple freshwater, forested swamp communities, five of which are considered rare in Virginia. Especially notable is the presence of pocosins, habitats with tangled masses

[21] The pond is an abandoned sand pit. See section 4.6.1, Mineral Resources, for additional information on the pit.

of dense evergreen shrubs and vines with a scattered pond pine overstory, and a community type that is increasingly disappearing from the southeast United States. The site encompasses much of the area referred to as Gum Swamp.

The North Landing River site supports at least 11 rare plant and animal species and provides important habitat for breeding and wintering waterfowl (VDCR 2021d). The species of concern listed by the VDCR for this site includes the Duke's skipper (*Euphyes duskesi*) and Virginia least trillium (*Trillium p.* var. *virginianum*) (for further information on these species, see Section 4.3.4, Protected Species). The conservation site additionally contains two endemic forest types, the Non-Riverine Swamp Forest (tupelo and bald cypress) and Bald Cypress–Mixed Tupelo Swamp (see Section 4.3.5, Vegetation, for additional information on these communities).

HF Route 1 (approximate MPs 7.7 to 10.4) and the HF Hybrid Route (approximate MPs 7.9 to 10.6) would each cross the conservation site adjacent to Dominion's existing transmission ROW for Lines #271/I-74. Land cover within the existing ROW is open space with surrounding areas characterized as forest, much of which is forested wetland. HF Routes 2 and 5 and the Line #2085 Route Variation would each cross the conservation site in the vicinity of the North Landing River Bridge along greenfield alignments through mostly forested areas. The approximate MPs for these crossings are:

- HF Route 2 - MPs 7.3 to 9.0
- HF Route 5 - MPs 8.1 to 10.3
- Line #2085 Route Variation MPs 2.5 to 4.3

4.3.3.2 Lands Owned by The Nature Conservancy

TNC owns and protects approximately 7,000 acres of land, referred to as the North Landing Preserve, in a series of parcels along and near the Intracoastal Waterway and North Landing River in both Chesapeake and Virginia Beach. TNC parcels encompass forested habitats on both the north and south sides of the Intracoastal Waterway canal and North Landing River, much of which is located within the North Landing River Conservation Site described above. TNC acquired these lands in fee title with funds from the FWS; the parcels include deed restrictions that limit development to minimize fragmentation of contiguous forested habitat and prevent habitat loss in areas of high ecological concern. As noted above, the North Landing River Conservation Site has a high conservation value and includes highly ranked ecological core communities (see Section 4.3.5, Vegetation) that provide a corridor for biodiversity movement and gene flow. TNC lands would be crossed by HF Route 1 from MPs 9.9 to 10.2 and at MP 10.6, and by the HF Hybrid Route from MPs 10.1 to 10.4 and at MP 10.8. None of the other routes would cross TNC-owned lands; however, HF Route 2 (at approximate MP 8.1) and HF Route 5 (from approximate MPs 9.5 to 9.7) would pass near the perimeter of TNC-owned lands where the routes would cross the Intracoastal Waterway canal (HF Route 2) or North Landing River (HF Route 5).

4.3.4 Protected Species

To protect and recover imperiled species and the ecosystems they depend on, Congress passed the Endangered Species Act (ESA) in 1973, which states that threatened and endangered plant and animal species are of aesthetic, ecological, educational, historic, and scientific value to the United States, and protection of these species and their habitats is required. The ESA is administered by both the National Oceanic and Atmospheric Administration (NOAA) and the FWS. It protects fish, wildlife, plants, and invertebrates that are federally listed as endangered or threatened by prohibiting the "take" of these species and the interstate or international trade of the species, including their parts and products, unless federally permitted. "Take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." A federally endangered species is any species in danger of extinction throughout all or a significant portion of its range, with exceptions for certain insect

pests. A federally threatened species is any species likely to become endangered in the near future throughout all or a significant portion of its range.

Critical habitat is the area occupied by a species at the time it was listed under the ESA that contains the physical or biological features that are essential to the species and that may need special management or protection. There is no designated or proposed critical habitat in the study area for any of the species described in Section 4.3.4.1, Federally and State-Listed Endangered and Threatened Species.

Candidate species are plants and animals for which the FWS has sufficient information to propose the species as endangered or threatened under the ESA; however, development of a proposed listing regulation by the FWS is precluded by other higher priority listing activities. Candidate species receive no statutory protection under the ESA. One candidate species is known to occur in the study area, as discussed in more detail in below.

"Species of concern" is a term used by the FWS that refers to species that may require conservation actions but are not threatened with extinction. Species of concern are not provided legal protection under the ESA. Some species of concern are known to occur in the study area, as discussed in more detail in below.

Virginia has adopted separate acts for protecting animals and plants. The Virginia ESA (Va. Code §§ 29.1-563 to 29.1-570) designates the VDWR as the agency with jurisdiction over state-listed endangered or threatened fish and wildlife. The Virginia ESA authorizes the Board of the VDWR to adopt the federal list of endangered and threatened species and to identify and protect state-listed wildlife. This act prohibits by regulation the taking, transportation, processing, sale, or offer for sale of those species.

Under the Endangered Plant and Insect Species Act (Virginia Administrative Code, Title 2, Chapter 320, Section 10 [2 VAC 5-320-10]), the taking or possession of endangered or threatened plant and insect species is prohibited. The VDCR represents the Virginia Department of Agriculture and Consumer Services (VDACS), which is responsible for state-listed plants and insects, in providing comments regarding potential effects on state-listed plant and insect species.

ERM obtained query results from the FWS Information for Planning and Consultation System (IPaC; FWS 2021b), the VDCR's Natural Heritage Data Explorer (NHDE), and VDWR's Fish and Wildlife Information Service (VaFWIS) to identify federally and state-listed species that may occur within the study area. Query results from FWS IPaC include listed and candidate species that may occur in the alternative transmission line routes (Appendix G, Protected Species). Query results from NHDE include species known or historically known to occur in the study area (VDCR 2021b). Query results from VaFWIS include species known or likely to occur in the study area (VDWR 2021b).

In addition to the general queries, digital data were obtained from the VDCR NHDE and VDWR Wildlife Environmental Review Map Service (WERMS; VDWR 2021k) to identify locations within the study area that potentially support protected species. The VDCR's element occurrence data are mapped representations of plants, animals, and exemplary natural communities, which are tracked by the VDCR NHP due to their rarity. Each occurrence is represented by a polygon indicating its known location. The polygons are intended to indicate the full known aerial extent of the occurrence, modified to account for the locational uncertainty of the source data. The VDWR's WERMS dataset includes all verified species documentations maintained by VDWR. In addition to species observation locations for listed and declining species, WERMS also includes data displaying designated threatened and endangered species waters, trout streams, waterbird nesting colonies, and anadromous fish use areas.

A total of 28 threatened and endangered species, eight federally designated species of concern, two non-listed rare species, and one candidate species were reviewed for their potential of occurrence within the areas crossed by the onshore Virginia Facilities. A summary of the findings is provided in Sections 4.3.4.1

through 4.3.4.3. Documented locations of protected species are shown on Figure 4.3-4 in Appendix A, Figures.

4.3.4.1 Federally and State-Listed Endangered and Threatened Species

The IPaC, NHDE, and VaFWIS database queries identified 14 federally and state-listed species, as well as 14 additional species listed only by the Commonwealth of Virginia. According to the review, each of these species has the potential to occur in either or both Chesapeake and Virginia Beach. A summary of the federally and state-listed species documented in the study area is presented in Table G-2 in Appendix G, Protected Species. However, the various queries that indicate potential or actual occurrences of protected species in the study area do not specify exact occurrence locations. Therefore, species are subsequently retained for, or dismissed from, further evaluation based on documented occurrences provided by the NHDE and WERMS spatial datasets relative to habitat suitability along the alternative transmission line routes. Federally designated species of concern are summarized in Section 4.3.4.3, Federally Listed Species.

Northern Long-eared Bat

The northern long-eared bat (*Myotis septentrionalis*; NLEB) is listed as threatened under the federal ESA, effective May 4, 2015, and by the Commonwealth of Virginia. Concurrent with the listing determination, the FWS issued an Interim Rule under Section 4(d) of the ESA, providing certain exemptions from Section 9 take prohibitions. The Interim 4(d) Rule exempts prohibition of incidental take due to ROW maintenance and expansion activities (up to 100 feet).

NLEBs predominantly overwinter in hibernacula that include caves and abandoned mines with large passages and entrances with constant cooler temperatures ranging from 32 to 48 degrees Fahrenheit (ºF) (USDA 2014). NLEBs arrive at hibernacula in August or September, enter into hibernation by October or November, and leave the hibernacula by March or April (FWS 2014a). In the winter, NLEBs tend to hibernate in deep caves and mines with large passages and entrances with no air current, constant temperatures, and high humidity (FWS 2015). During the summer, NLEBs typically use mature interior forest in proximity to wetlands for roosting (Foster and Kurta 1999). Day roosts are typically found in buildings, towers, hollow trees, beneath loose bark of trees, in crevices in cliffs, and beneath bridges, while caves are used as night roosts. Breeding begins in late July in northern ranges and early October for southern ranges of the species.

The VDWR operates an NLEB Winter Habitat and Roost Trees online mapping system, which shows general locations of known NLEB hibernacula and roost trees (VDWR 2021e). A review of this system indicated six known occupied maternity roosts (summer habitat) in Chesapeake, but no known roosts or hibernaculum in Virginia Beach. The six identified roost trees, which are located along Mt. Pleasant Road in Chesapeake (Figure 4.3-5; see Appendix A, Figures), were last surveyed by a VDWR biologist on February 29, 2016. Based on this, foraging and roosting habitat for the northern long-eared bat may be present within the study area.

West Indian Manatee

At the federal level, the West Indian manatee (*Trichechus manatus*) is protected as a threatened species under the ESA, effective March 11, 1967, and under the Marine Mammal Protection Act, which prohibits the take (i.e., harass, hunt, capture, or kill) of all marine mammals. The West Indian manatee is also protected at the state level as a state-listed endangered species. West Indian manatees move between freshwater, brackish, and saltwater environments, and prefer large, slow-moving rivers, river mouths, and shallow coastal areas such as coves and bays (FWS 2008a). Manatees migrate between winter and

summer grounds, congregating around warm springs in the winter, and traveling to the northern extent of their range in the summer.

There have been infrequent occurrences of the West Indian manatee in the Lower Chesapeake Bay, Lynnhaven River, and Southern Branch of the Elizabeth River, as well as the Atlantic Ocean. According to the VDWR WERMS database, a West Indian manatee was observed in the tributaries south of Wolfsare Creek in Virginia Beach in October of 1992; however, manatees have not been reported near the study area. Given the absence of suitable habitat near the onshore Virginia Facilities, the West Indian Manatee was eliminated from further evaluation.

Roseate Tern

The northeastern subpopulation of the Roseate Tern (*Sterna dougallii dougallii)* was listed as federally endangered under the ESA on November 2, 1987, and is protected under the Migratory Bird Treaty Act (MBTA), which prohibits the take (including killing, capturing, selling, trading, and transport) of species without prior authorization from the FWS. The Commonwealth of Virginia also lists the Roseate Tern as a state-endangered species. Found along seacoasts, bays, and estuaries in North America, the Roseate Tern forages offshore and roosts in flocks near tidal inlets from late July to mid-September (NatureServe 2021).

Roseate terns nest on small barrier islands, usually among colonies of common terns, laying one to two eggs in hollows or dense vegetation, debris, or rocks hidden from predators (FWS 2011). They begin arriving to breeding areas at the end of April, and begin laying eggs as early as the third or fourth week of May. In the winter, Roseate Terns migrate south from the northeastern United States to the waters off Trinidad and northern South America (FWS 2011). Roseate Terns are found along the North Atlantic coastline of the United States during both the breeding and non-breeding seasons; however, the populations in Virginia are thought to be solely migratory (Cornell University 2021).

The VaFWIS and IPaC queries indicate that Roseate Terns are known to occur within the Virginia Beach portion of the study area. Although spatial data provided by WERMS only notes one sighting near the outlet of Lake Rudee and Lake Wesley dating back to 1968, scientifically vetted citizen observations provided by eBird denotes photographed occurrences of the Roseate Tern in Virginia Beach as recent as 2020 (eBird 2021). Therefore, while the species is relatively rare in coastal Virginia, potential habitat for Roseate Tern may be present within the study area.

Red Knot

The Red Knot (*Calidris canutus rufa*) is protected as a threatened species under the federal ESA, effective January 12, 2015, and as a migratory bird under the MBTA. At the state level, the Commonwealth of Virginia lists the Red Knot as threatened. Red Knots migrate long distances between nesting areas in the mid- and high-arctic latitudes, and southern nonbreeding habitats in the coastal United States and South America (NatureServe 2021). During the migrating and wintering seasons, Red Knots use marine habitats, specifically sandy beaches, saltmarshes, lagoons, mudflats of estuaries and bays, and mangrove swamps to forage for abundant invertebrate prey (Cornell University 2021). Migrating Red Knots typically arrive along the Virginia Barrier Islands in early May, and depart by mid-June (Watts and Truitt 2015).

Although the WERMS and Natural Heritage Inventory (NHI) spatial data did not indicate any observations of the Red Knot within the study area, the VaFWIS query indicated that the species has the potential to occur within Virginia Beach. The Red Knot's presence in Virginia Beach is confirmed by eBird data, which denotes numerous observations in southeastern Virginia as recent as May of 2021 (eBird 2021). Therefore, while the species is uncommon in coastal Virginia, potential habitat for the Red Knot may be present within the study area.

Eastern Black Rail

The Eastern Black Rail (*Laterallus jamaicensis jamaicensis*) is protected as a threatened subspecies under the federal ESA, effective November 9, 2020, and as a migratory bird under the MBTA. The subspecies is also state-listed as either endangered or threatened in seven states within its range, including the Commonwealth of Virginia. The Eastern Black Rail is one of four subspecies of Black Rail, and is broadly distributed across salt and freshwater marshes in the United States and Central and South America (FWS 2020a).

As a small, secretive marsh bird, little is known of the Eastern Black Rail's migratory behavior (FWS 2020a). However, Black Rails are generally found along the coasts of New York, New Jersey, Maryland, Delaware, and Virginia in the spring and summer, and year-round along the southern Atlantic and Gulf coasts (Chesapeake Bay Program 2021a). Black Rails inhabit both tidally and non-tidally influenced marshes that range in salinity from salt to brackish to fresh (FWS 2020a). In Virginia, Black Rails have been documented within a range of landscape settings including tidal salt marshes behind barrier islands, open bay or estuarine tidal salt marshes, non-tidal marshes within impoundments, and wet meadows associated with pastures or floodplain settings (Watts 2016). Systematic surveys of Black Rail populations in Virginia indicated an 85 percent decline in the local population between 2007 and 2014, and the current state population is estimated between zero and 10 breeding pairs (Watts 2016).

Although WERMS and NHDE do not provide any documented occurrences of the Eastern Black Rail within the study area, suitable habitat for this subspecies may be present along the alternative transmission line routes discussed in this report.

Piping Plover

The Piping Plover (*Charadrius melodus*) is listed as threatened by the FWS under the federal ESA, effective December 11, 1985. It also is listed as threatened by the Commonwealth of Virginia. As a migratory shorebird, the Piping Plover is protected by the MBTA. Piping plovers breed in the northern United States and Canada in the spring and summer, and migrate south in the fall to winter along the Gulf Coast and other southern locations (FWS 2019a). Piping Plovers typically nest on sparsely vegetated ocean-facing beaches, sand flats, and washovers, and are known to return to the same nesting area in consecutive years (NatureServe 2021).

The eastern shore's barrier islands have supported all Piping Plover breeding activity in Virginia since the late 1990s (VDWR 2021f). The number of breeding pairs documented in Virginia rose above 200 in 2006; however, productivity studies conducted on the barrier islands of the eastern shore indicated that fledging success reached its lowest point in 2008 (VDWR 2021f). Although the NHDE and WERMS spatial datasets do not document any occurrences of the Piping Plover within the study area, eBird data indicates that Piping Plovers have been observed along the coast of Virginia Beach as recent as April 2021 (eBird 2021). Based on this, foraging habitat for the Piping Plover may be present within the study area.

Red-cockaded Woodpecker

The Red-cockaded Woodpecker (*Dryobates borealis*) is protected as a federally and state-listed endangered species, and as a migratory bird under the MBTA. Historically, the Red-cockaded Woodpecker inhabited open pine forests of the southeast, but current habitat differs in quality from the historical pines in which the species evolved (FWS 2014b). The Red-cockaded Woodpecker has the potential to occur in mature pine forests and in upland pine ecosystems with frequent, low-intensity fires. Longleaf pines are preferred; however, other species of southern pine are also used by the species.

Foraging habitat consists of pine or pine/hardwood stands of forest, woodland, or savannah in which 50 percent or more of the dominant trees are pines, and the dominant pine trees are generally 30 years in age or older. Breeding habitat consists of pine, pine/hardwood, and hardwood/pine stands that contain pines 60 years in age or older, and that are located within 0.5 mile of suitable foraging habitat. It is preferable that the foraging habitat and breeding habitat be contiguous. The Red-cockaded Woodpecker is the only woodpecker that excavates cavities exclusively in live pine trees. Cavities are excavated in mature pines, generally over 80 years old. Red-cockaded Woodpeckers live in groups with a breeding pair and as many as four helpers. Each group needs approximately 200 acres of mature pine forest to support its foraging and nesting habitat needs (FWS 2014b).

According to the NHDE System, the Red-cockaded Woodpecker has the potential to occur in mature pine forests in the City of Chesapeake; however, WERMS and NHI spatial data did not identify any known occurrences of the Red-cockaded Woodpecker within the study area. Therefore, Red-cockaded Woodpecker was dismissed from further evaluation.

Shortnose Sturgeon

The shortnose sturgeon (*Acipenser brevirostrum*) is listed as endangered by the FWS under the ESA, effective March 11, 1967, and is also listed as endangered by Commonwealth of Virginia. The National Marine Fisheries Service (NMFS) later assumed jurisdiction for shortnose sturgeon under a 1974 government reorganization plan (NMFS 1998). Primary threats to the shortnose sturgeon include construction of dams, pollution, dredging, and habitat alterations from discharges (NOAA 2015).

Shortnose sturgeon are long-lived, anadromous fish that spawn in coastal rivers along the East Coast of North America. They are benthic feeders, eating crustaceans, mollusks, and insects. They primarily occupy slow-moving riverine, estuarine, and marine near-shore water habitats, traveling only a short distance offshore during migration. Spawning begins in freshwater from late winter to early spring and is heavily dependent upon water temperature (NMFS 1998). Males seem to spawn more frequently at 2-year intervals, whereas females spawn at 3- to 5-year intervals (NMFS 1998). Spawning areas are generally located upstream, where channels of gravel substrate, rubble, and moderate flow conditions are characteristic (NMFS 1998).

The shortnose sturgeon inhabits the lower sections of larger rivers and coastal waters along the Atlantic Coast (NOAA 2015). Although the VaFWIS query indicates that the shortnose sturgeon has the potential to occur in Virginia Beach, WERMS and NHI spatial data do not indicate any occurrences within range of the alternative transmission line routes. As the onshore Virginia Facilities are not anticipated to directly or indirectly affect shortnose sturgeon habitat, this species was considered for, but dismissed from, further evaluation.

Atlantic Sturgeon

In 2009, the Atlantic sturgeon (*Acipenser oxyrinchus*) was listed under the ESA as five distinct population segments (DPS) (NOAA 2021). The listing status in the study area is under the Chesapeake Bay and Carolina DPS, where the Atlantic sturgeon was listed as endangered by NMFS in February 2012 (NatureServe 2021). The Atlantic sturgeon is also protected as a state-listed endangered species in the Commonwealth of Virginia.

Atlantic sturgeon are long-lived, estuarine-dependent, anadromous fish. Most of their lives are spent in the ocean and at the bottom of freshwater rivers when in the Chesapeake Bay and Carolina regions. Atlantic sturgeons travel during April and May to spawn in moderately flowing water in deep parts of large freshwater rivers in the spring and early summer. Sturgeon return to the freshwater river where they were born to spawn every 3 to 5 years. Females can lay up to 2 million eggs, which are large and black, and stick to the bottom of the river. After laying their eggs, females leave their spawning areas, while males

remain in the area until autumn (Chesapeake Bay Program 2021b). When not spawning, most of the sub-adults and adults live in coastal marine waters and estuaries. Juveniles usually reside in estuarine waters for months to years before heading to coastal areas (NOAA 2021).

The Atlantic sturgeon lives in rivers and coastal waters from Maine to Florida (NOAA 2015). Although the VaFWIS query indicates the Atlantic sturgeon has the potential to occur in Chesapeake and Virginia Beach, WERMS and NHI spatial data do not indicate any occurrences within range of the alternative transmission line routes discussed in this report. As the onshore Virginia Facilities are not anticipated to directly or indirectly affect Atlantic sturgeon habitat, this species was considered for, but dismissed from, further evaluation.

Sea Turtles

Sea turtles are listed as threatened and endangered, depending on the species, at both the federal and state level. NOAA Fisheries shares ESA authority with the FWS for sea turtles. Pursuant to a joint memorandum of understanding, the FWS has jurisdiction over sea turtles on land (terrestrial habitat) and NOAA Fisheries has jurisdiction over sea turtles in their marine habitats. Adult sea turtles are only found on land to lay eggs during the summer nesting season, which lasts from May to September in the Commonwealth of Virginia.

Five species of sea turtle are listed as threatened or endangered under the ESA, including the green (*Chelonia mydas*), loggerhead (*Caretta caretta*), hawksbill (*Eretmochelys imbricate*), leatherback (*Dermochelys coriacea*), and Kemp's ridley (*Lepidochelys kempii*) sea turtles. These sea turtles occur in marine and estuarine waters off the Atlantic Coast (NOAA 2020). With the exception of the hawksbill, which is considered a rare visitor in the mid-Atlantic, juvenile and adult sea turtles are generally present in Virginia's coastal waters migrating and foraging from early spring to late fall (VDWR 2016).

According to the NHDE System and VaFWIS query, sea turtles have the potential to occur in the City of Virginia Beach. The NHI and WERMS spatial data indicates that sea turtle habitat is present along the Atlantic Coast shorelines in the easternmost portion of the Project area. The dune and shoreline habitat east of the Cable Landing Location may provide suitable nesting habitat for the green, loggerhead, hawksbill, leatherback, and Kemp's ridley sea turtles.

Rafinesque's Big-eared Bat

The Commonwealth of Virginia lists Rafinesque's big-eared bat (*Corynorhinus rafinesquii macrotis*) as an endangered species of greatest conservation need. Rafinesque's big-eared bat is known to roost in hollow trees and old buildings year-round along the coast of the southern United States (VDWR 2021g). In Virginia, Rafinesque's big-eared bat inhabits bottomland hardwoods and swamps in the Coastal Plain, foraging primarily in mature hardwood floodplain forest and sites along permanent waterbodies (VDWR 2021g). Both the WERMS and NHDE spatial datasets indicate occurrences of Rafinesque's big-eared bat within Virginia Beach and Chesapeake. Based on this, habitat for the Rafinesque's big-eared bat may be present within the study area.

Tri-colored Bat

The tri-colored bat (*Perimyotis subflavus*) is listed as endangered in the Commonwealth of Virginia and is currently under review for ESA listing by the FWS. The tri-colored bat is associated with forested landscapes, particularly open woods, and is common throughout the eastern United States from Canada south into Mexico (FWS 2019b). Tri-colored bats are widely distributed in the Commonwealth of Virginia, generally inhabiting open wood near water, rock cliffs, buildings, and caves in the summer months, but retreat to caves and rock shelters in the western mountain ranges for hibernation in the winter (VDWR 2021h).

The VDWR operates a Tri-colored Bat Winter Habitat and Roosts Application online mapping system, which shows general locations of known little brown bat and tri-colored bat hibernacula and roost trees. A review of this system did not show a hibernaculum or roost tree in Chesapeake or Virginia Beach (VDWR 2021c). However, WERMS and NHDE spatial data indicate a number of documented occurrences of this state-listed species within the Project area, with observations as recent as July 2019. Based on this, habitat for the tri-colored bat may be present within the study area.

Wilson's Plover

Wilson's Plover (*Charadrius wilsonia*) is listed as endangered by the Commonwealth of Virginia and is federally protected under the MBTA. Known to occupy salt flats and sandy beaches, Wilson's Plover is a year-round resident along the south Atlantic and Gulf coasts of the United States and South America (Cornell University 2021). In Virginia, breeding populations nest on the upper portions of sandy beaches on barrier islands from early May through mid-June (NatureServe 2021).

The VaFWIS query indicated that Wilson's Plovers have been documented in Virginia Beach; however, the NHDE and WERMS spatial datasets do not indicate any occurrences within the study area. As the onshore Virginia Facilities are not anticipated to directly or indirectly impact Wilson's Plover habitat, this species was considered for, but dismissed from, further evaluation.

Henslow's Sparrow

Henslow's Sparrow (*Ammodramus henslowii*) is listed as threatened by the Commonwealth of Virginia and is federally protected under the MBTA. Historically, Henslow's Sparrow were concentrated in two areas: the central prairies of the United States and coastal marshes along the Atlantic. Today, they breed in wet meadows, weedy pastures, and lowland prairie, as well as cultivated hayfields where native habitats have diminished (Cornell University 2021).

No known breeding or wintering populations of Henslow's Sparrow are in Virginia, and occurrences are likely restricted to transient migrants. Although the VaFWIS query indicated that Henslow's Sparrow has been documented in Virginia Beach, neither the WERMS nor the NHDE spatial data indicate any observations of this species within the Virginia Facilities study area. As the onshore Virginia Facilities are not anticipated to directly or indirectly impact Henslow's Sparrow or its migratory habitat, this species was considered for, but dismissed from, further evaluation.

Loggerhead Shrike

The Loggerhead Shrike (*Lanius ludovicianus*) and its migrant subspecies (*L. ludovicianus migrans*) are both listed as threated by the Commonwealth of Virginia and is federally protected under the MBTA. In the northeastern United States, Loggerhead Shrikes breed in western Maryland, extreme eastern portions of West Virginia, and in the mountainous areas of western Virginia (NatureServe 2021). Loggerhead Shrike habitat generally consists of open country with short vegetation and well-spaced shrubs or low trees, but this species can also be found along roadsides with access to fence lines and utility poles (Cornell University 2021).

Although historically widely distributed, Loggerhead Shrikes are now considered rare to uncommon throughout the Commonwealth of Virginia. Local populations are currently concentrated west of the Blue Ridge Mountains, with some small pockets occurring in the Piedmont (VDWR 2018). The VaFWIS query indicated that the Loggerhead Shrike has been documented in both Virginia Beach and Chesapeake; however, the NHDE and WERMS spatial datasets did not indicate any observations of this species in the study area. Although rare in coastal Virginia, eBird data indicates that the Loggerhead Shrike has been observed within the study area within the past decade (eBird 2021). Based on this, suitable foraging habitat for this species may be present along the alternative transmission routes discussed in this study.

Peregrine Falcon

The Peregrine Falcon (*Falco peregrinus*) and its Arctic subspecies (*F. peregrinus tundrius*) are both listed as threated by the Commonwealth of Virginia and are federally protected under the MBTA. Although use of pervasive pesticides virtually eradicated Peregrine Falcon populations from eastern North America in the middle of the twentieth century, significant recovery efforts have led to the recovery of this species throughout its range. During the breeding season, Peregrine Falcons will use natural and artificial cliffs such as skyscrapers for nests. In the winter, Peregrine Falcons can be found in nearly any open habitat, especially barrier islands, mudflats, coastlines, lake edges, and mountain chains (Cornell University 2021).

Peregrine Falcons in Virginia predominately nest in the Coastal Plain, with more than 20 nests currently documented on natural and artificial structures throughout the region (VDWR 2021i). The VaFWIS query indicated that Peregrine Falcons are likely to occur in both Virginia Beach and Chesapeake, which was corroborated by the WERMS spatial data. Based on this, suitable foraging habitat for this species may be present along the alternative transmission routes discussed in this study.

Gull-billed Tern

The Gull-billed Tern (*Gelochelidon nilotica*) is listed as threatened by the Commonwealth of Virginia and is federally protected under the MBTA. The breeding range of the Gull-billed Tern in North America includes the Atlantic coastlines of New Jersey southward to Florida, as well as portions of the Gulf Coast and select locations in southern California (Cornell University 2021). Gull-billed Terns inhabit coastlines, salt marshes, estuaries, lagoons, and plowed fields year-round, and nest exclusively on sandy barrier islands, beaches, and sandy shores during the summer breeding season. The Gull-billed Tern typically arrives in its Atlantic breeding areas in mid-April and departs in late July and early August (NatureServe 2021).

The WERMS and NHDE spatial datasets do not indicate any occurrences of this species within the study area; however, eBird data documents observations of Gull-billed Terns in Virginia Beach as recent as April 2021 (eBird 2021). Based on this, suitable foraging habitat for this species may be present along the alternative transmission routes discussed in this study.

Barking Treefrog

The barking treefrog (*Hyla gratiosa*) is listed as threatened by the Commonwealth of Virginia. Its range currently spans the Coastal Plain of the southeastern United States, from southern New Jersey south through most of the Florida peninsula and west toward southeastern Louisiana (VHS 2021). Barking treefrogs are generally found in willow oak–blackgum forested wetland and pine savannas, and are most active in late spring and early summer when heavy rains trigger their migration to suitable breeding ponds (VDWR 2015). In Virginia, barking treefrogs breed from May through August in shallow, temporary pools such as cypress ponds, sinkholes, and forested depressions. Barking treefrogs do not migrate seasonally, but will burrow in sandy substrates to aestivate in the summer and hibernate in the winter (VDWR 2015).

The NHDE and VaFWIS queries both indicate that barking treefrogs have the potential to occur in Virginia Beach. Although WERMS and NHDE do not provide any spatial information for the barking treefrog within the study area, suitable habitat for this species may be present along the alternative transmission line routes discussed in this report.

Eastern Chicken Turtle

The eastern chicken turtle (*Deirochelys reticularia reticularia*) was listed as endangered by the Commonwealth of Virginia on October 1, 1987. Southeastern Virginia is the northern limit of this species' range, and only two isolated populations are known to occur: one in Isle of Wight and the other at First Landing State Park in Virginia Beach (VDWR 2021j). In Virginia, eastern chicken turtles are confined to freshwater, interdunal, cypress ponds, although they may be found in ponds, lakes, ditches, and cypress swamps elsewhere in its range (VHS 2021). As construction and operation of the onshore Virginia Facilities are not anticipated to impact First Landing State Park or Isle of Wight, the eastern chicken turtle was considered for, but dismissed from, further evaluation.

Canebrake Rattlesnake

The canebrake rattlesnake (*Crotalus horridus*), referred to as the timber rattlesnake outside the Coastal Plain, is listed as endangered by the Commonwealth of Virginia. Canebrake rattlesnakes occur throughout the Coastal Plain of the Southeast, but are absent from most of Florida (Taylor 2021). In southeastern Virginia, canebrakes inhabit hardwood and mixed hardwood-pine forests, cane fields, and ridges and glades adjacent to swampy areas (VHS 2021). Timber and canebrake rattlesnakes become active above ground by late spring, and can be observed periodically until the onset of cold weather in late fall (Taylor 2021).

The NHDE and WERMS spatial datasets denote current and historical observations of the canebrake rattlesnake within Chesapeake and Virginia Beach, indicating that suitable habitat for the species may be present within the study area.

Eastern Glass Lizard

The eastern glass lizard (*Ophisaurus ventralis*) is protected under the Virginia ESA as a state-listed threatened species. Eastern glass lizards occur throughout the southern and eastern portions of North Carolina southward to Florida and west toward Mississippi, but are most common in sandy areas of the Coastal Plain. Eastern glass lizards are present in coastal dune habitats throughout their range, but only rarely occur in the maritime forests and grassy marshes of southeastern Virginia (University of Georgia 2021; VHS 2021).

The NHDE and VaFWIS queries indicate that the eastern glass lizard has documented occurrences in Virginia Beach. While NHDE and WERMS provide no spatial data for this species, suitable habitat for the eastern glass lizard may be present along the alternative transmission line routes discussed in this study.

Raven's Seedbox

The Endangered Plant and Insect Species Act (EPISA) of the Code of Virginia mandates that the VDACS conserve, protect, and manage endangered and threatened plant and insect species. Effective August 20, 2020, Raven's seedbox (*Ludwigia ravenii*) is protected under EPISA as a state-listed endangered plant species. Known from the Coastal Plain of southeastern Virginia, eastern North Carolina, southeastern South Carolina, and northeastern Florida, the species has a relatively spotty distribution (FWS 2017).

Raven's seedbox is an obligate wetland plant restricted to open, wet, peaty places such as ditches and the margins of swamps, ponds, and bogs (NatureServe 2021). The NHDE query indicated that Raven's seedbox is present in Chesapeake and within the Virginia Coastal Zone. Although no spatial data is available for Raven's seedbox within the study area, suitable habitat for this species may be present along the alternative transmission line routes discussed in this report.

4.3.4.2 Migratory Birds and Bald Eagles

The MBTA protects migratory birds and most resident bird species within the United States. Migratory birds include species that nest in the United States and Canada during the summer and migrate south to warmer regions of the United States, Mexico, Central and South America, and the Caribbean for the winter. With a few exceptions, all bird species native to the United States are protected by the MBTA. Under the MBTA, it is illegal to pursue; hunt; take; capture; kill; attempt to take, capture, or kill; possess; offer for sale; and export, import, or transport birds, their parts (e.g., feathers), and active nests (and the eggs or young within). Unlike the ESA, the MBTA does not include harassment or destruction of habitat in its list of prohibitions or within its definition of take. Executive Order 13186 (January 2001) was established to assure that the environmental impacts of federal agency actions are properly evaluated for impacts on migratory birds, with emphasis on species of concern, priority habitats, and key risk factors.

Beyond the MBTA, the Bald and Golden Eagle Protection Act (BGEPA) provides additional protection to Bald (*Haliaeetus leucocephalus*) and Golden Eagles (*Aquila chrysaetos*). The BGEPA prohibits the take; possession; sale; purchase; barter; offer to sell, purchase, or barter; transport; export or import, of any Bald or Golden Eagle, alive or dead, including any part, nest, or egg, unless allowed by permit. "Take" under this act is defined as, "to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, or molest or disturb." Disturb is defined as, "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." If a proposed project or action occurs in an area where nesting, feeding, or roosting eagles occur, the proponent often needs to implement special conservation measures to comply with the BGEPA. FWS guidance on complying with the BGEPA is found in the *National Bald Eagle Management Guidelines* (FWS 2007).

In addition to the protection provided under the BGEPA, Bald Eagles in Virginia are also protected under Virginia's Endangered Species Act, the Federal Endangered Species Act Cooperative Agreement, and the State Protection of Wildlife Species. Dominion would coordinate with the VDWR and Virginia Field Office of the FWS through the standard consultation process as outlined in "Endangered Species: Project Reviews in Virginia Step 6a–Eagle Nests" (FWS 2021c) in order to comply with BGEPA.

Migratory Birds

A variety of migratory bird species could occur seasonally within the study area. The onshore Virginia Facilities would be located in the Atlantic Flyway, which is a major migratory route for birds during both spring and fall. A variety of migratory bird species, including both songbirds and raptors, use the vegetation communities identified along the alternative transmission line routes as part of their seasonal migrations. Productive riparian, wetland, and coastal habitats are typically important for migratory birds in the Atlantic Flyway. Priority bird species predominantly associated with migratory patterns in the study area include Semipalmated Sandpiper (*Calidris pusilla*), Cerulean Warbler (*Setophaga cerulea*), Black-capped Petrel (*Pterodroma hasitata*), and Swallow-tailed Kite (*Elanoides forficatus*) (National Audubon Society 2021).

ERM compiled a list of important or sensitive migratory birds that could potentially occur in the vicinity of the Virginia Facilities (FWS 2008b; South Atlantic Migratory Bird Initiative 2020; Atlantic Coast Joint Venture 2020). The study area includes portions of two Bird Conservation Regions (BCR): the New England/Mid-Atlantic Coast BCR (BCR 30) in the north, and the Southern Coastal Plain BCR (BCR 27) in the south. Birds of Conservation Concern (BCC) and high-priority bird species potentially found in the study area based on these BCRs (identified through the FWS IPaC review) and the Atlantic Coast Joint Ventures are listed in Appendix G, Protected Species. According to the VDEQ's Coastal Geospatial and

Education Mapping System (GEMS), no documented special or critical migratory songbird habitat is within the study area. Discussion of federally and state-listed species can be found in Section 4.3.4.1, Federally and State-Listed Species.

Based on the IPaC BCC bird list and priority bird species listed by the Atlantic Coast Joint Venture and South Atlantic Migratory Bird Initiative, a combined total of 72 bird species are expected to breed in the study area. A number of these protected migratory bird species are also known as colonial-nesting waterbirds, or birds that tend to gather in large assemblages and obtain most or all of their food from the water (FWS 2002). Colonial waterbirds known to gather in coastal Virginia include a variety of terns and gulls, as well as pelicans, skimmers, cormorants, herons, ibis, and egrets (Watts et al. 2019).

To identify potential risks to colonial waterbirds within the study area, ERM reviewed the Center for Conservation Biology's (CCB) 2018 Colonial Waterbird spatial data as provided by the CCB Mapping Portal (CCB 2021). Although a number of waterbird assemblages are present in Virginia Beach and Chesapeake, none are located within the study area.

Bald Eagles

The FWS Virginia Field Office's Bald Eagle Map tool provides information to the public about shoreline areas used by Bald Eagles during both the summer and winter when large numbers of birds will concentrate along shoreline areas (FWS 2021d). ERM reviewed the Bald Eagle Map to evaluate whether any Bald Eagle concentration areas occur in the study area, especially along the shorelines of the North Landing River and the Intracoastal Waterway canal (FWS 2021d). According to the Bald Eagle Map, there are no summer or winter Bald Eagle concentration areas present in the study area.

To obtain the most current Bald Eagle nest data, ERM reviewed the CCB website (CCB 2021), which provides information about the Virginia Bald Eagle population, including the results of the CCB's annual eagle nest survey. According to the Nest Locator, there are 15 Bald Eagle nests with primary (330-foot) and secondary (660-foot) management zones within the study area (see Figure 4.3-6; Appendix A, Figures). Bald Eagle nests potentially affected by the alternative transmission line routes are discussed in detail in Section 5.3.4.2, Migratory Birds and Bald Eagles.

Coastal Avian Protection Zones and Important Bird Areas

The Coastal Avian Protection Zone (CAPZ) map was created in 2010 to assist renewable energy project applicants in identifying those zones that are critically important to avian resources, to help guide preconstruction field surveys, and to aid in the development of mitigation plans designed to offset significant adverse impacts on wildlife (VDEQ 2011). The CAPZ map was the result of a collaborative effort by the CCB, VDWR, the Virginia Coastal Zone Management Program, and the VDCR NHP. The effort was conducted under the VDEQ's Offshore/Coastal Wind Regulatory Advisory Panel as part of the department's rulemaking for the Small Renewable Energy Projects (Wind) Permit by Rule Regulation (9 VAC 15-40).

The Important Bird Areas (IBA) Program is a global initiative of BirdLife International, implemented by Audubon and local partners in the United States. The IBA program identifies and aims to conserve areas that are vital to birds and to minimize the effects that habitat loss and degradation have on birds and biodiversity.

ERM's review of VDEQ's GEMS identified five CAPZs and one IBA within the study area; however none would be crossed by the alternative transmission line routes (Figure 4.3-7; see Appendix A, Figures). Potential impacts on migratory bird habitat outside of CAPZs and IBAs are discussed in Section 5.3.4.2, Migratory Birds and Bald Eagles.

4.3.4.3 Federally Listed Species of Concern and Other Documented Occurrences

As noted previously, species of concern and candidate species are designated at the federal level, but are not afforded the same level of protection as federally and state-listed endangered and threatened species. The species of concern designation is not a regulatory category, but instead constitutes an indication that the species merits special consideration due to its rarity or conservation needs. Candidate species are those with sufficient available information to warrant listing under the ESA, but for whom the development of a proposed listing regulation by the FWS is precluded by other higher priority tasks. NatureServe, an international network of Natural Heritage Programs, assigns a Global Rank to the species based on rarity and conservation status. Species ranked "G1" (global rank 1/critically imperiled) or "G2" (global rank 2/imperiled) are most at risk. Table 4.3-1 provides a summary of the non-listed rare species identified in the VDCR's Environmental Review letter (Appendix C, Correspondence), as well as the federally designated candidate species and species of concern listed in the IPaC and NHDE city-level query, respectively.

Table 4.3-1: Species of Concern and Non-Listed Species Occurrence in the Study Area

Common Name	Scientific Name	Federal Status	State Status	Global Rank	Habitat	City Documented
Invertebrates						
Dusky roadside skipper	*Amblyscirtes alternata*	SOC	None	G2	Open grassy pine woods, but may range from moist to dry habitats, including moist flatwoods, savannas, and sandhill ridges	Chesapeake
Noctuid moth	*Protodeltote* sp. 1	SOC	None	G2	Swamp forest with patches of cane along ditches and ditch roads	Chesapeake
Brimley's assassin bug	*Pnirontis brimleyi*	SOC	None	G2	No information available	Virginia Beach
Monarch butterfly	*Danaus plexippus*	C	None	G4	Open fields and meadows, or anywhere where there is access to larval host plants, milkweed (*Asclepias* spp.)	Chesapeake Virginia Beach
Little metalmark	*Calephelis virginiensis*	None	None	G4	Open areas with its host plants, yellow thistle (*Cirsium horridulum*), usually pine flatwoods, savannas and roadsides	Chesapeake Virginia Beach
Duke's skipper	*Euphyes dukesi*	None	None	G3	Wet, marshy areas including swamps, open marshes, and wet roadside ditches	Chesapeake Virginia Beach
Plants						
Blue panic grass	*Dichanthelium caerulescens*	SOC	None	G2	Certain dune swales and moist power lines of the Coastal Plain	Chesapeake Virginia Beach
Riverbank evening-primrose	*Oenothera riparia*	SOC	None	G2	Herbaceous wetlands, especially tidal marshes	Chesapeake

Common Name	Scientific Name	Federal Status	State Status	Global Rank	Habitat	City Documented
Virginia least trillium	*Trillium pusillum* var. *virginianum*	SOC	None	G3	Forested wetlands, especially low, alluvial woodlands	Chesapeake Virginia Beach
Maritime thoroughwort	*Eupatorium maritimum*	SOC	None	G2	Palustrine habitats and interdunal swales in coastal Virginia and the Outer Banks region of North Carolina	Virginia Beach
Long beach seedbox	*Ludwigia brevipes*	SOC	None	G2	Shallow water, pond shores, blackwater rivers, interdunal swales, marshes, shores of impoundments, and ditches	Virginia Beach

Sources: VDCR 2021b, July 13 letter to S. Throndson in Appendix C, Correspondence, IPaC Reports (Appendix G, Protected Species)

Federal/State Status:

C Candidate species

SOC Species of concern

Global Rank:

G1 Critically Imperiled: At very high risk of extinction due to extreme rarity (often five or fewer populations), very steep declines, or other factor

G2 Imperiled: At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors

G3 Vulnerable: At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors

G4 Apparently Secure: Uncommon but not rare; some cause for long-term concern due to declines or other factors

G5 Secure: Common, widespread, and abundant

Dusky Roadside Skipper

The dusky roadside skipper (*Amblyscirtes alternata*) is a federal species of concern, but does not have any regulatory protection under the ESA or Virginia EPISA. The dusky roadside skipper has a global rank of G2, or "at high risk of extinction," and is possibly extirpated in the Commonwealth of Virginia. This species is considered rare and its current northeastern limit appears to be in southern North Carolina (NatureServe 2021).

Limited information is available on this species as its range is moderately restricted and very poorly understood. While its primary habitat appears to consist of grassy open pinewoods, it may inhabit moist to dry environments, including moist flatwoods, savannas, and sandhill ridges (NatureServe 2021). The NHDE query indicates that this rare species of butterfly has the potential to occur in Chesapeake; however, the VDCR's Environmental Review letter (Appendix C, Correspondence) did not indicate any potential impacts to this species along the alternative transmission line routes.

Noctuid Moth

The noctuid or bird-dropping moth (*Protodeltote* sp. 1) is a species of concern, but does not have any regulatory protection under the ESA or Virginia EPISA. The noctuid moth is imperiled at the global scale (G2) and critically imperiled in the Commonwealth of Virginia (S1). The species appears to be endemic to the Coastal Plain of North Carolina, but has one documented occurrence in the Virginia Coastal Zone.

The noctuid moth's habitat consists of freshwater-forested wetlands, specifically swamp forest with patches of cane along ditches and ditch roads (NatureServe 2021). The NHDE query indicates that this

rare moth species has the potential to occur in Chesapeake; however, the VDCR's Environmental Review letter (Appendix C, Correspondence) did not indicate any potential impacts to this species along the alternative transmission line routes.

Brimley's Assassin Bug

Brimley's assassin bug (*Pnirontis brimleyi*) is not listed at the federal or commonwealth level, but is considered a species of concern for its rarity and restricted range. Ranked imperiled both at the global and state scale, Brimley's assassin bug is known to exist only in the Commonwealth of Virginia (NatureServe 2021). It is likely the complete distribution of this species is unknown.

Limited information is available on the specific habitat requirements of this species. The NHDE query indicates that this rare true bug has the potential to occur in Virginia Beach; however, the VDCR's Environmental Review letter (Appendix C, Correspondence) did not indicate any potential impacts to this species along the alternative transmission line routes.

Monarch Butterfly

A petition for listing the monarch butterfly (*Danaus plexippus*) as threatened under the ESA was submitted in September of 2014 (NatureServe 2021). In a 90-day petition finding, FWS determined that the petition action may be warranted, thus initiating a status review. The following 12-month FWS petition finding determined that listing was warranted but precluded by higher priority actions. The FWS intends to propose listing of the monarch in Fiscal Year 2024, assuming listing is still warranted at that time (FWS 2020b).

Habitat is considered complex for this species, as breeding areas include virtually all patches of milkweed (*Asclepias* spp.) in North America. Habitat along Atlantic coastal flyways are especially important to the survival of eastern populations travelling southbound to Mexico (NatureServe 2021). According to the VaFWIS and IPaC queries, this candidate species has the potential to occur throughout the study area wherever nectar-rich resources and larval host plants are present.

Little Metalmark

Little metalmark (*Calephelis virginiensis*) is a butterfly of the southeastern United States found from Virginia to Florida and west to Texas. Although apparently globally secure (G4) and common in other areas of its range, the little metalmark is imperiled (S2) in the Commonwealth of Virginia due to habitat loss associated with succession and development. It is documented in only three southeastern cities in Virginia, including Virginia Beach and Chesapeake.

The little metalmark prefers open areas with its host plants, including pine flatwoods, savannas, and roadsides. Although yellow thistle (*Cirsium horridulum*) appears to be the little metalmark's primary host plant, others have more recently been cited. According to the VDCR's Environmental Review letter (Appendix C, Correspondence), activities associated with the onshore Virginia Facilities could affect upland areas with yellow thistle.

Duke's Skipper

Duke's skipper (*Euphyes dukesi*) is a small, globally vulnerable (G3) butterfly present along coastal areas from southeastern Virginia to central Florida, and up the Mississippi River valley from Louisiana to Illinois. Duke's skipper is not a species of concern but is considered imperiled (S2) in the Commonwealth of Virginia, where it has only been recorded from the southeastern outer Coastal Plain. While habitat fragmentation and destruction are the primary threats to this species, certain insecticides also pose a significant risk to the population.

Duke's skipper prefers wet, marshy areas including swamps, open marshes, and wet roadside ditches. Expansive estuarine or coastal marshes with broad-leaved sedges such as shoreline sedge (*Carex hyalinolepis*) provide the best habitat for this species, as larvae are dependent on specific host sedges. Populations of Duke's skipper inhabit the North Landing River Conservation Site, and may use the wetlands associated with West Neck Creek, North Landing River, Pocaty River, and the Intracoastal Waterway where shoreline sedge is present. According to the VDCR's Environmental Review letter (Appendix C, Correspondence), activities associated with the onshore Virginia Facilities could occur in these areas.

Blue Panic Grass

Blue panic grass (*Dichanthelium caerulescens*) is a native species of perennial grass found across the eastern United States north into Ontario (USDA 2021b). According to the Digital Atlas of Virginia Flora, blue panic grass is native to southeastern Virginia, including Chesapeake and Virginia Beach areas (VBA 2021). As a species of concern, blue panic grass does not have any regulatory protection at the state or federal level.

Blue panic grass can be found in interdune swales, oligohaline tidal marshes, wet flatwoods, bogs, and boggy clearings. Although infrequent in Virginia, it is most often documented in Virginia Beach from Cape Henry south to False Cape and along the North Landing River, and in the Northwest River area of Chesapeake (VBA 2021). Although this species has documented occurrences and suitable habitat within the study area, the VDCR's Environmental Review letter (Appendix C, Correspondence) did not indicate any potential impacts to this species along the alternative transmission line routes.

Riverbank Evening-primrose

Riverbank evening-primrose (*Oenothera riparia*) is a globally imperiled species of concern. In Virginia, it is known only from the North Landing River to the Northwest River, where it is widely scattered and infrequent (VBA 2021). Although considered cryptic, this rare flowering plant appears to be endemic to variably fresh to oligohaline wind-tidal marshes (NatureServe 2021). According to the VDCR's Environmental Review letter (Appendix C, Correspondence), populations of riverbank evening-primrose are present at the Oceana Ponds and Forest Conservation Site.

Virginia Least Trillium

Virginia least trillium (*Trillium pusillum* var. *virginianum*) is a globally vulnerable species of concern native to the northeast United States (USDA 2021b). Found only in restricted areas of Maryland, West Virginia, Virginia, and North Carolina, this flowering perennial is most frequent on hummocks in braided seepage along small streams in southeastern Virginia. Although Virginia least trillium is relatively well distributed, it is considered rare in the Coastal Plain region of its range (VBA 2021). According to the VDCR's Environmental Review letter (Appendix C, Correspondence), populations of Virginia least trillium are present at the West Neck and North Landing River Conservation Sites.

Maritime Thoroughwort

Maritime thoroughwort (*Eupatorium maritimum*) is imperiled at the global scale and critically imperiled in the Commonwealth of Virginia. This rare flowering plant appears to be restricted to interdune swales south of Virginia and north of the Outer Banks region of North Carolina. In Virginia, maritime thoroughwort is frequent in saturated interdune swales from Little Island Park south through False Cape State Park (VBA 2021). Although this species has suitable habitat within the study area and has documented occurrences in Virginia Beach, the VDCR's Environmental Review letter (Appendix C, Correspondence) did not indicate any potential impacts to this species along the alternative transmission line routes.

Long Beach Seedbox

Long beach seedbox (*Ludwigia brevipes*) is a globally imperiled (G2) flowering perennial found from New Jersey south to Florida and considered rare in the southeast Coastal Plain south of the James River (VBA 2021). Suitable habitat for long beach seedbox includes interdunal swales, depression ponds, borrow pits, and impoundments. According to the VDCR's Environmental Review letter (Appendix C, Correspondence), populations of long beach seedbox are present at the Oceana Ponds and Forest Conservation Site.

4.3.5 Vegetation

The study area is located in the Coastal Plain physiographic province and includes diverse vegetation communities within terrestrial, estuarine, and palustrine ecological groups. Land within this province contains a mix of forests, agricultural lands, and wetlands, including Chesapeake Bay shore lands. Vegetation includes deciduous and evergreen plant species, supported by a regional climate that is generally warm year-round with humid summers and mild winters.

ERM evaluated vegetation communities within the study area using ArcGIS aerial imagery from March 2020 to assess vegetative cover types. In general, the forested communities that originally covered much of the Virginia Coastal Plain province have been extensively altered or cleared for agricultural or urban land use. As such, most of the existing upland forests in the area are composed of immature and semi-mature tree communities with species such as loblolly pine (*Pinus taeda*) and sweetgum (*Liquidambar styraciflua*) (Monette and Ware 1983). Some upland forests are characterized by more mature associations of American beech (*Fagus grandifolia*), oaks (*Quercus* spp.), and American holly (*Ilex opaca*), occasionally giving way to dry, oak-dominated forests with other species like chestnut oak (*Quercus prinus*) and mountain laurel (*Kalmia latifolia*).

Another terrestrial ecological group found within the study area is the Southern Coastal Plains Mesic Mixed Forest community type. These forests are found in both the Coastal Plain and Piedmont physiographic provinces, and typically contain tree species like American beech, oaks, red maple, tulip tree, and sweet gum, among others. This community tends to occupy mesic uplands, swamps, and well-drained areas within deep acidic and nutrient-poor conditions (Appendix C, Correspondence). The herbaceous layer is usually open and sparse, composed of common understory plants of mesic forests including Christmas fern (*Polystichum acrostichoides*), New York fern (*Parathelypteris noveboracensis*), and white wood aster (*Eurybia divaricata*) (VDCR 2021e). The Southern Coastal Plains Mesic Mixed Hardwood Forests have been greatly reduced due to agriculture and development within Virginia, with many of the remaining stands having been degraded by repeated logging (Fleming 2012; NatureServe 2021).

Wetland vegetation is locally diverse due to the presence of a variety of freshwater (palustrine) and tidal (estuarine) wetland communities. For example, the estuarine ecological group can be composed of tidal swamp forests and woodlands, or open marshes where development and persistent forested vegetation is limited by salinity (VDCR 2021f). Tidal hardwood swamps are structurally complex with semi-open canopy coverage and diverse understory compositions. Tree species commonly found in these ecological groups are pumpkin ash (*Fraxinus profunda*) and swamp tupelo (*Nyssa biflora*), with a diverse group of herbaceous shrub and wetland fern species in the understory. Maritime forests found along shoreline estuaries contain a canopy mainly composed of loblolly pine, oak species, and a shrub-dominated understory (VDCR 2021f).

Freshwater wetland vegetation in palustrine systems is often characterized by flatwood swamp communities commonly found in the Coastal Plain. These habitats are generally dominated by water-loving oak species like will oak (*Quercus phellos*) and water oak (*Quercus nigra*), giving rise to fast-growing species like red maple and sweet gum in areas subject to forest disturbance. Understory

structure can include multiple levels of vegetation (e.g., shrubs, forbs, and vines; VDCR 2021g), composed of species like sweet pepper bush (*Clethra alnifolia*), can (*Arundinaria* spp.), and poison ivy (*Toxicodendron radicans*).

4.3.5.1 Forested Land

Forested land refers to an area covered by a canopy of trees composed of natural or maintained woody vegetation. In urban or agricultural settings like those found in parts of the study area, forested land is easily identified using aerial imagery, with forested areas shown by green colors in stark contrast to adjacent development or agricultural fields without trees. To help conserve forested land in urban areas, local government ordinances can restrict tree removal during development activities. Where impacts to trees are unavoidable, a local government can require mitigation for trees lost or impacted as a result of development.

Forested lands within the study area include small or narrow strips of tree canopy as well as larger contiguous tracts of forested habitat surrounding major waterbodies like the North Landing River (see Figures 4.2-1 and 4.3-8 in Appendix A, Figures). Table 4.3-2 identifies contiguous areas of forested land by milepost along each route. In addition to these crossings, parts of the Harpers Switching Station site and all of the Chicory Switching Station site and expanded footprint at Fentress Substation would be in forested areas.

Table 4.3-2: Forested Lands Crossed by the Alternative Transmission Line Routes

Proposed Route	Forested Lands Crossed
CLH Route	■ MPs 0.0 to 0.3 – Route segment crossing Lake Christine ■ MPs 0.8 to 2.0 – Route segment approximately between General Booth Boulevard and Birdneck Road ■ MPs 2.6 to 3.4 – Route segment adjacent to the eastern side of Oceana Boulevard ■ MPs 3.9 to 4.4 – Route segment approximately between Princess Anne Road and Leyte Court
HF Route 1	■ MPs 0.6 to 0.9 – Route segment within or adjacent to the SEPG corridor north of Dam Neck Road ■ MPs 1.7 to 4.7 – Route segment mostly within the SEPG corridor approximately between London Bridge Road and Princess Anne Road; about 1.8 miles of this segment would be within and adjacent to Dominion's existing ROW for Lines #2118/147 ■ MPs 5.8 to 6.2 – Route segment north of Landstown Road ■ MPs 6.2 to 6.6: Route segment north of Salem Road within and adjacent to Dominion's existing ROW for Lines #271/I-74 ■ 7.0 to 7.3 – Route segment crossing North Landing River within and adjacent to Dominion's existing ROW for Lines #271/I-74 ■ MPs 7.7 to 10.8 – Route segment approximately between Indian River Road in Virginia Beach and Mt. Pleasant Road in Chesapeake within and adjacent to Dominion's existing ROW for Lines #271/I-74 ■ MPs 14.0 to 14.1 – Route segment between Dominion's existing Fentress Substation and the Chesapeake & Albemarle Railroad
HF Route 2	■ MPs 0.6 to 0.9 – Route segment within or adjacent to the SEPG corridor north of Dam Neck Road ■ MPs 1.7 to 4.7 – Route segment mostly within the SEPG corridor approximately between London Bridge Road and Princess Anne Road; about 1.8 miles of this segment would be within and adjacent to Dominion's existing ROW for Lines #2118/147 ■ MPs 6.6 to 6.8 and MPs 6.9 to 7.2 – Route segments on either side of Salem Road

Proposed Route	Forested Lands Crossed
	■ MPs 7.3 to 11.9 – Route segment approximately between Indian River Road in Virginia Beach and Mt. Pleasant Road in Chesapeake ■ MPs 15.0 to 15.2 – Route segment between Dominion's existing Fentress Substation and the Chesapeake & Albemarle Railroad
HF Route 5	■ MPs 0.6 to 0.9 – Route segment within or adjacent to the SEPG corridor north of Dam Neck Road ■ MPs 1.7 to 4.7 – Route segment mostly within the SEPG corridor approximately between London Bridge Road and Princess Anne Road; about 1.8 miles of this segment would be within and adjacent to Dominion's existing ROW for Lines #2118/147 ■ MPs 8.0 to 10.3 – Route segment approximately between Indian River Road in Virginia Beach and Blackwater Road in Chesapeake ■ MPs 10.6 to 11.3 – Route segment on the west side of Fentress Airfield Road ■ MPs 12.1 to 12.3 – Route segment west of Blackwater Road ■ MPs 12.7 to 15.8 – Route segment approximately between Pocaty Road and Long Ridge Road ■ MPs 20.0 to 20.2 – Route segment between Dominion's existing Fentress Substation and the Chesapeake & Albemarle Railroad
HF Hybrid Route	■ MPs 0.8 to 1.1 – Route segment within or adjacent to the SEPG corridor north of Dam Neck Road ■ MPs 1.9 to 4.9 – Route segment mostly within the SEPG corridor approximately between London Bridge Road and Princess Anne Road; about 1.8 miles of this segment would be within and adjacent to Dominion's existing ROW for Lines #2118/147 ■ MPs 6.0 to 6.4 – Route segment north of Landstown Road ■ MPs 6.4 to 6.8 – Route segment north of Salem Road within and adjacent to Dominion's existing ROW for Lines #271/I-74 ■ 7.3 to 7.5 – Route segment crossing North Landing River within and adjacent to Dominion's existing ROW for Lines #271/I-74 ■ MPs 7.9 to 11.0 – Route segment approximately between Indian River Road in Virginia Beach and Mt. Pleasant Road in Chesapeake within and adjacent to Dominion's existing ROW for Lines #271/I-74 ■ MPs 14.2 to 14.3 – Route segment between Dominion's existing Fentress Substation and the Chesapeake & Albemarle Railroad
Dam Neck Route Variation	■ MPs 0.6 to 1.2 – Route segment south of Dam Neck Road ■ MPs 1.5 to 2.8 – Route segment approximately between London Bridge Road and Holland Pines Park
Line #2085 Route Variation	■ MPs 2.5 to 4.3 – Route segment approximately between Indian River Road and the Intracoastal Waterway

CLH = Cable Landing to Harpers; HF = Harpers to Fentress; MP = milepost; SEPG = Southeastern Parkway and Greenbelt

4.3.5.2 Urban Tree Canopy Conservation

Efforts to promote tree canopy conservation are increasingly common in localities where the built environment has reduced tree canopy over time. For example, the City of Virginia Beach maintains an urban forestry program that promotes urban forest conservation. The City's 2014 Urban Forest Management Plan established public guidance for landowners to sustain urban forest and tree canopy (City of Virginia Beach 2014). According to the Urban Forest Management Plan, approximately 58,290 acres of tree cover exist within Virginia Beach (including state and federally managed land), accounting for an estimated 3 million trees. Areas of urban forest and tree canopy in Virginia Beach are shown on Figure 4.3-9 (Appendix A, Figures).

The City of Chesapeake manages tree conservation through the locality's Landscape and Tree Preservation Program, as part of the City's Department of Development and Permits. Through the City's code of ordinance, the program provides the public with minimum standards for the preservation, protection, and enhancement of the City's ecologic and aesthetic environment (City of Chesapeake 2008). The City does not have an urban forest management plan. Forested lands within the Chesapeake portion of the study area are primarily in larger contiguous forests surrounding the Intracoastal Waterway canal and North Landing River (see Figure 4.3-9; Appendix A, Figures).

4.3.5.3 Ecological Cores and Habitat Fragmentation

Ecological cores are "areas of unfragmented natural cover with at least 100 acres of interior that provide habitat for a wide range of species, from interior-dependent forest species to habitat generalists, as well as species that utilize marsh, dune, and beach habitats" (Appendix C, Correspondence). According to the VDCR, natural landscapes are essential for the provision of ecosystem services like filtration needed for clean air and water (VDCR 2018). Natural habitats provide refuge for thousands of species of animals and plants, in addition to a variety of recreational opportunities and open space resources for the public. The VDCR refers to these habitat types as "ecological cores" due to increased ecological integrity. An ecological core must contain an area of unfragmented natural cover with at least 100 acres of interior habitat. Because the quality of ecological cores varies across different landscapes, the VDCR evaluates ecological cores using an Ecological Integrity Score that ranks the relative contribution of different ecosystem services. The VDCR developed the ecological cores through the combination of the Virginia Natural Landscape Assessment (VaNLA), GIS datasets, and habitat connectivity models (VDCR 2018). Ecological cores are associated with areas of high ecological value.

Larger natural areas with a more biologically diverse habitat system generally have higher scores for ecological integrity. Moreover, the VDCR further increases scoring for larger complexes of natural lands with little or no habitat fragmentation. Fragmentation occurs when a contiguous area of natural cover is dissected through land development or other forms of altering the area through permanent conversion into multiple smaller patches of noncontiguous areas (Appendix C, Correspondence). The VDCR acknowledges habitat fragmentation as a threat to plant and animal biodiversity. Habitat areas with increased fragmentation (i.e., canopy gaps created from easements) typically have a reduced number of native species and biodiversity, and an increased threat of invasion from non-native species, resulting in decreased ecological integrity (VDCR 2018).

The VDCR rates ecological cores on a scale of C1 (Outstanding Significance) to C5 (General Lands), where C1 habitats are generally large, non-fragmented, and contiguous forested lands with diverse habitat types, or have natural communities with habitat for unique species and environmentally sensitive conditions. Within the study area, ecological cores of high and outstanding significance are primarily found in the forested habitats surrounding the North Landing River and its major tributaries. All ecological cores identified by the VDCR within the study area are shown on Figure 4.3-10 (Appendix A, Figures), as well as fragmented landscapes (e.g., agricultural land) surrounding the VDCR ecological core habitat designations.

The ecological cores that would be crossed by the alternative transmission line routes are generally associated with conservation sites (Table 4.3-3). For the proposed CLH Route, two ecological cores would be crossed between MPs 1.0 to 1.6 (rating of C4) and MPs 1.9 to 3.4 (rating of C5). The HF routes would each cross several ecological cores with rankings ranging from C1 to C5, with the largest individual crossings within the North Landing River Conservation Site. HF Route 1 and the HF Hybrid Route would cross this area at the boundary between C2 and C3 ecological cores, where the routes would be adjacent to Dominion's existing ROW for Lines #271/I-74 (approximately from MPs 7.9 to 10.9 for HF Route 1 and from MPs 8.1 to 11.1 for the HF Hybrid Route). HF Route 2 would cross a C2-rated ecological core from

about MPs 7.3 to 11.8. HF Route 5 would cross a C1-rated ecological core from MPs 8.1 to 9.4, a C2 core from about MPs 9.5 to 10.1, and a C1 core from about MPs 10.1 to 10.4.

Table 4.3-3: Ecological Cores Crossed by the Alternative Transmission Line Routes

Alternative Route	Ecological Core Crossed
CLH Route	■ MPs 1.0 to 1.6 – The route would cross a C4 moderate significance core area approximately between General Booth Boulevard and Bells Road ■ MPs 1.9 to 2.0 and MPs 2.7 to 3.4 – The route would cross a C5 general significance core area south of Bells Road and along Oceana Boulevard
HF Route 1	■ MPs 0.7 to 0.8 – The route would cross a C5 general significance core area north of Dam Neck Road ■ MPs 3.2 to 3.3 – The route would cross a C5 general significance core area east of West Neck Creek within the SEPG corridor and within and adjacent to Dominion's existing ROW for Lines #2118/147 ■ MPs 4.1 to 4.6 – The route would cross parts of two adjacent C5 general significance core areas approximately between Holland Road and Princess Anne Road within the SEPG corridor ■ MPs 7.8 to 11.0 – The route would pass between a C3 high significance core area and a C2 very high significance core area approximately between Indian River Farms Park and the Intracoastal Waterway canal within and adjacent to Dominion's existing ROW for Lines #217/I-74
HF Route 2	■ MPs 0.7 to 0.8 – The route would cross a C5 general significance core area north of Dam Neck Road ■ MPs 3.2 to 3.3 – The route would cross a C5 general significance core area east of West Neck Creek within the SEPG corridor and within and adjacent to Dominion's existing ROW for Lines #2118/147 ■ MPs 4.1 to 4.6 – The route would cross parts of two adjacent C5 general significance core areas approximately between Holland Road and Princess Anne Road within the SEPG corridor ■ MPs 7.0 to 7.2 – The route would cross a C4 moderate significance core area south of Salem Road ■ MPs 7.3 to 11.8 – The route would cross a C2 very high significance core area approximately between Indian River Road in Virginia Beach and Mt. Pleasant Road in Chesapeake
HF Route 5	■ MPs 0.7 to 0.8 – The route would cross a C5 general significance core area north of Dam Neck Road ■ MPs 3.2 to 3.3 – The route would cross a C5 general significance core area east of West Neck Creek within the SEPG corridor and within and adjacent to Dominion's existing ROW for Lines #2118/147 ■ MPs 4.1 to 4.6 – The route would cross parts of two adjacent C5 general significance core areas approximately between Holland Road and Princess Anne Road within the SEPG corridor ■ MPs 8.0 to 9.4 – The route would cross a C1 outstanding significance core area approximately between Indian River Road in Virginia Beach and Mt. Pleasant Road in Chesapeake ■ MPs 9.5 to 10.0 – The route would cross a C2 very high significance core area west of Mt. Pleasant Road ■ MPs 10.1 to 10.3 – The route would cross a C1 outstanding significance core area east of Mt. Pleasant Road ■ MPs 10.6 to 11.2 – The route would cross a C5 general significance core area west of Fentress Airfield Road

Alternative Route	Ecological Core Crossed
	■ MPs 12.7 to 13.1 – The route would cross a C1 outstanding significance core area east of Blackwater Road ■ MPs 13.3 to 15.8 – The route would cross a C3 high significance core area south of the Pocaty River
HF Hybrid Route	■ MPs 0.9 to 1.0 – The route would cross a C5 general significance core area north of Dam Neck Road ■ MPs 3.5 to 3.6 – The route would cross a C5 general significance core area east of West Neck Creek within the SEPG corridor and within and adjacent to Dominion's existing ROW for Lines #2118/147 ■ MPs 4.3 to 4.8 – The route would cross parts of two adjacent C5 general significance core areas approximately between Holland Road and Princess Anne Road within the SEPG corridor ■ MPs 8.0 to 11.2 – The route would pass between a C3 high significance core area and a C2 very high significance core area approximately between Indian River Farms Park and the Intracoastal Waterway within and adjacent to Dominion's existing ROW for Lines #217/I-74
Dam Neck Route Variation	■ MPs 2.2 to 2.5 – The route would cross a C5 general significance core area approximately between Dam Neck Road and Holland Pines Park
Line #2085 Route Variation	■ MPs 2.5 to 3.7 – The route would cross a C1 outstanding significance core area approximately between Indian River Road and North Landing Road ■ MPs 3.7 to 4.3 – The route would cross a C2 very high significance core area approximately between North Landing Road and the Intracoastal Waterway

CLH = Cable Landing to Harpers; HF = Harpers to Fentress; MP = milepost; ROW = right-of-way; SEPG = Southeastern Parkway and Greenway

4.4 Visual Resources and Conditions

ERM's overall approach to the evaluation of visual resources and potential visual impacts from the onshore Virginia Facilities uses an inventory and assessment approach that applies elements of the U.S. Bureau of Land Management's (BLM's) Visual Resource Management (VRM) system (BLM 1984, 1986a, 1986b).[22] The onshore Virginia Facilities would not occur on or affect BLM-administered lands, which typically have defined visual management objectives. The lands that would be affected by the onshore Virginia Facilities are mostly non-federal, and have no federally or state-designated visual management objectives. Nonetheless, components of the BLM VRM system can be used to systematically assess potential visual impacts on a wide variety of lands, regardless of management status.

In April 2021, the Bureau of Ocean Energy Management (BOEM), which is the lead federal agency reviewing the Project, published OCS Study BOEM 2021-032, *Assessment of Seascape, Landscape, and Visual Impacts of Offshore Wind Energy Developments on the Outer Continental Shelf of the United States* (BOEM 2021). This seascape and landscape visual impact assessment (SLVIA) guidance provided BOEM's recommended methodology for assessing onshore and offshore visual impacts associated with wind energy development. The SLVIA guidance was published while ERM's visual assessment process for the onshore Virginia Facilities was underway. As a result, ERM combined the modified VRM system with readily applicable aspects of the BOEM SLVIA guidance to prepare a Visual Impact Assessment for the onshore Virginia Facilities. The evaluation of visual resources in this section of the routing study therefore reflects the modified VRM system combined with elements of the BOEM SLVIA guidance.

[22] For additional information, see Section 5.4, Visual Resources and Conditions.

ERM evaluated existing visual resources and conditions in the study area using the following steps, as described in detail below:

- Identification of the visual study area
- Description of the landscapes and viewer types within the visual study area
- Identification of visually sensitive areas and locations
- Selection of Key Observation Points (KOPs) to represent landscapes, viewer types, and sensitive areas

4.4.1 Visual Study Area

The degree to which overhead transmission structures and other onshore Project components would be visible or noticeable depends on a number of factors including:

- Structure height, distance from viewer, and viewer elevation
- Topography, vegetation, and buildings/development that obscure transmission infrastructure
- Atmospheric conditions, including haze and cloud cover
- Lighting angles
- Nighttime lighting
- Viewing context

The alternative transmission line routes discussed in this report would traverse areas of the Atlantic Coastal Plain defined by nearly flat topography. As a result, the area's vegetation would obscure a large majority of the routes from all but the closest views. Exceptions include locations where the routes would cross public roads or cleared agricultural fields.

As a preliminary step in identifying the visual study area, ERM followed the VDHR's *Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia* (VDHR 2018). This guidance recommends a 1-mile buffer around aboveground features. As a result, the visual study area for this analysis is limited to locations within 1 mile of, and with views of, HF Routes 1, 2, and 5, the overhead portion of the HF Hybrid Route, the Dam Neck Route Variation, and the Line #2085 Route Variation as well as the Harpers and Chicory Switching Stations and Fentress Substation.

4.4.2 Landscape Character Areas

BOEM's SLVIA guidance recommends evaluation of Landscape Character Areas (LCAs), defined as "discrete areas of…landscape, each with its own character and identity" (BOEM 2021). These areas themselves are the resource for which visual impacts are evaluated. LCAs are geographic areas within the broader regional landscape that have similar landscape characteristics, including natural and built features. For the onshore Virginia Facilities, the following LCAs were identified:

- Transportation Corridors: Areas occurring along major roads or railroads, or surrounding airports or other transportation hubs. Transportation corridors are often linear, and are characterized by extensive paved areas, collocated utilities, signage, and appurtenant structures such as traffic signals.
- Developed—suburban residential: Areas characterized primarily by single-family detached homes on individual lots, often with landscaped yards. This includes planned residential communities and subdivisions with consistent architectural and landscaping standards.

- Developed—rural residential: Areas characterized by single-family detached homes on large lots with a variety of vegetation and landscaping patterns. These typically occur along rural roads, and are often surrounded by agriculture, open lands, or forested areas.
- Developed—commercial: Areas characterized by retail (ranging from individual stores to shopping malls) or office uses. Commercial areas typically have low buildings with substantial parking and circulation and varied landscaping.
- Developed—industrial: Areas characterized by activities involving production, storage, or distribution of bulk materials. Structures are typically low-lying, set amid paved areas, with minimal landscaping or vegetation.
- Agricultural and/or Open, Undeveloped Lands: Lands characterized by active agricultural uses (i.e., row crops, pasture, livestock grazing and feeding) or inactive, open fields with low vegetation. Views are often expansive, terminated by distant tree lines, with homes or other structures on adjacent properties visible but not prominent.
- Open Water: Areas where inland lakes and rivers are the dominant feature. As with agricultural and open lands, views over the water can be extensive and are terminated by vegetation along the banks.
- Forested: Areas primarily characterized by trees and forests. Surrounding uses may be visible along the periphery but are not the focus of the view. Forests may be on dry land (upland forests) or interspersed with standing water, marshes, or other wetlands (forested wetlands).
- Developed Recreational Areas: Locations developed for specific types of active recreation, ranging from playgrounds and picnic areas to collections of athletic fields with associated stadium, restroom, and service facilities. Views primarily focus on the recreational facilities themselves, while other visible landscape features (e.g., vegetation or surrounding development) are secondary.

LCAs were identified using the principles of Landscape Similarity Zones, as detailed in the BLM VRM system (BLM 1986a). Specifically, National Land Cover Database designations were evaluated in the context of observed patterns of landform, development, water, and vegetation. Regulatory designations such as zoning, scenic byways or rivers, and other land use or visual controls also informed LCA identification, as summarized below.

- Scenic Rivers: A segment of the North Landing River that would be crossed by (or within view of the crossing of) several alternative transmission line routes is a state-designated Scenic River, pursuant to the Virginia Scenic Rivers Act (Va. Code §10.1-400, *et. seq.*). A 26.7-mile-long segment of the North Landing River between North Landing Road (State Route 165) to the North Carolina state line is designated as scenic (Figure 4.2-2 in Appendix A, Figures) (VDCR 2021h). Designation as a Scenic River requires all state agencies to "consider the visual, natural, and recreational values of a scenic river in planning and permitting processes," (VDCR 2020) but includes no specific land use or visual controls.

  The following alternative transmission line routes would pass near or cross the designated Scenic River segment (all of which are near the North Landing River Bridge):

  - HF Route 2, MP 8.5, approximately 0.7 mile upstream (northwest) of the designated Scenic River segment
  - HF Route 5, MP 9.2, within the designated Scenic River segment
  - Line #2085 Route Variation, MP 4.1, approximately 0.6 mile upstream (northwest) of the designated Scenic River segment

- Scenic Byways: A segment of Indian River Road, which would be crossed by HF Routes 1, 2, and 5, the HF Hybrid Route, and the Line #2085 Route Variation, is a Virginia Byway (the Commonwealth's term for a scenic byway). This designation identifies roads "having relatively high aesthetic or cultural value, leading to or within areas of historical, natural or recreational significance" (VDOT 2019). The designation does not carry land use or visual impact controls, but instead recognizes roads "controlled by zoning or otherwise, so as to reasonably protect the aesthetic or cultural value of the highway" (Va. Code § 33.2-406).

  The following alternative transmission line routes would cross the scenic byway:

  - HF Route 1, MP 7.5, and the HF Hybrid Route, MP 7.7, between the Dewberry Farm, Indian River Woods, and Indian River Farms subdivisions;
  - HF Route 2, MP 7.3, west of the intersection of Indian River Road and Winston Avenue
  - HF Route 5, MP 8.0, and the Line #2085 Route Variation (MP 2.4), west of the Courthouse Estates subdivision

- Green Sea Blueway and Greenway Management Plan: Prepared by the City of Virginia Beach as a functional component of its Comprehensive Plan, this document addresses the North Landing River (and tributaries) and portions of Indian River Road. While the management plan does not establish regulations related to visual resources, it treats scenic resources as a contributing factor to goals related to environmental protection, agricultural preservation, passive recreation, tourism, growth management, and cultural heritage preservation. As such, the management plan supports the Comprehensive Plan policy of acquiring and protecting public lands (City of Virginia Beach 2015).

- Local Plans and Land Development Ordinances: The Comprehensive Plan for Virginia Beach generally discusses protection of scenic resources, but does not provide detailed policies or guidance applicable to the visual impacts from the onshore Project components (City of Virginia Beach 2017d). The Comprehensive Plan for the City of Chesapeake includes an objective that encourages the location or relocation of utilities underground, and recommends working "with private energy providers to plan for high-capacity transmission lines and substations in order to minimize their impact on residences and businesses" (City of Chesapeake 2016b). Land development ordinances such as zoning codes specify characteristics such as height, appearance, and visual screening. This visual assessment is based on the Virginia Facilities' compliance with these regulations (to the degree that they are applicable to state-regulated utilities).

- The City of Chesapeake Open Space and Agricultural Preservation Program: Scenic resources are a component of a candidate property's eligibility for inclusion in the program (City of Chesapeake 2017). The program itself does not have overall restrictions or limitations related to visual or scenic resources, and there are no known cases where the onshore Virginia Facilities would cross or be visible from a preserved parcel that has parcel-specific visual restrictions (City of Chesapeake 2018c).

4.4.3 Viewer Types and Characteristics

In addition to landscapes, as discussed in Section 4.4.2, Landscape Character Areas, viewers who might experience visual effects from construction and operation of the onshore Virginia Facilities are also resources for whom impacts are evaluated. These viewers can be classified into viewer types, based on distinctions such as viewer concern (i.e., expected sensitivity to landscape changes), activity types, and viewing characteristics.

Viewer concern can vary depending on the characteristics and preferences of each key viewer group. For example, residential viewers are expected to have high concern for changes in views from their

residences, whereas motorist concerns generally depend on when and where travel occurs and the type of travel involved (e.g., commuting vs. recreational travel). The types of viewers and their associated viewing characteristics are described below.

4.4.3.1 Local Residents and Workers

Local residential viewer groups consist of people who live within the visual study area, most on a year-round basis with some seasonal residents. Local residents generally view the landscape from their yards and homes, as well as from places of employment while engaged in daily activities. Residents of primary interest for this analysis live in or near the visual study area in locations with potential views of the overhead transmission lines and other associated facilities.

Regardless of their residence location, local residents' sensitivity to visual quality can be variable and may be tempered by the existing visual character and setting of their neighborhoods. For example, residents with views of existing commercial or industrial facilities or electric transmission lines may respond differently to landscape changes from development of similar facilities than those with views of open fields or forested areas. It is understood, however, that local residents are generally familiar with the local landscape and may be more sensitive to visual changes.

4.4.3.2 Travelers

Travelers passing through an area typically view the landscape from motor vehicles on their way to or from work or other destinations. Travelers include daily commuters and people engaged in various types of business or personal travel. Travelers would be concentrated on the major roads that cross the visual study area. This viewer group is a large proportion of the viewers in the visual study area, due to the presence of substantial residential development and employment centers (such as NAS Oceana and other businesses in Virginia Beach and the greater Norfolk area) within commuting distance of the transmission facilities.

Commuters do not tend to stop along their travel routes, have a relatively narrow field of view because they are focused on road and traffic conditions, and are destination-oriented. Passengers in commuter vehicles would have greater opportunities for prolonged off-road views toward landscape features and, accordingly, may have greater perception of changes in the visual environment.

Non-commuter travelers may have greater opportunities for prolonged views toward landscape features and may take more notice of changes in the visual environment. Within the visual study area, the alternative transmission line routes are occasionally collocated parallel to roadways or cross them perpendicularly.

4.4.3.3 Tourists and Recreational Users

This viewer group includes local and seasonal residents engaged in recreational activities as well as tourists and recreational users visiting from outside the local area. These users can be involved in outdoor recreational activities at parks and other developed recreational facilities or in undeveloped natural settings such as forests or preserves. Tourists and recreational users come to the area for the purpose of experiencing its cultural, scenic, and/or recreational resources. They may view the landscape while traveling to these destinations on local roads or from the sites themselves.

The recreational user group includes those involved in active recreation (e.g., bicyclists, golfers, hikers, joggers, swimmers, recreational boaters, kayakers, and participants in team sports) and those involved in more passive recreational activities (e.g., picnicking, sightseeing, and wildlife observation). Because the overhead transmission lines and other aboveground Project facilities would not be visible from beach areas, beachgoers and ocean-related recreationists are not addressed in this section. For some

recreational viewers, particularly those using undeveloped recreation facilities, scenery is an important part of their recreational experience, and recreational users often have continuous views of landscape features over relatively long periods. Most recreational viewers will only view the surrounding landscape from ground-level or water-level vantage points. Recreational users' sensitivity to visual quality and landscape character will be variable, depending on their reason for visiting the area. However, recreationalists are generally considered to have relatively high sensitivity to scenic quality and landscape character.

4.4.4 Key Observation Points

The inventory of visual resources involved both desktop and on-site review. GIS mapping was used to identify local, state, and federal areas of visual significance that could be affected by the onshore Virginia Facilities. These included (but were not limited to) resources such as parks, federal and state-managed lands, privately held conservation areas, and historic resources. Field observations were conducted in March and May 2021 to confirm initial findings and identify potential viewing areas.

KOPs are representative locations that would have views of the overhead transmission infrastructure and/or associated facilities. A preliminary list of KOPs was identified through the desktop review component of the visual resources inventory, and then refined based on field observations. The list of potential KOPs was checked to confirm that locations representing a range of LCAs, viewer types, and types of visual resources were selected.

Table 4.4-1 provides information about the KOPs evaluated in this study. The sections below describe existing visual conditions at each KOP. Figure 4.4-1 in Appendix A, Figures, depicts the locations of the KOPs.

KOPs 01 and 02 were initially identified to evaluate the visual impacts of a potential switching station site that is no longer being considered for the onshore Virginia Facilities (i.e., the Oceana Switching Station; see Section 3.2.6, Oceana Switching Station Site). Moreover, the portion of the onshore transmission lines within potential view of these KOPs (the CLH Route) would be installed underground. As a result, KOPs 01 and 02 are not included in this analysis. It was further determined that KOP 16 did not provide a meaningfully different view than KOP 17; therefore, KOP 16 was also not evaluated. Appendix I, Visual Simulations, contains existing conditions images from the KOPs identified in Table 4.4-1.

Table 4.4-1: Key Observation Points

KOP Number	Project Component	LCA	Location	Description
KOP 03	Harpers Switching Station, HF Routes 1, 2, and 5	Developed—industrial	Intersection of Nimitz Drive and Harpers Road	View of the Harpers Switching Station site from Harpers Road, just east of the intersection with Nimitz Drive
KOP 04a & 04b	Dam Neck Route Variation	Transportation Corridor, Agriculture/Open Land Developed—commercial	South side of Dam Neck Road just east of the London Bridge Road intersection	View facing west of transmission lines crossing field, adjacent to road, and through the intersection near the commercial center (KOP 04a); east facing view along Dam Neck Road (KOP 04b)

KOP Number	Project Component	LCA	Location	Description
KOP 05	HF Routes 1, 2, and 5 and the Dam Neck Route Variation	Developed—suburban residential	Median of Kingsland Lane between the existing transmission structures and the new structure locations	View of new transmission line collocated with existing lines
KOP 06	HF Route 5 and the Line #2085 Route Variation	Agriculture/Open Land, Developed—suburban residential, Developed—rural residential	Kempsville Mennonite Church	View from north side of North Landing Road (State Route 165), from field looking south along existing and new ROW
KOP 07	HF Route 5 and the Line #2085 Route Variation	Agriculture/Open Land, Developed—suburban residential, Developed—rural residential	Indian River Road east of North Landing Road, at the existing and proposed transmission line crossing	Facing north along centerline, through the field
KOP 08a	HF Route 2 and the Line #2085 Route Variation	Forested, Open Water	North Landing Bridge facing northwest	View facing upstream along the Intracoastal Waterway/North Landing River as far upstream as possible
KOP 08c	HF Route 5	Forested, Open Water	North Landing Bridge facing southeast	View facing downstream
KOP 09	HF Route 5	Agriculture/Open Land, Developed—rural residential	South of the intersection of Long Ridge Road and Land of Promise Road	View facing north past residences and cultivated fields
KOP 10	Fentress Substation	Agriculture/Open Land, Developed—suburban residential	Median of Fentress Loop Road at substation entrance north of the intersection with Meredith Drive	Long view required to capture the expansion of Fentress Substation, which will be on the north side of the existing facility
KOP 11	All HF Routes	Developed Recreation Area	Just east of the parking lot on the north side of baseball and soccer fields in the Princess Anne Athletic Complex	View facing south across athletic fields toward the routes
KOP 12	HF Route 1, and the overhead portion of the HF Hybrid Route	Agriculture/Open Land, Developed—rural residential	Salem Road Development, corner of Salem Road and Highland Drive	View along Salem Road west of the intersection with Highland Drive, facing east toward corner of Salem Road and Highland Drive

KOP Number	Project Component	LCA	Location	Description
KOP 13	HF Route 1 and the overhead portion of the HF Hybrid Route	Developed—suburban residential	Highland Parish Development; end of Boarder Way Road (cul-de-sac)	View facing southeast and south, views between and over homes for structure visibility
KOP 14a	HF Route 1 and the overhead portion of the HF Hybrid Route	Suburban Residential	Indian River Road, crossing of HF Route 1 and the HF Hybrid Route through the Dewberry Farm residential subdivision	View facing southeast adjacent to Indian River Road, near Dewberry Farm residential subdivision
KOP 14b	HF Route 1 and the overhead portion of the HF Hybrid Route	Suburban Residential	Indian River Road, crossing of HF Route 1 and the HF Hybrid Route through the Dewberry Farm residential subdivision	View facing south-southwest adjacent to Indian River Road, near Dewberry Farm residential subdivision
KOP 15	HF Route 2	Agriculture/Open Land	Intersection of Mt. Pleasant Road and Santoro Way	View facing north across large field, proposed transmission line in distance along edge of trees
KOP 17	HF Routes 1 and 2 and the overhead portion of the HF Hybrid Route	Agriculture/Open Land, Developed—rural residential	Mt. Pleasant Road at existing Line #271 crossing	View from existing transmission line corridor on north side of Mt. Pleasant Road, facing south-southeast

HF = Harpers to Fentress; KOP = Key Observation Point

4.4.4.1 KOP 03

KOP 03 provides a view from Harpers Road toward the proposed Harpers Switching Station (Figure I-1 in Appendix I, Visual Simulations). The view is primarily forested, with trees dominating the foreground just past a security fence (marking the boundary of NAS Oceana) and a narrow strip of open land. The view is currently characterized by rough, uneven texture (from grasses and leaves); tan, yellow, brown, and green colors (with the possible addition of red and orange in the fall, depending on tree species); and the horizontal and vertical lines of the fence.

4.4.4.2 KOP 04

KOP 04 provides two views (04a and 04b) along Dam Neck Road near the intersection with London Bridge Road. Both roads are divided, multi-lane facilities with at-grade intersections that meet at a signalized intersection. KOP 04a (Figure I-2 in Appendix I, Visual Simulations) shows the west-facing view toward the intersection, which has a primarily agricultural foreground and stands of trees on the far side of the intersection. Dam Neck Road occupies the right side of the view, while part of the London Bridge Marketplace, a small commercial property with shops and restaurants, occupies much of the left portion of the view. KOP 04B (Figure I-3 in Appendix I, Visual Simulations) shows the opposite view, facing east along Dam Neck Road. This view is primarily agricultural on both sides of Dam Neck Road,

with a mixed (deciduous and coniferous) stand of trees terminating the view in the foreground. Linear features here are prominent, including the smooth, gray pavement of Dam Neck Road, the tree line on the far side of London Bridge Road, the horizontal lines of the London Bridge Marketplace building, and various utility poles. The predominant texture is rough, due to the presence of foliage and crops (which would typically be higher during the growing season). Predominant colors include gray on human-made surfaces, and tans and greens on natural features.

4.4.4.3 KOP 05

KOP 05 shows the view looking west along an existing utility ROW (Dominion's Lines #2118/147) within the Castleton subdivision. Overall, the view here is dominated by the existing utility structures and conductors (Figures I-4 and I-5 in Appendix I, Visual Simulations). The left side of the view is primarily residential (the southern portion of the subdivision), while the right side is a forested buffer between the utility corridor and the northern portion of the subdivision. The new transmission structures for the onshore Virginia Facilities would replace the rough texture of the trees on the west side of the intersection with smooth textures and open views.

4.4.4.4 KOP 06

KOP 06 shows the view from north of North Landing Road toward Kempsville Mennonite Church (Figure I-6 in Appendix I, Visual Simulations). The view includes elements of agriculture (the field in the foreground), low-density residential on the left side of the view, and the church, which occupies much of the right side of the view. Existing electric transmission infrastructure (Dominion's Line #2085) in the left side of the view and distribution infrastructure and white fence across the center of the entire view (along North Landing Road) create strong lines. The lines of the church itself and nearby homes are broken up by the rough, irregular forms of trees and other vegetation, and the color palette is primarily green.

4.4.4.5 KOP 07

KOP 07 shows the view north along the same existing electrical transmission line (Dominion's Line #2085) as in KOP 06, as seen from Indian River Road, approximately 1.0 mile south of KOP 06 (Figure I-7 in Appendix I, Visual Simulations). The view here is almost entirely agricultural, except for the existing transmission structures and conductors on the right side of the view and widely spaced residential and other buildings (including the Kempsville Mennonite Church) in the middleground, along North Landing Road, in the left-center of the view. Rough textures, irregular forms, and a green palette dominate the view.

4.4.4.6 KOP 08

KOP 08 shows the proposed location where several alternative transmission line routes would cross the North Landing River from near the North Landing Bridge (which carries North Landing Road [State Route 165] over the river). KOP 08a shows the crossing locations for HF Route 2 and the Line #2085 Route Variation to the northwest of the viewer (Figures I-8 and I-9 in Appendix I, Visual Simulations), while KOP 08c shows the location of the HF Route 5 crossing to the southeast (Figure I-10) (KOP 08b was not used). The views from this location are almost entirely natural in appearance, with the river's flat, blue-brown texture dominating the foreground and middleground, and a rougher, green-brown mix of deciduous and coniferous trees on both shores. A navigation buoy and wood pilings associated with the bridge are the only human-made features noticeable in views to the northwest (Figures I-9 and I-10).

4.4.4.7 KOP 09

KOP 09 shows the view from Long Ridge Road, south of Promised Land Road (Figure I-11 in Appendix I, Visual Simulations). Low-density residential and rural-agricultural uses dominate the view, and characterize much of the landscape in this area. The tree line is rough and irregular, the foreground grasses are somewhat rough (with smoother areas of new grass) and more regular in shape, while residences and Long Ridge Road are gray, white, and brown with flat, boxy, or linear characteristics. Residences, one church along Promised Land Road, and the tree line beyond, are approximately 0.5 mile from the viewer.

4.4.4.8 KOP 10

KOP 10 shows the view of the Fentress Substation site, as viewed from Fentress Loop Road, adjacent to Etheridge Lakes Park (Figure I-12 in Appendix I, Visual Simulations). This view includes existing transmission infrastructure emanating from the substation site, within a forested corridor that occupies the foreground to the left and right of the transmission structures. The view itself is a combination of industrial and forest. Existing lattice structures and conductors create strong, black linear features, and the cleared ROW contrasts with the walls of green and brown trees on either side. The KOP location is on a suburban street, with residential development on all other sides. The sidewalk in the foreground is part of the overall community sidewalk system, and leads to the entrance to Etheridge Lakes Park, approximately 0.1 mile north (to the left). None of the park's active spaces are visible from this KOP (including areas outside of the view shown in Appendix I, Visual Simulations).

4.4.4.9 KOP 11

KOP 11 shows south-facing views from the central concession/restroom facilities at the Princess Anne Athletic Complex, a large multi-sport facility (Figures I-13, I-14, and I-15 in Appendix I, Visual Simulations). The view here is an entirely developed recreational area, including athletic fields, goals and goalposts, lighting structures, bleachers, parking, and associated facilities. The tree line at the southern edge of the facility, approximately 0.2 mile from the viewer, contributes rough, irregular texture; however, the overall view is dominated by smooth, linear features such as the fence in the foreground, the artificial turf of the playing field, and the vertical and horizontal lines of goals, goalposts, and lighting structures.

4.4.4.10 KOP 12

KOP 12 shows the view facing southeast from Salem Road (Figure I-16 in Appendix I, Visual Simulations). The landscape here is low-density residential amid open, undeveloped lands. St. Luke's Catholic Church is to the left of the view, while a portion of the Highland Parish subdivision is visible at the extreme right of the view. Rough, irregular, green vegetated features dominate the view here, with a variety of vegetation types present. The tree line in the foreground is the primary linear feature in the view.

4.4.4.11 KOP 13

KOP 13 shows views from a cul-de-sac within the Highland Parish subdivision, a high-density residential area (Figure I-17 in Appendix I, Visual Simulations). Houses with regular, flat, smooth textures and neutral colors are the dominant visual features, along with the flat, gray pavement of the cul-de-sac. Trees between the two houses are predominantly vertical features, with the tree trunks especially apparent from this distance; a more distant tree line is visible as an irregular shape through the foreground trees.

4.4.4.12 KOP 14

KOP 14 shows views from Indian River Road looking southeast and south-southwest (Figures I-18 and I-19 in Appendix I, Visual Simulations). The views themselves are largely suburban residential, with landscaped areas surrounding single-family houses, with Indian River Road extending through the foreground and middleground. The views have strong horizontal lines from existing electrical transmission and distribution lines, as well as vertical lines from trees and streetlights in the foreground. The landscape is a mix of rough, irregular green trees and shrubs along with smoother-textured green grass. Human components (houses, fences, landscaping) are the dominant features.

4.4.4.13 KOP 15

KOP 15 shows the view from Mt. Pleasant Road near Santoro Road (Figure I-20 in Appendix I, Visual Simulations). The view is dominated by open fields, characterized by rough, bright green grass. Low-density residential structures with smooth, rectangular gray and white features are on the right side of the image, and a recreational vehicle dealer parking lot is behind the tree line on the left. The rough, gray-green tree line behind the open fields is approximately 0.4 mile from the viewer.

4.4.4.14 KOP 17

KOP 17 shows the view from Mt. Pleasant Road facing south along an existing utility corridor crossing (Dominion's Lines #271/I-74) (Figure I-21 in Appendix I, Visual Simulations). The black, linear features of the existing lattice transmission structures and conductors dominate the view here, and electrical distribution lines along Mt. Pleasant Road also contribute strong linear components. The foreground is an agricultural field whose color and texture would change throughout the year, but would typically be green with rough-textured plants. The smooth, rectilinear residences on either side of the existing transmission lines are generally characteristic of the low-density residential development along this portion of Mt. Pleasant Road. Trees create irregular shapes and vertical features (trunks).

4.5 Cultural Resources

ERM conducted a pre-application analysis of potential cultural resource impacts for the onshore Virginia Facilities in accordance with the VDHR's *Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia* (Guidelines) (VDHR 2008). For each alternative transmission line route or route variation, the analysis identified and considered previously recorded resources within the following study tiers as specified in the VDHR Guidelines:

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

These study tiers additionally encompassed the Harpers and Chicory Switching Station sites and the planned expansion of Dominion's existing Fentress Substation.

Information on cultural resources within each of the study tiers was obtained from the Virginia Cultural Resource Information System (VCRIS). ERM additionally collected information from the City of Virginia

Beach's Historic and Cultural Overlay Districts, the Virginia Beach Historical Register, and the City of Chesapeake's Historic Preservation Commission on locally significant resources within a 1.0-mile radius of the centerlines of each route. ERM reviewed information on battlefields surveyed and assessed by the National Park Service's American Battlefield Protection Program (ABPP); however, no ABPP study areas, core areas, or potential NRHP boundaries for battlefields were identified within the relevant study tiers for the various route options.

Many of the previously recorded cultural resource sites in the vicinity of the onshore Virginia Facilities have not been assessed for NRHP eligibility, and therefore, are not included in the pre-application analysis per the VDHR Guidelines. Until they are assessed and a determination of eligibility made by the VDHR, these resources should be considered potentially eligible for listing in the NRHP. Additionally, there may be unreported historic and archaeological resources that could be affected by construction or operation of the onshore Virginia Facilities. Any such resources would be addressed during an intensive cultural resources survey to be conducted in a subsequent phase of cultural resource studies for these facilities.

Along with the records review, ERM conducted field assessments of the considered architectural resources and historic districts for each alternative transmission line route in accordance with the VDHR's Guidelines. Digital photographs were taken of each architectural resource with views toward the applicable transmission line route (or routes) or other facility. Photo simulations were prepared to assess potential visual effects on the considered resources within the tiered study area. For the previously recorded archaeological sites under consideration, aerial photographs were examined to assess the current land condition and spatial relationship between the sites and any existing or planned transmission lines. The results of these assessments are presented in Section 5.5.1, Archaeological Sites, and Section 5.5.2, Historical Architecture and Other Sites, as appropriate.

As enumerated in more detail below, ERM identified 16 previously recorded archaeological sites for this review (see Table 4.5-1). Because portions of the alternative routes are conterminous, some archaeological sites would be crossed by the ROW of more than one route. Of the 16 sites, four are potentially eligible for listing in the NRHP, three are unevaluated for listing in the NRHP, eight are ineligible for listing in the NRHP, and one is no longer extant.

With regard to historic architectural resources, ERM identified ten previously recorded sites and/or historic districts within the study tiers described above (see Tables 4.5-2 through 4.5-8). Because portions of the alternative routes would be conterminous, some of these resources would be within the VDHR-defined study tiers for more than one route. Of the ten districts and sites, four are listed in the NRHP, three are eligible for listing in the NRHP, and three are considered locally significant by the City of Virginia Beach.

4.5.1 Archaeological Sites

Crossings of archaeological sites were considered a constraint in this study due to the potential for an electric transmission line or associated facility to impact archaeological deposits in these areas (for example, due to transmission structure placement, tree clearing, or heavy equipment usage within a site). The known archaeological sites that would be within the ROW for each alternative transmission line route or route variation are listed and described in Table 4.5-1. A desktop assessment of potential impacts on archaeological sites is provided in Section 5.5.1, Archaeological Sites; however, a confident and complete assessment of the integrity of each site would require archaeological field investigations, which would be completed in a subsequent phase of studies for the onshore Virginia Facilities.

Table 4.5-1: Archaeological Resources in the Rights-of-Way for each Alternative Transmission Line Route and Associated Facilities

Route Alternative [a]	Greenfield or Existing/ Expanded ROW?	Site Number	Description	NRHP Status
CLH Route	Greenfield	44VB0204	Historic trash scatter (Antebellum Period, Civil War, Reconstruction and Growth)	Not eligible
		44VB0361	Historic farmstead (Reconstruction and Growth, The New Dominion, World War I to World War II)	Not eligible
		44VB0389	Prehistoric lithic scatter (Pre-Contact)	Not eligible
			Historic architectural remains (The New Dominion, World War I to World War II)	
		44VB0395	Prehistoric lithic scatter (Pre-Contact)/ Historic artifact scatter (Antebellum Period, Civil War, Reconstruction and Growth, The New Dominion, World War I to World War II)	Not eligible
		44VB0396	Historic artifact scatter (The New Dominion, World War I to World War II)	Not eligible
HF Route 1	Existing/ Expanded ROW	44CS0250	Multicomponent prehistoric camp (Middle Archaic, Late Archaic)	Not evaluated
	Greenfield	44VB0162	Prehistoric camp (Early Archaic, Middle Archaic, Late Archaic, Early Woodland, Middle Woodland, Late Woodland) / Historic cemetery (Antebellum Period, Civil War, Early National Period, Post-Cold War, Reconstruction and Growth, The New Dominion, World War I to World War II)	Potentially eligible
	Existing/ Expanded ROW	44VB0274	Prehistoric artifact scatter (Pre-contact) / Historic farmstead (Antebellum Period, Civil War, Reconstruction and Growth)	Not eligible
		44VB0306	Salem Canal (Channelized Segment of North Landing River) (Antebellum Period, Civil War, Early National Period, Post-Cold War, Reconstruction and Growth, The New Dominion, World War I to World War II)	Not extant
	Greenfield	44VB0314	Historic dwelling (Antebellum Period, Civil War, Reconstruction and Growth)	Not eligible
HF Route 2	Existing/ Expanded ROW	44VB0274	Prehistoric artifact scatter (Pre-contact) / Historic farmstead (Antebellum Period, Civil War, Reconstruction and Growth)	Not eligible
		44VB0275	Historic trash scatter (Antebellum Period, Civil War, Reconstruction and Growth)	Potentially eligible
	Greenfield	44VB0314	Historic dwelling (Antebellum Period, Civil War, Reconstruction and Growth)	Not eligible

Route Alternative [a]	Greenfield or Existing/ Expanded ROW?	Site Number	Description	NRHP Status
HF Route 5	Greenfield	44CS0016	Prehistoric site (Early Archaic, Middle Archaic, Late Archaic)	Not evaluated
		44CS0156	Multicomponent historic artifact scatter (Colony to Nation, Contact Period, Early National Period, Post-Cold War, Reconstruction and Growth, The New Dominion, World War I to World War II)	Not evaluated
	Existing/ Expanded ROW	44VB0263	Historic artifact scatter (Antebellum Period, Civil War, Early National Period, Reconstruction and Growth)	Potentially eligible
		44VB0267	Multicomponent historic trash scatter (Antebellum Period, Civil War, Reconstruction and Growth, The New Dominion, World War I to World War II)	Potentially eligible
		44VB0274	Prehistoric artifact scatter (Pre-contact) / Historic farmstead (Antebellum Period, Civil War, Reconstruction and Growth)	Not eligible
		44VB0275	Historic trash scatter (Antebellum Period, Civil War, Reconstruction and Growth)	Potentially eligible
		44VB0280	Cemetery (Reconstruction and Growth)	Not eligible
	Greenfield	44VB0314	Historic dwelling (Antebellum Period, Civil War, Reconstruction and Growth)	Not eligible
HF Hybrid Route	Existing/ Expanded ROW	44CS0250	Multicomponent prehistoric camp (Middle Archaic, Late Archaic)	Not evaluated
	Greenfield	44VB0162	Prehistoric camp (Early Archaic, Middle Archaic, Late Archaic, Early Woodland, Middle Woodland, Late Woodland) / Historic cemetery (Antebellum Period, Civil War, Early National Period, Post-Cold War, Reconstruction and Growth, The New Dominion, World War I to World War II)	Potentially eligible
	Existing/ Expanded ROW	44VB0274	Prehistoric artifact scatter (Pre-contact) / Historic farmstead (Antebellum Period, Civil War, Reconstruction and Growth)	Not eligible
		44VB0306	Salem Canal (Channelized Segment of North Landing River) (Antebellum Period, Civil War, Early National Period, Post-Cold War, Reconstruction and Growth, The New Dominion, World War I to World War II)	Non-extant
	Greenfield	44VB0314	Historic dwelling (Antebellum Period, Civil War, Reconstruction and Growth)	Not eligible
Dam Neck Route Variation	Not Applicable	None Identified	Not Applicable	Not Applicable
Line #2085 Route Variation	Existing/	44VB0263	Historic artifact scatter (Early National Period, Antebellum Period, Civil War, Reconstruction and Growth)	Potentially eligible

Route Alternative [a]	Greenfield or Existing/ Expanded ROW?	Site Number	Description	NRHP Status
	Expanded ROW	44VB0267	Historic trash scatter (19th Century: 2nd half, 20th Century: 1st half)	Potentially eligible
		44VB0275	Historic trash scatter (Antebellum Period, Civil War, Reconstruction and Growth)	Potentially eligible
		44VB0280	Cemetery (Reconstruction and Growth)	Not eligible

CLH = Cable Landing to Harpers; HF = Harpers to Fentress; NRHP = National Register of Historic Places; ROW = right-of-way

[a] *No previously recorded archaeological sites are located in the footprints of the Harpers Switching Station, Chicory Switching Station, or expanded Fentress Substation.*

4.5.2 Historic Architecture and Other Sites

Each alternative transmission line route reviewed in this study has the potential to affect a number of historic architectural resources and districts. This section of the report presents information on known architectural resources in the vicinity of each alternative route, using the VDHR's tiered study area model. The locations of the resources relevant to each alternative are shown on Figure 4.5-1 (Appendix A, Figures). Individual descriptions of the resources are provided in the Pre-application Analysis Report, which is attached as Appendix H, Pre-application Analysis of Cultural Resources.[23]

Because portions of the route alternatives are conterminous, the same resources may occur in the same tier for more than one route. Tables 4.5-2 through 4.5-8 list the considered architectural resources pertinent to each route alternative. Resources that extend from one tier into the next are only presented once in the tier nearest the alternative. The results of the visual assessment for each route and resource are presented in Section 5.5.2, Historical Architecture and Other Sites

4.5.2.1 Cable Landing to Harpers Route

The four considered resources that lie within the VDHR study tiers for the CLH Route are presented in Table 4.5-2. ERM conducted a field reconnaissance of these resources. A preliminary assessment of effects is provided in Section 5.5.2.1, Cable Landing to Harpers Route, with the Pre-application Report provided in Appendix H, Pre-application Analysis of Cultural Resources.

[23] The Pre-application Analysis Report discusses two additional routes, HF Routes 3 and 4, which were eliminated for analysis in this study; however, the portions of these routes that differ from other routes were retained as route variations (i.e., the Dam Neck and Line #2085 Route Variations).

Table 4.5-2: Historic Architectural Resources in the VDHR Tiers for the CLH Route

Buffer (miles)	Resource Category	Resource Number	Description
1.0 to 1.5	National Historic Landmarks	Not applicable	None identified
0.5 to 1.0	National Register Properties (listed)	Not applicable	None identified
0.0 to 0.5	National Register Properties (listed)	134-0413-0110	Building 1
	National Register (eligible)	134-0917	Winford White House
0.0 (within ROW)	National Register (eligible)	134-0003	Bell House (ROW does not intersect, but is nearly adjacent)
	National Register Properties (listed)	134-0413	Camp Pendleton/State Military Reservation Historic District

ROW = right-of-way

4.5.2.2 Harpers to Fentress Route 1

The six considered resources that lie within the VDHR study tiers for HF Route 1 are presented in Table 4.5-3. ERM conducted a field reconnaissance of these resources. A preliminary assessment of effects is provided in Section 5.5.2.2, Harpers to Fentress Route 1.

Table 4.5-3: Historic Architectural Resources in the VDHR Tiers for HF Route 1

Buffer (miles)	Resource Category	Resource Number	Description
1.0 to 1.5	National Historic Landmarks	Not applicable	None identified
0.5 to 1.0	Locally Significant Resources	134-0702	St. John's Baptist Church
0.0 to 0.5	National Register Properties (listed)	131-5071 [a]	Centreville-Fentress Historic District
	Locally Significant Resources	134-0038	Jonathan Woodhouse House/ William Woodhouse House
		134-0072	Thomas Lovett House/ Rollingswood Academy
0.0 (within ROW)	National Register Properties (listed)	131-5333	Albemarle & Chesapeake Canal Historic District
	National Register (eligible)	131-0044	Albemarle & Chesapeake Canal

ROW = right-of-way

[a] *Also within the VDHR 1-mile tier of the Fentress Substation*

4.5.2.3 Harpers to Fentress Route 2

The six considered resources that lie within the VDHR study tiers for HF Route 2 are presented in Table 4.5-4. ERM conducted a field reconnaissance of these resources. A preliminary assessment of effects is provided in Section 5.5.2.3, Harpers to Fentress Route 2.

Table 4.5-4: Historic Architectural Resources in the VDHR Tiers for HF Route 2

Buffer (miles)	Resource Category	Resource Number	Description
1.0 to 1.5	National Historic Landmarks	Not applicable	None identified
0.5 to 1.0	Locally Significant Resources	134-0702	St. John's Baptist Church
0.0 to 0.5	National Register Properties (listed)	131-5071 [a]	Centreville-Fentress Historic District
	Locally Significant Resources	134-0038	Jonathan Woodhouse House/ William Woodhouse House
		134-0072	Thomas Lovett House/ Rollingswood Academy
0.0 (within ROW)	National Register Properties (listed)	131-5333	Albemarle & Chesapeake Canal Historic District
	National Register (eligible)	131-0044	Albemarle & Chesapeake Canal

ROW = right-of-way

[a] Also within the VDHR 1-mile tier of the Fentress Substation

4.5.2.4 Harpers to Fentress Route 5

The six considered resources that lie within the VDHR study tiers for HF Route 5 are presented in Table 4.5-5. ERM conducted a field reconnaissance of these resources. A preliminary assessment of effects is provided in Section 5.5.2.4, Harpers to Fentress Route 5.

Table 4.5-5: Historic Architectural Resources in the VDHR Tiers for HF Route 5

Buffer (miles)	Resource Category	Resource Number	Description
1.0 to 1.5	National Historic Landmarks	Not applicable	None identified
0.5 to 1.0	Locally Significant Resources	134-0702	St. John's Baptist Church
0.0 to 0.5	National Register Properties (listed)	131-5071 [a]	Centreville-Fentress Historic District
	National Register (eligible)	131-0044	Albemarle & Chesapeake Canal
	Locally Significant Resources	134-0038	Jonathan Woodhouse House/ William Woodhouse House
		134-0072	Thomas Lovett House/ Rollingswood Academy
0.0 (within ROW)	National Register Properties (listed)	131-5333	Albemarle & Chesapeake Canal Historic District

ROW = right-of-way

[a] Also within the VDHR 1-mile tier of the Fentress Substation

4.5.2.5 Harpers to Fentress Hybrid Route

The six considered resources that lie within the VDHR study tiers for the HF Hybrid Route are presented in Table 4.5-6. ERM conducted a field reconnaissance of these resources. A preliminary assessment of effects is provided in Section 5.5.2.5, Harpers to Fentress Hybrid Route.

Table 4.5-6: Historic Architectural Resources in the VDHR Tiers for HF Hybrid Route

Buffer (miles)	Resource Category	Resource Number	Description
1.0 to 1.5	National Historic Landmarks	Not applicable	None identified
0.5 to 1.0	Locally Significant Resources	134-0702	St. John's Baptist Church
0.0 to 0.5	National Register Properties (listed)	131-5071 [a]	Centreville-Fentress Historic District
	Locally Significant Resources	134-0038	Jonathan Woodhouse House/ William Woodhouse House
		134-0072	Thomas Lovett House/ Rollingswood Academy
0.0 (within ROW)	National Register Properties (listed)	131-5333	Albemarle & Chesapeake Canal Historic District
	National Register (eligible)	131-0044	Albemarle & Chesapeake Canal

ROW = right-of-way

[a] *Also within the VDHR 1-mile tier of the Fentress Substation*

4.5.2.6 Dam Neck Route Variation

Two considered resources are within the VDHR study tiers for the Dam Neck Variation (Table 4.5-7). ERM conducted a field reconnaissance of these resources. A preliminary assessment of effects is provided in Section 5.5.2.6, Dam Neck Route Variation.

Table 4.5-7: Historic Architectural Resources in the VDHR Tiers for Dam Neck Variation

Buffer (miles)	Resource Category	Resource Number	Description
1.0 to 1.5	National Historic Landmarks	Not applicable	None identified
0.5 to 1.0	Locally Significant Resources	134-0038	Jonathan Woodhouse House/ William Woodhouse House
		134-0072	Thomas Lovett House/ Rollingswood Academy
0.0 to 0.5	National Register Properties (listed)	Not applicable	None identified
	Locally Significant Resources	Not applicable	None identified
0.0 (within ROW)	National Register Properties (listed)	Not applicable	None identified
	National Register (eligible)	Not applicable	None identified

4.5.2.7 Line #2085 Route Variation

Two considered resources are within the VDHR study tiers for the Line #2085 Route Variation (Table 4.5-8). ERM conducted a field reconnaissance of these resources. A preliminary assessment of effects is provided in Section 5.5.2.7, Line #2085 Route Variation.

Table 4.5-8: Historic Architectural Resources in the VDHR Tiers for Line #2085 Route Variation

Buffer (miles)	Resource Category	Resource Number	Description
1.0 to 1.5	National Historic Landmarks	Not applicable	None identified
0.5 to 1.0	Locally Significant Resources	Not applicable	None identified
0.0 to 0.5	National Register Properties (listed)	Not applicable	None identified
	National Register (eligible)	Not applicable	None identified
	Locally Significant Resources	Not applicable	None identified
0.0 (within ROW)	National Register Properties (listed)	131-5333	Albemarle & Chesapeake Canal Historic District
	National Register (eligible)	131-0044	Albemarle & Chesapeake Canal

ROW = right-of-way

4.5.3 Summary of Existing Survey Data Performed Under Section 106 or Section 110 of the National Historic Preservation Act

Some portions of the alternative routes and associated facilities were previously surveyed for cultural resources. Research indicates that 56 prior Phase I cultural resource surveys have been conducted within 1.0 mile of the alternative routes, including 30 that overlap portions of individual routes. Because the alternative routes share some common segments, many of the previous surveys have covered portions of multiple routes. The previous surveys relevant to the alternative transmission line routes are identified in Table 4.5-9 and shown on Figure 4.5-2 (Appendix A, Figures).

Table 4.5-9: Cultural Resource Surveys Covering Portions of the Alternative Transmission Line Routes and Associated Facilities

VDHR Survey #	Title	Author	Date
CS-019	Phase I Cultural Resource Survey of the Proposed Build Alternatives for the Southeastern Expressway in the Cities of Chesapeake and Virginia Beach, Virginia	Traver, Jerome D., and Maryanna Ralph	1989
CS-034	Phase I Archaeological Survey of Approximately 2,000 Acres at Naval Air Station Oceana, Virginia Beach, Virginia and Naval Auxiliary Landing Field Fentress, Chesapeake City, Virginia	Hornum, Michael B, Patrick Giglio, and William T. Dod	1994
CS-044	Additional Phase I Cultural Resource Survey of Revised Alignments for Proposed Southeastern Expressway, Cities of Chesapeake and Virginia Beach, Virginia	Higgins, Thomas F. III, Anne S. Beckett, and Veronica Deitrick	1994
CS-078	Archaeological Survey, Proposed Southeastern Parkway and Greenbelt, Cities of Chesapeake and Virginia Beach, Virginia	Baicy, Daniel, Loretta Lautzenheiser, and Michael Scholl	2005
CS-137	Phase I Cultural Resource Survey of the ±233-Hectare (±576-Acre) Bedford Solar Project Area, City of Chesapeake, Virginia	Smith, Hope	2018

VDHR Survey #	Title	Author	Date
VB-015	An Archaeological Survey of the Virginia National Guard Camp Pendleton Training Camp Site, City of Virginia Beach, Virginia	Robison, Neil, and Ernie Seckinger	1987a
VB-017	A Phase I Archaeological Reconnaissance Survey of the Proposed Improvements to the Entrance to Oceana Naval Air Station, Virginia Beach, Virginia	Wittkofski, J. Mark	1980
VB-035	An Archeological Survey of the Naval Amphibious Base Annex, Camp Pendleton, Virginia Beach, Virginia	Robison, Neil, and Ernie Seckinger	1987b
VB-037	Phase I Cultural Resource Survey Along Proposed Improvements to Oceana Boulevard in Virginia Beach, Virginia	Egghart, Christopher, and Luke Boyd	1991
VB-038	Phase I Archaeological Survey of a Proposed U.S. Navy Construction Project at Owl Creek in Virginia Beach, Virginia	Bussey, Stanley B., and Jerome D. Traver	1992
VB-047	Phase I Cultural Resource Survey, Birdneck Road, City of Virginia Beach, Virginia	Busby, Virginia, and Leslie Bashman	1993
VB-064	Phase I Archaeological Identification Survey in Support of 1995 Base Realignment and Closure, Naval Air Station Oceana, Virginia Beach, Virginia	Shmookler, Leonid I.	1996a
VB-066	An Addendum to Phase I Cultural Resource Study of Proposed Improvements to Oceana Boulevard and First Colonial Road in Virginia Beach, Virginia	Hodges, Mary Ellen N., and Margaret Long Stephenson	1997
VB-069	Phase I Archaeological Survey of Proposed Landstown-West Landing, 230 kV Transmission Line, Virginia Beach, Virginia	Stuck, Kenneth E., and Thomas F. Higgins III	1997
VB-071	A Supplemental Identification Survey of Proposed Oceana Boulevard-First Colonial Road Project, City of Virginia Beach, Virginia: An Addendum to Phase I Cultural Resource Survey Along Proposed Improvements to Oceana Boulevard In Virginia Beach, Virginia	Stuck, Kenneth E.	1997
VB-079	Archaeological Survey along a Portion of Holland Road (Route 410), the City of Virginia Beach, Virginia	Clarke, Robert, and Bradley Bowden	2000
VB-082	Archaeological Identification Survey, Princess Anne Road and Ferrell Parkway, City of Virginia Beach, Virginia	Brady, Ellen M., and Loretta Lautzenheiser	2000
VB-087	Phase I Archeological Survey of Approximately 583 Acres at Naval Air Station Oceana, Virginia Beach, Virginia	Madsen, Andrew D., Michael B. Hornum, Steven A. Mallory, and W. Patrick Giglio	1996
VB-088	Archaeological Survey of Route 165 (Princess Anne Road) Between Dam Neck Road and Judicial Boulevard, Virginia Beach, Virginia: Management Summary	Tippett, Lee	2002
VB-091	Phase I Archaeological Identification Survey in Support of 1995 Base Closure and Realignment, Naval Air Station Oceana, Virginia Beach, Virginia	Shmookler, Leonid I.	1996b

VDHR Survey #	Title	Author	Date
VB-095	Archaeological Identification Survey and Archaeological Evaluations of Nine Sites Along the Proposed Landstown-West Landing 230 kV Transmission Line, City of Virginia Beach, Virginia	McDonald, Bradley, and Maureen Meyers	2002
VB-097	Supplemental Archaeological Survey of Two Canals within the Proposed Realignment of Elbow Road, City of Virginia Beach, Virginia	Penner, Bruce R.	2003
VB-099	Phase I Archaeological Identification Survey of the Proposed Security Improvements (P-445/P-509), NAS Oceana, Virginia Beach, Virginia	Jensen, Todd L.	2003
VB-125	Phase I Archaeological Survey of the State Military Reservation, 83.81 ha (207 Acres) at Camp Pendleton, Virginia Beach, Virginia	Boyko, Wayne C.J., and Beverly A. Boyko	2008
VB-143	Phase I Archaeological Investigation of Approximately 170 Acres at Naval Air Station Oceana, Virginia Beach, Virginia	Clement, Christopher	2011
VB-145	Survey of the Architectural and Archaeological Cultural Resources at the Virginia Air National Guard Installations at the Richmond International Airport, Henrico County and the State Military Reservation, Camp Pendleton, City of Virginia Beach, Virginia	Markell, Ann, Katherine Kuranda, Katherine Grandine, and Nathan Workman	2007
VB-173	Phase I Cultural Resources Survey of Landstown Road Improvements, City of Virginia Beach, Virginia	Tyrer, Carol D., and Dawn M. Muir-Frost	2017a
VB-174	Completion and Synthesis of Archaeological Survey, State Military Reservation Camp Pendleton, City of Virginia Beach, Virginia	Monroe, Elizabeth J., David W. Lewes, and Ellen L. Chapman	2017
VB-183	Addendum to Phase I Cultural Resources Survey of Landstown Road Improvements, City of Virginia Beach, Virginia	Tyrer, Carol D., and Dawn M. Muir-Frost	2017b
VB-193	Phase I Archaeological and Architectural Reconnaissance Surveys for the North Landing Bridge Replacement, Albemarle and Chesapeake Canal/State Route 165; Cities of Chesapeake and Virginia Beach, Virginia	Goode, Charles E., Sarah G. Traum, and Cynthia V. Goode	2019

ha = hectare; kV = kilovolt; NAS = Naval Air Station; VDHR = Virginia Department of Historic Resources

4.6 Geological Resources

The study area is located within the Coastal Plain geologic province, which is characterized by a series of ancient shorelines that form a terraced landscape extending east of Richmond to the Atlantic Ocean. The province primarily comprises Quaternary-age (<2.6 million years old) sand, silt, clay, and gravel deposited as a result of fluctuating sea levels during interglacial periods. The lowland sub-province, where the onshore Virginia Facilities would be located, encompasses the low-relief coastal area adjacent to the Atlantic Ocean with an elevation range of 0 to 60 feet. The study area is underlain by Quaternary-age sand and silt, localized Holocene-age (<11,700 years old) marsh and intertidal mud deposits along streams and beach sand, and dune sand deposits along the coastline (Virginia Division of Geology and Mineral Resources 2021; William and Mary Department of Geology 2021).

4.6.1 Mineral Resources

ERM reviewed publicly available Virginia Department of Mines, Minerals, and Energy (DMME; DMME 2021) and USGS Mineral Resources Data System (USGS 1996) datasets, USGS topographic quadrangles (USGS 2019), and recent (2018) digital aerial photographs (Historic Aerials 2021) to identify mineral resources in the study area. Based on this review, the mineral resources listed in Table 4.6-1 were identified within 0.25 mile of the alternative transmission line routes and other facilities discussed in this study. Refer to Figure 4.6-1 for the locations of these mineral resources.

Table 4.6-1: Summary of Mineral Resources within 0.25 Mile of Virginia Facilities

Mine Name	Closest Onshore Virginia Facility	Approximate Milepost	Distance / Direction from Onshore Virginia Facility	Mine Status	Permitted Area (acres)
Taylor Farm Pit	HF Routes 1, 2, and 5	0.3–0.9	100 feet / west	Active	79.3
	HF Hybrid Route	0.5–1.1	≤10 feet / west		
	Dam Neck Route Variation	0.0–0.2	500 feet / north		
Sandpit	CLH Route	2.2	200 feet / south	Inactive	Not available
Lilley Pit	CLH Route	2.0	0.25 mile / north	Inactive	19.5

Sources: DMME 2021; USGS 1996

CLH = Cable Landing to Harpers; HF = Harpers to Fentress

4.6.1.1 Active Mines

One active mine, the Taylor Farm Pit, was identified within 0.25 mile of the alternative routes and associated facilities. The mine is situated between Harpers and Dam Neck roads in Virginia Beach. According to available information from the Virginia DMME, the Taylor Farm Pit is a 79.3-acre permitted surface sand mine, of which 66.5 acres have been disturbed. The Virginia DMME permit for the Taylor Farm Pit was issued in 2012. The mine began operating in the same year, expanding to the east and north between 2017 and 2018 based on review of aerial imagery. HF Routes 1, 2, and 5 and the HF Hybrid Route would each pass just east of the mine, while the Dam Neck Route Variation would pass to the south of the mine on the south side of Dam Neck Road.

4.6.1.2 Inactive Mines

Two inactive mines, an unnamed sandpit and the Lilley Pit, were identified within 0.25 mile of the alternative routes and associated facilities. Based on review of the USGS MRDS and topographic quadrangles, the unnamed sandpit is located within NAS Oceana east of Oceana Boulevard in Virginia Beach. Historical aerial imagery indicates the sandpit has been inactive since 1982. The pit is mapped on a 1991 USGS topographic quadrangle, but is not consistently identified on more recent USGS topographic maps. The CLH Route would pass north and west of the former sandpit.

The inactive Lilley Pit sand mine is located northeast of the intersection of Oceana Boulevard and Bells Road in Virginia Beach. Available information from the Virginia DMME indicates the borrow pit was originally permitted in 1985, and that the City of Virginia Beach purchased the property in 2017 with the intention of filling the pit. The CLH Route would pass to the south of the former borrow pit.

4.7 Environmental Justice

ERM conducted a desktop environmental justice (EJ) review of the onshore Virginia Facilities. The purpose of this review was to:

- Identify potential EJ populations (i.e., populations of color, low-income populations, age communities, or linguistically isolated communities) within a 1.0-mile radius of the alternative routes and facilities; and
- Assess potential impacts on EJ communities to determine if implementation along the routes could result in disproportionately high and adverse environmental effects on these populations.

A desktop Environmental Justice Screening Report is attached as Appendix J, Environmental Justice Screening Report. Stakeholder outreach for the onshore Virginia Facilities is ongoing and will help identify issues within communities of concern. Section 5.7, Environmental Justice, provides a summary of Dominion's outreach to date with potentially affected communities.

4.7.1 Methodology

The EJ review of the alternative routes followed federal guidance and recommended methodologies outlined by the Council on Environmental Quality and the Federal Interagency Working Group on Environmental Justice and National Environmental Policy Act Committee using definitions provided in the Virginia Environmental Justice Act (Va. Code §§ 2.2-234 and 2.2-235). This approach is consistent with requirements outlined in the Virginia Clean Economy Act of 2020 pertaining to the development of new, or expansion of existing, energy resources or facilities (Va. Code § 56-585.1).

The Census Block Group (CBG) was used as the primary unit for analysis in the EJ screening for each alternative route because it is the smallest geographic unit for which U.S. Census Bureau demographic data is available. All CBGs that would be crossed by, or within 1.0-mile of, the alternative routes were included in the analysis area. Commonwealth-wide data for Virginia and city-wide data for Virginia Beach and Chesapeake were included in the screening as reference populations to address regional and local demographic variations. The USEPA's EJ mapping and screening tool, EJSCREEN, which is based on census data from the U.S. Census Bureau's 2014–2018 American Community Survey, was used to collect CBG, city, and commonwealth data (USEPA 2020).

The Commonwealth of Virginia defines "population of color" as a group of individuals belonging to one or more of the following racial and ethnic categories: "Black, African American, Asian, Pacific Islander, Native American, other, non-white race, mixed race, Hispanic, Latino or linguistically isolated." The EJSCREEN's definition of a minority population is analogous to Virginia's definition of population of color, but does not include linguistically isolated individuals.

The Commonwealth's criteria for an identified "community of color" or minority population and what constitutes an EJ population has a lower threshold and is more inclusive than federal guidance. Therefore, the Commonwealth's criteria were used to identify populations of color. Virginia has a population of color of 38 percent, which is largely composed of Black or African American, Hispanic or Latino, and Asian populations. Virginia Beach and Chesapeake have minority populations of 38 percent and 42 percent, respectively, mostly consisting of Black or African American residents. For the EJ screening, CBGs whose percentage of minority population exceeds the state average of 38 percent were characterized as populations of color.

The Virginia Environmental Justice Act defines a low-income community as "any census block group in which 30 percent or more of the population is composed of people with low-income" (Virginia General Assembly). Therefore, low-income populations were identified in a CBG if 30 percent or more of the population was characterized as low-income. The EJSCREEN tool provides percentages of low-income

populations by CBG that are defined as households where the income is less than or equal to twice the federal poverty level as reported by the U.S. Census Bureau. Virginia has a low-income population of 25 percent, and Virginia Beach and Chesapeake both have low-income populations of 21 percent.

The EJ review assessed the potential for age-based vulnerabilities in the analysis area of the various alternative routes. Young (under age 5) or elderly (over age 64) populations within CBGs were identified using the federal guidance of a meaningfully greater threshold. Virginia was used as the reference population, which has a population under age 5 of 6 percent and a population over age 64 of 15 percent. Both age populations within the reference population are low; therefore, the application of a 10 percent greater-than threshold may inaccurately reflect the existence of an age population by inflating their representation within the analysis area. A difference of over 20 percentage points compared to the reference population was used to identify age populations (EJ populations) for this review. Using this criterion, no CBGs with young populations and one CBG with an elderly population were identified in the study areas for the alternative routes.

The EJ review also assessed language barriers that could limit low-income or minority communities from reviewing and commenting on the alternative routes. Linguistically isolated populations within CBGs were identified using federal guidance on meaningfully greater threshold. Virginia was used as the reference population, which has a linguistically isolated population of 3 percent. Linguistically isolated populations within the reference population are low; therefore, the application of a 10 percent greater-than threshold may inaccurately reflect the existence of populations with language barriers by inflating their representation within the analysis area. A difference of over 20 percentage points compared to the reference population was used to identify linguistically isolated populations (EJ populations) for this review. Using this criteria, no CBGs with linguistically isolated populations greater than 23 percent were identified in the analysis areas for the alternative routes. The linguistically isolated populations do not exceed 8 percent.

As noted above, the analysis area for each route alternative includes CBGs that would be crossed by, or within 1.0-mile of, the route centerline. The same analysis area was used for the Cable Landing Location, two switching station sites, and the expanded footprint at Fentress Substation. A combined total of 45 CBGs were identified within 1.0 mile of the alternative routes and associated facilities.

4.7.2 Potentially Affected Communities

The desktop review results suggested that construction of the CLH Route, HF Routes 1, 2, and 5, the HF Hybrid Route, the Dam Neck Route Variation, and the Line #2085 Route Variation could affect populations of color, low-income, or historically underserved communities in the study area.[24]

Based on the EJ criteria thresholds identified above, 18 CBGs containing EJ communities were identified within the study area. Of these 18 CBGs, five are crossed by one or more alternative routes. EJ communities identified within the 18 CBGs include:

- 11 populations of color
- 4 populations of color and low-income populations
- 2 low-income populations
- 1 over age 64 population

It should be noted that CBGs are often too geographically large to meaningfully assess impacts on particular EJ communities because most Project impacts would be localized to a much smaller area. Further desktop analysis of aerial imagery identified specific neighborhoods or housing developments

[24] The Cable Landing Location, Harpers Switching Station, Chicory Switching Station, and Fentress Substation Expansion are not located in CBGs with populations of color, age populations, or low-income populations.

within these 18 CBGs that could be directly affected due to close proximity to the one or more of the routes. Each of these neighborhoods are identified in Table 4.7-1. Based on this analysis, it was determined that more on-the-ground investigation was warranted both through outreach directly to those neighborhoods, and engagement with local experts knowledgeable of the area.

Table 4.7-1: Census Block Groups of Concern within 1 Mile of an Alternative Transmission Line Route

Census Block Group	Census Block Group within 1 Mile of Route	Census Block Group Crossed by Route (miles)	Demographic Indicators
Virginia Beach			
518100442001	■ CLH	■ CLH (0.8 mile)	Population of color and Low Income
518100442003	■ CLH	NA	Low Income
518100452002	■ CLH	NA	Population of color and Low Income
518100452003	■ CLH	NA	Low Income
518100454064	■ HF Route 1 ■ HF Route 2 ■ HF Route 5 ■ HF Hybrid Route	NA	Population of color
518100454081	■ CLH	NA	Population of color and Low Income
518100454082	■ CLH	NA	Population of color and Low Income
518100454222	■ HF Route 1 ■ HF Route 2 ■ HF Route 5 ■ HF Hybrid Route ■ Dam Neck Route Variation ■ Line #2085 Route Variation	NA	Population of color
518100454232	■ HF Route 1 ■ HF Route 2 ■ HF Route 5 ■ HF Hybrid Route ■ Line #2085 Route Variation	■ HF Route 1 (1.0 mile) ■ HF Route 2 (3.5 miles) ■ HF Route 5 (2.5 miles) ■ HF Hybrid Route (1.0 mile) ■ Line #2085 Route Variation (1.7 miles)	Population of color
518100454281	■ CLH ■ HF Route 1 ■ HF Route 2 ■ HF Route 5 ■ HF Hybrid Route	NA	Over Age 64
518100460151	■ HF Route 1 ■ HF Route 5 ■ HF Hybrid Route ■ Line #2085 Route Variation	■ HF Route 1 (1.1 miles) ■ HF Hybrid Route (1.1 miles)	Population of color

Census Block Group	Census Block Group within 1 Mile of Route	Census Block Group Crossed by Route (miles)	Demographic Indicators
518100460152	■ HF Route 1 ■ HF Hybrid Route	NA	Population of color
518100460154	■ HF Route 1 ■ HF Hybrid Route	NA	Population of color
518100460161	■ HF Route 1 ■ HF Route 2 ■ HF Route 5 ■ HF Hybrid Route ■ Line #2085 Route Variation	■ HF Route 1 (1.3 miles) ■ HF Route 2 (0.2 mile) ■ HF Hybrid Route (1.3 miles) ■ Line #2085 Route Variation (0.1 mile)	Population of color
518100462161	■ HF Route 1 ■ HF Hybrid Route	NA	Population of color
518100462162	■ HF Route 1 ■ HF Hybrid Route	NA	Population of color
518100462172	■ HF Route 1 ■ HF Hybrid Route	NA	Population of color
Chesapeake			
515500208043	■ HF Route 1 ■ HF Route 2 ■ HF Route 5 ■ HF Hybrid Route ■ Line #2085 Route Variation	■ HF Route 1 (2.5 miles) ■ HF Route 2 (0.2 mile) ■ HF Hybrid Route (2.5 miles) ■ Line #2085 Route Variation (0.2 mile)	Population of color

CLH = Cable Landing to Harpers; HF = Harpers to Fentress; NA = not applicable

4.8 Routing Opportunities

ERM identified existing and planned future corridors within the study area through review of recent digital aerial photography, city planning documents (e.g., City of Chesapeake 2016a; City of Virginia Beach 2016c; and Urban Design Associates 2017), data from Dominion on its existing transmission system, and various publicly available data layers. Existing corridors within the study area include the SEPG study corridor, electric transmission lines, a fuel pipeline, roads, and a railroad. Planned future corridors include various road expansion projects. Each of the existing and future planned corridors was assessed as a potential opportunity for routing the onshore transmission circuits required for the Project and considered in developing the alternative transmission line routes. Descriptions of the routing opportunities in the study area are provided in the following subsections. Figure 4.8-1 (Appendix A, Figures) depicts routing opportunities within the study area.

4.8.1 Southeast Parkway and Greenbelt Corridor

As discussed in Section 2.2, Inventory of Constraints and Opportunities, the SEPG is an approximately 300-foot-wide study corridor previously evaluated for a once-proposed 21.4-mile-long highway designed to provide an east-west connection between the cities of Virginia Beach and Chesapeake. The FHA and VDOT jointly published a Final Environmental Impact Statement for the project in 2008 (FHA and VDOT 2008). In 2010, however, the FHA terminated environmental review of the project due to concerns regarding successful permitting of the expected wetland impacts (a loss of approximately 170 acres of wetlands) from highway construction (FHA 2010).

In anticipation of the highway project, and prior to the termination of environmental review, the City of Virginia Beach acquired undeveloped land within the SEPG study corridor. The City continues to own these lands, much of which remain undeveloped. Because of this, Dominion identified the SEPG study corridor as a potential routing opportunity to align the required transmission circuits through the heavily developed residential and commercial areas of Virginia Beach between NAS Oceana and Princess Anne Commons.

In regular meetings with Dominion, City of Virginia Beach staff said that the transmission infrastructure comprising the onshore Virginia Facilities would be a compatible and acceptable use of City lands within the SEPG corridor, provided that: (1) Dominion work with City staff to resolve potential conflicts with other planned developments within or near the corridor; and (2) that the City would retain use of at least 150 feet of the 300-foot-wide corridor for potential future transportation and recreational uses (see also the discussion of planned developments in Section 4.2.7, Planned Developments). City staff additionally identified a preference for routing the transmission lines within the SEPG corridor over other potential alignments. Dominion worked with the City's planning, transportation, and economic development departments to ensure compatibility of the transmission infrastructure with other planned developments while aligning the alternative routes to maintain sufficient space within the corridor for potential future uses by the City.

The CLH Route, HF Routes 1, 2, and 5, and the HF Hybrid Route would each utilize portions of the SEPG study corridor as follows:

- CLH Route: This route would be within the SEPG corridor approximately between MPs 2.3 and 2.8 where the route follows the east side of Oceana Boulevard within NAS Oceana.
- HF Route 1: This route would be within or immediately adjacent to the SEPG corridor approximately between MPs 0.4 and 6.2. This includes an approximately 1.8-mile-long segment that would also be adjacent to Dominion's existing Lines #2118/147 ROW.
- HF Route 2: This route would be within or immediately adjacent to the SEPG corridor approximately between MPs 0.4 and 5.5. This includes an approximately 1.8-mile-long segment that would also be adjacent to Dominion's existing Lines #2118/147 ROW.
- HF Route 5: This route would be within or immediately adjacent to the SEPG corridor approximately between MPs 0.4 and 5.5. This includes an approximately 1.8-mile-long segment that would also be adjacent to Dominion's existing Lines #2118/147 ROW.
- HF Hybrid Route: This route would be within or immediately adjacent to the SEPG corridor approximately between MPs 0.7 and 6.4. This includes an approximately 1.8-mile-long segment that would also be adjacent to Dominion's existing Lines #2118/147 ROW.

4.8.2 Electric Transmission Corridors

Dominion maintains a broad network of existing transmission lines and associated infrastructure that crosses the study area. An assessment of the ROWs for these transmission lines as routing opportunities for the onshore Virginia Facilities is provided in Table 4.8-1. As shown in the table, portions of HF Routes 1, 2, and 5, the HF Hybrid Route, and the Line #2085 Route Variation would be adjacent to and overlap with existing Dominion transmission ROWs.

4.8.3 Pipeline

NuStar Energy, L.P., owns and operates a products pipeline to carry fuel from a terminal on the North Landing River (which receives fuel supplies via barge deliveries) to NAS Oceana in Virginia Beach. The terminal is located on the north bank of the river approximately 0.4 mile east of the North Landing River

Bridge. From here, the pipeline extends approximately 9.0 miles north to a receipt facility at NAS Oceana near the airfield.

About 6.6 miles of the pipeline (73 percent) is adjacent to roads, including 4.1 miles across heavily developed areas in Virginia Beach approximately between the Princess Anne Athletic Complex and London Bridge Road. The density of residential and commercial development between the athletic complex and NAS Oceana largely precludes use of the pipeline as a routing opportunity. Farther south, the pipeline is either adjacent to existing roads with homes on either side of the roadway (e.g., North Landing Road), or better opportunities are available for routing new transmission infrastructure (e.g., Dominion's existing Line #2085 transmission ROW). For these reasons, none of the alternative transmission line routes discussed in this study would utilize the pipeline as a routing opportunity.

4.8.4 Roads and Railroads

4.8.4.1 Roads

The study area contains a well-developed road network maintained by the City of Virginia Beach and/or the City of Chesapeake, as appropriate. Major roads in the study area include the Norfolk-Virginia Beach Expressway, Oceana Boulevard, General Booth Boulevard, Dam Neck Road, London Bridge Road, Holland Road, Independence Boulevard, Princess Anne Road, Nimmo Parkway, North Landing Road, Sandbridge Road, Salem Road, Indian River Road, Mt. Pleasant Road, and Blackwater Road. While these and other roads were assessed as potential routing opportunities, in most places, existing development precludes large scale use of the roads for routing new transmission infrastructure. Even in the rural and agricultural portions of the study area (generally the area south of Princess Anne and Sandbridge roads), homes are typically on one or both sides of the road.

Portions of the CLH Route and the Dam Neck Route Variation, however, were aligned to collocate with roads as follows:

- CLH Route: This route would be adjacent to Bells Road from approximately MPs 1.3 to 1.8; Oceana Boulevard from approximately MPs 2.4 to 3.4; and Harpers Road from approximately MPs 3.4 to 4.4.
- Dam Neck Route Variation: This route would be adjacent to Dam Neck Road from approximately MPs 0.0 to 1.7.

Additionally, two segments along HF Route 5 would follow the general alignment of roads, but would not be immediately adjacent to the road ROW. From approximately MPs 10.5 to 11.3, HF Route 5 would parallel the west side of Fentress Airfield Road with an offset ranging from about 100 to 125 feet, which would leave a treed corridor between the route and the road. From approximately MPs 12.4 to 13.1, the route would parallel the east side of Blackwater Road with an offset of approximately 50 feet, which would similarly leave a treed corridor between the route and road.

Table 4.8-1: Existing Dominion Transmission Rights-of-Way within the Study Area

Transmission Rights-of-Way	Description	Suitability as a Routing Opportunity	Use as a Routing Opportunity
Landstown-to-Virginia Beach	This ROW extends east for about 4.0 miles from the Landstown Substation to the London Bridge Substation (Lines #147 and #2118), then north for about 7.0 miles to the Virginia Beach Substation (Lines #78 and #2118), all within Virginia Beach. The ROW crosses a mix of heavily developed residential and commercial areas interspersed with more open, undeveloped (mostly forested) areas. About 1.8 miles of the ROW is within or adjacent to the SEPG study corridor.	In places, there is no room to expand the existing corridor due to development abutting both sides of the ROW, particularly in areas to the north and east (e.g., along General Booth Boulevard and in the Dam Neck Corner and Gum Hall Manor areas of Virginia Beach). In the undeveloped, forested areas to the south and west, particularly the area between Landstown Substation and London Bridge Road, however, sufficient space is available to accommodate new infrastructure. This includes the area where the existing ROW is within or adjacent to the SEPG study corridor.	HF Routes 1, 2, and 5, and the HF Hybrid Route would each utilize a segment of the Landstown-to-Virginia Beach ROW as a routing opportunity in the area approximately between Piney Woods Lane to the east and Holland Road to the west. The approximate milepost ranges for each route are: ■ HF Route 1: MPs 2.3 to 4.1 ■ HF Route 2: MPs 2.3 to 4.1 ■ HF Route 5: MPs 2.3 to 4.1 ■ HF Hybrid Route: MPs 2.5 to 4.3
Fentress-to-Landstown-to-Lynnhaven	This ROW extends north for about 8.8 miles from Fentress Substation in Chesapeake to Landstown Substation in Virginia Beach (Lines #I-74, #271, and #2240), then north for about 5.8 miles to Lynnhaven Substation in Virginia Beach (Lines #2025 and #2026).	The segment from Fentress Substation to Landstown Substation is mostly undeveloped forested or agricultural land, with sufficient space to expand the existing ROW. Exceptions include a 0.5-mile-long section along Indian River Road and a 0.5-mile-long section along Highland Drive where the ROW crosses residential areas in Virginia Beach. The segment from Landstown Substation to Lynnhaven Substation mostly crosses heavily developed residential and commercial areas where there is insufficient space to expand the existing corridor due to development or other features (e.g., a channelized tributary to London Bridge Creek) abutting both sides of the existing ROW.	HF Routes 1, 2, and 5, and the HF Hybrid Route would each utilize a segment of the Fentress-to-Landstown-to-Lynnhaven ROW as a routing opportunity in the undeveloped area between the Fentress Substation and Landstown Substation. The approximate milepost ranges for each route are: ■ HF Route 1: MPs 6.2 to 14.0 ■ HF Route 2: MPs 11.8 to 15.0 ■ HF Route 5: MPs 19.9 to 20.0 ■ HF Hybrid Route: MPs 6.4 to 14.2

Transmission Rights-of-Way	Description	Suitability as a Routing Opportunity	Use as a Routing Opportunity
Green Run-to-Greenwich	This ROW extends northwest for about 7.0 miles from the Fentress-to-Landstown-to-Lynnhaven ROW (near an intersection with Princess Anne Road) to the Greenwich Substation (Line #2025), all in Virginia Beach.	The ROW mostly crosses heavily developed residential and commercial areas where there is insufficient space to expand the corridor due to development abutting both sides of the ROW. Moreover, the orientation of this ROW does not provide for a reasonably direct alignment for new transmission infrastructure between the Harpers or Chicory Switching Station sites and Fentress Substation.	None of the routes would utilize the Green Run-to-Greenwich ROW as a routing opportunity.
Portsmouth-to-Landstown	This ROW extends west for about 3.6 miles from Landstown Substation to Stumpy Lake Substation in Virginia Beach, then west/southwest for 4.8 miles to Thrasher Substation in Chesapeake (Line #231).	This ROW mostly crosses heavily developed residential and commercial areas where there is insufficient space to expand the corridor due to development abutting both sides of the ROW. Moreover, the orientation of this ROW does not provide for a reasonably direct alignment for new transmission infrastructure between the Harpers or Chicory Switching Station sites and Fentress Substation.	None of the routes would utilize the Portsmouth-to-Landstown ROW as a routing opportunity.
Fentress-to-Reeves	This ROW extends north/northwest for about 6.0 miles from Fentress Substation to Thrasher Substation (Line #2128), all in Chesapeake.	This ROW, which is adjacent to the Albemarle & Chesapeake Railroad, mostly crosses heavily developed residential and commercial areas where there is insufficient space on one or both sides of the corridor to expand the ROW. An exception is an approximately 1.9-mile-long section between Back Road and Clearfield Avenue, including a crossing of the Intracoastal Waterway, where both sides of the existing ROW mostly consists of undeveloped forested lands. However, the alignment of this ROW is oriented away from the onshore Virginia Facilities, trending northwest from Fentress Substation to outside the study area	None of the routes would utilize the Fentress-to-Reeves ROW as a routing opportunity.
Fentress-to-Yadkin	This ROW extends west/northwest for about 13.7 miles from Fentress Substation to Yadkin Substation (Line #588) in Chesapeake.	This ROW crosses a mix of developed residential and undeveloped agricultural lands, but its alignment is away from the onshore Virginia Facilities, trending west from Fentress Substation to outside the study area.	None of the routes would utilize the Fentress-to-Yadkin ROW as a routing opportunity.

Transmission Rights-of-Way	Description	Suitability as a Routing Opportunity	Use as a Routing Opportunity
Fentress-to-Hickory	This ROW extends southwest for 4.2 miles from Fentress Substation to Hickory Substation (Lines #269 and #2067) in Chesapeake.	This ROW crosses a mix of developed residential and undeveloped forested lands, but its alignment is oriented away from the onshore Virginia Facilities (trending southwest from Fentress Substation to outside the study area).	None of the routes would utilize the Fentress-to-Hickory ROW as a routing opportunity.
Landstown-to-West Landing	This ROW extends south/southeast for about 7.8 miles from Landstown Substation to West Landing Substation (Line #2085) in Virginia Beach.	This ROW mostly crosses undeveloped agricultural and forested lands where there is sufficient space to expand the existing ROW. An approximately 1.3-mile-long segment abuts residential developments (i.e., the Courthouse Woods and Courthouse subdivisions) on one side of the ROW, limiting available space to the west side of the corridor in this area.	HF Route 5 and the Line #2085 Route Variation would each utilize a segment of the Landstown-to-West Landing ROW as a routing opportunity. The approximate milepost ranges for each route are: ■ HF Route 5: MPs 5.5 to 8.3 ■ Line #2085 Route Variation: MPs 0.0 to 2.8

HF = Harpers to Fentress; MP = milepost; ROW = right-of-way; SEPG = Southeastern Parkway and Greenbelt

4.8.4.2 Railroads

One active railroad, the Albemarle & Chesapeake Railroad, is present within the study area in the City of Chesapeake. The railroad enters the study area just north of the community of Hickory following the same general alignment as the Centerville Turnpike north from Hickory Road to Blue Ridge Road, passing about 150 feet east of the existing Fentress Substation. It then heads northeast, crossing Mt. Pleasant Road and the Intracoastal Waterway, exiting the study area near the community of Butts. While the general orientation of the railroad relative to the transmission routes does not provide for large-scale collocation opportunities, approximately 0.1 mile of HF Routes 1, 2, and 5, and the HF Hybrid Route would be adjacent to the railroad where the routes enter Fentress Substation.

5. AFFECTED ENVIRONMENT

The potential environmental impacts associated with each route or route variation are quantified in Tables K-1 and K-2 in Appendix K, Feature Crossing Tables, respectively, and discussed by resource in the following subsections. A comparative analysis of the advantages and disadvantages of each route or route variation is provided in Section 6.0, Comparison of Alternatives.

5.1 Land Ownership

ERM quantified information on land ownership in the study area using publicly available GIS databases and digital tract data obtained from the City of Virginia Beach and City of Chesapeake. Data on landownership for each alternative transmission line route and route variations are provided in Tables K-1 and K-2, respectively (see Appendix K, Feature Crossing Tables).

5.1.1 Cable Landing to Harpers Route

Virtually all of the land along the CLH Route is publicly owned. The route would cross 3.5 miles of USN land encompassing 35.8 acres of new ROW, including 0.1 mile (3.3 acres) at Dam Neck Annex and 3.4 miles (32.5 acres) at NAS Oceana. The Dam Neck Annex and a portion of NAS Oceana would be crossed by HDD. The CLH Route would cross approximately 0.8 mile of the SMR encompassing 29.7 acres of new ROW, of which about 0.2 mile would be crossed by HDD. The route would cross approximately 0.1 mile of City of Virginia Beach parkland, requiring 2.0 acres of new ROW. The City of Virginia Beach lands, which would include portions of the grounds at the Virginia Marine Science Museum (2.0 acres) and a small (about 0.01 acre) section within the Owl Creek Preservation Area, would be crossed by HDD. Privately owned lands along the CLH Route would be limited to approximately 0.01 acre where the route intersects General Booth Boulevard.

5.1.2 Harpers to Fentress Route 1

About 6.8 miles (48 percent) of HF Route 1 would cross public (federal and city) lands, encompassing a combined total of approximately 137.0 acres, of which 43.4 acres would be existing ROW and 93.6 acres would be new or expanded ROW. The federal lands would include a 0.1-mile-long segment of transmission line and the Harpers Switching Station site at NAS Oceana, requiring approximately 21.9 acres of new ROW. The only other federal lands along the route would consist of a 0.4-mile-long crossing of USACE land at the Intracoastal Waterway canal covering approximately 5.3 acres of existing ROW and 1.8 acres of expanded ROW.

The remainder of the public land along HF Route 1 would consist of City of Virginia Beach or City of Chesapeake property. The route would cross 4.4 miles of City of Virginia Beach land encompassing 10.0 acres of existing ROW and 61.1 acres of new or expanded ROW. Essentially all of the land owned by the City of Virginia Beach along the route would be within or adjacent to the SEPG study corridor and/or existing Dominion transmission ROW (Lines #2118/147 or Lines #271/I-74). In Chesapeake, HF Route 1 would cross 1.9 miles of lands owned by the City of Chesapeake, covering 28.1 acres of existing ROW and 8.8 acres of expanded ROW, all within or adjacent to existing Dominion transmission ROW (Lines #271/I 74 or Lines #2240/I-74).

Regarding private property, HF Route 1 would cross 79 and 13 individual private parcels in Virginia Beach and Chesapeake, respectively. HF Route 1 would cross 3.2 miles of private land in Virginia Beach (23.0 acres of existing ROW and 35.1 acres of new or expanded ROW), and 3.9 miles of private land in Chesapeake (65.4 acres of existing ROW and 29.5 acres of new or expanded ROW). Most of the private land in Virginia Beach would be within or adjacent to the SEPG study corridor and/or existing Dominion transmission lines (i.e., Lines #2118/147 or Lines #271/I-74). In Chesapeake, HF Route 1 would cross

private property within or adjacent to existing Dominion ROW (Lines #271/I-74 or Lines #2240/I-74). The private land in Chesapeake would include a 0.3-mile-long crossing of two parcels owned by TNC along Lines #271/I-74 that would require 4.5 acres of existing ROW and 1.5 acres of expanded ROW.

The remainder of the land along HF Route 1 (0.2 mile; 2.2 acres of existing ROW and 3.3 acres of new or expanded ROW) would consist of road ROWs.

5.1.3 Harpers to Fentress Route 2

Approximately 6.5 miles (43 percent) of HF Route 2 would cross federal or city lands, encompassing 14.0 acres of existing ROW and 114.6 acres of new ROW. Like HF Route 1, the federal land crossings would include a 0.1-mile-long segment of transmission line and the Harpers Switching Station site at NAS Oceana, requiring approximately 21.9 acres of new ROW. The only other crossing of federal lands would be a 0.7-mile-long segment of USACE land at the Intracoastal Waterway encompassing 12.4 acres of new ROW.

HF Route 2 would cross 5.0 miles of lands owned by the City of Virginia Beach (5.5 acres of existing ROW and 76.2 acres of new or expanded ROW), and 0.7 mile of lands owned by the City of Chesapeake (8.5 acres of existing ROW and 4.1 acres of new or expanded ROW). Of the lands along the route owned by the City of Virginia Beach, about 1.5 miles would be a greenfield corridor across the ITA with the remainder mostly within or adjacent to the SEPG study corridor and/or Dominion's existing ROW for Lines #2118/147. The crossings of lands owned by the City of Chesapeake would be mostly adjacent to Dominion's existing ROW for Lines #271/I-74.

HF Route 2 would cross 28 and 30 individual private parcels in Virginia Beach and Chesapeake, respectively. HF Route 2 would cross 2.9 miles of private property in Virginia Beach (3.2 acres of existing ROW and 49.1 acres of new or expanded ROW), and 5.6 miles of private property in Chesapeake (50.4 acres of existing ROW and 71.0 acres of new or expanded ROW). While some crossings of private property in the cities would be within or adjacent to existing transmission corridors, longer contiguous crossings in greenfield areas would occur south of the ITA in Virginia Beach (about 1.0 mile) and the area south of the Intracoastal Waterway canal in Chesapeake (about 3.4 miles).

The remainder of the land along HF Route 2 (0.2 mile; 0.9 acre of existing ROW and 3.7 acres of new or expanded ROW) would consist of road ROWs.

5.1.4 Harpers to Fentress Route 5

About 7.7 miles (38 percent) of HF Route 5 would cross public (federal and city) lands. Federal lands include a 0.1-mile-long segment of transmission line and the Harpers Switching Station site at NAS Oceana (about 21.9 acres of new ROW) as well as a 1.8-mile-long crossing of NALF Fentress (30.3 acres of new ROW). The route would cross a 0.1-mile-long segment of USACE land just south of the North Landing River, requiring 1.0 acre of new ROW.

The remainder of the public land along HF Route 5 would consist of City of Virginia Beach or City of Chesapeake property. The route would cross 5.7 miles of lands owned by the City of Virginia Beach encompassing 19.0 acres of existing ROW and 74.0 acres of new or expanded ROW. Most of the route on lands owned by the City of Virginia Beach, about 5.6 miles, would be within or adjacent to the SEPG study corridor and/or existing Dominion transmission ROW (i.e., Lines #2118/147 or Line #2085). In Chesapeake, the route would cross less than <0.1 mile of lands owned by the City of Chesapeake requiring about 0.6 acre of existing ROW and 0.2 acre of expanded ROW.

HF Route 5 would cross 39 and 49 individual private parcels in Virginia Beach and Chesapeake, respectively. HF Route 5 would cross 4.6 miles of private lands in Virginia Beach (6.2 acres of existing ROW and 77.1 acres of new or expanded ROW), and 7.4 miles of private lands in Chesapeake (12.0

acres of existing ROW and 134.0 acres of new or expanded ROW). Most crossings of private land within Virginia Beach would be in areas within or adjacent to the SEPG study corridor and/or existing Dominion transmission ROWs (i.e., Lines #2118/147 or Line #2085); however, an approximately 1.0-mile-long segment of the route between the Courthouse Estates subdivision and North Landing River would be greenfield. In Chesapeake, almost all of the private land crossed by HF Route 5 would be along greenfield segments of the route.

5.1.5 Harpers to Fentress Hybrid Route

Approximately 49 percent (7.0 miles) of the HF Hybrid Route would cross public (federal or city) lands. The route would cross 0.3 mile of USN land at NAS Oceana (2.0 acres of new ROW), and 0.4 mile of USACE land at the Intracoastal Waterway (5.3 acres of existing ROW and 1.8 acres of expanded ROW). Unlike HF Routes 1, 2, and 5, the HF Hybrid Route would not require a switching station at NAS Oceana.

Regarding city-owned land, the HF Hybrid Route would cross 4.4 miles owned by the City of Virginia Beach (12.1 acres of existing ROW and 57.5 acres of new or expanded ROW, including about 0.6 acre within the Chicory Switching Station), and 1.9 miles owned by the City of Chesapeake (28.1 acres of existing ROW and 8.8 acres of new or expanded ROW). Nearly all of the city-owned land crossed by the HF Hybrid Route would be within or adjacent to the SEPG study corridor and/or existing Dominion transmission ROWs (Lines #2118/147, Lines #271/I-74, or Lines #2240/I-74).

The HF Hybrid Route would cross 82 and 13 individual private parcels in Virginia Beach and Chesapeake, respectively. The route would cross 3.1 miles of private land in Virginia Beach (21.8 acres of existing ROW and 55.4 acres of new or expanded ROW, inclusive of all but 0.6 acre within the Chicory Switching Station site), and 3.9 miles of private land in Chesapeake (65.4 acres of existing ROW and 29.5 acres of new or expanded ROW). Most of the private land crossed by the HF Hybrid Route in both Virginia Beach and Chesapeake would be within or adjacent to the SEPG study corridor and/or existing Dominion transmission corridors (i.e., Lines #2118/147, Lines #271/I-74, or Lines #2240/I-74). As with HF Route 1, the private land crossed by the route in Chesapeake would include a 0.3-mile-long crossing of two parcels owned by TNC along Lines #271/I-74, requiring 4.5 acres of existing ROW and 1.5 acres of expanded ROW.

The remainder of the land along the HF Hybrid Route (0.2 mile; 2.1 acres of existing ROW and 3.8 acres of new or expanded ROW) would consist of road ROWs.

5.1.6 Dam Neck Route Variation

A majority of the Dam Neck Route Variation (2.2 miles; 79 percent) would cross private parcels in Chesapeake, encompassing 35.3 acres of new ROW, with about 1.7 miles of the route adjacent to Dam Neck Road. A total of eight individual private parcels would be crossed or affected by the route. The route additionally would cross 0.5 mile of City of Virginia Beach land at Holland Pines Park (0.3 acre of existing ROW and 7.4 acres of new ROW). The remainder of the land along the Dam Neck Route Variation (<0.1 mile; 4.5 acres of new ROW) would consist of road ROWs.

5.1.7 Line #2085 Route Variation

Approximately 2.8 miles (64 percent) of the Line #2085 Route Variation would cross publicly owned lands, mostly city-owned. The route would cross 2.3 miles of City of Virginia Beach land encompassing 13.6 acres of existing ROW and 24.7 acres of new or expanded ROW. Most of the City of Virginia Beach land along the route would be within the ITA. The route additionally would cross 0.5 mile of USACE land, requiring 16.1 acres of new ROW, all at the Intracoastal Waterway canal. The Line #2085 Route Variation would cross 1.5 miles of private land and 18 individual private parcels in Virginia Beach, covering 3.0 acres of existing ROW and 23.8 acres of new or expanded ROW. The remainder of the land along the

route variation (0.1 mile; 0.1 acre of existing ROW and 1.1 acres of new or expanded ROW) would consist of road ROWs.

5.2 Land Uses

5.2.1 Land Use/Land Cover

ERM categorized and quantified land use/land cover types along and within the alternative transmission line routes and associated facilities based on review of local and statewide datasets and air photo interpretation to identify the most current uses using the following categories: Developed Lands, Open Space, Forested Lands, Agricultural Lands, and Open Water.[25] Definitions of these categories are provided in Section 4.2.1, Land Use/Land Cover. See Tables K-1 and K-2 in Appendix K, Feature Crossing Tables, for a quantification of the specific land use/land cover types along each route.[26] More detailed descriptions of potential impacts on agricultural and forested lands are provided in Section 5.2.4, Agricultural Areas, and Section 5.3.5, Vegetation, respectively. Potential impacts on recreational and residential areas are addressed in Section 5.2.2, Recreation Areas, and Section 5.2.3, Residences, respectively.

5.2.1.1 Cable Landing to Harpers Route

By area, land use/land cover types along and within the CLH Route would consist of an approximately equal mix of forested lands (19.4 acres of new ROW; 37 percent by area) and developed lands (19.4 acres of new ROW; 37 percent by area).[27] The route additionally would cross small areas of open space (8.8 acres of new ROW; 17 percent by area) and agricultural lands (5.2 acres of new ROW; 10 percent by area).

5.2.1.2 Harpers to Fentress Route 1

Land use/land cover along and within HF Route 1 and its associated facilities (i.e., the Harpers Switching Station and Fentress Substation) would mostly consist of open space and forested lands, with smaller areas of agricultural and developed lands and open water.[28] By area, approximately 40 percent of the route would consist of open space, encompassing 118.5 acres (97.6 acres of existing ROW and 20.8 acres of new or expanded ROW). Another 34 percent of the route would be within forested areas, covering 101.2 acres (0.9 acre of existing ROW and 100.3 acres of new or expanded ROW). Agricultural lands would account for 13 percent of the route at 37.4 acres (13.7 acres of existing ROW and 23.7 acres of new or expanded ROW), followed by developed lands at 12 percent, covering 35.6 acres (20.3 acres of existing ROW and 15.3 acres of new or expanded ROW). Open water areas would comprise less than 1 percent of the route, totaling just 2.7 acres (1.5 acres of existing ROW and 1.2 acres of new or expanded ROW).

[25] For purposes of land use/land cover, wetland areas have been classified as open space, forested land, or open water. Wetland impacts for each route are addressed in Section 5.3.1, Wetlands. The desktop wetland report is provided as Appendix F, Wetland and Waterbody Report.

[26] The values exclude areas along the CLH Route and the underground portion of the HF Hybrid Route that would be crossed by HDD or microtunnel, which would avoid ground disturbance between the entry and exit points at each HDD location.

[27] Excluding areas crossed by HDDs, the footprint for the CLH Route would encompass 52.8 acres. The HDDs would avoid impacts on open water areas at Lake Christine and Owl Creek.

[28] The footprint for HF Route 1, including the Harpers Switching Station and expanded Fentress Substation, would be 295.5 acres.

5.2.1.3 Harpers to Fentress Route 2

By area, approximately 51 percent of HF Route 2 and its associated facilities (i.e., the Harpers Switching Station and Fentress Substation) would consist of forested lands, encompassing 156.9 acres (0.9 acre of existing ROW and 156.0 acres of new or expanded ROW).[29] Agricultural lands and open space would account for approximately 19 percent and 17 percent, respectively, of the lands along the route. Agricultural lands would total 58.0 acres (13.7 acres of existing ROW and 44.3 acres of new or expanded ROW) with open space areas covering 51.7 acres (33.6 acres of existing ROW and 18.0 acres of new or expanded ROW). About 12 percent of the route would consist of developed lands, covering 37.4 acres (20.3 acres of existing ROW and 17.1 acres of new or expanded ROW), with open water areas accounting for less than 1 percent of HF Route 2 (3.0 acres of new ROW).

5.2.1.4 Harpers to Fentress Route 5

Forested and agricultural lands would comprise the majority of the land use/land cover types along and within HF Route 5 and its associated facilities (i.e., the Harpers Switching Station and Fentress Substation), accounting for 50 percent and 35 percent, respectively, of the route by area.[30] Forested lands along the route would total 191.0 acres (0.9 acre of existing ROW and 190.1 acres of new or expanded ROW), while agricultural lands would cover 135.0 acres (10.4 acres of existing ROW and 124.6 acres of new or expanded ROW). Open space would account for about 8 percent of the route at 31.7 acres (15.1 acres of existing ROW and 16.6 acres of new or expanded ROW) with developed lands encompassing 7 percent of the route at 25.2 acres (11.9 acres of existing ROW and 13.2 acres of new or expanded ROW). Open water areas would comprise less than 1 percent of the route, totaling 1.4 acres of new ROW.

5.2.1.5 Harpers to Fentress Hybrid Route

Land use/land cover along and within the overhead portion of the HF Hybrid Route and its associated facilities (i.e., the Chicory Switching Station and Fentress Substation) would mostly consist of open space and forested lands, with smaller crossings of agricultural lands, developed lands, and open water areas. By area, about 42 percent of the route would consist of open space, encompassing 115.4 acres (95.8 acres of existing ROW and 19.6 acres of new or expanded ROW).[31] Forested lands would account for 37 percent of the route, covering 101.1 acres (0.9 acre of existing ROW and 100.2 acres of new or expanded ROW). Agricultural and developed lands would each comprise about 10 percent of the HF Hybrid Route, with agricultural lands covering 28.1 acres (13.7 acres of existing ROW and 14.4 acres of new or expanded ROW) and developed lands totaling 27.2 acres (20.2 acres of existing ROW and 7.0 acres of new or expanded ROW). Open water areas would account for about 1 percent of the route, totaling 2.7 acres (1.5 acres of existing ROW and 1.2 acres of new or expanded ROW).

5.2.1.6 Dam Neck Route Variation

By area, over two-thirds (68 percent) of the Dam Neck Route Variation would consist of forested lands, covering 32.1 acres, all of which would be new ROW. Agricultural lands would account for about 28 percent of the route at 13.4 acres (all new ROW).[32] Developed lands would account for approximately 3 percent of the route (1.5 acres of new ROW), with open space areas covering about 1 percent of the

[29] The footprint for HF Route 2, including the Harpers Switching Station and expanded Fentress Substation, would be 306.9 acres.

[30] The footprint for HF Route 5, including the Harpers Switching Station and expanded Fentress Substation, would be 384.3 acres.

[31] Excluding areas crossed by HDD or microtunnel, the footprint for the HF Hybrid Route and its associated facilities (Chicory Switching Station and the expanded Fentress Substation) would encompass 274.6 acres.

[32] The footprint for the Dam Neck Route Variation would be 47.5 acres.

route (0.3 acre of existing ROW and 0.1 acre of expanded ROW). No open water areas would be crossed by the Dam Neck Route Variation.

5.2.1.7 Line #2085 Route Variation

Forested and agricultural lands would account for about 42 and 35 percent, respectively, of the Line #2085 Route Variation by area, with forested lands covering 34.6 acres (<0.1 acre of existing ROW and 34.5 acres of new or expanded ROW) and agricultural lands totaling 28.9 acres (9.8 acres of existing ROW and 19.2 acres of new or expanded ROW).[33] Open space would account for approximately 12 percent of the route at 9.8 acres (6.8 acres of existing ROW and 3.0 acres of new or expanded ROW) followed by open water areas at about 8 percent of the route (6.8 acres, all new ROW). Developed lands would account for about 3 percent of the route, covering 2.2 acres (2.2 acres of new or expanded ROW and <0.1 acre of existing ROW).

5.2.2 Recreation Areas

ERM identified parks, golf courses, trails, and other recreational facilities along and near the alternative transmission line routes and other facilities through review of digital datasets and maps, USGS topographic quadrangles, recent (2020) digital aerial photography, and city websites. Descriptions of the individual recreational areas discussed in the subsections below are provided in Section 4.2.2, Recreation Areas.

5.2.2.1 Cable Landing to Harpers Route

The CLH Route would cross each of the following recreational areas in Virginia Beach:

- The SCL of the Virginia Birding and Wildlife Coastal Trail in a forested area along the west side of General Booth Boulevard at approximate MP 0.9;
- Approximately 0.1 mile (1.9 acres) of mostly forested grounds at the Virginia Marine Science Museum between approximate MPs 0.9 and 1.0;
- The Rudee Inlet Water Trail along Rudee Inlet at approximate MP 1.0; and
- A small (about 0.01 acre) area within the Owl Creek Preservation Area near approximate MP 1.0.

Each of these recreational areas would be crossed by HDD. The entry point for the HDD would be on the east side of General Booth Boulevard, approximately 340 feet southeast of the SCL; the exit point would be near Bells Road approximately 1,150 feet northwest of the Virginia Marine Science Museum crossing. Use of the HDD method to install the transmission circuits required for the Project would avoid surface disturbing activities between the entry and exit points, including within each of the recreation areas listed above.

5.2.2.2 Harpers to Fentress Route 1

HF Route 1 would cross or affect portions of eight parks or sporting facilities (Holland Pines, Woods of Piney Grove, Virginia Beach Sportsplex, U.S. Field Hockey Complex, Princess Anne Athletic Complex, Highland Meadows, Dewberry Farms Parcel, and Indian River Farms), three golf courses (Aeropines Golf Course, Virginia Beach National Golf Course, and Battlefield Golf Club), three trails (the SECT, the SCL of the Virginia Birding and Wildlife Coastal Trail, and a trail within the ITA), North Landing River, and the Intracoastal Waterway/Albemarle & Chesapeake Canal. The route additionally would be adjacent to Pine Ridge Park. Each of these recreation areas are discussed in milepost order:

[33] The footprint for the Line #2085 Route Variation would be 82.3 acres.

- Aeropines Golf Course: The Harpers Switching Station at NAS Oceana would occupy a portion of the Aeropines Golf Course (approximately 7.6 acres), affecting parts of two fairways and also requiring the removal of several maintenance buildings and associated outbuildings at the site. As discussed in Section 3.1.1.2, Cable Landing to Harpers Route, Dominion worked cooperatively with the USN to identify an appropriate site for the switching station that minimizes impacts on military training/readiness, natural and cultural resources, existing land uses, and future planned developments on the base to the extent practicable. The USN supported the use of the proposed site for the Harpers Switching Station in a letter to Dominion dated August 17, 2021, a copy of which is provided in Appendix C, Correspondence. Dominion would work with the USN on a re-design of the affected fairways at the golf course and to relocate or replace the maintenance structures at the site.
- Pine Ridge Park: HF Route 1 would be adjacent to Pine Ridge Park from approximate MPs 1.9 to 2.0 on the south side of London Bridge Road in Virginia Beach. At this location, the route would be installed in a forested area within the SEPG study corridor where it passes between the Castleton and Pine Ridge subdivisions. The route would be offset from the park by between 10 and 15 feet, which would leave a treed buffer between the ROW and the edge of the park. Moreover, there is an approximately 40-foot-wide treed corridor in the interior of the park along its western boundary, which would provide additional buffer between the developed area of the park (i.e., parking lot, basketball court, and playground) and the ROW for the transmission line.
- Southeast Coast Saltwater Paddling Trail: At approximate MP 3.3 in Virginia Beach, HF Route 1 would cross the SECT where the trail is coterminous with Dam Neck Creek. The crossing would occur where the route is both within the SEPG study corridor and within and adjacent to an existing Dominion transmission corridor (Lines #2118/147). In this area, the existing 120-foot-wide ROW would be expanded by approximately 105 feet to the south. One set of three single-circuit monopole structures would be installed about 525 feet east of the trail, with a second set installed about 215 feet to the west.
- Holland Pines Park: HF Route 1 would cross Holland Pines Park between approximate MPs 3.4 and 3.6 in Virginia Beach where the route would be within the SEPG study corridor and within and adjacent to an existing Dominion transmission ROW (Lines #2118/147), which would be expanded by 105 feet to the south. The crossing would be limited to the southern edge of the park, affecting approximately 0.8 acre of existing ROW and <0.1 acre of expanded ROW, where land cover is characterized as open space. No new transmission structures would be installed within the park and no new ROW within the park would be required.
- Woods of Piney Grove Park: HF Route 1 would cross Woods of Piney Grove Park in Virginia Beach between approximate MPs 4.0 and 4.1 where the route would be within or adjacent to the SEPG study corridor as well as an existing Dominion transmission ROW (Lines #2118/147), which would be expanded by 105 feet to the south. The crossing would affect areas along the southern boundary of the park, which is bisected by the existing transmission lines. In total, HF Route 1 would affect about 0.6 acre within the park, consisting of 0.3 acre of existing ROW (open space) and 0.3 acre of expanded ROW (forested). One new single-circuit monopole structure would be installed within the park.
- Trail in the ITA: HF Route 1 would cross a bike trail along Princess Anne Road at approximate MP 4.6, where the route would be within the SEPG corridor. Lands on either side of the road at this location are forested. The route would create a new ROW across the trail at this location.
- Virginia Beach National Golf Course: HF Route 1 would cross two small areas of land owned by the City of Virginia Beach associated with, and on the periphery of, the Virginia Beach National Golf Course in an area where the route would be within the SEPG corridor. The first area, located at approximate MP 4.6 within Princess Anne Road, would encompass about 0.01 acre of developed

land. The second area, at approximate MP 4.7, would encompass about 0.01 acre of forested land just west of Princess Anne Road. Both areas would be located greater than 0.3 mile from the fairways at the golf course (and separated from the fairways by agricultural fields and/or forested lands in the area between them).

- Virginia Beach Sportsplex, U.S. Field Hockey Complex, and Princess Anne Athletic Complex: From approximate MPs 4.7 to 6.2, HF Route 1 would cross contiguous parcels of parkland owned by the City of Virginia Beach within the Virginia Beach Sportsplex, U.S. Field Hockey Complex, and Princess Anne Athletic Complex, all within the SEPG study corridor. The route would encompass a combined total of 21.3 acres of parkland, of which 0.4 acre would be existing ROW and 20.9 acres would be new ROW. The route through this area would mostly cross undeveloped open space with isolated areas of forested land, particularly between MPs 5.8 and 6.2 in the Princess Anne Athletic Complex. The route would avoid existing recreational facilities and playing fields as well as a planned future expansion for new fields and associated infrastructure.[34] Moreover, while the route would not collocate with existing transmission infrastructure in this area, several existing Dominion transmission lines cross the parks, including Lines #2118/147, which cross the Virginia Beach Sportsplex along the park's northern boundary; Line #2085, which crosses the Virginia Beach Sportsplex and U.S. Field Hockey Complex along Landstown Road; and Lines #271/I-74, which bisect the Princess Anne Athletic Complex between Landstown Road and the southwest corner of the park. Twelve sets of three single-circuit monopole structures would be installed along HF Route 1 across the three parks.
- Highland Meadows Park: HF Route 1 would cross Highland Meadows Park between approximate MPs 6.7 and 6.8 in Virginia Beach, just east of Highland Meadows Way in the Highland Meadows subdivision. In this area, the route would be confined to Dominion's existing 120-foot-wide corridor for Lines #271/I-74, encompassing approximately 0.8 acre of existing ROW (open space). While this segment of HF Route 1 would include a wreck-and-rebuild of the existing transmission lines, no existing transmission structures are within the park. To keep the onshore Virginia Facilities within the existing corridor in this area, however, one set of two double-circuit, monopole structures would be installed within the park.
- Dewberry Farms Parcel and North Landing River: At approximate MP 7.2, HF Route 1 would cross a short segment of the Dewberry Farms parcel in Virginia Beach in the area east of Dewberry Lane near the Dewberry Farm subdivision. At this location, the route would also cross North Landing River, which forms the eastern boundary of the park. The route in this area would be within and adjacent to Dominion's existing Line #271/I-74 corridor, which would be expanded by 40 feet to the south. HF Route 1 would pass along the southeastern boundary of the park affecting 0.4 acre of existing ROW, all characterized as open space. One existing lattice structure within the park would be removed and replaced with a double-circuit, monopole structure. Two additional single-circuit, monopole structures would be installed outside of, but near to (within about 30 feet of), the southeastern boundary of the park.
- Seashore to Cypress Loop of the Virginia Birding and Wildlife Trail: At approximate MP 7.5 in Virginia Beach, HF Route 1 would cross the SCL where the trail is coterminous with Indian River Road.[35] The crossing would occur where the route would be confined to the existing 120-foot-wide ROW for Dominion's Lines #271/I-74. Two existing lattice structures, located about 275 feet to the northeast and 685 feet to the southwest of Indian River Road, would be removed in this area. These structures would be replaced with two sets of two double-circuit, monopole structures within the existing ROW,

[34] The planned expansion is discussed in Section 5.2.7, Planned Developments. It additionally should be noted that parts of the Virginia Beach Sportsplex and Virginia National Golf Course outside the SEPG corridor would be affected by another planned development, Bio-Tech Park, which is also discussed in Section 5.2.7.

[35] Indian River Road is also a VDCR-designated scenic byway (see Section 5.4.2, Future Conditions).

with one set located about 515 feet to the northeast and the other about 130 feet to the southwest of the road.

- Indian River Farms Park: This park would be crossed by HF Route 1 between approximate MPs 7.7 and 7.9 in Virginia Beach, southeast of the Indian River Farms subdivision. The park is bisected by Dominion's existing transmission corridor for Lines #271/I-74, with the area within the ROW consisting of open space and surrounding lands as forest. The existing 120-foot-wide ROW across the park would be expanded by 40 feet to the north. The route would affect 4.2 acres within the park, including 3.2 acres of existing ROW and 1.0 acre of expanded ROW. One existing lattice structure would be removed and one set of two double-circuit, monopole structures and two sets of three single-circuit, monopole structures would be installed along the route where it would cross the park.
- Intracoastal Waterway/Albemarle & Chesapeake Canal: At approximate MP 10.4, HF Route 1 would cross the Intracoastal Waterway/Albemarle & Chesapeake Canal where the route would be within and adjacent to an existing Dominion transmission corridor (Lines #271/I-74).[36] In this area, the existing 120-foot-wide ROW would be expanded by 40 feet to the west with existing lattice structures on either side of the waterway removed and replaced with one double-circuit and two single-circuit monopole structures.
- Battlefield Golf Club: HF Route 1 would be installed within the Battlefield Golf Club in Chesapeake (approximate MPs 12.7 to 13.8) along the eastern and southern boundaries of the course where the route would be within and adjacent to an existing Dominion transmission corridor (Lines #2240/I-74). In this area, the existing 120-foot-wide ROW would be expanded by 40 feet to the west or north. The crossing of the golf course would encompass about 22.6 acres, including 17.1 acres of existing ROW and 5.5 acres of expanded ROW (all characterized as open space). Seven existing lattice structures would be removed from within the existing ROW and replaced with eight sets of one double-circuit and two single-circuit monopole structures, with all new structures to be installed within the existing ROW. The route would not cross any of the fairways or other operational areas within the golf course.

5.2.2.3 Harpers to Fentress Route 2

HF Route 2 would cross portions of four parks (Holland Pines, Woods of Piney Grove, Virginia Beach Sportsplex, and U.S. Field Hockey Complex), three golf courses (Aeropines Golf Course, Virginia Beach National Golf Course, and Battlefield Golf Club), three trails (the SECT, the SCL of the Virginia Birding and Wildlife Coastal Trail, and a trail within the ITA), North Landing River, and the Intracoastal Waterway/Albemarle & Chesapeake Canal. The route additionally would be adjacent to Pine Ridge Park.

Because HF Route 2 would follow the same alignment and use the same configuration as HF Route 1 from approximate MPs 0.0 to 5.5 and MPs 11.8 to 15.2, the affected environment at Pine Ridge Park, Holland Pines Park, Woods of Piney Grove Park, Virginia Beach Sportsplex, all three golf courses, and the SCL and ITA trails would be the same as described above in Section 5.2.2.2, Harpers to Fentress Route 1. The crossings of each of the remaining recreation areas are discussed in milepost order below.

- U.S. Field Hockey Complex: From approximate MPs 5.0 to 5.6, HF Route 2 would cross parkland owned by the City of Virginia Beach within the U.S. Field Hockey Complex. The route would be within the SEPG study corridor from approximate MPs 5.0 to 5.5, and within and adjacent to an existing Dominion transmission corridor (Line #2085) from approximate MPs 5.5 to 5.6. The route would encompass about 10.1 acres within the park, of which 1.0 acre would be existing ROW and 9.1 acres would be new or expanded ROW. The route through this area would mostly cross undeveloped open space with isolated stands of forest throughout. HF Route 2 would avoid existing recreational

[36] The Albemarle & Chesapeake Canal is listed in the NRHP as part of the Albemarle & Chesapeake Canal Historic District (see Section 5.5.2, Historic Architecture and Other Sites).

facilities and playing fields as well as a planned future expansion for new fields and associated infrastructure.[37] Six sets of three singe-circuit, monopole structures would be installed along the route within the park, with three sets in the area adjacent to Dominion's existing Line #2085.

- Seashore to Cypress Loop of the Virginia Birding and Wildlife Trail: At approximate MP 7.5 in Virginia Beach, HF Route 2 would cross the SCL where the trail is coterminous with Indian River Road.[38] Agricultural lands are found on the north side of the crossing with forested lands to the south. HF Route 2 would create a new, 140-foot-wide ROW across the trail in this area (including through the forested lands south of the road). One set of three single-circuit, monopole structures would be installed in the agricultural land about 520 feet to the northeast of Indian River Road, and one set of three single-circuit, monopole structures would be installed about 240 feet southwest of the road where the route would pass through forest.
- North Landing River: HF Route 2 would cross North Landing River in a forested area at approximate MP 8.2 in Virginia Beach. The route in this area would create a new 140-foot-wide ROW across the river, with one set of three single-circuit, monopole structures installed about 305 feet north of the river, and a second set installed about 470 feet to the south.
- Intracoastal Waterway/Albemarle & Chesapeake Canal: From approximate MP 8.5 to 8.6 in Chesapeake, HF Route 2 would cross the Intracoastal Waterway/Albemarle & Chesapeake Canal in a forested area along a new greenfield corridor.[39] As with North Landing River, the route through this area would create a new 140-foot-wide ROW across the watercourse with one set of three single-circuit, monopole structures installed on either side of the crossing.

5.2.2.4 Harpers to Fentress Route 5

HF Route 5 would cross portions of four parks (Holland Pines, Woods of Piney Grove, Virginia Beach Sportsplex, and U.S. Field Hockey Complex), two golf courses (Aeropines Golf Course and Virginia Beach National Golf Course), three trails (the SECT, the SCL of the Virginia Birding and Wildlife Coastal Trail, and a trail within the ITA), and North Landing River. The route additionally would be adjacent to Pine Ridge Park.

Because HF Route 5 would follow the same alignment and use the same configuration as HF Route 1 from approximate MPs 0.0 to 5.5, the affected environment at Holland Pines Park, Woods of Piney Grove Park, Virginia Beach Sportsplex, both golf courses, and the SCL and ITA trails would be the same as described above in Section 5.2.2.2, Harpers to Fentress Route 1. The crossings of each of the remaining recreation areas are discussed in milepost order below.

- U.S. Field Hockey Complex: From approximate MPs 5.0 to 5.9, HF Route 5 would cross parkland owned by the City of Virginia Beach within the U.S. Field Hockey Complex. The route would be within the SEPG study corridor from approximate MPs 5.0 to 5.5, and within and adjacent to an existing Dominion transmission corridor (Line #2085) from approximate MPs 5.5 to 5.9, with the latter segment running along the southern boundary of the park. The route would encompass about 15.1 acres within the park, of which 3.0 acres would be existing ROW and 12.1 acres would be new or expanded ROW. The route through this area would mostly cross undeveloped open space with isolated stands of forest throughout. HF Route 5 would avoid existing recreational facilities and

[37] The planned expansion is discussed in Section 5.2.7, Planned Developments.

[38] Indian River Road is also a VDCR-designated scenic byway (see Section 5.4.2, Future Conditions).

[39] The Albemarle & Chesapeake Canal is listed in the NRHP as part of the Albemarle & Chesapeake Canal Historic District (see Section 5.5.2, Historic Architecture and Other Sites).

playing fields as well as a planned future expansion for new fields and associated infrastructure.[40] Nine sets of three singe-circuit, monopole structures would be installed along the route within the park, with six sets in the area adjacent to Dominion's existing Line #2085.

- Seashore to Cypress Loop of the Virginia Birding and Wildlife Trail: At approximate MP 8.0 in Virginia Beach, HF Route 5 would cross the SCL where the trail is coterminous with Indian River Road.[41] In this area, the route would be within and adjacent to an existing Dominion transmission corridor (Line #2085). The setting consists of agricultural lands on the north side of the road with forested lands to the south. The route additionally would pass just west of the Courthouse Estates subdivision at this location. To accommodate the new transmission circuits required for the onshore Virginia Facilities, the existing 120-foot-wide ROW for Line #2085 would be expanded by 90 feet to the west. Within the expanded ROW, one set of three single-circuit, monopole structures would be installed about 110 feet north of Indian River Road in the agricultural field, and one set of three single-circuit, monopole structures would be installed about 320 feet south of the road in the forested area.
- North Landing River: HF Route 5 would cross the North Landing River at approximately MP 9.2 (about 650 feet southeast of the North Landing River Bridge), passing from Virginia Beach into Chesapeake. This segment of the river is designated as scenic by the VDCR and also is part of the SECT. The route in this area would be a greenfield corridor through forested lands on either side of the river. The route would create a new 140-foot-wide ROW across the river with one set of three single-circuit, monopole structures installed on either side of the crossing.

5.2.2.5 *Harpers to Fentress Hybrid Route*

The underground segment of the HF Hybrid Route would follow essentially the same alignment as HF Route 1 from approximate MP 0.0 to 4.6, within which the route would cross the SECT, Holland Pines Park, and Woods of Piney Grove Park, and pass near Pine Ridge Park. The crossings of each of these areas, which would require surface trenching and/or HDD or microtunneling to install the new transmission circuits, are discussed below.

The overhead segment of the HF Hybrid Route would follow the same alignment and use the same configuration as HF Route 1 from approximate MPs 4.6 to 14.2, where the route would cross the Virginia Beach National Golf Course, a trail within the ITA, Virginia Beach Sportsplex, U.S. Field Hockey Complex, Princess Anne Athletic Complex, Highland Meadows Park, Dewberry Farms Parcel, the SCL of the Virginia Birding and Wildlife Coastal Trail, Indian River Farms Park, North Landing River, Intracoastal Waterway/Albemarle & Chesapeake Canal, and Battlefield Golf Club.[42] The crossings of these areas would be the same as described above in Section 5.2.2.2, Harpers to Fentress Route 1.

- Pine Ridge Park: The HF Hybrid Route would be adjacent to Pine Ridge Park from approximate MPs 2.1 to 2.2 on the south side of London Bridge Road in Virginia Beach. At this location, the route would be in a forested area within the SEPG study corridor where it would pass between the Castleton and Pine Ridge subdivisions. London Bridge Road would be crossed by microtunnel, which would require temporary workspace abutting the edge of the park in areas immediately adjacent to the road. Trees would be cleared to the edge of the park within this workspace. South of the HDD, the route would be offset from the park by about 40 feet, which would leave a treed buffer between

[40] The planned expansion is discussed in Section 5.2.7, Planned Developments.

[41] Indiana River Road is also a VDCR-designated scenic byway (see Section 5.4.2, Future Conditions).

[42] The approximate milepost crossings for these areas are ITA bike trail – MP 4.8; Virginia Beach National Golf Course – MPs 4.8 and 4.9; Virginia Beach Sportsplex/U.S. Field Hockey Complex/Princess Anne Athletic Complex – MPs 4.9 to 6.4; Highland Meadows Park – MPs 6.9 to 7.0; Dewberry Farms Parcel/North Landing River – MPs 7.4 to 7.5; the SCL of the Virginia Birding and Wildlife Coastal Trail – MP 7.7; Indian River Farms Park – MPs 7.9 to 8.1; Intracoastal Waterway/Albemarle & Chesapeake Canal – MP 10.6, and Battlefield Golf Club – MPs 12.9 to 14.0.

the ROW and park. Moreover, as noted in Section 5.2.2.2, Harpers to Fentress Route 1, there is an approximately 40-foot-wide treed corridor in the interior of the park along its western boundary, which would provide additional buffer between the developed area of the park and the new ROW for the transmission line.

- Southeast Coast Saltwater Paddling Trail: At approximate MP 3.5 in Virginia Beach, the HF Hybrid Route would cross the SECT where the trail is coterminous with Dam Neck Creek in an area where the route would be within the SEPG study corridor and within and adjacent to an existing Dominion transmission ROW (Lines #2118/147). The crossing would be by HDD, which would require a wider ROW (up to 270 feet) than in areas where the transmission circuits would be installed by surface trenching (65 feet).[43] However, no ground disturbing activities would occur in the area between the entry and exit points for the HDD, which would be about 775 feet east and 1,425 feet west of the trail, respectively.
- Holland Pines Park: The HF Hybrid Route would cross Holland Pines Park between approximate MPs 3.6 and 3.8 in Virginia Beach where the route is both within the SEPG study corridor and within and adjacent to an existing Dominion transmission ROW (Lines #2118/147). In total, the route would encompass approximately 1.3 acres within the park, virtually all of which would be existing ROW. Additionally, most of the route across the park would be in an area crossed by HDD (the same HDD noted above for the crossing of the SECT).
- Woods of Piney Grove Park: The HF Hybrid Route would cross Woods of Piney Grove Park in Virginia Beach between approximate MPs 4.2 and 4.3 where the route would be adjacent to the SEPG study corridor and within and adjacent to an existing Dominion transmission ROW (Lines #2118/147). Underground installation of the transmission circuits in this area would expand the existing ROW by about 45 feet to the south. The crossing of the park would affect areas along its southern boundary, encompassing 0.2 acre of existing ROW (open space) and 0.2 acre of expanded ROW (forested).

5.2.2.6 Dam Neck Route Variation

The Dam Neck Route Variation would cross Holland Pines Park and the SECT. Crossings of these areas are discussed below.

- Holland Pines Park: The Dam Neck Route Variation would cross parkland owned by the City of Virginia Beach at Holland Pines Park between approximate MPs 2.4 and 2.8. The route in this area would be a greenfield corridor through the forested lands (mostly wetlands) that comprise the park. The Dam Neck Route Variation would create a new 140-foot-wide ROW within which four sets of three single-circuit, monopole structures would be installed within the park. The route variation would affect about 7.7 acres of parkland, of which 7.4 acres would be new ROW and 0.3 acre would be expanded ROW.
- Southeast Coast Saltwater Paddling Trail: At approximate MP 2.5 in Virginia Beach, the Dam Neck Route Variation would cross the SECT (within Holland Pines Park) at an acute angle where the trail is coterminous with Dam Neck Creek. As with Holland Pines Park, the route would create a new 140-foot-wide ROW across the SECT. One set of three single-circuit, monopole structures would be installed about 470 feet to the north of the trail with a second set installed about 360 feet to the south.

[43] As discussed in Section 3.1.2.4, Harpers to Fentress Hybrid Route, for the HDD and microtunnel installations, the typical three-wide, nine-circuit, duct bank configuration for the underground segment of the route would diverge into six HDDs/microtunnels, which is why the width of the ROW would increase.

5.2.2.7 Line #2085 Route Variation

The Line #2085 Route Variation would cross the U.S. Field Hockey Complex, the SCL of the Virginia Birding and Wildlife Coastal Trail, North Landing River, and the Intracoastal Waterway/Albemarle & Chesapeake Canal. Because the route variation would follow the same alignment and use the same configuration as HF Route 5 from approximate MPs 0.0 to 3.3, the affected environment at the U.S. Field Hockey Complex and SCL would be the same as described above in Section 5.2.2.4, Harpers to Fentress Route 5. The crossings of North Landing River and the Intracoastal Waterway/Albemarle & Chesapeake Canal are discussed below.

- North Landing River and the Intracoastal Waterway/Albemarle & Chesapeake Canal: Between approximate MP 3.7 in Virginia Beach and MP 4.3 in Chesapeake, the Line #2085 Route Variation would cross an unnamed tributary to North Landing River (MP 3.7), North Landing River (MP 3.8), and the Intracoastal Waterway/Albemarle & Chesapeake Canal (MPs 4.0 to 4.2). The route along this segment would be a greenfield corridor through a heavily forested area. The crossings of North Landing River and its tributary would be roughly perpendicular, but the crossing of the Intracoastal Waterway would be acute, requiring a longer-than-average span (approximately 1,300 feet) between the transmission structures that would be installed on either side of the waterbody. Additionally, because of the close proximity of the three watercourses and the long span across the Intracoastal Waterway, this segment of the route variation would require the use of H-frame structures (rather than the monopole structures that would be used elsewhere along the route) and a wider, 250-foot-wide ROW.

5.2.3 Residences

As discussed in Section 4.2.3, Residences, Residential Areas, and Commercial Structures, ERM tallied the number of residential dwellings (multi-unit, single family, and mobile homes) within 100 feet, 250 feet, and 500 feet of each route centerline and the permanent footprint of the Harpers and Chicory Switching Station sites and the expanded Fentress Substation. The results of this analysis are provided in Tables 4.2-5 and 4.2-6.

To provide additional context and to focus the analysis on areas where new impacts would occur, ERM sorted the results presented in Table 4.2-5 to differentiate between transmission route segments representing new ROW from route segments collocated with existing Dominion transmission infrastructure. Table 5.2-1 provides the number of dwellings in each of these categories within 100 feet, 250 feet, and 500 feet of the centerline of each alternative route. No dwellings would be within the new or expanded ROW for any of the alternative routes or route variations.

As discussed in Section 4.2.3, Residences, Residential Areas, and Commercial Structures, all of the dwellings near the Harpers and Chicory Switching Station sites and a majority of the dwellings (18 of 23) near the expanded Fentress Substation would be in the area between 250 and 500 feet of the fence line of the facility.

Table 5.2-1: Residences within 100 Feet, 250 Feet, and 500 Feet of the Centerline of Each Alternative Route

Route Name	Type	Structures Within 100 Feet		Structures Within 250 Feet		Structures Within 500 Feet	
		New ROW	Existing/ Expanded ROW	New ROW	Existing/ Expanded ROW	New ROW	Existing/ Expanded ROW
CLH Route	Dwellings - Total	3	0	23	0	108	0
	Multi-unit Dwellings	0	0	11	0	53	0
	Single Family Dwellings	3	0	12	0	31	0
	Mobile Homes	0	0	0	0	24	0
HF Route 1	Dwellings - Total	0	32	39	137	138	434
	Multi-unit Dwellings	0	0	0	0	0	0
	Single Family Dwellings	0	32	39	137	126	434
	Mobile Homes	0	0	0	0	12	0
HF Route 2	Dwellings - Total	0	1	42	59	139	280
	Multi-unit Dwellings	0	0	0	0	0	0
	Single Family Dwellings	0	1	42	59	127	280
	Mobile Homes	0	0	0	0	12	0
HF Route 5	Dwellings - Total	0	0	52	111	186	433
	Multi-unit Dwellings	0	0	0	0	0	0
	Single Family Dwellings	0	0	52	111	174	433
	Mobile Homes	0	0	0	0	12	0
HF Hybrid Route	Dwellings - Total	0	32	39	142	134	437
	Multi-unit Dwellings	0	0	0	0	0	0
	Single Family Dwellings	0	32	39	142	126	437
	Mobile Homes	0	0	0	0	8	0
Dam Neck Route Variation	Dwellings - Total	0	0	11	0	54	6
	Multi-unit Dwellings	0	0	0	0	0	0
	Single Family Dwellings	0	0	11	0	54	6
	Mobile Homes	0	0	0	0	0	0
Line #2085 Route Variation	Dwellings - Total	0	0	1	56	2	186
	Multi-unit Dwellings	0	0	0	0	0	0
	Single Family Dwellings	0	0	1	56	2	186
	Mobile Homes	0	0	0	0	0	0

CLH = Cable Landing to Harpers; HF = Harpers to Fentress; ROW = right-of-way

5.2.3.1 Cable Landing to Harpers Route

The CLH Route, which would be underground, would have 3 dwellings within 100 feet, 23 dwellings within 250 feet, and 108 dwellings within 500 feet of the centerline. None of this route would be adjacent to existing Dominion transmission lines.

5.2.3.2 Harpers to Fentress Route 1

HF Route 1 would have 32 dwellings within 100 feet, 176 dwellings within 250 feet, and 572 dwellings within 500 feet of the centerline. Most of the dwellings (all 32 within 100 feet, 137 of 176 within 250 feet, and 434 of 572 within 500 feet) would be in areas where the route would be within or adjacent to existing Dominion transmission lines. Zero dwellings within 100 feet, 39 dwellings within 250 feet, and 138 dwellings within 500 feet of the centerline would be along route segments classified as all new ROW.

Many of the dwellings within 500 feet of the HF Route 1 centerline in new ROW areas would be in the segment between MP 1.5 and 2.2 where the route would pass between the Pine Ridge and Castleton subdivisions either within or adjacent to the SEPG study corridor. The HF Route 1 ROW in this area would mostly be on the eastern side of the SEPG corridor, which crosses agricultural lands from MP 1.5 to 1.7 and forested lands from MP 1.7 to 2.2. In the forested area, Dominion would leave a treed buffer on either side of the new ROW, measuring between approximately 115 and 150 feet on the west side of the ROW and between 25 and 50 feet on the east side of the ROW. The treed buffer would help shield views of the route from homes in this area.

All 32 homes within 100 feet of the centerline for HF Route 1 would be along the route segment between approximate MPs 6.2 and 7.8 where the route would pass through and between the Highland Acres, Highland Meadows, Dewberry Farm, Indian River Woods, and Indian River Farms subdivisions in Virginia Beach. In these areas, the route would mostly be confined to the existing 120-foot-wide ROW for Lines #271/I-74. The existing lattice structures for Lines #271/I-74 would be removed and replaced with sets of two double-circuit, monopole structures to carry Line #271 and the onshore Virginia Facilities.

5.2.3.3 Harpers to Fentress Route 2

HF Route 2 would have 1 dwelling within 100 feet, 101 dwellings within 250 feet, and 419 dwellings within 500 feet of the centerline. Most of the dwellings (1 within 100 feet, 59 of 101 within 250 feet, and 280 of 419 within 500 feet) would be in areas where the route would be within or adjacent to existing Dominion transmission lines. Zero dwellings within 100 feet, 42 dwellings within 250 feet, and 139 dwellings within 500 feet of the centerline would be along route segments classified as all new ROW.

As with HF Route 1, many of the dwellings within 500 feet of the HF Route 2 centerline in new ROW areas would be in the segment between MP 1.5 and 2.2 where the route would pass between the Pine Ridge and Castleton subdivisions either within or adjacent to the SEPG study corridor. See the discussion of this area above in Section 5.2.3.2, Harpers to Fentress Route 1.

5.2.3.4 Harpers to Fentress Route 5

HF Route 5 would have 0 dwellings within 100 feet, 163 dwellings within 250 feet, and 619 dwellings within 500 feet of the centerline. Most of the dwellings (111 of 163 within 250 feet and 433 of 619 within 500 feet) would be in areas where the route would be within or adjacent to existing Dominion transmission lines. Zero dwellings within 100 feet, 52 dwellings within 250 feet, and 186 dwellings within 500 feet of the centerline would be along route segments classified as all new ROW.

As with HF Route 1, many of the dwellings within 500 feet of the HF Route 5 centerline in new ROW areas would be in the segment between MP 1.5 and 2.2 where the route would pass between the Pine

Ridge and Castleton subdivisions either within or adjacent to the SEPG study corridor. See the discussion of this area above in Section 5.2.3.2, Harpers to Fentress Route 1.

5.2.3.5 Harpers to Fentress Hybrid Route

The HF Hybrid Route would have 32 dwellings within 100 feet, 181 dwellings within 250 feet, and 571 dwellings within 500 feet of the centerline. Most of the dwellings (all 32 within 100 feet, 142 of 181 within 250 feet, and 437 of 571 within 500 feet) would be in areas where the route would be within or adjacent to existing Dominion transmission lines. Zero dwellings within 100 feet, 39 dwellings within 250 feet, and 134 dwellings within 500 feet of the centerline would be along route segments classified as all new ROW.

Many of the dwellings within 500 feet of the HF Hybrid Route centerline in greenfield areas would be in the segment between MP 1.7 and 2.4 where the route would pass between the Pine Ridge and Castleton subdivisions either within or adjacent to the SEPG study corridor; however, the transmission lines would be underground in this area.

As with HF Route 1, all 32 homes within 100 feet of the centerline for the HF Hybrid Route would be along the route segment between approximate MPs 6.4 and 8.0 where the route would pass through and between the Highland Acres, Highland Meadows, Dewberry Farm, Indian River Woods, and Indian River Farms subdivisions in Virginia Beach. In these areas, the route would mostly be confined to the existing 120-foot-wide ROW for Lines #271/I-74. The existing lattice structures for Lines #271/I-74 would be removed and replaced with sets of two double-circuit, monopole structures to carry Line #271 and the onshore Virginia Facilities.

5.2.3.6 Dam Neck Route Variation

The Dam Neck Route Variation would have 0 dwellings within 100 feet, 11 dwellings within 250 feet, and 60 dwellings within 500 feet of the centerline. Just 6 of the 60 dwellings within 500 feet of the centerline would be in areas where the route would be adjacent to an existing Dominion transmission line. Zero dwellings within 100 feet, 11 dwellings within 250 feet, and 54 dwellings within 500 feet of the centerline would be along route segments classified as all new ROW.

5.2.3.7 Line #2085 Route Variation

The Line #2085 Route Variation would have 0 dwellings within 100 feet, 57 dwellings within 250 feet, and 188 dwellings within 500 feet of the centerline, virtually all of which (56 of 57 within 250 feet and 186 of 188 within 500 feet) would be in areas where the route would be within or adjacent to existing Dominion transmission lines. One dwelling within 250 feet and 2 dwellings within 500 feet of the centerline would be along route segments classified as all new ROW.

5.2.4 Agricultural Areas

As discussed above in Section 5.2.1, Land Use/Land Cover, ERM categorized and quantified land use/land cover types along and within the alternative transmission line routes, including agricultural lands, based on review of local and statewide datasets and air photo interpretation. Quantifications of the agricultural lands that would be affected by each route or route variation are provided in Tables K-1 and K-2 in Appendix K, Feature Crossing Tables, respectively. No agricultural land would be affected by construction or operation of the Harpers Switching Station, Chicory Switching Station, or expanded Fentress Substation.

5.2.4.1 Cable Landing to Harpers Route

The CLH Route would cross approximately 0.7 mile of agricultural lands between approximate MPs 2.0 and 2.6 and MPs 3.5 to 3.7, encompassing about 5.2 acres of new ROW. Because the transmission circuits would be installed underground along this route, plowing would be prohibited within the ROW during operations. To minimize impacts on future agricultural activities, however, the Company aligned both of the route segments through agricultural lands to follow the edges of fields rather than crossing them. The segment from approximate MPs 2.0 to 2.6 would follow a tree line adjacent to the field, a gravel access road into the field, and the edge of Oceana Boulevard. The segment from approximate MPs 3.5 to 3.7 would follow the edge of Harpers Road.

5.2.4.2 Harpers to Fentress Route 1

HF Route 1 would cross approximately 2.1 miles of agricultural lands, encompassing about 37.4 acres, of which 13.7 acres would be existing ROW and 23.7 acres would be new or expanded ROW. All but about 0.3 mile of the agricultural crossings would occur in areas where the route would be within or adjacent to the SEPG study corridor and/or within or adjacent to existing Dominion transmission lines. With the exception of areas directly affected by new transmission structures, agricultural activities would continue within the ROW during operation of the onshore Virginia Facilities.

5.2.4.3 Harpers to Fentress Route 2

HF Route 2 would cross approximately 3.4 miles of agricultural lands, encompassing about 58.0 acres, of which 13.7 acres would be existing ROW and 44.3 acres would be new or expanded ROW. Approximately 1.5 miles of the agricultural crossings would be in areas where the route would be within or adjacent to the SEPG study corridor and/or within or adjacent to existing Dominion transmission lines. With the exception of areas directly affected by new transmission structures, agricultural activities would continue within the ROW during operation of the onshore Virginia Facilities.

5.2.4.4 Harpers to Fentress Route 5

The HF Hybrid Route would cross approximately 8.4 miles of agricultural lands, encompassing about 135.0 acres, of which 10.4 acres would be existing ROW and 124.6 acres would be new or expanded ROW. Approximately 3.0 miles of the agricultural crossings would be in areas where the route would be within or adjacent to the SEPG study corridor and/or within or adjacent to existing Dominion transmission lines. With the exception of areas directly affected by new transmission structures, agricultural activities would continue within the ROW during operation of the onshore Virginia Facilities.

5.2.4.5 Harpers to Fentress Hybrid Route

The HF Hybrid Route would cross approximately 2.1 miles of agricultural lands, encompassing about 28.1 acres, of which 13.7 acres would be existing ROW and 14.4 acres would be new or expanded ROW. All but about 0.3 mile of the agricultural crossings would occur in areas where the route would be within or adjacent to the SEPG study corridor and/or within or adjacent to existing Dominion transmission lines. The underground segment of the route would cross about 1.2 miles of agricultural lands (between approximate MPs 0.3 and 0.8 and MPs 1.2 and 1.9) where activities such as plowing would be prohibited during operation of the onshore Virginia Facilities. However, in both of these locations, the route was aligned to follow the edges of fields rather than crossing the fields to minimize impacts on future agricultural activities. For the overhead segment of the route, and with the exception of areas directly affected by new transmission structures, agricultural activities would be able to continue within the ROW.

5.2.4.6 Dam Neck Route Variation

The Dam Neck Route Variation would cross approximately 0.9 mile of agricultural lands, encompassing about 13.4 acres of new ROW. The crossings would occur where the route is adjacent to Dam Neck Road. With the exception of areas directly affected by new transmission structures, agricultural activities would be able to continue within the ROW during operation of the onshore Virginia Facilities.

5.2.4.7 Line #2085 Route Variation

The Line #2085 Route Variation would cross approximately 1.7 miles of agricultural lands, encompassing about 28.9 acres, of which 9.8 acres would be existing ROW and 19.2 acres would be new or expanded ROW. All but about 0.3 mile of the agricultural crossings would occur in areas where the route would be within or adjacent to existing Dominion transmission lines. With the exception of areas directly affected by new transmission structures, agricultural activities would be able to continue within the ROW.

5.2.5 Cemeteries, Schools, and Places of Worship

ERM identified cemeteries, schools, and places of worship along and near the alternative transmission line routes and other onshore Virginia Facilities through review of digital data sets, archaeological site files, and digital aerial photography. As noted in Section 4.2.5.2, Schools, no schools would be crossed by or within 500 feet of the ROWs for the alternative transmission line routes and other facilities discussed in this report. Descriptions of the individual cemeteries and places of worship discussed in the subsections below are provided in Tables 4.2-7 and 4.2-9.

5.2.5.1 Cable Landing to Harpers Route

No cemeteries or places of worship would be crossed by or within 500 feet of the ROW for the CLH Route.

5.2.5.2 Harpers to Fentress Route 1

Cemeteries

The ROW for HF Route 1 would pass within 500 feet of two cemeteries, Piney Grove Baptist Church Cemetery and the Land Family Cemetery (No. 1), as discussed below.

- Piney Grove Baptist Church Cemetery: At approximate MP 4.0 in Virginia Beach, the HF Route 1 ROW would pass about 150 feet south of this cemetery where the route would be partially within and adjacent to the SEPG study corridor and within and adjacent to an existing Dominion transmission corridor (Lines #2118/147). The new transmission circuits would be installed on the opposite side of the existing transmission line from the cemetery. Additionally, the route would be on the opposite side of Damascus Trail and a series of residential dwellings on the north side of Damascus Trail from the cemetery.
- Land Family Cemetery (No. 1): At approximate MP 5.8 in Virginia Beach, the HF Route 1 ROW would pass about 75 feet north of this cemetery where the route would be within the SEPG study corridor. In this area, the cemetery is surrounded by forested land to the north, west, south, and east with an open field to the northeast. While the open field would provide an unobstructed view to the ROW from parts of the cemetery, existing baseball/softball fields and associated parking facilities at Princess Anne Athletic Complex (about 500 feet to the northeast) are within the viewshed of the cemetery. Additionally, Dominion would leave a treed buffer of approximately 75 feet in the area immediately north of the cemetery between the burial ground and the ROW, which would block most views from within the cemetery toward the ROW.

Places of Worship

The ROW for HF Route 1 would pass within 500 feet of two places of worship, Piney Grove Baptist Church and True Way Evangelistic Mission, as discussed below.

- Piney Grove Baptist Church: At approximate MP 4.0 in Virginia Beach, the HF Route 1 ROW would pass about 475 feet south of this church where the route would be partially within and adjacent to the SEPG study corridor and within and adjacent to an existing Dominion transmission corridor (Lines #2118/147). The new transmission circuits would be installed on the opposite side of the existing transmission line from the church. Additionally, the route would be on the opposite side of Holland Road and Chestwood Drive from the church.
- True Way Evangelistic Mission: At approximate MP 11.0 in Chesapeake, the HF Route 1 ROW would pass about 475 feet west of the True Way Evangelistic Mission near the crossing of Mt. Pleasant Road where the route would be within an existing Dominion transmission corridor (Lines #271/I-74). An approximately 250-foot-wide tree buffer plus 225 feet of farm land and a house would be between the church and the ROW for HF Route 1.

5.2.5.3 Harpers to Fentress Route 2

Cemeteries

The ROW for HF Route 2 would pass within 500 feet of one cemetery, Piney Grove Baptist Church Cemetery, at approximate MP 4.1. Because the route would follow the same alignment and use the same configuration as HF Route 1 in this area, the affected environment would be the same as described above in Section 5.2.5.2, Harpers to Fentress Route 1.

Places of Worship

The ROW for HF Route 2 would pass within 500 feet of two places of worship, Piney Grove Baptist Church (at approximate MP 4.0) and True Way Evangelistic Mission (at approximate MP 12.1). Because the route would follow the same alignment and use the same configuration as HF Route 1 in each of these areas, the affected environment near the two churches would be the same as described above in Section 5.2.5.2, Harpers to Fentress Route 1.

5.2.5.4 Harpers to Fentress Route 5

Cemeteries

The ROW for HF Route 5 would pass within 500 feet of one cemetery, Piney Grove Baptist Church, at approximate MP 4.0. Because the route would follow the same alignment and use the same configuration as HF Route 1 in this area, the affected environment would be the same as described in Section 5.2.5.2, Harpers to Fentress Route 1.

As discussed in Section 4.2.5.1, Cemeteries, HF Route 5 would cross a potential cemetery recorded as an archaeological site on the Kempsville Mennonite Church property at approximate MP 7.1. The site was first recorded in 1996 on the basis of surface observation and informant testimony. No evidence of headstones, depressions, or other signs of burials were observed during a 2020 revisit to the site. Field survey would be required to determine if burials are present at the site.

Places of Worship

The ROW for HF Route 5 would pass within 500 feet of three places of worship, Piney Grove Baptist Church, Kempsville Mennonite Church, and Pleasant Valley Baptist Church. Because the route would

follow the same alignment and use the same configuration as HF Route 1 in the vicinity of Piney Grove Baptist Church (at approximate MP 4.0), the affected environment at this location would be the same as described above in Section 5.2.5.2, Harpers to Fentress Route 1. The two remaining churches are discussed below.

- Kempsville Mennonite Church: The HF Route 5 ROW would cross the Kempsville Mennonite Church property at approximate MP 7.1 in Virginia Beach where the route would intersect North Landing Road. In this area, the route would be within and adjacent to an existing Dominion transmission corridor (Line #2085) west of the Courthouse Estates subdivision. The western edge of the ROW would be adjacent to the southeastern corner of the church building. Additionally, the route in this area would partially overlap with a stormwater management pond and require the complete removal of a tree corridor along the eastern edge of the church property, which currently provides a buffer from adjacent houses in the subdivision to the east. See Section 5.4.2.4, KOP 06, for a discussion of potential visual impacts on this church.
- Pleasant Valley Baptist Church: At approximate MP 16.1 in Chesapeake, the HF Route 5 ROW would pass about 275 feet south of the Pleasant Valley Baptist Church along a greenfield segment of the route where it would cross Long Ridge Road. The lands surrounding the church are largely agricultural; therefore, this church would have unobstructed views to the ROW.

5.2.5.5 Harpers to Fentress Hybrid Route

Cemeteries

The ROW for the HF Hybrid Route would pass within 500 feet of two cemeteries, Piney Grove Baptist Church Cemetery (at approximate MP 4.2) and Land Family Cemetery (No. 1) (at approximate MP 6.0), along the same alignment as HF Route 1. The only substantive difference in the affected environment near the Piney Grove Baptist Church Cemetery between the HF Hybrid Route and HF Route 1 is that the former would be underground, whereas the latter would be overhead. The HF Hybrid Route would use the same overhead configuration as HF Route 1 near the Land Family Cemetery (No. 1). See Section 5.2.5.2, Harpers to Fentress Route 1, for a description of the affected environment in both of these areas.

Places of Worship

The HF Hybrid Route ROW would pass within 500 feet of two churches, Piney Grove Baptist Church (at approximate MP 4.2) and True Way Evangelistic Mission (at approximate MP 11.2), along the same alignment as HF Route 1. The only substantive difference in the affected environment near the Piney Grove Baptist Church between the HF Hybrid Route and HF Route 1 is that the latter would be underground whereas the former would be overhead. The HF Hybrid Route would use the same overhead configuration as HF Route 1 near the True Way Evangelistic Mission. See Section 5.2.5.2, Harpers to Fentress Route 1, for a description of the affected environment in both of these areas.

5.2.5.6 Dam Neck Route Variation

No cemeteries or places of worship would be crossed by or within 500 feet of the ROW for the Dam Neck Route Variation.

5.2.5.7 Line #2085 Route Variation

Cemeteries

The ROW for the Line #2085 Route Variation would pass within 500 feet of one cemetery, Mercer Family Cemetery, as discussed below.

- Mercer Family Cemetery: At approximate MP 3.7 in Virginia Beach, the Line #2085 Route Variation would pass about 5 feet north of the Mercer Family Cemetery along a greenfield segment where the route would cross North Landing Road. The entire area surrounding the cemetery (which is on the east side of the road) is forested. The ROW for this route would create a new, 140-foot-wide cleared corridor in the area immediately north of the burial ground, creating an unobstructed view from the cemetery.[44]

At approximate MP 1.6, the Line #2085 Route Variation would cross the same potential cemetery within the Kempsville Mennonite Church property as HF Route 5. As noted above, field survey would be required to determine if burials are present at the site.

Places of Worship

The ROW for the Line #2085 Route Variation would pass within 500 feet of one place of worship, Kempsville Mennonite Church, at approximate MP 1.6. Because the route would follow the same alignment and use the same configuration as HF Route 5 in this area, the affected environment near the church would be the same as described in Section 5.2.5.4, Harpers to Fentress Route 5.

5.2.6 Land Use Planning

An overview of the land planning objectives and comprehensive plans for the City of Virginia Beach and the City of Chesapeake is provided in Section 4.2.6.2, Land Use Planning.

5.2.6.1 Cable Landing to Harpers Route

The CLH Route would be located entirely north of the Green Line in the City of Virginia Beach with approximately 0.8 mile of the route (between approximate MPs 3.6 and 4.4) within the AICUZ, mostly within APZ 1. As discussed in Section 4.2.9.2, Accident Potential Zones, buried electric transmission lines are an allowable land use within APZ 1. Based on review of the City's land planning objectives and coordination with City planning staff, this route would not conflict with the City's comprehensive plan (City of Virginia Beach 2016a).

Portions of the CLH Route would cross USN lands at Dam Neck Annex (approximate MPs 0.1 to 0.2) and NAS Oceana (approximate MPs 1.0 to 4.4), and Commonwealth lands at the SMR (approximate MPs 0.0 to 0.1 and MPs 0.2 to 0.9). The Cable Landing Location additionally would be located within the SMR. The DMA has developed an Installation Master Plan for the SMR as outlined in Section 4.2.6.2, Land Use Planning. Dominion worked cooperatively with both the USN and SMR to develop a route that minimizes impacts on existing and potential future land uses within each base, as discussed in Section 3.1.1.2, Cable Landing to Harpers Route. The USN and DMA each supported the CLH Route alignment in letters to Dominion (see Appendix C, Correspondence).

5.2.6.2 Harpers to Fentress Route 1

HF Route 1 would begin north of the Green Line in Virginia Beach at the Harpers Switching Station site (MP 0.0). As it extends south of the Green Line and into the ITA, the route would be located primarily within or adjacent to the SEPG study corridor, which the City of Virginia Beach has retained for potential future transportation or recreational land uses, and/or within and adjacent to existing Dominion transmission corridors (Lines #2118/147 and Lines #271/I-74). As noted in Section 4.8.1, Southeast Parkway and Greenbelt Corridor, City staff advised the Company that the proposed transmission

[44] Alternate routing to increase the buffer between the cemetery and the route at this location is not feasible due to difficult crossings of North Landing River (and a tributary) and the Intracoastal Waterway on the west side of North Landing Road, as well as homes on both sides of the road.

infrastructure for the Project would be a compatible and acceptable use of City lands within the SEPG corridor. As the route extends into Chesapeake, it would pass through rural (undeveloped or agricultural) areas. The entire route in Chesapeake (approximate MPs 7.9 to 14.2) would be within and adjacent to existing Dominion transmission corridors (Lines #271/I-74 or Lines #2240/I-74).

Based on review of each city's land planning objectives and coordination with city planning staff, HF Route 1 would not conflict with the land planning objectives outlined in each city's comprehensive plan (City of Virginia Beach 2016a; City of Chesapeake 2016a).

The site for the Harpers Switching Station would be on USN lands at NAS Oceana within APZ 2 of the AICUZ; however, the proposed infrastructure at the station would be an allowable use in this area. As noted above, the USN supported the use of the proposed site for the Harpers Switching Station in a letter to Dominion dated August 17, 2021, a copy of which is provided in Appendix C, Correspondence.

5.2.6.3 Harpers to Fentress Route 2

HF Route 2 would follow the same alignment as HF Route 1 from approximate MPs 0.0 to 5.5 in Virginia Beach, mostly within or adjacent to the SEPG study corridor and/or an existing Dominion transmission corridor (Lines #2118/147). The route would then turn south and follow a greenfield alignment from approximate MPs 5.5 to 8.4 across rural (mostly agricultural or undeveloped) lands within the ITA. As the route extends into Chesapeake, it would cross rural (undeveloped or agricultural) areas. From approximate MPs 8.4 to 11.8, the route would utilize a greenfield alignment mostly south of and parallel to the Intracoastal Waterway across undeveloped forested lands. It would then follow the same alignment as HF Route 1 from approximate MPs 11.8 to 15.2 along existing Dominion transmission corridors (Lines #271/I-74 or Lines #2240/I-74) to Fentress Substation.

Based on review of each city's land planning objectives and coordination with city planning staff, HF Route 2 would not conflict with the land planning objectives outlined in each city's comprehensive plan (City of Virginia Beach 2016a; City of Chesapeake 2016a).

5.2.6.4 Harpers to Fentress Route 5

HF Route 5 would follow the same alignment as HF Route 1 from approximate MPs 0.0 to 5.5, mostly within or adjacent to the SEPG study corridor and/or an existing Dominion transmission corridor (Lines #2118/147). The route would then follow Dominion's existing Line #2085 ROW south to a point just south of Indian River Road (approximate MP 8.5), then a greenfield alignment southwest to the City of Virginia Beach limits near MP 9.2. As the route extends into Chesapeake, it would pass through rural areas (mostly agricultural and undeveloped lands), including an approximately 1.8-mile-long crossing of NALF Fentress.

Based on review of each city's land planning objectives and coordination with city planning staff, HF Route 5 would not conflict with the land planning objectives outlined in each city's comprehensive plan (City of Virginia Beach 2016a; City of Chesapeake 2016a).

5.2.6.5 Harpers to Fentress Hybrid Route

The HF Hybrid Route would follow essentially the same alignment as HF Route 1, with the segment between MPs 0.0 and 4.6 utilizing an underground configuration for the transmission circuits. Based on review of each city's land planning objectives and coordination with city planning staff, the HF Hybrid Route would not conflict with the land planning objectives outlined in each city's comprehensive plan (City of Virginia Beach 2016a; City of Chesapeake 2016a).

5.2.6.6 Dam Neck Route Variation

The Dam Neck Route Variation is located entirely north of the Green Line in the City of Virginia Beach. In this area, the route would cross the City's Special Economic Growth Area 3, which prioritizes non-residential development. Based on review of the City's land planning objectives and coordination with City planning staff, the Dam Neck Route Variation would not conflict with the land planning objectives outlined in the City's comprehensive plan (City of Virginia Beach 2016a).

5.2.6.7 Line #2085 Route Variation

The Line #2085 Route Variation follows the same alignment as HF Route 5 along Dominion's existing Line #2085 corridor from approximate MPs 0.0 to 2.8, then a greenfield alignment from approximate MPs 2.8 to 4.3, crossing the Intracoastal Waterway canal and passing from Virginia Beach into Chesapeake near MP 4.0. The route in this area would cross USACE lands at the crossing of the Intracoastal Waterway canal, but would not otherwise affect conservation lands. Based on review of each city's land planning objectives and coordination with city planning staff, the Line #2085 Route Variation would not conflict with the land planning objectives outlined in each city's comprehensive plan (City of Virginia Beach 2016a; City of Chesapeake 2016a).

5.2.7 Planned Developments

ERM identified planned developments along the alternative transmission line routes and other onshore Virginia Facilities through review of data on city websites and consultations with city planning officials and other stakeholders. Descriptions of the individual planned developments discussed by route in the subsections below are provided in Table 4.2-10.

5.2.7.1 Cable Landing to Harpers Route

As discussed in Section 4.2.7.1, State Military Reservation Development Plan, the CLH Route would cross two potential future parking lots between approximate MPs 0.7 and 0.9 within the SMR. The parking lots would be compatible with buried electric transmission infrastructure. Additionally, as noted elsewhere in this study, the DMA concurred with the route alignment across the SMR in a letter to Dominion dated April 13, 2021, and provided an overview of the route selection process, including a discussion of factors affecting the SMR's identification of the CLH Route as its preferred route, in a letter dated June 24, 2021. Copies of both letters are provided in Appendix C, Correspondence.

5.2.7.2 Harpers to Fentress Route 1

HF Route 1 would cross portions of five planned developments (Sunny Farms Hydroponic Greenhouse, Bio-Tech Park, Virginia Beach Sports Center, Expanded Trail Network in the ITA, and Bedford Solar Center), as discussed below.

- Sunny Farms Hydroponic Greenhouse: HF Route 1 would cross this planned development, located on the south side of Harpers Road just east of the City of Virginia Beach's Pupil Transportation Services Maintenance Facility, on private lands between approximate MPs 0.1 and 0.3. Dominion coordinated with the developer to ensure compatibility between the new transmission infrastructure and the greenhouses to be built at the site. The ROW for HF Route 1 would cross the development along its eastern boundary in an area to be used as a driveway or for parking, uses which would be compatible with the overhead transmission infrastructure along this alignment.
- Bio-Tech Park: HF Route 1 would cross this planned development, which would occupy undeveloped land (mostly owned by the City of Virginia Beach) within the Virginia Beach Sportsplex and Virginia Beach National Golf Course, between approximate MPs 4.7 and 4.9 where the route is within the

SEPG study corridor. In this area, the City has narrowed the width of the SEPG corridor to 150 feet to accommodate planned development on both sides of the corridor. The Company worked and continues to work with staff from the City of Virginia Beach's planning and economic development departments to ensure compatibility between the transmission infrastructure and planned future developments at the site. Dominion adjusted the route to stay within the 150-foot-wide SEPG corridor across the planned development, which City staff identified as suitable for the route. Dominion additionally worked with City staff on the placement of overhead structures in this area to avoid conflicts with existing and planned stormwater management facilities at the site.

As discussed in Section 4.2.7.6, Bio-Tech Park, staff with the City of Virginia Beach provided a conceptual site plan for a new development within the Bio-Tech Park area to Dominion in October 2021. Based on the site plan, the ROW for HF Routes 1, 2, and 5 (approximate MPs 4.9 to 5.1) and the HF Hybrid Route (approximate MPs 5.1 to 5.3) would cross a parking lot and stormwater management pond and be adjacent to an industrial building in the area just east of Princess Anne Road should this planned development move forward. The planned parking lot and stormwater management pond would be compatible uses with the overhead transmission circuits proposed for the onshore Virginia Facilities. Additionally, Dominion has and continues to work with City staff regarding the locations of overhead transmission structures to avoid conflicts with this development.

- Virginia Beach Sports Center: The City of Virginia Beach is planning an expansion of recreational facilities on City-owned land within the Virginia Beach Sportsplex, U.S. Field Hockey Complex, and Princess Anne Athletic Complex by adding additional playing fields on either side of, but not within, the SEPG study corridor. HF Route 1 would cross the area of planned development within the SEPG corridor between approximate MPs 4.9 and 6.2. Based on a conceptual drawing of the development plan and coordination with City staff, the route would not affect the planned addition of playing fields within the parks.
- Expanded Trail Network in the ITA: HF Route 1 would cross several planned future trails in the ITA in Virginia Beach. Based on a conceptual development plan, the crossings would occur at approximate MPs 3.9, 4.3, 5.5, 6.6, and 7.5. The trails would mostly be associated with existing or planned future roadways.
- Bedford Solar Center: HF Route 1 would cross this development, which is nearly complete, on private property between MPs 11.9 and 12.5 in Chesapeake where the route would be adjacent to existing Dominion transmission corridors (i.e., Lines #271/I-74 in the area north of Pocaty Substation and Lines #2240/I-74 south of the substation). In this area of the route, existing lattice structures along Lines #271/I-74 and Lines #2240/I-74 would be removed and replaced with sets of three single-circuit monopole structures, requiring an expansion of the existing ROW from 120-feet-wide to 160-feet-wide. To ensure compatibility between the planned overhead infrastructure and the solar center, the additional 40 feet of ROW would be on the east side of the existing corridor (whereas in areas north and south of the development, the additional 40 feet would be on the west side of the corridor). This design would avoid conflicts between the onshore Virginia Facilities and the solar facility.

5.2.7.3 Harpers to Fentress Route 2

HF Route 2 would cross portions of nine planned developments (Sunny Farms Hydroponic Greenhouse, Bio-Tech Park, Virginia Beach Sports Center, City Municipal Services Facilities, Agricultural Production Areas in the ITA, Preservation and Passive Recreation Areas in the ITA, Expanded Road Network in the ITA, Expanded Trail Network in the ITA, and Bedford Solar Center). Because the route would follow the same alignment and use the same configuration as HF Route 1 from approximate MPs 0.0 to 5.5 and MPs 11.8 to 15.2, the affected environment at the Sunny Farms Hydroponic Greenhouse, Bio-Tech Park,

and Bedford Solar Center developments would be the same as described above in Section 5.2.7.2, Harpers to Fentress Route 1.[45] The crossings of each of the remaining planned developments are discussed in milepost order below.

- Virginia Beach Sports Center: HF Route 2 would cross this development on lands owned by the City of Virginia Beach between approximate MPs 4.9 and 5.6. The alignment would be identical to HF Route 1 from approximate MPs 4.9 to 5.5 where the route would cross the Virginia Beach Sportsplex and U.S. Field Hockey Complex within the SEPG study corridor. The segment of HF Route 2 between MPs 5.5 and 5.6 would follow an existing Dominion transmission corridor (Line #2085) south across the field hockey complex. Based on a conceptual drawing of the development plan and coordination with City staff, the route would not affect the planned addition of playing fields within the parks.
- Expanded Trail Network in the ITA: HF Route 2 would cross several planned future trails in the ITA in Virginia Beach. Based on a conceptual development plan, the crossings would occur at approximate MPs 3.9, 4.3, 6.3, 6.5, 6.9, 7.3, 7.4, and 7.7. Most of the trails would be associated with existing or planned future roadways.
- City Municipal Service Facilities: HF Route 2 would cross this potential future development, a waste transfer station, on lands owned by the City of Virginia Beach between approximate MPs 5.6 and 6.3. Based on a conceptual plan, the route appears to cross an area near the western boundary of the future development where new buildings would be constructed. The design shown on the plan is high level, however, and conflicts with other City plans. Moreover, Dominion reviewed the alignment with City planning staff and no conflicts between the route and future plans for the site were identified.
- Expanded Road Network in the ITA: The City of Virginia Beach has conceptual future plans to extend Landstown Road farther south (to provide a connection to Indian River Road) and Nimmo Parkway farther west (to provide a connection to Salem Road). While development plans are conceptual, HF Route 2 would cross the planned extensions of Landstown Road and Nimmo Parkway at approximate MPs 5.6 and 6.7, respectively. Dominion reviewed the HF Route 2 alignment with City planning and transportation staff and no conflicts between the route and future road extensions were identified.
- Agricultural Production Areas in the ITA: HF Route 2 would cross about 0.1 mile of this area of the ITA on lands owned by the City of Virginia Beach at approximate MP 6.4. As discussed in Section 4.2.7.9, Agricultural Production Areas, the City has future plans to establish a research farm, educational facility, and visitor center in this area; however, no specific development plans have been proposed. Dominion reviewed the HF Route 2 alignment with City planning staff and no conflicts between the route and future plans for the area were identified.
- Preservation and Passive Recreation Areas in the ITA: HF Route 2 would cross this area of the ITA on lands owned by the City of Virginia Beach between approximate MPs 6.4 and 7.3. As discussed in Section 4.2.7.10, Preservation and Passive Recreation Areas, City-planners envision a variety of potential uses for this area, including stormwater management, flood prevention, wetland preservation, and recreation; however, no specific development plans have been proposed. Dominion reviewed the HF Route 2 alignment with City planning staff and no conflicts between the route and future plans for the area were identified.

[45] The approximate milepost crossings of these planned developments along HF Route 2 are Sunny Farms Hydroponic Greenhouse – MPs 0.1 to 0.3; Bio-Tech Park – MPs 4.7 to 4.9; and Bedford Solar Center – MPs 13.0 to 13.6.

5.2.7.4 Harpers to Fentress Route 5

HF Route 5 would cross portions of eight planned developments (Sunny Farms Hydroponic Greenhouse, Bio-Tech Park, Virginia Beach Sports Center, City Municipal Services Facilities, Agricultural Production Areas in the ITA, Expanded Trail Network in the ITA, Expanded Road Network in the ITA, and North Landing Bridge Replacement). Because the route would follow the same alignment and use the same configuration as HF Route 1 from approximate MPs 0.0 to 5.5, the affected environment at the Sunny Farms Hydroponic Greenhouse and Bio-Tech Park would be the same as described above in Section 5.2.7.2, Harpers to Fentress Route 1.[46] The crossings of each of the remaining planned developments are discussed in milepost order below.

- Virginia Beach Sports Center: HF Route 5 would cross this development on lands owned by the City of Virginia Beach between approximate MPs 4.9 and 5.8. The alignment would be identical to HF Route 1 from about MPs 4.9 to 5.5 where the route would cross the Virginia Beach Sportsplex and U.S. Field Hockey Complex within the SEPG study corridor. The route segment between approximate MPs 5.5 and 5.8 would follow an existing Dominion transmission corridor (Line #2085) south and east across the field hockey complex along its southern boundary. Based on a conceptual drawing of the development plan and coordination with City staff, the route would not affect the planned addition of playing fields within the parks.
- Expanded Trail Network in the ITA: HF Route 5 would cross several planned future trails in the ITA in Virginia Beach. Based on a conceptual development plan, the crossings would occur at approximate MPs 3.9, 4.3, 6.7, 7.1, and 7.9. Most of the trails would be associated with existing or planned future roadways.
- Expanded Road Network in the ITA: As noted above, the City of Virginia Beach has conceptual future plans to extend Landstown Road and Nimmo Parkway across the ITA. HF Route 5 would be adjacent to the planned extension of Landstown Road between approximate MPs 5.5 and 8.0 where the route would follow Dominion's existing ROW for Line #2085. City staff advised Dominion that the City plans to build the road extension immediately adjacent to the Line #2085 ROW to minimize impacts on developable land in the area immediately west. This would represent a potential future conflict between HF Route 5 and the road extension project should that project move forward. Based on current land uses in the area, however, there would be sufficient space to expand the existing ROW for the onshore Virginia Facilities and for the potential future extension of Landstown Road.

  HF Route 5 would cross the planned future extension of Nimmo Parkway at approximate MP 6.8. Dominion reviewed this crossing with City planning and transportation staff, and no conflicts between the route and the future road extension were identified.
- City Municipal Services Facilities: HF Route 5 would cross this development on lands owned by the City of Virginia Beach between approximate MPs 5.7 and 6.7 where the route would be adjacent to an existing Dominion transmission corridor (Line #2085). The route generally would follow the northern and eastern boundaries of the planned development where no future planned buildings or other infrastructure are indicated on a conceptual site plan. Additionally, Dominion reviewed the HF Route 5 alignment with City planning staff and no conflicts between the route and planned future development were identified.
- Agricultural Production Areas in the ITA: HF Route 5 would cross this area of the ITA on lands owned by the City of Virginia Beach between approximate MPs 6.7 and 8.0 where the route would be within and adjacent to Dominion's Line #2085 ROW. As noted above, while the City has future plans to

[46] The approximate milepost crossings of these planned developments along HF Route 5 are Sunny Farms Hydroponic Greenhouse – MPs 0.1 to 0.3; and Bio-Tech Park – MPs 4.7 to 4.9.

establish a research farm, educational facility, and visitor center in this area, no specific development plans have been proposed. Dominion reviewed the HF Route 5 alignment with City planning staff and no conflicts between the route and future plans for the area were identified.

- North Landing Bridge Replacement: The USACE (2020) prepared a feasibility study for replacing the existing North Landing Bridge with a fixed high-rise bridge with a maximum roadway elevation of 78 feet above mean sea level (AMSL) and a bridge length of 3,360 feet. At these dimensions, HF Route 5 would cross a portion of the elevated section of the bridge on the south side of North Landing River at approximate MP 9.4 in Chesapeake. Based on review of a preliminary profile drawing provided in the feasibility study, the route would cross at an elevated elevation of approximately 50 feet.

5.2.7.5 Harpers to Fentress Hybrid Route

The underground segment of the HF Hybrid Route would follow the same general alignment as HF Route 1 from approximate MP 0.0 to 4.6, within which the route would cross the Sunny Farms Hydroponic Greenhouse planned development between approximate MPs 0.3 and 0.5. The only substantive difference in the affected environment at this planned development between the HF Hybrid Route and HF Route 1 is that the former would be underground whereas the latter would be overhead. Use of an underground configuration would reduce the width of the ROW across the development from 140 feet to 65 feet. A portion of the ROW would be used as a driveway and/or parking area for the greenhouse development, both of which would be compatible uses with an underground transmission line.

The overhead segment of the HF Hybrid Route would use the same alignment and configuration as HF Route 1 between approximate MPs 4.6 and 14.2, within which the route would cross the Bio-Tech Park, Virginia Beach Sports Center, Expanded Trail Network in the ITA, and Bedford Solar Center developments.[47] The crossings of these areas would be the same as described above in Section 5.2.7.2, Harpers to Fentress Route 1.

5.2.7.6 Dam Neck Route Variation

The Dam Neck Route Variation would cross one planned development, Creech Outside Storage, on private lands between approximate MPs 0.6 and 0.8 where the route would be adjacent to Dam Neck Road in Virginia Beach. The route would cross a portion of the development planned to be a dry detention pond. No proposed storage or parking areas would be within the ROW for the route variation. Consequently, the route would not conflict with the planned development.

5.2.7.7 Line #2085 Route Variation

The Line #2085 Route Variation would cross portions of five planned developments. Because the route variation would follow the same alignment and use the same configuration as HF Route 5 from approximate MPs 0.0 to 3.3, the crossings of four planned developments (Virginia Beach Sports Center, City Municipal Services Facilities, Agricultural Production Areas within the ITA, Expanded Trail Network within the ITA, and Expanded Road Network within the ITA) would be the same as those described above

[47] The approximate milepost crossings of these planned developments along the HF Hybrid Route are Bio-Tech Park – MPs 4.7 to 4.9; Virginia Beach Sports Center – MPs 5.1 to 6.4; and Bedford Solar Development – MPs 12.1 to 12.7. The approximate milepost crossings for future trails in the ITA are MPs 4.1, 4.5, 5.7, 6.8, and 7.7.

in Section 5.2.7.4, Harpers to Fentress Route 5.[48] The crossing of the North Landing Bridge Replacement planned development is discussed below.

- North Landing Bridge Replacement: The Line #2085 Route Variation would cross a portion of the elevated section of the proposed bridge replacement on the north side of North Landing River at approximate MP 3.7 in Virginia Beach. Based on review of a preliminary profile drawing provided in the USACE (2020) feasibility study, the route would cross the future bridge at an elevated elevation of approximately 25 feet.

5.2.8 Easements and Other Protected Lands

ERM reviewed various digital datasets and coordinated with local, state, and federal agencies to identify easements and other protected lands along the alternative routes and other facilities discussed in this study. Descriptions of the different easement types referenced in the subsections below are provided in Section 4.2.8, Easements and Other Protected Lands.

5.2.8.1 Cable Landing to Harpers Route

The CLH Route would cross a USN RUE for NAS Oceana on lands owned by the City of Virginia Beach at approximate MP 3.4 just east of Oceana Boulevard. The crossing would measure less than 0.1 mile in length. The easement sets a height limitation for structures, including utilities, to limit future development that would be incompatible with air operations within and near the base; however, the CLH Route would be underground. No other easements would be crossed by the CLH Route.

5.2.8.2 Harpers to Fentress Route 1

HF Route 1 would cross USN RUEs near NAS Oceana and NALF Fentress, a City of Chesapeake Multi-Year Encroachment Protection Easement, and City-owned parcels acquired under the City of Chesapeake NALF Fentress Encroachment Protection Acquisition Program, as described below.

- U.S. Navy Restrictive Use Easements – NAS Oceana: HF Route 1 would cross about 0.5 mile of USN RUEs on private lands between approximate MPs 0.1 and 0.6 in Virginia Beach. The easements set a maximum height of 170 feet AMSL for new structures, including utilities, to limit future development that would be incompatible with air operations within and near the base. All of the proposed transmission structures along HF Route 1 within the easements would comply with this restriction.
- City of Chesapeake Multi-Year Encroachment Protection Easements: From approximate MPs 7.9 to 8.0 and MPs 8.7 to 9.9, HF Route 1 would cross a total of approximately 1.2 miles within a multi-year encroachment protection easement where the route would be within and adjacent to an existing Dominion ROW (Lines #271/I-74) in Chesapeake. The crossing would encompass about 24.1 acres, of which 18.3 acres would be existing ROW and 5.8 acres would be expanded ROW. The easement, also referred to as the Sawyer Tract, is owned in fee title by the City of Chesapeake. The City partnered with the USN to acquire the parcel and place it under an easement to limit future development that would be incompatible with air operations at NALF Fentress as well as to preserve the parcel's natural resources. The easement sets a maximum height of 170 feet AMSL for new development on the property. All of the transmission structures along HF Route 1 within the easement would comply with this restriction.

[48] The approximate milepost crossings of these planned developments along the Line #2085 Route Variation are Virginia Beach Sports Center – MPs 0.0 to 0.2; City Municipal Services Facilities – MPs 0.2 to 1.1; Agricultural Production Areas in the ITA – MPs 1.1 to 2.5; and Expanded Road Network in the ITA – MPs 0.0 to 2.4 (Landstown Road) and MP 1.2 (Nimmo Parkway). The milepost crossings for future trails in the ITA are MPs 1.1, 1.5, and 2.4.

- City of Chesapeake NALF Fentress Encroachment Protection Acquisition Program: HF Route 1 would cross three parcels acquired by the City of Chesapeake under this program, which is designed to prevent or reduce land uses that would conflict with military operations at NALF Fentress. The crossings would occur between approximate MPs 10.6 and 10.9, 11.1 and 11.4, and 13.8 and 14.0 in areas where the route would be within and adjacent to Dominion's existing transmission corridor for Lines #271/I-74 or Lines #2240/I-74. Combined, the crossings would measure 0.7 mile in length, encompassing approximately 12.7 acres (9.7 acres of existing ROW and 3.0 acres of expanded ROW). As noted in Section 4.2.8.3, City of Chesapeake Easements, utilities are an allowable use within parcels acquired under this program.
- U.S. Navy Restrictive Use Easements – NALF Fentress: HF Route 1 would cross about 1.9 miles of USN RUEs for NALF Fentress on private lands between approximate MPs 11.9 and 13.8 in Chesapeake where the route would be within and adjacent to Dominion's existing transmission corridors for Lines #271/I-74 or Lines #2240/I-74. The easements that would be crossed set a maximum height of 165 feet AMSL for new structures, including utilities, to limit development that would be incompatible with air operations within and near the base. All of the proposed transmission structures along HF Route 1 within the easements would comply with this restriction.

5.2.8.3 Harpers to Fentress Route 2

HF Route 2 would cross USN RUEs near NAS Oceana and NALF Fentress and parcels owned by the City of Chesapeake acquired under the City of Chesapeake NALF Fentress Encroachment Protection Acquisition Program as discussed below.

- U.S. Navy Restrictive Use Easements – NAS Oceana: Like HF Route 1, HF Route 2 would cross about 0.5 mile of USN RUEs on private lands between approximate MPs 0.1 and 0.6 in Virginia Beach. The affected environment would be the same as described above in Section 5.2.8.2, Harpers to Fentress Route 1.
- U.S. Navy Restrictive Use Easements – NALF Fentress: HF Route 2 would cross about 4.3 miles of USN RUEs on private lands between MPs 8.0 and 8.3 in Virginia Beach and MPs 8.9 to 11.2 and MPs 13.0 to 14.9 in Chesapeake. The easements set maximum heights ranging from 165 feet to 170 feet AMSL for new structures, including utilities, to limit future development that would be incompatible with air operations within and near the base. All of the proposed transmission structures along HF Route 2 within the easements would comply with this restriction.
- City of Chesapeake NALF Fentress Encroachment Protection Acquisition Program: Like HF Route 1, HF Route 2 would cross three parcels–between approximate MPs 11.7 and 12.0, 12.2 and 12.4, and 14.9 and 15.0–acquired by the City of Chesapeake under this program. Approximately 0.1 mile of the crossing between MPs 11.7 and 12.0 would be along a greenfield segment of the route, with the remainder in the area where the route would be within and adjacent to Dominion's existing transmission corridor for Lines #271/I-74. Each of the other crossings, which would utilize the same alignment and configuration as HF Route 1, occur where the route would be within and adjacent to existing transmission corridors (Lines #271/I-74 or Lines #2240/I-74). The crossings would measure a combined 0.7 mile in length, encompassing 12.8 acres, of which 8.6 acres would be existing ROW and 4.2 acres would be new or expanded ROW. As noted in Section 4.2.8.3, City of Chesapeake Easements, utilities are an allowable use within parcels acquired under this program.

5.2.8.4 Harpers to Fentress Route 5

HF Route 5 would cross USN RUEs near NAS Oceana and NALF Fentress and a parcel owned by the City of Chesapeake acquired under the City of Chesapeake NALF Fentress Encroachment Protection Acquisition Program as discussed below.

- U.S. Navy Restrictive Use Easements – NAS Oceana: Like HF Route 1, HF Route 5 would cross about 0.5 mile of USN RUEs on private lands between approximate MPs 0.1 and 0.6 in Virginia Beach. The affected environment would be the same as described above in Section 5.2.8.2, Harpers to Fentress Route 1.
- U.S. Navy Restrictive Use Easements – NALF Fentress: HF Route 5 would cross about 5.5 miles of USN RUEs on private lands between approximate MPs 8.4 and 9.2 in Virginia Beach and MPs 9.3 to 9.4, 9.5 to 9.7, 11.3 to 13.1, and 17.1 to 19.7 in Chesapeake. The easements set maximum heights for new structures, including utilities, to limit future development that would be incompatible with air operations within and near the base. Most of the easements that would be crossed by HF Route 5 have height restrictions of 165 feet AMSL; however, one easement on the north side of North Landing River has a height restriction of 120 feet AMSL and the easements between approximate MPs 17.1 and 18.2 have height restrictions of 132 feet AMSL.

  As currently designed, all but two sets of the transmission structures along HF Route 5 within the RUEs would comply with the applicable height restrictions. The structures on either side of the crossing of North Landing River would be on easements limiting the heights of the structures to 165 feet, but as currently designed, these structures would be 170 feet tall. Dominion's overhead engineering team has determined that the height of the structures could likely be reduced to 165 feet, but additional analysis, including completion of a ground survey, would be required to complete this design.
- City of Chesapeake NALF Fentress Encroachment Protection Acquisition Program: HF Route 5 would cross one parcel acquired by the City of Chesapeake under this program between approximate MPs 19.6 and 20.0 where the route would be within and adjacent to Dominion's existing transmission corridor for Lines #2240/I-74. The crossing would measure less than 0.1 mile in length, encompassing 0.6 acre of existing ROW and 0.2 acre of expanded ROW.

5.2.8.5 Harpers to Fentress Hybrid Route

The HF Hybrid Route would cross USN RUEs near NAS Oceana and NALF Fentress, a City of Chesapeake Multi-Year Encroachment Protection Easement, and City-owned parcels acquired under the City of Chesapeake NALF Fentress Encroachment Protection Acquisition Program following essentially the same alignment as HF Route 1.[49] The only substantive difference in the affected environment where the route would cross the USN RUEs near NAS Oceana is that the route would be underground in this area. See Section 5.2.8.2, Harpers to Fentress Route 1, for a description of the affected environments at the other crossings.

5.2.8.6 Dam Neck Route Variation

The Dam Neck Route Variation would cross approximately 1.5 miles of USN RUEs for NAS Oceana on private lands between approximate MPs 0.6 and 1.4 and MPs 1.6 and 2.4 in Virginia Beach. The easements set a maximum height of 170 feet AMSL for new structures, including utilities, to limit future development that would be incompatible with air operations within and near the base. All proposed transmission structures along the Dam Neck Route Variation within the easements would comply with this restriction.

[49] The approximate milepost crossings for these areas along the HF Hybrid Route are NAS Oceana RUEs – MPs 0.3 to 0.8; City of Chesapeake Multi-Year Encroachment Protection Easement – MPs 8.1 to 8.2 and MPs 8.9 to 10.1; City of Chesapeake NALF Fentress Encroachment Protection Acquisition Program – MPs 10.8 to 11.2, MPs 11.4 to 11.6, and MPs 14.0 to 14.2; and NALF Fentress RUEs – MPs 12.1 to 14.0.

5.2.8.7 Line #2085 Route Variation

The Line #2085 Route Variation would cross approximately 1.0 mile of USN RUEs for NALF Fentress on private lands between approximate MPs 2.8 and 3.8 in Virginia Beach. The easements set a maximum height of 165 feet AMSL for new structures, including utilities, to limit future development that would be incompatible with air operations within and near the base. All proposed transmission structures along the Line #2085 Route Variation within the easements would comply with this restriction.

5.2.9 Airports

ERM reviewed the height limitations associated with FAA- and DOD-defined imaginary surfaces for all runways associated with NAS Oceana and NALF Fentress. Both airfields are governed by FAA and DOD aviation regulations. No other public or private registered airfields or airports occur within the study area. The runways associated with NAS Oceana and NALF Fentress were reviewed to determine whether any transmission structures along the alternative routes would penetrate the relevant surfaces for the runways. Dominion conducted a preliminary evaluation of structure heights and locations using FAA Civil and DOD military airport surfaces and applying standard GIS tools, including ESRI's ArcMap 3D and Spatial Extension software. This software was used to create and geo-reference the imaginary surfaces in space and in relation to the locations and proposed heights of the transmission structures. Ground surface data for the study area were derived by using a USGS 10 Meter Digital Elevation Model.

As described above, NAS Oceana and NALF Fentress are the only two airfields near the route alternatives with the potential to be impacted by the heights of overhead transmission structures. DOD airport imaginary surfaces have been established by the FAA in relation to each airport and to each runway. The imaginary surfaces were developed to prevent existing or proposed objects from extending up from the ground and penetrating into the navigable airspace represented by the imaginary surfaces (for the DOD description of the imaginary surfaces, see Section 4.2.9.5, Department of Defense Airport Imaginary Surfaces).

The DOD Airport Imaginary Surfaces evaluated for each runway in relation to the potential for impact from the transmission line structures are described below. Based on evaluation of the runways associated with NAS Oceana and NALF Fentress, and the orientation and geospatial location of the imaginary flight surfaces associated with each runway relative to the potential transmission line alternative routes, ERM found that only NAS Oceana Runway 5R and NALF Fentress Runway 5/23 had the potential to be impacted (see Figures 4.2-11 and 4.2-12 in Appendix A; Figures). Critical surfaces associated with both of these runways are discussed below.

5.2.9.1 NAS Oceana—Runway 5R

HF Routes 1, 2, and 5 would all pass underneath the following surfaces associated with NAS Oceana Runway 5R with the same centerline:

- Inner Horizontal Surface: The inner horizontal surface for this runway is located at 172 feet AMSL (i.e., a horizontal plane 150 feet above the established airport elevation of 22 feet AMSL). No structures of any of the alternative transmission line routes would penetrate this imaginary surface while passing underneath the surface. The closest any structure along HF Routes 1, 2, or 5 would come to this surface is 31 feet below the surface (i.e., Structures A, B, C 163, located at MP 0.09).
- Conical Surface: The conical surface for this runway has an elevation that extends from 172 feet to 522 feet AMSL. The maximum height of all structures along the alternative routes would be under this imaginary surface. The maximum allowable transmission structure height along the alternative routes while underneath this surface would range from 158 feet AMSL (Structures A, B, C 163, located at MP 0.22) to 465 feet AMSL (Structures A, B, C 133, located at MP 3.97).

- Approach Clearance Surface: The slope of the approach clearance surface is 50 to 1 along the runway centerline extended until it reaches an elevation of 522 feet AMSL. It then continues horizontally at this elevation to a point 50,000 feet from the point of beginning. The nearest transmission structure along the alternative routes to pass beneath this imaginary surface would be located over 18,000 feet from the end of the runway and under the approach clearance surface elevation of 330 feet AMSL. None of the transmission structures along the alternative routes would penetrate this imaginary surface as the clearance gap between structure design height and the confining surface would range from 192 feet to 296 feet.
- Transitional Surface: The nearest transmission structure (i.e., Structure A, B, C 132) along the alternative routes to pass beneath the transitional surface would also be located over 18,000 feet from the end of the runway and under the transitional surface elevation of 478 feet AMSL. None of the transmission structures along the alternative routes would penetrate this imaginary surface as the clearance gap between structure design height and the confining surface would range from 203 feet to 340 feet.

5.2.9.2 NALF Fentress—Runway 5/23

HF Routes 2 and 5, and the Line #2085 Route Variation would pass underneath the following surfaces associated with NALF Fentress Runway 5/23:

- Inner Horizontal Surface: The inner horizontal surface for this runway is located at 166 feet AMSL (i.e., a horizontal plane 150 feet above the established airport elevation of 16 feet AMSL). Transmission structures along HF Routes 2 and 5 that would be located north and east of the end of the runway, respectively, would be limited to a maximum allowable of height of 166 feet as the routes pass under this imaginary surface. None of the transmission structures along HF Route 2 would penetrate this imaginary surface as the clearance gap between structure design height and the confining surface would range from 43 feet to 48 feet. Similarly along HF Route 5, the clearance gap would range from 31 to 56 feet. For HF Routes 2 and 5, where they pass underneath the inner horizontal surface, the maximum design height determined by Dominion is 120 feet and 125 feet, respectively. Consequently, no structures along either route would penetrate this surface.
- Conical Surface: The conical surface for this runway has an elevation that extends from 166 feet to 516 feet AMSL. With the exception of the Intracoastal Waterway crossing, where HF Routes 2 and 5 pass underneath the conical surface, the maximum design height determined by Dominion is 145 feet and 125 feet, respectively. At the Intracoastal Waterway crossing, the design structure heights along HF Routes 2 and 5 are 170 feet. The design structure heights for both crossings have clearance gaps to the conical surface ranging from 66 feet to 130 feet. Consequently, no structures along either route, including the Intracoastal Waterway crossings, would penetrate this surface.
- Approach Clearance Surface: The slope of the approach clearance surface is 50 to 1 along the runway centerline extended until it reaches an elevation of 516 feet. It then continues horizontally at this elevation to a point 50,000 feet from the point of beginning.

  The nearest transmission structure along the alternative routes to pass beneath this imaginary surface is located over 7,650 feet from the end of the Runway 23 (along HF Route 5), limiting the overall height of this structure to 159 feet AMSL. The design height for this set of structures is 110 feet. Transmission structures located along HF Route 2 and the Line #2085 Route Variation, where the routes would cross the Intracoastal Waterway, would be located about 9,100 feet from the end of Runway 23. These structures would have a maximum allowable height of 185 feet to stay below the approach clearance surface. The design height for these structures is 170 feet.

The nearest transmission structures underneath the approach surface off the end of Runway 5 are approximately 11,000 feet from the runway, limiting structure heights to a range of 206 feet to 228 feet above ground. Design transmission structure heights underneath the approach clearance surface for Runway 5 would range from 110 feet to 125 feet tall. Consequently, no transmission structures along the alternative routes would penetrate the allowable height limitations, based on the approach clearance surface guidelines for NALF Fentress Runways 23 and 5.

- Transitional Surface: The nearest transmission structure along the alternative routes to pass beneath this imaginary surface is located approximately 7,500 feet from the end of the runway, thus limiting the overall tower height to 155 feet AMSL. The design height for this set of towers is 110 feet. Consequently, no transmission structures along the alternative routes would penetrate this imaginary surface.

The overhead alternative routes and route segments were aligned in a way that would maintain distance from the ends of the runways of NAS Oceana and NALF Fentress. Consequently, there is no penetration of any of the above-mentioned imaginary surfaces.

Since the FAA manages air traffic in the United States, it will evaluate any physical objects that may affect the safety of aeronautical operations through an obstruction evaluation. During the permitting process, the Company will submit an FAA Form 7460-1, Notice of Proposed Construction or Alteration, pursuant to 14 CFR Part 77, for any tower locations that meet the review criteria.

5.2.10 Other Transportation

Road crossings along each alternative route and route variation are quantified in Tables K-1 and K-2 in Appendix K, Feature Crossing Tables, respectively. For underground routes or route segments, most roads would be crossed via surface trenching, but some roads would be crossed by HDD or microtunnel, including General Booth Boulevard (CLH Route) and Dam Neck and London Bridge roads (the underground segment of the HF Hybrid Route). Road crossings along overhead segments would comply with applicable clearance requirements over the roads. All road crossings would be as near to perpendicular as practicable given the surrounding constraints, alignment of existing transmission infrastructure (where applicable), and the general orientation of the routes.

Various segments of the CLH Route and Dam Neck Route Variation would utilize roads as routing opportunities as discussed in Section 5.8, Routing Opportunities.

HF Routes 1, 2, and 5, and the HF Hybrid Route would each cross the Chesapeake & Albemarle Railroad and parallel a short, approximately 0.2-mile-long segment of the railroad where they enter Fentress Substation in Chesapeake. The crossings would comply with applicable clearance requirements over the railroad.

5.3 Natural Resources

5.3.1 Wetlands

The alternative transmission line routes and associated facilities discussed in this study were designed to avoid wetland areas wherever practicable. For the overhead alternatives, some wetlands could be spanned by siting transmission structures outside wetland boundaries. In several places, however, the routes would cross long, broad expanses of wetland where it would not be practicable or possible to do so (e.g., along the route segments that would cross Dam Neck Creek and Gum Swamp). The CLH Route and approximately 4.5 miles of the HF Hybrid Route would be underground, which would require continuous surface trenching through wetlands, with the exception of areas crossed by HDD or microtunnel.

Where the removal of trees or shrubby vegetation occurs within wetlands, Dominion would use the least intrusive method reasonably practicable to clear the ROW. Hand-cutting of vegetation would be conducted, where needed, to avoid and minimize impacts on wetlands or streams. Excess soil in wetlands resulting from foundation installation for overhead transmission structures or surface trenching for underground installations would be spread across the ROW and/or removed for disposal at an appropriate site.

Mats would be used for construction equipment to travel over wetlands, as needed. Access to the ROW for each alternative route generally would be from existing public roads or access roads where available; however, in some areas new access roads would likely need to be constructed.[50] Where warranted, Dominion would install culverts, fords, or temporary bridges along the ROW or approved access roads to cross small streams. In such cases, some temporary fill material could be placed in wetlands adjacent to these crossings. Where needed, this fill would be placed on erosion control fabric and removed when work is completed, returning ground elevations to original contours.

As noted above, surface trenching would be required to install the transmission circuits along the CLH Route and underground segment of the HF Hybrid Route. For these installations, Dominion would excavate three parallel trenches, one for each transmission circuit. Most of the backfill for the trenches would consist of non-native fill material, as discussed in more detail below. Approximately 0.7 mile of the CLH Route and 0.6 mile of the underground segment of the HF Hybrid Route would be installed by HDD or microtunnel, which would avoid surface disturbing activities within wetlands in these areas.

The analysis of wetland impacts below is based on ERM's desktop wetland study (Appendix F, Wetland and Waterbody Report), which assessed the probability of wetland occurrence within the ROW of each alternative route and its associated facilities based on the sources listed in Section 4.3. The analysis includes desktop delineated wetlands assigned a medium/high or high probability of occurrence based on the study. The analysis also identifies the type of wetlands crossed using the Cowardin classification system (Cowardin et al. 1979). Quantifications of the predicted wetland impacts by wetland type for each route and route variation are provided in Tables K-1 and K-2 (Appendix K, Feature Crossing Tables).[51]

The wetland analysis below differentiates between clearing impacts and fill impacts. Clearing impacts would occur wherever an alternative route would cross forested or scrub/shrub wetlands. Clearing impacts would result in a reduction in wetland functions due to the conversion of forested or scrub/shrub wetlands to scrub/shrub or emergent wetlands within the maintained ROW. Fill impacts would occur where surface trenching through wetlands is required and/or where overhead transmission structures are installed in wetlands. Surface trenching and foundation installation would introduce permanent fill into wetlands.

Upon SCC approval of a route and final line engineering, Dominion would obtain the required permits from the USACE and VDEQ for work within wetlands to ensure compliance with Sections 401 and 404 of the CWA.

[50] Access roads have not been identified.

[51] The numbers presented in this analysis have been rounded for presentation purposes; therefore, sums do not always equal the total of addends.

5.3.1.1 Wetland Clearing

Cable Landing to Harpers Route

Excluding areas crossed by HDD, and in descending order of prevalence, the CLH Route would affect 11.8 acres of wetlands, all within new ROW, including:

- 8.5 acres of freshwater forested wetlands
- 3.2 acres of freshwater emergent wetlands
- 0.1 acre of riverine wetlands

Harpers to Fentress Route 1

In descending order of prevalence, HF Route 1 would affect 149.2 acres of wetlands, including:

- 68.8 acres of freshwater forested wetlands, of which 1.3 acres would be within existing Dominion ROW and 67.5 acres would be within new or expanded ROW
- 45.4 acres of freshwater scrub/shrub wetlands, of which 43.6 acres would be within existing Dominion ROW and 1.8 acres would be within new or expanded ROW
- 25.5 acres of freshwater emergent wetlands, of which 17.9 acres would be within existing Dominion ROW and 7.6 acres would be within new or expanded ROW
- 8.0 acres of riverine wetlands, of which 3.7 acres would be within existing Dominion ROW and 4.3 acres would be within new or expanded ROW
- 1.4 acres of freshwater ponds, of which 0.3 acre would be within existing Dominion ROW and 1.2 acres would be within new or expanded ROW

Harpers to Fentress Route 2

In descending order of prevalence, HF Route 2 would affect 159.8 acres of wetlands, including:

- 122.3 acres of freshwater forested wetlands, of which 1.0 acre would be within existing Dominion ROW and 121.3 acres would be within new or expanded ROW
- 18.2 acres of freshwater emergent wetlands, of which 10.1 acres would be within existing Dominion ROW and 8.1 acres would be within new or expanded ROW
- 9.8 acres of freshwater scrub/shrub wetlands, of which 8.2 acres would be within existing Dominion ROW and 1.6 acres would be within new or expanded ROW
- 8.1 acres of riverine wetlands, of which 1.4 acres would be within existing Dominion ROW and 6.7 acres would be within new or expanded ROW
- 1.4 acres of freshwater ponds, of which 0.3 acre would be within existing Dominion ROW and 1.2 acres would be within new or expanded ROW

Harpers to Fentress Route 5

In descending order of prevalence, HF Route 5 would affect 185.8 acres of wetlands, including:

- 152.0 acres of freshwater forested wetlands, of which 1.1 acres would be within existing Dominion ROW and 150.9 acres would be within new or expanded ROW
- 17.5 acres of freshwater emergent wetlands, of which 5.2 acres would be within existing Dominion ROW and 12.3 acres would be within new or expanded ROW

- 4.9 acres of freshwater scrub/shrub wetlands, of which 3.7 acres would be within existing Dominion ROW and 1.3 acres would be within new or expanded ROW
- 10.7 acres of riverine wetlands, of which 0.9 acre would be within existing Dominion ROW and 9.7 acres would be within new or expanded ROW
- 0.7 acre of freshwater ponds, of which 0.3 acre would be within existing Dominion ROW and 0.4 acre would be within new or expanded ROW

Harpers to Fentress Hybrid Route

Excluding areas crossed by HDD or microtunnel, and in descending order of prevalence, the HF Hybrid Route would affect 158.8 acres of wetlands, including:

- 81.0 acres of freshwater forested wetlands, of which 0.8 acre would be within existing Dominion ROW and 80.2 acres would be within new or expanded ROW
- 45.3 acres of freshwater scrub/shrub wetlands, of which 43.5 acres would be within existing Dominion ROW and 1.8 acres would be within new or expanded ROW
- 23.9 acres of freshwater emergent wetlands, of which 17.1 acres would be within existing Dominion ROW and 6.9 acres would be within new or expanded ROW
- 7.1 acres of riverine wetlands, of which 3.6 acres would be within existing Dominion ROW and 3.5 acres would be within new or expanded ROW
- 1.4 acres of freshwater ponds, of which 0.3 acres would be within existing Dominion ROW and 1.2 acres would be within new or expanded ROW

Dam Neck Route Variation

In descending order of prevalence, the Dam Neck Route Variation would affect 27.4 acres of wetlands, including:

- 25.5 acres of freshwater forested wetlands, all of which would be within new or expanded ROW
- 1.0 acre of freshwater emergent wetlands, of which 0.3 acre would be within existing Dominion ROW and 0.7 acre would be within new or expanded ROW
- 1.0 acre of riverine wetlands, all of which would be within new or expanded ROW
- <0.1 acre of freshwater pond, all of which would be within new or expanded ROW

Line #2085 Route Variation

In descending order of prevalence, the Line #2085 Route Variation would affect 44.4 acres of wetlands, including:

- 29.1 acres of freshwater forested wetlands, of which 0.1 acre would be within existing Dominion ROW and 28.9 acres would be within new or expanded ROW
- 8.1 acres of riverine wetlands, of which 0.6 acre would be within existing Dominion ROW and 7.6 acres would be within new or expanded ROW
- 4.8 acres of freshwater scrub/shrub wetlands, of which 3.5 acres would be within existing Dominion ROW and 1.3 acres would be within new or expanded ROW
- 2.1 acres of freshwater emergent wetlands, of which 0.7 acre would be within existing Dominion ROW and 1.4 acres would be within new or expanded ROW
- 0.3 acre of freshwater ponds, nearly all of which would be within existing Dominion ROW

5.3.1.2 Permanent Fill

Structure Foundations

For overhead routes and route segments, ERM estimated the quantity of permanent fill to be placed in wetlands due to the installation of structure foundations using an assumption of 13 cubic yards of fill per structure within wetlands. Based on this, permanent fill impacts on wetlands for each overhead route or route segment would be as follows:

- HF Route 1: 2,379 cubic yards
- HF Route 2: 2,457 cubic yards
- HF Route 5: 3,042 cubic yards
- HF Hybrid Route (overhead segment): 1,560 cubic yards
- Dam Neck Route Variation: 585 cubic yards
- Line #2085 Route Variation: 741 cubic yards

Underground Trenching

Installation of underground cables along the CLH Route and underground segment of the HF Hybrid Route would require the excavation of three parallel trenches, each measuring approximately 7.75 feet deep by 5.25 feet wide. The trenches would be continuous with the exception of areas crossed by HDD or microtunnel. Most backfill in the trenches would consist of non-native materials, including crushed rock in the trench bottom, 3,000 pounds per square inch concrete around the cable duct bank, and fluidized thermal backfill in the top half of the trench up to about 1 foot below the surface, with excavated spoil or imported topsoil placed at the surface. The backfill would represent a permanent fill where it is placed in wetlands.

ERM estimated the quantity of permanent fill to be placed in wetlands due to backfilling the trenches based on the crossing length of each underground route within wetlands, excluding areas that would be crossed by HDD or microtunnel, and an assumption of 12,534.2 cubic yards of fill per 2,500-foot-long route segment (including manhole/splicing vaults) within wetlands. The results for each route are as follows:

- CLH Route: 26,527 cubic yards
- HF Hybrid Route (underground segment): 57,311 cubic yards

5.3.2 Waterbodies

Short-term, minor water quality impacts on waterbodies could occur during construction along any of the alternative transmission line routes or route variations. Such impacts would primarily be associated with stormwater transporting soils from disturbed areas into adjacent waters during rain events. Increased turbidity and localized sedimentation of the stream bottom could occur as a result of the runoff. These impacts would be significantly reduced through the implementation of Dominion's erosion control measures, including the installation of erosion control structures and materials. Where minor waterbodies along underground route segments would be crossed by surface trenching, impacts would include in-stream disturbance and associated turbidity in the vicinity of the trench.

Waterways crossed by the alternative routes and route variations would be maintained for proper drainage during construction through the use of culverts or other crossing devices, as needed, according to Dominion's standard policies. Where clearing of trees and/or woody shrubs is required, clearing within 100 feet of a stream would be conducted by hand. Vegetation would be at or slightly above ground level, and stumps would not be grubbed. To protect waterways from soil erosion and sedimentation during construction, Dominion would use sediment barriers along waterways and steep slopes. If a section of

line cannot be accessed from existing roads, Dominion may need to install a culvert or temporary bridge to cross small streams. In such case, some temporary fill material may be required that would be placed on erosion control fabric and removed when work is completed, returning the surface to original contours.

For overhead installations, no transmission structures are planned for installation within waterbodies. For underground installations along the CLH Route and HF Hybrid Route, minor waterbodies would be crossed by surface trenching; larger waterbodies, such as Lake Christine, Owl Creek, and West Neck Creek, would be crossed by HDD.

The following descriptions of the anticipated waterbody impacts along each alternative route or route variation are based on ERM's desktop wetland study, which is provided in Appendix F, Wetland and Waterbody Report. In addition to the waterbodies listed in the subsections below, the routes and route variations additionally would cross numerous drainage ditches and canals (especially within agricultural fields), which are not enumerated in the discussions below.[52]

5.3.2.1 Cable Landing to Harpers Route

The CLH Route would cross two fingers of Lake Christine (perennial; approximate MPs 0.1 and 0.2), an unnamed tributary to Lake Christine (intermittent; approximate MP 0.5), and Owl Creek (perennial; approximate MP 1.0). Lake Christine and Owl Creek would each be crossed by HDD, which would avoid direct impacts on these waterbodies. The intermittent tributary to Lake Christine would be crossed by surface trenching.

5.3.2.2 Harpers to Fentress Route 1

HF Route 1 would cross the following waterbodies:

- Three crossings of an unnamed waterbody (perennial) at approximate MPs 1.3, 2.1, and 2.6
- One crossing of an unnamed tributary to West Neck Creek (perennial) at approximate MP 2.9
- One crossing of West Neck Creek (perennial) at approximate MP 3.3
- Three crossings of an unnamed tributary to North Landing River (perennial) at approximate MPs 5.9, 6.2, and 6.7
- One crossing of the North Landing River (perennial) at approximate MP 7.2
- One crossing of the Intracoastal Waterway canal (perennial) at approximate MP 10.4
- One crossing of an intermittent tributary to Pocaty River at approximate MP 13.0

All of the crossings would be overhead with no transmission structures placed within the waterbodies. The crossings of the unnamed perennial waterbody at MPs 1.3 and 2.1 would occur within the SEPG corridor. The crossings of the unnamed perennial waterbody at MP 2.6, the perennial tributary to West Neck Creek at MP 2.9, and the mainstem of West Neck Creek at MP 3.3 would occur where the route is both within the SEPG corridor and within and adjacent to Dominion's existing transmission ROW for Lines #2118/147. The crossing of the unnamed perennial tributary to North Landing River at MP 5.9 would occur within the SEPG corridor. Each of the remaining crossings would occur where the route is within and adjacent to Dominion's existing transmission ROW for Lines #271/I-74 or Lines #2240/I-74.

[52] All waterbodies, including the drainage ditches, are included in the desktop wetland study provided as Appendix F, Wetland and Waterbody Report.

5.3.2.3 Harpers to Fentress Route 2

HF Route 2 would cross the same waterbodies as HF Route 1 between approximate MPs 0.0 and 5.5 as discussed in Section 5.3.2.2, Harpers to Fentress Route 1. Other crossings along the route would include:

- One crossing of a tributary to the North Landing River (perennial) at approximate MP 6.6
- One crossing of the North Landing River (perennial) at approximate MP 8.2
- One crossing of the Intracoastal Waterway canal (perennial) at approximate MP 8.5
- One crossing of a tributary to Pocaty River (intermittent) at approximate MP 14.0

All of these crossings would be overhead with no transmission structures placed within the waterbodies. The crossings of the tributary to North Landing River at MP 6.6, North Landing River at MP 8.2, and the Intracoastal Waterway canal at MP 8.5 would occur along a greenfield segment of the route. The crossing of the tributary to Pocaty River would occur where the route would be within and adjacent to Dominion's existing ROW for Lines #2240/I-74.

5.3.2.4 Harpers to Fentress Route 5

HF Route 5 would cross the same waterbodies as HF Route 1 between approximate MPs 0.0 and 5.5 as discussed above in Section 5.3.2.2, Harpers to Fentress Route 1. Other crossings along the route would include:

- One crossing of a tributary to North Landing River (perennial) at approximate MP 6.9
- One crossing of a tributary to North Landing River (perennial) at approximate MP 9.1
- One crossing of the North Landing River (perennial) at approximate MP 9.2
- One crossing of a tributary to the Pocaty River (perennial) at approximate MP 12.4
- One crossing of a tributary to the Pocaty River (perennial) at approximate MP 12.8
- Three crossings of the Pocaty River (perennial) at approximate MPs 13.1, 15.3, and 15.7

All of these crossings would be overhead with no transmission structures placed within the waterbodies. Additionally, all of these crossings would occur along a greenfield segment of the route.

5.3.2.5 Harpers to Fentress Hybrid Route

The HF Hybrid Route would cross the same waterbodies as HF Route 1 as discussed above in Section 5.3.2.2. The waterbody crossings between approximate MPs 0.0 and 4.5 would be underground. Of these, the crossings of the unnamed perennial waterbodies at MPs 1.5, 2.3, and 2.8 and the perennial tributary to West Neck Creek at MP 3.1 would be by surface trenching. The crossing of West Neck Creek (perennial) at approximate MP 3.5 would be by HDD.

The following HF Hybrid Route crossings would be overhead installations: three crossings of an unnamed tributary to North Landing River (perennial) at approximate MPs 6.1, 6.4, and 6.9; one crossing of the North Landing River (perennial) at approximate MP 7.4; one crossing of the Intracoastal Waterway canal (perennial) at approximate MP 10.6; and one crossing of an intermittent tributary to Pocaty River at approximate MP 13.2.

5.3.2.6 Dam Neck Route Variation

The Dam Neck Route Variation would cross two unnamed perennial tributaries to West Neck Creek at approximate MPs 0.8 and 0.9 and the mainstem of West Neck Creek at approximate MP 2.5. All of the crossings would be overhead with no transmission structures placed within the waterbodies. The crossings of the two tributaries would occur where the route would be adjacent to Dam Neck Road, while the crossing of West Neck Creek would occur along a greenfield segment of the route.

5.3.2.7 Line #2085 Route Variation

The Line #2085 Route Variation would cross two unnamed perennial tributaries to the North Landing River at approximate MPs 1.4 and 3.5, the mainstem of the North Landing River at approximate MP 3.8, and the Intracoastal Waterway canal at approximate MP 4.1. All of the crossings would be overhead with no transmission structures placed within the waterbodies. Additionally, all of the crossings would occur along a greenfield segment of the route.

5.3.3 Areas of Ecological Significance

Based on the VDCR Environmental Review and research conducted by ERM, four conservation sites would be crossed by or within the alternative routes and associated facilities discussed in this study: Camp Pendleton Dam Neck Dunes and Swales, Oceana Ponds and Forests, West Neck Creek, and North Landing River (see Appendix C, Correspondence). HF Route 1 and the HF Hybrid Route additionally would cross TNC lands within the North Landing Preserve. Crossings of these areas are described in the subsections below.

5.3.3.1 Cable Landing to Harpers Route

The CLH Route would cross or affect two conservation sites: Camp Pendleton Dam Neck Dunes and Swales, and the Oceana Ponds and Forests:

- Camp Pendleton Dam Neck Dunes and Swales: A portion of the Cable Landing Location and associated workspace at the SMR would be within this conservation site, encompassing a total of approximately 9.0 acres. This entire area is heavily disturbed (almost completely denuded of vegetation), consisting of an active rifle range and associated parking lot. No areas of the conservation site containing natural vegetation would be affected by the onshore Virginia Facilities.
- Oceana Ponds and Forests: The CLH Route would cross approximately 1.1 miles of this conservation site between approximate MPs 1.9 and 3.0, encompassing about 8.2 acres, all of which would be new ROW. The route would follow the edge of the northern and southern boundaries of the site within NAS Oceana. From approximate MPs 1.8 to 2.0, the route would cross forested lands in the northeast corner of the site near Bells Road in an area previously disturbed by a former sand pit, which ceased operations in the early 1980s (see Section 4.6.1.2, Inactive Mines).[53] From approximate MPs 2.0 to 2.6, the route would be in an agricultural field, first following a tree line, then a gravel access road, and then Oceana Boulevard. From approximate MPs 2.4 to 3.0, the route would cross mostly forested lands immediately adjacent to Oceana Boulevard, which forms the western boundary of the site. With this alignment, the CLH Route would avoid crossing areas of interior habitat and the ponds within the site.

5.3.3.2 Harpers to Fentress Route 1

HF Route 1 would cross two conservation sites, West Neck Creek and North Landing River, and the North Landing Preserve:

- West Neck Creek: HF Route 1 would cross about 1.2 miles of the West Neck Creek conservation site between approximate MPs 2.1 and 3.3. The entire length of the crossing would be within the SEPG corridor, with an approximately 1.0-mile-long segment between MPs 2.3 and 3.3 also within and adjacent to Dominion's existing ROW for Lines #2118/147. The crossing would encompass 20.2 acres within the site, consisting of 4.4 acres of existing Dominion ROW (open space) and

[53] The ponds within the conservation site are former sand pits that have filled with water.

15.8 acres of new or expanded ROW (forested). Overlap within the existing ROW would reduce the amount of new tree clearing required within the site.

- North Landing River: HF Route 1 would cross about 2.7 miles of the North Landing River conservation site between approximate MPs 7.7 and 10.1 (generally the area between Indian River Farms Park and the Intracoastal Waterway). The entire length of the crossing would be within and adjacent to Dominion's existing ROW for Lines #271/I-74. The crossing would encompass 51.8 acres, including 39.0 acres of existing ROW (open space) and 12.8 acres of expanded ROW (forested). In this area, Dominion would utilize the entire width of the existing 120-foot-wide ROW plus an additional 40 feet of new ROW to wreck the existing lattice structures and install new monopole structures for Line #271 and the new onshore Virginia Facilities. The overlap with the existing ROW would minimize the amount of new tree clearing required within the conservation site.
- North Landing Preserve: HF Route 1 would cross two parcels of TNC lands within the North Landing Preserve (approximate MPs 9.9 to 10.2 and at MP 10.6) measuring a combined 0.3 mile in length. At both crossings, the route would be within and adjacent to Dominion's existing transmission ROW for Lines #271/I-74. The two crossings would encompass about 4.5 acres of existing Dominion transmission ROW (open space) and 1.5 acres of expanded ROW (forested).

  In meetings within Dominion, TNC expressed a preference for HF Route 1 or the HF Hybrid Route over the other alternatives. Thereafter, on October 29, 2021, TNC sent Dominion a letter expressing its support for HF Route 1 in the form of committing to provide Dominion the necessary easement of its property to expand the existing ROW to accommodate HF Route 1 (see Appendix C, Correspondence). TNC found HF Routes 2 and 5 less favorable because they would create new transmission ROWs across high quality forested wetlands on either side of the Intracoastal Waterway canal and/or North Landing River along greenfield alignments.

5.3.3.3 Harpers to Fentress Route 2

HF Route 2 would cross two conservation sites, West Neck Creek and North Landing River. Because the route would use the same alignment and configuration as HF Route 1 between approximate MPs 0.0 and 5.5, the affected environment within the West Neck Creek conservation site would be the same as described above in Section 5.3.3.2, Harpers to Fentress Route 1.

- North Landing River: HF Route 2 would cross approximately 1.7 miles of the North Landing River conservation site along a greenfield alignment between approximate MPs 7.3 and 9.0 (generally the area between Indiana River Road and Mt. Pleasant Road). The route would encompass about 29.5 acres of new ROW within the site, nearly all of which would be forested. The route across the site would include crossings of North Landing River and the Intracoastal Waterway canal. The route would create a new corridor across the site in a heavily forested area.

5.3.3.4 Harpers to Fentress Route 5

HF Route 5 would cross two conservation sites, West Neck Creek and North Landing River. Because the route would use the same alignment and configuration as HF Route 1 between approximate MPs 0.0 and 5.5, the affected environment within the West Neck Creek conservation site would be the same as described above in Section 5.3.3.2, Harpers to Fentress Route 1.

- North Landing River: HF Route 5 would cross approximately 2.7 miles of the North Landing River conservation site between approximate MPs 8.1 and 10.3 (generally the area between Indian River Road and Mt. Pleasant Road). An approximately 0.2-mile-long segment of the route from approximate MPs 8.1 to 8.3 would be within and adjacent to Dominion's existing ROW for Line #2085, with the remainder of the route consisting of greenfield. HF Route 5 would encompass about

45.8 acres of the site, including 1.4 acres of existing Dominion ROW (open space) and 44.4 acres of new ROW (nearly all forested). The route segment across the site would include a crossing of the North Landing River near the North Landing River Bridge. The route would create a new corridor in a heavily forested area across much of the conservation site.

5.3.3.5 Harpers to Fentress Hybrid Route

The underground segment of the HF Hybrid Route would cross the West Neck Creek conservation site, as discussed below. The overhead segment of the HF Hybrid Route would follow the same alignment and use the same configuration as HF Route 1 from approximate MPs 4.6 to 14.2, within which the route would cross the North Landing River conservation site and TNC lands within North Landing Preserve. The affected environment at these crossings would be the same as described above in Section 5.3.3.2, Harpers to Fentress Route 1.[54]

- West Neck Creek: Approximately 1.2 miles of the West Neck Creek conservation site would be crossed by the HF Hybrid Route between approximate MPs 2.3 and 3.5, with the route crossing the creek near MP 3.3. The entire length of the crossing would be within the SEPG corridor, with a 1.0-mile-long segment between approximate MPs 2.5 and 3.5 also within and adjacent to Dominion's existing ROW for Lines #2118/147. The transmission circuits required for the onshore Virginia Facilities would be installed by surface trenching for much of the route across the site; however, about 0.1 mile of the route (including the crossing of West Neck Creek) would be installed by HDD. The route would encompass 14.5 acres of the conservation site, including 3.0 acres of existing Dominion ROW (open space) and 11.5 acres of new ROW (forested). Overlap with the existing transmission ROW and use of the HDD installation for part of the crossing would reduce the amount of new tree clearing required within the site.

5.3.3.6 Dam Neck Route Variation

The Dam Neck Route Variation would cross one conservation site, West Neck Creek.

- West Neck Creek: The Dam Neck Route Variation would cross approximately 1.0 mile of the West Neck Creek conservation site between approximate MPs 1.6 and 2.6 along a greenfield alignment (generally the area between Dam Neck Road and Holland Pines Park). The route would encompass about 16.7 acres of new ROW within the site, all of which would be forested. An approximately 0.2-mile-long segment of the route would be on lands owned by the City of Virginia Beach within the park. The route would create a new corridor in a heavily forested area across the site.

5.3.3.7 Line #2085 Route Variation

Line #2085 Route Variation would cross one conservation site, North Landing River:

- North Landing River: The Line #2085 Route Variation would cross approximately 1.9 miles of the North Landing River conservation site between approximate MPs 2.5 and 4.3 (generally the area between Indian River Road and the Intracoastal Waterway). An approximately 0.2-mile-long segment of the route from approximate MPs 2.5 to 2.7 would be within and adjacent to Dominion's existing ROW for Line #2085, with the remainder consisting of greenfield. The route would encompass about 39.9 acres of the site, including 1.4 acres of existing Dominion ROW (open space) and 38.4 acres of new ROW (nearly all forested). Due to the length of the span across the Intracoastal Waterway, the Line #2085 Route Variation in this area would require the use of H-frame structures (rather than

[54] The approximate milepost crossings for these areas are: North Landing River conservation site – MPs 7.9 to 10.1, and North Landing Preserve – 10.1 to 10.4 and at MP 10.8.

monopole structures), which would require a 250-foot-wide ROW across the waterway. The route would create a new corridor in a heavily forested area across much of the conservation site.

5.3.4 Protected Species

Species are protected at the federal level under the ESA, MBTA, and the BGEPA, and at the state level under the Virginia ESA (Va. Code §§ 29.1-563 to 570) and Endangered Plant and Insect Species Act (2 VAC 5-320-10). To evaluate potential impacts on habitat for protected species, including federal and state-listed species, candidate species, non-listed rare species, migratory birds, and eagles, ERM obtained query results from the VDCR's NHDE, VDWR VaFWIS (VDWR 2021b), and the FWS IPaC (Appendix G, Protected Species). In addition to the general queries, spatial data were obtained from the VDCR NHDE, VDWR WERMS, CCB Bald Eagle Nest and Rookery Locators, VDWR Bat Winter Habitat and Roosts Online Maps, and VDEQ's Coastal GEMS.

Species of concern are designated at the federal level, but are not afforded the same level of protection as federal and state-listed endangered and threatened species. The species of concern designation is not a regulatory category, but instead constitutes an indication that the species merits special consideration due to its rarity or conservation needs. To evaluate potential impacts on habitat for species of concern within the study area, ERM reviewed the VDWR NHDE general queries for Chesapeake and Virginia Beach and the results of the VDCR Environmental Review (see Appendix C, Correspondence). In addition to species of concern, ERM also evaluated potential impacts on habitat for the non-listed rare species identified in the VDCR Environmental Review (see Appendix C, Correspondence) as well as candidate species included in the FWS IPaC.

All species identified through the initial screening process are identified and discussed in detail in Section 4.3, Natural Resources. Those species with a lack of suitable habitat or an absence of recent documented occurrences near the alternative routes were eliminated from further evaluation. Potential impacts on habitat for the remaining species, including 22 federal and/or state-listed species, six non-listed species of concern/rare/candidate species, migratory birds, eagles, and their respective habitats, are considered below.

5.3.4.1 Federal and State-Listed Endangered and Threatened Species

The IPaC, NHDE, and VaFWIS database queries identified 14 federal and state-listed species and 14 additional species listed only by the Commonwealth of Virginia. These species are identified in Table G-2 in Appendix G, Protected Species. Of the 28 listed species discussed in Section 4.3, Natural Resources, six were eliminated from further evaluation due to a lack of suitable habitat and/or documented occurrences of the species within the study area. Potential impacts on habitat for the remaining 22 species are discussed in the subsections below.

Neither habitat mapping nor field surveys have been completed on the alternative routes and associated facilities for the onshore Virginia Facilities. As a result, land use/land cover types in the study area were used as a surrogate for habitat types, where appropriate. The cover types include: Developed Lands, Open Space, Forested Lands, Agricultural Lands, and Open Water.[55] Definitions of these cover types are provided in Section 4.2.1, Land Use/Land Cover. See Tables K-1 and K-2 (Appendix K, Feature Crossing Tables) for a quantification of the specific land use/land cover types along each route.[56] See also Section

[55] For purposes of land use/land cover, wetland areas have been classified as open space, forested land, or open water. Wetland impacts for each route are addressed in Section 5.3.1, Wetlands. The desktop wetland report is provided as Appendix F, Wetland and Waterbody Report.

[56] The values provided in these tables for land use/land cover and wetlands exclude areas along the CLH Route and the underground portion of the HF Hybrid Route that would be crossed by HDD, which would avoid ground disturbance between the entry and exit points at each HDD location.

5.2.1, Land Use/Land Cover. The analysis below additionally uses data from the desktop wetland study as discussed above in Section 5.3.1, Wetlands.

Regardless of the final route selected for the onshore Virginia Facilities, species-specific field surveys may be required by the FWS (for federally listed species) and/or the VDCR (for state-listed species) prior to construction. Dominion would complete consultation with these agencies regarding effects on species after the final route is determined.

Cable Landing to Harpers Route

The CLH Route would encompass 19.4 acres of forested land (including 8.5 acres of forested wetland) that may provide suitable habitat for northern long-eared bat, Rafinesque's big-eared bat (*Corynorhinus rafinesquii macrotis*), tricolored bat (*Perimyotis subflavus*), barking treefrog (*Hyla gratiosa*), canebrake rattlesnake (*Crotalus horridus*), eastern glass lizard (*Ophisaurus ventralis*), and Raven's seedbox (*Ludwigia ravenii*). Based on VDWR spatial data, no known bat maternity roosts would be within 1.5 miles of the ROW for this route. For tricolored bat, the VDCR recommends coordination with the VDWR to ensure management and protection of this species in accordance with the Virginia ESA. The VDCR Environmental Review recommends that roost habitat assessments be conducted prior to the removal or disturbance of bald cypress, water tupelo, or swamp tupelo trees (see Appendix C, Correspondence).

The CLH Route would encompass 8.8 acres of lands classified as open space and 5.2 acres of agricultural lands that may contain nearby artificial perching structures and utility poles suitable for Peregrine Falcon (*Falco peregrinus*) and Loggerhead Shrike (*Lanius ludovicianus*) perching. The CLH Route additionally would encompass 3.2 acres of freshwater emergent wetlands, including salt and brackish marshes, which may provide suitable habitat for the Eastern Black Rail (*Laterallus jamaicensis jamaicensis*).

The Cable Landing Location and associated workspace at the eastern end of the CLH Route would be near to CAPZs of local and international importance, which have been designated as important habitat for Roseate Tern (*Sterna dougallii*), Piping Plover (*Charadrius melodus*), Wilson's Plover (*Charadrius wilsonia*), and Gull-billed Tern (*Gelochelidon nilotica*), as well as the Peregrine Falcon and the Bald Eagle (*Haliaeetus leucocephalus*). Additional information on CAPZ and Bald Eagles is provided in Section 5.3.4.2, Migratory Birds and Bald Eagles. Sea turtles, including green (*Chelonia mydas*), loggerhead (*Caretta caretta*), hawksbill (*Eretmochelys imbricate*), leatherback (*Dermochelys coriacea*), and Kemp's ridley (*Lepidochelys kempii*), may use the adjacent dune and beach area along the shoreline for nesting during the late spring and summer seasons. No ground disturbing activities would occur on the dune and beach areas; however, construction activities at the Cable Landing Location and associated workspace could result in temporary indirect impacts (e.g., light, dust, noise) near the shoreline habitat.

Harpers to Fentress Route 1

HF Route 1 would encompass 101.2 acres of forested lands (including 68.8 acres of forested wetland) that may provide suitable habitat for northern long-eared bat, Rafinesque's big-eared bat, tricolored bat, barking treefrog, canebrake rattlesnake, eastern glass lizard, and Raven's seedbox. Based on VDWR spatial data, no known bat maternity roosts would be within 1.5 miles of the ROW for this route. The VDCR Environmental Review recommends that roost habitat assessments be conducted prior to the removal or disturbance of bald cypress, water tupelo, or swamp tupelo trees. Also, given the route's intersection with the North Landing River conservation site, the VDCR recommends coordination with the VDWR to ensure that management and protection of the canebrake rattlesnake compliant with the Virginia ESA (see Appendix C, Correspondence).

In addition to forested lands, HF Route 1 would encompass 118.5 acres of open land and 37.4 acres of agricultural lands that may contain nearby artificial perching structures and utility poles suitable for Peregrine Falcon and Loggerhead Shrike perching.

Harpers to Fentress Route 2

HF Route 2 would encompasses 156.9 acres of forested lands (including 122.3 acres of forested wetland) that may provide suitable habitat for the northern long-eared bat, Rafinesque's big-eared bat, tricolored bat, barking treefrog, canebrake rattlesnake, eastern glass lizard, and Raven's seedbox. The VDCR Environmental Review recommends that roost habitat assessments be conducted prior to removal or disturbance of bald cypress, water tupelo, or swamp tupelo trees. Additionally, given the route's intersection with the North Landing River conservation site, the VDCR recommends coordination with the VDWR to ensure that management and protection of the canebrake rattlesnake is compliant with the Virginia ESA (see Appendix C, Correspondence).

In addition to crossing forested areas that may support bat foraging and commuting, HF Route 2 would fall within 1.5 miles of a cluster of six VDWR-documented northern long-eared bat maternity roosts along Mt. Pleasant Road in Chesapeake (Figure 4.3-5). The nearest maternity roost would be approximately 0.8 mile south of the HF Route 2 alignment. The roost tree was first observed by a VDWR biologist in June 2015 and may or may not be active today.

HF Route 2 would encompass 51.7 acres of open space and 58.0 acres of agricultural lands that may contain nearby artificial perching structures and utility poles suitable for Peregrine Falcon and Loggerhead Shrike perching.

Harpers to Fentress Route 5

HF Route 5 would encompass 191.0 acres of forested lands (including 152.0 acres of forested wetland) that may provide suitable habitat for the northern long-eared bat, Rafinesque's big-eared bat, tricolored bat, barking treefrog, canebrake rattlesnake, eastern glass lizard, and Raven's seedbox. The VDCR Environmental Review recommends that roost habitat assessments be conducted prior to removal or disturbance of bald cypress, water tupelo, or swamp tupelo trees. Additionally, given the route's intersection with the North Landing River conservation site, the VDCR recommends coordination with the VDWR to ensure that management and protection of the canebrake rattlesnake is compliant with the Virginia ESA (see Appendix C, Correspondence).

In addition to crossing forested areas that may support bat foraging and commuting, HF Route 5 would fall within 1.5 miles of a cluster of six VDWR-documented northern long-eared bat maternity roosts along Mt. Pleasant Road in Chesapeake (Figure 4.3-5). The nearest maternity roost would be approximately 890 feet west of the ROW for HF Route 5. The roost tree was first observed by a VDWR biologist in June 2015 and may or may not still be active today.

HF Route 5 would encompass 31.7 acres of open space and 135.0 acres of agricultural lands that may contain artificial perching structures and utility poles suitable for Peregrine Falcon and Loggerhead Shrike perching.

Harpers to Fentress Hybrid Route

The HF Hybrid Route would encompass 101.1 acres of forested lands (including 81.0 acres of forested wetlands) that may provide suitable habitat for the northern long-eared bat, Rafinesque's big-eared bat, tricolored bat, barking treefrog, canebrake rattlesnake, eastern glass lizard, and Raven's seedbox. Based on VDWR spatial data, no known bat maternity roosts would be within 1.5 miles of this route. The VDCR Environmental Review recommends that roost habitat assessments be conducted prior to removal or

disturbance of bald cypress, water tupelo, or swamp tupelo trees. Additionally, given the route's intersection with the North Landing River conservation site, the VDCR recommends coordination with the VDWR to ensure that management and protection of the canebrake rattlesnake is compliant with the Virginia ESA (see Appendix C, Correspondence).

The HF Hybrid Route would encompass 115.4 acres of open space and 28.1 acres of agricultural lands that may contain nearby artificial perching structures and utility poles suitable for Peregrine Falcon and Loggerhead Shrike perching.

Dam Neck Route Variation

The Dam Neck Route Variation would encompass 32.1 acres of forested land (including 25.5 acres of forested wetlands) that may provide suitable habitat for northern long-eared bat, Rafinesque's big-eared bat, tricolored bat, barking treefrog, canebrake rattlesnake, eastern glass lizard, and Raven's seedbox. Based on VDWR spatial data, no known bat maternity roosts are within 1.5 miles of this route's ROW. The VDCR Environmental Review recommends that roost habitat assessments be conducted prior to removal or disturbance of bald cypress, water tupelo, or swamp tupelo trees (see Appendix C, Correspondence).

The Dam Neck Route Variation would encompass 0.4 acre of open space and 13.4 acres of agricultural lands that may contain nearby artificial perching structures and utility poles suitable for Peregrine Falcon and Loggerhead Shrike perching.

Line #2085 Route Variation

The Line #2085 Route Variation would encompass 34.6 acres of forested lands (including 29.1 acres of forested wetland) that may provide suitable habitat for the northern long-eared bat, Rafinesque's big-eared bat, tricolored bat, barking treefrog, canebrake rattlesnake, eastern glass lizard, and Raven's seedbox. The VDCR Environmental Review recommends that roost habitat assessments be conducted prior to removal or disturbance of bald cypress, water tupelo, or swamp tupelo trees. Additionally, given the route's intersection with the North Landing River conservation site, the VDCR recommends coordination with the VDWR to ensure that management and protection of the canebrake rattlesnake is compliant with the Virginia ESA (see Appendix C, Correspondence).

The Line #2085 Route Variation would encompass 9.8 acres of open space and 28.9 acres of agricultural land that may contain artificial perching structures and utility poles suitable for Peregrine Falcon and Loggerhead Shrike perching.

5.3.4.2 Migratory Birds and Bald Eagles

ERM compiled a list of important or sensitive migratory birds that could potentially occur in the vicinity of the onshore Virginia Facilities (Appendix G, Protected Species). Based on the IPaC BCC bird list and priority bird species listed by the Atlantic Coast Joint Venture South Atlantic Migratory Bird Initiative, 72 species are expected to breed in the study area. According to the VDEQ's GEMS, no documented special or critical migratory songbird habitat is within the study area. ERM also reviewed the CCB's 2018 Colonial Waterbird spatial data as provided by the CCB Mapping Portal to identify potential risks to colonial waterbirds within the study area (CCB 2021). Although a number of waterbird assemblages are present in Virginia Beach and Chesapeake, none are located within the study area. For other species, ERM used land cover types and wetlands in the study area as a proxy for assessing potential impacts on bird habitat.

The CAPZ map was created in 2010 to assist renewable energy project applicants in identifying zones that are critically important to avian resources, to help guide preconstruction field surveys, and to aid in

the development of mitigation plans designed to offset significant adverse impacts on wildlife (VDEQ 2011). ERM's review of VDEQ's GEMS identified five distinct CAPZs within the study area. None would be intersected by the alternative transmission line routes; however, the Cable Landing Location and associated workspace would be near a CAPZ along the shoreline (Figure 4.3-7).

ERM reviewed the VDWR Bald Eagle Map and CCB Nest Locator to evaluate potential impacts on Bald Eagle concentration areas and nests within the study area. While no Bald Eagle concentration areas were identified, 15 Bald Eagle nests have been reported within the study area. None of the alternative transmission line routes, route variations, or associated facilities would intersect the primary (330 foot) or secondary (660 foot) management zones around the documented Bald Eagle nests. Proximity of the nearest known Bald Eagle nests to the alternative routes is outlined below. Once a final route is selected, Dominion would work with the appropriate jurisdictional agencies to complete consultation for this species.

Cable Landing to Harpers Route

The CLH Route is adjacent to a CAPZ of local and international importance near the proposed Cable Landing Location along the Atlantic Ocean shoreline (Figure 4.3-7), which has been designated as important habitat for Roseate Tern, Piping Plover, Wilson's Plover, and Gull-billed Tern, as well as Peregrine Falcon and Bald Eagle. In addition to supporting federal and state-listed species, the adjacent CAPZ is a hemispherically important migratory corridor for shorebirds, seabirds, and waterfowl, and a hemispherically important migratory staging and wintering area for seabirds and waterfowl. As discussed in Section 3.1.1.1, Cable Landing Location, Dominion would use a trenchless installation method (HDD or direct pipe) to install the Offshore Export Circuits beneath the dune and beach habitat along the coast, which would avoid surface impacts on shoreline habitat. However, construction activities at the Cable Landing Location could result in temporary indirect impacts (e.g., light, dust, noise) on adjacent shorebird foraging areas.

As discussed in Section 5.2.1, Land Use/Land Cover, the CLH Route would encompass 19.4 acres of forest, which may support migratory passerine and songbirds.[57] The route additionally would encompass 3.2 acres of freshwater emergent wetlands that may provide nesting and foraging habitat for migratory shorebirds, seabirds, and colonial-nesting marsh birds. In addition to these areas, the route would cross bird habitat within Lake Christine and Owl Creek, though these waterbodies would be crossed by HDD.

According to CCB spatial data, no documented Bald Eagle nests are within 660 feet of the CLH Route. The nearest nest (VB1501) is approximately 1,875 feet northeast of the route at approximate MP 1.2. The nest was last surveyed and found occupied in 2021.

Harpers to Fentress Route 1

HF Route 1 would encompass 101.2 acres of forested habitat that may support migratory passerine and songbirds; 25.5 acres of freshwater emergent wetland that may provide nesting and foraging habitat for migratory shorebirds, seabirds, and colonial-nesting marsh birds; and 2.7 acres of open water areas that may provide staging or overwintering habitat for waterfowl and seabirds.

According to CCB spatial data, no documented Bald Eagles nests are within 660 feet of HF Route 1. The nearest nest (CP1001) is located approximately 1,925 feet northwest of the route at approximate MP 10.3. The nest was last surveyed and found occupied in 2016.

[57] The land cover and wetland values discussed in this section exclude areas that would be crossed by HDD.

Harpers to Fentress Route 2

HF Route 2 would encompass 156.9 acres of forested habitat that may support migratory passerine and songbirds; 18.2 acres of freshwater emergent wetland that may provide nesting and foraging habitat for migratory shorebirds, seabirds, and colonial-nesting marsh birds; and 3.0 acres of open water that may provide staging or overwintering habitat for waterfowl and seabirds.

According to CCB spatial data, no documented Bald Eagle nests are within 660 feet of HF Route 2. The nearest nest (VB1202) is located approximately 1,275 feet west of the route at approximate MP 6.0. The nest was last surveyed and found occupied in 2016.

Harpers to Fentress Route 5

HF Route 5 would affect 191.0 acres of forested habitat that may support migratory passerine and songbirds; 17.5 acres of freshwater emergent wetland that may provide nesting and foraging habitat for migratory shorebirds, seabirds, and colonial-nesting marsh birds; and 1.4 acres of open water areas that may provide staging or overwintering habitat for waterfowl and seabirds.

According to CCB spatial data, no documented Bald Eagle nests are within 660 feet of HF Route 5. The nearest nest (VB1202) is approximately 2,625 feet southwest of the route at approximate MP 5.5. The nest was last surveyed and found occupied in 2016.

Harpers to Fentress Hybrid Route

The HF Hybrid Route would encompass 101.1 acres of forested habitat that may support migratory passerine and songbirds; 23.9 acres of freshwater emergent wetlands that may provide nesting and foraging habitat for migratory shorebirds, seabirds, and colonial-nesting marsh birds; and 2.7 acres of open water that may provide staging or overwintering habitat for waterfowl and seabirds.

According to CCB spatial data, no documented Bald Eagle nests are within 660 feet of the HF Hybrid Route. The nearest nest (CP1001) is approximately 1,925 feet northwest of the route at approximate MP 10.5. The nest was last surveyed and found occupied in 2016.

Dam Neck Route Variation

The Dam Neck Route Variation would encompass 32.1 acres of forested habitat that may support migratory passerine and songbirds, and 1.0 acre of freshwater emergent wetland that may provide nesting and foraging habitat for migratory shorebirds, seabirds, and colonial-nesting marsh birds.

According to CCB spatial data, no documented Bald Eagle nests are within 660 feet of the Dam Neck Route Variation. The nearest nest (VB1901) is located approximately 800 feet north of the route at approximate MP 0.9. The nest was last surveyed and found occupied in 2019.

Line #2085 Route Variation

The Line #2085 Route Variation would encompass 34.6 acres of forested habitat that may support migratory passerine and songbirds; 2.1 acres of freshwater emergent wetland that may provide nesting and foraging habitat for migratory shorebirds, seabirds, and colonial-nesting marsh birds; and 6.8 acres of open water that may provide staging or overwintering habitat for waterfowl and seabirds.

According to CCB spatial data, no documented Bald Eagle nests are within 660 feet of the Line #2085 Route Variation. The nearest nest (VB1202) is approximately 2,625 feet southwest of the route at approximate MP 5.5. The nest was last surveyed and found occupied in 2016.

5.3.4.3 Federally Listed Species of Concern and Other Documented Occurrences

Eight species of concern, two non-listed rare species, and one federal candidate species with potential to occur in the study area were identified through the NHDE query for Virginia Beach and Chesapeake, the VDCR Environmental Review of the route alternatives, and the IPaC resources lists, respectively (see Appendix C, Correspondence). These eleven species are identified in Table 4.3-1. The two non-listed rare species, three species of concern, and one candidate species with potential to occur within the study area are addressed in the subsections below. The remaining five species were eliminated from further evaluation due to a lack of suitable habitat or an absence of recent documented occurrences of the species in the study area.

Little metalmark (*Calephelis virginiensis*) prefers open areas that feature its host plant, yellow thistle (*Cirsium horridulum*), including pine flatwoods, savannas, and roadsides. Duke's skipper (*Euphyes dukesi*) inhabits the North Landing River conservation site and prefers estuarine or coastal marshes with broad-leaved sedges. According to the VDCR's Environmental Review, there is potential for little metalmark and Duke's skipper to occur along and within all of the routes if suitable habitat is present (see Appendix C, Correspondence). Resource inventories for both species are recommended by the VDCR. Specifically, VDCR recommends survey for Duke's skipper in wetlands associated with West Neck Creek, North Landing River, Pocaty River, and the Intracoastal Waterway canal where the larval food plant, shoreline sedge (*Carex hyalinolepis*), is present. VDCR also recommends surveying for little metalmark in upland areas containing yellow thistle to assess potential impacts on this species.

The monarch butterfly (*Danaus plexippus*), an FWS candidate species, has the potential to occur in a wide variety of nectar-rich areas, including wild and manmade habitats (e.g., gardens, meadows, and roadsides), especially where its host plant, milkweed (*Asclepias* spp.), is present. Suitable habitat for this species is likely present within all of the alternative transmission line routes.

Riverbank evening-primrose (*Oenothera riparia*) prefers variably fresh oligohaline wind-tidal marshes, and long beach seedbox (*Ludwigia brevipes*) prefers interdunal swales, depression ponds, borrow pits, and impoundments. Both riverbank evening-primrose and long beach seedbox are present at the Oceana Ponds and Forest conservation site. Virginia least trillium (*Trillium pusillum* var. *virginianum*) is found in forested areas, such as pinewoods and swamp forests, with populations present at the West Neck and North Landing River conservation sites.

Cable Landing to Harpers Route

The VDCR Environmental Review indicates that the CLH Route has the potential to impact long beach seedbox at the Oceana Ponds and Forest conservation site (see Appendix C, Correspondence). The VDCR recommends species-specific surveys and rare plant inventory surveys along the route during the June to September flowering and fruiting period. The VDCR additionally recommends species-specific habitat surveys for little metalmark and Duke's skipper along the CLH Route.

Harpers to Fentress Routes 1, 2, and 5, and the Harpers to Fentress Hybrid Route

The VDCR Environmental Review indicates that HF Routes 1, 2, and 5, and the HF Hybrid Route would have potential to impact Virginia least trillium due to the intersection of each route with the West Neck Creek conservation site (see Appendix C, Correspondence). The VDCR recommends species-specific surveys and rare plant inventory surveys of the routes across the conservation site during the early flowering period (late March to late April). HF Routes 1, 2, and 5, and the HF Hybrid Route have the potential to impact Duke's skipper and Virginia least trillium populations inhabiting the North Landing River conservation site (see Section 5.3.3, Areas of Ecological Significance). The VDCR recommends species-specific surveys and rare plant inventory surveys of the routes across the conservation site for

these species. The VDCR additionally recommends species-specific habitat surveys for Duke's skipper and little metalmark along the route.

Dam Neck Route Variation

The VDCR Environmental Review indicates that the Dam Neck Route Variation would have potential to impact Virginia least trillium where the route would cross the West Neck Creek conservation site (see Appendix C, Correspondence).[58] The VDCR recommends species-specific surveys during the early flowering period (late March to late April) and rare plant inventory surveys of the route within the West Neck Creek conservation site.

Line #2085 Route Variation

The VDCR Environmental Review indicates that the Line #2085 Route Variation would have the potential to impact Duke's skipper and Virginia least trillium populations inhabiting the North Landing River conservation site (see Appendix C, Correspondence).[59] The VDCR recommends species-specific habitat surveys for Duke's skipper and little metalmark along the route variation.

5.3.5 Vegetation

Herbaceous vegetation could be temporarily affected by construction and vehicular movement. In forested areas, trees would be cleared from the ROW during construction and maintained with an herbaceous cover during operations. Disturbed areas resulting from use of temporary workspace would revert back to preconstruction vegetative conditions. See Tables K-1 and K-2 in Appendix K, Feature Crossing Tables, for a quantification of the land use/land cover types that would be crossed by each route.

Similar vegetation types would be crossed by each route. HF Routes 1, 2, and 5, the HF Hybrid Route, and the Dam Neck Route Variation would each cross the West Neck Creek conservation site, which contains southern coastal plain mesic mixed hardwood forests, including species such as American beech (*Fagus grandifolia*), white oak (*Quercus abla*), water oak (*Quercus nigra*), swamp chestnut oak (*Quercus michauxii*), common sweetleaf (*Symplocos tinctoria*), and silky camellia (*Stewartia malacodendron*). Forested lands along each of the routes and route variations would include mesic mixed forests and pocosins, a rare ecological community, near the North Landing River, including within the North Landing River conservation site (see Appendix C, Correspondence). Areas near the river also contain non-riverine flatwood swamps, containing species such as cherry bark oak (*Quercus pagoda*), swamp chestnut oak (*Quercus michauxii*), laurel oak (*Quercus laurifolia*), American hornbeam (*Carpinus caroliniana*), coastal doghobble (*Leucothoe axillaris)*, and switchcane (*Arundinaria tecta*).

5.3.5.1 Urban Tree Canopy Plans

The City of Virginia Beach and City of Chesapeake each have goals of 40 percent urban canopy coverage within their respective jurisdictions. Each alternative route and route variation would require tree removal, resulting in a net reduction in existing tree canopy. Relative to existing cover, however, the changes would be small for each route (less than 0.1 percent change for each route in Virginia Beach and less than 1 percent change for each route in Chesapeake).[60] See Tables K-1 and K-2 (Appendix K,

[58] The VDCR Environmental Review (Appendix C, Correspondence) addresses the Dam Neck Route Variation under an alternate name (HF Route 3).

[59] The VDCR Environmental Review (Appendix C, Correspondence) addresses the Line #2085 Route Variation under an alternate name (HF Route 4).

[60] Existing canopy cover is estimated to be 59,975 acres in the City of Virginia Beach and 16,283 acres in the City of Chesapeake.

Feature Crossing Tables) for a quantification of the forested land along and within each route and associated facilities.

City of Virginia Beach Tree Mitigation

The City of Virginia Beach typically requires the replacement of trees (at 6-inch diameter breast height or greater) removed from City parcels at a ratio of 3:1. Additionally, in meetings with Dominion, staff from the City of Virginia Beach said that impacts on forested lands on City-owned parcels would be one factor in the City's review of the alternative transmission line routes for the onshore Virginia Facilities. While surveys to estimate the number or density of trees on City-owned parcels have not been completed, the total area of forested land on City-owned parcels was used to compare tree removal on City lands for each route. Clearing impacts on forested lands for each route on City of Virginia Beach property would be as follows:

- CLH Route: 1.2 acres
- HF Route 1: 46.2 acres
- HF Route 2: 47.3 acres
- HF Route 5: 43.1 acres
- HF Hybrid Route: 44.0 acres
- Dam Neck Route Variation: 7.4 acres
- Line #2085 Route Variation: 4.4 acres

5.3.5.2 Fragmentation

Fragmentation refers to the breaking up of contiguous areas of vegetation communities into smaller patches. Fragment size plays a crucial role in landscape function and many ecosystem interactions, including the distribution of plants and animals, fire regime, vegetation structure, and wildlife habitat. Reducing the size of contiguous patches of suitable habitat can indirectly reduce the effectiveness of that habitat for individual species beyond the removal of habitat. Some species require large, unfragmented blocks of habitat, and fragmentation can lead to reduced habitat quality. Forest fragmentation related to construction practices can directly affect waterbodies and wetlands when they occur within or near the construction footprint (Drohan et al. 2012).

Cable Landing to Harpers Route

The CLH Route would generally avoid large contiguous blocks of unfragmented tree cover. Forested lands in the area immediately surrounding Lake Christine (MPs 0.0 to 0.3) and in the route segment generally between General Booth Boulevard and Bells Road (approximate MPs 0.8 to 2.0) would be crossed by HDD, avoiding the creation of new fragments in these areas. The remainder of the route would either avoid forested lands or cross them along the edge of the treed area. For example, as discussed in Section 5.3.3, Areas of Ecological Significance, the route would intersect the Oceana Ponds and Forest conservation site (approximate MPs 1.9 to 3.0) by following existing tree lines and/or the edge of Oceana Boulevard, which would avoid creating a new fragment within the site.

Harpers to Fentress Route 1

HF Route 1 would largely avoid fragmenting larger contiguous blocks of forest due to its high utilization of routing opportunities, including the SEPG corridor and existing Dominion transmission ROWs. In particular, HF Route 1 would cross the West Neck Creek conservation site (approximate MPs 2.1 to 3.3) mostly adjacent to Dominion's existing ROW for Lines #2118/147; and the North Landing River conservation site (approximate MPs 7.7 to 10.1) adjacent to Dominion's existing ROW for Lines #271/I-74.

Harpers to Fentress Route 2

Between approximate MPs 0.0 and 5.5, HF Route 2 would avoid fragmenting larger contiguous blocks of forest due to its use of the SEPG corridor and an existing Dominion transmission ROW (Lines #2118/147) as routing opportunities. This would include a crossing of the West Neck Creek conservation site between approximate MPs 2.1 and 3.3. Between approximate MPs 6.6 and 11.9, the route would cross several blocks of forest along a greenfield alignment, resulting in new fragments. This would include a crossing of the North Landing River conservation site (approximate MPs 8.1 to 10.3, including a crossing of the Intracoastal Waterway canal) and a band of forested land where the route would parallel the south side of the Intracoastal Waterway canal (approximate MPs 8.7 to 11.8).

Harpers to Fentress Route 5

Between approximate MPs 0.0 and 8.3, HF Route 5 would avoid fragmenting larger contiguous blocks of forest due to its use of the SEPG corridor and existing Dominion transmission ROWs (Lines #2118/147 and Line #2085) as routing opportunities. This segment would include a crossing of the West Neck Creek conservation site between approximate MPs 2.1 and 3.3. South and west of MP 8.3, HF Route 5 would cross larger contiguous blocks of forested lands from approximate MPs 8.3 to 10.3, MPs 10.6 to 11.3, MPs 12.1 to 12.3, and MPs 12.7 to 15.8 along a greenfield alignment, creating new fragments in these areas. This would include a crossing of the North Landing River conservation site between approximate MPs 8.1 and 10.3 (inclusive of a crossing of North Landing River). The route segment between approximate MPs 13.1 and 15.3 would be on the south side of Pocaty River along a river segment designated as scenic by the VDCR.

Harpers to Fentress Hybrid Route

Because the HF Hybrid Route would utilize essentially the same alignment as HF Route 1, fragmentation impacts would be similar to those described above for that route.

Dam Neck Route Variation

The Dam Neck Route Variation would cross a block of forested land between approximate MPs 1.5 and 2.8. Part of this would be adjacent to Dam Neck Road (MPs 1.5 to 1.7) and part would be adjacent to or near a parcel where land cover consists of open space (MPs 1.7 to 2.3). From approximate MPs 2.3 to 2.8, however, the route would utilize a greenfield alignment creating a new fragment through forested lands across and near West Neck Creek. The route would cross the West Neck Creek conservation site between MPs 1.6 and 2.6 and Holland Pines Park between MPs 2.4 and 2.8, creating new fragments in these areas.

Line #2085 Route Variation

From approximate MPs 0.0 to 2.8, the Line #2085 Route Variation would be within and adjacent to an existing Dominion transmission ROW. From approximate MPs 2.8 to 4.3, the route would utilize a greenfield alignment across mostly forested lands, including a crossing of the Intracoastal Waterway canal, creating a new fragment. This segment of the route additionally would cross the North Landing River conservation site.

5.3.5.3 Ecological Cores

As discussed in Section 4.3.5.3, Ecological Cores and Habitat Fragmentation, and as enumerated in Tables K-1 and K-2 (see Appendix K, Feature Crossing Tables), each of the routes would cross varying lengths of VDCR-defined ecological cores with rankings ranging from C5 (general significance) to C1 (outstanding significance). The analysis below focuses on crossings of ecological cores with rankings of

C3 (high significance) and higher as these are considered the most sensitive by the VDCR. The impacts associated with crossing high-value ecological cores would be disruption of habitat continuity resulting in a higher number of lower-quality fragmented habitats, which can have lower biodiversity and be prone to the introduction of non-native species. No ecological cores with C3 through C1 rankings would be crossed by the CLH Route or the Dam Neck Route Variation.

Harpers to Fentress Route 1 and the Harpers to Fentress Hybrid Route

HF Route 1 and the HF Hybrid Route would each pass between a C3 (high significance) core and a C2 (very high significance) core along the route segment between Indian River Farms Park and the Intracoastal Waterway canal (approximate MPs 7.8 to 11.0 for HF Route 1 and MPs 8.0 to 11.2 for the HF Hybrid Route). This area corresponds to the crossing of the North Landing River conservation site. The route segment here would be within and adjacent to Dominion's existing ROW for Lines #271/I-74, which forms the boundary between the C2 core to the east and C3 core to the west. Dominion would utilize the entire width of the existing 120-foot-wide ROW plus an additional 40 feet of expanded ROW to wreck the existing lattice structures for Lines #271/I-74 and install new monopole structures for Line #271 and the new CVOW transmission circuits. To minimize impacts on the higher quality C2 core to the east, the additional 40 feet of expanded ROW would be on the west side of the existing transmission corridor. The route would encompass 7.6 acres within the C2 core (all existing ROW) and 0.7 acre of the C3 core (all expanded ROW). No new tree clearing would occur within the C2 core.

Harpers to Fentress Route 2

HF Route 2 would cross a C2 (very high significance) core between approximate MPs 7.3 and 10.9 with a second crossing between approximate MPs 11.1 and 11.8, all along a greenfield alignment. The route segment between approximate MPs 7.3 and 9.0 corresponds with the crossing of the North Landing River conservation site, and includes a crossing of the Intracoastal Waterway canal at approximate MP 8.5. In total, the route would encompass about 71.7 acres within the C2 core, nearly all of which would be forested. The route would fragment forested areas within the core on both sides of the Intracoastal Waterway, reducing the area of contiguous forested land in both areas. HF Route 2 additionally would encompass about 0.2 acre of a C3 core where the route would intersect Dominion's existing transmission ROW for Lines #271/I-74 at approximate MP 11.8.

Harpers to Fentress Route 5

HF Route 5 would cross a C1 (outstanding significance) core in three locations: between approximate MPs 8.0 and 9.4, MPs 10.1 and 10.3, and MPs 12.7 and 13.1, with the first two generally corresponding to the crossing of the North Landing River conservation site. The segment from MPs 8.0 to 9.4, which would also cross North Landing River, would mostly follow a greenfield alignment, creating a new fragment across the core. The segments between MPs 10.1 and 10.3 and MPs 12.7 and 13.1 would similarly utilize greenfield alignments; however, they both would cross the core along its western boundary. Thus, while these crossings would require tree removal, they would not create new fragments across the core. The three crossings of the C1 core collectively would encompass 31.1 acres, nearly all of which would be new ROW in forested areas.

HF Route 5 would cross a short segment of a C2 (very high significance) core between approximate MPs 9.5 and 10.0 on the west side of North Landing River within the North Landing River conservation site. The route would follow a greenfield alignment across a forested area, fragmenting a small section of the core. The route would encompass 8.9 acres of new ROW within the core.

HF Route 5 would cross a C3 (high significance) core between approximate MPs 13.3 and 15.8 along a greenfield alignment. Most of this segment would parallel the south side of Pocaty River. The route would

bisect and create a new fragment across the core. It would encompass about 42.8 acres within the core, all of which would be new ROW in a forested area.

Line #2085 Route Variation

The Line #2085 Route Variation would cross a C1 (outstanding significance) core between approximate MPs 2.5 and 3.7 and a C2 (very high significance) core between approximate MPs 3.7 and 4.3, with North Landing Road forming the boundary between the two cores. The route would follow a mostly greenfield alignment encompassing 19.9 acres within the C1 core and 18.1 acres within the C2 core. The route segment across the C2 core would additionally cross the Intracoastal Waterway. The Line #2085 Route Variation would create new fragments across both cores.

5.4 Visual Resources and Conditions

5.4.1 Analytical Approach

The analytical approach to evaluating the potential visual impacts of the onshore Virginia Facilities involved: (1) identifying visually sensitive resources in the visual study area; (2) identifying locations where viewers would be likely to observe the facilities and resulting impacts on visual resources; and (3) providing accurate, visual simulations illustrating future conditions. Section 4.4, Visual Resources and Conditions, discusses the inventory of visually sensitive resources and selection of KOPs.

Photographic visual simulations were developed to depict the onshore Virginia Facilities and associated changes to the existing landscape. The approach to developing these simulations involved the use of a high-resolution digital camera with tripod and Global Positioning System (GPS) to record existing views at each KOP in the selected viewing direction. For each KOP, a panoramic existing-conditions image was prepared by combining multiple individual high-resolution images to replicate the human field of vision.

To represent future conditions during operations, baseline photography was combined with accurate, computer-generated renderings of the onshore Virginia Facilities. Location data captured by the GPS device attached to the camera during site photography were transferred to design software that combined the GIS data with a three-dimensional (3D) model of the facility component that would be visible in the viewshed. Views from the digital photographs were matched in the 3D modeling software using virtual cameras with the same focal length and field-of-view as the camera settings used to capture the digital imagery. Date- and time-specific lighting were added into the 3D model. Renderings of the onshore Virginia Facilities were overlaid on the site photography, and modifications to the existing landscape (e.g., clearing of vegetation and removal of existing structures) were made to the images to simulate the predicted future conditions after construction and restoration are complete.

5.4.2 Future Conditions

This section discusses the visual conditions at each KOP based on the simulations (Figures I-1 through I-21) provided in Appendix I, Visual Simulations.

5.4.2.1 KOP 03

The Harpers Switching Station associated with HF Routes 1, 2, and 5 would replace the stand of trees in the near middleground and dominate the view (Figure I-1 in Appendix I, Visual Simulations). To some degree, the switching station would be consistent with the appearance of the school bus parking depot located behind the viewer (on the south side of Harpers Road), and would include a fence and manicured lawn similar to the existing view. Overall, however, the facility would add industrial-appearing rectangular structures, strong vertical and horizontal lines (transmission structures and conductors), and smooth, white or gray surfaces to a generally natural-appearing view. The future view would be essentially the

same for all alternatives, except the HF Hybrid Route, which would use an alternate site for the switching station.

5.4.2.2 KOP 04

The transmission structures and to a lesser degree, conductors, associated with the Dam Neck Route Variation would introduce dominant vertical elements in the center of the view, in both directions, adjacent to Dam Neck Road. The brown color of the weathering steel used for the transmission structures would contrast with the predominantly tan and green palette in the foreground, and would contrast with the commercial structures at London Bridge Marketplace in the background of the west-facing view (see Figures I-2 and I-3 in Appendix I, Visual Simulations).[61] The removal of vegetation along Dam Neck Road would be noticeable (as evident in the simulation from both KOP 4a and KOP4b) due to the removal of roadside street trees and wooded stands. Although there would be a change in immediate perception due to this clearing, it would not open views to other forms of landscape character or change the overall landscape similarity zone.

5.4.2.3 KOP 05

For HF Routes 1, 2, and 5, the existing transmission ROW in this location would be expanded to accommodate the new transmission circuits for the onshore Virginia Facilities (Figure I-4 in Appendix I, Visual Simulations) to the viewer's right (away from the visible houses). Although the new transmission structures would use a different design (and would be taller) than the existing towers, most observers would likely consider the new towers and conductors to be similar in appearance to the existing towers. The new transmission infrastructure would introduce a wider area of open views along the ROW; however, the edge treatment along the south side of the ROW, along with the textures, colors, and linear forms associated with the overhead transmission structures, would be similar to the existing view. Figure I-5 (Appendix I, Visual Simulations) is the same view showing the intersection of the Dam Neck Route Variation with the existing transmission ROW in the background.

5.4.2.4 KOP 06

HF Route 5 and the Line #2085 Route Variation would remove the largest visible stand of trees in this area near the Kempsville Mennonite Church, resulting in a view dominated by strong vertical lines (the existing and new transmission structures) (Figure I-6 in Appendix I, Visual Simulations). Removal of the trees would completely expose the church building as shown in the view. This, in combination with the new transmission structures and conductors, would result in a view dominated by regular polygons and flat textures, with more natural and rough textures limited to the distant horizon on the left side of the image. Additionally, the new weathering steel structures for the onshore Virginia Facilities would contrast with the existing galvanized structures.

5.4.2.5 KOP 07

HF Route 5 and the Line #2085 Route Variation would result in minimal clearance of visible vegetation at KOP 07; thus the existing textures, forms, and colors would remain (Figure I-7 in Appendix I, Visual Simulations). The new transmission structures for the onshore Virginia Facilities would add strong smooth, linear, textured brown features that would dominate the view. In particular, the view directly down the ROW would be industrial in appearance. As with KOP 06, the weathering steel structures for the onshore Virginia Facilities would contrast with the existing galvanized structures.

[61] Field investigation noted the presence of soybean crops in the field where the simulation photos were taken; such crops typically appear green during growing season and fade to yellow at the end of the season.

5.4.2.6 KOP 08

KOP 08a

HF Route 2 and the Line #2085 Route Variation would add new human-made, vertical, brown elements to the most distant part of the view. HF Route 2 would cross the river approximately 0.5 mile from the viewer (Figure I-8 in Appendix I, Visual Simulations), while the Line #2085 Route Variation would cross approximately 0.4 mile away (Figure I-9 in Appendix I, Visual Simulations). At these distances, the new transmission infrastructure would contrast with and would add new elements to the existing landscape, but would not dominate or fully diminish the landscape. The routes visible from KOP 08a (the northwest-facing view from the North Landing Bridge) would not be within the designated scenic river segment of the North Landing River, although these alternatives would likely be visible from designated segments approximately 1.2 miles to the southeast. Beyond this point, bends in the river's path would obscure HF Route 2 and the Line #2085 Route Variation from view.

KOP 08c

HF Route 5 would add new human-made, vertical brown elements in the foreground of this view (Figure I-10 in Appendix I, Visual Simulations). The brown color and linear, vertical forms would somewhat mimic visible tree trunks; however, the new transmission structures would be substantially taller than (approximately twice as tall as) existing trees, and the horizontal lines of the conductors would clearly contrast with the predominantly natural, aquatic landscape. HF Route 5 would cross the designated scenic segment of the North Landing River, and would be visible from the entire 0.2 mile of designated scenic river upstream of the crossing, and approximately 1.0 mile of designated scenic river downstream.

5.4.2.7 KOP 09

HF Route 5 would cross the entire field of view from this KOP, creating a noticeable linear feature (Figure I-11 in Appendix I, Visual Simulations). While transmission structures would be visible, the horizontal lines of the conductors would be more dominant. At this distance, the transmission structures would noticeably contrast, although this contrast would be somewhat tempered by the distant tree line.

5.4.2.8 KOP 10

The fence around the expanded Fentress Substation (HF Routes 1, 2, and 5, and the HF Hybrid Route) would be the most visible change caused by the onshore Virginia Facilities. This combined with clearance of additional land for the substation expansion would remove some of the rough, green and brown, forested landscape and replace it with rectangular, smooth, white structures (the fence and substation facilities) in the center of the foreground (Figure I-12 in Appendix I, Visual Simulations). The more distant transmission lines associated with each alternative route (HF Routes 1, 2, and 5, and the HF Hybrid Route) would add brown, vertical features, although these features would blend somewhat with existing transmission structures in this area.

5.4.2.9 KOP 11

Each of the overhead alternative transmission line routes would add distinct vertical, brown, transmission structures and black, horizontal lines (conductors) at or above the existing horizon (Figures I-13 through I-15 in Appendix I, Visual Simulations). Some trees would be removed, but none of the alternatives would meaningfully change the volume of rough, irregular features along the horizon. The new transmission facilities would be somewhat similar in form to the existing light towers, but would contrast substantially due to height and clustering and the number of new structures installed. HF Route 5 and the Line #2085

Route Variation (Figure I-15) would have the smallest effects, and would only be visible on the left side of the view. The clustering of transmission structures for HF Route 1 and the HF Hybrid Route (Figure I-13) would create less contrast than those of HF Route 2 (Figure I-14); however, this would change from various points within the Athletic Complex.

5.4.2.10 KOP 12

The onshore Virginia Facilities would not be visible from this KOP (Figure I-16 in Appendix I, Visual Simulations).

5.4.2.11 KOP 13

The onshore Virginia Facilities would not be visible from this KOP (Figure I-17 in Appendix I, Visual Simulations).

5.4.2.12 KOP 14

HF Route 1 and the HF Hybrid Route would replace the existing single set of black lattice transmission structures with two sets of brown (weathering steel) monopole structures, along with an increased number of conductors (Figures I-18 and I-19 in Appendix I, Visual Simulations). The form and color of the new structures would blend somewhat with other existing transmission and utility structures; however, the new transmission facilities would increase the number of visible structures, and would place the structures closer to the viewer and to Indian River Road. Overall, the Project would add substantial visual clutter to the views from KOP 14a and 14b, primarily due to the increased number of structures and conductors.

5.4.2.13 KOP 15

HF Route 2 would add vertical and horizontal structures along the horizon (Figure I-20 in Appendix I, Visual Simulations). While visible, these structures would not strongly contrast with the existing landscape due to distance from the viewer and the location of the conductors near the horizon.

5.4.2.14 KOP 17

HF Routes 1 and 2 and the HF Hybrid Route would replace the existing lattice transmission structures with brown (weathering steel) monopole structures (Figure I-21 in Appendix I, Visual Simulations). These new structures would occupy a noticeably larger portion of the ROW, but would not change any of the existing landscape. To some degree, the new structures would blend with their surroundings better than the existing structures, due to the reduced number of physical elements, compared to the numerous individual pieces of steel in each lattice structure as shown in the existing conditions view.

5.4.3 Assessment of Visual Impacts

The degree to which overhead transmission structures and other associated facilities would be visible or noticeable depends on a number of factors including:

- Structure height, distance from viewer, and viewer elevation
- Topography, vegetation, and buildings/development that obscure transmission infrastructure
- Atmospheric conditions, including haze and cloud cover
- Lighting angles
- Nighttime lighting
- Viewing context

Infrastructure at the Cable Landing Location and the CLH Route would be installed underground with no meaningful visual change once installation and restoration are complete. As such, this assessment does not analyze the visual impacts of the Cable Landing Location or CLH Route.

For HF Routes 1, 2, and 5, and the overhead portion of the HF Hybrid Route, this section discusses the degree of visual changes between the existing and proposed environments, based on the descriptions of existing conditions in Section 4.4.4, Key Observation Points, and future conditions in Section 5.4.2, Future Conditions. Those changes, in turn, form the basis for assessing the level of impact on viewer groups within the respective LCAs (see Section 4.4.2, Landscape Character Areas), and the overall level of impact on views and landscapes resulting from construction and operation of the onshore Virginia Facilities.

The sections below describe the impacts of HF Routes 1, 2, and 5, and the overhead portion of the HF Hybrid Route between Harpers Road in Virginia Beach and the Fentress Substation in Chesapeake (inclusive of the Harpers Switching Station or Chicory Switching Station sites, as appropriate). They also describe the impacts of the Dam Neck and Line #2085 Route Variations. HF Route 1 is discussed in detail, whereas the impacts from the other routes and route variations are described only to the degree to which they differ from previously discussed alternatives.

5.4.3.1 Harpers to Fentress Route 1

The impacts of HF Route 1 are summarized below according to the affected LCA.

This route would affect KOPs 3, 5, 10, 11, 12, 13, 14a, 14b, and 17.

- Transportation Corridors: HF Route 1 would cross transportation corridors in several locations (e.g., KOP 17), but would generally not be collocated with major roads. Transmission structures near roads would be somewhat visually consistent with other transportation-related features, such as existing distribution lines; however, the new transmission structures for the onshore Virginia Facilities would be substantially larger than existing distribution lines, and would typically cross transportation corridors perpendicularly. As a result, the new transmission infrastructure would create substantial contrast with the existing view experienced by travelers along transportation corridors. Because views of HF Route 1 along transportation corridors would generally be brief (i.e., limited to the immediate area around the crossing), and because human influences are common in this LCA, adverse impacts would be limited.
- Developed—suburban residential: Suburban residential areas would comprise the majority of the area that would potentially experience visual impacts from HF Route 1. Affected subdivisions would include Castleton, Highland Parish, Dewberry Farm, and Indian River Farms. The human-made transmission structures would be visually contrasting modern elements with strong vertical and horizontal linear elements, smooth surfaces, and brown (weathering steel) or black (conductor) colors. These structures and their cleared ROWs would contrast with the predominantly flat, rectangular, light-colored character of residential structures, streets, sidewalks, and other architectural design features. Transmission structures would also contrast with the rough-textured, green, irregular shapes of landscaping within suburban residential developments. Due to this contrast and the height and mass of the transmission structures, the new structures would be noticeable if not dominant features in many views, especially close views. Most viewers would be local residents or commuters traveling on public roads. These viewers—especially local residents—would likely be sensitive to visual changes, especially along segments of HF Route 1 that are not collocated with existing transmission lines.
- Developed—rural residential: The visual impacts of HF Route 1 in rural residential areas would be similar to those in suburban residential areas, except that views of the HF Route 1 transmission

infrastructure would be available from greater distances, due to the predominantly open lands that surround rural residential uses. Rural residential areas would be limited to areas near Fentress Substation. Viewers in this area would be sensitive to visual changes, and contrast would be substantial at close distance, but less noticeable where the new infrastructure is near the tree line.

- Developed—industrial: Industrial areas would be limited to areas near KOP 3 and the Fentress Substation. In these areas, HF Route 1's structures would be similar in form, texture, color, and line to existing industrial facilities—especially at the Harpers Switching Station and Fentress Substation where the new infrastructure would be galvanized. Viewers here would be accustomed to industrial views, and would thus have low sensitivity to change.
- Agricultural and/or Open, Undeveloped Lands: For HF Route 1, these areas exist near the Harpers Switching Station (KOP 3) and northeast of the Fentress Substation. As with rural residential areas, agricultural and open lands would have longer-distance views of HF Route 1. Contrast would be substantial, especially closer to the transmission infrastructure. The brown and black, smooth linear features of the transmission structures would contrast substantially with the rough, uneven, yellow, tan, and green features of agricultural and open fields. Viewers in these areas, primarily residents at their homes and farms, or traveling along rural roads, would be sensitive to visual changes, although substantial portions of the route across agricultural and open lands would parallel existing transmission lines (e.g., Lines #271/I-74 and Line #2240).
- Open Water: Open water views would exist at HF Route 1's crossing of the Intracoastal Waterway canal, which would be collocated with an existing transmission ROW (Lines #271/I-74). The transmission structures and conductors from HF Route 1 would introduce additional linear, smooth shapes to a predominantly natural visual environment. This would create incremental, but substantial, contrast. Viewers would include individuals in boats or travelers in cars on Centerville Turnpike, which crosses the canal approximately 1.2 miles west of the crossing. These viewers, especially recreationists, would be very sensitive to visual changes, although the presence of existing transmission infrastructure would mitigate this sensitivity.
- Forested: HF Route 1 would cross forested areas at various locations, with the most substantial crossing north of the North Landing River. In these areas, the primary source of contrast would be the clearing of trees for new or (in many areas along HF Route 1) expanded ROW (e.g., along Line #271/I-74). Where new ROW is established, the contrast would be extensive, effectively partitioning otherwise continuous forest. In collocated areas, the newly installed transmission structures and conductors would be the primary source of contrast, although this change would be incremental. Recreational viewers (to the degree that trails exist near HF Route 1) would be particularly sensitive to changes, while travelers along adjacent roads would have more limited views of HF Route 1 in forested areas, and would have less sensitivity to change.
- Developed Recreational Areas: HF Route 1 would be visible from south-facing locations within the Princess Anne Athletic Complex. The new transmission structures and conductors would be visible and noticeable, but would be similar in form, texture, and color to other features visible at the same time. Moreover, viewers at this location would be primarily focused on activities on the playing surfaces, and thus would be less sensitive to visual contrast on the horizon. Users of the Battlefield Golf Club (east of the Fentress Substation) would likely have similar attitudes, especially because HF Route 1 would be within and adjacent to an existing transmission ROW (Lines #2240/I-74).

5.4.3.2 Harpers to Fentress Route 2

This route would affect KOPs 3, 5, 8a, 10, 11, 15, and 17.

HF Route 2 would diverge from HF Route 1 at the Princess Anne Athletic Complex. From there, HF Route 2 would cross an area of rural residential, agricultural, and forested land north of the North Landing River, and would cross the river about 0.5 mile northwest of KOP 08. The visual impact at the river crossing would be larger than for HF Route 1, because the crossing would be visible from (although it would not occur within) portions of the river designated as scenic (see Section 4.4.2, Landscape Character Areas). HF Route 2's alignment south of the North Landing River would be within forested areas and along a tree line at the north edge of rural residential and agricultural parcels. Contrast would be substantial along this new ROW within the forest, and transmission infrastructure would be noticeable along the horizon, as viewed by residents and travelers near rural residential and agricultural properties. HF Route 2 would follow the same alignment as HF Route 1 from the point where it joins Dominion's existing ROW for Lines #271/I-74 to Fentress Substation.

5.4.3.3 Harpers to Fentress Route 5

This route would affect KOPs 3, 5, 6, 7, 8c, 9, 10, and 11.

HF Route 5 would follow the same alignment as HF Route 1 to the Princess Anne Athletic Complex, then follow Dominion's existing ROW for Line #2085 south toward Indian River Road, then head southwest within a new ROW to the north bank of North Landing River. The segment along Line #2085 would cross agricultural land along the western edge of the Courthouse Estates subdivision (paralleling the existing transmission line). Visual impacts within the suburban residential subdivision would be substantial, due primarily to the scale of the HF Route 5 transmission structures (which would be larger than the existing structures for Line #2085). The route would then cross North Landing River east of KOP 8 before crossing through extensive stretches of forest, agricultural, and rural residential land, all within a new ROW. The river crossing would be within the designated scenic portion of the river. HF Route 5 would cross and then run through forests along the south bank of the Pocaty River, a scenic-designated tributary of the North Landing River. These crossings and the removal of riparian forest near the Pocaty River for new ROW could conflict with the Commonwealth of Virginia's visual resources management intent for the designated scenic river segments. In the rural agricultural areas south and west of Fentress Airfield, HF Route 5 would be visible for extended distances. From distant views, the linear form of HF Route 5 along the horizon would contrast with the irregular form of tree lines. Depending on the distance of the view, HF Route 5 would create low to moderate contrast in these areas.

5.4.3.4 Harpers to Fentress Hybrid Route

This route would affect KOPs 10, 11, 12, 13, 14a, 14b, and 17.

The HF Hybrid Route would follow HF Route 1 in its entirety, but would remain underground between Harpers Road and the Chicory Switching Station site in Virginia Beach. This would avoid visual impacts on an area of suburban residential development (Castleton and Pine Ridge) at the eastern end of the route. The Chicory Switching Station would replace primarily forested areas adjacent to a transportation corridor (Princess Anne Road—a multi-lane divided highway flanked by forest, similar to the description of Dam Neck Road in Section 5.4.2.2, KOP 04). Existing ROW within or near the subdivisions would be expanded to accommodate the underground portion of the route, but no new structures would be built in these areas. The northern edge of the Chicory Switching Station could be visible from adjacent subdivisions, across an existing transmission ROW and through trees along the facility's northern boundary. As a result, the HF Hybrid Route would have lower impacts on suburban residential LCAs than other alternatives.

5.4.3.5 Dam Neck Route Variation

This route variation would affect KOPs 4a, 4b, and 5.

The Dam Neck Route Variation would diverge from the alignments of HF Routes 1, 2, and 5 west of the Harpers Switching Station site. From there, it would travel west adjacent to Dam Neck Road, before heading south across a forested area to rejoin the other routes. The alignment for the route variation would affect a transportation corridor (Dam Neck Road), a developed commercial area (London Bridge Marketplace—see Section 5.4.2.2, KOP 04), and agricultural and forested areas, including the Holland Pines Park between the Holland Pines and Lake Placid subdivisions. While drivers along transportation corridors are typically accustomed to the presence of transmission infrastructure, the affected segment of Dam Neck Road is bordered by agricultural lands and forest, with minimal existing infrastructure (other than the road). In addition, the size and proximity of the new transmission structures to viewers would create substantial contrast in this area. Similarly, while users of the London Bridge Marketplace would typically be focused on shopping, the size and proximity of the new transmission infrastructure would be noticeable, and could be viewed as an adverse impact.

5.4.3.6 Line #2085 Route Variation

This route variation would affect KOPs 6, 7, 8a, and 11.

The Line #2085 Route Variation would follow the same alignment as HF Route 5 along Dominion's existing ROW for Line #2085 from the Princess Anne Athletic Complex to a point south of Indian River Road and east of North Landing Road. As with HF Route 5, the segment along Line #2085 would cross agricultural land along the western edge of the Courthouse Estates subdivision (paralleling the existing transmission line). Visual impacts within the suburban residential subdivision would be substantial, due primarily to the scale of the HF Route 5 transmission structures (which would be larger than the existing structures for Line #2085). The route would then head east within a new ROW through forested areas and across the North Landing River before intersecting HF Route 2. The North Landing River crossing would be outside of the designated scenic portion of the river, but would be closer to KOP 8 than HF Route 2. Additionally, given the span length across the river, this segment of the route would utilize H-frame structures, rather than monopole structures, requiring a wider (approximately 250-foot-wide) ROW. As a result, the Line #2085 Route Variation would have larger visual impacts at the river crossing.

5.5 Cultural Resources

Effects for the considered cultural resources relevant to each alternative transmission line route and associated facilities are discussed below. The complete Pre-application Analysis Report is provided in Appendix H.[62]

5.5.1 Archaeological Sites

Sixteen previously recorded archaeological sites (see Table 4.5-1) would be within the ROW of one or more of the alternative transmission line routes or route variations as follows:

- The CLH Route would cross 44VB0204, 44VB0361, 44VB0389, 44VB0395, and 44VB0396.
- HF Route 1 and the HF Hybrid Route would each cross 44CS0250, 44VB0162, and 44VB0306 where the routes share a common alignment.

[62] The Pre-application Analysis Report discusses two additional routes, HF Routes 3 and 4, which were eliminated for analysis in this study; however, the portions of these routes that differ from other routes were retained as route variations (i.e., the Dam Neck and Line #2085 Route Variations).

- HF Routes 1, 2, and 5, and the HF Hybrid Route would each cross 44VB0274 and 44VB0314 where the routes share a common alignment.
- HF Routes 2 and 5 and the Line #2085 Route Variation would each cross 44VB0275 where the routes share a common alignment.
- HF Route 5 would cross 44CS0016 and 44CS0156.
- HF Route 5 and the Line #2085 Route Variation would each cross 44VB0263, 44VB0267, and 44VB0280 where the routes share a common alignment.

No previously recorded sites would be within the footprints of the Harpers Switching Station, Chicory Switching Station, or expanded Fentress Substation.

Nine of the previously recorded sites would be within greenfield segments of one or more of the alternative routes (44VB0162, 44VB0204, 44VB0314, 44VB0361, 44VB0389, 44VB0395, 44VB0396, 44CS0016, and 44CS0156). The remainder would fall wholly or partially within existing transmission line ROWs that would be reused and expanded for the onshore Virginia Facilities or crossed by an alternative route (44CS0250, 44VB0263, 44VB0267, 44VB0274, 44VB0275, 44VB0280, and 44VB0306).

The sites that would be impacted by each alternative route are discussed below, along with current NRHP status and desktop reconnaissance-level information about each site's condition. A confident determination about the nature of archaeological deposits at each site and the extent of impacts from prior land use activities would be required to verify the desktop analysis.

5.5.1.1 Cable Landing to Harpers Route

Five archaeological sites lie within greenfield ROWs associated with the CLH Route: 44VB0204, 44VB0361, 44VB0389, 44VB0395, and 44VB0396. All have been determined not eligible for listing on the NRHP. Sites 44VB0389, 44VB0395, and 44VB0396 are associated with Camp Pendleton/SMR. Site 44VB0204 is a historic period trash scatter whose southern extent appears to be intersected by the CLH Route. Site 44VB0361 is a historic farmstead whose southern boundary would be crossed by the route. Site 44VB0389 includes a prehistoric lithic scatter and historic architectural remains. A small portion of the site's northern boundary would be crossed by the CLH Route. Site 44VB0395, which contains both prehistoric lithic and historic artifact scatters, would be within the ROW and associated workspace on the west side of Lake Christine. Finally, 44VB0396 is a historic artifact scatter that would be within the area crossed by the HDD at Lake Christine.

5.5.1.2 Harpers to Fentress Route 1

Five archaeological sites would lie within the ROW for HF Route 1. Two of these have been determined not eligible for the NRHP. The first, 44VB0274, is a prehistoric artifact scatter and remains of a historic farmstead. The other ineligible site, 44VB0314, contains remains from a historic dwelling. One other archaeological site, 44VB0306, is no longer extant. Of the remaining two sites, 44CS0250 has not been evaluated for listing in the NRHP and 44VB0162 has been recommended potentially eligible for listing in the NRHP.

Site 44CS0250 is a multicomponent prehistoric camp crossed by Dominion's existing ROW for Lines #271/I-74. In this area, Dominion would wreck the existing lattice structures within the ROW and install new monopole structures for the onshore Virginia Facilities. The existing ROW is 120 feet wide. An additional 40 feet would be needed for the new transmission infrastructure, for a total ROW width of 160 feet. There are no existing transmission structures within the site boundary. One set of one double-circuit and two single-circuit, monopole structures would be installed within the site along its southern

boundary to accommodate the rebuild of Line #271 and the new transmission circuits required for the onshore Virginia Facilities.

Site 44VB0162, the potentially NRHP-eligible site, consists of a prehistoric camp and a historic period cemetery. HF Route 1 intersects the long axis of 44VB0162 along a greenfield alignment. Two sets of three single-circuit, monopole structures would be installed within the site boundary for the onshore Virginia Facilities. The historic cemetery is in the southwestern corner of the site in a grove of trees about 75 feet south of the ROW associated with the route. The remainder of the site (and possibly the area within the historic cemetery as well) contains materials associated with a prehistoric camp.

5.5.1.3 Harpers to Fentress Route 2

Three archaeological sites (44VB0274, 44VB0275, and 44VB0314) would lie within the ROW for HF Route 2. Two of these, 44VB0274 and 44VB0314, which would also be in the ROW for HF Route 1, have been determined not eligible for listing in the NRHP. As noted above, 44VB0274 consists of a prehistoric artifact scatter and a historic farmstead, while 44VB0314 is associated with a historic dwelling. Site 44VB0275, which is potentially eligible for listing in the NRHP, consists of an antebellum historic trash scatter. One set of thee single-circuit, monopole structures would be installed within the site for this route.

5.5.1.4 Harpers to Fentress Route 5

Eight archaeological sites would be within the ROW for HF Route 5. Three of these (44VB0274, 44VB0280, and 44VB0314) have been determined ineligible for listing in the NRHP. Sites 44VB0274 (a prehistoric artifact scatter and a historic farmstead) and 44VB0314 (associated with a historic dwelling) would also be in the ROW for HF Routes 1 and 2. Site 44VB0280, which is crossed by Dominion's existing transmission ROW for Line #2085, is reported as a late nineteenth/early twentieth century cemetery. When first recorded in 1996 (Stuck and Higgins 1997), the site reportedly contained 12 burials. As noted in Section 4.2.5.1, Cemeteries, however, a 2020 revisit to the site found no headstones, depressions, or any other evidence of burials in this area. While the route would intersect 44VB0280, no transmission structures would be installed within its boundary.[63]

Two unevaluated sites (44CS0016 and 44CS0156) and three potentially eligible sites (44VB0263, 44VB0267, and 44VB0275) would be within the ROW for HF Route 5. The greenfield portion of HF Route 5 would intersect the western extent of 44CS0016, a prehistoric site in an open field. One set of three single-circuit, monopole structures associated with the route would be installed along the site's northwestern boundary. HF Route 5 would intersect the eastern half of 44CS0156, which consists of a multicomponent historic artifact scatter in an open field. No transmission structures would be installed within the site; however, two single-circuit, monopole structures would be installed just north of the mapped site boundary.

Of the potentially eligible sites, 44VB0263 consists of a historic artifact scatter, 44VB0267 is a multicomponent historic trash scatter, and 44VB0275 is a historic trash scatter. Each of these sites is crossed by Dominion's existing transmission ROW for Line #2085. Along this segment of HF Route 5, the existing 120-foot-wide ROW for Line #2085 would be expanded by 90 feet, for a total width of 210 feet. Two single-circuit, monopole structures would be installed within 44VB0263; one single-circuit, monopole structure would be installed within 44VBO267; and two single-circuit, monopole structures would be installed within 42VB0275.

[63] When initially recorded in 1996, the cemetery was identified on the basis of surface observation ("some fallen stones") and informant testimony. The cemetery reportedly contained 12 graves dating from the late nineteenth/early twentieth centuries associated with the Bell family. As noted above, the site form for 44VB0280 in the VCRIS notes that no evidence of burials was observed at the site during a revisit in 2020.

5.5.1.5 Harpers to Fentress Hybrid Route

The HF Hybrid Route would utilize essentially the same alignment as HF Route 1. Thus, the same five archaeological sites would lie within the ROW for the HF Hybrid Route as identified above for HF Route 1 (i.e., 44CS0250, 44VB0162, 44VB0274, 44VB0306, and 44VB0314). All five sites would be crossed by the overhead segment of the HF Hybrid Route; therefore, potential impacts on these sites would be the same as those described in Section 5.5.1.2 for HF Route 1.

5.5.1.6 Dam Neck Route Variation

There are no known archaeological sites along the ROW for the Dam Neck Route Variation.

5.5.1.7 Line # 2085 Route Variation

Four archaeological sites (44VB0263, 44VB0267, 44VB0275, and 44VB0280) would be crossed by the Line #2085 Route Variation along the same alignment as HF Route 5. Impacts on these sites would be as described above for HF Route 5.

5.5.2 Historic Architecture and Other Sites

Several previously recorded historic architectural resources fall within the VDHR study tiers for the alternative transmission line routes and associated facilities. Since portions of several routes follow the same or similar alignments, impacts on some of the historic resources would be the same regardless of the alternative route selected for the onshore Virginia Facilities.

A comparison of the number of resources that would be impacted and the degree of impact on these resources for each alternative transmission line route is presented in Table 5.5-1. As the CLH Route is the only route under consideration between the Cable Landing Location and the site for the Harpers Switching Station, it is the expected route for this segment of the onshore Virginia Facilities and would be built in conjunction with one of the alternative routes south of this point. Among those, and based on desktop analyses and visual simulations, HF Route 1 and the HF Hybrid Route would result in, at most, minimal impacts on the considered resources discussed below. In contrast, HF Route 2 would result in minimal and moderate impacts and HF Route 5 would result in moderate impacts. The Dam Neck Route Variation would have no impacts on historic architectural resources, and the Line #2085 Route Variation would result in severe impacts on two resources. The specific resources affected for each alternative are discussed in the following sections.

No previously recorded historic architectural resources would fall within the switching station sites or the expanded area at the existing Fentress Substation; however, the latter would be within the viewshed of one resource (131-5071).

Table 5.5-1: Comparison of Route Alternative Impacts on Historic Resources in the Study Area of the Proposed Routes

Route Alternative	Number of Considered Resources in Each Impact Category				
	No Impact	Minimal Impact	Moderate Impact	Severe Impact	Total
CLH Route [a]	2	1	0	1	4
HF Route 1	3	3	0	0	6
HF Route 2	3	1	2	0	6
HF Route 5	3	0	3	0	6

Route Alternative	Number of Considered Resources in Each Impact Category				
	No Impact	Minimal Impact	Moderate Impact	Severe Impact	Total
HF Hybrid Route	3	3	0	0	6
Dam Neck Variation	2	0	0	0	2
Line #2085 Variation	0	0	0	2	2

CLH = Cable Landing to Fentress; HF = Harpers to Fentress

[a] *The CLH Route is the only route under consideration between the Cable Landing Location and the Harpers Switching Station site.*

5.5.2.1 Cable Landing to Harpers Route

Four aboveground historic resources were identified within the VDHR study tiers for the CLH Route (Table 5.5-2). Construction and operation of the onshore Virginia Facilities would have no impact on two resources (134-0413-0110 and 134-0917), minimal impact on one resource (134-0003), and a severe impact on one resource (134-0413).

Building 1 in Camp Pendleton (134-0413-0110) would be approximately 0.3 mile northwest of the CLH Route, while the Winford White House (134-0917) would be about 0.4 mile south. Both structures would have no view of the CLH Route due to distance and intervening vegetation; thus, neither resource would be impacted by the CLH Route.

The underground transmission line associated with the CLH Route would run north to south across Oceana Boulevard from the James Bell House (134-0003) property, passing approximately 15 feet from the edge of this resource. Because the CLH Route would be underground, the only impact on the resource would be a minor change to its viewshed due to a slight tree cut across the street from the property, resulting in minimal impact on the resource from this route.

The CLH Route would run east to west through approximately 0.9 mile of 134-0413, the Camp Pendleton SMR Historic District. The eastern portion of the district would not be impacted by the underground route because the circuits would be installed beneath Lake Christine by HDD, a trenchless installation method, which would avoid surface disturbing actives, including clearing. Beyond this HDD, surface trenching for installation of the transmission cables and workspace for a second HDD at General Booth Boulevard would remove trees and vegetation near the western edge of the district, north of the main entrance. In addition to this tree cut, this route would require the demolition of two contributing structures to the district, Buildings 410 and 59.

Building 59 is a mess hall constructed in 1934, during a period in which the State Rifle Range was expanded between World Wars I and II. It is one of nine nearly identical buildings within the district. Building 410 is a fire house constructed between 1940 and 1942. This building is a unique structure, built for a specific purpose during the World War II base expansion. The loss of Building 410 would have a greater impact than the loss of Building 59 on the overall integrity of the district, as the fire house is associated with a specific activity that took place at the base.

Because the destruction of the two contributing structures would be permanent, the CLH Route would have a severe impact on the historic district. As discussed in Section 3.1.1.2, Cable Landing to Harpers Route, Dominion worked cooperatively with SMR staff to develop a route that would minimize impacts on military training/readiness, natural and cultural resources, and future development plans at the base. SMR staff preferred a route requiring the demolition of Buildings 59 and 410 over other potential alignments to preserve landscape elements within the historic district, including trees, which are also

considered as contributing elements. The DMA supported the CLH Route alignment in letters to Dominion dated April 13 and June 24, 2021 (see Appendix C, Correspondence).

Table 5.5-2: Impacts on Historic Resources in the VDHR Study Tiers for the CLH Route

Buffer (miles)	Resource Category	Resource Number	Description	Impact
1.0 to 1.5	National Historic Landmarks	NA	NA	NA
0.5 to 1.0	National Register Properties (Listed)	NA	NA	NA
0.0 to 0.5	National Register Properties (Listed)	134-0413-0110	Building 1	None
	National Register – eligible	134-0917	Winford White House	None
0.0 (within ROW)	National Register – eligible	134-0003	Bell House	Minimal
	National Register Properties (Listed)	134-0413	Camp Pendleton/State Military Reservation Historic District	Severe

CLH = Cable Landing to Harpers; NA = not applicable; ROW = right-of-way; VDHR = Virginia Department of Historic Resources

5.5.2.2 Harpers to Fentress Route 1

Six aboveground resources were identified within the VDHR study tiers for HF Route 1 (Table 5.5-3). The route would have no impact on three resources (134-0038, 134-0702, and 134-0072) and minimal impact on three resources (131-0044, 131-5071, and 131-5333).

The Jonathan Woodhouse House (134-0038), would be approximately 0.5 mile southeast of HF Route 1 where the route would utilize a greenfield alignment. The Thomas Lovett House/Rollingswood Academy (134-0072) would be located about 0.3 mile south of the route and the St. John's Baptist Church (134-0702) would be about 0.9 mile south of the route where the alignment would be within and adjacent to Dominion's existing ROW for Lines #2118/147. For these three resources, there would be no view to the transmission infrastructure along HF Route 1 due to the distance and intervening vegetation and residential subdivisions. Because views to the route would be entirely screened, there would be no impact on these three resources from HF Route 1.

The route would intersect about 500 feet of the Albemarle & Chesapeake Canal (131-0044) and about 0.4 mile of the Albemarle & Chesapeake Canal Historic District (131-5333). In this area, HF Route 1 would be within and adjacent to Dominion's existing ROW for Lines #271/I-74 in an otherwise forested area. As discussed above, the existing lattice structures for Lines #271/I-74 would be wrecked and removed from the ROW and replaced with sets of three monopole structures (one double-circuit and two single-circuit) to carry Line #271 and the three circuits required for the onshore Virginia Facilities. The existing ROW would be expanded from 120 feet wide to 160 feet wide for this installation. The views of the new transmission infrastructure would be noticeable from within the canal due to the widened vegetation cut and addition of transmission structures, which would make the new transmission lines more visible than the existing line that intersects this resource. However, because of the presence of the existing transmission structures and conductors, the orientation of the crossing (mostly perpendicular), and how the majority of views would be obscured by vegetation along either side of the waterway, HF Route 1 would have a minimal impact on the canal and district.

The Centreville-Fentress Historic District (131-5071) would be approximately 175 feet west of HF Route 1 at its nearest point. At this location, HF Route 1 would be within and adjacent to Dominion's existing ROW for Lines #2240/I-74. The existing lattice structures for Lines #2240/I-74 would be wrecked and removed

from the ROW and replaced with sets of three monopole structures (one double-circuit and two single-circuit) to carry Line #2240 and the three circuits required for the onshore Virginia Facilities. The existing ROW would be expanded from 120 feet wide to 160 feet wide for this installation. In addition to the new transmission infrastructure, the expanded Fentress Substation would also be visible from the resource. While the new transmission lines and expanded substation would be visible from multiple points within the historic district, few views would be significantly altered because of the presence of the existing transmission infrastructure, including the substation. Therefore, HF Route 1 would have a minimal impact on the Centreville-Fentress Historic District.

Table 5.5-3: Impacts on Historic Resources in the VDHR Study Tiers for HF Route 1

Buffer (miles)	Resource Category	Resource Number	Description	Impact
1.0 to 1.5	National Historic Landmarks	NA	NA	NA
0.5 to 1.0	Locally Significant Resources	134-0702	St. John's Baptist Church	None
0.0 to 0.5	National Register Properties (Listed)	131-5071	Centreville-Fentress Historic District [a]	Minimal
	Locally Significant Resources	134-0038	Jonathan Woodhouse House/ William Woodhouse House	None
		134-0072	Thomas Lovett House/ Rollingswood Academy	None
0.0 (within ROW)	National Register Properties (Listed)	131-5333	Albemarle & Chesapeake Canal Historic District	Minimal
	National Register – eligible	131-0044	Albemarle & Chesapeake Canal	Minimal

HF = Harpers to Fentress; NA = not applicable; ROW = right-of-way; VDHR = Virginia Department of Historic Resources

[a] *Also within the VDHR 1-mile tier of the Fentress Substation*

5.5.2.3 Harpers to Fentress Route 2

Six aboveground historic resources were identified within the VDHR study tiers for HF Route 2 (Table 5.5-4). The route would have no impact on three of these resources (134-0038, 134-0702, 134-0072), a minimal impact on one resource (131-5071), and a moderate impact on the two resources associated with the Albemarle & Chesapeake Canal (131-0044 and 131-5333).

HF Route 2 would follow the same alignment and use the same design as HF Route 1 where the route would pass near the Jonathan Woodhouse House (134-0038), Thomas Lovett House/Rollingswood Academy (134-0072), St. John's Baptist Church (134-0702), and Centreville-Fentress Historic District (131-5071). Impacts on these resources would be the same as described above in Section 5.5.2.2 for HF Route 1.

HF Route 2 would both cross and parallel the Albemarle & Chesapeake Canal (131-0044) and associated historic district (131-5333) along a greenfield alignment through a heavily forested area. The route would cross an approximately 420-foot-long segment of the canal and a 0.6-mile-long segment of the district on the eastern end of the property (near the North Landing River Bridge). In addition, an approximately 2.8-mile-long segment of the route would parallel the district on the south side of the canal. Trees would be cleared and new transmission structures would be located on either side of the canal crossing, supporting transmission lines that would be seen by vessels from within the canal or vehicular traffic

across the North Landing River Bridge. Overall, the intersected section of the canal would be small in comparison to the resource as a whole. Given the visibility of the transmission lines from the heavily used public bridge and the fact that this alternative route would introduce significant new elements into the viewshed, HF Route 2 would have a moderate impact on the Albemarle & Chesapeake Canal and the associated historic district.

Table 5.5-4: Impacts on Historic Resources in the VDHR Study Tiers for HF Route 2

Buffer (miles)	Resource Category	Resource Number	Description	Impact
1.0 to 1.5	National Historic Landmarks	NA	NA	NA
0.5 to 1.0	Locally Significant Resources	134-0702	St. John's Baptist Church	None
0.0 to 0.5	National Register Properties (Listed)	131-5071	Centreville-Fentress Historic District [a]	Minimal
	Locally Significant Resources	134-0038	Jonathan Woodhouse House/ William Woodhouse House	None
		134-0072	Thomas Lovett House/ Rollingswood Academy	None
0.0 (within ROW)	National Register Properties (Listed)	131-5333	Albemarle & Chesapeake Canal Historic District	Moderate
	National Register – eligible	131-0044	Albemarle & Chesapeake Canal	Moderate

HF = Harpers to Fentress; NA = not applicable; ROW = right-of-way; VDHR = Virginia Department of Historic Resources

[a] *Also within the VDHR 1-mile tier of the Fentress Substation*

5.5.2.4 Harpers to Fentress Route 5

Six aboveground historic resources were identified within the VDHR study tiers for HF Route 5 (Table 5.5-5). Of these, the route would have no impact on three resources (134-0038, 134-0702, 134-0072), a moderate impact on the two resources associated with the Albemarle & Chesapeake Canal (131-0044 and 131-5333), and a moderate impact on the Centreville-Fentress Historic District (131-5071).

HF Route 5 would follow the same alignment and use the same design as HF Route 1 where the route would pass near the Jonathan Woodhouse House (134-0038), Thomas Lovett House/Rollingswood Academy (134-0072), and St. John's Baptist Church (134-0702). Impacts on these resources would be the same as described above in Section 5.5.2.2 for HF Route 1.

HF Route 5 would not directly cross the Albemarle & Chesapeake Canal (131-0044), instead crossing the North Landing River approximately 0.1 mile southeast of the canal on the east side of the North Landing River Bridge; however, the route would intersect approximately 295 feet of the southeast corner of the associated historic district (131-5333). The route would utilize a greenfield alignment through a heavily forested area, creating new vegetation cuts near the canal within a small portion of the district. From the vantage point of vessels exiting the canal, the new transmission structures installed across North Landing River would be visible, but not obtrusive, given that they would be set back from the river and partially screened by dense tree coverings on either side of the waterbody. For the crossing of the district, the tree cut typically would only be seen from vehicles crossing the North Landing River Bridge due to dense vegetation on either side of the waterway. The affected and visible areas would be small in comparison to

each resource as a whole, but given the visibility of new infrastructure from within the canal and nearby areas, HF Route 5 would have a moderate impact on the canal and associated district.

HF Route 5 would differ from the other alternative transmission line routes in relation to the Centreville-Fentress Historic District (131-5071) because of its greenfield alignment on the south side of the district. The other alternative routes in the vicinity of the district would be aligned along Dominion's existing transmission ROW for Lines #2240/I-74, approaching from the north, and passing east of the district, then turning west and running west along the south side of the Battlefield Gold Club to Fentress Substation. In contrast, HF Route 5 would follow a mostly greenfield alignment to the east and south, going around NALF Fentress, and approaching Fentress Substation from the southeast. Near the substation, the route would intersect and follow a short segment of Lines #2240/I-74 beginning at a point about 0.2 mile south of the district boundary and continuing to the substation.

Since HF Route 5 would utilize a greenfield alignment as it approaches Fentress Substation from the south, new transmission structures would be visible from the historic district in an area where none currently exist. The overall visibility of the onshore Virginia Facilities would be greater along this alignment relative to HF Routes 1 and 2, which would approach the district from the north and would entirely be within and adjacent to an existing ROW. For these reasons, HF Route 5 would have a moderate impact on the Centreville-Fentress Historic District.

Table 5.5-5: Impacts on Historic Resources in the VDHR Study Tiers for HF Route 5

Buffer (miles)	Resource Category	Resource Number	Description	Impact
1.0 to 1.5	National Historic Landmarks	NA	NA	NA
0.5 to 1.0	Locally Significant Resources	134-0702	St. John's Baptist Church	None
0.0 to 0.5	National Register Properties (Listed)	131-5071	Centreville-Fentress Historic District [a]	Moderate
	National Register – eligible	131-0044	Albemarle & Chesapeake Canal	Moderate
	Locally Significant Resources	134-0038	Jonathan Woodhouse House/ William Woodhouse House	None
		134-0072	Thomas Lovett House/ Rollingswood Academy	None
0.0 (within ROW)	National Register Properties (Listed)	131-5333	Albemarle & Chesapeake Canal Historic District	Moderate

HF = Harpers to Fentress; NA = not applicable; ROW = right-of-way; VDHR = Virginia Department of Historic Resources

[a] *Also within the VDHR 1-mile tier of the Fentress Substation*

5.5.2.5 Harpers to Fentress Hybrid Route

Six aboveground resources were identified within the VDHR study tiers for the HF Hybrid Route, which includes both underground and overhead segments (Table 5.5-6). The HF Hybrid Route would have no impact on three of these resources (134-0038, 134-0702, 134-0072), a minimal impact on the Centreville-Fentress Historic District (131-5071), and a minimal impact on the two resources associated with the Albemarle & Chesapeake Canal (131-0044 and 131-5333).

The HF Hybrid Route would be underground where it would pass near the Jonathan Woodhouse House (134-0038), Thomas Lovett House/Rollingswood Academy (134-0072), and St. John's Baptist Church (134-0702). Because of the underground installation, as well as intervening vegetation and buildings, there would be no impact on these resources from the HF Hybrid Route.

The overhead segment of the HF Hybrid Route would cross and/or pass near the Albemarle & Chesapeake Canal (131-0044), Albemarle & Chesapeake Canal Historic District (131-5333), and Centreville-Fentress Historic District (131-5071) using the same alignment and design as HF Route 1. Therefore, impacts on these resources would be the same as described above in Section 5.5.2.2 for HF Route 1.

Table 5.5-6: Impacts on Historic Resources in the VDHR Study Tiers for the HF Hybrid Route

Buffer (miles)	Resource Category	Resource Number	Description	Impact
1.0 to 1.5	National Historic Landmarks	NA	NA	NA
0.5 to 1.0	Locally Significant Resources	134-0702	St. John's Baptist Church	None
0.0 to 0.5	National Register Properties (Listed)	131-5071	Centreville-Fentress Historic District [a]	Minimal
	Locally Significant Resources	134-0038	Jonathan Woodhouse House/ William Woodhouse House	None
		134-0072	Thomas Lovett House/ Rollingswood Academy	None
0.0 (within ROW)	National Register Properties (Listed)	131-5333	Albemarle & Chesapeake Canal Historic District	Minimal
	National Register – eligible	131-0044	Albemarle & Chesapeake Canal	Minimal

HF = Harpers to Fentress; NA = not applicable; ROW = right-of-way; VDHR = Virginia Department of Historic Resources

[a] *Also within the VDHR 1-mile tier of the Fentress Substation*

5.5.2.6 Dam Neck Route Variation

Two locally significant resources, 134-0038 and 134-0072, were identified within the VDHR study tiers for the Dam Neck Route Variation. These resources would be between 0.5 and 1.0 mile from the route. Due to the distance from the route as well as intervening vegetation and buildings, there would be no impact on the two resources from the route variation (Table 5.5-7).

Table 5.5-7: Impacts on Historic Resources in the VDHR Study Tiers for the Dam Neck Route Variation

Buffer (miles)	Resource Category	Resource Number	Description	Impact
1.0 to 1.5	National Historic Landmarks	NA	None identified	NA
0.5 to 1.0	Locally Significant Resources	134-0038	Jonathan Woodhouse House/ William Woodhouse House	None

Buffer (miles)	Resource Category	Resource Number	Description	Impact
		134-0072	Thomas Lovett House/ Rollingswood Academy	None
0.0 to 0.5	National Register Properties (Listed)	NA	None identified	NA
	Locally Significant Resources	NA	None identified	NA
0.0 (within ROW)	National Register Properties (Listed)	NA	None identified	NA
	National Register – eligible	NA	None identified	NA

HF = Harpers to Fentress; NA = not applicable; ROW = right-of-way; VDHR = Virginia Department of Historic Resources

5.5.2.7 Line #2085 Route Variation

Two historic architectural resources, the Albemarle & Chesapeake Canal Historic District (131-5333) and Albemarle & Chesapeake Canal (131-0044), were identified within the VDHR study tiers for the Line #2085 Route Variation (Table 5.5-8). The route would cross an approximately 715-foot-long segment of the canal and 0.5-mile-long segment of the district along a greenfield alignment through a forested area at the eastern end of the property, near the North Landing River Bridge. Trees would be cleared and new transmission structures would be located on either side of the canal crossing, which would introduce modern elements to an area that currently contains only the canal itself surrounded by dense vegetation. This route would impact the canal and associated historic district more than the other alternatives (i.e., HF Routes 2 and 5) due to a longer span length across the waterbody, necessitating the use of H-frame structures rather than monopoles, and a wider than typical ROW. Infrastructure along the route would be visible to vehicles crossing the North Landing River Bridge as well as vessels transiting the canal. The new transmission line would introduce a significant change to the setting of the canal and historic district. Because views of the transmission line would be expansive and constitute a noticeable change to the viewshed, the Line #2085 Route Variation would have a severe impact on the two resources.

Table 5.5-8: Impacts on Historic Resources in the VDHR Study Tiers for the Line #2085 Route Variation

Buffer (miles)	Resource Category	Resource Number	Description	Impact
1.0 to 1.5	National Historic Landmarks	NA	NA	NA
0.5 to 1.0	Locally Significant Resources	NA	NA	NA
0.0 to 0.5	National Register Properties (Listed)	NA	NA	NA
	Locally Significant Resources	NA	NA	NA
0.0 (within ROW)	National Register Properties (Listed)	131-5333	Albemarle & Chesapeake Canal Historic District	Severe
	National Register – eligible	131-0044	Albemarle & Chesapeake Canal	Severe

NA = not applicable; ROW = right-of-way; VDHR = Virginia Department of Historic Resources

5.6 Geological Resources

As discussed in Section 4.6, Geological Resources, ERM reviewed publicly available data sets, USGS topographic maps, and historic and recent aerial imagery to identify active and inactive mineral mining operations along and near the routes. One active and two inactive mines were identified near the routes as discussed below.

5.6.1 Mineral Resources

5.6.1.1 Cable Landing to Harpers Route

One inactive mineral operation, a former sandpit labeled on the USGS topographic quadrangle (USGS 2019), is located approximately 200 feet south of approximate MP 2.2 of the CLH Route. Based on available historical aerial imagery (Historic Aerials 2021) and review of DMME and USGS Mineral Resources Data System databases, the sandpit mining operation has not been active since 1982 (DMME 2021; USGS 1996). In addition, the inactive Lilley Pit sand mine is approximately 0.25 mile north of approximate MP 2.0 of the CLH Route. This mine has not been operational since 2017. As such, the CLH Route would not impact any identified mineral resources.

5.6.1.2 Harpers to Fentress Routes

One active mineral operation is within 500 feet of HF Routes 1, 2, and 5 (each from approximate MPs 0.3 to 0.9), the HF Hybrid Route (approximate MPs 0.5 to 1.1), and the Dam Neck Route Variation (approximate MPs 0.0 to 0.2). The Taylor Farm Pit, operated by DWH, Inc., is a sand and gravel operation that the DMME permitted in 2012. According to a publicly available agenda from a City of Virginia Beach public hearing held in March 2016, the mine property owner, Taylor Farms Land Company, LLC, submitted a Conditional Use Permit application to expand the borrow pit area to the north and east (City of Virginia Beach 2016d). Available aerial imagery corroborates that the borrow pit expanded to the north and east between 2016 and 2018. A portion of HF Routes 1, 2, and 5, and the HF Hybrid Route would be within the parcel owned by Taylor Farms Land Company, LLC, but outside the expanded pit footprint and permitted mine area. As such, none of the routes would impact active mineral operations, but could restrict future mining operations within the parcel. No additional active mines are present within 0.25 mile of the routes.

5.7 Environmental Justice

To ensure that the concerns of EJ communities regarding the potential direct and indirect impacts of constructing and operating the onshore Virginia Facilities were understood and considered in the routing process, Dominion designed and implemented an outreach program to identify and engage with communities of color, low income communities, and other underserved communities along and near the alternative routes.

5.7.1 Outreach

Based on the desktop analysis described in Section 4.7, Environmental Justice, as well as coordination with a diverse group of community members, Dominion identified potentially affected EJ communities and houses of faith from which to seek feedback on the alternative routes. These communities and houses of faith were included in the community outreach program implemented for the Project. The potentially affected communities are identified in Table 5.7-1.

Table 5.7-1: Potential Environmental Justice Communities and Proximity to Alternative Transmission Line Routes

Name	Community Description	Approximate Distance and Direction from each Alternative Route or Facility
Virginia Beach		
SeaTack	One of the oldest free African American communities in Virginia Beach and the U.S., this community is located along both sides of Birdneck Road south of I-264	■ CLH Route: 1.0 mile north of MP 1.7
Lincoln Military Housing	Military housing located on USN land at Dam Neck Annex bounded by S. Birdneck Road to the north, Prosperity Road to the West, and Red Wing Lake Golf Course to the south	■ CLH Route: 0.3 mile south of MP 0.6
Derby Run Mobile Home Park	A 277-site mobile home park located southwest of the intersection of Oceana Boulevard and Harpers Road	■ CLH Route: <0.1 mile south of MPs 3.5 to 3.7 ■ HF Route 1: 0.8 mile east of MP 0.0 ■ HF Route 2: 0.8 mile east of MP 0.0 ■ HF Route 5: 0.8 mile east of MP 0.0 ■ HF Hybrid Route: 0.8 mile east of MP 0.0 ■ Harpers Switching Station: 0.8 mile east
Ocean Gate Apartments	A 174-unit rental community that offers apartment homes for restricted income residents; this community is located south of Harpers Road west of the Derby Run Mobile Home Park	■ CLH Route: <0.1 mile south of MPs 3.8 to 4.1 ■ HF Route 1: 0.5 mile east of MP 0.0 ■ HF Route 2: 0.5 mile east of MP 0.0 ■ HF Route 5: 0.5 mile east of MP 0.0 ■ HF Hybrid Route: 0.5 mile east of MP 0.0 ■ Harpers Switching Station: 0.5 mile east
Harpers Square Apartments	A rental community south of Ocean Gate Apartments	■ CLH Route: 0.1 mile south of MPs 3.8 to 4.1 ■ HF Route 1: 0.5 mile east of MP 0.0 ■ HF Route 2: 0.5 mile east of MP 0.0 ■ HF Route 5: 0.5 mile east of MP 0.0 ■ HF Hybrid Route: 0.5 mile east of MP 0.0 ■ Harpers Switching Station: 0.5 mile east
Atlantic Shores Retirement Community	Senior living community located on the north side of Dam Neck Road about 0.8 mile west of its intersection with General Booth Boulevard	■ CLH Route: 0.1 mile south of MPs 3.8 to 4.1 ■ HF Route 1: 2.2 miles east of MP 0.9 ■ HF Route 2: 2.2 miles east of MP 0.9 ■ HF Route 5: 2.2 miles east of MP 0.9 ■ HF Hybrid Route: 2.2 miles east of MP 1.1 ■ Dam Neck Route Variation: 2.2 miles east of MP 0.0
Holland Pines	Residential neighborhood situated between Holland Pines Park to the east and Holland Road to the west; to the south, the community is adjacent to Dominion's existing Line #2118 ROW	■ HF Route 1: <0.1 mile north of MPs 3.4 to 3.9 ■ HF Route 2: <0.1 mile north of MPs 3.4 to 3.9 ■ HF Route 5: <0.1 mile north of MPs 3.4 to 3.9 ■ HF Hybrid Route: <0.1 mile north of MPs 3.6 to 4.1 ■ Dam Neck Route Variation: crosses the community between MPs 2.5 and 2.8

Name	Community Description	Approximate Distance and Direction from each Alternative Route or Facility
Piney Grove Baptist Church	Located within the Holland Pines neighborhood at the northeast corner of Holland Road and Chestwood Drive	■ HF Route 1: 0.1 mile south of MP 3.8 ■ HF Route 2: 0.1 mile south of MP 3.8 ■ HF Route 5: 0.1 mile south of MP 3.8 ■ HF Hybrid Route: 0.1 mile south of MP 4.0 ■ Dam Neck Route Variation: 0.5 mile west of MP 2.7
Courthouse Estates	Residential neighborhood south of North Landing Road, north of Indian River Road, and adjacent to Dominion's existing Line #2085 ROW to the west	■ HF Route 5: adjacent to ROW between MPs 7.1 and 7.9 ■ Line #2085 Route Variation: adjacent to ROW between MPs 1.6 and 2.4
Kempsville Mennonite Church	Located south of North Landing Road and west of Charterhouse Estates, this church also has an elementary school on the property; the church is east of Dominion's existing Line #2085 ROW	■ HF Route 5: adjacent to ROW west of MP 7.1 ■ Line #2085 Route Variation: adjacent to ROW west of MP 1.6
Highland Meadows	Neighborhood located west of Salem Road and east of Highland Parish; Dominion's existing Line #271/I-74 ROW passes through the neighborhood	■ HF Route 1: crosses between MPs 6.6 and 6.9 ■ HF Hybrid Route: crosses between MPs 6.8 and 7.1
Highland Acres	Neighborhood between Highland Meadows to the east and Highland Parish to the west; Dominion's existing Line #271/I-74 ROW passes through the neighborhood	■ HF Route 1: crosses between MPs 6.9 and 7.0 ■ HF Hybrid Route: crosses between MPs 7.1 and 7.2
Highland Parish	Neighborhood west of Highland Acres neighborhood and south of Salem Road; Dominion's existing Line #271/I-74 ROW crosses a 0.1 mile segment of wetland at the southern extent of the neighborhood	■ HF Route 1: crosses between MPs 7.1 and 7.2 ■ HF Hybrid Route: crosses between MPs 7.3 and 7.4
Dewberry Farm	Neighborhood east of Indian River Road and north of Indian River Woods neighborhood; Dominion's existing Line #271/I-74 ROW is adjacent to the neighborhood to the south	■ HF Route 1: crosses between MPs 7.2 and 7.4 ■ HF Hybrid Route: crosses between MPs 7.4 and 7.6
Indian River Woods	Neighborhood east of Indian River Road; Dominion's existing Line #271/I-74 ROW is adjacent to the neighborhood to the north	■ HF Route 1: adjacent between MPs 7.2 and 7.4 ■ HF Hybrid Route: adjacent between MPs 7.4 and 7.6
Indian River Farms	Neighborhood west of Indian River Road and east of Indian River Farms Park; Dominion's existing Line #271/I-74 ROW crosses the neighborhood	■ HF Route 1: crosses between MPs 7.5 and 7.7 ■ HF Hybrid Route: crosses between MPs 7.5 and 7.9
Chesapeake		
True Way Evangelical Mission	Church south of Mt. Pleasant Road (Highway 165) east of Dominion's Line #271/I-74 ROW	■ HF Route 1: 0.1 mile east of MP 11.0 ■ HF Route 2: 0.1 mile east of MP 12.1 ■ HF Hybrid Route: 0.1 mile east of MP 11.2

Name	Community Description	Approximate Distance and Direction from each Alternative Route or Facility
United House of Prayer for All People	Church north of Whittamore Road and east of the Battlefield Golf Club	■ HF Route 1: 0.2 mile east of MP 12.7 ■ HF Route 2: 0.1 mile east of MP 13.7 ■ HF Route 5: 1.2 miles north of MP 18.5 ■ HF Hybrid Route: 0.1 mile east of MP 12.9 ■ Fentress Substation: 1.2 miles east

CLH = Cable Landing to Harpers; HF = Harpers to Fentress; MP = milepost; ROW = right-of-way

To ensure that concerns regarding the potential direct and indirect impacts of the construction and operation of the Virginia Facilities were understood and considered in routing decisions, Dominion designed and implemented a comprehensive and robust outreach program to identify and engage with community stakeholders regardless of environmental justice community status. Input from stakeholder groups regarding community considerations; critical historic and environmental resources; regional development and land use; commercial and recreational fishing; and environmental justice informed the Project design. Enhanced outreach was implemented to encourage meaningful involvement among environmental justice and sensitive communities, in line with the Company's Environmental Justice Policy and stakeholder expectations, in addition to general stakeholder engagement.

Dominion conducted outreach with communities of color and low-income populations at the earliest opportunity to ensure that the outreach efforts for the Project were as comprehensive as possible.

A full listing of Dominion's engagement activities are included in sections III.B, III.J, and III.K of the SCC Appendix.

The general stakeholder outreach program included the following key elements:

- Conducted more than 1,100 outreach encounters with more than 6,500 individuals, including both in-person and virtual meetings with individuals, Homeowner Associations, civic groups, and church congregations to accommodate community availability and solicit feedback from diverse audiences.
- Requested property owner permission to access parcels for surveying activities.
- Established a website, a Project email address, a toll-free Project phone number, and a calendar to schedule meetings with Dominion.
- Sent seven mailings, totaling more than 140,000 pieces.
- Produced and distributed multilingual informational materials to build awareness and solicit feedback about the Project; materials were translated from English to Spanish and Tagalog based on community member feedback on language needs.
- Hosted 10 virtual and in-person public meetings, reaching more than 600 attendees, with event recordings available online.
- Held multiple workshops with the City of Virginia Beach and the City of Chesapeake and other Hampton Roads leaders, as well as participating in local events to "meet the community where they are."
- Utilized an online tool, GeoVoice, which allows the public to view Project maps and leave geo-referenced comments
- Conducted ongoing tours by boat with media, community leaders, business partners and other stakeholders to see the offshore pilot project and proposed wind turbine generation lease area with approximately 1,000 participants to date.
- Hosted in-person and virtual open houses in Virginia Beach and Chesapeake, with event recordings available online.

Dominion began outreach with the communities listed in Table 5.7-1 (shown on Figure 5-1, Appendix J, Environmental Justice Screening Report), by identifying community leaders, homeowners association points-of-contact, or property managers to schedule community meetings and distribute literature. Additionally, Dominion placed yard signs regarding community meetings, met with faith-based organizations within or near those communities, and issued digital media to keep them informed and aware that Dominion is available to discuss any concerns they may have. Information was also distributed to local elected officials and community organizations for inclusion in newsletters.

Community members at large were generally supportive of the Project. The following issues were broadly and consistently raised (it is important to note that this feedback was received from all stakeholders, and not directly attributed solely to potentially impacted EJ communities; through the Company's engagement, the various groups of peoples provided similar feedback):

- Community disruption during construction: Community members requested information on traffic impacts.
- Visual impacts and vegetative screening: Community members wanted to know if overhead transmission structures would be visible, and if so, whether vegetative screening would be a potential mitigation measure.
- Property values: Community members expressed concerns regarding impacts on property values and compensation for relocation/buy out.
- Health: Community members asked if the Project could result in health impacts for residents in close proximity to the transmission line, such as EMF concerns.
- Natural environment: Community members commented that the onshore Virginia Facilities could impact waterways and wildlife.
- Training and job opportunities: Community members inquired about training and job opportunities during construction and operation of the Project.
- Right-of-way: Community members asked if landowners would be fairly compensated for ROW acquisition.
- Existing infrastructure: Community members asked if Dominion would use existing infrastructure or whether all construction would be new.
- Rate increases and service reliability: Community members asked if their electricity rates would increase and whether wind power would affect the reliability of electric service.[64]

5.7.2 Outreach Summary

Dominion implemented an enhanced outreach plan to identify issues of concern raised by populations of color, low-income communities, and special populations. The following categories of concern were identified during community engagement with these populations/communities: permanent and temporary impacts associated with developing facilities in new ROWs in previously undisturbed areas; visual impacts; environmental impacts (waterways and wildlife); health (exposure to electromagnetic fields [EMFs]); construction impacts (traffic and access); property values; and economic impacts (rate increases, compensation for ROW acquisition, and employment opportunities). Much of the outreach with potentially affected EJ communities did not result in actionable feedback. Therefore, based on Dominion's collective EJ outreach approach and engagement, combined with the feedback received from communities at-large, Dominion applied the input received to limit impacts and address concerns where

[64] Information regarding impacts on rates can be found in the Direct Testimony of Company Witness Timothy P. Stuller.

possible and feasible. As such, the following sections use the term "community" in a broad sense and is not necessarily restricted to EJ communities.

5.7.2.1 Routing Opportunities

Dominion sought to maximize the use of existing transmission line and transportation corridors in the routing and sitting of the alternative transmission line routes and associated facilities. It is standard practice in compliance with SCC regulatory guidance to use these routing opportunities to limit the overall impacts of a project (see Section 4.8, Routing Opportunities). As a result of residential growth and expansion, many of the existing ROWs in the area are now encumbered by residential and commercial developments on one or both sides of the corridor. Because of this, Dominion received numerous comments expressing concerns about impacts during construction and operation of the transmission facilities in new ROWs. There was particular concern about the placement of new transmission line facilities in residential areas. Limiting the amount of new ROW, blending the color of the new transmission structures with existing infrastructure, retaining tree buffers adjacent to new and expanded ROWs, and keeping structure heights at the minimum needed to meet safety requirements help address this issue.

As discussed in more detail in Sections 4.8 and 5.8, Routing Opportunities, ERM identified existing corridors through review of recent digital aerial photography, city planning documents, various publicly available data layers, and data from Dominion for its existing transmission lines and associated infrastructure. Existing corridors within the study area include: the SEPG study corridor, electric transmission lines, a pipeline, roads, and railroads. Efforts were made to collocate route alternatives with existing transmission lines and other linear corridor features wherever possible. Tables K-1 and K-2 (Appendix K, Feature Crossing Tables) quantify the use of routing opportunities for each route. The use of routing opportunities along specific areas of each route relevant to potential EJ communities are discussed below.

Approximately 2.6 miles of the CLH Route would utilize routing opportunities, including but not limited to, a 0.6-mile-long segment on NAS Oceana property adjacent to Harpers Road between approximate MPs 3.5 and 4.1. This segment passes directly north of the Derby Run Mobile Home Park, Ocean Gate Apartments, and Harpers Square Apartments. The new ROW in this area, in which the transmission circuits would be installed underground, would generally be 65 feet wide.

HF Routes 1, 2, and 5 would each utilize a segment of Dominion's existing transmission ROW for Lines #2118/147 as a routing opportunity for approximately 1.8 miles in the area between Piney Woods Lane to the east and Holland Road to the west; this area also overlaps with the SEPG study corridor. The existing ROW for Lines #2118/147 is 120-feet-wide. Another 105 feet of expanded ROW on either the north or south sides of the existing corridor would be required to accommodate the additional overhead structures for the new transmission circuits. Overlap with the existing corridor would minimize the amount of expanded ROW where the alternative routes would pass south of the Piney Grove Baptist Church and between the Holland Pines and Christopher Farms neighborhoods.

Approximately 2.9 miles of HF Route 5 would utilize Dominion's existing ROW for Line #2085 as a routing opportunity, where the route would pass west of the Courthouse Estates subdivision and cross the Kempsville Mennonite Church. The existing ROW for Line #2085 is 120-feet-wide. An additional 90 feet of expanded ROW on the west side of the existing corridor would be required to accommodate the additional overhead structures required for the new transmission circuits. Overlap with the existing corridor would minimize the amount of expanded ROW needed in this area.

ERM studied a potential route variation as an alternative to a segment of HF Route 1 and the HF Hybrid Route which would cross the Highland Acres and Highland Meadows, Dewberry Farms, Indian River Woods, and Indian River Farms neighborhoods (see Section 3.2.2, Line #271 Route Variation). Beginning at the point where HF Route 1 and the HF Hybrid Route would intersect Dominion's existing

Lines #271/I-74 near the Princes Anne Athletic Complex, the route variation would follow an alternate alignment to the west/southwest for about 2.0 miles, crossing a mix of private land and land owned by the City of Virginia Beach, and passing around or between the Highland Acres, Highland Parish, Dewberry Farm, Indian River Woods, and Indian River Farms subdivisions. The route variation would intersect and rejoin the HF Route 1 / HF Hybrid Route alignment near the Virginia Beach/Chesapeake boundary. This alternative was dropped because it would create new ROW about 0.2 mile longer than the corresponding segment of the existing Line #271 ROW, would represent a new visual impact to the communities (such as to Highland Parish, Dewberry Farm, Indian River Farms, Indian River Woods, Highland Acres, and Highland Meadows), and would result in the communities being bordered to the north and south by transmission lines.

Dominion identified a solution that would allow the existing 120-foot-wide ROW for Lines #271/I-74 to be used for HF Route 1 and the HF Hybrid Route. Dominion is proposing to remove the existing lattice structures for Lines #271/I-74 and replace them with two monopole structures within the existing 120-foot ROW where HF Route 1 and the HF Hybrid Route cross Highland Acres, Highland Meadows, Dewberry Farms, Indian River Woods, and Indian River Farms neighborhoods. New ROW needs for this solution would be in open spaces and not immediately in private property backyards. Although adding additional structures within this segment of existing ROW, the new structure heights would be comparable to existing heights.

5.7.2.2 Visual Impacts

Community members expressed concern about changes in existing visual conditions if the onshore Virginia Facilities are constructed. The primary routing strategy for minimizing visual impacts was to identify routes that would allow the new transmission infrastructure to blend with existing landscapes to the extent practicable. Mitigation measures include avoiding unique viewsheds, placing structures to take advantage of natural or built screening (e.g., tall trees or buildings), and avoiding the placement of structures directly in front of residences.

ERM evaluated existing visual conditions by identifying visually sensitive areas, describing the landscape and viewer types within the study area (e.g., local residents), and identifying KOPs to represent landscapes, sensitive areas, and viewer types along the routes. Several KOPs were identified near sensitive communities to understand baseline conditions in these areas (see Sections 4.4 and 5.4, Visual Resources).

For HF Routes 1, 2, and 5, KOP 5 was identified to characterize the view facing west along Dominion's existing transmission ROW for Line #2118/147 within the Castleton subdivision towards the Holland Pines neighborhood. Overall, the view from this KOP is dominated by existing utility structures and conductors. The existing ROW in this area would be expanded by 105 feet. Although the new transmission structures would use a different design (and would be taller) than the existing structures, most observers would likely consider the new infrastructure to be similar in appearance to the existing infrastructure and similar to the existing view.

For HF Route 1 and the overhead portion of the HF Hybrid Route, KOPs 12, 13, and 14 provide views towards Dominion's existing transmission ROW for Lines #271/I-74 where the routes would cross or pass between the Highland Meadows, Highland Acres, Dewberry Farms, Indian River Woods, and Indian River Farms neighborhoods. KOP 12 was identified to characterize the view facing southeast from Salem Road just north of the Highland Acres neighborhood. The landscape here is residential amid open, undeveloped lands. HF Route 1 and the HF Hybrid Route would not be visible from this location. KOP 13 was identified to characterize the views from a cul-de-sac within the Highland Parish neighborhood, a high-density residential area. HF Route 1 and the HF Hybrid Route would not be visible from this location.

KOP 14 was identified to characterize the views from Indian River Road looking southeast and south-southwest towards the Indian River Woods and Indian River Farms neighborhoods. The views are largely suburban residential, with landscaped areas surrounding single-family houses. The shape and color of the new structures for HF Route 1 and the HF Hybrid Route would blend somewhat with the existing Line #271/I-74 structures; however, the number of visible structures and conductors would increase (the existing lattice structures would be removed and replaced with sets of two double-circuit monopole structures). Visual changes would be more noticeable at closer distances, but less noticeable where new structures would be near tree lines.

For HF Routes 1 and 2 and the overhead portion of the HF Hybrid Route, KOP 15 was identified to characterize the view from Mt. Pleasant Road near the True Way Evangelistic Mission. The view is dominated by open fields and existing transmission infrastructure associated with Lines #271/I-74. While visible, the wreck of the existing structures and installation of new structures would be consistent with the existing landscape.

5.7.2.3 Environmental Impacts

Comments were received regarding potential impacts on water resources and wildlife. As part of the regulatory review process for the onshore Virginia Facilities, Dominion will complete an evaluation of potential impacts on environmental, cultural, and historical resources. Dominion will continue to engage with local, state, and federal agencies to complete these evaluations and mitigate impacts from construction of the new facilities. In addition, Dominion will obtain all required environmental permits and will comply with applicable permit conditions. Permitting agencies will include the USACE, VDCR, VDEQ, and Virginia Marine Resources Commission. Commenting agencies will include the VDWR and VDHR, among others. Dominion anticipates that impacts would be mitigated through design and construction best practices.

5.7.2.4 Property Values

Concerns were raised that the placement of transmission lines near populations could affect property values. In general, there was concern that the presence of transmission lines in the viewshed of homes could adversely affect aesthetics resulting in a reduction of property values and deterring potential buyers. Indirect impacts on property values caused by direct visual impacts of high-voltage transmission lines (i.e., lines carrying more than 69 kV) depend on proximity, visibility, size and type of transmission structures, easement landscaping, and surrounding topography. As noted, to the extent practicable, the routes would utilize existing transmission lines and other routing opportunities to minimize impacts from the creation of new ROWs. Based on peer-reviewed and industry research published in peer-reviewed journals and trade journals, residential property values and sales prices primarily are affected by factors unrelated to the presence of a transmission line. Other factors, such as location, type and condition of improvements to the property, neighborhood, and local real estate market conditions, are shown through research to have greater influence on the value of residential property than the presence of a transmission line (Jackson and Pitts 2010; Anderson et al. 2017).

5.7.2.5 Health

Community members stated their concerns about the potential health effects of living in proximity to electric transmission lines. Scientific evidence does not show that common sources of EMF in the environment, including transmission lines and other parts of the electric system, are a cause of any adverse health effects.

The conclusions of multidisciplinary scientific review panels assembled by national and international scientific agencies during the past two decades are the foundation of Dominion's opinion that no adverse

health effects would result from the operation of the transmission infrastructure.[65] The general scientific consensus of agencies that have reviewed this research, relying on generally accepted scientific methods, is that common sources of EMF in the environment, including from transmission lines and other parts of the electric system, appliances, etc., are a cause of any adverse health effects.

Typical levels of EMF from Dominion's power lines outside its property and ROWs are far below the screening reference levels of EMF recommended for the general public, and still lower than exposure limits on fields within the body (ICNIRP 2010; ICES 2019). Therefore, based on the conclusions of scientific reviews and the levels of EMF associated with transmission lines, Dominion has determined that no adverse health effects are anticipated from transmission line operation.

EMF is a common concern raised around power delivery infrastructure, and when concerns arise, Dominion representatives have addressed these concerns directly through conversations with stakeholders and in other public forums. Dominion engaged two EMF experts to attend outreach meetings in Virginia Beach and Chesapeake to answer detailed questions about EMF concerns from the public.

5.7.2.6 Training and Job Opportunities

Since the Virginia Clean Economy Act (the Act) became effective on July 1, 2020, Dominion has worked to implement the hiring and economic development objectives of the law with respect to the Project. The Company's approach was twofold: (1) understand the magnitude of economic benefits, including job creation and state and local tax revenue, that would accrue from construction and operation of an offshore wind installation off the Virginia coast and associated onshore facilities; and (2) identify and engage strategic partners with the capability and resources to support Dominion's efforts to achieve the Act's objectives. While the Act's plan requirements appear to limit the focus on a plan related to "constructing" an offshore wind facility, Dominion's plan embraces a more comprehensive approach that also includes the longer-term operation of these facilities.

In short, Dominion's plan focuses on fostering and leading widespread and ongoing community, workforce, business/industry, governmental, and stakeholder outreach and engagement, with the goal of obtaining business, training, and hiring commitments and actions from key actors related to the Project and the offshore wind industry (i.e., supply chain) in Virginia. Dominion is cognizant that its actions alone under this plan will not produce the desired economic development and jobs impacts desired; it will require action from all of the groups, and individuals therein, to work collectively to achieve the Commonwealth of Virginia's policies, as outlined in Va. Code § 56-585.1:11 D, and the shared goals.

5.7.2.7 Construction Activities

Impacts due to construction of the onshore Virginia Facilities would be temporary, lasting about two years. Various regulations, industry standards, and best management practices would guide construction within and restoration of the ROW. The temporary impacts associated with construction could include equipment noise, potential changes in traffic patterns, and ground disturbance.

Noise is generally defined as unwanted sound. The primary noise receptors in the vicinity of construction activities would be residents or individuals using recreational facilities. During construction, temporary, localized noise from heavy equipment and increased vehicle traffic would be expected to occur along the and near the ROW during daytime hours. Construction activity and crews would be present at a particular

[65] Agencies include European Health Risk Assessment Network on Electromagnetic Fields Exposure, the International Commission on Non-Ionizing Radiation Protection, the World Health Organization, the Institute of Electrical and Electronics Engineers' (IEEE's) International Committee on Electromagnetic Safety, the Scientific Committee on Emerging and Newly Identified Health Risks of the European Commission, and the Swedish Radiation Safety Authority.

location during daytime hours for a few to several days at a time, but on multiple occasions throughout the construction period between initial ROW clearing and final restoration.

Construction could occasionally cause lanes or roadways to be closed, although these closures would only last for the duration of the construction activity in a given area. Construction equipment and delivery vehicles would increase traffic along roadways near the selected route, with effects lasting from a few minutes to a few hours, depending upon the complexity and duration of the specific construction activity. Drivers in nearby areas could experience increased travel times. The primary means of mitigating potential impacts on traffic is to develop a traffic plan, if necessary, by coordinating with city highway departments and by taking into account the need for roadways to be safely operated and maintained.

During construction, Dominion would minimize ground disturbing activities to the extent possible. Following construction, Dominion would remove constructed-related equipment and debris from the ROW. Dominion would work closely with landowners to determine appropriate methods for restoring surface soils and to identify appropriate seeds mixes for restoration.

5.7.3 Summary

Potential EJ communities were identified in proximity to the Virginia Facilities through a desktop review. Ground truthing efforts included conducting site visits to each identified EJ neighborhood by Dominion representatives to confirm the results of the desktop study, identifying potential additional sensitive areas by staff with local knowledge of Dominion's service territory, and incorporating insights from a community-based advisory group. This information was used in the development and refinement of the transmission line routes for the Virginia Facilities.

In particular, ERM and Dominion made a concerted effort to minimize impacts by identifying underground routing opportunities, maximizing collocation opportunities by using existing ROW wherever practicable, routing across undeveloped land, and when possible, avoiding residential areas to minimize impacts on potential environmental justice communities.

The CLH Route is proposed to be built underground in response to structure height restrictions on USN lands (see Section 3.1.1.2, Cable Landing to Harpers Route), but that decision has the added benefit of reducing potential visual impacts to several nearby EJ neighborhoods. In addition, the decision to rebuild the existing double-circuit, lattice structures for Lines #271/I-74 and replace them with two new double-circuit, monopole structures in the densely developed residential area in the vicinity of Salem and Indian River roads is an engineering solution that allows the existing 120-foot-wide ROW to support the additional transmission lines needed for this Project in this area. This precludes the need to expand the existing ROW and also avoids having to develop a completely new ROW alignment, which would create new impacts to the neighborhoods in this area.

Outreach with potential EJ communities was initiated in January 2021 and represents a 10-month effort to identify, learn about, and engage with potential EJ community residents and EJ-interested stakeholder groups. An initial list of potential EJ communities was developed based on desktop screening and stakeholder feedback. All identified sensitive areas have been (or were attempted to be) contacted directly by Dominion to provide Project information and request feedback. Dominion tailored the outreach effort to best meet community needs (e.g., meetings scheduled according to community availability).

Enhanced outreach to EJ areas and sensitive receptors includes contacting property managers to ensure materials reach residents of multi-family housing, contacting houses of faith, promoting GeoVoice as a tool for public feedback (i.e., the opportunity for meaningful participation), and offering presentations or more information where requested. Based on the feedback received to date, the routing choices made, the implementation of best management practices for routing and construction, and studies completed to date (e.g., visual assessment), the onshore Virginia Facilities would not result in significant adverse and

disproportionate impacts on EJ communities. Nonetheless, Dominion is committed to ongoing engagement with EJ communities along the selected alternative, and to addressing outstanding concerns.

In summary, Dominion's work to identify, access, ground truth, and engage with EJ communities (and all of the communities) in the vicinity of the proposed Virginia Facilities has allowed for a robust identification of potential EJ communities that could be affected, and has created opportunity for the meaningful involvement and participation of such communities, as envisioned by the federal requirements and the Virginia Environmental Justice Act. This engagement has provided Dominion with important information to assist in routing alternatives, as well as identifying ways to mitigate unavoidable effects.

5.8 Routing Opportunities

ERM identified potential routing opportunities (i.e., existing linear corridor features and the SEPG corridor) within the study area through review of recent digital aerial photography, city planning documents, data on Dominion's existing transmission system, and various publicly available data layers.

5.8.1 Cable Landing to Harpers Route

Approximately 2.6 miles (59 percent) of the CLH Route would utilize collocation routing opportunities, including:

- 0.5 mile adjacent to Bells Road or Birdneck Road between approximately MPs 1.3 and 1.8;
- 0.1 mile within the SEPG corridor between approximately MPs 2.3 and 2.4;
- 0.5 mile within the SEPG corridor *and* adjacent to Oceana Boulevard between approximately MPs 2.4 and 2.9; and
- 1.5 miles adjacent to Oceana Boulevard or Harpers Road between approximately MPs 2.9 and 4.4.

5.8.2 Harpers to Fentress Route 1

Approximately 13.1 miles (92 percent) of HF Route 1 would utilize collocation routing opportunities, including:

- 3.3 miles within the SEPG corridor between approximately MPs 0.4 and 0.5, MPs 0.9 and 1.4, MPs 1.8 and 2.3, and MPs 4.1 and 6.2;
- 1.8 miles within the SEPG corridor *and* within and adjacent to Dominion's existing transmission ROW for Lines #2118/147 between approximately MPs 2.3 and 4.1;
- 7.8 miles within and adjacent to Dominion's existing transmission ROWs for Lines #271/I-74 or Lines #2240/I-74 between approximately MPs 6.3 and 14.0; and
- 0.2 mile adjacent to the Chesapeake & Albemarle Railroad between approximately MPs 14.0 and 14.2.

Additionally, another approximately 0.8 mile of the route would be outside of, but adjacent to, the SEPG corridor between approximately MPs 0.5 and 0.9 and MPs 1.4 and 1.8. These segments would leave the SEPG corridor to parallel property lines, align the route along the edge of agricultural fields, or avoid other constraints along the route.

5.8.3 Harpers to Fentress Route 2

Approximately 7.9 miles (52 percent) of HF Route 2 would utilize collocation routing opportunities, including:

- 2.6 miles within the SEPG corridor between approximately MPs 0.4 and 0.5, MPs 0.9 and 1.4, MPs 1.8 and 2.3, and MPs 4.1 and 5.5;
- 1.8 miles within the SEPG corridor *and* within and adjacent to Dominion's existing transmission ROW for Lines #2118/147 between approximately MPs 2.3 and 4.1;
- 3.3 miles within and adjacent to Dominion's existing transmission ROWs for Lines #271/I-74 or Lines #2240/I-74 between approximately MPs 11.8 and 15.0; and
- 0.2 mile adjacent to the Chesapeake & Albemarle Railroad between approximately MPs 15.0 and 15.2.

Another approximately 0.8 mile of the route would be outside of, but adjacent to, the SEPG corridor between approximately MPs 0.5 and 0.9 and MPs 1.4 and 1.8. These segments would leave the SEPG corridor to parallel property lines, align the route along the edge of agricultural fields, or avoid other constraints along the route.

5.8.4 Harpers to Fentress Route 5

Approximately 7.5 miles (37 percent) of HF Route 5 would utilize collocation routing opportunities, including:

- 2.6 miles within the SEPG corridor between approximately MPs 0.4 and 0.5, MPs 0.9 and 1.4, MPs 1.8 and 2.3, and MPs 4.1 and 5.5;
- 1.8 miles within the SEPG corridor *and* within and adjacent to Dominion's existing transmission ROW for Lines #2118/147 between approximately MPs 2.3 and 4.1;
- 2.9 miles within and adjacent to Dominion's existing transmission ROW for Line #2085 between approximately MPs 5.5 and 8.3; and
- 0.2 mile adjacent to the Chesapeake & Albemarle Railroad between approximately MPs 22.0 and 22.2.

Another approximately 0.8 mile of the route would be outside of, but adjacent to, the SEPG corridor between approximately MPs 0.5 and 0.9 and MPs 1.4 and 1.8. These segments would leave the SEPG corridor for short distances to parallel property lines, align the route along the edge of agricultural fields, or avoid other constraints along the route.

5.8.5 Harpers to Fentress Hybrid Route

Approximately 13.1 miles (92 percent) of the HF Hybrid Route would utilize the same collocation routing opportunities listed above for HF Route 1, including:

- 3.3 miles within the SEPG corridor between approximately MPs 0.7 and 0.8, MPs 1.1 and 1.6, MPs 2.0 and 2.5, and MPs 4.3 and 6.4;
- 1.8 miles within the SEPG corridor *and* within and adjacent to Dominion's existing transmission ROW for Lines #2118/147 between approximately MPs 2.5 and 4.3;

- 7.8 miles within and adjacent to Dominion's existing transmission ROWs for Lines #271/I-74 or Lines #2240/I-74 between approximately MPs 6.4 and 14.1; and
- 0.2 mile adjacent to the Chesapeake & Albemarle Railroad between approximately MPs 14.1 and 14.3.

Additionally, another approximately 0.6 mile of the route would be outside of, but adjacent to, the SEPG corridor between approximately MPs 0.8 and 1.0 and MPs 1.6 and 2.0. These segments would leave the SEPG corridor to parallel property lines, align the route along the edge of agricultural fields, or avoid other constraints along the route.

5.8.6 Dam Neck Route Variation

Approximately 1.7 miles (61 percent) of the Dam Neck Route Variation would be adjacent to Dam Neck Road between approximate MPs 0.0 and 1.7.

5.8.7 Line #2085 Route Variation

Approximately 2.7 miles (61 percent) of the Line #2085 Route Variation would be within and adjacent to an existing Dominion transition ROW for Line #2085 between approximate MPs 0.0 and 2.7.

6. COMPARISON OF ALTERNATIVES

This section of the routing study provides a comparative analysis of the advantages and disadvantages of the alternative transmission line routes (Section 6.1) and route variations (Section 6.2). Because the CLH Route is the only alignment for the underground transmission line between the Cable Landing Location and Harpers Switching Station site (as discussed in Section 3, Onshore Virginia Facilities), it is not discussed below.

6.1 Route Alternatives

A comparison of the advantages and disadvantages of HF Routes 1, 2, and 5, and the HF Hybrid Route is provided in the subsections below. The potential environmental impacts associated with each route are quantified in Table K-1 (Appendix K, Feature Crossing Tables).

6.1.1 Route Length and Construction Footprint

Of the overhead routes, HF Route 1 would be the shortest in overall length. At 14.2 miles, it would be 1.0 mile shorter than HF Route 2 and 6.0 miles shorter than HF Route 5. HF Route 1 additionally would have the smallest overall footprint of the overhead routes, requiring less new or expanded ROW than HF Routes 2 or 5. HF Route 1 would encompass 295.5 acres, of which 134.0 acres would be existing Dominion ROW and 161.5 acres would be new or expanded ROW. In contrast, HF Route 2 would encompass 306.9 acres (68.5 acres of existing Dominion ROW and 238.4 acres of new or expanded ROW), and HF Route 5 would encompass 384.3 acres (38.4 acres of existing Dominion ROW and 346.0 acres of new or expanded ROW).[66] Thus, HF Route 1 would require 76.9 acres and 184.5 acres less of new or expanded ROW than HF Routes 2 or 5, respectively.

While HF Route 1 and the HF Hybrid Route would each measure 14.2 miles in length, the footprint for the HF Hybrid Route would be about 1.9 acres smaller than the footprint for HF Route 1. The HF Hybrid Route would encompass approximately 293.6 acres, of which 134.8 acres would be existing Dominion ROW and 158.8 acres would be new or expanded ROW.[67] Approximately 4.5 miles of the HF Hybrid Route would be installed underground which would require a narrower ROW than the overhead installation along the corresponding overhead segment of HF Route 1.[68] The Chicory Switching Station site associated with the HF Hybrid Route would be about 10.8 acres larger than the Harpers Switching Station site associated with HF Route 1, however, which would make up some of the difference in area due to the different ROW widths along parts of the two routes.[69]

6.1.2 Routing Opportunities

HF Route 1 and the HF Hybrid Route would each utilize more routing opportunities than either HF Route 2 or HF Route 5. Approximately 13.1 miles of HF Route 1 and the HF Hybrid Route alignments (92 percent of each route) would be collocated with existing corridors, including primarily the SEPG study corridor owned by the City of Virginia Beach, existing Dominion transmission ROWs, or a railroad. This compares with 7.9 miles (52 percent) for HF Route 2 and 7.5 miles (37 percent) for HF Route 5.

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[66] For each overhead route, these values include the Harpers Switching Station and expanded Fentress Substation.

[67] These values include the Chicory Switching Station and expanded Fentress Substation as well as areas along the route that would be crossed by HDD or microtunnel.

[68] With the exception of HDD or microtunnel installations, which would require a 250-foot-wide or greater ROW.

[69] The additional 10.8 acres would be used for temporary workspace during construction and for stormwater management during operations. Construction of the Harpers Switching Station is not expected to require additional temporary workspace for construction. Stormwater management facilities for the Harpers Switching Station site have not been determined.

Regarding the SEPG corridor, as noted in Section 4.8.1, Southeast Parkway and Greenbelt Corridor, staff from the City of Virginia Beach expressed a preference for routing the new transmission infrastructure within this corridor, where feasible, over other alignments. In a letter from the Mayor of the City of Virginia Beach, the City further indicated its preference for routing alignments that avoided private lands and used existing ROWs and public lands (see Appendix C, Correspondence). HF Route 1 and the HF Hybrid Route would each make greater use of the SEPG corridor than either HF Routes 2 or 5. HF Route 1 and the HF Hybrid Route would each be within the SEPG corridor for approximately 5.1 miles (36 percent), compared with 4.4 miles each for HF Routes 2 and 5 (29 percent and 22 percent, respectively).

The SCC's routing guidelines prioritize the use of existing ROWs for expanded or new transmission infrastructure.[70] More of HF Route 1 and the HF Hybrid Route would be within and adjacent to existing Dominion transmission ROWs than either HF Routes 2 or 5. HF Route 1 and the HF Hybrid Route would each be within and adjacent to existing transmission ROWs for 9.6 miles (68 percent), compared with 5.1 miles (34 percent) for HF Route 2 and 4.7 miles (23 percent) for HF Route 5.[71] Moreover, for HF Route 1 and the HF Hybrid Route, nearly the entire alignment in the City of Chesapeake (about 6.0 miles of each route) would be within and adjacent to an existing transmission ROW. In comparison, HF Routes 2 and 5 would each include substantial greenfield routing (about 3.4 miles and 9.2 miles, respectively) in Chesapeake.

6.1.3 Land Ownership

Land ownership along the four routes consists of a mix of federal (USN and USACE) lands, City of Virginia Beach and City of Chesapeake lands, and privately owned parcels. Short segments (approximately 0.1 mile long) of HF Routes 1, 2, and 5, as well as the associated Harpers Switching Station, would be on USN lands at NAS Oceana, encompassing about 21.9 acres of new ROW and switching station footprint. The HF Hybrid Route would cross about 0.3 mile of USN land at NAS Oceana affecting approximately 2.0 acres, and would not require a switching station at this location. As noted elsewhere in this study, the USN supported the route for the transmission circuits and the Harpers Switching Station site within NAS Oceana in a letter to Dominion dated August 17, 2021 (see Appendix C, Correspondence).

In addition to NAS Oceana, HF Route 5 would cross approximately 1.8 miles of USN land encompassing 30.3 acres of new ROW at NALF Fentress. The USN support letter dated August 17, 2021 does not address this crossing. None of the other routes would cross NALF Fentress.

Each route would cross USACE lands across or near the Intracoastal Waterway. HF Route 1 and the HF Hybrid Route would each cross 0.4 mile, encompassing 5.3 acres of existing ROW and 1.8 acres of expanded ROW, where the routes would be within and adjacent to Dominion's existing transmission corridor for Lines #271/I-74. In contrast, HF Route 2 would cross 0.7 mile of USACE land northwest of the North Landing River Bridge along a new, greenfield alignment. This route would encompass 12.4 acres of USACE lands, all of which would be new ROW. HF Route 5 would have the shortest crossing of USACE lands at 0.1 mile, intersecting a short segment on the west side of North Landing Road south of the Intracoastal Waterway canal along a greenfield alignment. This route would encompass about 1.0 acre of new ROW on the USACE parcel.

The key factor differentiating the alternative routes within USACE lands is that the crossing of USACE lands along HF Route 1 and the HF Hybrid Route would be within and adjacent to an existing

[70] That is consistent with the Virginia Code's requirement that before acquiring any new ROW for transmission lines, Dominion must consider the availability of using its existing ROW (Va. Code § 56-259(C)).

[71] For all four routes, the length within and adjacent to existing Dominion transmission ROWs includes a 1.8-mile-long segment that also would be within the SEPG corridor.

transmission ROW whereas the other routes would require the creation of a new ROW across the Intracoastal Waterway. Further, during initial discussions with USACE regarding routing across the Intracoastal Waterway, the USACE indicated a preference for the crossing associated with HF Route 1, due to lessened visual impacts in light of collocating with existing transmission facilities. It also indicated that due to planned bridge work in the area of the crossing for HF Routes 2 and 5, as well as likely greater visual impacts, it did not favor a crossing in those areas.

Crossings of city-owned lands for the onshore transmission infrastructure were considered an advantage given the support for the Project, including the onshore Virginia Facilities, from the City of Virginia Beach and the City of Chesapeake. In a letter from the Mayor of the City of Virginia Beach, for example, the City indicated its preference for routing alignments that avoided private lands and used existing ROWs and public lands (Appendix C, Correspondence). HF Route 1 and the HF Hybrid Route would each cross 4.4 miles of lands owned by the City of Virginia Beach and 1.9 miles of lands owned by the City of Chesapeake for a total of 6.3 miles of land owned by the cities. For HF Route 1, the crossings would encompass 108.0 acres, consisting of 38.1 acres of existing Dominion ROW and 69.9 acres of new or expanded ROW. For the HF Hybrid Route, the crossings would encompass 106.5 acres, consisting of 40.2 acres of existing Dominion ROW and 66.3 acres of new ROW. For both routes, the crossings of lands owned by the City of Virginia Beach would mostly be within the SEPG corridor, which as noted above, the City prefers routing the new transmission infrastructure over other potential alignments. This includes a 1.8-mile-long segment that also would be within and adjacent to Dominion's existing ROW for Lines #2118/147. In Chesapeake, crossings of lands owned by the City of Chesapeake along HF Route 1 and the HF Hybrid Route would occur entirely where the route is within and adjacent to Dominion existing transmission ROWs for Lines #271/I-74 and Lines #2240/I-74.

HF Routes 2 and 5 would each cross slightly more land owned by the City of Virginia Beach, but less land owned by the City of Chesapeake, resulting in fewer miles overall on parcels owned by the cities compared to HF Route 1 and the HF Hybrid Route. HF Route 2 would cross 5.0 miles of land owned by the City of Virginia Beach and 0.7 mile of land owned by the City of Chesapeake (5.7 miles total), encompassing a combined 94.3 acres (14.0 acres of existing Dominion ROW and 80.3 acres of new or expanded ROW). About a third of the HF Route 2 alignment on lands owned by the City of Virginia Beach (1.8 miles) would be along a greenfield alignment, with the remainder mostly within the SEPG corridor. HF Route 5 would cross 5.7 miles of land owned by the City of Virginia Beach and less than 0.1 mile of land owned by the City of Chesapeake, encompassing a combined 94.0 acres, including 19.6 acres of existing Dominion ROW and 74.2 acres of new or expanded ROW. The crossings of lands owned by the City of Virginia Beach along HF Route 5 would mostly be within or adjacent to the SEPG corridor and/or adjacent to existing Dominion transmission ROWs.

On balance, and relative to HF Routes 2 and 5, HF Route 1 and the HF Hybrid Route would cross the most miles of lands owned by the cities, while maximizing use of the SEPG corridor and existing transmission ROWs. HF Route 1 (38.1 acres) and the HF Hybrid Route (40.2 acres) would each utilize more existing Dominion transmission ROWs on lands owned by the cities than either HF Routes 2 or 5 (14.0 acres and 19.6 acres, respectively). Conversely, HF Route 1 (at 69.9 acres) and the HF Hybrid Route (at 66.3 acres) would require less new or expanded ROW on lands owned by the cities than HF Routes 2 or 5 (80.3 acres and 74.2 acres, respectively).

HF Route 1 and the HF Hybrid Route would each cross about 0.3 mile of TNC lands (encompassing 4.5 acres of existing Dominion ROW and 1.5 acres of expanded ROW) in two parcels on either side of the Intracoastal Waterway canal (i.e., in the Gum Swamp area) where the routes would be within and adjacent to Dominion's existing corridor for Lines #271/I-74. While TNC owns additional lands along the Intracoastal Waterway canal and North Landing River, including near the areas that would be crossed by

HF Routes 2 and 5, the alignments of these routes would avoid the TNC parcels, which include deed restrictions limiting new development.[72]

In meetings within Dominion, TNC expressed a preference for HF Route 1 or the HF Hybrid Route over the other alternatives. Thereafter, on October 29, 2021, TNC sent Dominion a letter expressing its support for HF Route 1 in the form of committing to provide Dominion the necessary easement of its property to expand the existing ROW to accommodate HF Route 1 (see Appendix C, Correspondence). Among other things, due to the high ecological values of its and other lands near the crossings for HF Routes 2 and 5, TNC found HF Routes 2 and 5 less favorable because they would create new transmission ROWs across forested wetlands on either side of the Intracoastal Waterway canal and/or North Landing River. See the discussions in Sections 6.1.5.5, Forest Fragmentation, and 6.1.5.6, Ecological Cores, regarding impacts on these areas.

Other than TNC lands, HF Route 1 and the HF Hybrid Route would each cross less private lands than either HF Routes 2 or 5. HF Route 1 would cross 3.2 miles of private land in Virginia Beach and 3.6 miles of private land in Chesapeake (total of 6.8 miles), encompassing a combined 147.0 acres (83.9 acres of existing ROW and 63.1 acres of new or expanded ROW). The HF Hybrid Route would cross 3.1 miles of private land in Virginia Beach and 3.6 miles of private land in Chesapeake (total of 6.7 miles), encompassing 166.1 acres (82.7 acres of existing ROW and 83.4 acres of new or expanded ROW). A key difference in the crossings of private lands for the two routes, and the reason the footprint for the HF Hybrid Route on private lands would be larger, is that the Chicory Switching Station site associated with the HF Hybrid Route would be on private land. In contrast, the Harpers Switching Station site associated with HF Route 1 would be on USN land as discussed above.

HF Routes 2 and 5 would each cross and encompass more private lands than either HF Route 1 or the HF Hybrid Route. HF Route 2 would cross 2.9 miles of private land in Virginia Beach and 5.6 miles of private land in Chesapeake (total of 8.5 miles), encompassing 173.7 acres (53.6 acres of existing Dominion ROW and 120.1 acres of new or expanded ROW). HF Route 5 would cross 4.6 miles of private land in Virginia Beach and 7.4 miles of private land in Chesapeake (total of 12.0 miles), encompassing 229.4 acres (18.2 acres of existing ROW and 211.1 acres of new or expanded ROW). HF Routes 2 and 5 would each utilize less existing ROW and more new or expanded ROW on private lands than either HF Route 1 or the HF Hybrid Route.

Regarding individual private parcels, HF Route 2 would cross fewer parcels (58) than HF Routes 1 or 5 or the HF Hybrid Route (92, 88, and 95 parcels, respectively). Relative to HF Route 1 and the HF Hybrid Route, this is indicative of more rural areas with fewer and larger parcels along HF Route 2, particularly between MP 5.5 in Virginia Beach and MP 11.8 in Chesapeake. This area of HF Route 2 would include a crossing of the ITA in Virginia Beach (mostly agricultural or forested lands) as well as the route segment paralleling the south side of the Intracoastal Waterway canal in Chesapeake (mostly forested). Relative to HF Route 5, the difference in parcels crossed is indicative of the shorter length of HF Route 2, which is 5.0 miles shorter than HF Route 5.

6.1.4 Land Uses

6.1.4.1 Land Use/Land Cover

Land use/land cover types along and within the alternative transmission line routes and associated facilities (i.e., developed land, open space, forested land, agricultural land, and open water) are quantified in Table K-1 (Appendix K, Feature Crossing Tables). Installation of the onshore transmission lines would

[72] The crossings of TNC lands along HF Route 1 and the HF Hybrid Route would require approval from TNC and the FWS; however, as noted in this section, TNC prefers these routes over the alternative routes.

not substantively alter existing land uses or cover types in developed lands, open space, agricultural lands, and open water areas; therefore, potential impacts in these areas would not meaningfully differentiate the alternative routes.[73] In forested areas, installation of the transmission lines would result in a permanent change in existing conditions (from forested lands to open space) within the maintained ROW. Installation of the switching station at either the Harpers or Chicory site and expansion of the existing Fentress Substation would permanently convert existing land uses (currently forested, developed, and/or open space) to developed land within the maintained facility site.

Forested lands are highly valued for the benefits they provide, including watershed and riparian buffers, wildlife habitat, enhanced biodiversity, carbon sequestration, water filtration, flood control/protection, and aesthetic appeal. Of the three overhead alternatives, HF Route 1 (and the associated Harpers Switching Station site) would have less impact on forested lands than either HF Routes 2 or 5. HF Route 1 would cross about 4.2 miles of forested lands, encompassing 101.2 acres (including 0.9 acre of existing ROW and 100.3 acres of new or expanded ROW). In contrast, HF Route 2 would cross 8.4 miles of forest, encompassing 156.9 acres (0.9 acre of existing ROW and 156.0 acres of new or expanded ROW); and HF Route 5 would cross 10.7 miles of forest, encompassing 191.0 acres (0.9 acre of existing ROW and 190.1 acres of new or expanded ROW).

Based on the above, HF Route 1 would impact 55.7 acres less forest than HF Route 2 and 89.8 acres less forest than HF Route 5. The difference between the routes is due to the shorter length of HF Route 1 and better utilization of routing opportunities, particularly existing cleared transmission ROWs, than the other two overhead routes. In particular, the overlap of HF Route 1 with Dominion's existing ROW for Lines #271/I-74 (particularly between approximate MPs 6.2 and 10.8, the area within Gum Swamp) would minimize the amount of forested clearing required along this alignment. In this area, the existing ROW would be expanded by just 40 feet. In contrast, HF Routes 2 and 5 would each cross long segments of forested lands along greenfield alignments requiring tree clearing within a 140-foot-wide corridor.

HF Route 1 and the HF Hybrid Route would have nearly identical impacts on forested lands at 101.2 acres and 101.1 acres, respectively. While approximately 4.5 miles of the HF Hybrid Route would be installed underground in a narrower corridor than the corresponding segment of HF Route 1, the Chicory Switching Station site would be larger and contain more forested land than the Harpers Switching Station site, which would make up for most of the difference in the amount of forested land affected by the two routes.

In meetings with Dominion, staff from the City of Virginia Beach said that impacts on forested lands on City-owned parcels would be a factor in the City's review of the alternative transmission line routes for the onshore Virginia Facilities. Each of the routes would affect similar amounts of forested lands on City-owned parcels in Virginia Beach, with HF Route 5 affecting the least (43.1 acres) and HF Route 2 affecting the most (47.3 acres). HF Route 1 and the HF Hybrid Route would affect 46.2 acres and 44.0 acres, respectively. Therefore, crossings of forested lands on City-owned parcels would not meaningfully differentiate the four alternative routes.

6.1.4.2 Recreation Areas

Parks

HF Route 1 and the HF Hybrid Route would each cross more individual parks owned by the cities (8 for each route) than either HF Routes 2 or 5 (4 for each route), and as such, would cross more miles and

[73] For underground installations of the transmission circuits, certain agricultural activities, such as plowing, would be prohibited within the ROW. As discussed in Section 5.2.4.5, Harpers to Fentress Hybrid Route, the underground segment of the HF Hybrid Route would cross agricultural lands from approximate MPs 0.3 to 0.8 and MPs 1.2 to 1.9. In both of these areas, the route would follow the edges of fields rather than crossing the fields to minimize impacts on future agricultural activities.

affect more acres of city parkland than the other alternatives. HF Route 1 would cross 1.7 miles of parkland encompassing about 28.1 acres (5.9 acres of existing Dominion ROW and 22.2 acres of new or expanded ROW), while the HF Hybrid Route would cross 1.7 miles of parkland encompassing about 28.4 acres (6.3 acres of existing Dominion ROW and 22.1 acres of new ROW). In contrast, HF Route 5 would cross about 1.0 mile of parkland encompassing 18.2 acres (4.1 acres of existing Dominion ROW and 14.1 acres of new or expanded ROW). HF Route 2 would have the least impact, crossing about 0.7 mile of parkland encompassing 13.2 acres (2.1 acres of existing ROW and 11.1 acres of new or expanded ROW).

While HF Route 1 and the HF Hybrid Route would each affect more parkland overall than the other alternatives, crossings of parks along these routes would be confined to the SEPG corridor and/or areas within and adjacent to existing Dominion transmission ROWs. Little to no new ROW would be required within several parks, including Holland Pines, Woods of Piney Grove, Highland Meadows, and Dewberry Farms. What differentiates HF Route 1 and the HF Hybrid Route from the other alternatives, and the main reason for the larger area of affected parkland along these routes, is the contiguous crossing of the Virginia Beach Sportsplex, U.S. Field Hockey Complex, and Princess Anne Athletic Complex in the Princess Anne Commons area of Virginia Beach.

HF Route 1 and the HF Hybrid Route would each cross a combined 1.3 miles of parkland across the Virginia Beach Sportsplex, U.S. Field Hockey Complex, and Princess Anne Athletic Complex, encompassing 21.3 acres, almost all of which would be new ROW located within the SEPG corridor. HF Routes 2 and 5 would each cross a portion of the Virginia Beach Sportsplex on the same alignment as HF Route 1 and the HF Hybrid Route. HF Routes 2 and 5 would diverge from HF Route 1 and the HF Hybrid Route within the U.S. Hockey Field Hockey Complex, and both would avoid crossing the Princess Anne Athletic Complex altogether, resulting in a net reduction of the area of affected parkland relative to HF Route 1 and the HF Hybrid Route.

For each route, the applicable crossings of the Virginia Beach Sportsplex, U.S. Field Hockey Complex, and/or Princess Anne Athletic Complex would be within the SEPG corridor and/or within and adjacent to an existing Dominion transmission ROW in areas where existing cover mostly consists of open space with isolated areas of trees. Moreover, the crossings of these parks along each route would not affect developed facilities (e.g., ball fields, bleachers) or a planned future expansion of the facilities as discussed in Section 5.1.7, Planned Developments. Crossings of other parks for all routes would mostly encompass existing transmission ROWs and small amounts of expanded ROW. For these reasons, crossings of parkland would not meaningfully differentiate the alternative routes. In addition, as noted above, the City of Virginia Beach has indicated a preference for routes that avoid private property and indicated its intent to cooperate with Dominion in obtaining the necessary real estate interests over City-owned parcels (see Appendix C, Correspondence).

Golf Courses

Each of the alternative routes and/or their associated facilities would affect golf courses. A portion of the Harpers Switching Station site associated with HF Routes 1, 2, and 5 would be within the Aeropines Golf Course at NAS Oceana, affecting approximately 7.6 acres, including portions of two fairways and surrounding areas. Use of the site additionally would require the removal of several golf course maintenance buildings and associated outbuildings at the site. As discussed in Section 5.2.2, Recreation Areas, Dominion would work with the USN on a re-design of the affected fairways at the golf course and to relocate or replace the maintenance structures at the site. Moreover, as noted elsewhere in this study, the USN supports the use of this site for the Harpers Switching Station as stated in a letter to Dominion dated August 17, 2021 (see Appendix C, Correspondence).

HF Routes 1, 2, and 5, and the HF Hybrid Route would each cross two small (approximately 0.01 acre) areas of lands owned by the City of Virginia Beach associated with and on the periphery of the Virginia Beach National Golf Course in an area where the routes would be within the SEPG corridor. The routes would not affect the fairways or any developed facilities at the course. In fact, the crossings would be greater than 0.3 mile from the fairways at the course.

HF Routes 1 and 2 and the HF Hybrid Route would each cross 1.2 miles of the Battlefield Golf Club in Chesapeake along the eastern and southern boundaries of the course in the area within and adjacent to Dominion's existing ROW for Lines #2240/I-74. The routes would encompass 22.6 acres within the golf course, of which 17.1 acres would be existing Dominion transmission ROW and 5.5 acres would be new ROW. The routes would not cross the fairways or otherwise affect operational areas within the course. HF Route 5 would not cross the Battlefield Golf Club.

Based on the above discussion, impacts on golf courses would not meaningfully differentiate the alternative routes.

Trails

HF Routes 1, 2, and 5, and the HF Hybrid Route would each cross the SECT near Holland Pines Park in Virginia Beach where the trail is coterminous with West Neck Creek. The crossings would occur where the routes would be within and adjacent to Dominion's existing transmission ROW for Lines #2118/147. The installation of additional transmission structures for HF Routes 1, 2, and 5 (sets of three single-circuit, monopole structures) would change existing visual conditions in this area, but would only result in a marginal new impact on the trail. The HF Hybrid Route would be underground at the trail crossing, so no new overhead transmission structures would be required for this alternative. Additionally, this segment of the HF Hybrid Route would be installed by HDD, which would eliminate the need for surface trenching across the trail, resulting in the least impact on the trail of the four routes.

In addition to the crossing at West Neck Creek, HF Route 5 would intersect a second segment of the SECT where it is coterminous with North Landing River. This segment of the river is designated as scenic by the VDCR (see additional discussion in Section 6.1.6, Visual Resources). The route in this area would be a greenfield corridor through forested lands on either side of the river. The route would create a new 140-foot-wide ROW across the river with one set of three, 170-foot-tall, single-circuit, monopole structures installed on either side of the crossing. This would result in a new visual impact on the trail.

HF Routes 1, 2, and 5, and the HF Hybrid Route would each cross the SCL of the Virginia Birding and Wildlife Coastal Trail along Indian River Road (which is also a VDCR-designated scenic byway). The crossing along HF Route 1 and the HF Hybrid Route would occur where the routes would be confined to Dominion's existing transmission ROW for Lines #271/I-74 in the area between the Dewberry Farms/Indian River Woods and Indian River Farms subdivisions of Virginia Beach. Existing lattice structures within the ROW would be removed and replaced with sets of two double-circuit, monopole structures in this area. While this would change existing visual conditions at the trail, it would not represent a new impact.

HF Route 5 would cross the SCL farther east near the intersection of Indian River Road and Sumter Drive where the route would be within and adjacent to Dominion's existing transmission ROW for Line #2085. The installation of new single-circuit, monopole structures (sets of three) at this crossing would likewise result in a change in existing viewshed conditions, but would not cause a new impact on the trail.
HF Route 2 would cross the SCL west of the intersection of Indian River Road and Winston Avenue along a greenfield alignment in a heavily forested area. Use of this route for the new transmission circuits would create a new corridor across the trail, resulting in the greatest impact on the SCL relative to the other alternatives.

Based on the above, HF Route 1 and the HF Hybrid Route would have less overall impact on trails than the other alternatives. The trail crossings along these routes would be within and adjacent to existing transmission ROWs. In contrast, HF Route 2 would require a greenfield crossing of the SCL and HF Route 5 would require a greenfield crossing of the SECT.

6.1.4.3 Residences

As discussed in Section 4.2.3, Residences, Residential Areas, and Commercial Structures, ERM tabulated the number of residences within 100 feet, 250 feet, and 500 feet of the centerline of each route (see Table 4.2-5). To better focus the analysis on areas where new impacts would occur, ERM sorted the results to differentiate between route segments classified as greenfield and those that would be within and adjacent to existing Dominion transmission ROWs (see Table 5.2-1). The results of this analysis are as follows:

- HF Route 1 would have 32 dwellings within 100 feet, 176 dwellings within 250 feet, and 572 dwellings within 500 feet of the centerline, with most of these (all 32 within 100 feet, 137 within 250 feet, and 434 within 500 feet) in areas where the route would be within and adjacent to existing Dominion transmission ROWs.[74] No dwellings within 100 feet, 39 dwellings within 250 feet, and 138 dwellings within 500 feet of the centerline would be along greenfield segments of the route.
- HF Route 2 would have 1 dwelling within 100 feet, 101 dwellings within 250 feet, and 419 dwellings within 500 feet of the centerline, with most of these (1 within 100 feet, 59 within 250 feet, and 280 within 500 feet) in areas where the route would be within and adjacent to existing Dominion transmission ROWs. The route would have 0 dwellings within 100 feet, 42 dwellings within 250 feet, and 139 dwellings within 500 feet of the centerline along greenfield segments of the route.
- HF Route 5 would have 0 dwellings within 100 feet, 163 dwellings within 250 feet, and 619 dwellings within 500 feet of the centerline, with most of these (111 within 250 feet and 433 within 500 feet) in areas where the route would be within and adjacent to existing Dominion transmission ROWs. The route would have 0 dwellings within 100 feet, 52 dwellings within 250 feet, and 186 dwellings within 500 feet of the centerline along greenfield segments of the route.
- The HF Hybrid Route would have 32 dwellings within 100 feet, 181 dwellings within 250 feet, and 571 dwellings within 500 feet of the centerline, with most of these (all 32 within 100 feet, 142 within 250 feet, and 437 within 500 feet) in areas where the route would be within and adjacent to existing Dominion transmission ROWs.[75] The route would have 0 dwellings within 100 feet, 39 dwellings within 250 feet, and 134 dwellings within 500 feet of the centerline along greenfield segments of the route.

Among the overhead alternatives, HF Route 2 would have the fewest dwellings within 100 feet, 250 feet, and 500 feet of the centerline overall, but HF Route 1 would have the fewest number of homes near the centerline along greenfield route segments. None of the overhead routes would have dwellings within 100 feet of the centerline in greenfield areas. HF Route 1 would have 3 fewer dwellings within 250 feet and 1 fewer dwelling within 500 feet of the centerline than HF Route 2 in greenfield areas; and 13 fewer dwellings within 250 feet and 48 fewer dwellings within 500 feet of the centerline than HF Route 5.

Counts of dwellings along the HF Hybrid Route would be similar to HF Route 1. The HF Hybrid Route would have the same number of dwellings within 100 feet, 5 more dwellings within 250 feet, and 1 fewer

[74] The 32 homes within 100 feet of the centerline for HF Route 1 would all be located along the route segment between approximate MPs 6.2 and 7.8 where the route would mostly be confined to the existing 120-foot-wide ROW for Lines #271/I-74.

[75] The 32 homes within 100 feet of the centerline for the HF Hybrid Route would all be located along the route segment between approximate MPs 6.4 and 8.0 where the route would mostly be confined to the existing 120-foot-wide ROW for Lines #271/I-74.

dwelling within 500 feet of the centerline than HF Route 1. Because 4.5 miles of the HF Hybrid Route would be underground, there would be limited visual impacts on houses along this segment of the route.

In addition to houses near the alternative transmission line routes, ERM quantified the number of dwellings within 100 feet, 250 feet, and 500 feet of the permanent, fenced facilities that would be installed at the Harpers Switching Station, Chicory Switching Station, and expanded Fentress Substation sites (see Table 4.2-6).[76] Similar numbers of dwellings would be near each of these facilities. Nineteen dwellings (all mobile homes within NAS Oceana) would be between 250 and 500 feet of the Harpers Switching Station. Seventeen dwellings (all single family homes in the Woods of Piney Grove subdivision or a new residential development along Princess Anne Road) would be between 250 and 500 feet of the Chicory Switching Station. At the Fentress Substation, there would be 5 dwellings between 100 and 250 feet and 18 dwellings between 250 and 500 feet of the expanded substation area.

6.1.4.4 Cemeteries and Places of Worship

Cemeteries

Two cemeteries (Piney Grove Baptist Church Cemetery and Land Family Cemetery No. 1) would be within 500 feet of HF Route 1 and the HF Hybrid Route, compared with one cemetery each (Piney Grove Baptist Church Cemetery) for HF Routes 2 and 5. Each route would pass about 475 feet south of Piney Grove Baptist Church Cemetery. The routes would be on the opposite side of Damascus Trail and Dominion's existing transmission ROW for Lines #2118/147 from the burial ground. HF Route 1 and the HF Hybrid Route would each pass to the north of Land Family Cemetery No. 1 with a buffer of approximately 75 feet. The cemetery is mostly surrounded by forest, with open land facing toward the Princess Anne Athletic Complex to the northeast. During operations, an approximately 75-foot-wide forested buffer would be between the cemetery and the edge of the ROW in the area immediately north of the cemetery.

HF Route 5 would cross a potential cemetery recorded as an archaeological site on the Kempsville Mennonite Church property in Virginia Beach. Field survey would be required to determine if burials are present at this site.

Places of Worship

HF Routes 1 and 2 and the HF Hybrid Route would each pass within 500 feet of two churches (Piney Grove Baptist Church and True Way Evangelistic Mission) compared with three churches (Piney Grove Baptist Church, Kempsville Mennonite Church, and Pleasant Valley Baptist Church) for HF Route 5. All four routes would pass about 475 feet south of the Piney Grove Baptist Church. The routes would be on the opposite side of Damascus Trail and Dominion's existing transmission ROW for Lines #2118/147 from this church. HF Routes 1 and 2 and the HF Hybrid Route would each pass about 475 feet west of the True Way Evangelistic Mission where the routes would be within Dominion's existing transmission ROW for Lines #271/I-74 with an approximately 250-foot-wide forested buffer in the area in between.

As discussed in Section 5.2.5, Cemeteries, Schools, and Places of Worship, HF Route 5 would cross the Kempsville Mennonite Church property where the route would intersect North Landing Road west of the Courthouse Estates subdivision in Virginia Beach. In this area, the route would be within and adjacent to Dominion's existing transmission ROW for Line #2085. The western edge of the ROW would be adjacent to the southeast corner of the church building. The route additionally would require the complete removal

[76] Some of these dwellings would also be within 500 feet of one or more alternative transmission line routes. At the Harpers Switching Station, this would include 12 mobile homes within 500 feet of the facility. At the Chicory Switching Station, this would include four single-family dwellings within 500 feet of the facility. At the expanded Fentress Substation, this would include three single-family dwellings within 250 feet and four single-family dwellings within 500 feet of the facility.

of a tree corridor along the eastern edge of the church property, which currently provides a buffer from adjacent houses in the subdivision to the east. Impacts on the church property would be substantial due to the addition of new single-circuit, monopole structures and removal of the tree buffer on the parcel. Farther south in Chesapeake, HF Route 5 would pass about 275 feet south of the Pleasant Valley Baptist Church along a greenfield alignment in an agricultural area. The route would result in unobstructed views from the church to new transmission infrastructure in the ROW.

6.1.4.5 Planned Developments

Each of the routes would cross planned residential or commercial developments, particularly in the ITA and areas farther north in Virginia Beach. Some of the planned developments are conceptual and/or dependent on outside funding sources or commitments or approvals from city government. Where warranted, Dominion worked with city staff and/or the developer to identify and resolve potential conflicts between the new transmission infrastructure and planned developments (e.g., Sunny Farms Hydroponic Greenhouse and the Bio-Tech Park). While the number of planned development crossings would vary somewhat by route (a low of five for HF Route 1 and the HF Hybrid Route and a high of nine for HF Route 2), given the absence of known conflicts with the planned developments, these crossings would not meaningfully differentiate the alternative routes.

As discussed in Section 5.2.7.4, Harpers to Fentress Route 5, the City of Virginia Beach has a plan to extend Landstown Road to the south using an alignment immediately adjacent to Dominion's existing transmission ROW for Line #2085. The plan for the road extension is conceptual, subject to change, and dependent on other developments moving forward as well as ongoing assessments of the City's transportation needs. The alignment for the potential future extension of the road would minimize impacts on developable land in the area west of the existing transmission ROW. Because HF Route 5 and the Line #2085 Route Variation would each be within and adjacent to the ROW for Line #2085 in this area, they would conflict with the planned future extension of Landstown Road should that project move forward. Based on current land uses in the area, however, there would be sufficient space to expand the existing ROW for the onshore Virginia Facilities and for the potential future extension of Landstown Road.

6.1.4.6 Easements and Other Protected Lands

The easements that would be crossed by the alternative transmission line routes are designed to limit future development that may be incompatible with air operations in areas around NAS Oceana and NALF Fentress. These include USN RUEs, City of Chesapeake NALF Fentress Encroachment Acquisition parcels, and City of Chesapeake Multi-Year Encroachment Protection Easements. Utilities are an allowable land use under each of these programs.

Each route would cross varying lengths of USN RUEs with height restrictions ranging from 120 feet to 170 feet AMSL, with most between 165 feet and 170 feet AMSL. All transmission structures along HF Routes 1 and 2 and the overhead portion of the HF Hybrid Route would be less than the applicable height restriction on the RUEs that would be crossed. All but two sets of the transmission structures along HF Route 5 within the RUEs would comply with the applicable height restrictions. The structures on either side of the North Landing River crossing for HF Route 5 would be on easements limiting the heights of the structures to 165 feet, but as currently designed, these structures would be 170 feet tall. Dominion's overhead engineering team has determined that the height of the structures could likely be reduced to 165 feet, but additional analysis would be required to complete this design.

HF Route 1 and the overhead segment of the HF Hybrid Route would each cross one parcel (in two locations) in Chesapeake subject to a Multi-Year Encroachment Easement. The crossing lengths for either route would measure a combined 1.2 miles in length across these parcels, encompassing about 24.1 acres (18.3 acres of existing Dominion ROW and 5.8 acres of expanded ROW) where the routes

would be within and adjacent to the ROW for Lines #271/I-74. The easement sets a maximum height of 170 feet AMSL for new development on the property. All of the transmission structures along HF Route 1 and the HF Hybrid Route would be under this height restriction.

Each of the routes would cross one or more NALF Fentress Encroachment Acquisition parcels in Chesapeake. These easements are designed to prevent encroachment and incompatible uses of parcels while also preserving rural and agricultural land uses in the Fentress area. HF Route 1 and the HF Hybrid Route would each cross three discrete parcels measuring a combined 0.7 mile in length, encompassing 12.7 acres (9.7 acres of existing Dominion ROW and 3.0 acres of expanded ROW). The crossings would occur where the routes would be within and adjacent to Dominion's existing ROW for Lines #271/I-74. HF Route 2 would similarly cross three parcels mostly adjacent to the Line #271/I-74 corridor, measuring 0.7 mile in length and encompassing 12.8 acres (8.6 acres of existing Dominion ROW and 4.2 acres of new ROW). HF Route 5 would cross a short (less than 0.1-mile-long) segment of one parcel, encompassing 0.6 acre of existing ROW and 0.2 acre of new ROW, where the route would be within and adjacent to Dominion's existing ROW for Lines #2240/I-74. There would be no known conflicts between these easements and the alternative transmission line routes.

6.1.4.7 Airports

As discussed in Section 5.2.9, Airports, none of the routes would penetrate the applicable imaginary surfaces around or near the runways at NAS Oceana and NALF Fentress.

6.1.5 Natural Resources

6.1.5.1 Wetlands

Impacts on waters of the United States, including wetlands, will be a significant distinguishing factor among the alternative transmission line routes in the federal permitting process for the onshore Virginia Facilities. Specifically, under the Clean Water Act and its implementing regulations, the USACE can only permit Dominion's preferred route if it finds, after an alternatives analysis, that such route is the least environmentally damaging practicable alternative (i.e., the LEDPA) to aquatic resources (i.e., surface waters and wetlands). As discussed in Section 5.3.1, Wetlands, ERM's analysis of wetland impacts for each route addressed both vegetative clearing (i.e., conversion of wetland types due to maintenance of the ROW) and permanent filling (i.e., the placement of permanent fill in wetlands due to the installation of overhead transmission structures and/or from backfilling trenches excavated for underground installations).[77] The results of the analysis indicate that HF Route 1 would have substantially less impact on wetlands than the other alternatives.

Clearing Impacts

Regarding clearing, HF Route 1 would affect a combined total of 149.2 acres of wetland, of which 66.8 acres would be within existing Dominion ROW and 82.4 acres would be within new or expanded ROW. HF Routes 2 and 5 would each affect more wetland, including more acres of wetland in new or expanded ROW. HF Route 2 would affect 159.8 acres of wetland (20.9 acres within existing Dominion ROW and 138.9 acres within new or expanded ROW), while HF Route 5 would affect 185.8 acres of wetland (11.2 acres within existing Dominion ROW and 174.6 acres within new or expanded ROW). Overall, HF Route 1 would affect 10.6 fewer acres of wetland than HF Route 2 and 36.6 fewer acres of wetland than HF Route 5. The differences between these three routes become more apparent when focusing on new or expanded ROW. HF Route 1 would affect 56.5 fewer acres of previously undisturbed

[77] Wetland impacts are based on ERM's desktop wetland study, which is provided in Appendix F, Wetland and Waterbody Report.

wetland than HF Route 2 and 92.2 fewer acres of previously undisturbed wetland than HF Route 5 in new or expanded ROW areas.

HF Route 1 would also have less wetland impacts overall than the HF Hybrid Route, the latter of which would affect 158.8 acres of wetland (65.2 acres of existing Dominion ROW and 93.6 acres of new or expanded ROW). While the underground segment of the HF Hybrid Route would require a narrower ROW than the corresponding segment of HF Route 1, the Chicory Switching Station site associated with the former would be larger and affect more wetlands than the Harpers Switching Station site associated with the latter. Virtually the entire Chicory Switching Station site is characterized as forested wetland.

The clearing of forested wetlands will be an important consideration by both federal (USACE) and state (VDEQ) regulators because of the sensitivity of this particular wetland type. In the new or expanded ROW areas for the onshore transmission line, forested wetlands would be permanently converted to emergent or scrub/shrub types. Focusing on forested wetlands, HF Route 1 would have substantially less impact than HF Routes 2 or 5 or the HF Hybrid Route (inclusive of the switching station sites associated with each alternative). HF Route 1 would affect 68.8 acres of forested wetland (1.3 acre within existing Dominion ROW and 67.5 acres within new or expanded ROW). In contrast, the HF Hybrid Route would affect 81.0 acres (0.8 acre of existing Dominion ROW and 80.2 acres of new or expanded ROW); HF Route 2 would affect 122.3 acres (1.0 acre of existing Dominion ROW and 121.3 acres of new or expanded ROW); and HF Route 5 would affect 152.0 acres (1.1 acres of existing Dominion ROW and 150.9 acres of new or expanded ROW). Thus, HF Route 1 would affect 12.2 acres, 53.5 acres, and 83.2 acres less of forested wetland, respectively, than the HF Hybrid Route and HF Routes 2 and 5.

Fill Impacts

Fill impacts would occur where overhead transmission structures are installed in wetlands and/or where surface trenching through wetlands is required along the underground segment of the HF Hybrid Route. Fill impacts in wetlands associated with overhead structure installations (in ascending order) would be 1,560 cubic yards for the HF Hybrid Route, 2,379 cubic yards for HF Route 1, 2,457 cubic yards for HF Route 2, and 3,042 cubic yards for HF Route 5.[78] The smaller value for the HF Hybrid Route relative to HF Route 1 would be due to the shorter length of the overhead segment of this alternative.

For the underground segment of the HF Hybrid Route, permanent fill impacts on wetlands would be substantial. Most of the backfill in the trenches excavated for the underground portion of the transmission circuits (three parallel trenches, one for each circuit) would consist of non-native materials, including crushed rock, concrete, and fluidized thermal backfill. The backfill would be needed to protect the underground transmission line and diffuse heat from the buried circuits during operations.

Excluding areas that would be crossed by HDD, surface trenching and backfilling for the underground segment of the HF Hybrid Route would deposit approximately 57,311 cubic yards of permanent fill in wetlands along the route.[79] To provide context, the area of wetland affected by surface trenching for the HF Hybrid Route would be approximately 17.1 acres.[80] Surface trenching and backfilling additionally would result in three, parallel, near impermeable, subsurface barriers being installed across about 2.2 miles of wetland in Virginia Beach. The probability of successful permitting of these crossings is uncertain due to: (1) the large volume of non-native material to be placed in the wetlands; and (2) the potential negative hydrologic effects on subsurface water flows within the wetlands. Both of these issues

[78] Impacts are based on an estimate of 13 cubic yards of fill per overhead transmission structure installed in wetlands.

[79] Impacts are based on an estimate of 12,534.2 cubic yards per 2,500-foot-long segment of underground route in wetlands, including manholes, but excluding areas crossed by HDD.

[80] This value is the surface area affected by surface trenching in a 65-foot-wide corridor across wetlands.

could extend the USACE Section 404 regulatory process and the timeline for issuance of an individual permit as well as with the VDEQ regulatory process.

6.1.5.2 Waterbodies

HF Route 1 and the HF Hybrid Route would each cross 10 perennial and 1 intermittent waterbodies, compared with crossings of 8 perennial and 1 intermittent waterbodies for HF Route 2 and 11 perennial waterbodies for HF Route 5. All of the crossings along HF Route 1 and the HF Hybrid Route would occur where the routes would be within the SEPG corridor and/or within and adjacent to existing Dominion transmission ROWs. In contrast, three of the waterbody crossings along HF Route 2 and eight of the waterbody crossings along HF Route 5 would occur within greenfield segments of each route. These would include crossings of the Intracoastal Waterway canal (HF Route 2), North Landing River (both routes), and Pocaty River (HF Route 5). New corridors through mostly forested lands would be required for the greenfield crossings of the waterbodies along these routes.

The HF Hybrid Route would be underground from approximate MPs 0.0 to 4.5, where the route would cross three unnamed perennial waterbodies, a perennial tributary to West Neck Creek, and the West Neck Creek mainstem. Of these, all but the West Neck Creek mainstem would be crossed by surface trenching, which would result in temporary water quality impacts within each waterbody during construction. It also could impact the ability to permit that route with the USACE for the reasons noted above. The West Neck Creek mainstem would be crossed by drilling completely under the waterbody using HDD, which would avoid direct impacts on this stream during construction.

6.1.5.3 Conservation Sites

HF Routes 1, 2, and 5, and the HF Hybrid Route would each cross two VDCR-designated conservation sites: West Neck Creek and North Landing River. Each route would cross approximately 1.2 miles within the West Neck Creek site in the area generally between London Bridge Road and West Neck Creek in Virginia Beach, where the routes would be within the SEPG corridor, and within and adjacent to Dominion's existing transmission ROW for Lines #2118/147. The primary impact on this area would be forested clearing; however, overlap with the existing ROW would minimize the amount of tree removal within the site. HF Routes 1, 2, and 5 would each encompass 20.2 acres within the conservation site, including 4.4 acres of existing Dominion transmission ROW (open space) and 15.8 acres of expanded ROW (forested).

The HF Hybrid Route would be underground where it crosses the conservation site, resulting in less impact overall than the overhead alternatives. The HF Hybrid Route would encompass 14.5 acres, including 3.0 acres of existing Dominion transmission ROW (open space) and 11.5 acres of expanded ROW (forested). A short, approximately 0.1-mile-long segment of the HF Hybrid Route within the site (near where it would intersect West Neck Creek) would be installed by HDD, which would further minimize impacts on the site relative to the overhead alternatives.

HF Route 1 and the HF Hybrid Route would each cross the North Landing River site where the routes would be within and adjacent to Dominion's existing transmission ROW for Lines #271/I-74 in the area generally between Indian River Farms Park in Virginia Beach and the Intracoastal Waterway canal in Chesapeake. These routes would cross 2.7 miles encompassing 51.8 acres within the site. The routes in this area would utilize the entire width of the existing 120-foot-wide ROW plus 40 feet of expanded ROW on the west side of the existing corridor, which would substantially minimize the amount of new ROW required within the site. Of the total area within the site, HF Route 1 and the HF Hybrid Route would encompass 39.0 acres of existing ROW (open space) and just 12.8 acres of expanded ROW (forested).

HF Route 2 would cross 1.7 miles of the North Landing River conservation site along a greenfield alignment south of Indian River Road and west of North Landing Road in Virginia Beach and

Chesapeake. This route would encompass 29.5 acres of new ROW, nearly all of which would be forested. HF Route 5 would cross 2.7 miles of the site along a mostly greenfield alignment south of Indian River Road and mostly east of North Landing Road in Virginia Beach and Chesapeake. This route would encompass 1.4 acres of Dominion's existing transmission ROW for Line #2085 (open space) and 44.4 acres of new or expanded ROW (forested). Thus, HF Routes 2 and 5 would each require more forested clearing within the conservation site in areas currently unaffected by transmission infrastructure than either HF Route 1 or the HF Hybrid Route.

6.1.5.4 Protected Species

Federal and Commonwealth-Listed Species

Because habitat mapping and field surveys have not been completed for the routes, land use/land cover and wetlands were used as a proxy for assessing potential impacts on suitable habitat for federal- and state-listed species. Forested lands (including forested wetlands) provide habitat for a number of species, including northern long-eared bat, Rafinesque's big-eared bat, tricolored bat, barking treefrog, canebrake rattlesnake, eastern glass lizard, and Raven's seedbox. Impacts on forested habitat would be permanent due to tree removal and the conversion of forest to an herbaceous cover type in the maintained ROW during operation of the Virginia Facilities. For each route, the VDCR's Environmental Review (see Appendix C, Correspondence) recommends bat roost habitat assessments prior to the removal of bald cypress, water tupelo, or swamp tupelo trees, and coordination with the VDWR to ensure management and protection of the canebrake rattlesnake compliant with the Virginia ESA.

As discussed above, HF Route 1 would impact about the same amount of forested land as the HF Hybrid Route (101.1 acres and 101.2 acres, respectively), but significantly less forested land than HF Routes 2 and 5 (156.9 acres and 191.0 acres, respectively). HF Route 1 additionally would impact substantially less forested wetland than the other routes at 68.8 acres, compared with 81.0 acres for the HF Hybrid Route, 122.3 acres for HF Route 2, and 152.0 acres for HF Route 5.

In addition to crossing forested areas that may provide bat habitat, HF Routes 2 and 5 would each pass within 1.5 miles of a cluster of six VDWR-documented maternity roosts for northern long-eared bat along Mt. Pleasant Road in Chesapeake. The nearest maternity roost to HF Route 2 would be approximately 0.8 mile south of approximate MP 9.2, and the nearest maternity roost to HF Route 5 would be about 0.2 mile west of approximate MP 10.0. Neither HF Route 1 nor the HF Hybrid Route would pass within 1.5 miles of a known bat maternity roost.

Each of the alternative routes would cross varying amounts of open space and agricultural lands, which may contain nearby artificial structures such as fences and utility poles suitable for Peregrine Falcon and Loggerhead Shrike perching. Because installation and operation of the onshore transmission lines would not substantively alter existing land uses or cover types in these areas, crossings of open space and agricultural lands would not meaningfully differentiate the alternative routes with regard to habitat for these species. The new transmission infrastructure, however, could create additional opportunities for perching along greenfield segments of the overhead routes.

A review of potential impacts on federally listed species also will occur in the BOEM-led federal permitting process for the Project.

Migratory Birds and Bald Eagles

HF Routes 1, 2, and 5, and the HF Hybrid Route would cross varying amounts of forested land, freshwater emergent wetland, and open water areas that may provide habitat for migratory and other birds. HF Route 1 and the HF Hybrid Route would impact less forested land than the other routes as discussed above. Impacts on freshwater emergent wetlands would range from 17.5 acres for HF Route 5

to 25.5 acres for HF Route 1. Impacts on open water areas would be similar for the four routes (range of 1.4 acres to 3.0 acres). None of the routes would intersect the primary (330 foot) or secondary (660 foot) management zones around documented Bald Eagle nests within the study area.

Other Sensitive Species

The VDCR's Environmental Review (see Appendix C, Correspondence) provides survey recommendations for non-listed species that are applicable to each of the routes. These include: (1) species-specific (Virginia least trillium) and rare plant surveys where the routes would cross the West Neck Creek conservation site; (2) species-specific (Virginia least trillium and Duke's skipper) surveys and rare plant inventory surveys where the routes would cross the North Landing River conservation site; and (3) surveys for little metalmark along each route.

6.1.5.5 Forest Fragmentation

Due to a combination of their shorter length, better utilization of routing opportunities (including existing Dominion transmission ROWs), and fewer crossings of contiguous, unfragmented blocks of forest, HF Route 1 and the HF Hybrid Route would each have less fragmentation impacts than HF Routes 2 and 5. Most of the forested land crossed by HF Route 1 and the HF Hybrid Route would be in areas adjacent to existing transmission infrastructure, areas along edge habitat (i.e., where the forest intersects other land cover types), or smaller blocks of forest. In contrast, HF Routes 2 and 5 would each include longer crossings of larger blocks of unfragmented forest along greenfield alignments.

Between approximate MPs 6.5 and 11.8, HF Route 2 would cross several blocks of forest including a segment within the North Landing River conservation site and a segment south of, and parallel to, the Intracoastal Waterway canal. HF Route 5 would cross several blocks of forested lands between approximate MPs 8.3 and 15.8, including a crossing of the North Landing River conservation site and a band of forest where the route would parallel the south side of the Pocaty River. The routes would fragment forest in each of these areas.

6.1.5.6 Ecological Cores

Ecological cores are areas identified by the VDCR that contain at least 100 acres of unfragmented natural cover, providing habitat for numerous species. The cores are ranked based on the diversity of habitat they contain. For each of the routes, ERM identified and compared crossings of cores ranked C3 (high significance) and higher as these are considered the most sensitive by the VDCR. As discussed below, HF Route 1 and the HF Hybrid would result in substantially less impact on higher-ranked ecological cores than either HF Routes 2 or 5.

HF Route 1 and the HF Hybrid Route would each pass between a C3 (high significance) core and a C2 (very high significance) core along the route segment between Indian River Farms Park and the Intracoastal Waterway. This segment of the route would be within and adjacent to Dominion's existing transmission ROW for Lines #271/I-74, which forms the boundary between each core. Overlap with, and use of, the existing ROW would significantly reduce the amount of new tree clearing required along this segment of the route. Each route would encompass about 7.6 acres within the C2 core (all existing ROW) and 0.7 acre within the C3 core (all expanded ROW). Because the routes would pass between the cores, no new fragments would be created. Additionally, no new tree clearing would be required within the higher-ranked C2 core.

HF Routes 2 and 5 would have substantially greater impacts on higher-ranked ecological cores. HF Route 2 would cross a C2 (very high significance) core in two locations along a greenfield alignment. Combined, these crossings would measure 4.2 miles in length and encompass about 71.7 acres within

the core, nearly all of which would be forested. The crossings would create new fragments across the core on both sides of the Intracoastal Waterway canal.

HF Route 5 would cross a C1 (outstanding significance) core in three locations, all along a greenfield alignment. The first crossing would create a new fragment across the core; the other two would be on the edge of the core, which would require tree removal, but would not create a new fragment. The three crossings of the C1 core collectively would measure 1.9 miles long and encompass 31.1 acres, nearly all of which would be new ROW in heavily forested areas. HF Route 5 additionally would cross about 0.5 mile of a C2 (very high significance) core and 2.5 miles of a C3 (high significance) core along greenfield alignments, creating new fragments within each core. The route would encompass about 8.9 acres of new ROW within the C2 core and 42.8 acres of new ROW within the C3 core.

6.1.6 Visual Resources

Each of the alternative routes would introduce new, visible transmission infrastructure in predominantly undeveloped rural forested or agricultural areas and some suburban residential areas between the Harpers Switching Station site in Virginia Beach and the Fentress Substation in Chesapeake. Installation of the new infrastructure would add visual contrast to the landscape, with strong vertical and horizontal linear elements, smooth surfaces, and brown (weathering steel) or black (conductor) colors. The structures and conductors would contrast with the predominantly rough, green, irregular pattern of agricultural and forested areas, and with the flat, rectangular light-colored character of suburban residential areas. Due to the contrast in color and scale (height and mass) of the transmission structures relative to existing conditions, the onshore Virginia Facilities would be noticeable, if not the dominant feature, from some views along some of the route alternatives.

The highest concentration of viewers along and near the routes would be local residents/workers followed by commuters/travelers. These viewers—especially local residents—would likely be sensitive to visual changes in the landscape, especially along route segments that would not be adjacent to existing transmission ROWs. Viewers in more developed commercial or non-residential locations would likely be less sensitive to visual changes.

An approximately 0.7-mile-long segment of HF Routes 1, 2, and 5 would pass between the Prince George Estates/Mayfield and Castleton/Pine Ridge subdivisions in Virginia Beach. While this segment of each route would be within or adjacent to the SEPG corridor, there is no existing transmission infrastructure in this area. The ROW for each route would mostly be on the eastern side of the SEPG corridor, crossing about 0.2 mile of agricultural lands and 0.5 mile of forested lands across the segment. In the forested area, Dominion would leave a treed buffer on either side of the new ROW, measuring between approximately 115 and 150 feet on the west side of the ROW and between 25 and 50 feet on the east side of the ROW. The treed buffer would help shield some of the views to each route from homes in the nearby subdivisions. The HF Hybrid Route would be underground in this area, which would minimize visual impacts from the nearby homes.

HF Route 1 and the overhead segment of the HF Hybrid Route would each pass between or through the Highland Meadows/Highland Acres, Dewberry Farms/Indian River Woods, and Indian River Farms subdivisions in Virginia Beach where the routes would be within and adjacent to Dominion's existing transmission ROW for Lines #271/I-74. In this area, existing lattice structures within the ROW would be removed and replaced with sets of two double-circuit, monopole structures and more conductors, but no additional ROW would be required. While the new infrastructure would change existing viewshed conditions, it would not represent a new impact.

HF Route 2 would diverge from HF Route 1 at the Princess Anne Athletic Complex, heading south along a greenfield alignment across agricultural fields and forested lands within the ITA, introducing new transmission infrastructure in this area. HF Route 5 similarly would diverge from HF Route 1 at the

Princess Anne Athletic Complex, but would follow Dominion's existing ROW for Line #2085 south toward Indian River Road. The segment along Line #2085 would cross agricultural land along the western edge of the Courthouse Estates subdivision, and would be located on the western side of the existing Line #2085, with the existing transmission line located between the new line and the subdivision. Visual impacts within the subdivision would be noticeable due to the scale of the new transmission structures (which would be taller than the existing structures for Line #2085).[81]

HF Routes 1, 2, and 5 and the overhead segment of the HF Hybrid Route would each cross a VDCR-designated byway (Indian River Road). HF Route 1 and the HF Hybrid Route would each cross the byway where the routes would be within and adjacent to Dominion's existing ROW for Lines #271/I-74. HF Route 5 would cross where the route would be within and adjacent to Dominion's existing ROW for Line #2085. The installation of new single-circuit, monopole structures at either of these crossings would result in a change in existing viewshed conditions, but because of the existing transmission line, would not cause a significant change in the visual impact at the crossing of the byway. The crossing along HF Route 2 would occur along a greenfield alignment representing a new impact on the byway.

HF Route 1 and the overhead segment of the HF Hybrid Route would each cross the Intracoastal Waterway canal where the routes would be within and adjacent to Dominion's existing ROW for Lines #271/I-74. In contrast, HF Routes 2 and 5 would cross the North Landing River and/or Intracoastal Waterway canal farther east along greenfield alignments close to the North Landing River Bridge. At these crossings, HF Routes 2 and 5 would both create noticeable contrast relative to HF Route 1 and the HF Hybrid Route by creating a new ROW through heavily forested areas on both sides of the canal/river. Both crossings would be visible from the North Landing River Bridge.

HF Route 5 would have direct impacts on segments of the North Landing River and the Pocaty River designated as scenic by the VDCR. The route would both cross and parallel the scenic segment of Pocaty River. The removal of riparian forest in these areas could conflict with the Commonwealth of Virginia's visual resources management objectives for the designated scenic river segments.

6.1.7 Cultural Resources

Archaeological Sites

HF Route 1 and the HF Hybrid Route would each cross five previously recorded archaeological sites compared with three sites for HF Route 2 and eight sites for HF Route 5. The fewer number of previously recorded sites along HF Route 2 relative to the other alternatives appears in part to be due to differences in previous survey coverage along the routes. For the overhead alternatives, impacts on most sites could likely be avoided through selective structure placement if intact archaeological deposits are confirmed at the sites. An exception would be 44VB0162, which would be crossed by HF Route 1 and the overhead portion of the HF Hybrid Route. The crossing length for this site, which is recorded in the VCRIS as potentially eligible for listing in the NRHP, would be approximately 1,600 feet for each route. For all routes, field investigation would be needed to evaluate the significance of the archaeological deposits at the previously recorded site and to survey for as-yet unrecorded sites.

Historic Architectural Sites

HF Routes 1, 2, and 5, and the HF Hybrid Route would each be proximate to the same suite of six previously recorded historic architectural sites: the Jonathan Woodhouse House (134-0038), Thomas Lovett House/Rollingswood Academy (134-0072), St. John's Baptist Church (134-0702), Centreville-

[81] The heights of the existing structures in this area range from 75 to 85 feet tall; the heights of the new structures would be 110 feet tall.

Fentress Historic District (131-5071), Albemarle & Chesapeake Canal (131-0044), and Albemarle & Chesapeake Canal Historic District (131-5333). None of the routes would impact the Jonathan Woodhouse House (134-0038), Thomas Lovett House/Rollingswood Academy (134-0072), and St. John's Baptist Church (134-0702), which would be located 0.3 mile or greater from each route. Regardless of the alternative selected, the new transmission infrastructure for the onshore Virginia Facilities would not be visible from these sites due to the distance from the ROW and intervening vegetation and buildings.

HF Routes 1 and 2, and the Hybrid Route would each cross the Albemarle & Chesapeake Canal (131-0044) and associated historic district (131-5333). HF Route 5 would pass near the canal (131-0044) and cross the district (131-5333). The crossings along HF Route 1 and the HF Hybrid Route would occur where these routes would be within and adjacent to Dominion's existing transmission ROW for Lines #271/I-74. The wreck and rebuild of Line #271 and installation of new structures for the onshore Virginia Facilities would not substantively change existing viewshed conditions at the crossings, resulting in minimal impact on the canal and district. In contrast, HF Routes 2 and 5 would each utilize greenfield alignments through heavily forested areas where they would cross and/or pass near the canal and district, resulting in noticeable changes in existing viewshed conditions resulting in a moderate impact on each resource.

HF Routes 1 and 2, and the HF Hybrid Route would each pass near the Centreville-Fentress Historic District (131-5071) where the routes would be within and adjacent to Dominion's existing ROW for Lines #2240/I-74. The wreck and rebuild of Line #2240 and installation of new structures for the onshore Virginia Facilities along these routes would not substantively change existing viewshed conditions near the district, resulting in minimal impacts on the site. In contrast, HF Route 5 would approach the Centreville-Fentress Historic District along a greenfield alignment which would introduce new transmission infrastructure into the viewshed from the site, resulting in a moderate impact on the district.

6.1.8 Environmental Justice

ERM's EJ assessment (see Appendix J, Environmental Justice Screening Report and Sections 4.7 and 5.7 of this study) found that none of the routes would result in a disproportionate impact on populations of color, low income populations, age communities, or linguistically isolated communities.

6.2 Route Variations

This section of the routing study compares the advantages and disadvantages of the Dam Neck Route Variation and the Line #2085 Route Variation compared with the applicable corresponding segments of other routes. The potential environmental impacts associated with each route variation are quantified in Table K-2 (Appendix K, Feature Crossing Tables). The discussion below focuses on the salient characteristics that would differentiate the route variations from the other routes.

6.2.1 Dam Neck Route Variation

The Dam Neck Route Variation would be 2.8 miles long or approximately 0.3 mile longer than the corresponding segment of HF Routes 1, 2, and 5. Construction of the route variation would disturb 47.5 acres (0.3 acre of existing Dominion ROW and 47.2 acres of new ROW) compared with 42.4 acres (5.1 acres of existing Dominion ROW and 37.3 acres of new or expanded ROW) for the corresponding segment of the other routes. Thus, the Dam Neck Route Variation would disturb 5.1 more acres overall and 9.9 more acres of new or expanded ROW than the other routes.

About 1.7 miles of the route variation would be adjacent to the south side of Dam Neck Road, while approximately 2.1 miles of the corresponding segment of HF Routes 1, 2, and 5 would be within the SEPG corridor, including an approximately 1.0-mile-long segment within and adjacent to Dominion's

existing ROW for Lines #2118/147. As noted elsewhere in this study, staff with the City of Virginia Beach expressed a preference for routing the new infrastructure within the SEPG corridor, where feasible, over other potential alignments.

Regarding land ownership, approximately 0.5 mile of the route variation (about 7.7 acres) would cross parcels owned by the City of Virginia Beach, nearly all of which (about 7.4 acres) would be new ROW. Conversely, approximately 1.9 miles of the corresponding segment of HF Routes 1, 2, and 5 (about 27.8 acres) would be on parcels owned by the City of Virginia Beach, of which 1.9 acres would be within existing Dominion ROW and 25.9 acres would be new or expanded ROW. As indicated in Section 6.1.3, Land Ownership, crossings of City-owned lands were considered an advantage given the support for the Project from the City of Virginia Beach. The route variation would cross 2.2 miles of private lands (encompassing 35.3 acres) compared with 0.6 mile for the other routes (encompassing 14.0 acres). The route variation additionally would cross more private parcels (8) than the corresponding segment of the other routes (4).

The Dam Neck Route Variation would require the clearing of approximately 32.1 acres of forested lands (including 25.5 acres of forested wetland). The corresponding segment of HF Routes 1, 2, and 5 would require the clearing of about 25.4 acres of forested lands (including 22.4 acres of forested wetland). Thus, the Dam Neck Route Variation would affect 6.7 more acres of forested land (and 3.1 more acres of forested wetland) than the corresponding segment of HF Routes 1, 2, and 5.

One advantage of the Dam Neck Route Variation regarding forested lands would be tree clearing on parcels owned by the City of Virginia Beach. Because the corresponding segments of HF Routes 1, 2, and 5 would cross more City-owned land, more tree clearing would be required on City-owned parcels for these routes. The route variation would affect 7.4 acres of forest on City-owned land compared to 23.4 acres for the corresponding segments of HF Routes 1, 2, and 5.

The Dam Neck Route Variation would cross about 0.5 mile of land owned by the City of Virginia Beach within Holland Pines Park (nearly all of which is forested) in the area between the Holland Pines and Lake Placid subdivisions. Construction of the route variation would require the clearing of approximately 7.4 acres of forest (mostly forested wetland) along a greenfield alignment across the park. As discussed above, increased impacts on forested wetlands could present permitting problems with the USACE. While the corresponding segments of HF Routes 1, 2, and 5 would cross a small portion of the park, the entire affected area would be within Dominion's existing ROW for Lines #2118/147 along the southern edge of the park; no new clearing would occur within the park for these routes.

The Dam Neck Route Variation would pass near fewer dwellings than the corresponding segments of HF Routes 1, 2 and 5. The number of dwellings within 100 feet, 250 feet, and 500 feet of the route variation centerline would be 0, 11, and 60, respectively, while the number of residences within these distances of the centerline for the other routes would be 0, 69, and 253, respectively. While HF Routes 1, 2, and 5 would be proximate to more homes overall, 30 of the 69 dwellings within 250 feet and 132 of the 253 residences within 500 feet of the centerline for HF Routes 1, 2, and 5 would be in areas where the routes would be within or adjacent to Dominion's existing transmission ROW for Lines #2118/147; the remainder would be in areas where the routes would be within or adjacent to the SEPG corridor.

With some exceptions, most of the dwellings within 500 feet of the centerline of HF Routes 1, 2, and 5 in new ROW areas would be in the segment between MPs 1.5 and 2.3 where the routes would pass between the Prince George Estates/Mayberry and Castleton/Pine Ridge subdivisions, either within or adjacent to the SEPG study corridor. The ROW in this area for HF Routes 1, 2, and 5 would mostly be on the eastern side of the SEPG corridor, crossing agricultural lands between approximate MPs 1.5 and 1.7 and forested lands between approximate MPs 1.7 and 2.2. In the forested area, Dominion would leave a treed buffer on either side of the new ROW. The buffer would measure between about 115 and 150 feet wide on the west side of the new ROW and between about 25 and 50 feet wide on the east side of the

new ROW. The treed buffer would help shield views of overhead installations along the routes from homes in this area.

The Dam Neck Route Variation would cross 1.5 miles of USN RUEs compared with no such crossings for the other routes; however, transmission structure heights along the route variation would be well below the height restriction of 170 feet AMSL required by the RUEs. No other easements would be crossed by the routes.

Overall, wetland impacts between the Dam Neck Route Variation and corresponding segment of HF Routes 1, 2, and 5 would be similar. The route variation would encompass 27.4 acres of wetland, including 0.3 acre within existing Dominion transmission ROW and 27.1 acres within new or expanded ROW. The corresponding segment of the other routes would encompass 27.4 acres of wetland, consisting of 4.0 acres within existing Dominion transmission ROW and 23.4 acres within new or expanded ROW. As noted above, the Dam Neck Route Variation would affect 3.1 more acres of forested wetland than the corresponding segment of HF Routes 1, 2, and 5.

The Dam Neck Route Variation would cross two fewer perennial waterbodies than the corresponding segment of the other routes. The crossing of the West Neck Creek mainstem would occur along a greenfield segment of the route, creating a new corridor in a forested area across the waterbody. While HF Routes 1, 2, and 5 would cross more waterbodies overall, the crossing of the West Neck Creek mainstem would occur where these routes would be within and adjacent to Dominion's ROW for Lines #2118/147. This would avoid creating a new corridor across the creek.

The Dam Neck Route Variation would cross about 1.0 mile of the VDCR-designated West Neck Creek conservation site along a greenfield alignment, encompassing 16.7 acres of new ROW, almost all forested. The corresponding segment of HF Routes 1, 2, and 5 would cross 1.2 miles within the conservation site, encompassing 20.2 acres. Because of the overlap between this route segment with Dominion's existing transmission ROW for Lines #2118/147, less new ROW would be required. The corresponding segment of HF Routes 1, 2, and 5 would encompass 4.4 acres of existing ROW (open space) and 15.8 acres of expanded ROW (forested) within the conservation site. Thus, despite the shorter crossing length, the Dam Neck Route Variation would have greater impact on the West Neck Creek conservation site than the corresponding segments of HF Routes 1, 2, and 5.

As noted above, the corresponding segments of HF Routes 1, 2, and 5 would pass near more dwellings than the Dam Neck Route Variation, which would result in greater visual impacts on residential areas than the Dam Neck Route Variation. However, the installation of new transmission structures for the route variation along Dam Neck Road would have a significant impact on the existing viewshed in this area, including on businesses and some residences near the intersection of Dam Neck Road and London Bridge Road. The route variation additionally would introduce new transmission infrastructure along its entire greenfield alignment, including along a residential area where the route would pass east of the Lake Placid subdivision and cross Holland Pine Park.

6.2.2 Line #2085 Route Variation

The Line #2085 Route Variation would be 4.4 miles long or approximately 1.3 miles longer than the corresponding segment of HF Route 2. Construction of the route variation would encompass 82.3 acres (16.7 acres of existing Dominion ROW and 65.7 acres of new ROW) compared with 53.7 acres (0.2 acre of existing Dominion ROW and 53.5 acres of new or expanded ROW) for the corresponding segment of HF Route 2. Thus, the Line #2085 Route Variation would encompass 28.6 more acres overall and 12.2 more acres of new or expanded ROW than the other route. A key benefit of the route variation, and the main reason it was considered, is that it would be collocated with Dominion's existing transmission ROW for Line #2085 for 2.7 miles (61 percent of the route), whereas the corresponding segment of HF Route 2 would create 3.1 miles (100 percent) of new ROW along a greenfield alignment.

The route variation and the corresponding segment of HF Route 2 would each cross a mix of public (USACE and City of Virginia Beach) and private lands. The route variation would cross 0.5 mile of USACE lands (16.1 acres), 2.3 miles of City-owned lands (38.3 acres), and 1.5 miles (26.8 acres) of private lands. In contrast, the corresponding segment of HF Route 2 would cross 0.5 mile of USACE lands (8.6 acres), 1.5 miles of City-owned lands (27.3 acres) and 1.1 miles of private lands (17.3 acres). In addition to affecting more private lands overall, the route variation would cross more individual private parcels (18) than the corresponding segment of the other route (8).

The Line #2085 Route Variation and corresponding segment of HF Route 2 would cross the Intracoastal Waterway canal at similar locations on USACE lands northwest of the North Landing River Bridge. However, the crossing angle of the waterway for the route variation would be more acute, requiring a longer-than-average span (about 1,300 feet) between the transmission structures that would be installed on either side of the canal. Because of this, the route variation would require the use of H-frame structures (rather than monopole structures) and a wider (250-foot-wide) ROW to span the waterbody. This wider corridor at the crossing is the reason the route variation would affect 7.5 more acres of USACE land than the corresponding segment of HF Route 2.

Another consideration regarding the Intracoastal Waterway when comparing the two routes is the potential for visual impacts from the North Landing River Bridge. The USACE lands and the Intracoastal Waterway canal are both within the Albemarle & Chesapeake Canal Historic District, which is listed in the NRHP. The Line #2085 Route Variation crossing would be closer to potential viewers along the North Landing River Bridge, and as noted above, would require a longer crossing with a wider ROW when compared to HF Route 2. Consequently, the Line #2085 Route Variation would have greater visual impact on the historic district than the corresponding segment of HF Route 2.

Regarding land cover, the Line #2085 Route Variation and corresponding segment of HF Route 2 would encompass similar areas of forest. Both routes would cross 1.9 miles of forest, with the route variation encompassing 34.6 acres compared to 32.1 acres for HF Route 2. The route variation would affect less forested land on City of Virginia Beach parcels (4.4 acres) than HF Route 2 (9.0 acres).

Another consideration regarding forested lands for the two routes are crossings of ecological cores. The Line #2085 Route Variation would cross 1.2 miles (19.9 acres) of an ecological core ranked as C1 (outstanding significance) and 0.6 mile (18.1 acres) of an ecological core ranked as C2 (very high significance), but no ecological cores ranked as C3 (high significance). In contrast, the corresponding segment of HF Route 2 would not affect any ecological cores ranked as C1 (outstanding significance) or C3 (high significance), but would cross 1.4 miles (22.9 acres) of an ecological core with a ranking of C2 (very high significance). While both routes would fragment ecological cores, the route variation would have a substantially greater cumulative effect on higher-ranked cores.

Both HF Route 2 and the route variation would cross parkland within the U.S. Field Hockey Complex. The route variation would occur along the periphery of the park where it would be within and adjacent to Dominion's existing ROW for Line #2085. However, the route variation would affect considerably more parkland (5.3 acres, including 3.3 acres of new or expanded ROW) as compared to the corresponding segment of HF Route 2 (0.7 acre, including 0.6 acre of new or expanded ROW).

An approximately 1.4-mile-long segment of the route variation would follow Dominion's existing Line #2085 corridor in the area immediately west of the Courthouse Woods and Courthouse Estates subdivisions in Virginia Beach. Because of this, the route variation would be proximate to significantly more homes than the corresponding segment of HF Route 2. The number of dwellings within 100 feet, 250 feet, and 500 feet of the route variation centerline would be 0, 57, and 188, respectively. The number of dwellings within these distances from the centerline of the applicable segment of HF Route 2 would be 0, 1, and 4, respectively. Nearly all of the dwellings that would be proximate to the route variation (56 within 250 feet and 186 within 500 feet) are already near existing transmission infrastructure associated

with Line #2085. Nonetheless, because the new transmission structures for the onshore Virginia Facilities would be taller than the existing structures along Line #2085, existing viewsheds in this area would change.

The Line #2085 Route Variation would pass within 5 feet of the Mercer Family Cemetery along a greenfield segment of the route in a forested area near North Landing Road. The ROW for the route variation would create a new, 140-foot-wide, cleared corridor in the area immediately north of the burial ground, creating an unobstructed view from the cemetery to the ROW. The route variation additionally would cross a potential cemetery recorded as an archaeological site on the Kempsville Mennonite Church property in Virginia Beach; however, field survey would be required to determine if burials are present at this site. No cemeteries would be near the corresponding segment of HF Route 2.

The Line #2085 Route Variation would cross the Kempsville Mennonite Church property where the route would intersect North Landing Road. Because the route variation would follow the same alignment and use the same configuration as HF Route 5 in this area, impacts on the church would be the same as those described above in Section 6.1.4.4, Cemeteries and Places of Worship. That is, where the existing ROW for Line #2085 would be expanded, the route variation would require the complete removal of a tree corridor along the eastern edge of the church property, which currently provides a buffer from adjacent houses in the Courthouse Estates subdivision to the east. The corresponding segment of HF Route 2 would not cross or pass near any places of worship.

The route variation would cross 1.0 mile of USN RUEs compared with 0.1 mile for the corresponding portion of HF Route 2. Transmission structure heights along both routes would be below the height limits set by the RUEs. No other easements would be crossed by the routes.

The Line #2085 Route Variation would affect more wetlands than the corresponding portion of HF Route 2. The route variation would cross 2.2 miles of wetland encompassing 44.4 acres (5.3 acres within existing Dominion transmission ROW and 39.1 acres of new ROW), whereas the applicable segment of HF Route 2 would cross 2.0 miles of wetland encompassing 35.0 acres (all within existing ROW). Crossings of forested wetlands would be similar for the two routes, with the route variation affecting 29.1 acres and the corresponding segment of HF Route 2 affecting 30.4 acres. Waterbody crossings would be similar for the two routes.

The Line #2085 Route Variation and applicable segment of HF Route 2 would each cross the VDCR-designated North Landing River conservation site. The route variation would cross 1.9 miles along a mostly greenfield alignment encompassing 39.9 acres, nearly all of which would be forested. The HF Route 2 segment would cross 1.4 miles along a greenfield alignment encompassing 23.6 acres, nearly all of which would be forested. While both routes would create new corridors through mostly forested lands, the route variation would affect 16.3 fewer acres within the site than the other alternative.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 Route Alternatives

On behalf of Dominion, ERM identified, assessed, and compared several alternative transmission line routes for the onshore Virginia Facilities associated with the Project. The CLH Route is the only alignment for the proposed underground transmission line between the Cable Landing Location and Harpers Switching Station site in Virginia Beach. Four alternative routes (three overhead and one hybrid) were evaluated between the Harpers Switching Station site in Virginia Beach and Fentress Substation in Chesapeake. Based on a comparison of the advantages and disadvantages of these routes as discussed in Section 6.1, Route Alternatives, Dominion concluded that HF Route 1 would reasonably minimize adverse impacts on scenic assets, historic districts, and the environment of the area concerned, and therefore recommends HF Route 1 as the preferred alternative. This conclusion is based on the following:

- Of the overhead routes, HF Route 1 would be the shortest overhead alternative (14.2 miles compared to 15.2 miles and 20.2 miles, respectively, for HF Routes 2 and 5). HF Route 1 additionally would have the smallest overall footprint of the overhead routes at 295.5 acres, compared with 306.9 acres and 384.3 acres, respectively, for HF Routes 2 and 5. HF Route 1 and the HF Hybrid Route would be the same length (14.2 miles) and have similar construction footprints (295.5 acres and 293.6 acres, respectively).

- HF Route 1 would utilize more collocation routing opportunities (13.1 miles) than either HF Routes 2 or 5 (7.9 miles and 7.5 miles, respectively). Collocation routing opportunities along the routes would include the SEPG corridor, existing Dominion transmission ROWs, and a railroad. The HF Hybrid Route would use the same amount of collocation routing opportunities as HF Route 1.

- HF Route 1 would utilize more of the SEPG corridor (5.1 miles) than HF Routes 2 and 5 (4.4 miles each).[82] The City of Virginia Beach owns much of the land within the SEPG corridor, supports use of the corridor for the onshore Virginia Facilities, and urged minimizing impacts on private lands. The HF Hybrid Route would use the same amount of the SEPG corridor as HF Route 1.

- HF Route 1 would utilize more existing Dominion transmission ROWs (9.6 miles) than HF Routes 2 or 5 (5.1 miles and 4.7 miles, respectively).[83] The HF Hybrid Route would use the same amount of existing Dominion transmission ROWs as HF Route 1. Because of the overlap with existing transmission ROWs, HF Route 1 and the HF Hybrid Route (at 161.5 acres and 158.8 acres, respectively) would each require less new or expanded ROW than HF Routes 2 and 5 (238.4 acres and 346.0 acres, respectively). HF Route 1 would cross more lands owned by the cities (6.3 miles) than HF Routes 2 and 5 (5.7 miles for each route). The HF Hybrid Route would cross the same amount of lands owned by the cities. Additionally, because HF Route 1 and the HF Hybrid Route would utilize more existing Dominion transmission ROWs, they both would require less new or expanded ROW on lands owned by the cities (69.9 acres and 66.3 acres, respectively) than HF Routes 2 or 5 (80.3 acres and 74.2 acres, respectively). HF Route 1 and the HF Hybrid Route would each cross 0.3 mile of TNC lands within Gum Swamp where the routes would be within and adjacent to Dominion's existing transmission ROW for Lines #271/I-74.[84] While HF Routes 2 and 5 would avoid TNC lands, they would each require new ROWs along greenfield alignments where the routes would cross sensitive habitat within Gum Swamp. As a result, TNC has expressed a preference for

[82] For all routes, this includes an approximately 1.8-mile-long segment that would also be within or adjacent to Dominion's existing ROW for Lines #2118/147.

[83] For all routes, this includes an approximately 1.8-mile-long segment that would also be within the SEPG corridor.

[84] HF Route 1 and the HF Hybrid Route would be identical where they cross TNC lands.

HF Route 1 over the other alternatives, even though the HF Hybrid Route would avoid TNC lands altogether. TNC sent Dominion a letter indicating its willingness to grant Dominion an easement over its lands to expand Dominion's current ROW for Line #271 to accommodate the onshore Virginia Facilities in a manner consistent with HF Route 1 (see Appendix C, Correspondence).

- HF Route 1 would affect less forested land (101.2 acres) than HF Routes 2 and 5 (156.9 acres and 191.0 acres, respectively) and about the same amount of forested land as the HF Hybrid Route (101.1 acres).
- HF Route 1 would have less impact on trails than the other overhead alternatives. The trail crossings along HF Route 1 would be within and adjacent to existing Dominion transmission ROWs. In contrast, HF Route 2 would require a greenfield crossing of the SCL and HF Route 5 would require a greenfield crossing of the SECT. The HF Hybrid Route would have similar impacts on trails as HF Route 1 (though the crossing of the SECT would be underground).
- Of the overhead routes, and on a total basis, HF Route 1 would pass near more residences within 100 feet (32) and 250 feet (176) of the centerline than HF Routes 2 and 5 (1 and 0 residences, respectively, within 100 feet of the centerlines, and 101 and 163 residences, respectively, within 250 feet of the centerlines). Most of the homes along each route, however, would be in areas where the route is planned to be within or adjacent to existing transmission lines. When focusing on greenfield segments of the routes, HF Route 1 would have the same number of homes within 100 feet (0) and fewer homes within 250 feet (39) of the centerline than the other routes, suggesting that HF Route 1 would have less impact on areas currently unaffected by transmission infrastructure. In greenfield areas, HF Routes 2 and 5 would each have 0 houses within 100 feet and 42 and 52 houses, respectively, within 250 feet of their centerlines. The HF Hybrid Route would pass near a similar number of residences within 100 feet (32) and 250 feet (181) of the centerline (though approximately 4.5 miles of this route would be underground).
- HF Route 1 (along with HF Route 2 and the HF Hybrid Route) would have less impact on churches than HF Route 5, which would cross the Kempsville Mennonite Church, requiring the removal of a grove of trees on the church property.
- HF Route 1 (at 149.2 acres) would require less clearing within wetlands than HF Routes 2 and 5 and the HF Hybrid Route (at 159.8 acres, 185.8 acres, and 158.8 acres, respectively). The differences among the routes are more apparent when focusing on wetland impacts within new or expanded ROW. HF Route 1 would affect 56.5 acres, 92.2 acres, and 11.2 acres less wetland in new or expanded ROW than HF Route 2, HF Route 5, or the HF Hybrid Route, respectively.
- HF Route 1 would have less impact on forested wetlands than the other routes, which will be a key factor considered by federal (USACE) and state (VDEQ) regulators reviewing the onshore Virginia Facilities. HF Route 1 would affect 53.5 acres, 83.2 acres, and 12.2 acres less forested wetland than HF Route 2, HF Route 5, and the HF Hybrid Route, respectively. As noted in Section 6.1.5.1, Wetlands, the USACE can only permit Dominion's preferred route if it finds, after an alternatives analysis, that such route is the least environmentally damaging practicable alternative (LEDPA) to aquatic resources.
- The HF Hybrid Route would require the placement of more permanent fill in wetlands than HF Route 1. The HF Hybrid Route would require the placement of 58,871 cubic yards of fill in wetlands (1,560 cubic yards for overhead structures and 57,311 cubic yards for surface trenching) compared with 2,379 cubic yards for HF Route 1 (all for overhead structures). This also will be a key factor considered by the USACE and VDEQ when reviewing the Virginia Facilities.

- HF Route 1 would cross North Landing River and the Intracoastal Waterway canal where the route would be within and adjacent to Dominion's existing transmission ROW for Lines #271/I-74. HF Routes 2 and 3 would cross the canal and/or the river along greenfield alignments through heavily forested areas. The HF Hybrid Route would cross these waterbodies at the same location as HF Route 1.
- HF Route 1 would have less impact on the North Landing River conservation site than the other overhead alternatives due to the use of existing ROW along Dominion's corridor for Lines #271/I-74. HF Routes 2 and 5 would each cross the conservation site along greenfield alignments through heavily forested areas. The HF Hybrid Route would have the same impact on the North Landing River conservation site as HF Route 1.
- HF Route 1 would have less impact on VDCR-designated ecological cores with rankings of C3 (high significance) or higher than either HF Routes 2 or 5 due to greater use of existing transmission ROWs than the other alternatives. HF Route 2 would fragment a C2 (very high significance) core, while HF Route 5 would fragment C1 (outstanding significance), C2 (very high significance), and C3 (high significance) cores. HF Route 1 would pass between C2 and C3 cores but would not fragment the cores. The HF Hybrid Route would have the same impact on high-ranked VDCR-designated ecological cores as HF Route 1.
- Visual impacts overall would be similar for the four routes, although the HF Hybrid Route would have less impacts where it is underground. HF Route 1 and the HF Hybrid Route would pass near or cross more residential areas, but generally would do so where the routes would be within and adjacent to existing Dominion transmission ROWs. HF Routes 2 and 5 would have greater impacts on some areas, particularly the crossings of the Intracoastal Waterway canal and/or North Landing River, due to their use of greenfield alignments.
- HF Route 1 would have minimal impact on the Albemarle & Chesapeake Canal historic site (131-0044) and the associated historic district (131-5333) compared with a moderate impact for HF Routes 2 and 5. This would be due to HF Route 1 and the HF Hybrid Route crossing the sites within and adjacent to Dominion's existing transmission ROW for Lines #271/I-74, whereas HF Routes 2 and 5 would cross along greenfield alignments in heavily forested areas. The HF Hybrid Route would have the same impact on the historic site and historic district as HF Route 1.

HF Route 1 would have substantially less impacts overall on natural and cultural resources than HF Routes 2 and 5. HF Route 1 and the Hybrid Route would have similar impacts overall, with the exception of wetlands. The HF Hybrid Route would require more clearing in wetlands (including forested wetlands) than HF Route 1 and would place substantially more permanent fill in wetlands due to the backfilling of surface trenches along the underground segment of the route. These are key factors considered by USACE and VDEQ when reviewing the Virginia Facilities.

7.2 Route Variations

7.2.1 Dam Neck Route Variation

Based on the discussion in Section 6.2, Route Variations, Dominion concluded that the disadvantages of the Dam Neck Route Variation would outweigh the advantages when compared with the corresponding segment of HF Routes 1, 2, and 5. Consequently, Dominion does not prefer this route variation, but is proposing it for notice to the public and consideration by the Commission. This conclusion is justified by the following:

- The route variation would be 0.3 mile longer and affect 5.1 more acres of land than the corresponding segment of the other routes.
- The route variation would utilize less collocation routing opportunities than the corresponding segment of the other routes. About 1.7 miles of the route variation (61 percent) would be adjacent to Dam Neck Road, whereas 2.1 miles of the corresponding segment of the other routes (84 percent) would be within the SEPG corridor, including an approximately 1.0-mile-long segment that would also be within and adjacent to Dominion's existing ROW for Lines #2118/147.
- None of the route variation would be within the SEPG corridor, which the City of Virginia Beach prefers for routing the new transmission infrastructure.
- The route variation would cross less land owned by the City of Virginia Beach, which is considered a disadvantage given the support for the Project from the City. About 0.5 mile of the route variation would be on City-owned lands compared with 1.9 miles for the corresponding segment of the other routes.
- The route variation would affect more forested land (32.1 acres) than the corresponding segment of the other routes (25.4 acres); however, the route variation would require less tree clearing on City of Virginia Beach lands (7.4 acres) than the corresponding segment of the other routes (23.4 acres).
- The route variation would cross about 0.5 mile of Holland Pines Park, encompassing 7.4 acres of forested land along a greenfield alignment. While the corresponding segment of HF Routes 1, 2, and 5 would cross a small portion of the park, the entire affected area would be within Dominion's existing ROW for Lines #2118/147.
- Fewer homes would be proximate to the route variation than the corresponding segment of the other routes; however, many of the homes along the applicable segment of HF Routes 1, 2, and 5 are already near existing transmission infrastructure (i.e., Lines #2118/147). Moreover, for the segment between MPs 1.5 and 2.3 where HF Routes 1, 2, and 5 would pass between the Prince George Estates/Mayberry and Castleton/Pine Ridge subdivisions, Dominion would maintain a tree buffer between the new transmission infrastructure and nearby homes, where possible.
- The route variation and corresponding segment of HF Routes 1, 2, and 5 would each affect 27.4 acres of wetland; however, the route variation would affect 3.1 more acres of forested wetland than the corresponding segment of the other routes.
- The route variation would cross West Neck Creek along a greenfield alignment in a mostly forested area, whereas the corresponding segment of the other routes would cross the creek along and within Dominion's existing ROW for Lines #2118/147.
- The route variation would cross the VDCR-designated West Neck Creek conservation site along a greenfield alignment in a heavily forested area, whereas the other routes would cross the site along and within Dominion's existing ROW for Lines #2118/147.
- The route variation would have less visual impact on nearby homes due to the fewer number of dwellings along the route. However, the installation of new transmission structures along Dam Neck Road would impact the existing viewshed in this area, which includes businesses and some residences near the intersection of Dam Neck Road and London Bridge Road.

7.2.2 Line #2085 Route Variation

Based on the discussion in Section 6.2, Route Variations, Dominion concluded that the disadvantages of the Line #2085 Route Variation would outweigh the advantages when compared with the corresponding

segment of HF Route 2. Consequently, Dominion does not prefer this route variation, but is proposing it for notice to the public and consideration by the Commission. This conclusion is justified by the following:

- The route variation would be 1.3 miles longer and affect 28.6 more acres of land than the corresponding segment of HF Route 2.
- The route variation would utilize more collocation routing opportunities than the corresponding segment of HF Route 2. The route variation would be within and adjacent to Dominion's existing ROW for Line #2085 for 2.7 miles (61 percent), whereas all of HF Route 2 would utilize new ROW along a greenfield alignment.
- The route variation would cross 2.3 miles of lands owned by the City of Virginia Beach (52 percent) compared with 1.5 miles (48 percent) for the corresponding segment of HF Route 2. While greater use of City-owned lands is considered an advantage, the difference is largely due to the length of the route variation; about half of each route would be on City-owned parcels.
- The route variation and corresponding segment of HF Route 2 would cross the Intracoastal Waterway canal at similar locations on USACE lands. The crossing angle for the route variation would be more acute, requiring a longer-than-average span across the waterbody, the use of H-frame structures rather than monopole structures on either side of the canal, and a wider (250-foot-wide) ROW to support the crossing. Because of this, visual impacts at the crossing would be greater for the route variation than the corresponding segment of HF Route 2. This would include visual impacts on the Albemarle & Chesapeake Canal historic site and associated historic district.
- The route variation would cross and fragment VDCR-designated ecological cores with C1 (outstanding significance) and C2 (very high significance) rankings, whereas the corresponding segment of HF Route 2 would cross and fragment an ecological core with a C2 ranking. While both routes would fragment ecological cores, the route variation would have a greater impact on higher-ranked cores.
- The route variation would be proximate to more homes than the corresponding segment of HF Route 2 because the route variation would follow Dominion's existing Line #2085 ROW in the area immediately west of the Courthouse Woods and Courthouse Estates subdivisions. Most of these dwellings are already near the existing transmission infrastructure associated with Line #2085. However, the new transmission structures for the onshore Virginia Facilities would be taller than the existing structures for Line #2085, thereby changing existing viewsheds from the homes.
- The route variation would pass within 5 feet of the Mercer Family Cemetery, creating a cleared corridor adjacent to the burial ground.
- The route variation would cross the Kempsville Mennonite Church, requiring the removal of a grove of trees on the church property.
- The route variation would affect 9.4 more acres of wetland than the corresponding segment of HF Route 2. Impacts on forested wetlands would be similar for each route (29.1 acres for the route variation and 30.4 acres for the corresponding segment of HF Route 2).
- The route variation would cross about 0.5 mile more of the VDCR-designated North Landing River conservation site than the corresponding segment of HF Route 2, though both routes would utilize greenfield alignments in heavily forested areas across the site.

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APPENDIX A FIGURES

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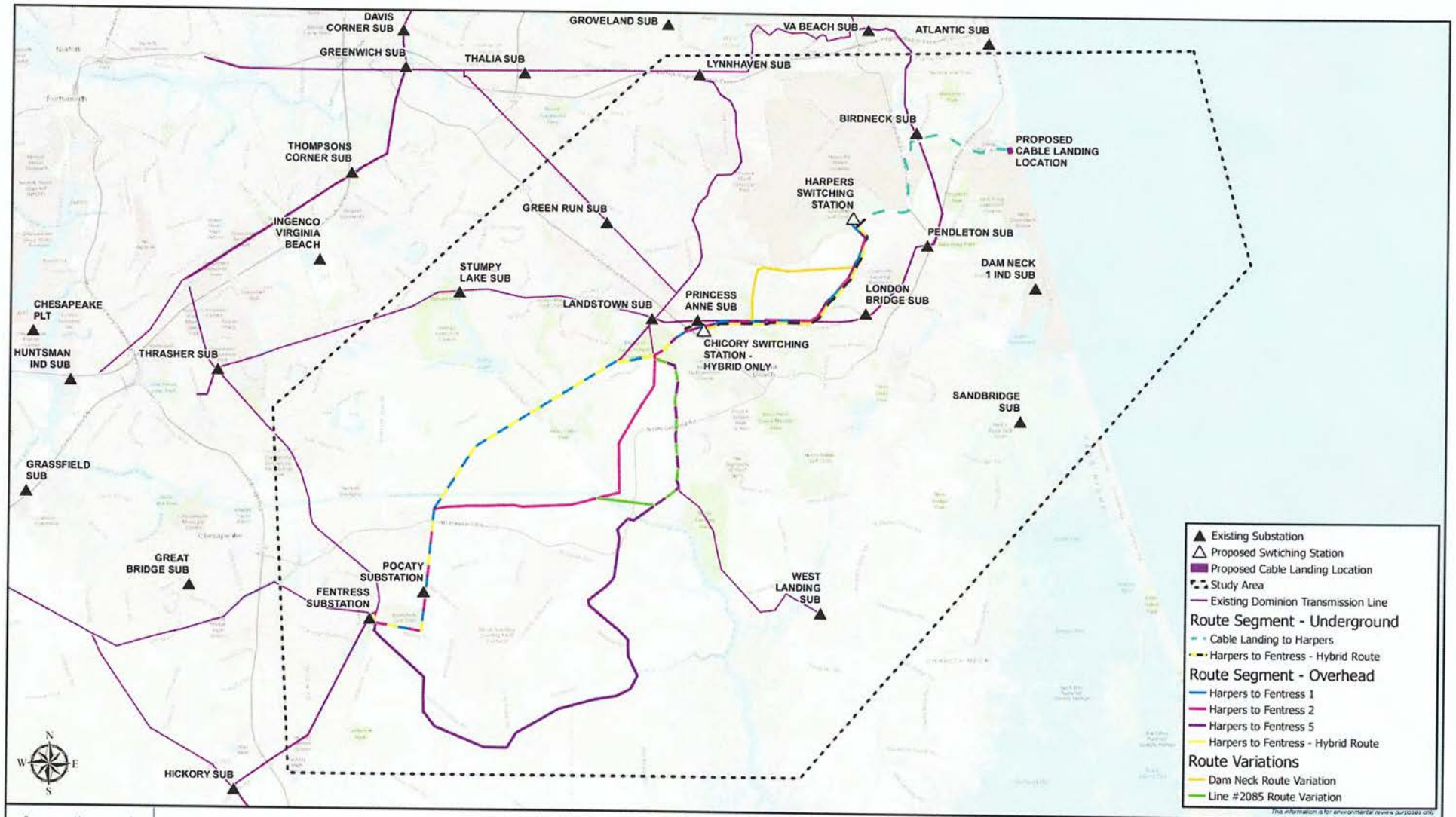

Figure 2.1-1
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Study Area Map

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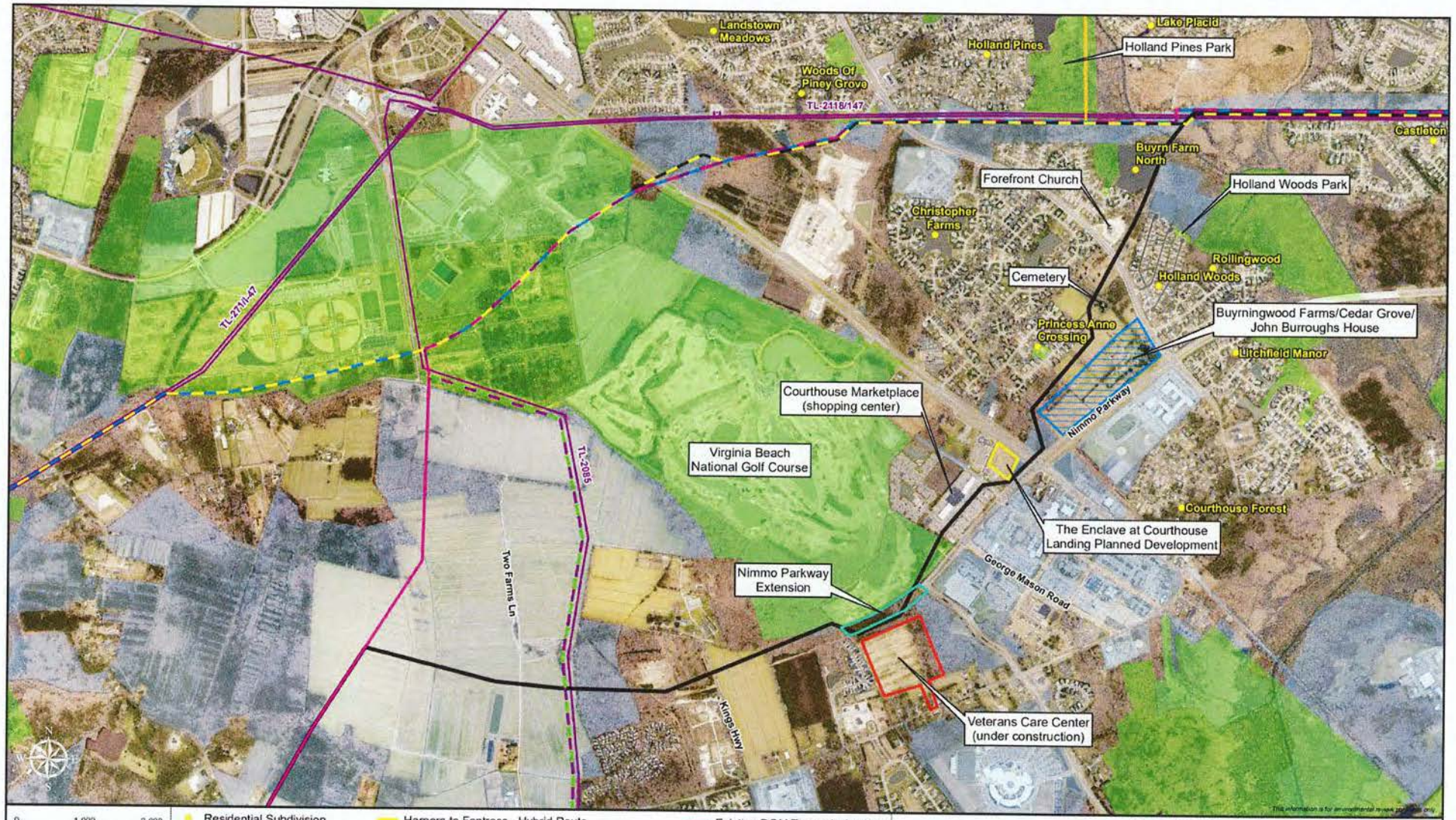

Figure 3.2-1
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
City of Virginia Beach, VA
Princess Anne Municipal Center Alternative Route

Dominion Energy

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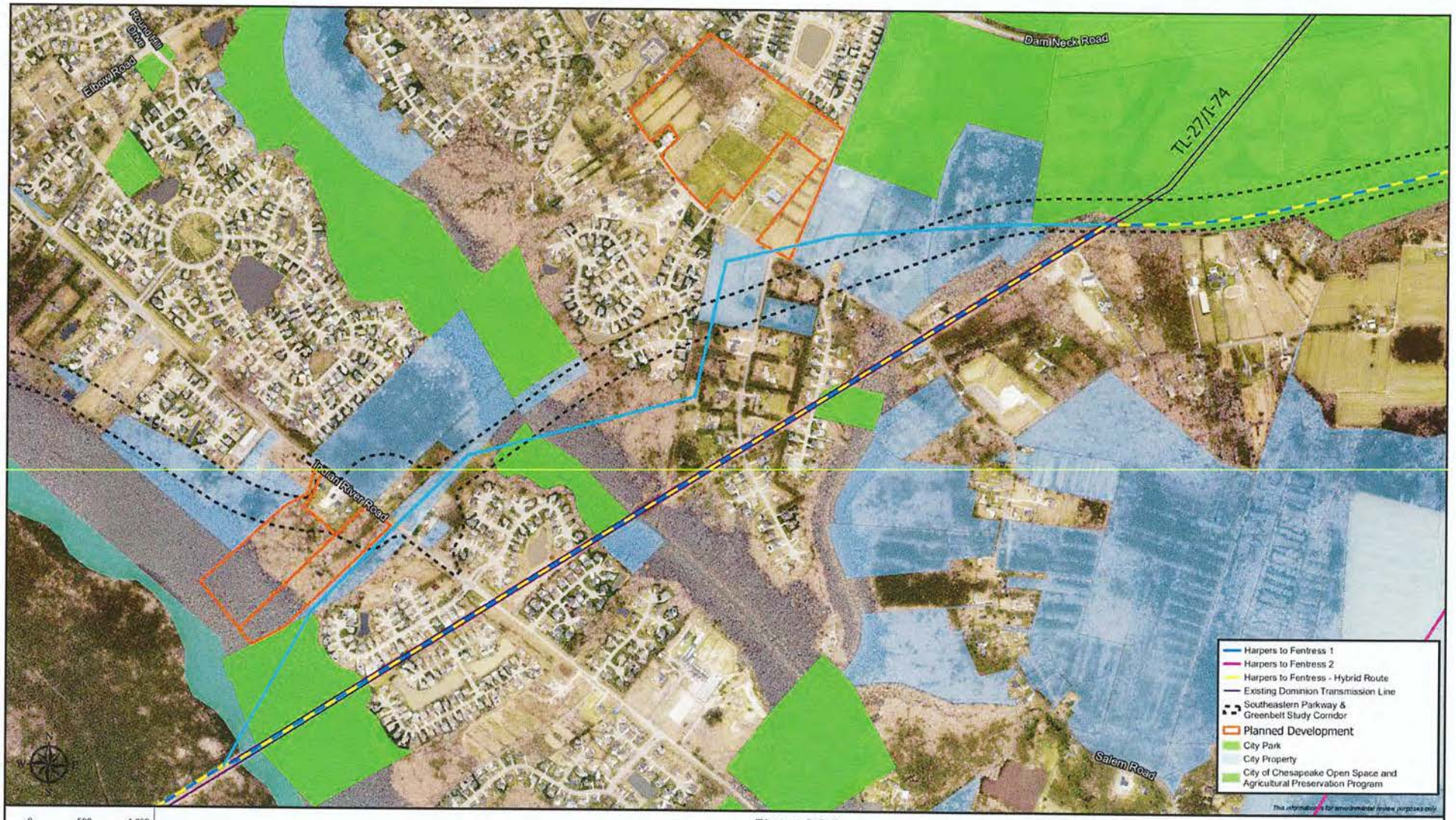

Figure 3.2-2
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Line #271 Route Variation

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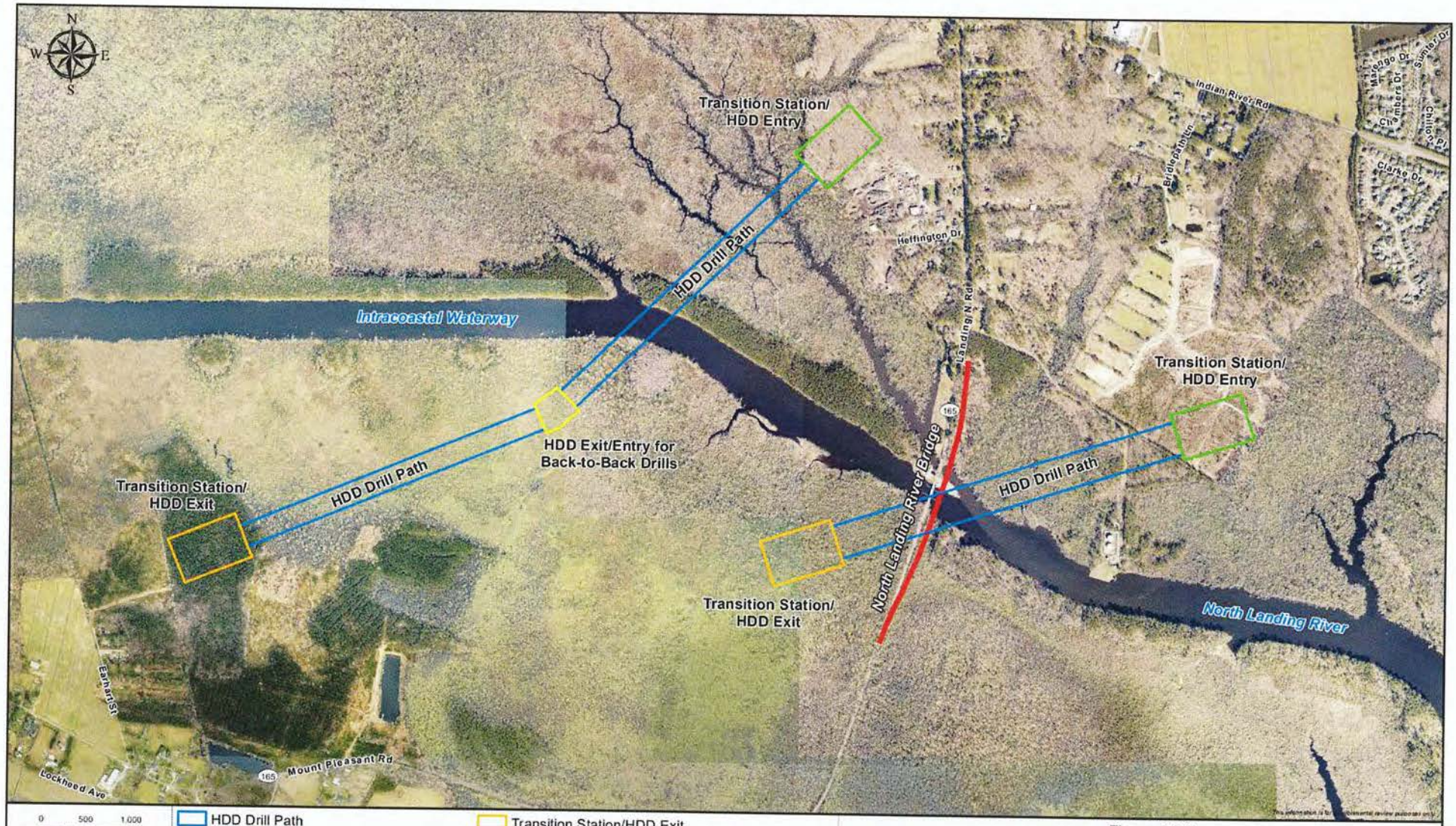

Figure 3.2-3
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Cities of Virginia Beach and Chesapeake, VA
Conceptual Underground Crossings of the Intracoastal Waterway

Dominion Energy

ERM

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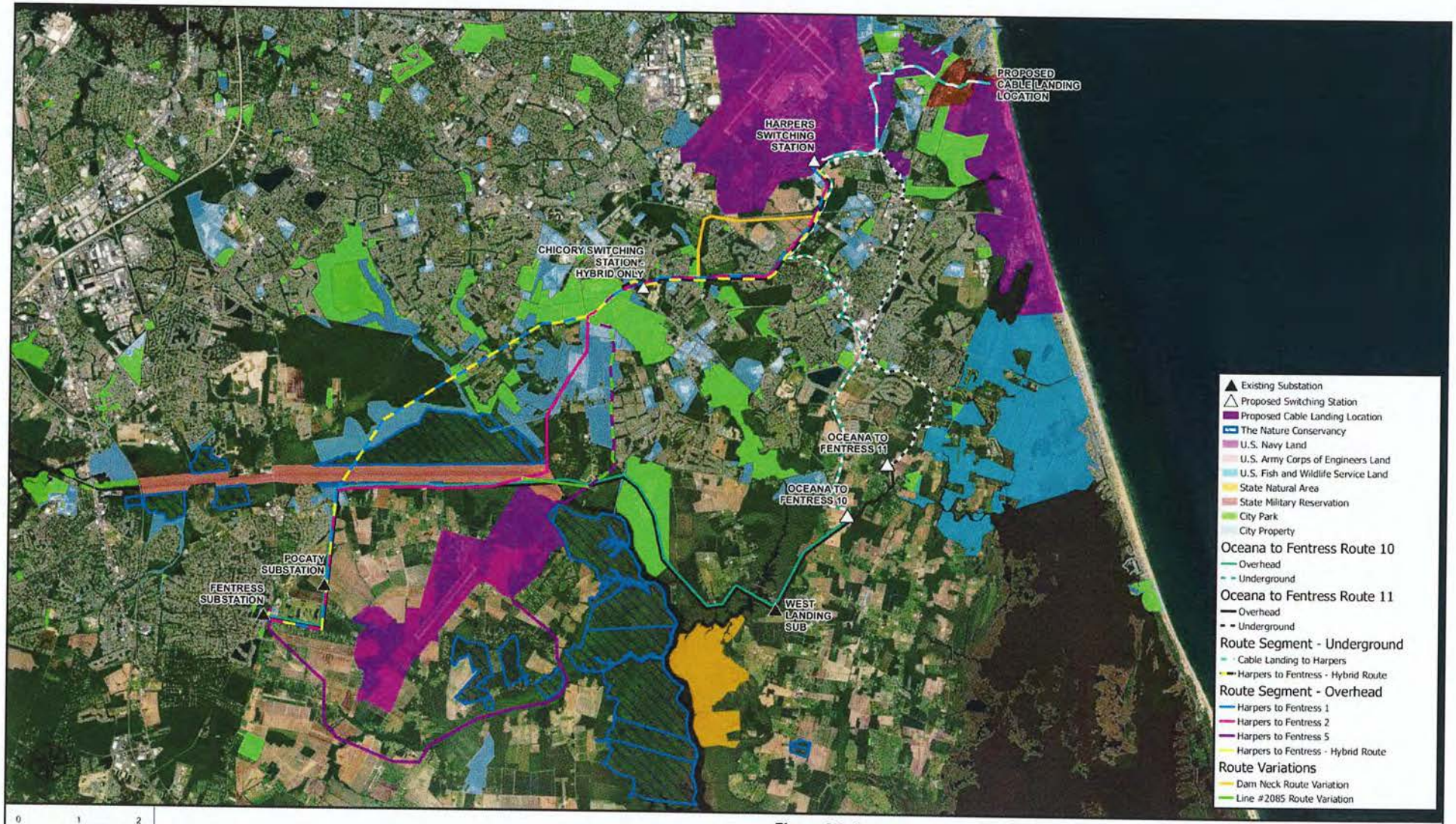

Figure 3.2-4
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Hybrid Routes 10 and 11

Figure 3.2-5
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Underground Segments of Hybrid Routes 10 and 11

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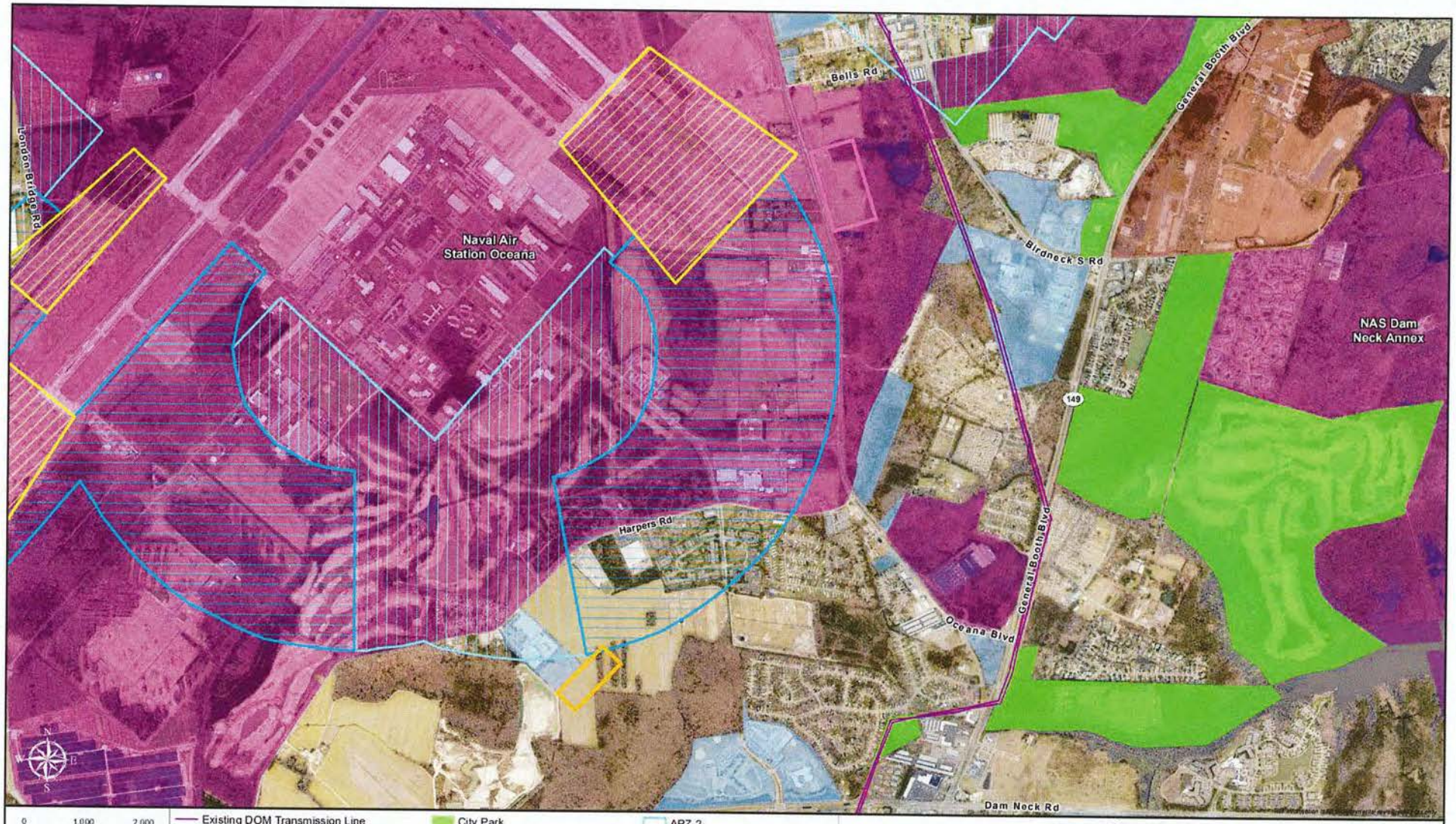


Figure 3.2-6
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
City of Virginia Beach, VA
Oceana Switching Station and Harpers Transition Station Alernative Sites

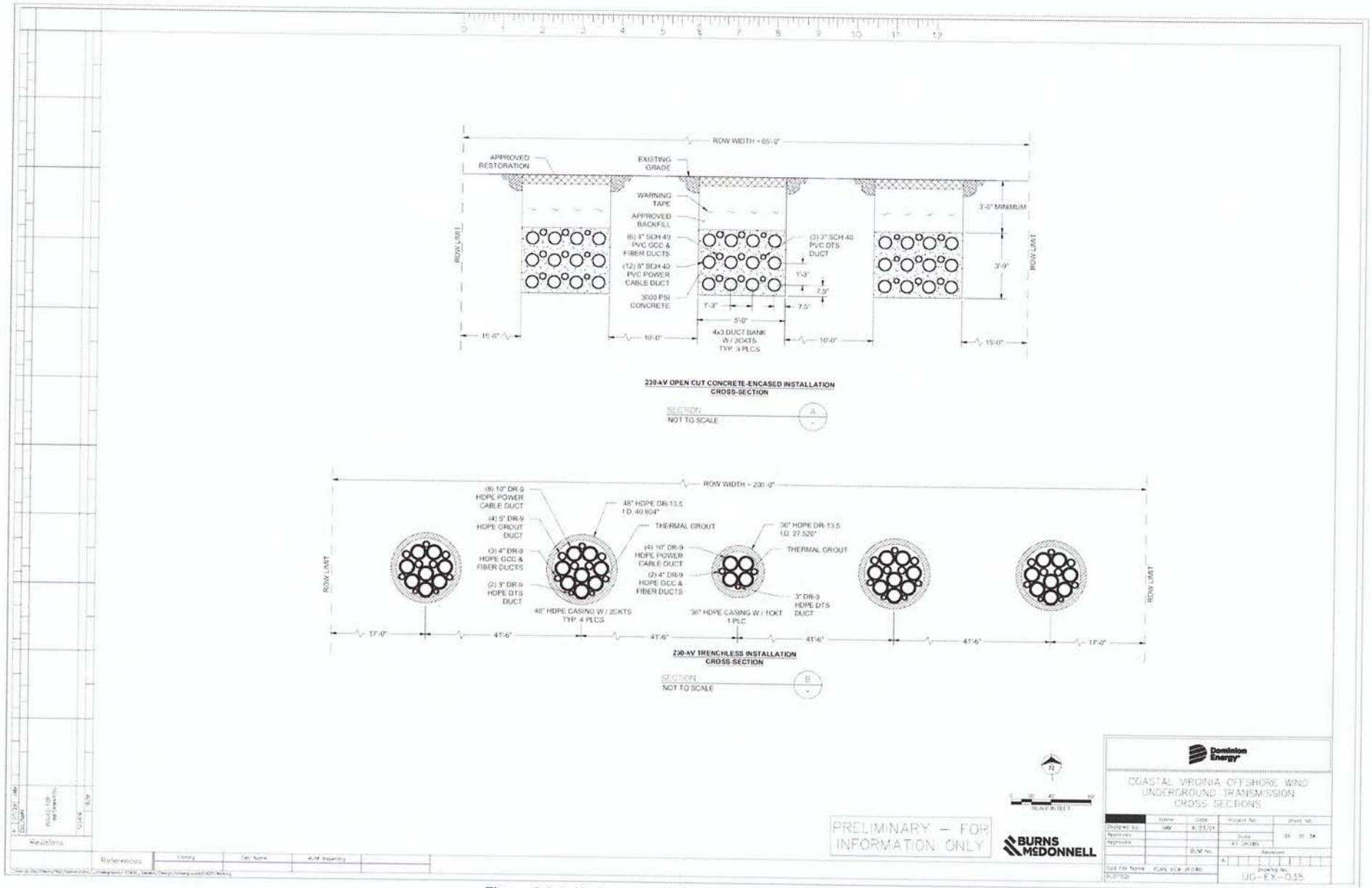
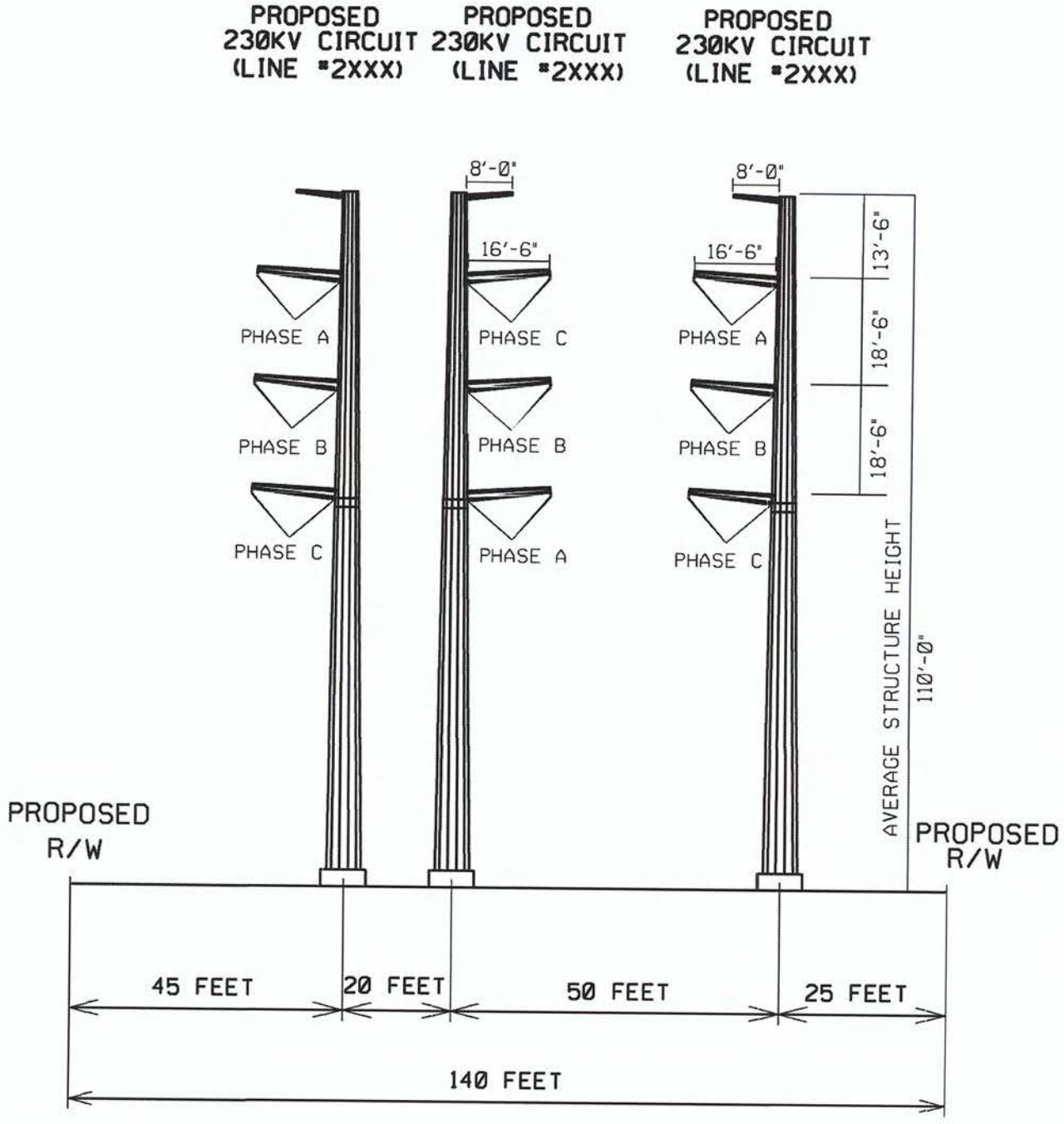


Figure 3.3-1: Underground Transmission Cross Sections

TYPICAL TRANSMISSION RIGHT OF WAY



NOTE: Information contained on drawing is to be considered preliminary in nature and subject to change based on final design.

Figure 3.3-2: Typical Transmission Right of Way (Greenfield)

$DGNSPEC$

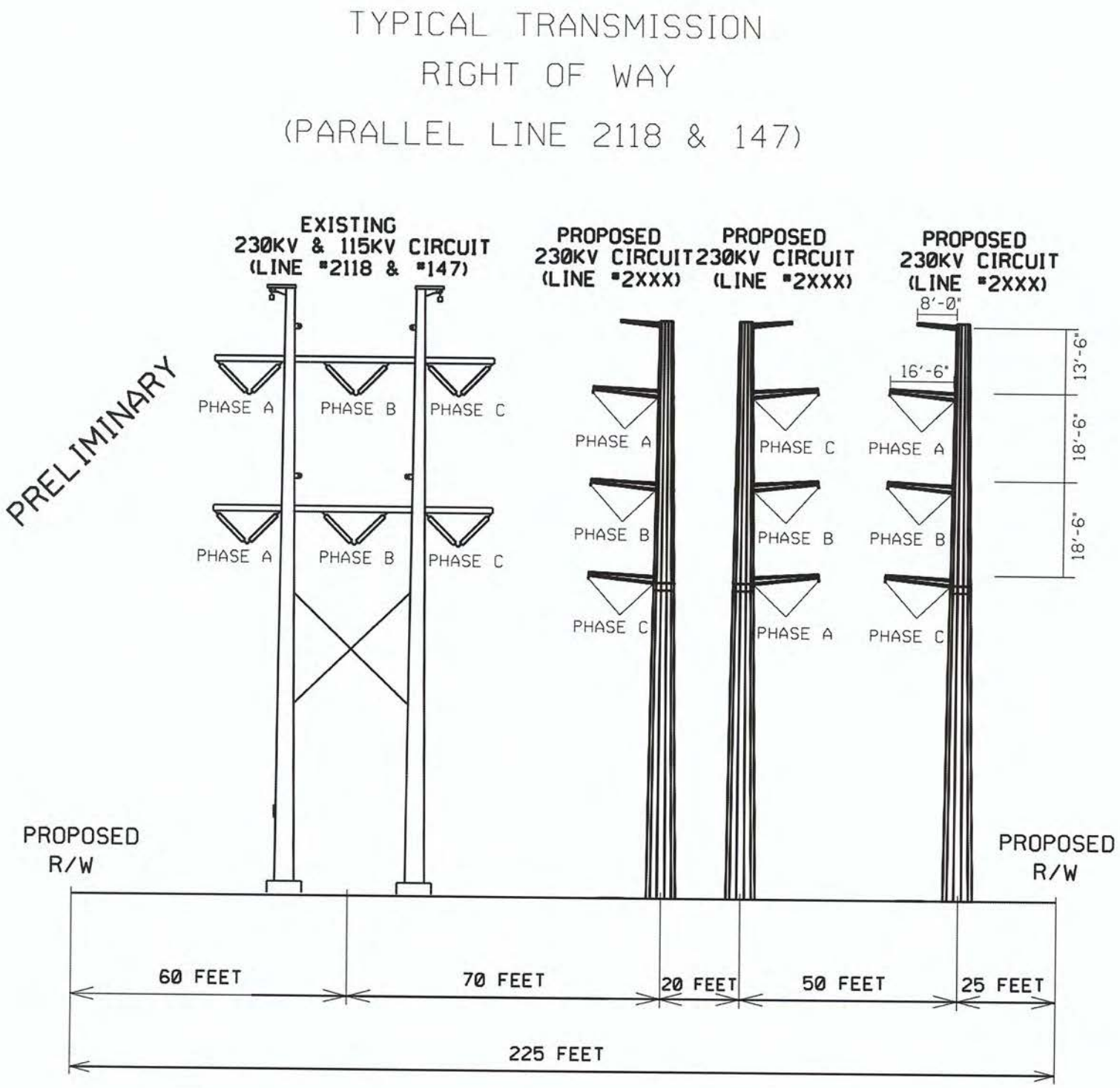


Figure 3.3-3: Typical Transmission Right of Way (Parallel Lines #2118 and #147)

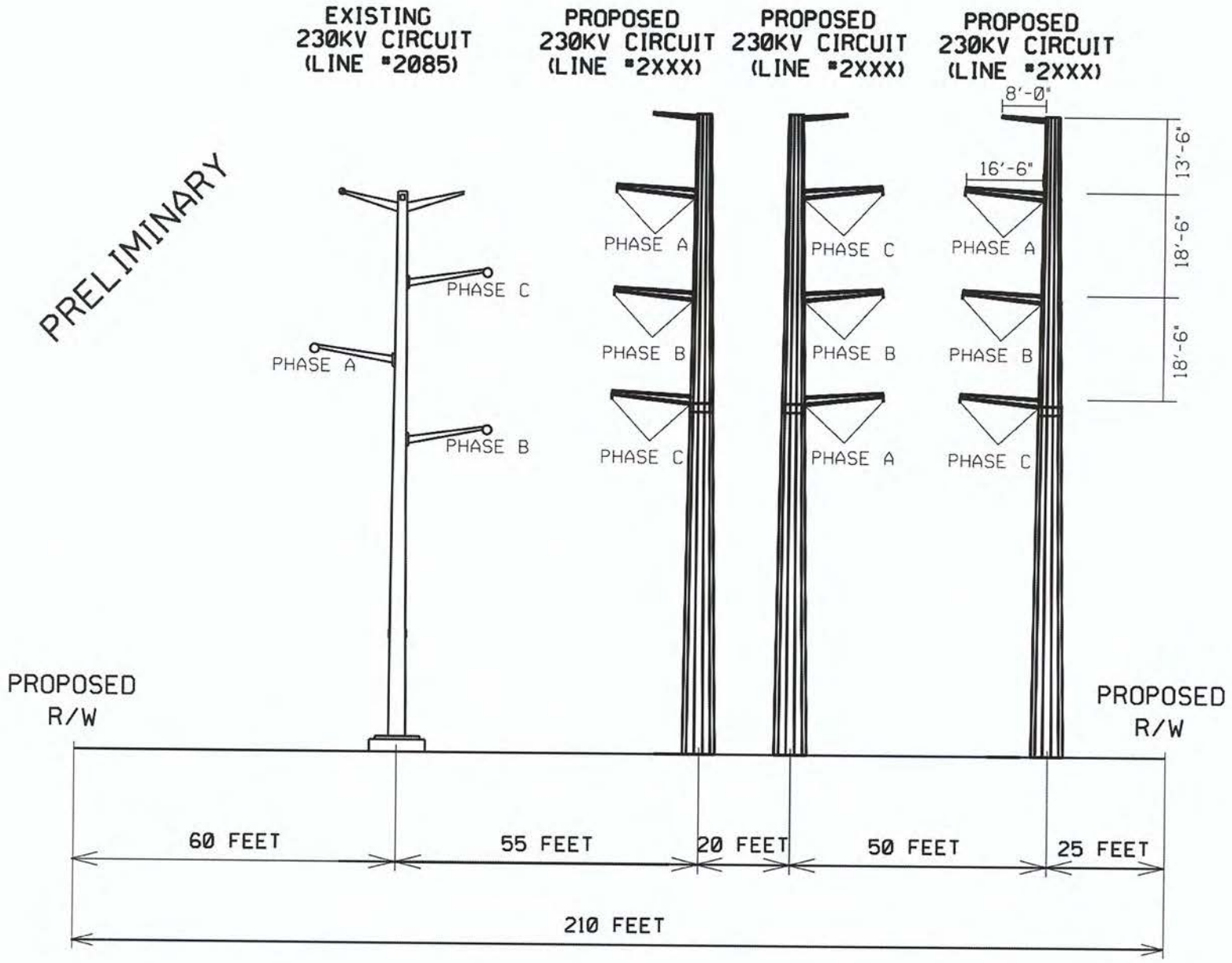


Figure 3.3-4: Typical Transmission Right of Way (Parallel Line #2085)

TYPICAL TRANSMISSION
RIGHT OF WAY
(TL 271 CORRIDOR - WRECK & REBUILD - WEST)

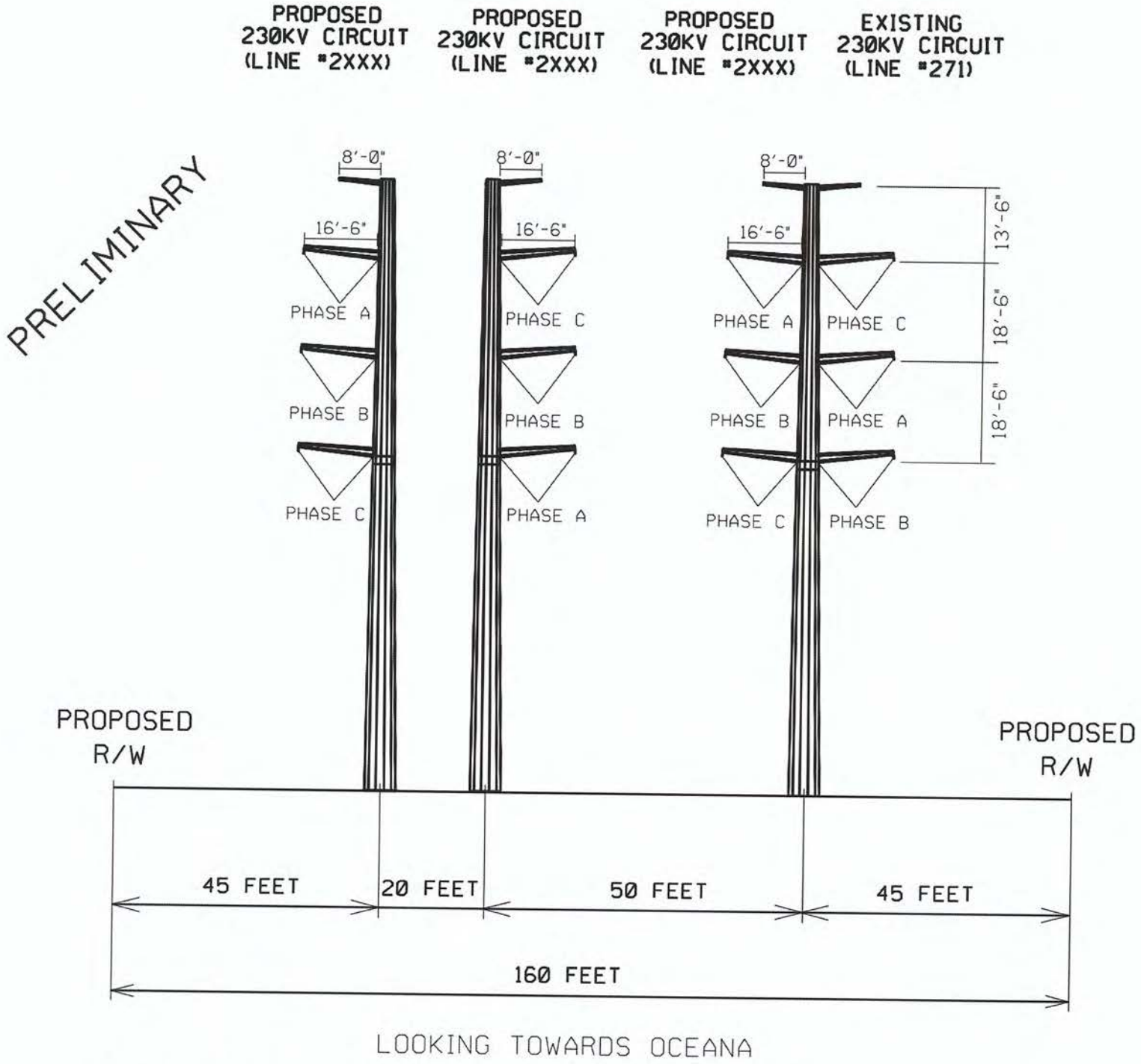


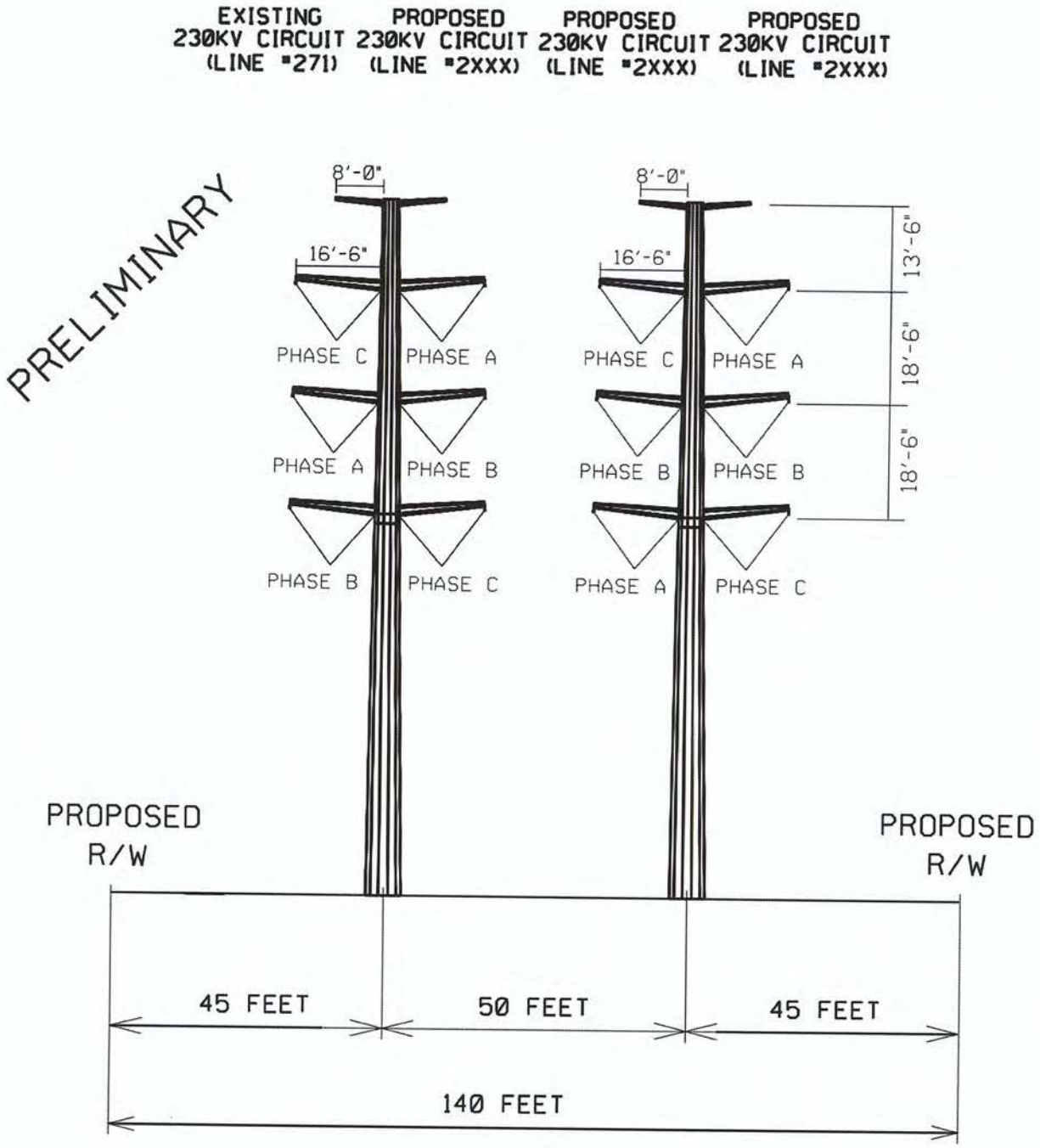
Figure 3.3-5: Typical Transmission Right of Way (Line #271 Corridor–Wreck and Rebuild–West)

NOTE: Information contained on drawing is to be considered preliminary in nature and subject to change based on final design.

TYPICAL TRANSMISSION RIGHT OF WAY

TL 271 CORRIDOR - WRECK & REBUILD

2 DC MONOPOLE OPTION



LOOKING TOWARDS HARPERS

Figure 3.3-6: Typical Transmission Right of Way (Line #271 Corridor–Wreck and Rebuild–2DC)

NOTE: Information contained on drawing is to be considered preliminary in nature and subject to change based on final design.

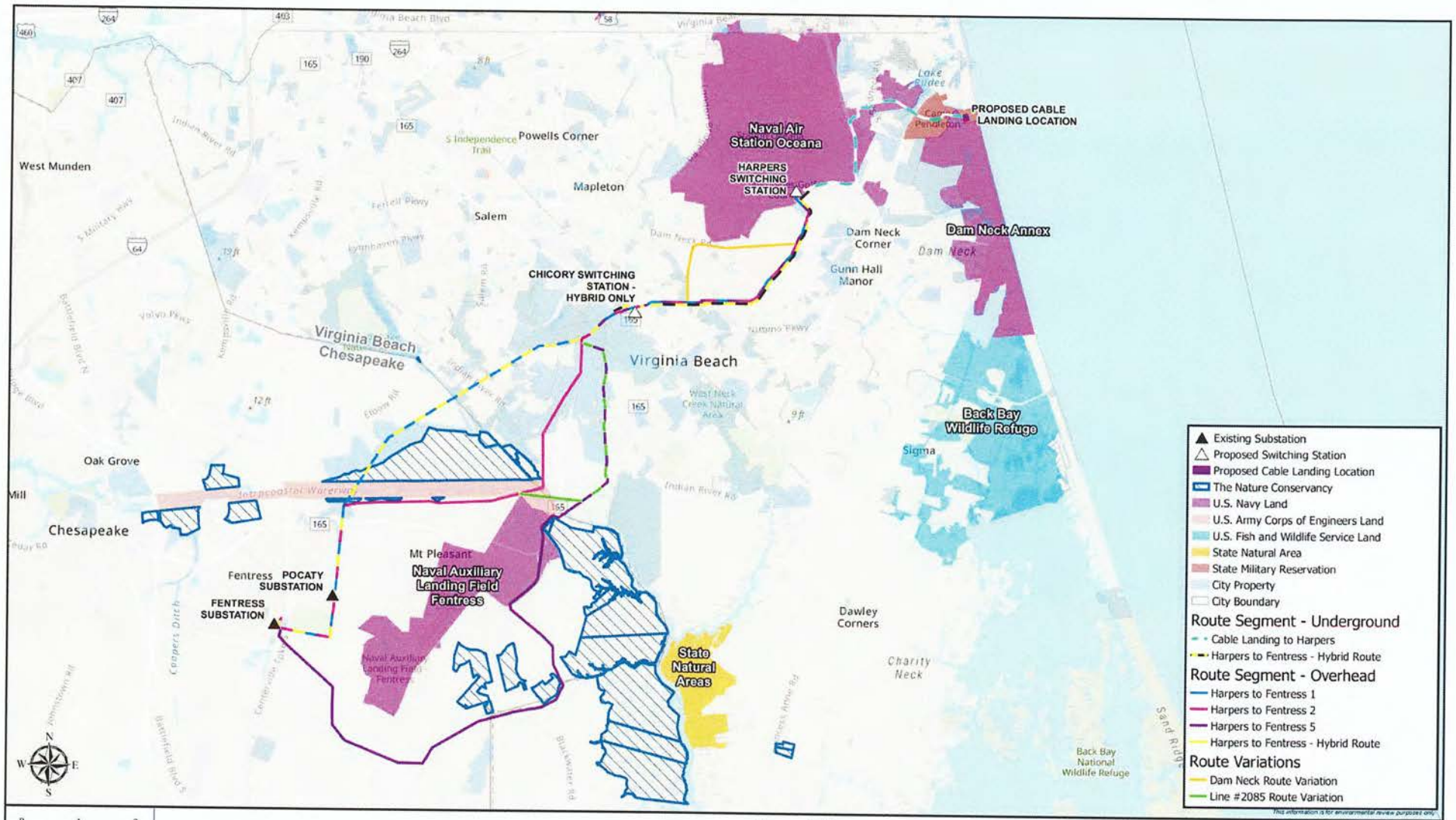


Figure 4.1-1
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Land Ownership

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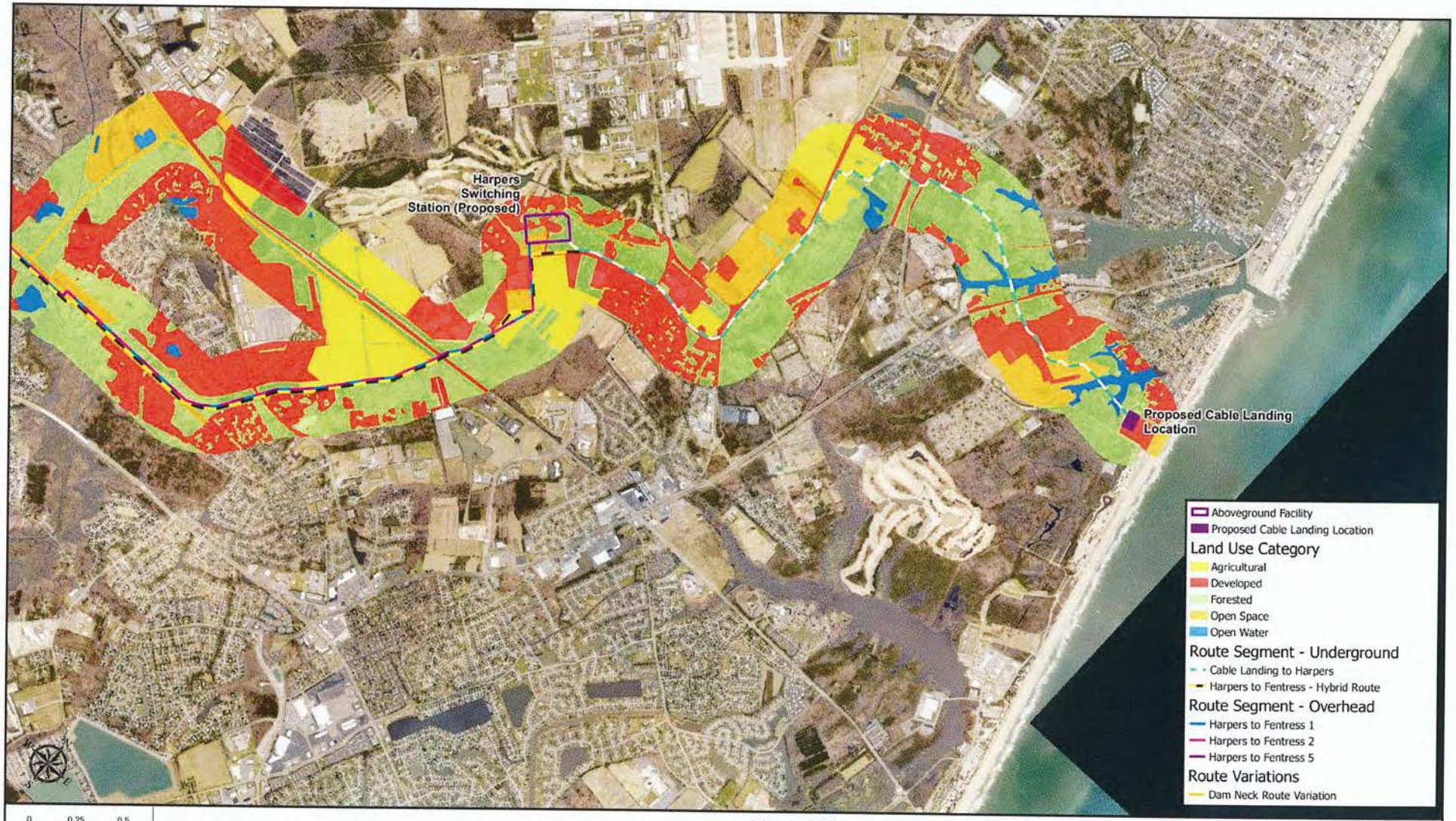

Figure 4.2-1
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Land Use/Land Cover

ERM

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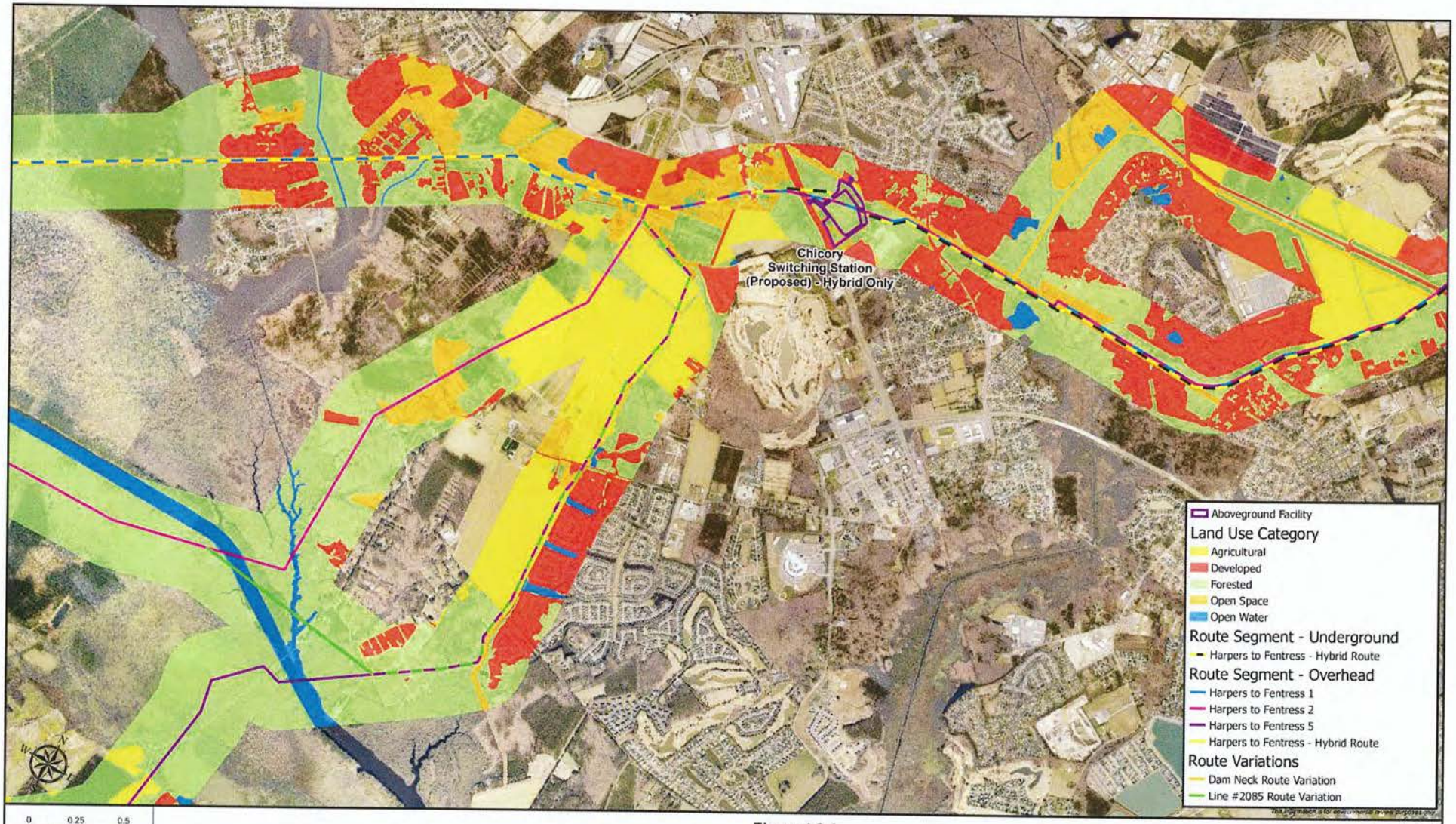

Figure 4.2-1
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Land Use/Land Cover

ERM

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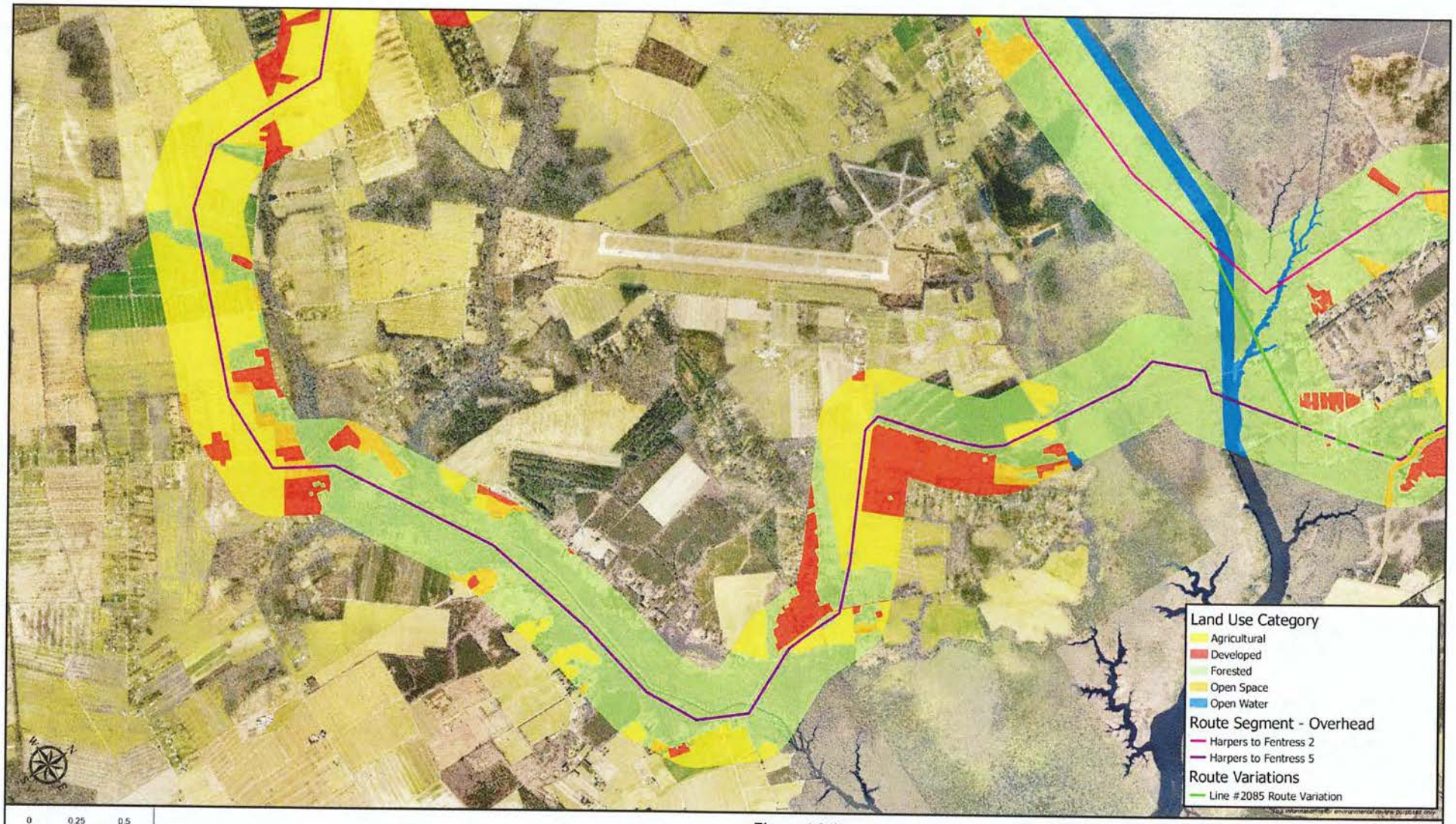

Figure 4.2-1
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Land Use/Land Cover

ERM

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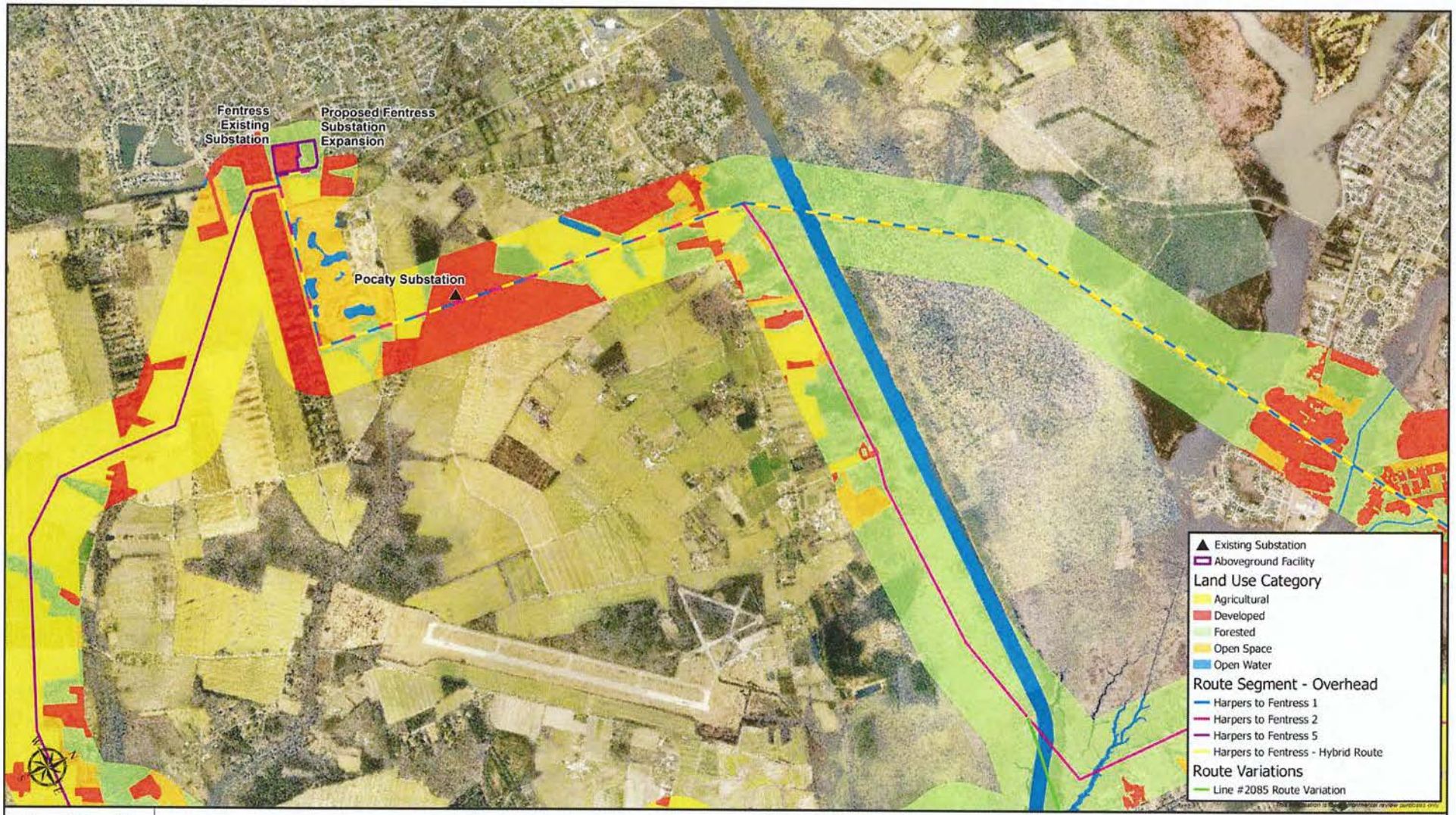

Figure 4.2-1
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Land Use/Land Cover

Dominion Energy

ERM

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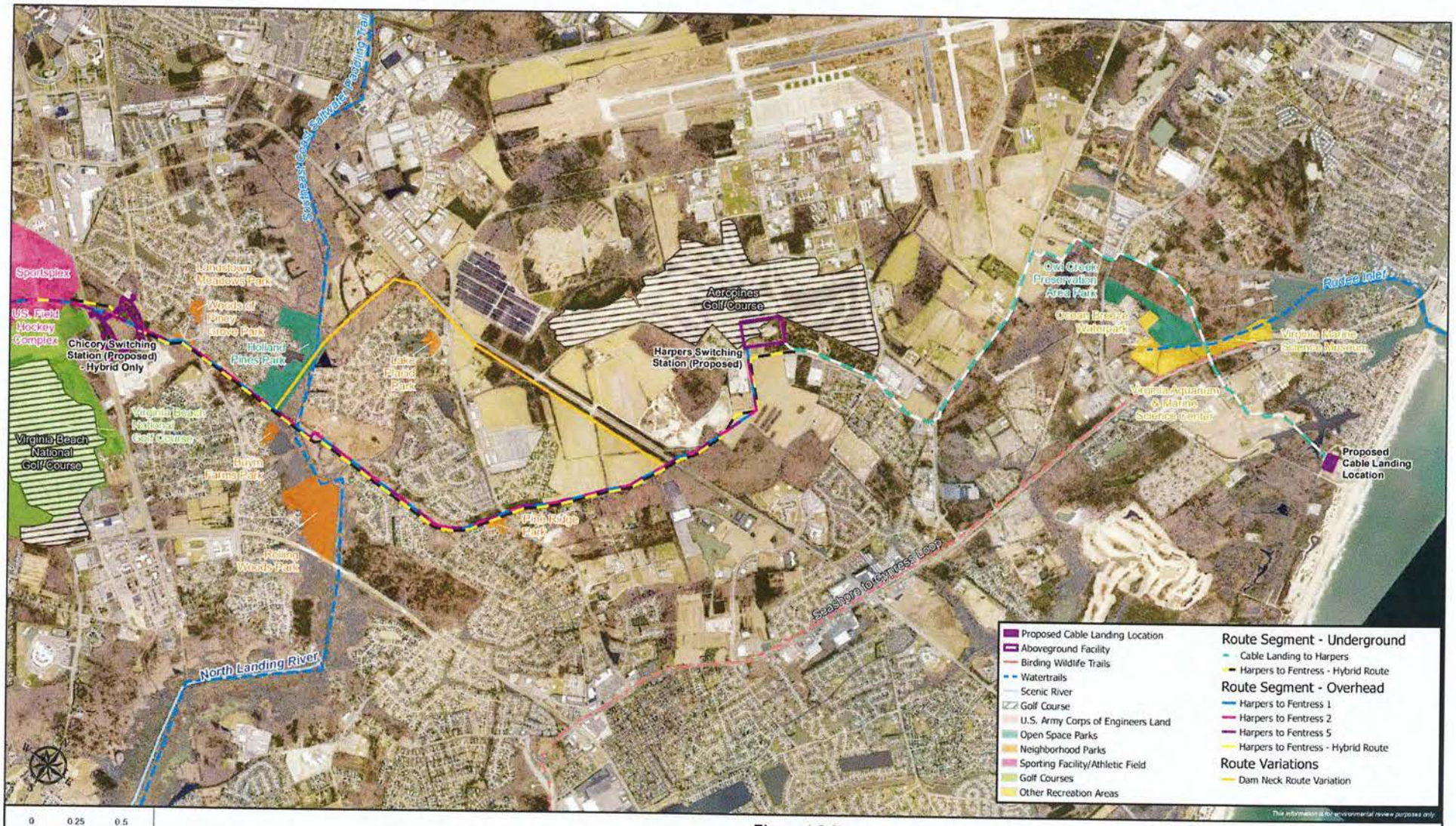

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Dominion Energy

Figure 4.2-2
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Recreational Areas within 0.25 Mile of a Proposed Route

ERM

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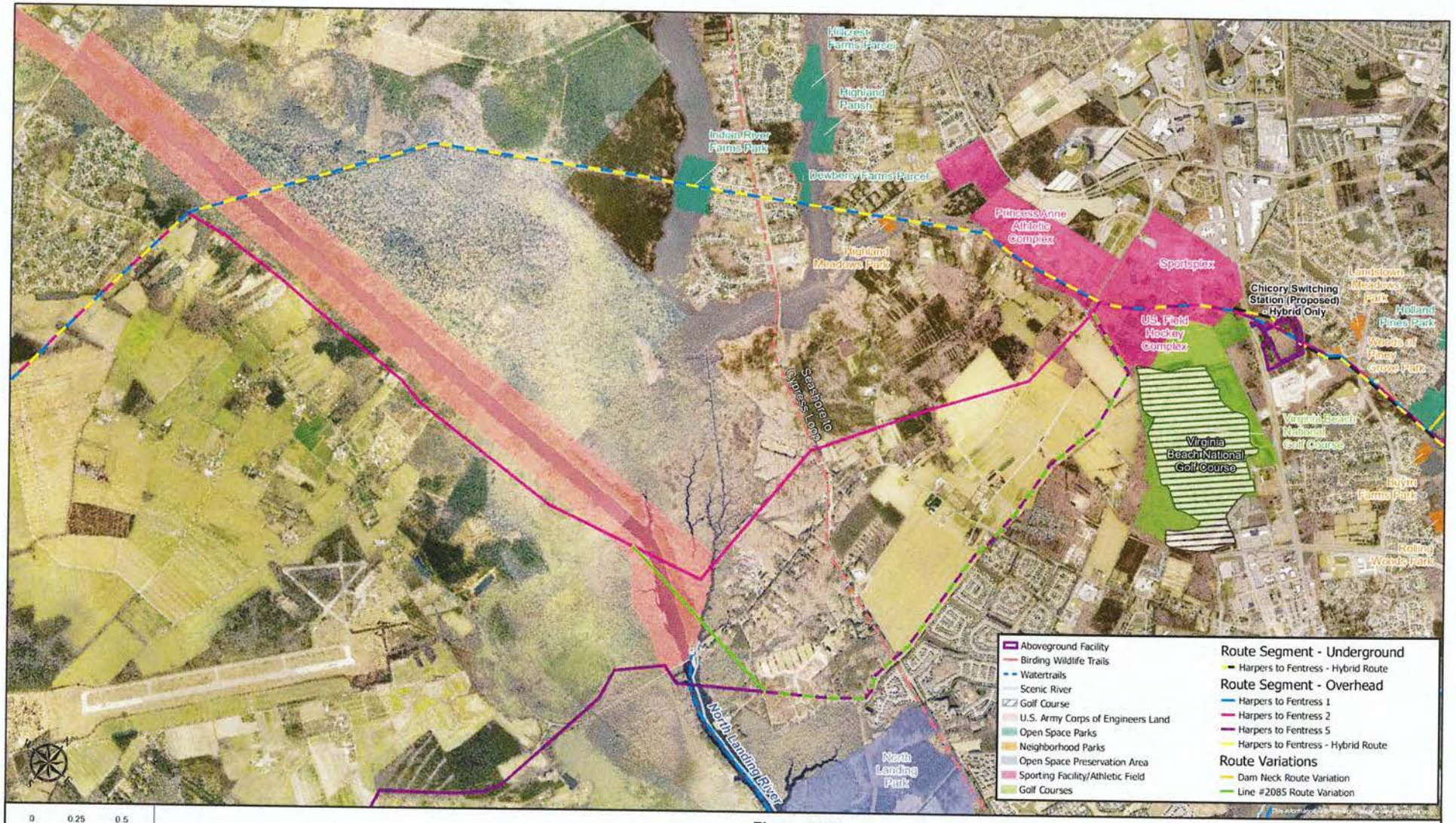

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Dominion Energy

Figure 4.2-2
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Recreational Areas within 0.25 Mile of a Proposed Route

ERM

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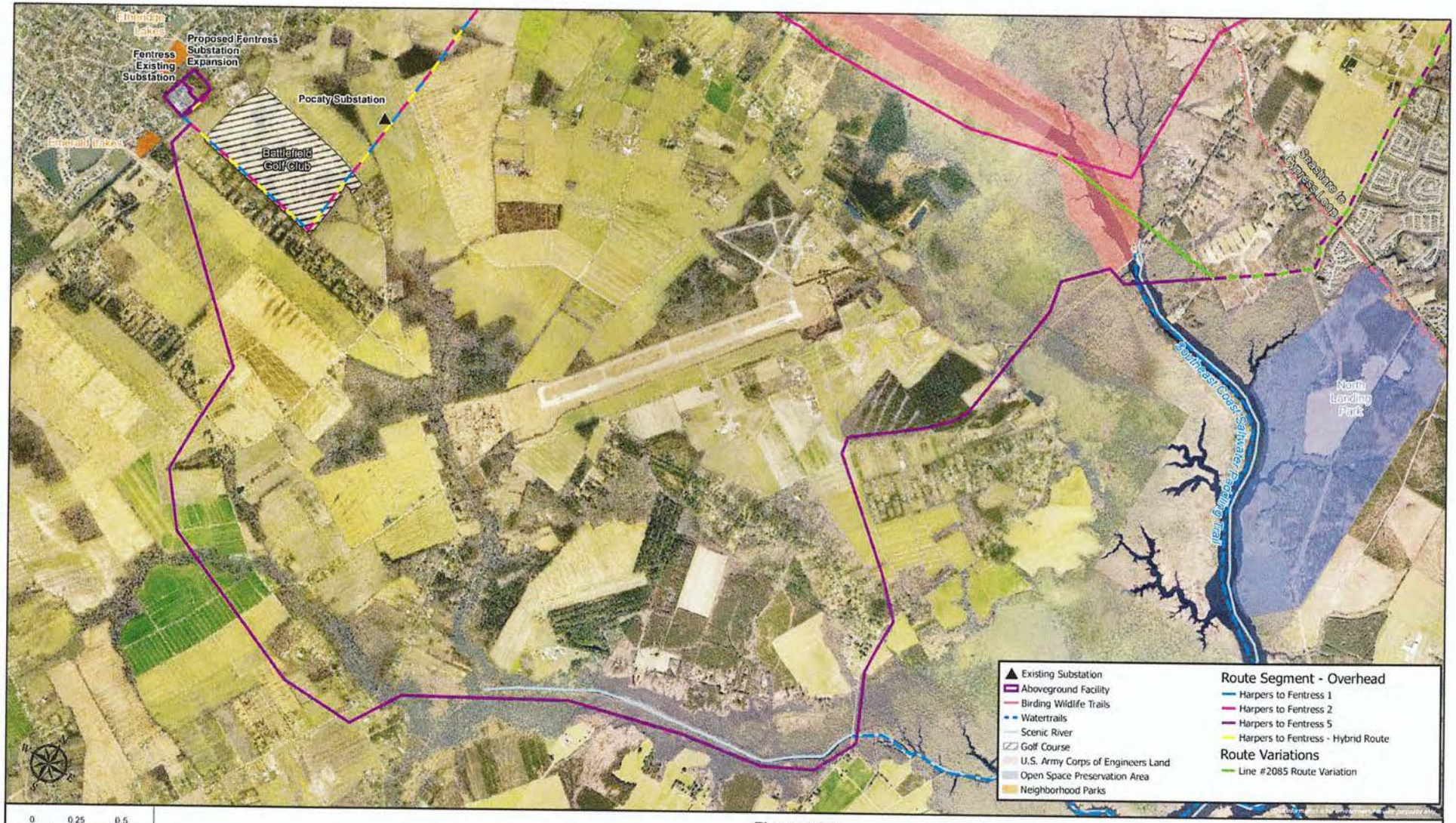

Figure 4.2-2
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Recreational Areas within 0.25 Mile of a Proposed Route

ERM

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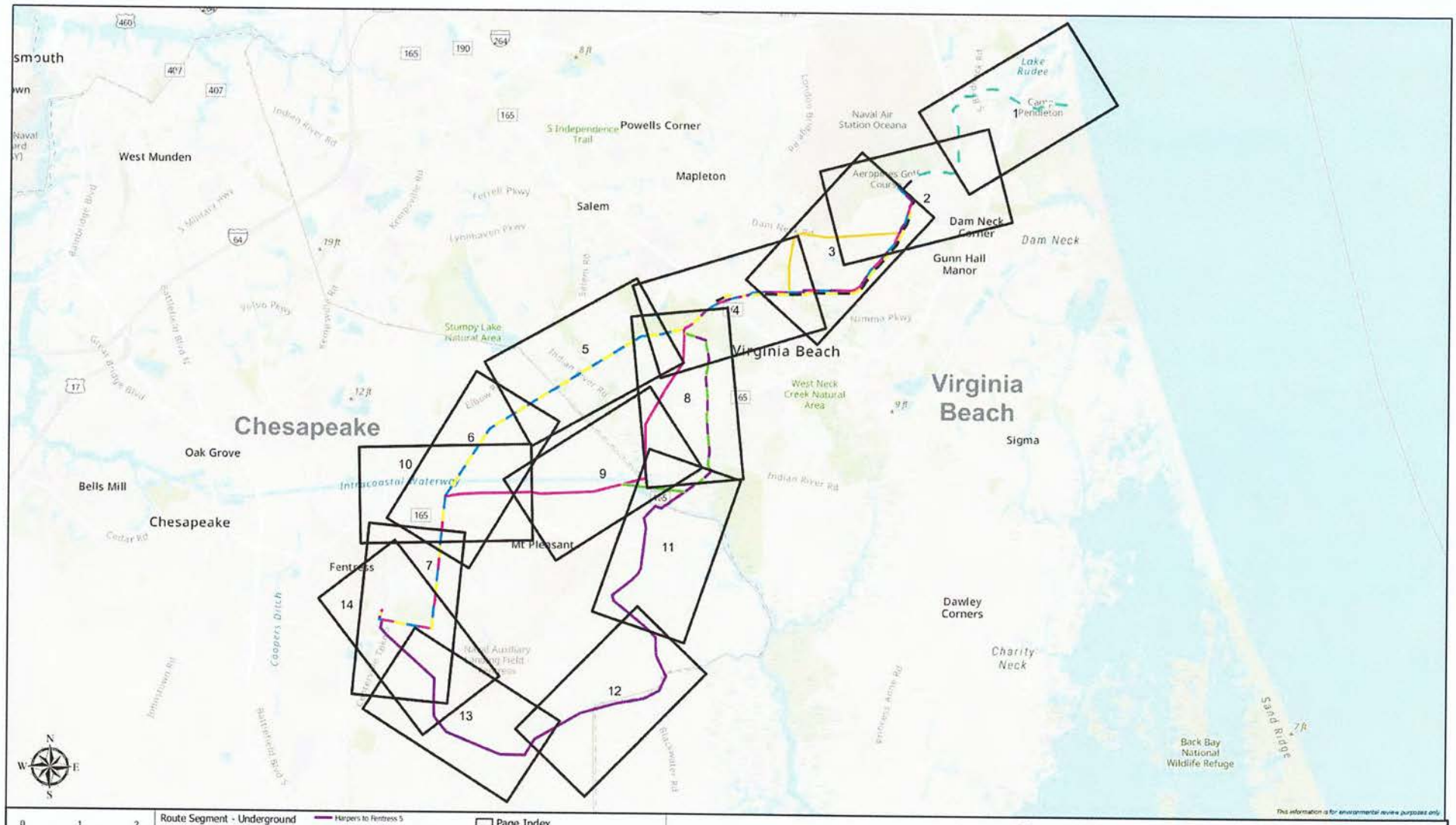

Figure 4.2-3
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Existing Residences and Commercial Buildings Index Map

Dominion Energy

ERM

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Figure 4.2-3
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Existing Residences and Commercial Buildings within 500 feet of a Proposed Route

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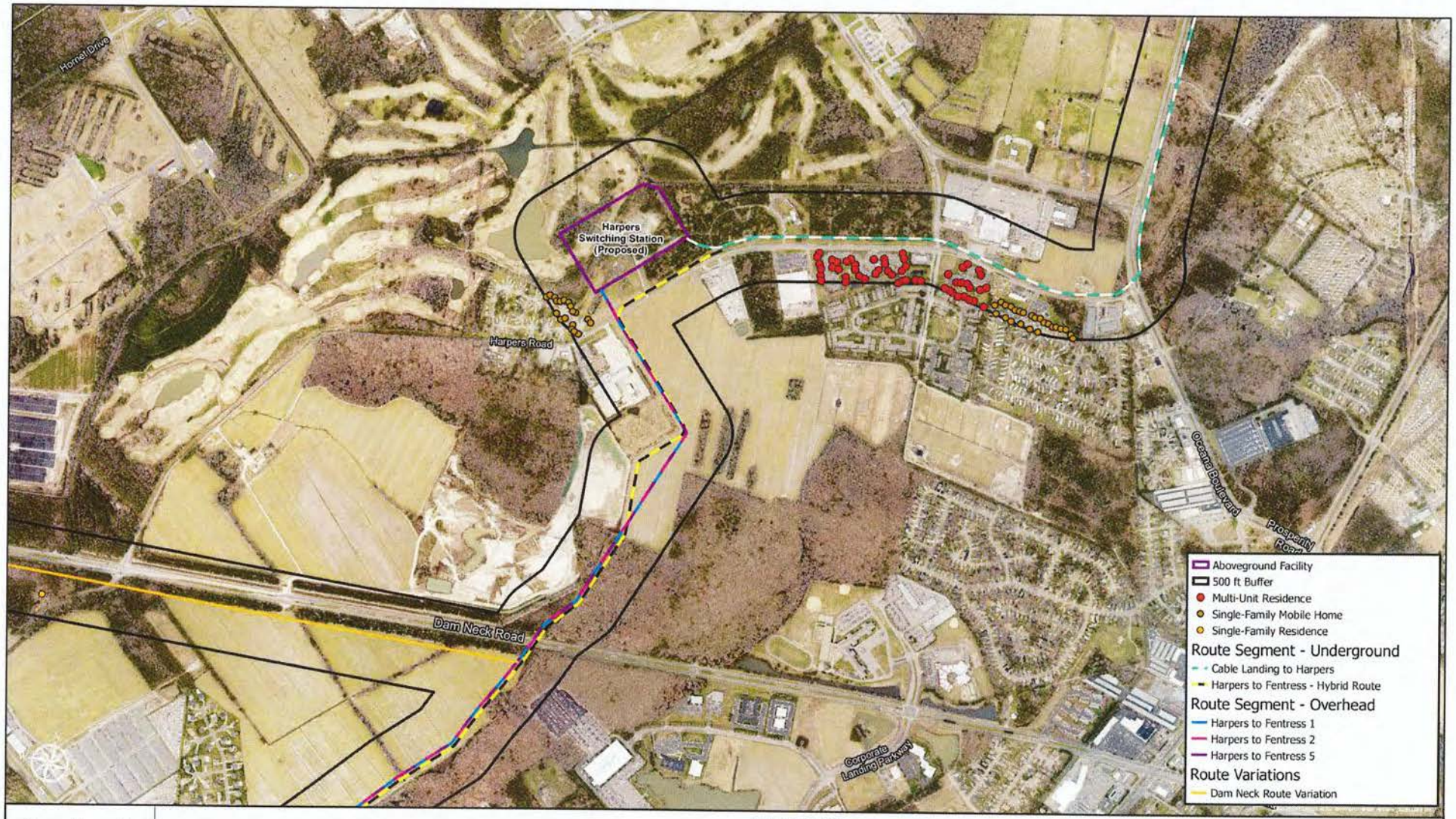

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Dominion Energy

Figure 4.2-3
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Existing Residences and Commercial Buildings within 500 feet of a Proposed Route

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Figure 4.2-3
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Existing Residences and Commercial Buildings within 500 feet of a Proposed Route

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Dominion Energy

Figure 4.2-3
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Existing Residences and Commercial Buildings within 500 feet of a Proposed Route

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Figure 4.2-3
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Existing Residences and Commercial Buildings within 500 feet of a Proposed Route

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Figure 4.2-3
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Existing Residences and Commercial Buildings within 500 feet of a Proposed Route

ERM

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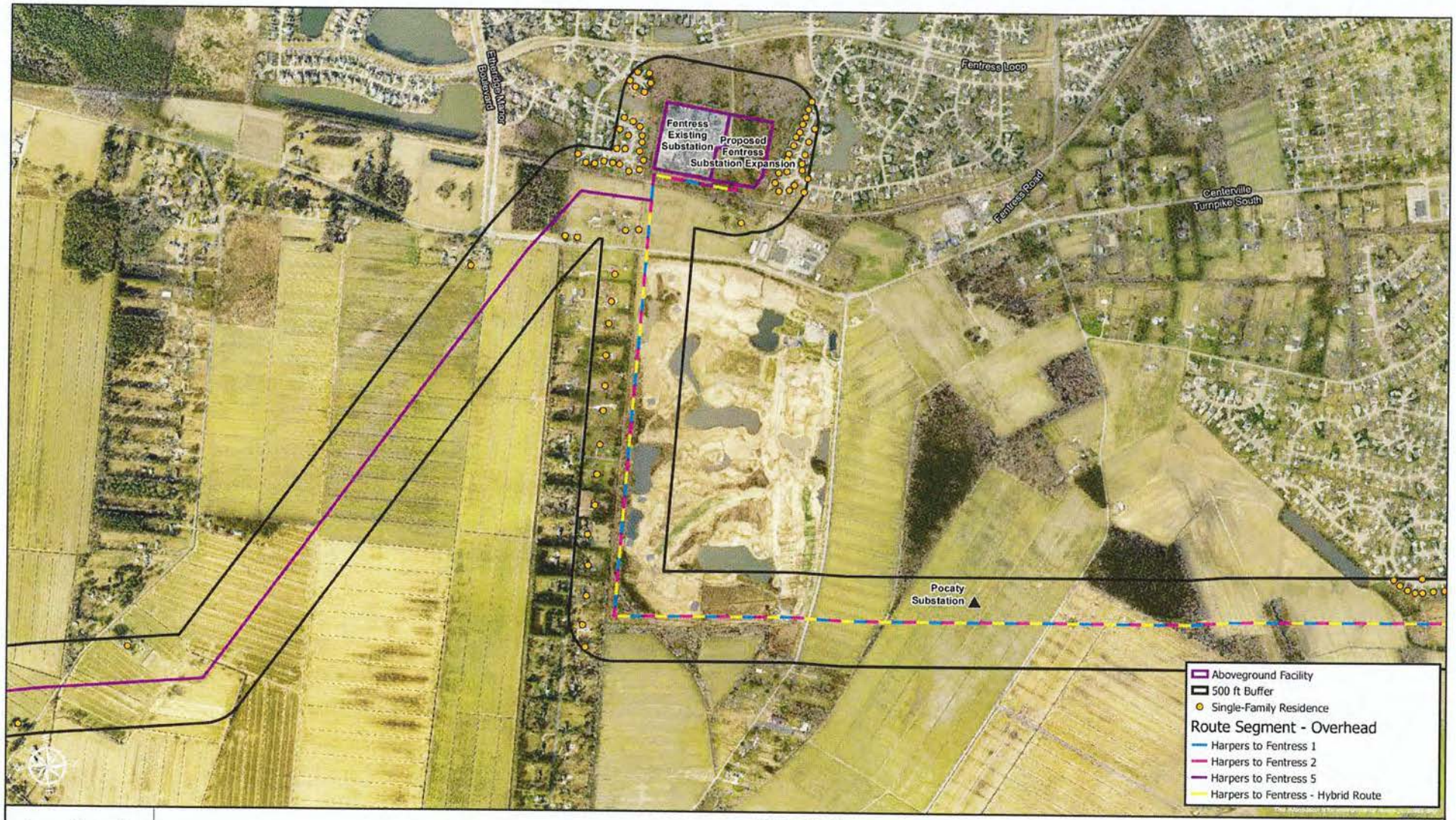

Figure 4.2-3
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Existing Residences and Commercial Buildings within 500 feet of a Proposed Route

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Figure 4.2-3
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Existing Residences and Commercial Buildings within 500 feet of a Proposed Route

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Figure 4.2-3
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Existing Residences and Commercial Buildings within 500 feet of a Proposed Route

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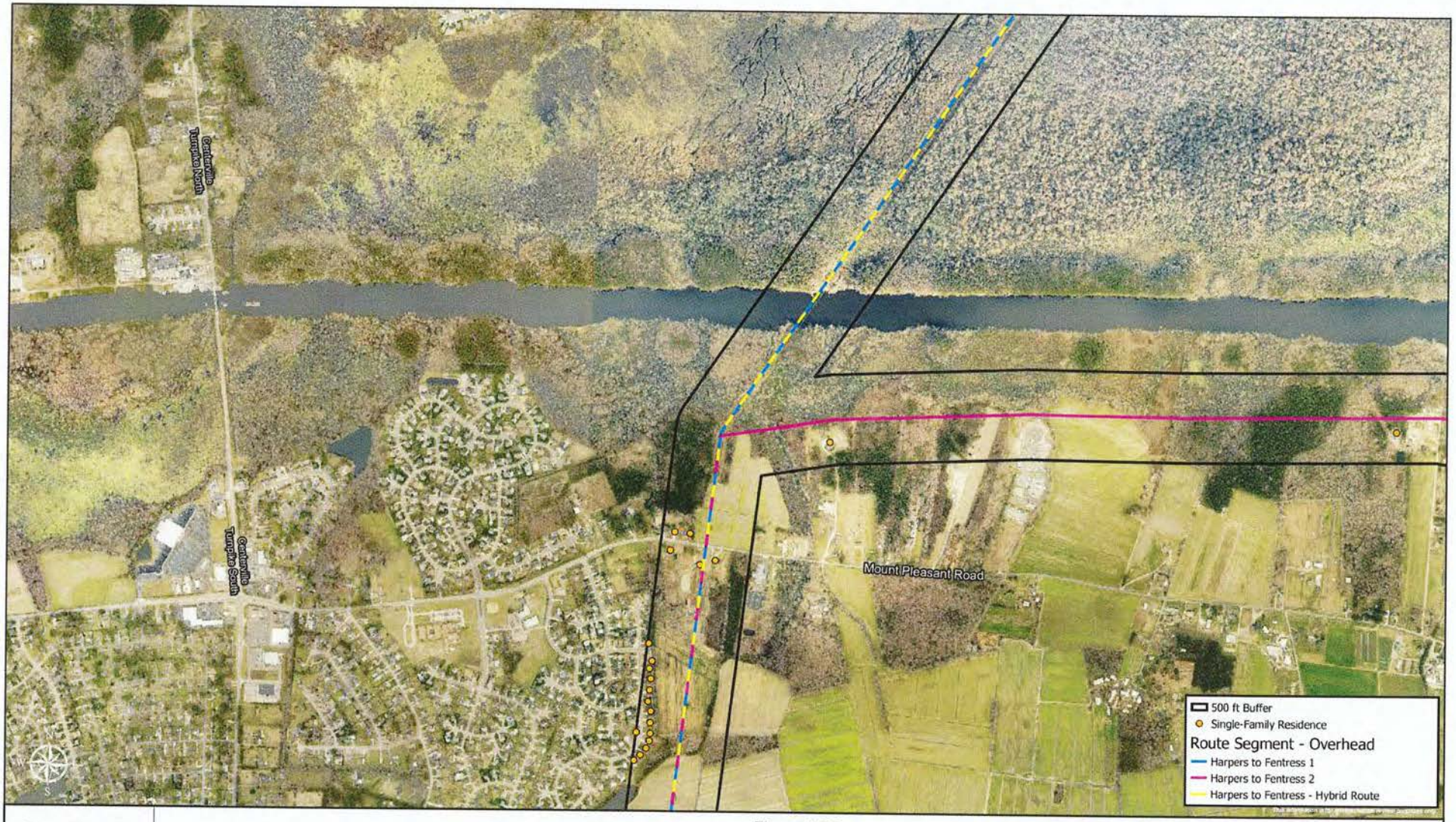

Figure 4.2-3
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Existing Residences and Commercial Buildings within 500 feet of a Proposed Route

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Figure 4.2-3
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Existing Residences and Commercial Buildings within 500 feet of a Proposed Route

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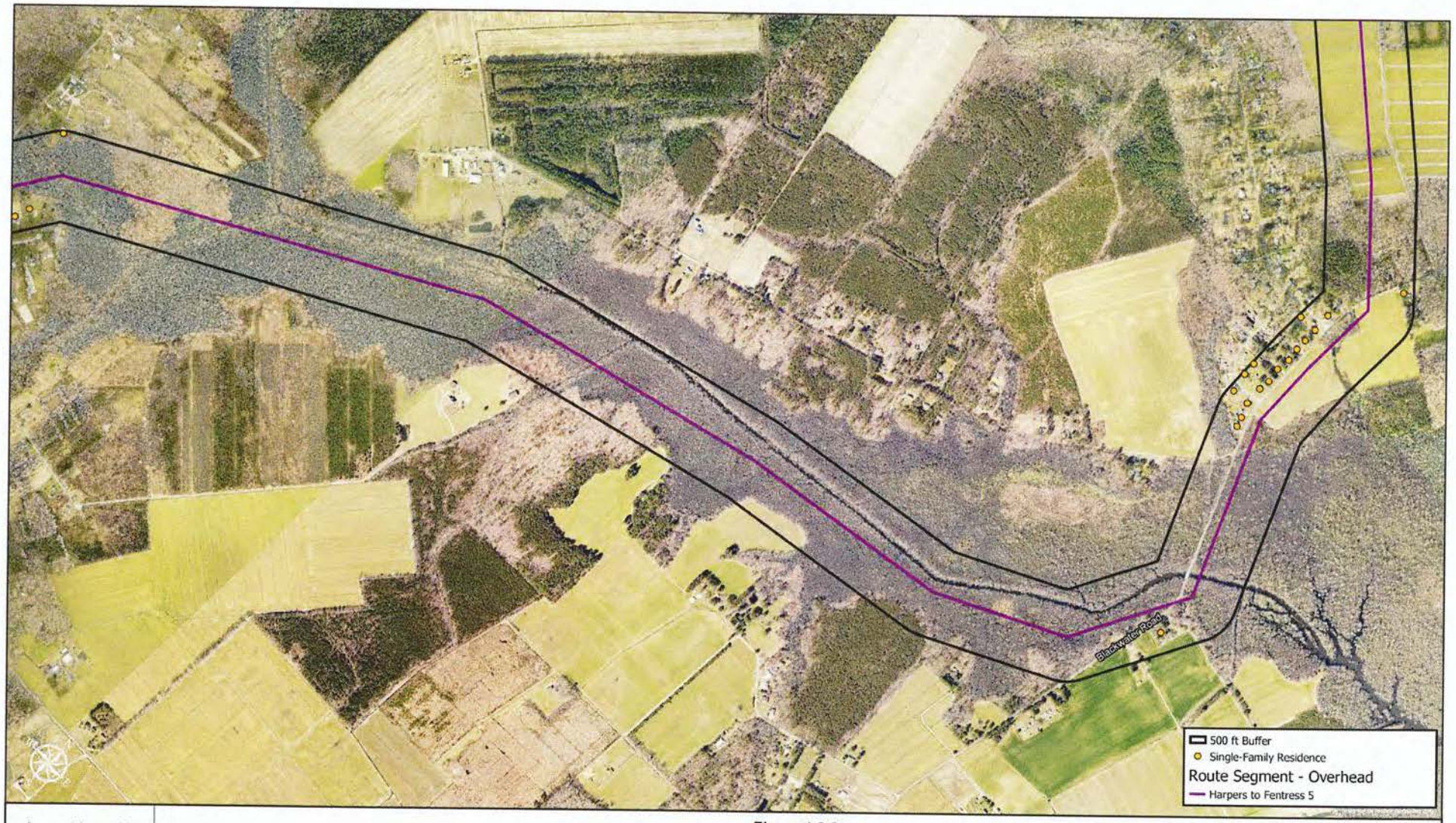

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Dominion Energy

Figure 4.2-3
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Existing Residences and Commercial Buildings within 500 feet of a Proposed Route

ERM

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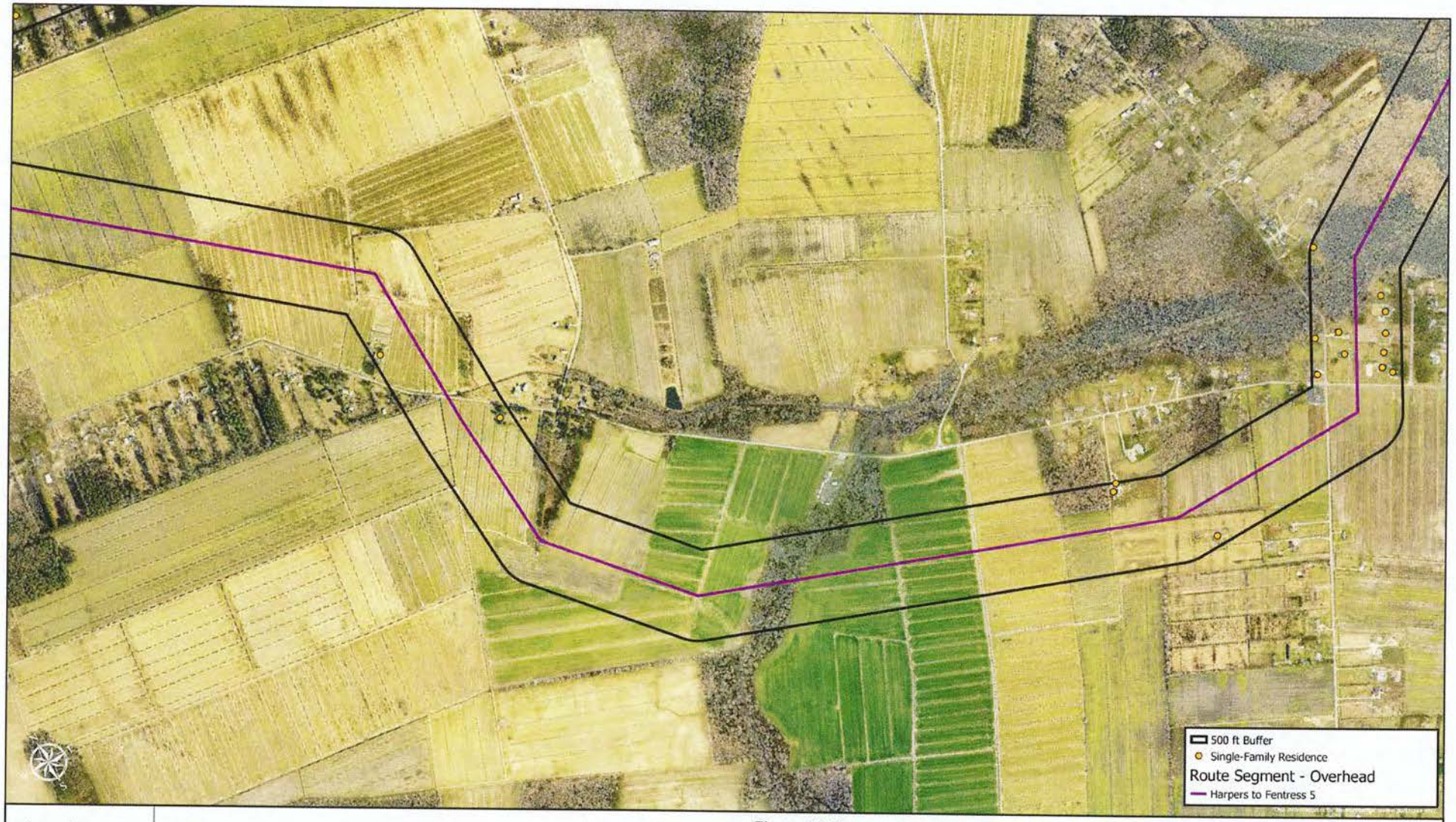

Figure 4.2-3
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Existing Residences and Commercial Buildings within 500 feet of a Proposed Route

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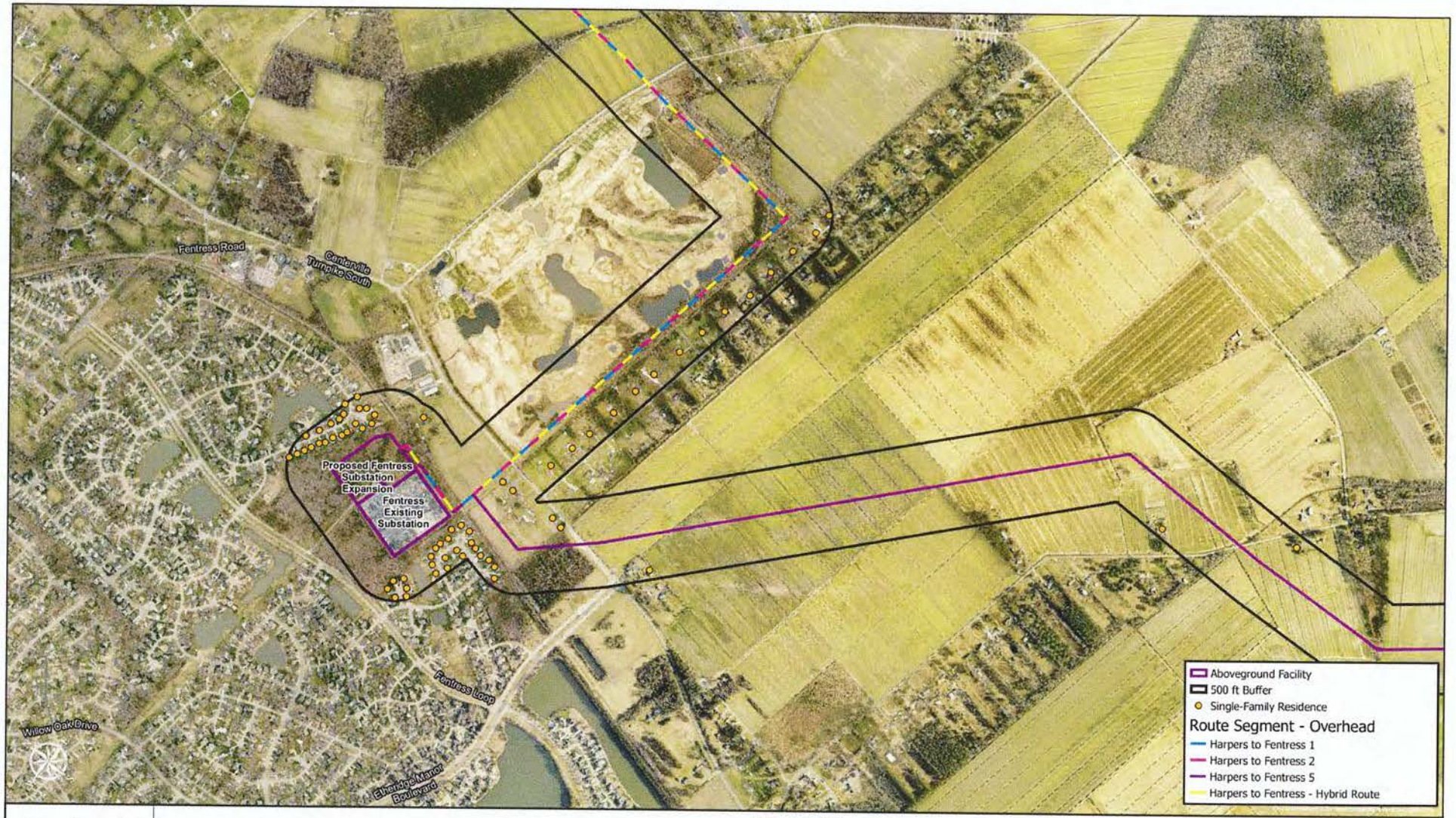

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Dominion Energy

Figure 4.2-3
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Existing Residences and Commercial Buildings within 500 feet of a Proposed Route

ERM

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Figure 4.2-4
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Cemeteries, Schools, Churches

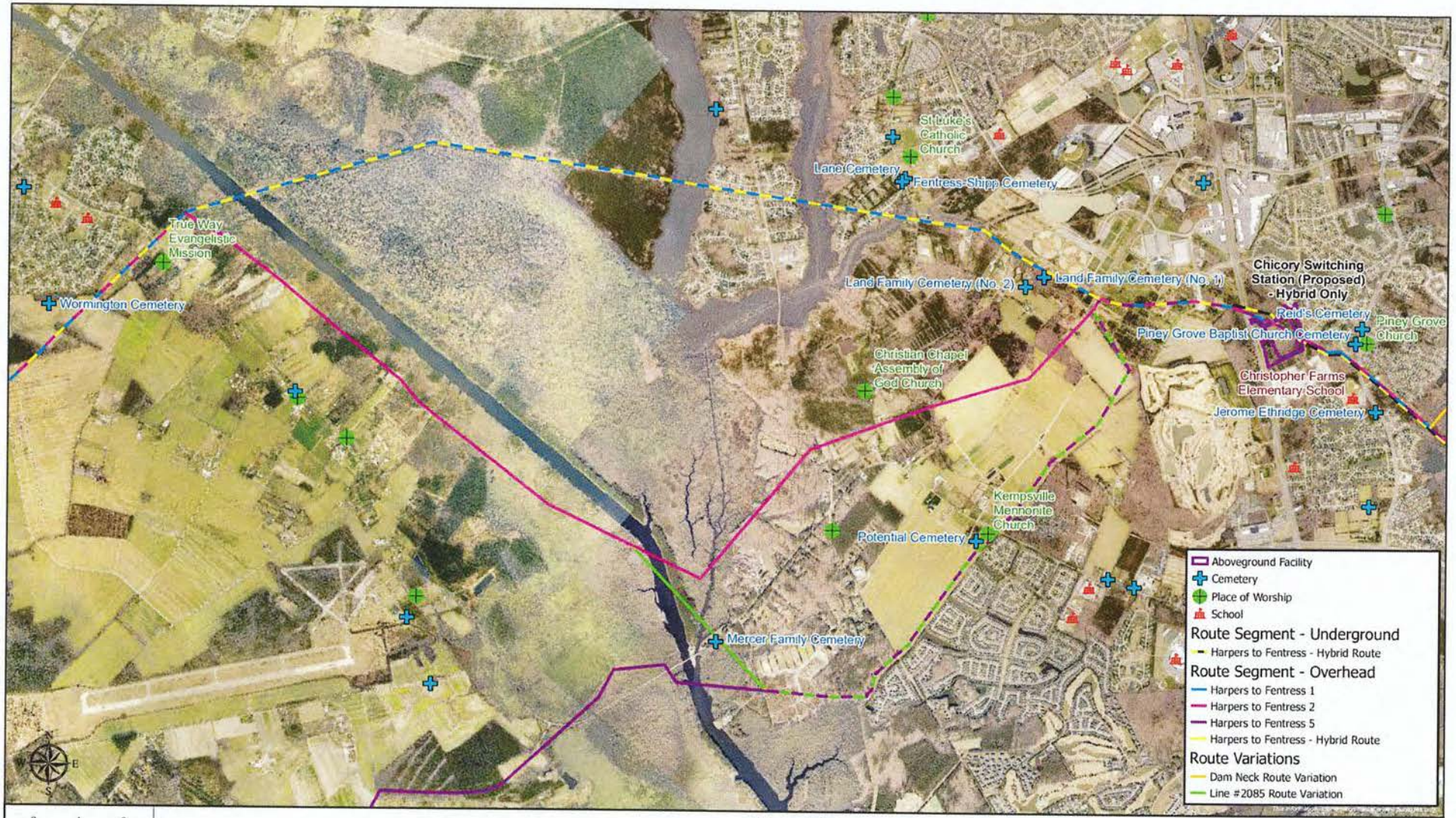

Figure 4.2-4
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Cemeteries, Schools, Churches

ERM

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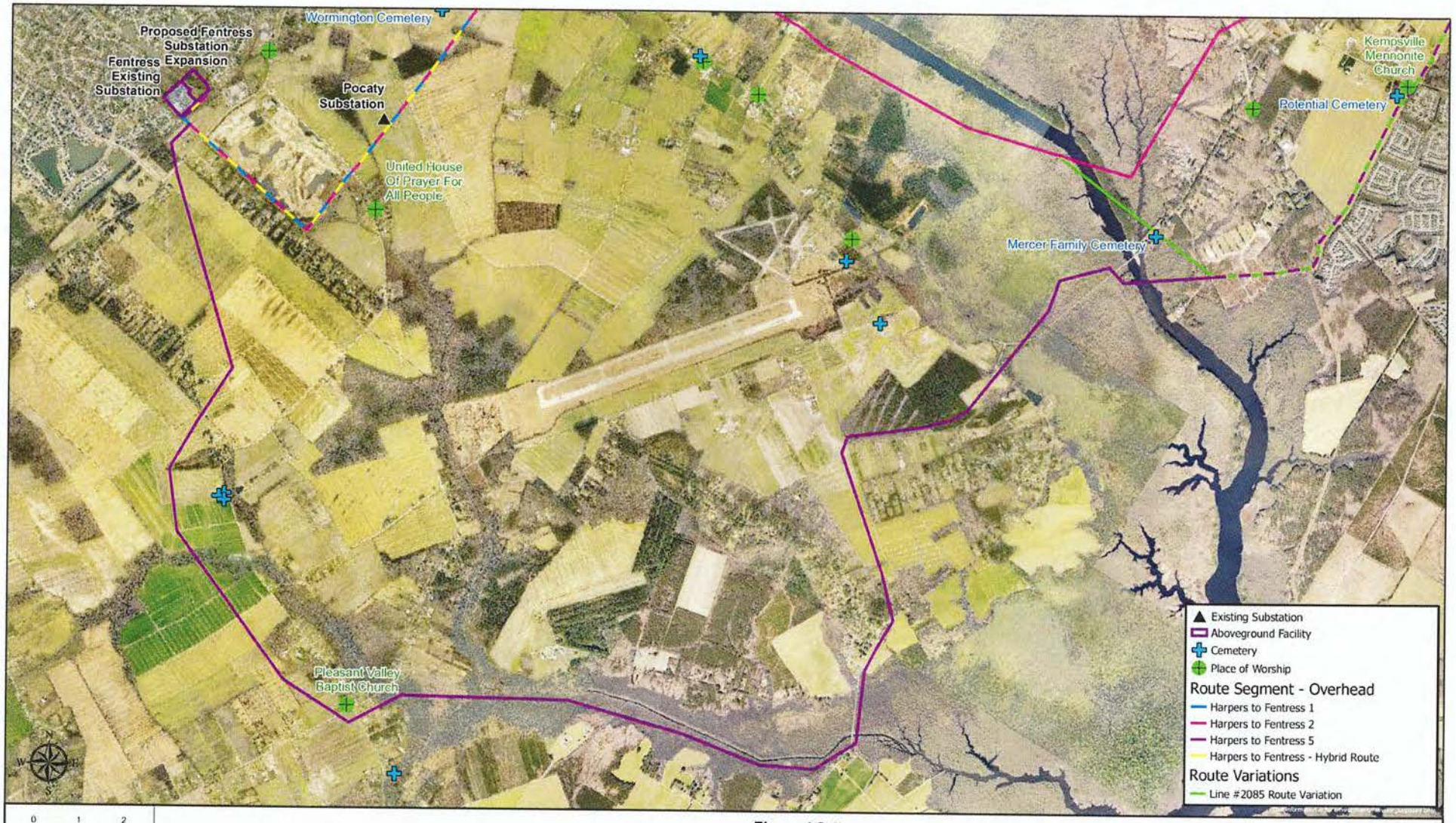

Figure 4.2-4
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Cemeteries, Schools, Churches

ERM

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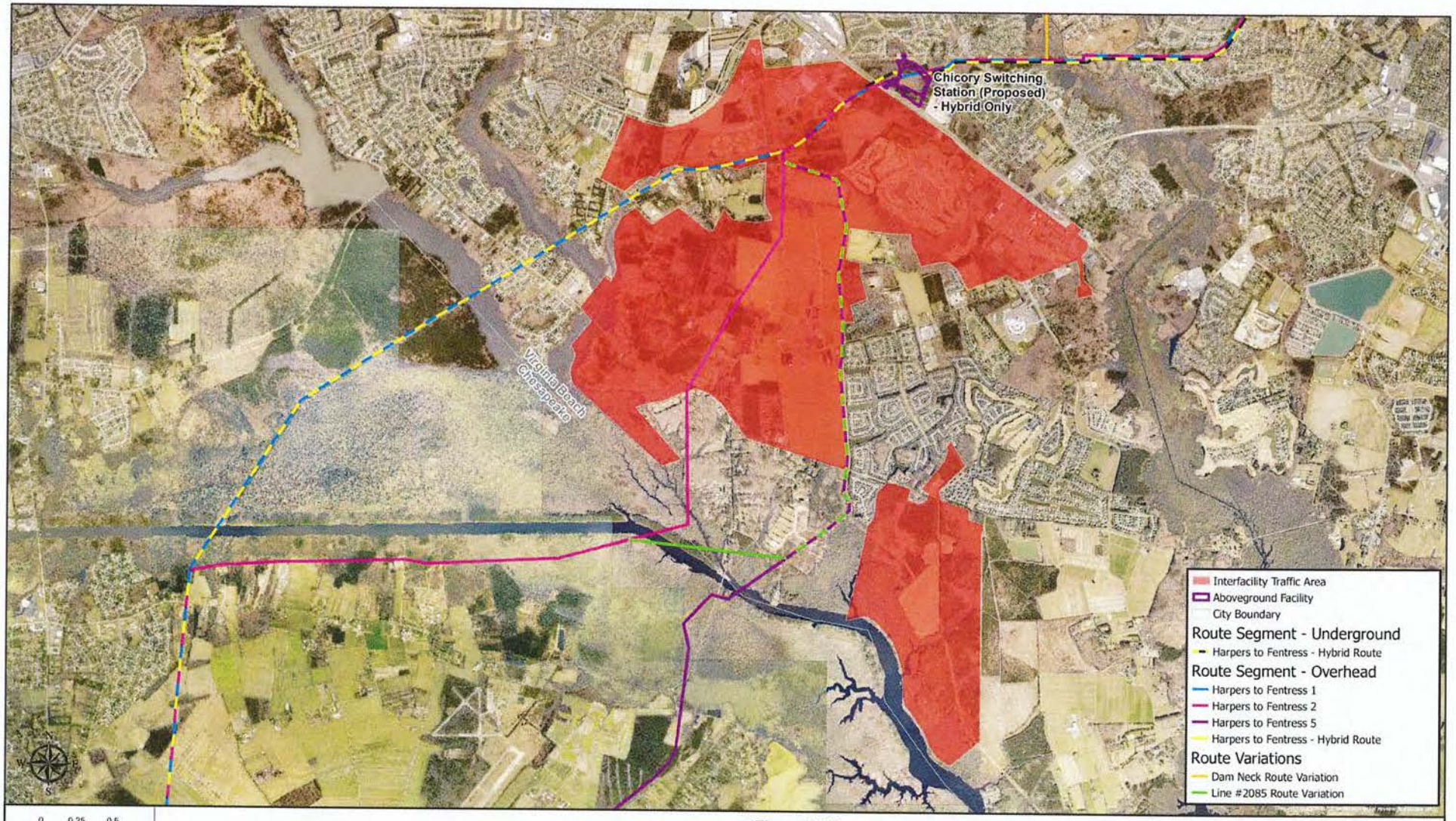

Figure 4.2-5
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
City of Virginia Beach - Interfacility Traffic Area

Dominion Energy

ERM

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Figure 4.2-6
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Planned Developments within 0.25 mile of Routes

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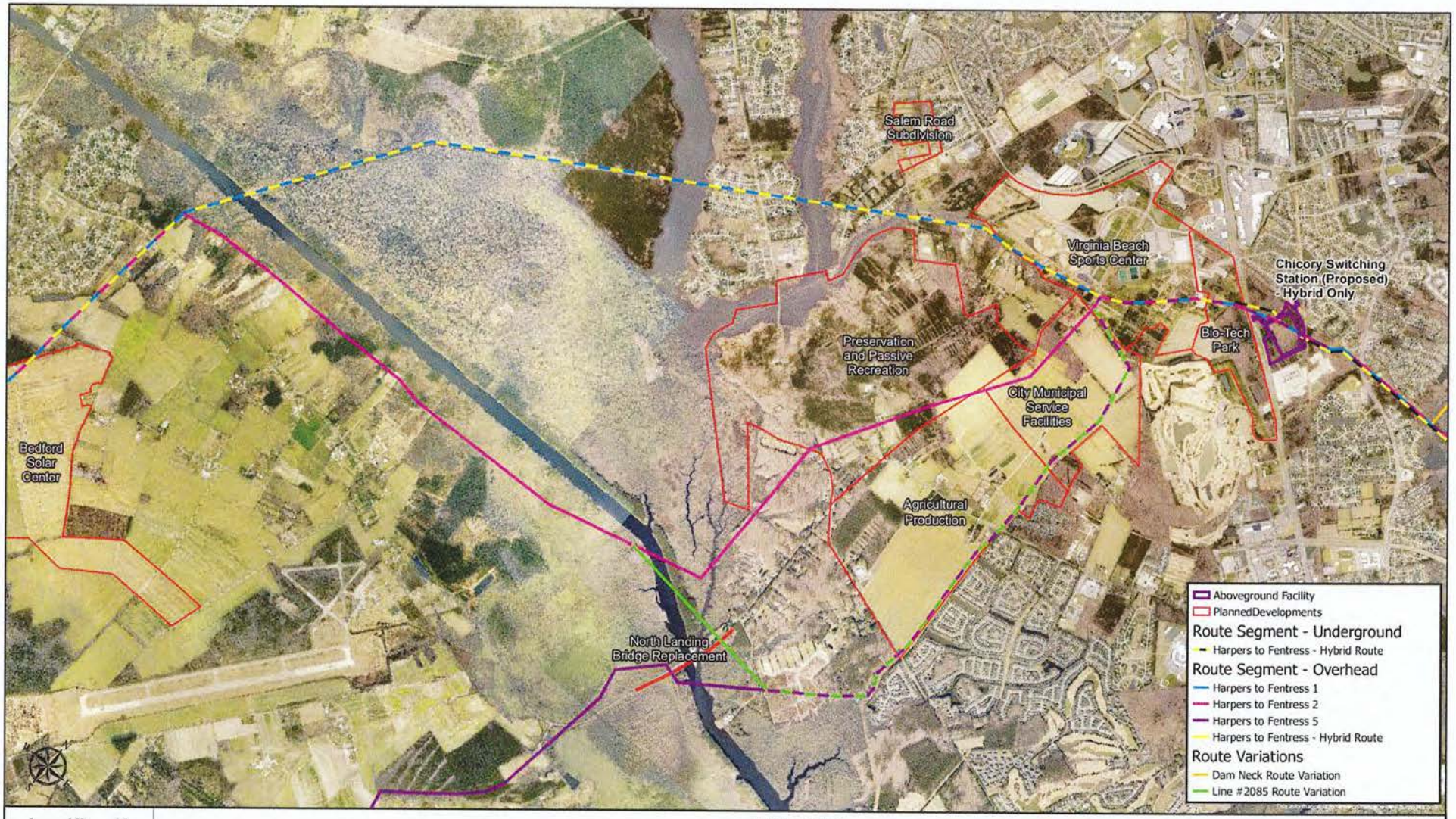

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Dominion Energy

Figure 4.2-6
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Planned Developments within 0.25 mile of Routes

ERM

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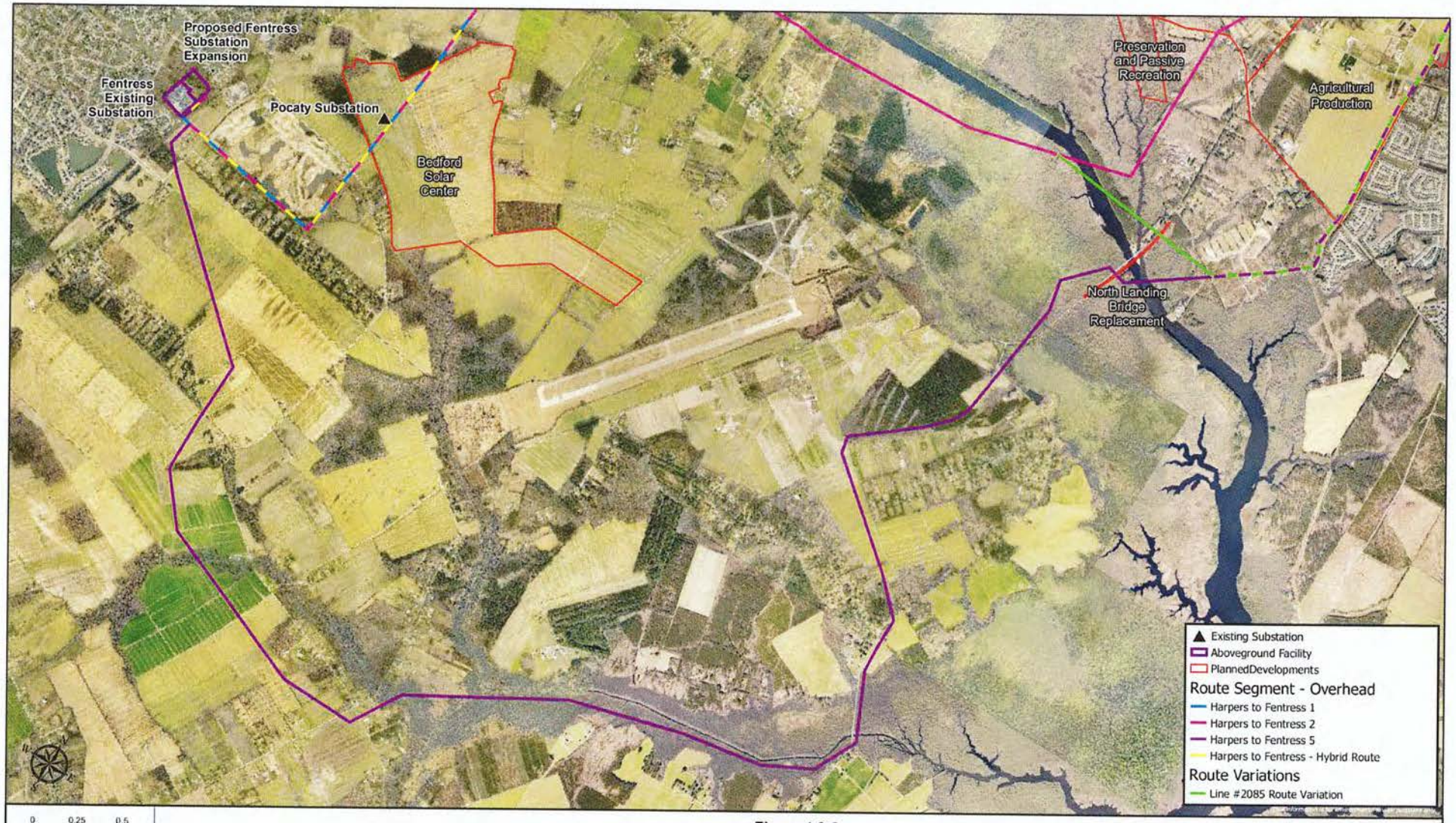

Figure 4.2-6
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Planned Developments within 0.25 mile of Routes

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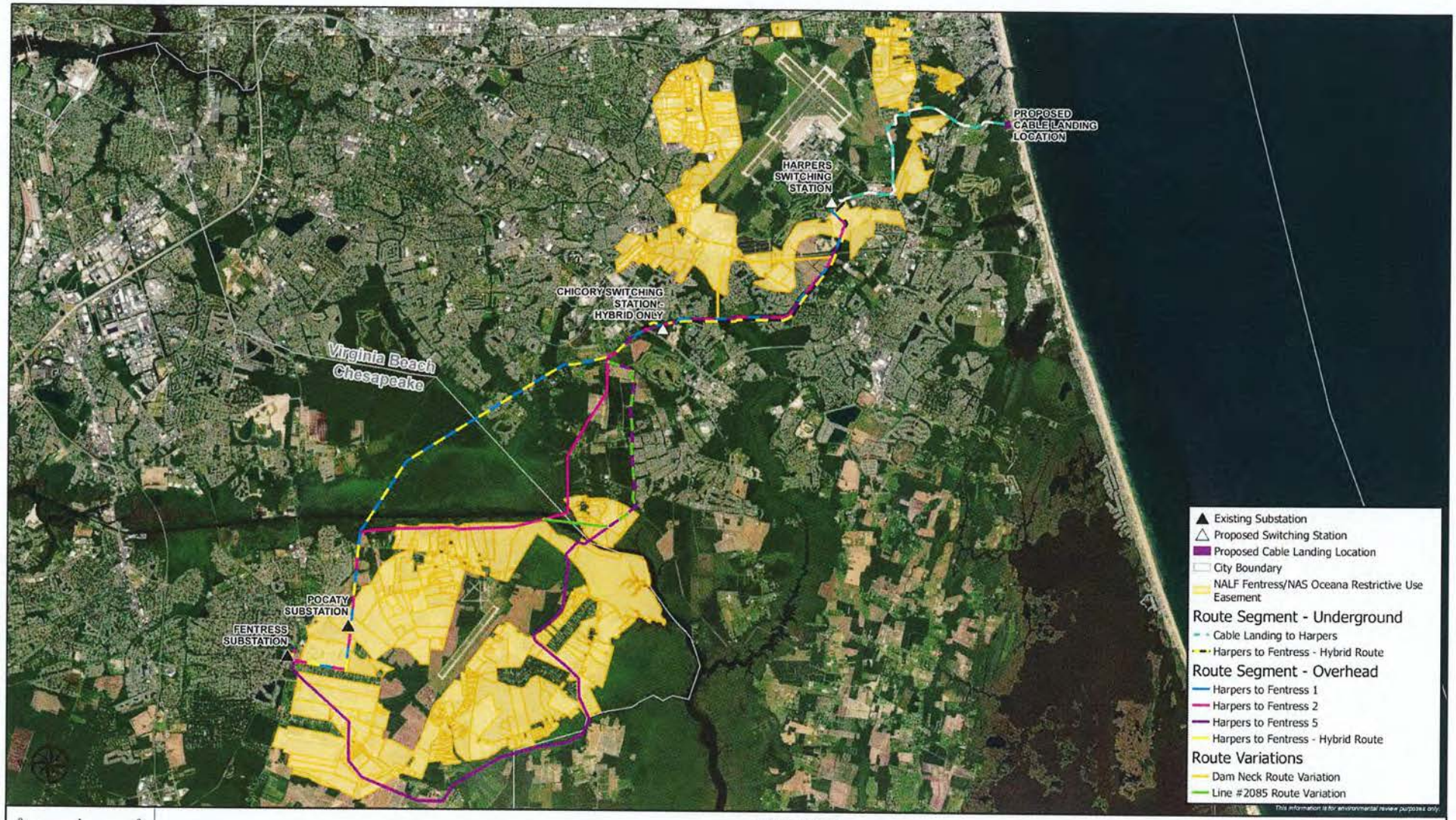

Figure 4.2-7
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Navy Restrictive Use Easements within the Project Area

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Figure 4.2-8
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Non-Navy Easements within the Project Area

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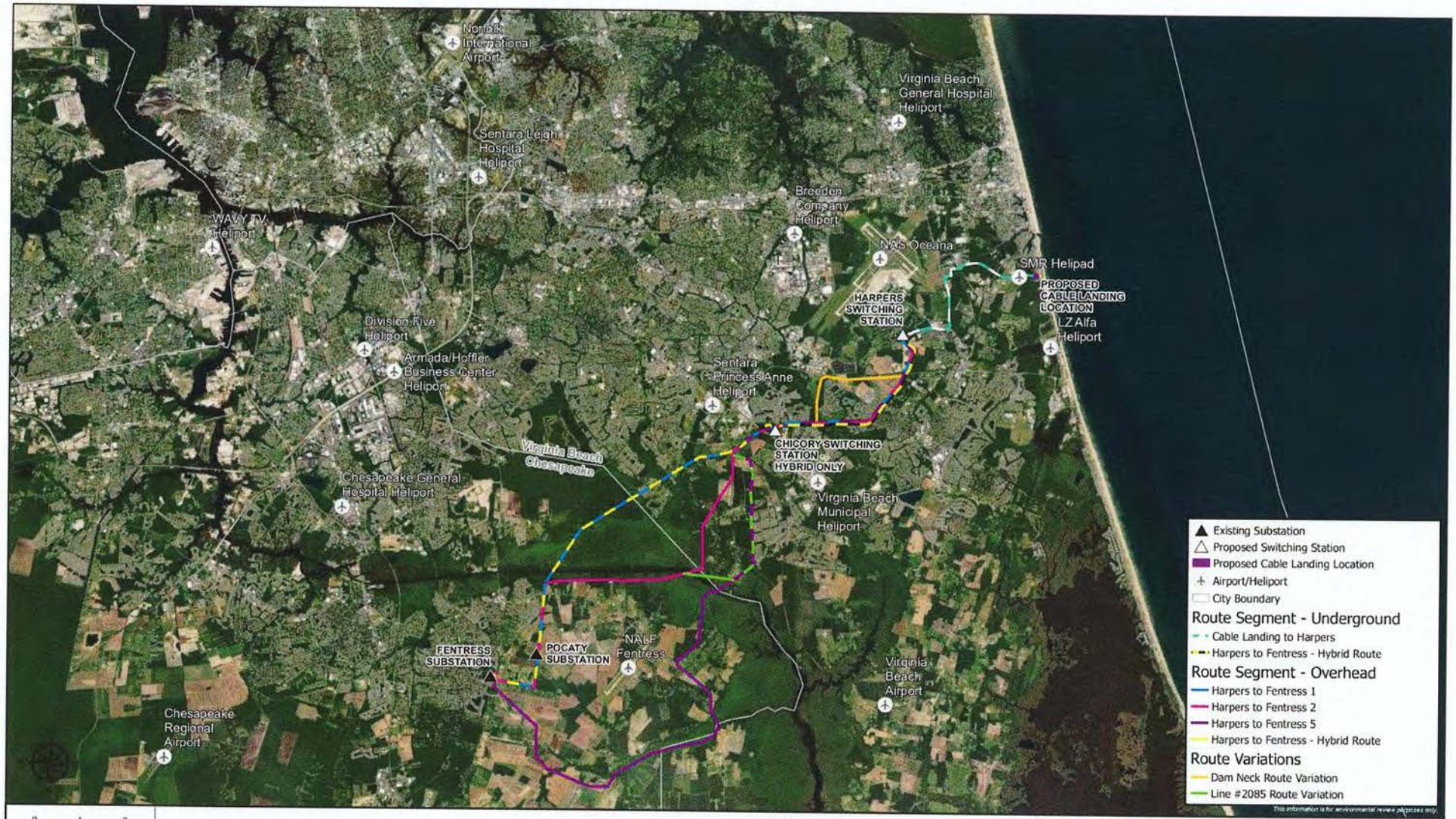

Figure 4.2-9
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Airport and Heliports within 10 Miles of Proposed Routes

ERM

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Figure 4.2-10
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Accident Potential Zones

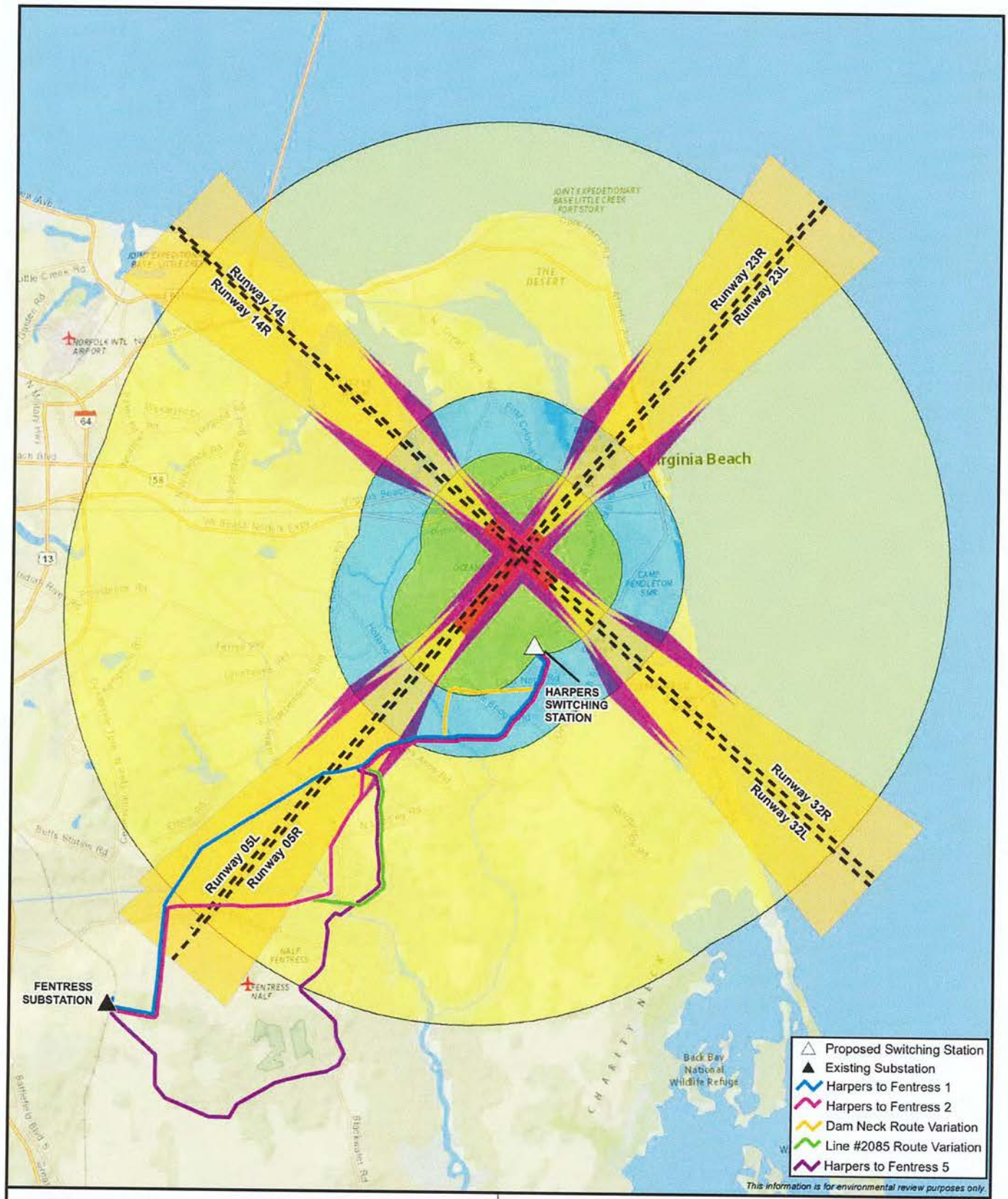

Figure 4.2-11
Coastal Virginia Offshore Wind Commercial Project
Dominion Virginia Power
Department of Defense Airport Imaginary Surfaces
Naval Air Station Oceana

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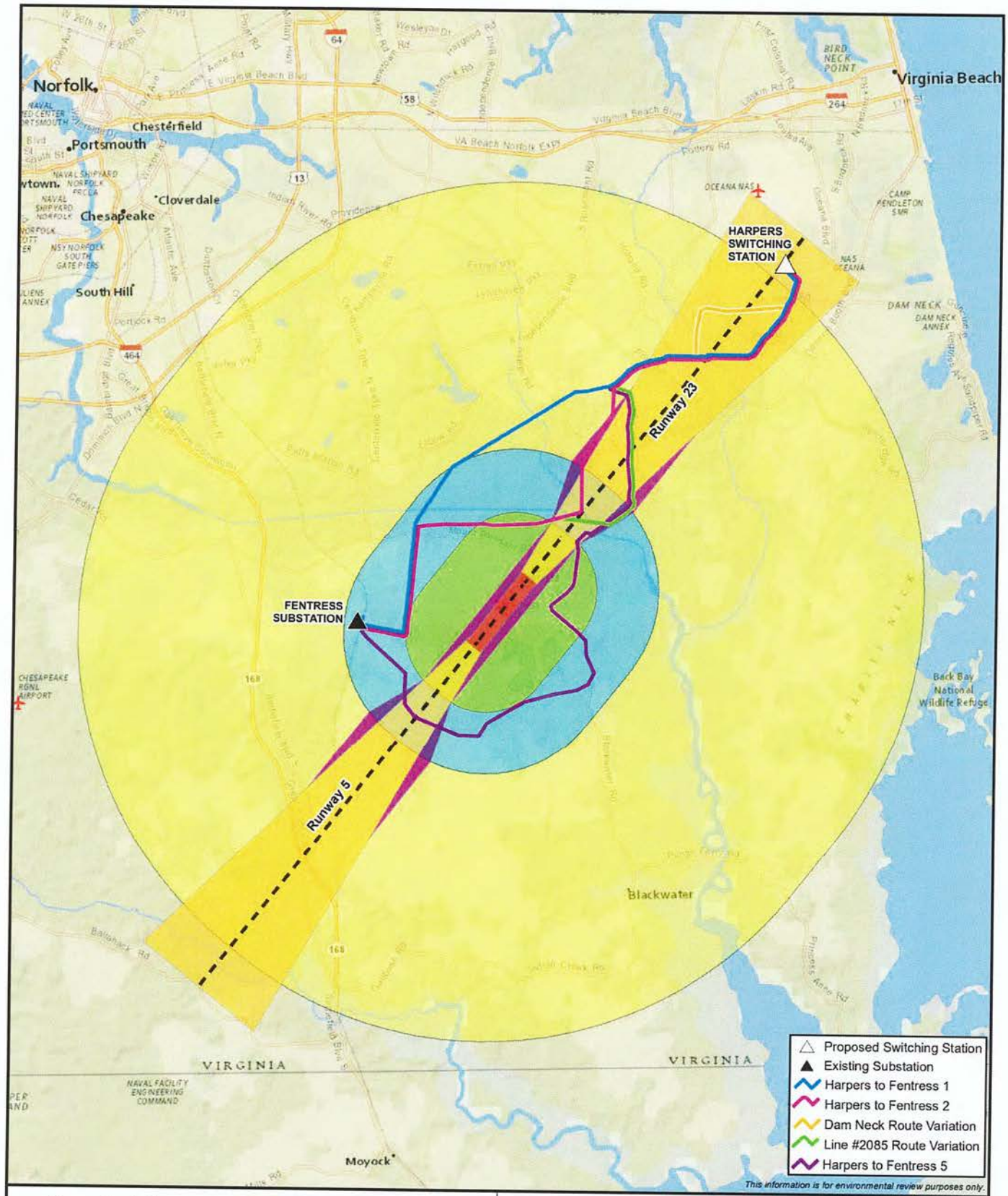

Figure 4.2-12
Coastal Virginia Offshore Wind Commercial Project
Dominion Virginia Power
Department of Defense Airport Imaginary Surfaces
Naval Auxiliary Landing Field Fentress

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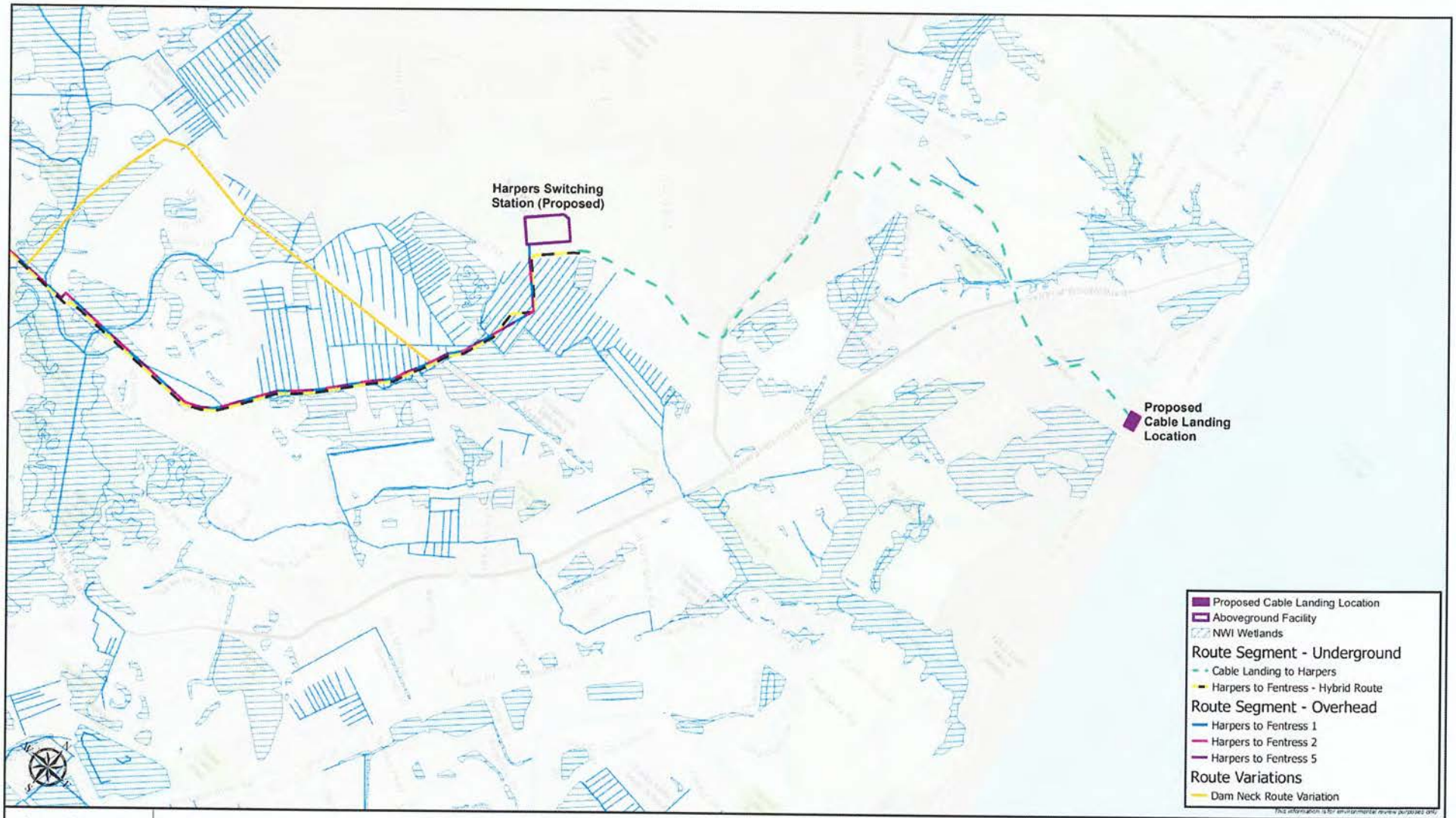

Figure 4.3-1
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
National Wetland Inventory: Wetlands

ERM

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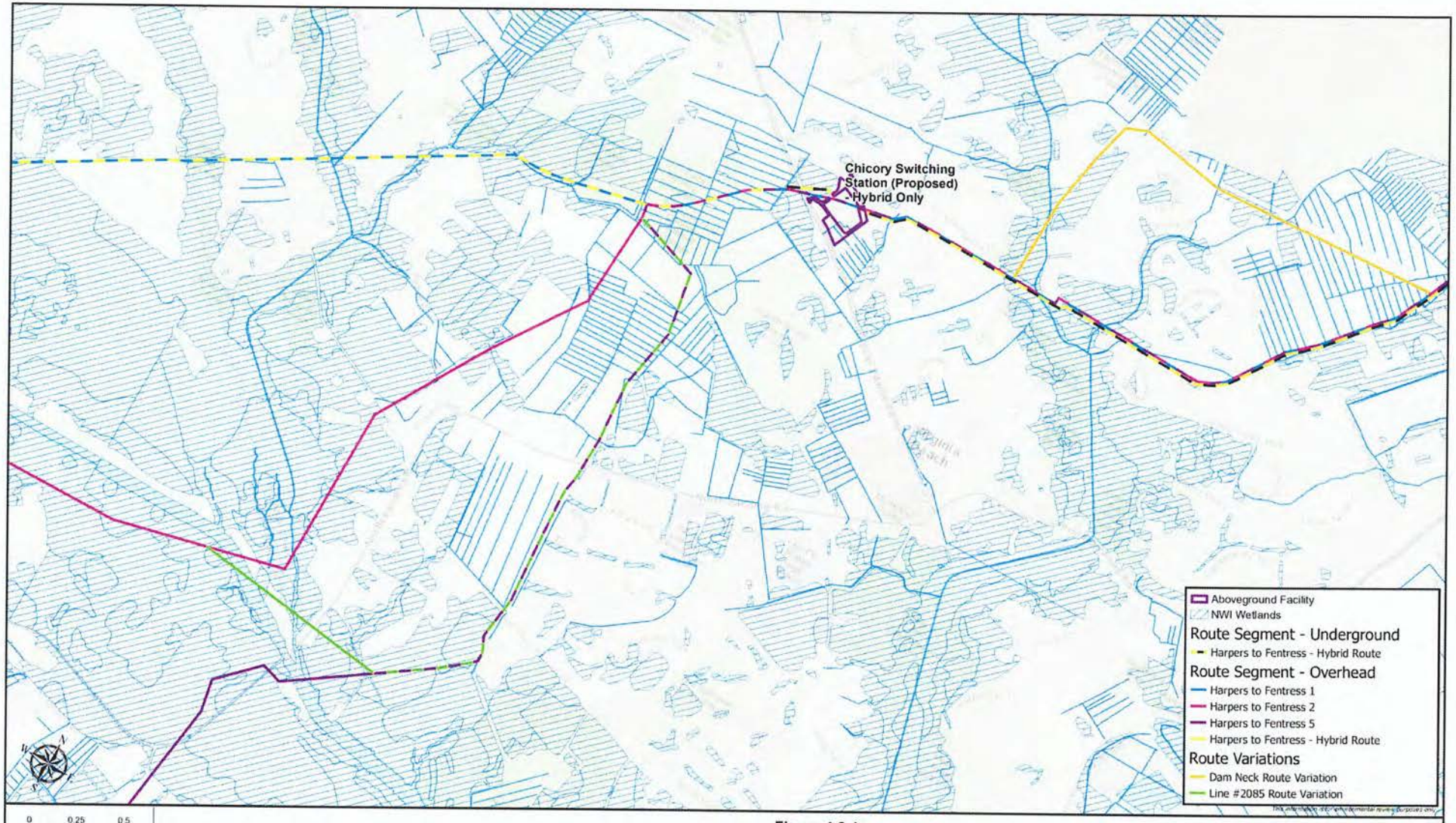

Figure 4.3-1
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
National Wetland Inventory: Wetlands

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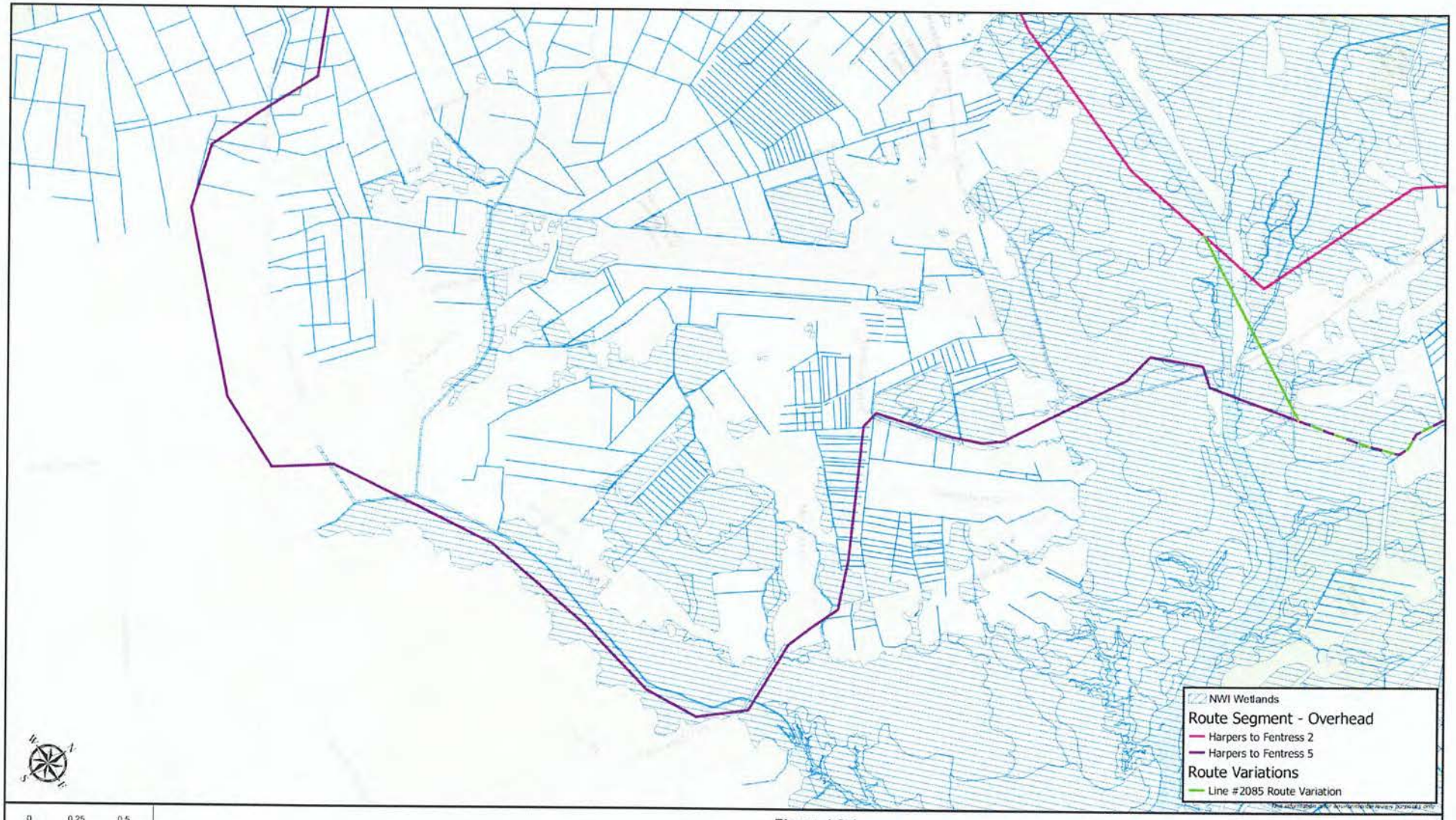

Figure 4.3-1
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
National Wetland Inventory: Wetlands

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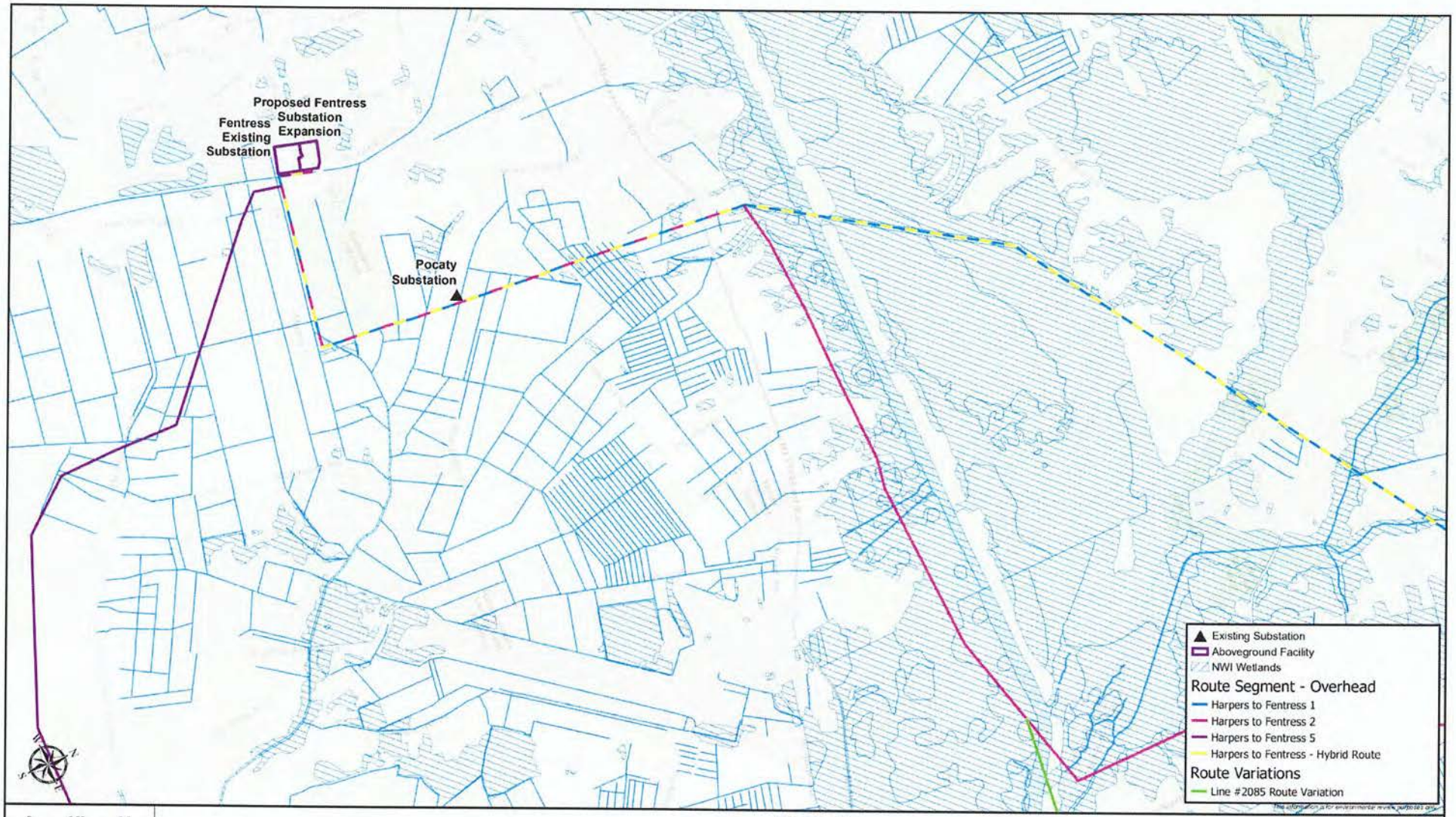

Figure 4.3-1
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
National Wetland Inventory: Wetlands

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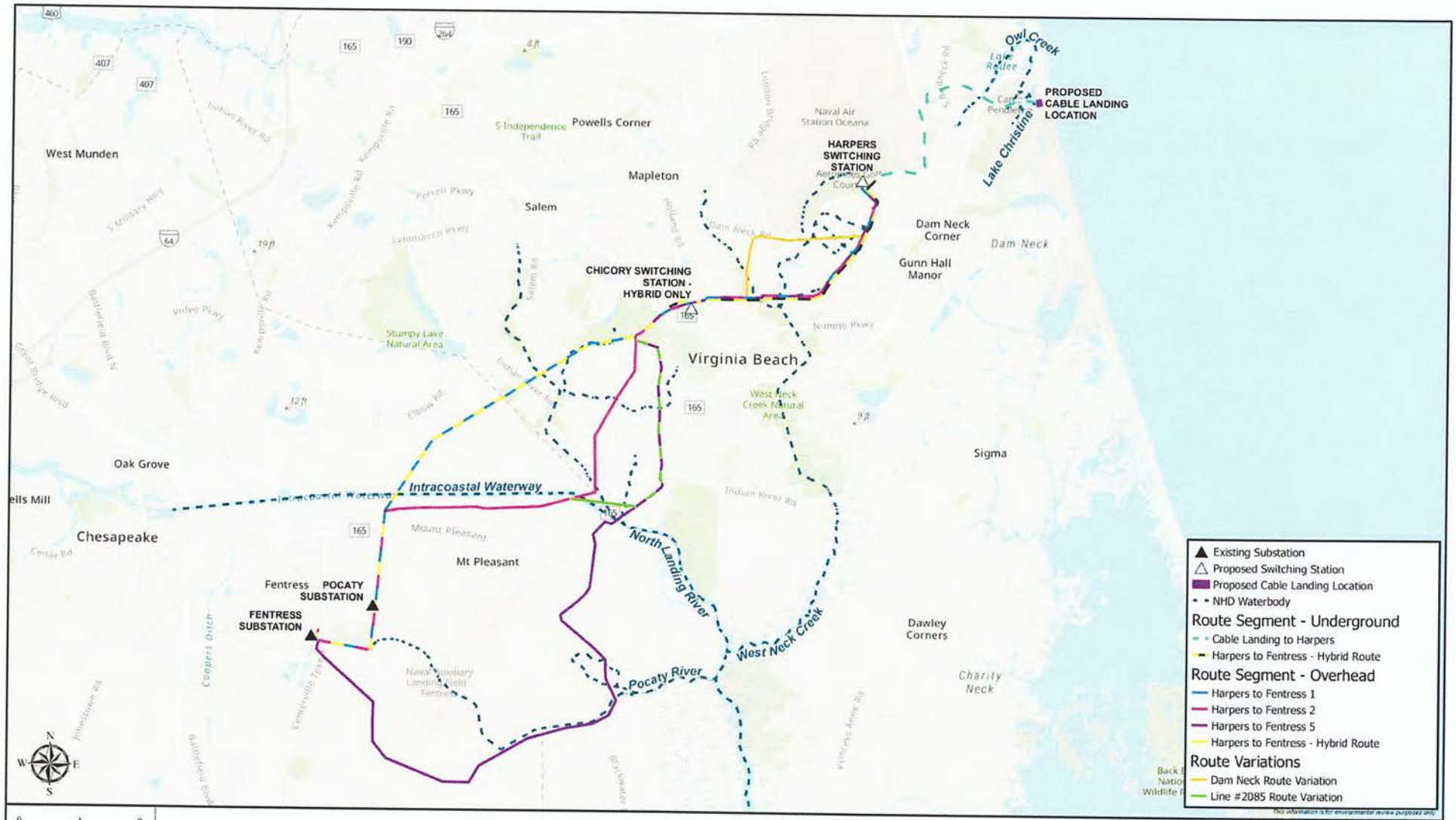

Figure 4.3-2
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
National Hydrography Dataset: Waterbodies

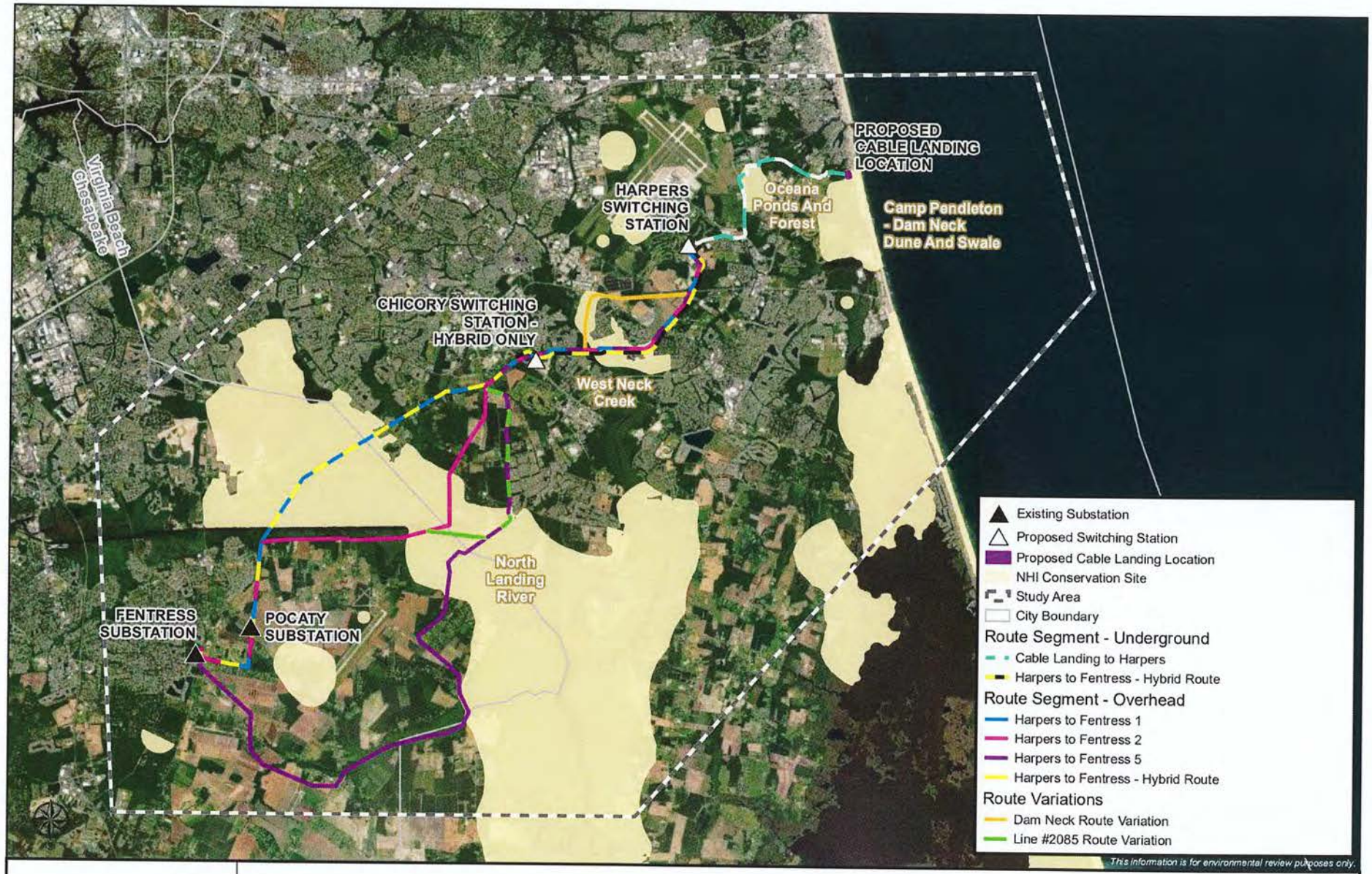

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Figure 4.3-3
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Conservation Sites in the Study Area

Dominion Energy

ERM

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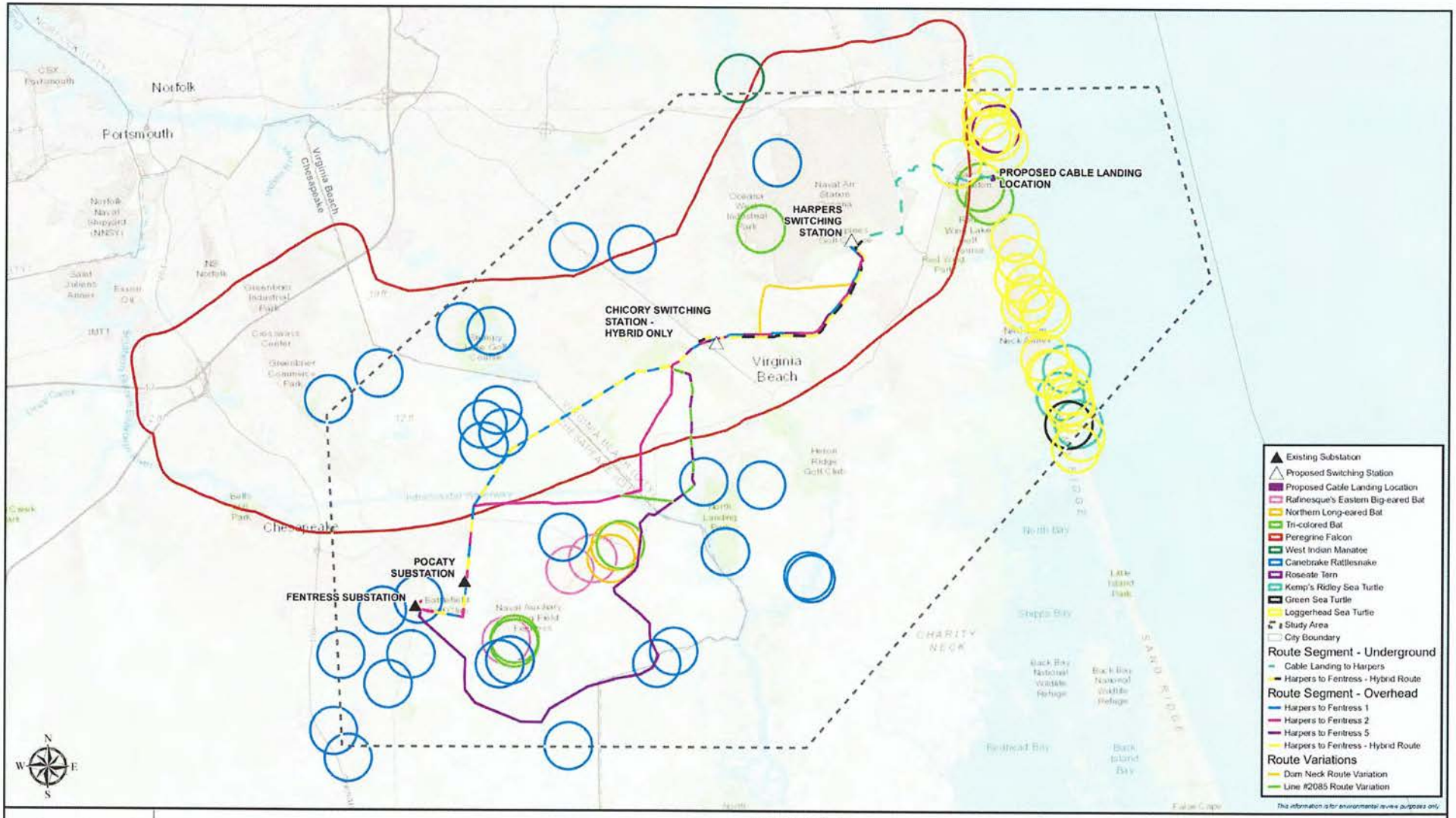

Figure 4.3-4
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Documented Locations of Protected Species

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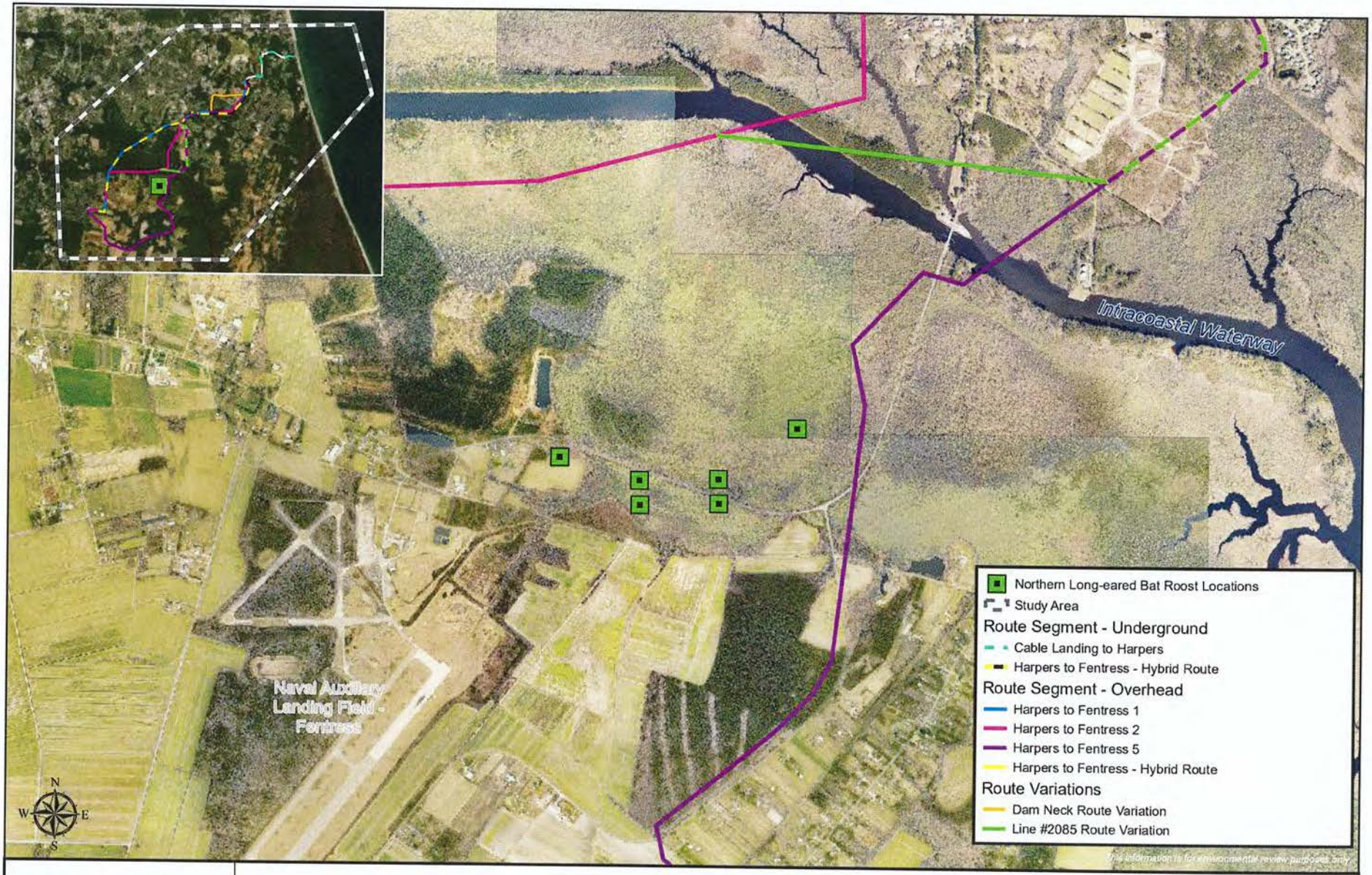

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Figure 4.3-5
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Northern Long-eared Bat Known Roost Tree Locations

Dominion Energy

ERM

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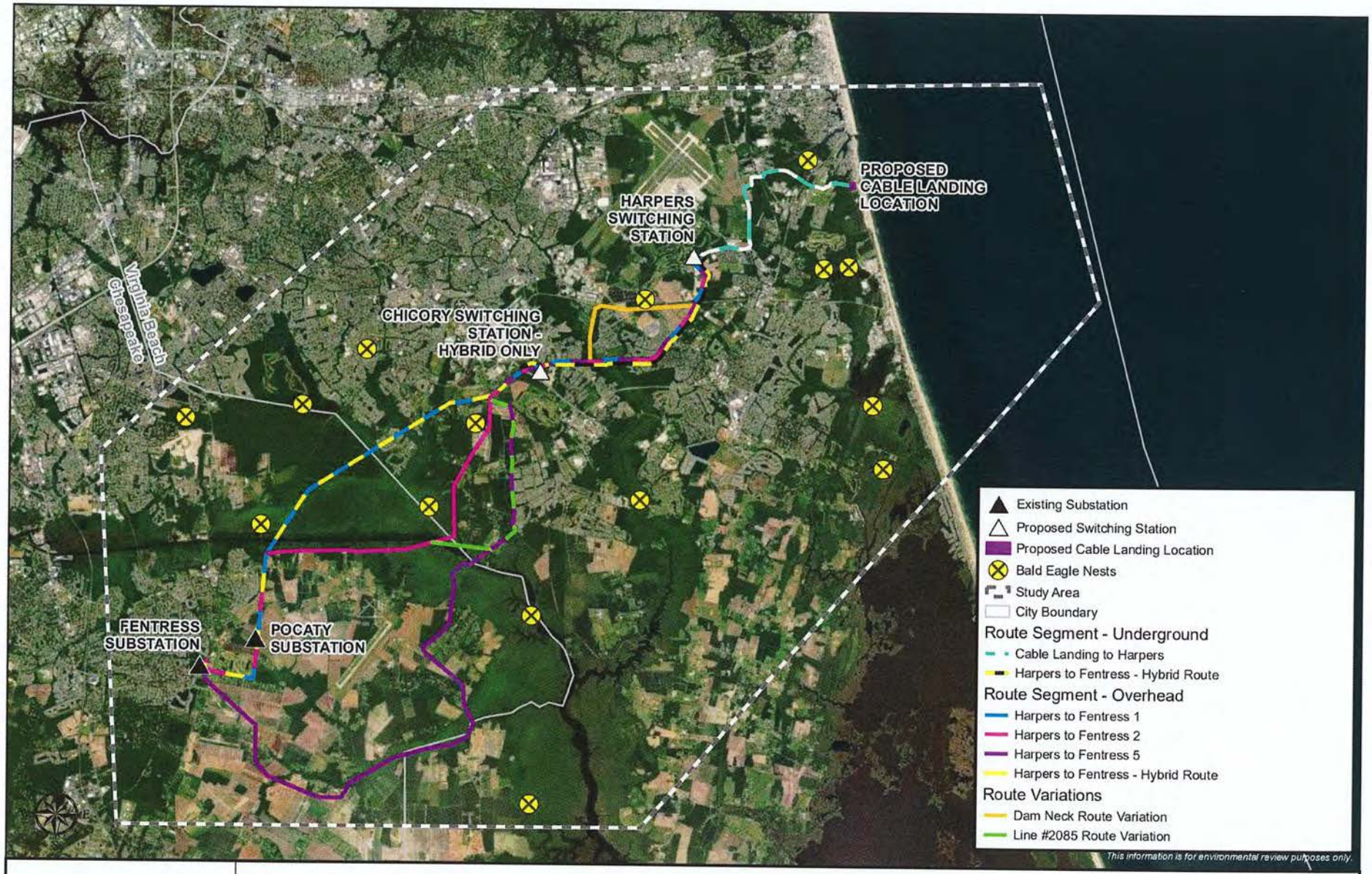

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Figure 4.3-6
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Bald Eagle Nests

Dominion Energy

ERM

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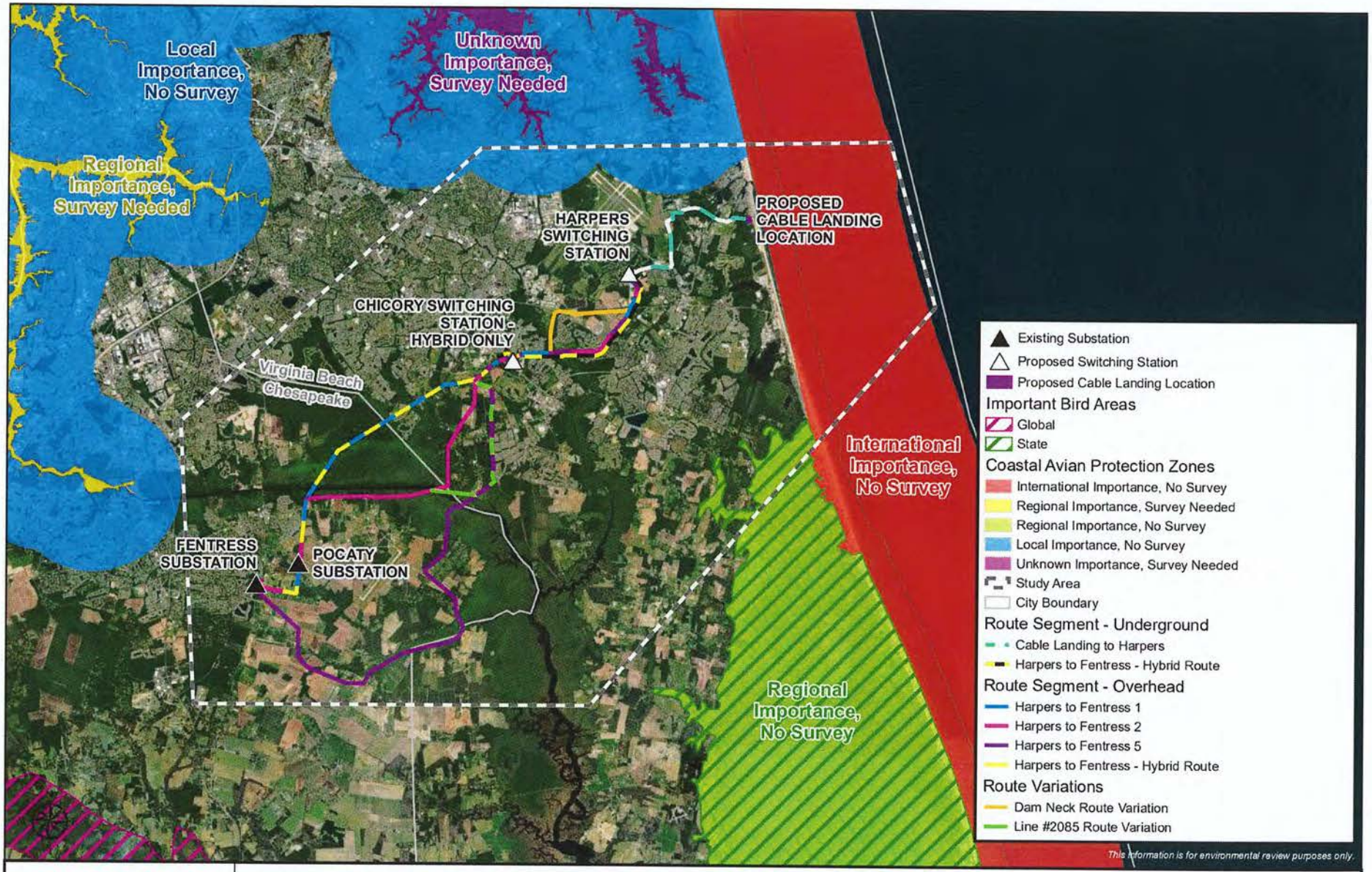

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Figure 4.3-7
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Coastal Avian Protection Zones and Important Bird Areas

Dominion Energy

ERM

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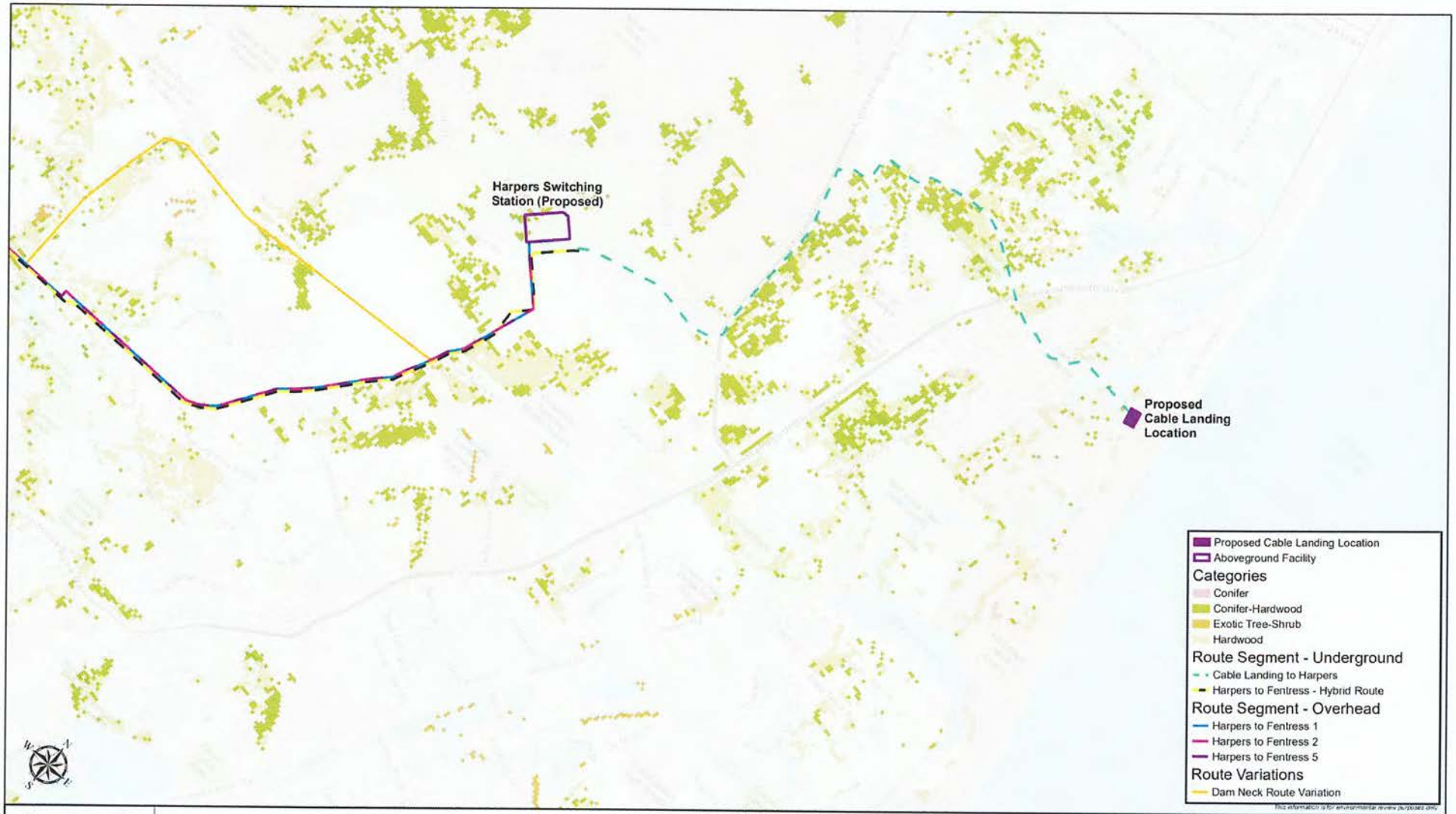

Figure 4.3-8
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Forested Areas using GAP Data

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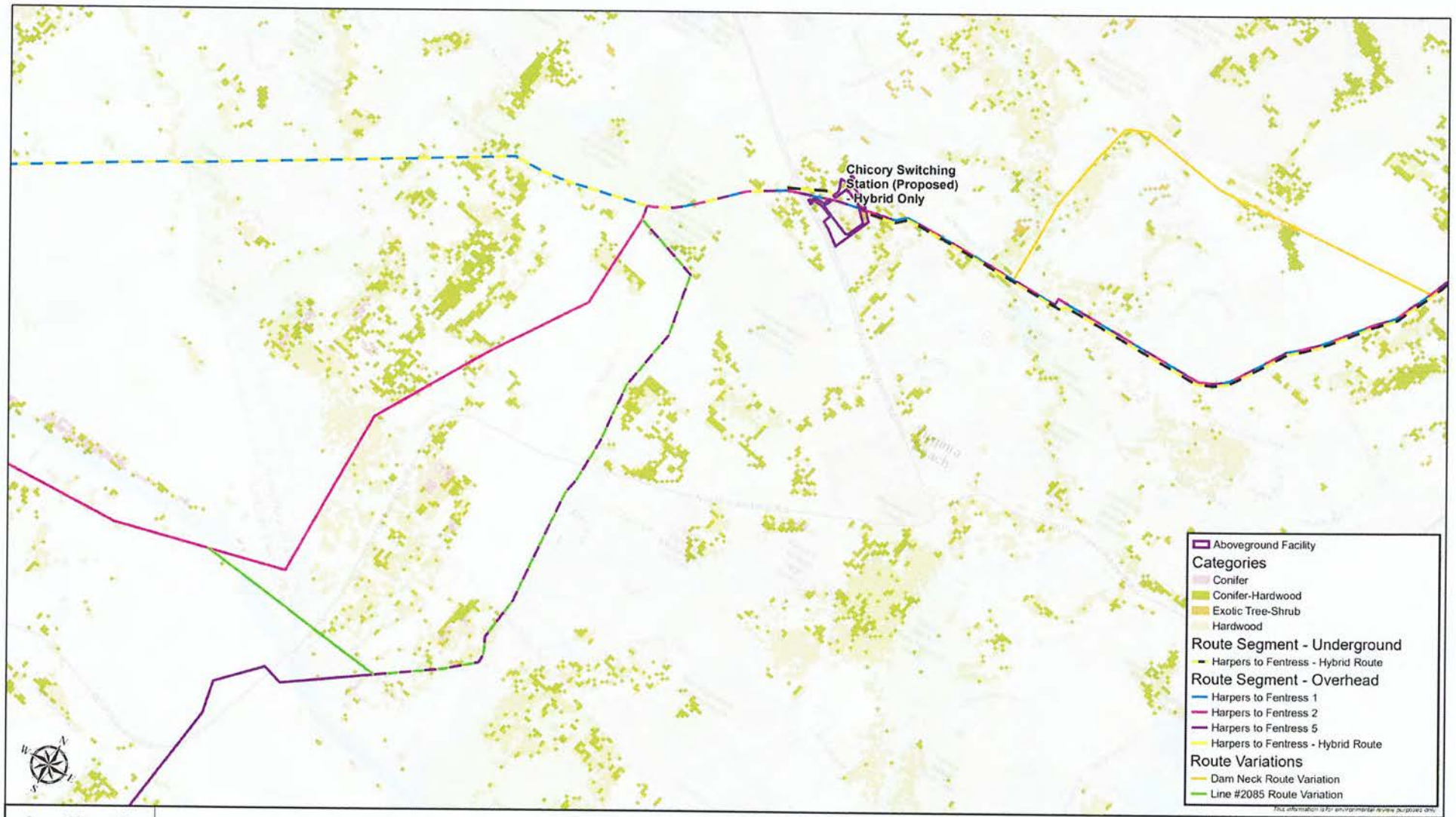

Figure 4.3-8
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Forested Areas using GAP Data

Figure 4.3-8
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Forested Areas using GAP Data

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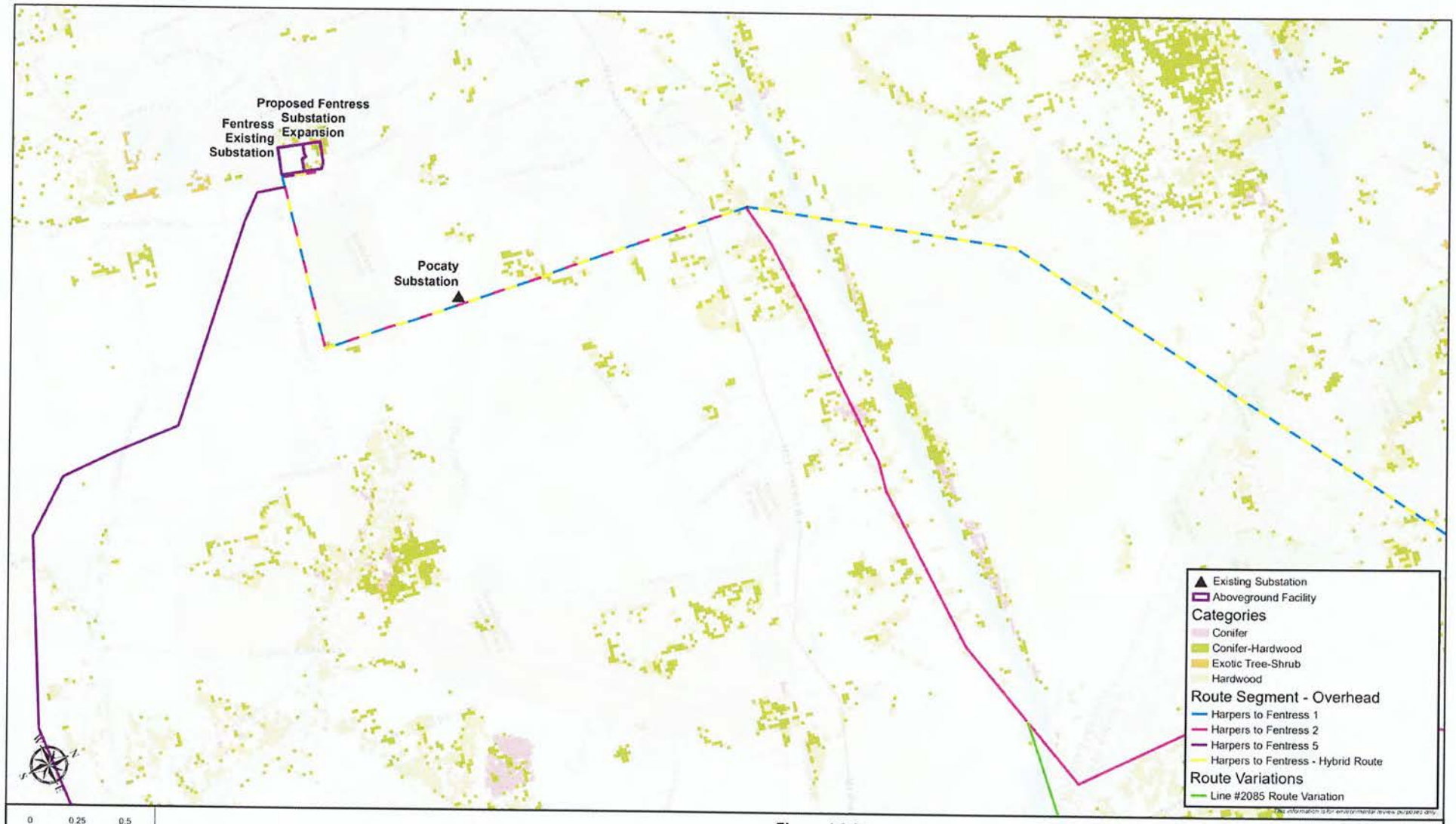

Figure 4.3-8
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Forested Areas using GAP Data

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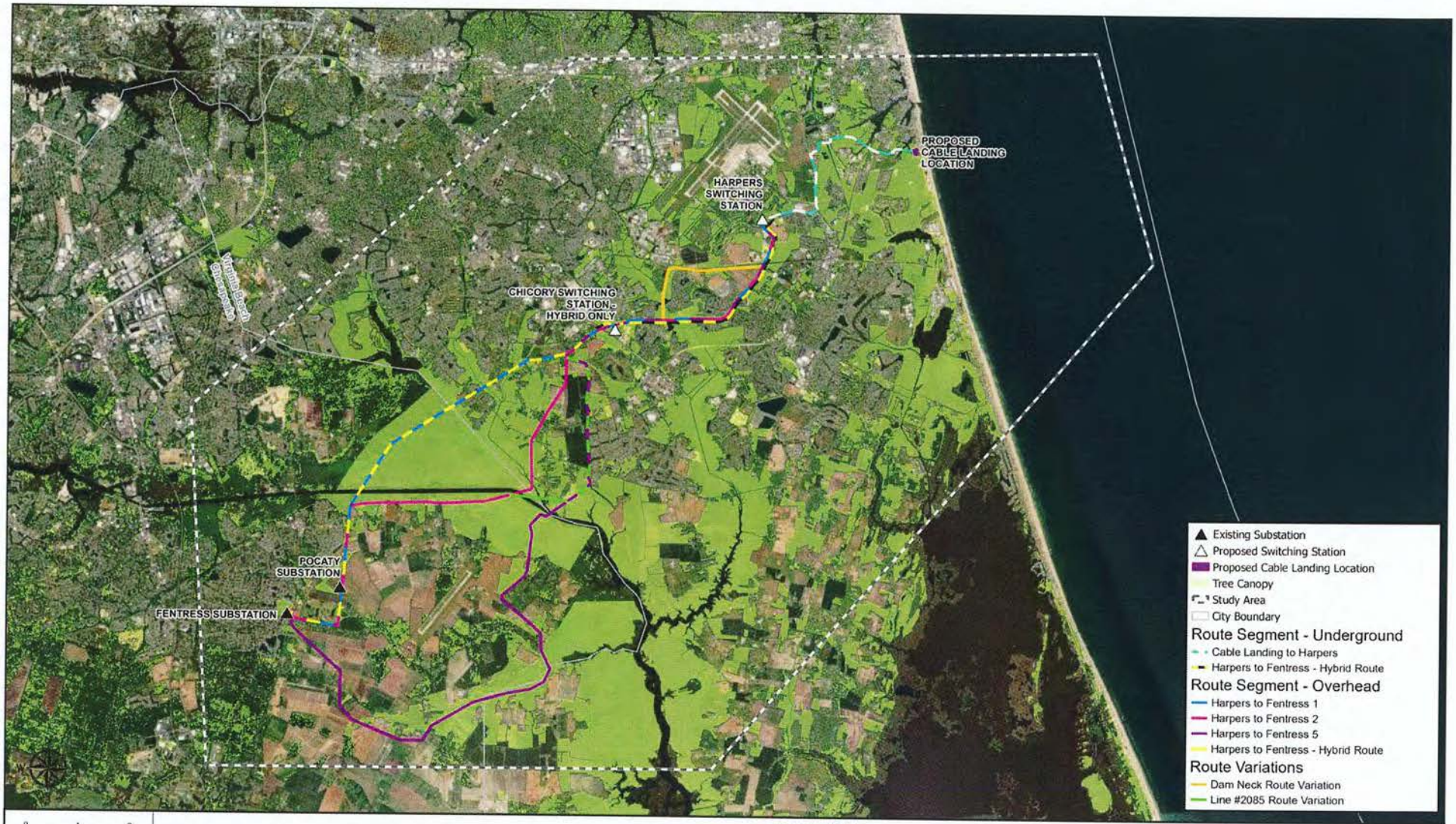

Figure 4.3-9
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Tree Canopy

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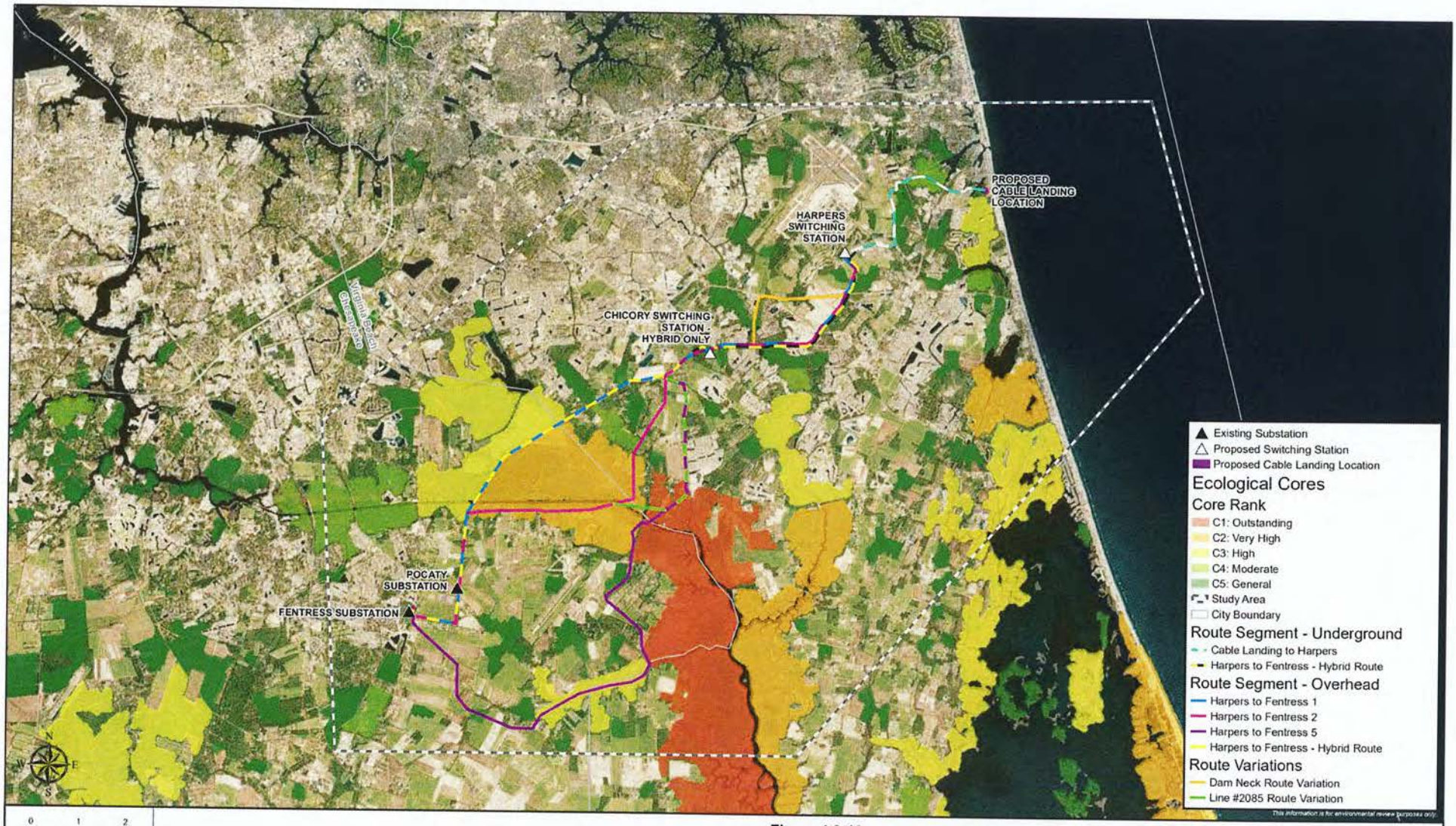

Figure 4.3-10
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Ecological Cores

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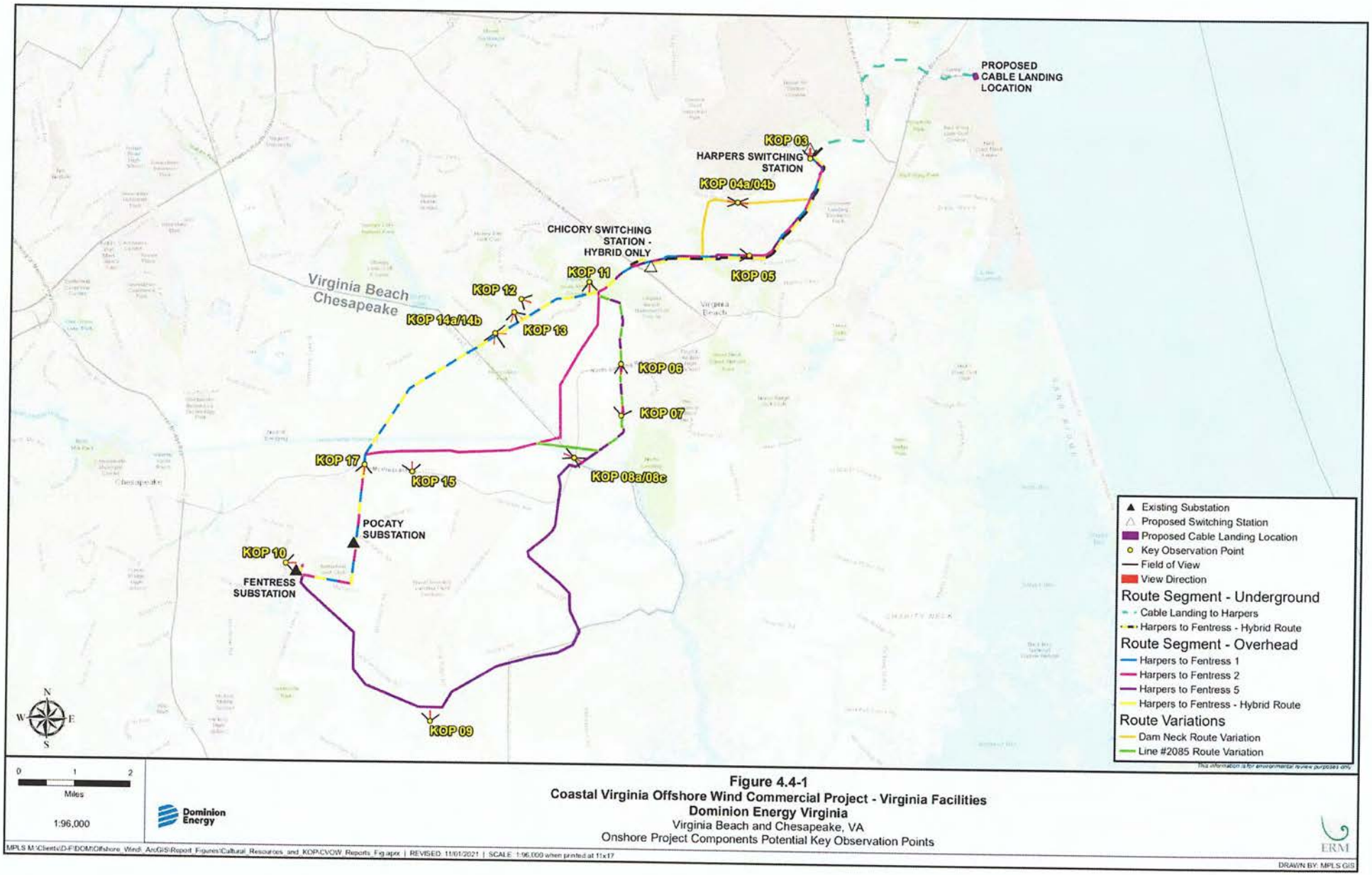

Figure 4.4-1
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Onshore Project Components Potential Key Observation Points

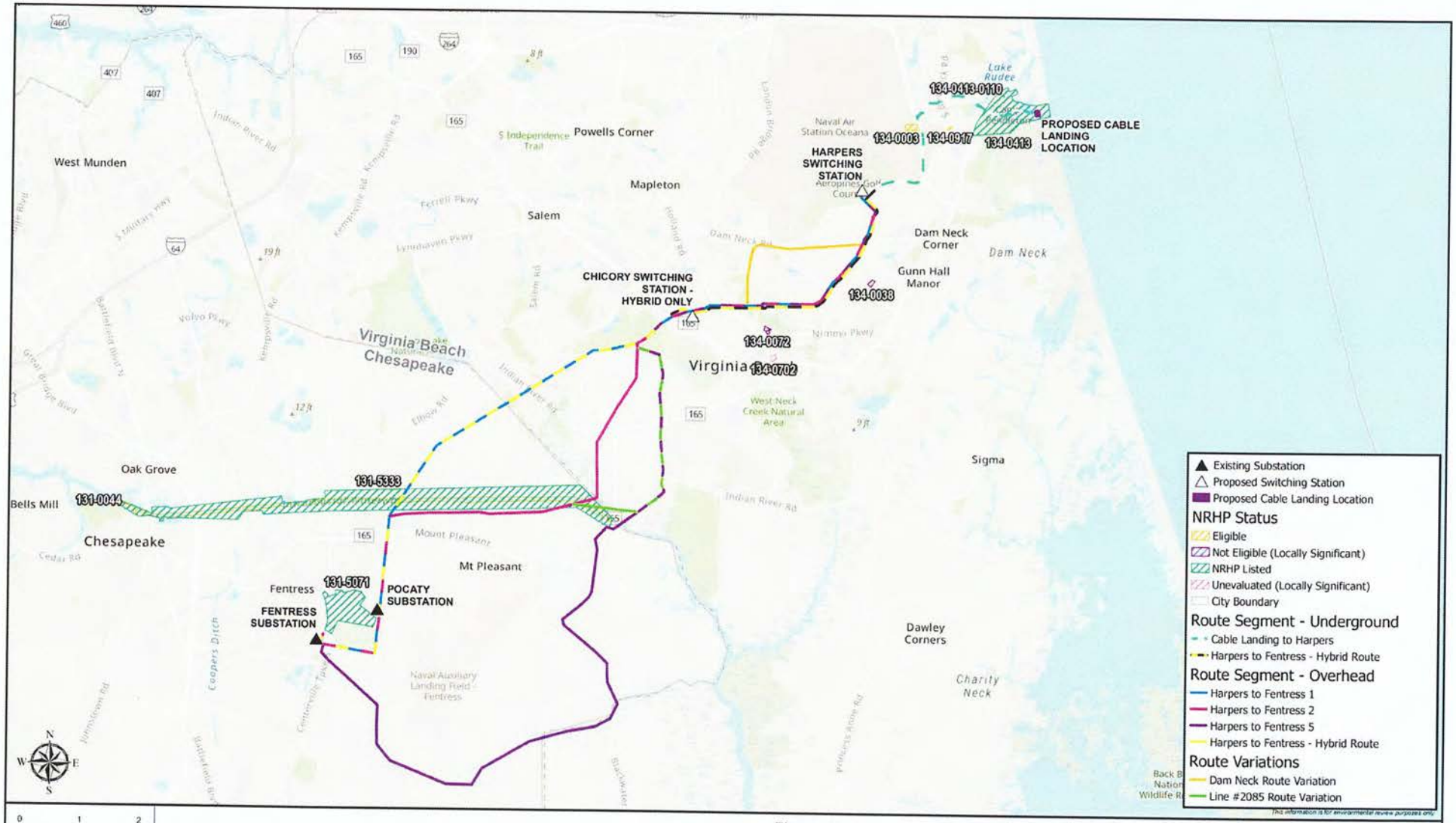

Figure 4.5-1
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Considered Historic and Architectural Resources in the Project Vicinity

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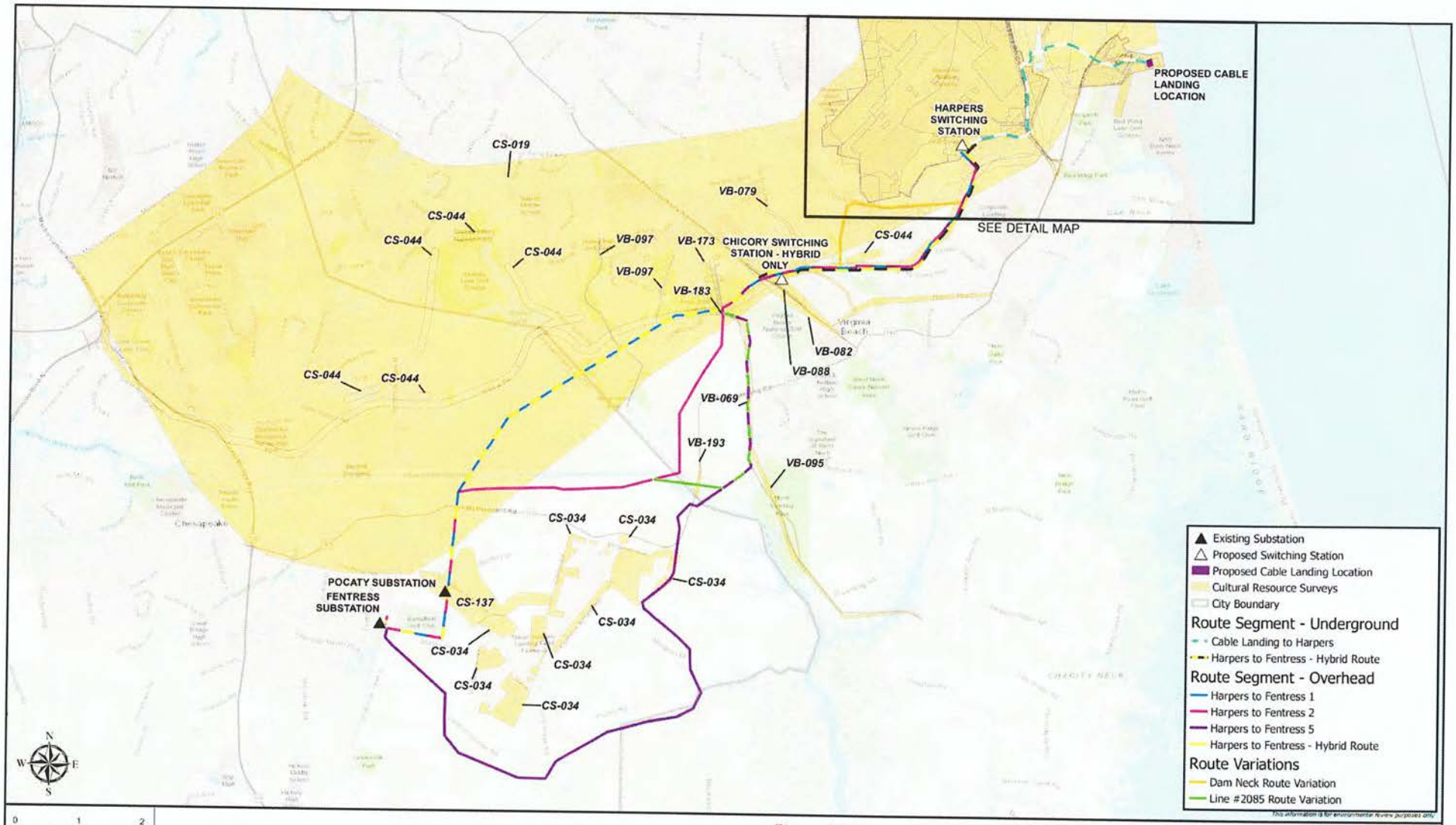

Figure 4.5-2
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Cultural Resource Surveys Covering Portions of Alternative Routes

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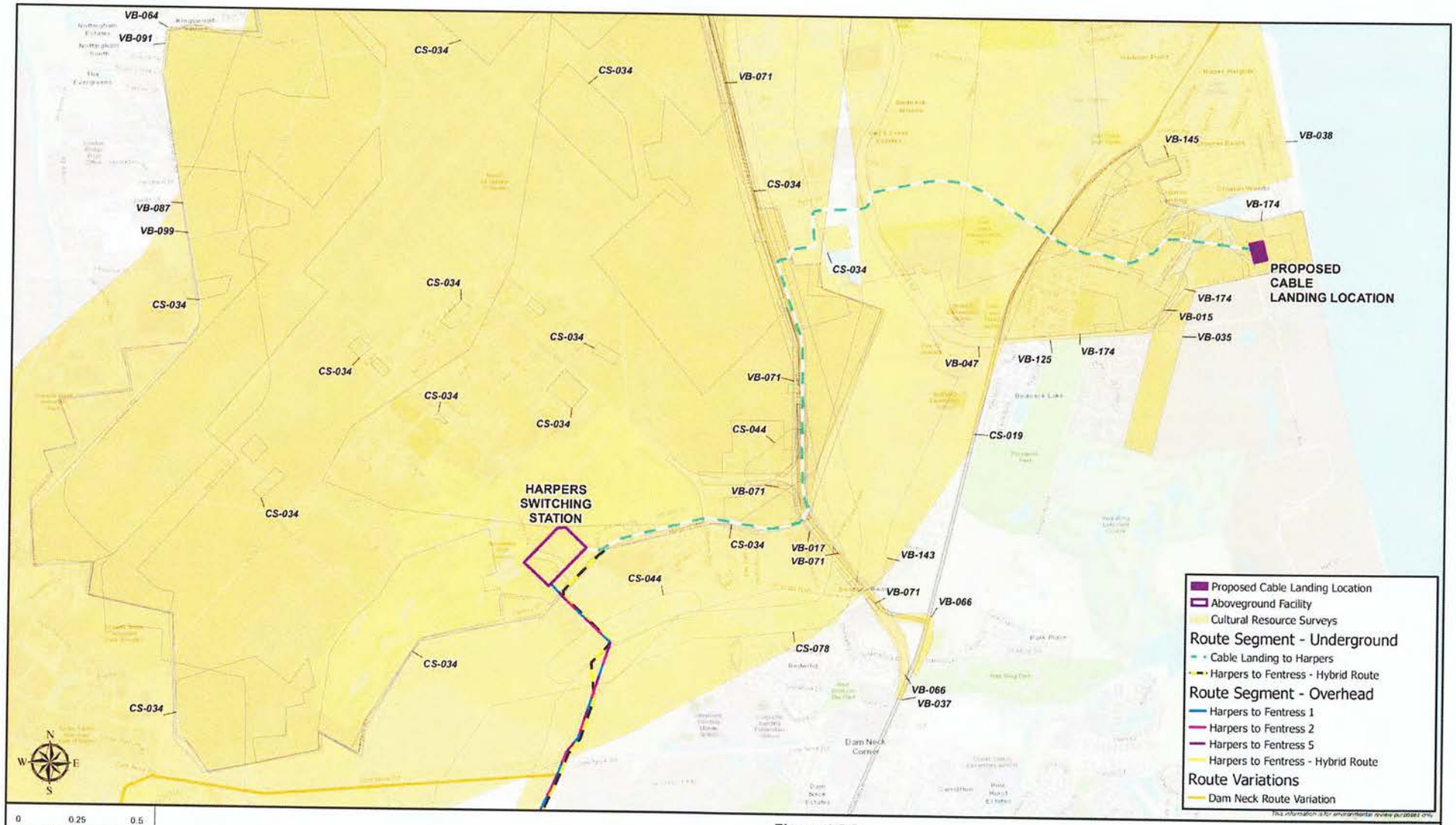

Figure 4.5-2
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Cultural Resource Surveys Covering Portions of Alternative Routes - Detail Map

Dominion Energy

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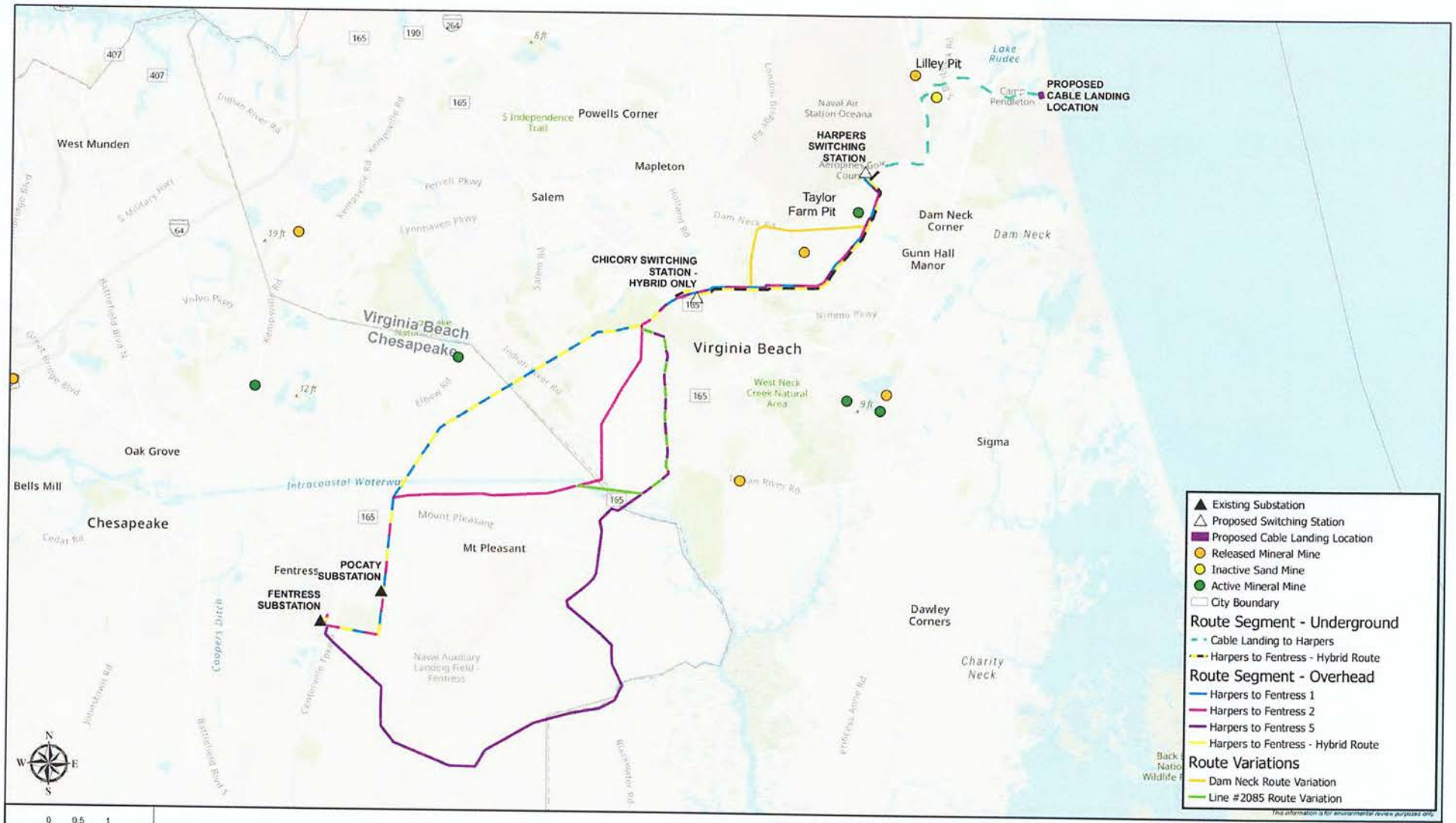

Figure 4.6-1
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Mineral Resources

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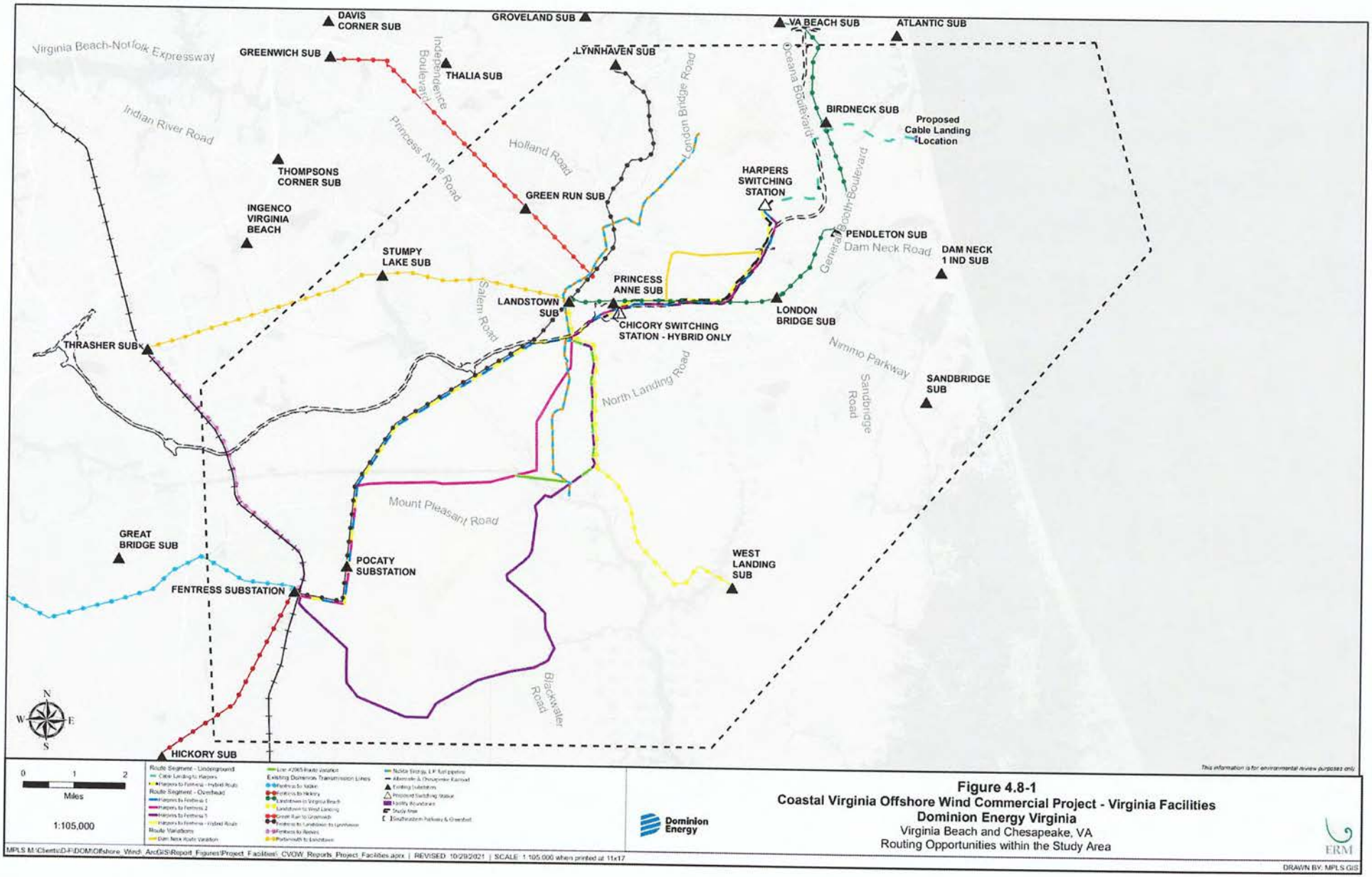

Figure 4.8-1
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Routing Opportunities within the Study Area

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APPENDIX B AERIAL AND TOPOGRAPHIC PHOTO-BASED ROUTE MAP SETS

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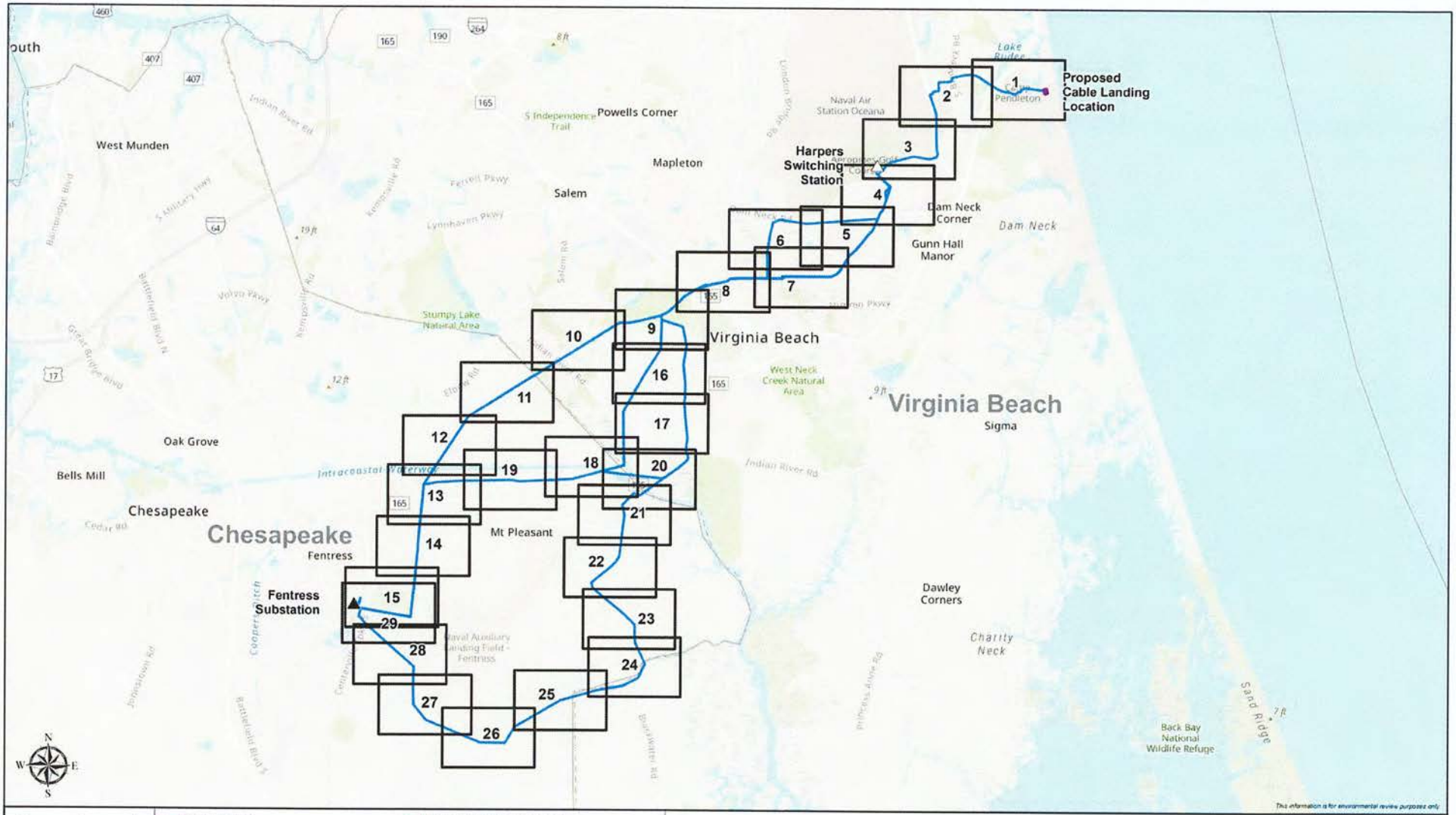

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- Proposed Route
- Existing Substation
- Proposed Switching Station
- Proposed Cable Landing Location
- Page Index
- City Boundary

This information is for environmental review purposes only.

Appendix B1
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities Index Map

Dominion Energy

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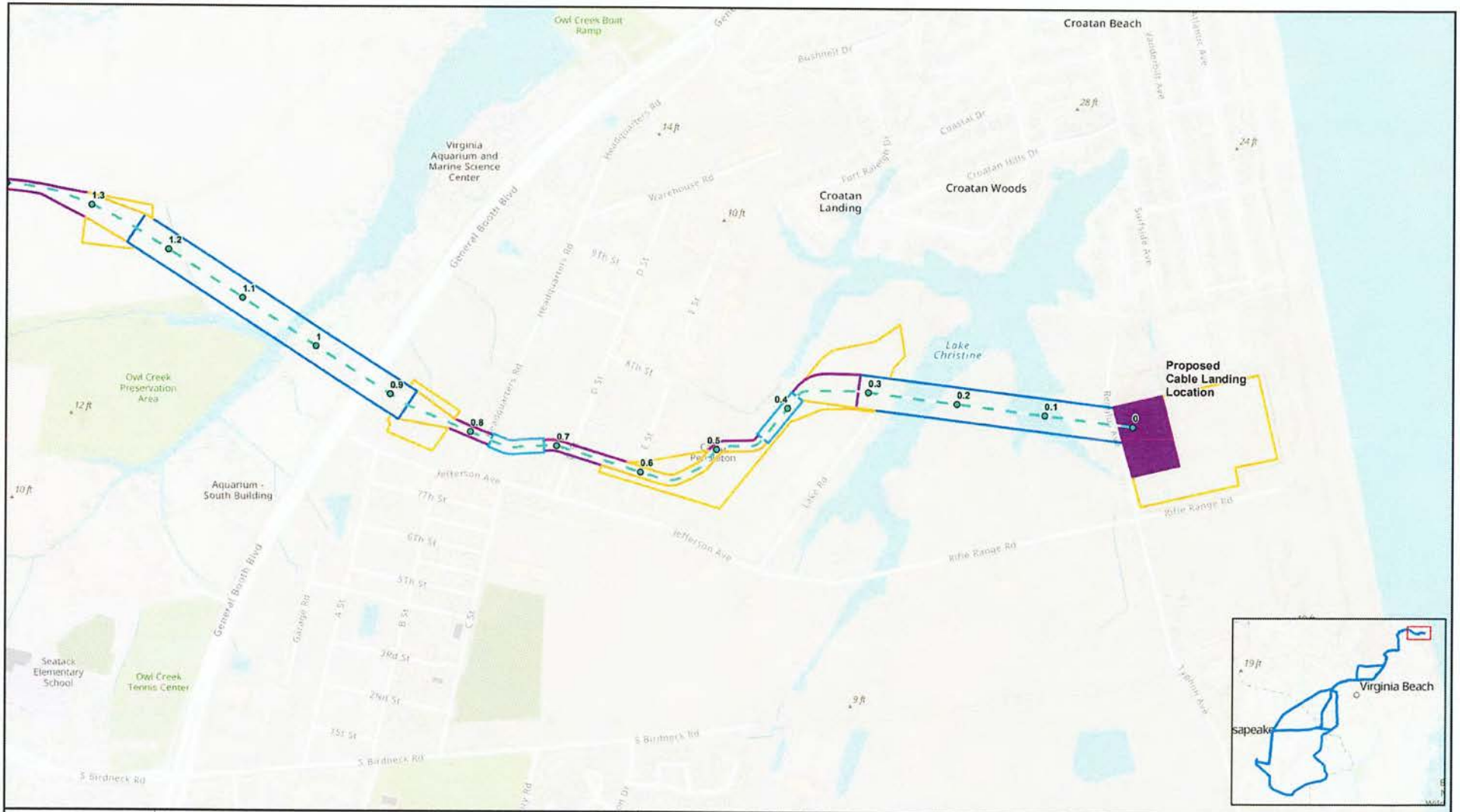

Appendix B1 - Page 1 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

MPLS M:\Clients\D-F\DOM\Offshore_Wind_ArcGIS\Report_Figures\Project_Facilities_CVOW_Reports_Project_Facilities.aprx | REVISED: 10/29/2021 | SCALE: 1 when printed at 11x17

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Miles

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- Cable Landing to Harpers Milepost
- **Route Segment - Underground**
- Cable Landing to Harpers
- HDD
- Surface Trenched Right-Of-Way
- Surface Trenched ROW - Manhole Location
- Temporary Construction Easement

Dominion Energy

Appendix B1 - Page 2 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

ERM

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Appendix B1 - Page 3 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

Dominion Energy

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Harpers Switching Station (Proposed)
Harpers Rd
Halsey Dr
Nimitz Dr
Dam Neck Rd
Corporate Landing Middle School
Corporate Landing Elementary School
Petrel Dr
Eaglewood Dr
Perimeter Pkwy
18 ft
19 ft
20 ft
15 ft
Virginia Beach
0 0.05 0.1
Miles
1:6,500
Harpers to Fentress 1 Milepost
Harpers to Fentress 2 Milepost
Harpers to Fentress 5 Milepost
Dam Neck Route Variation
Route Segment - Overhead
Harpers to Fentress 1
Harpers to Fentress 2
Harpers to Fentress 5
Route Variations
Dam Neck Route Variation
Aboveground Facility
Proposed Right-Of-Way
Dominion Energy
Appendix B1 - Page 4 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes
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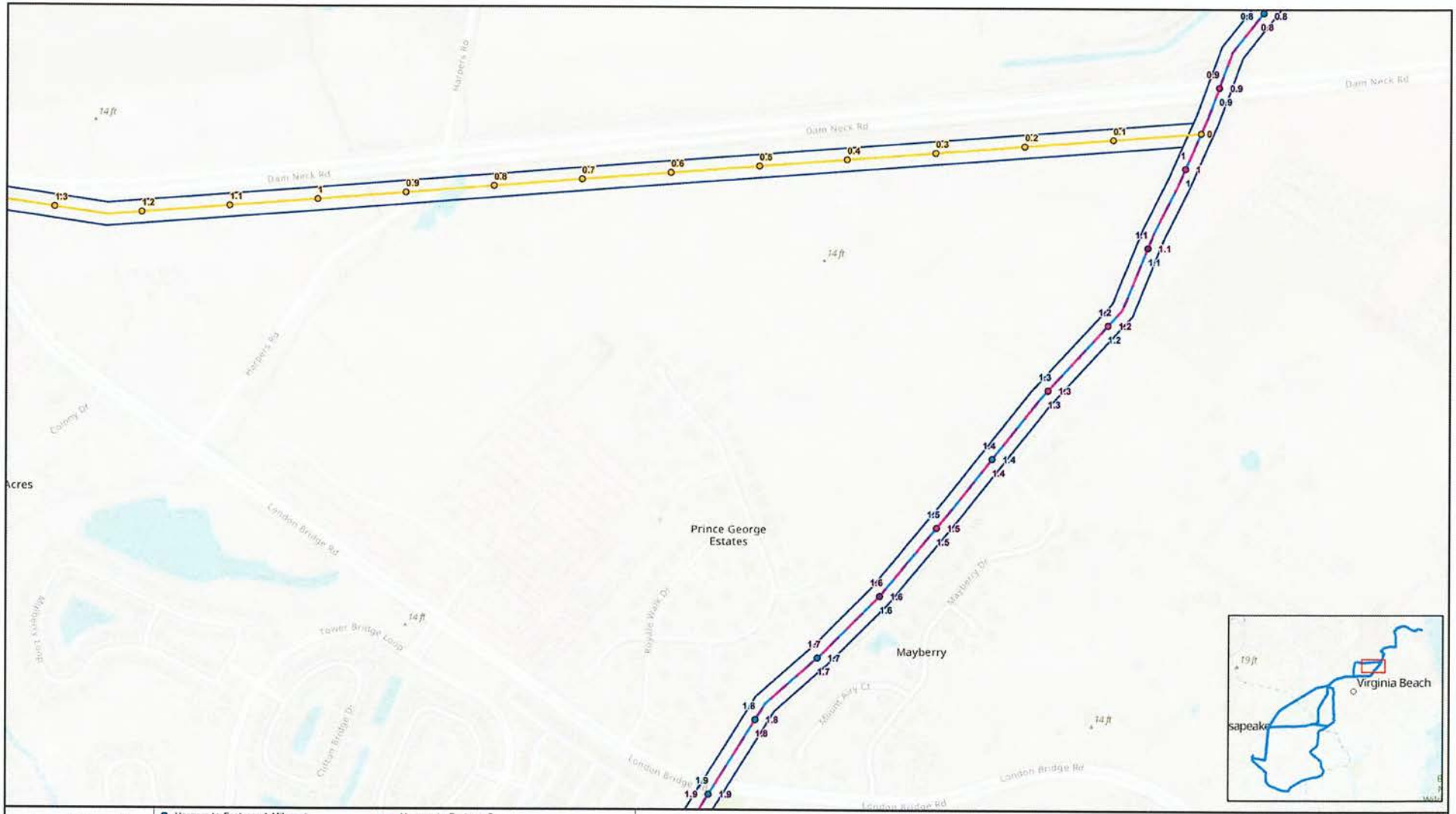

0 0.05 0.1
Miles

1:6,500

- Harpers to Fentress 1 Milepost
- Harpers to Fentress 2 Milepost
- Harpers to Fentress 5 Milepost
- Dam Neck Route Variation

Route Segment - Overhead

- Harpers to Fentress 1
- Harpers to Fentress 2
- Harpers to Fentress 5

Route Variations

- Dam Neck Route Variation
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 5 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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Appendix B1 - Page 6 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

Dominion Energy

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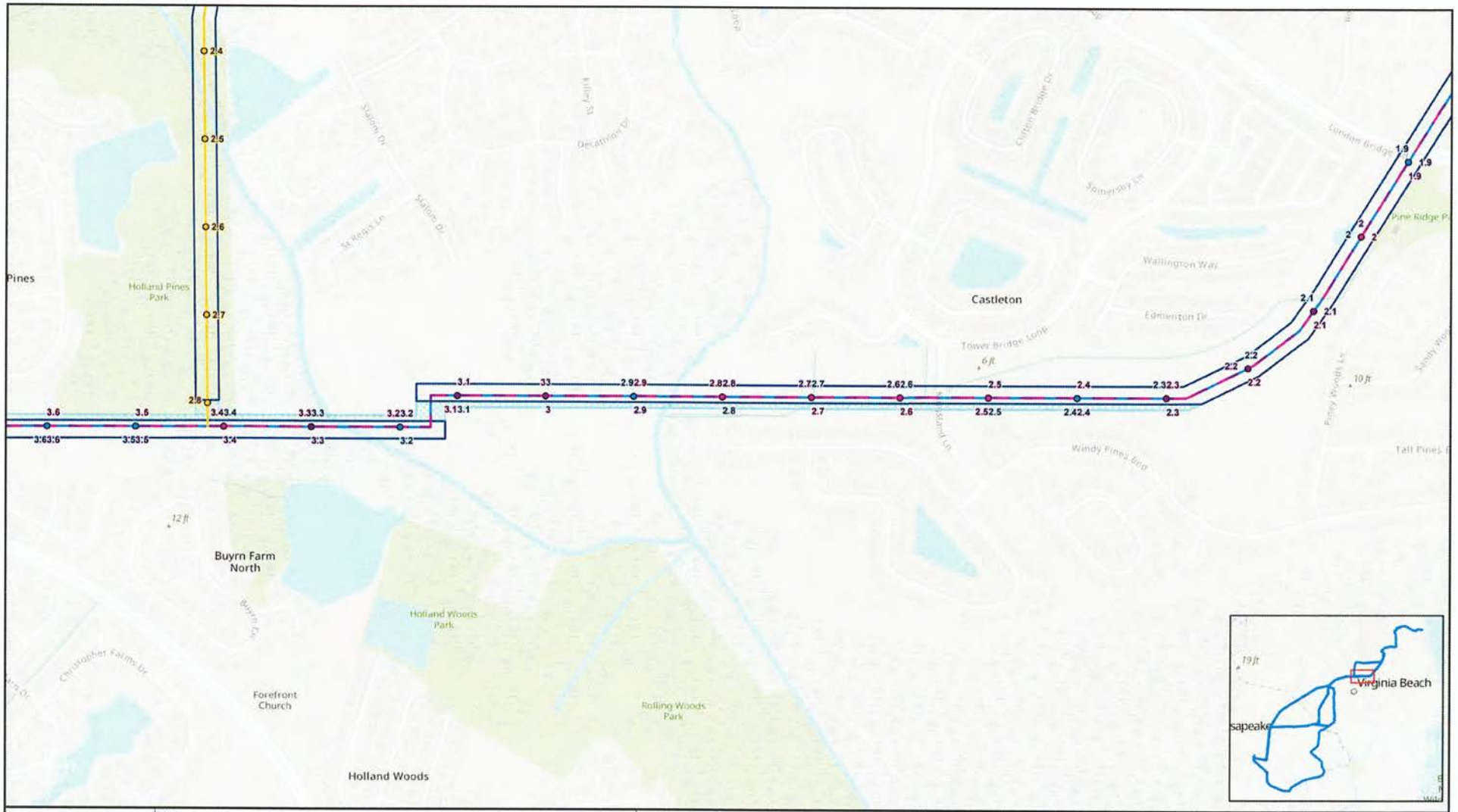

Appendix B1 - Page 7 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

Dominion Energy

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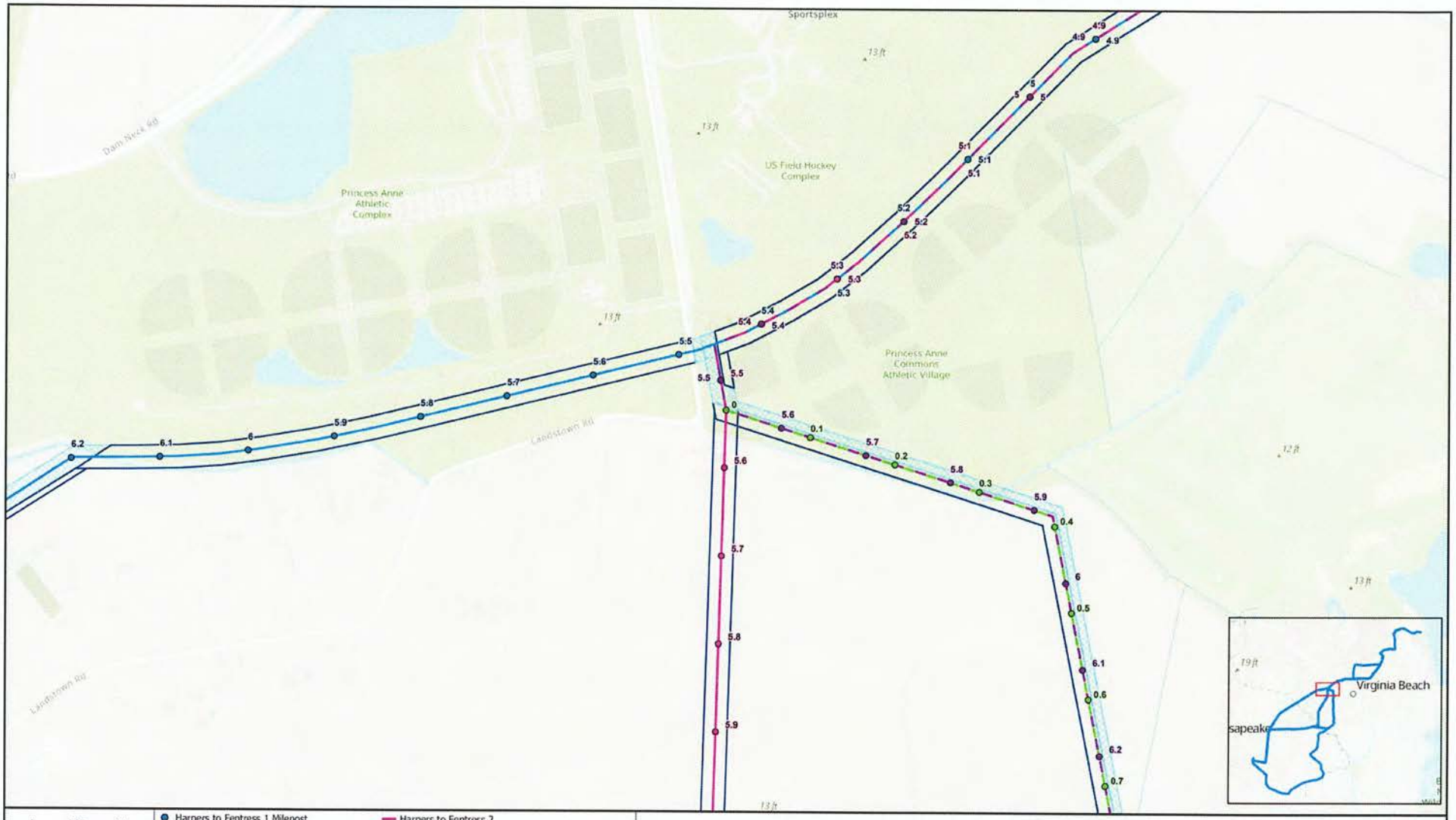
Appendix B1 - Page 8 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes



Appendix B1 - Page 9 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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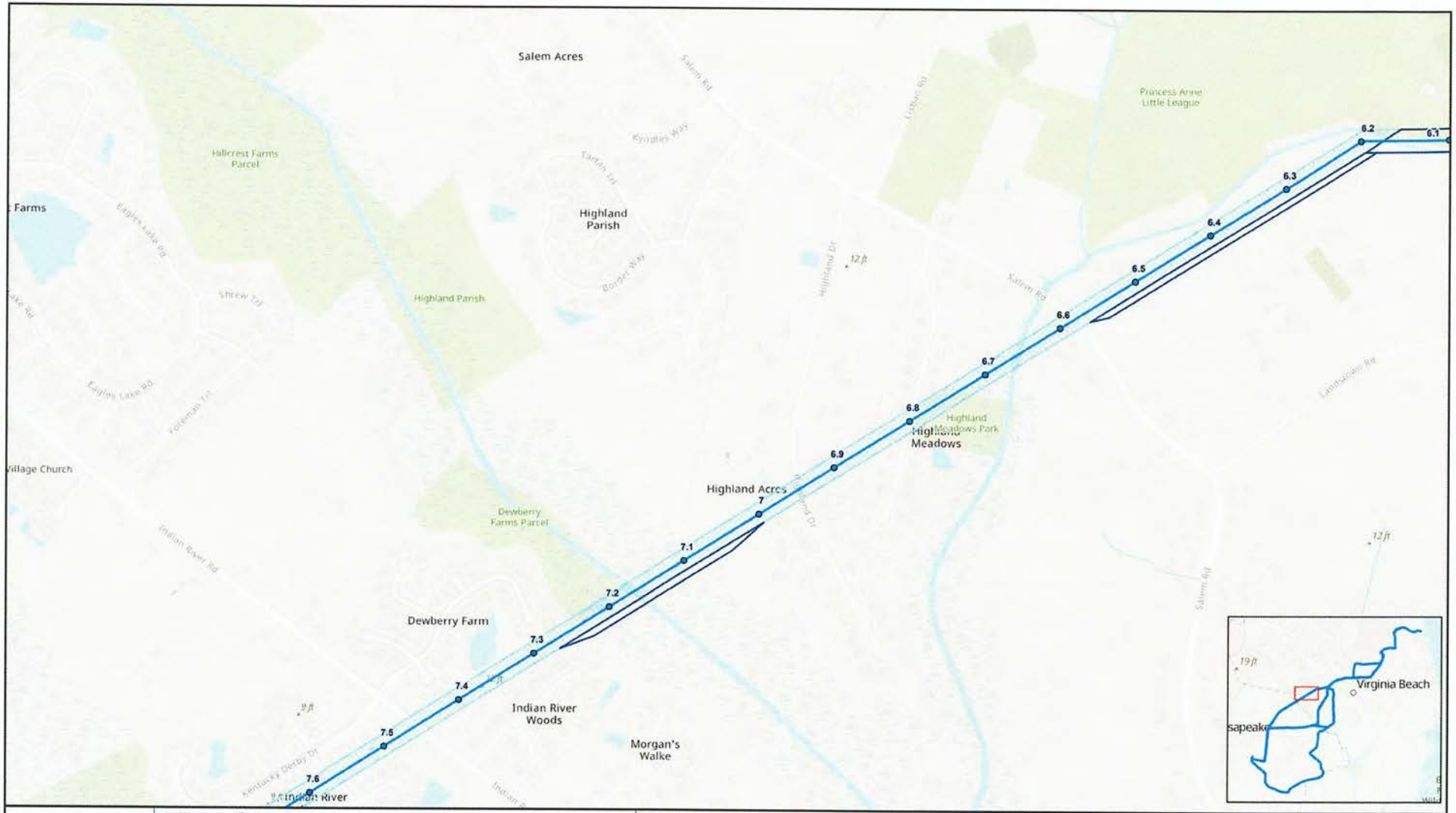
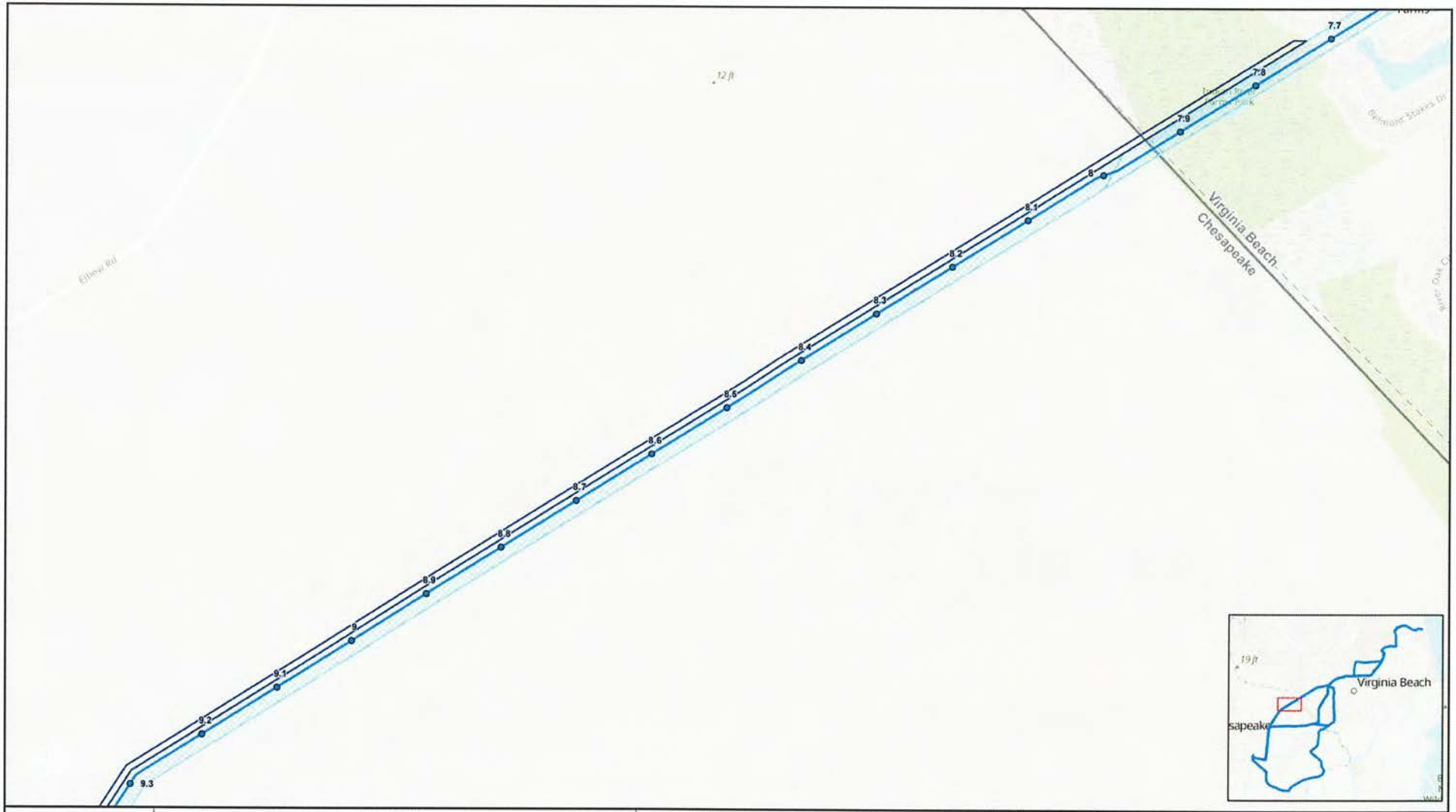


Appendix B1 - Page 10 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes



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Miles

1:6,500

- Harpers to Fentress 1 Milepost

Route Segment - Overhead

- Harpers to Fentress 1
- Existing Right-Of-Way
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 11 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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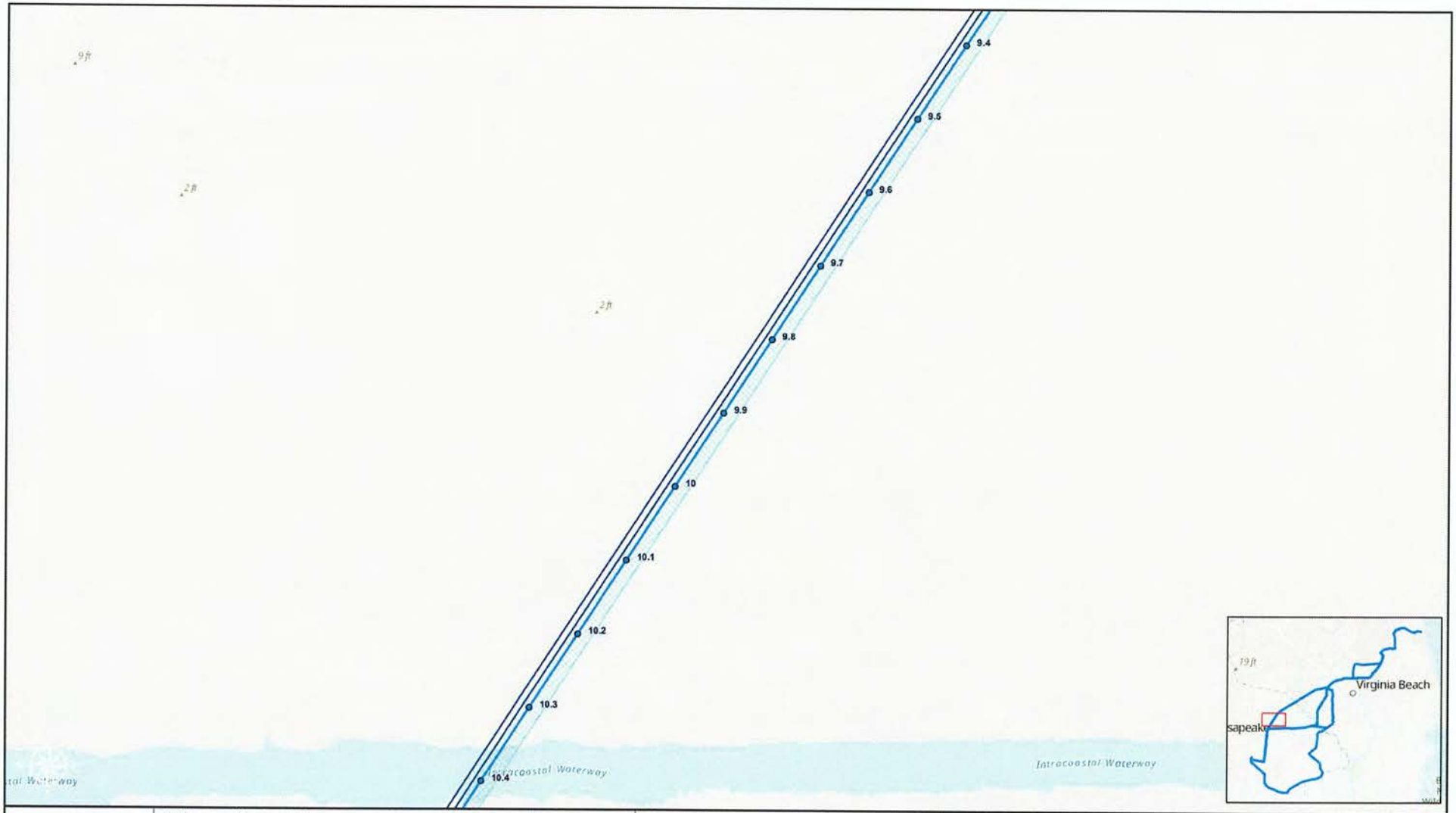

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Miles

1:6,500

- Harpers to Fentress 1 Milepost

Route Segment - Overhead

- Harpers to Fentress 1
- Existing Right-Of-Way
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 12 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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Miles

1:6,500

- Harpers to Fentress 1 Milepost
- Harpers to Fentress 2 Milepost

Route Segment - Overhead

- Harpers to Fentress 1
- Harpers to Fentress 2
- Existing Right-Of-Way
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 13 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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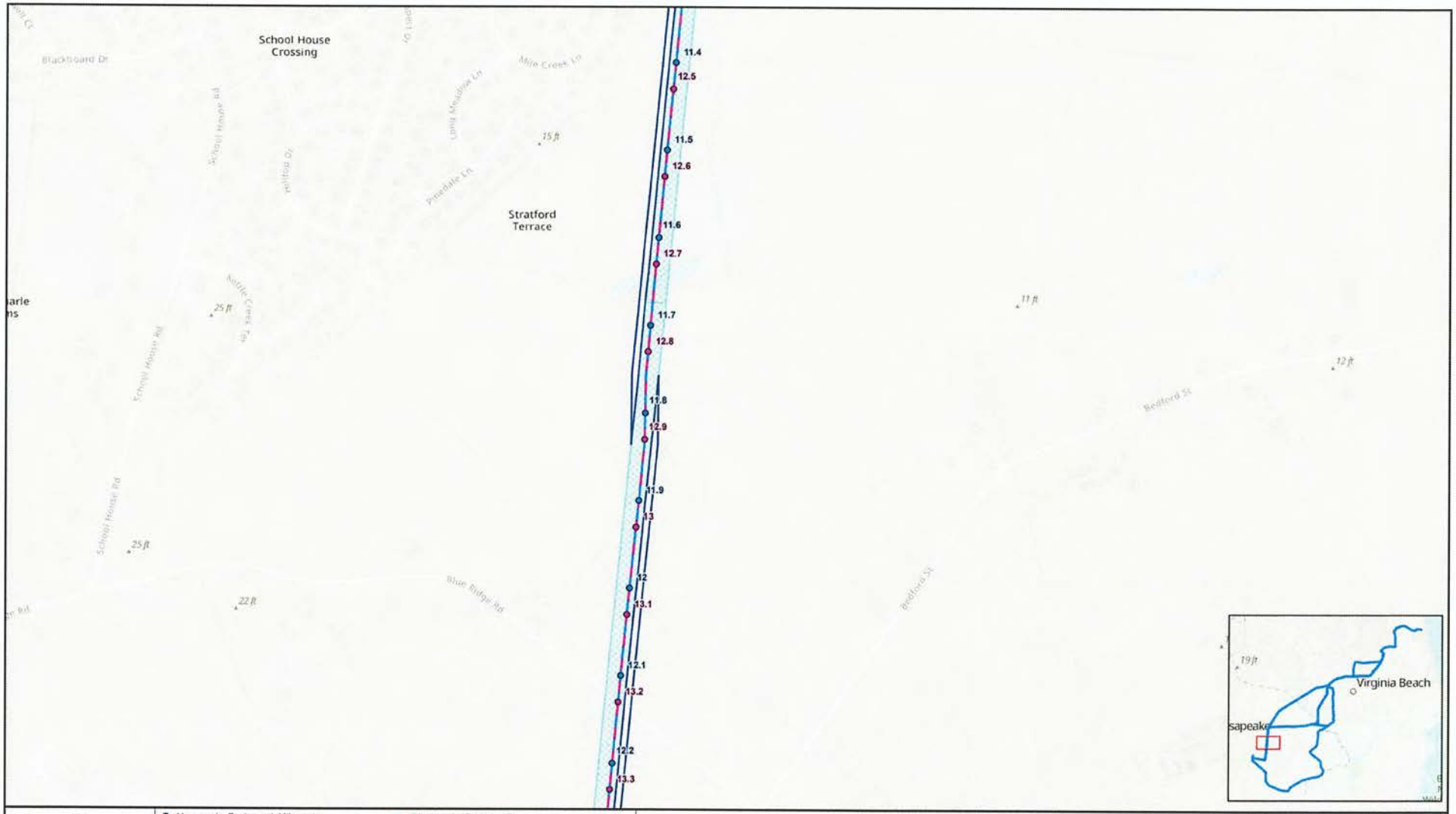

0 0.05 0.1
Miles

1:6,500

- Harpers to Fentress 1 Milepost
- Harpers to Fentress 2 Milepost

Route Segment - Overhead

- Harpers to Fentress 1
- Harpers to Fentress 2
- Existing Right-Of-Way
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 14 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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0 0.05 0.1
Miles

1:6,500

- Harpers to Fentress 1 Milepost
- Harpers to Fentress 2 Milepost
- Harpers to Fentress 5 Milepost

Route Segment - Overhead

- Harpers to Fentress 1
- Harpers to Fentress 2
- Harpers to Fentress 5
- Aboveground Facility
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Existing Substation

Dominion Energy

Appendix B1 - Page 15 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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Appendix B1 - Page 16 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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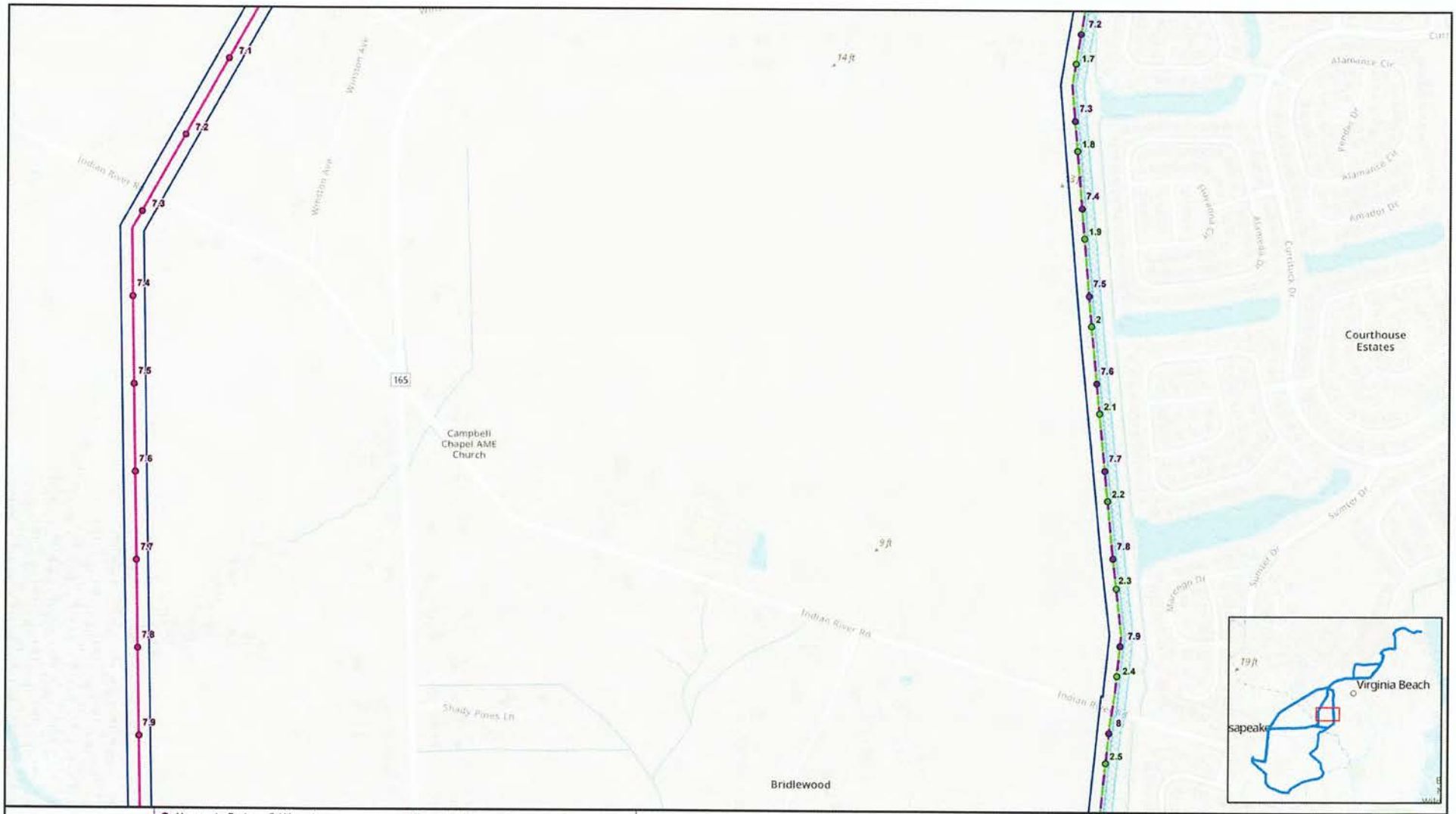

0 0.05 0.1
Miles

1:6,500

- Harpers to Fentress 2 Milepost
- Harpers to Fentress 5 Milepost
- Line 2085 Route Variation

Route Segment - Overhead

- Harpers to Fentress 2
- Harpers to Fentress 5

Route Variations

- Line #2085 Route Variation
- Existing Right-Of-Way
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 17 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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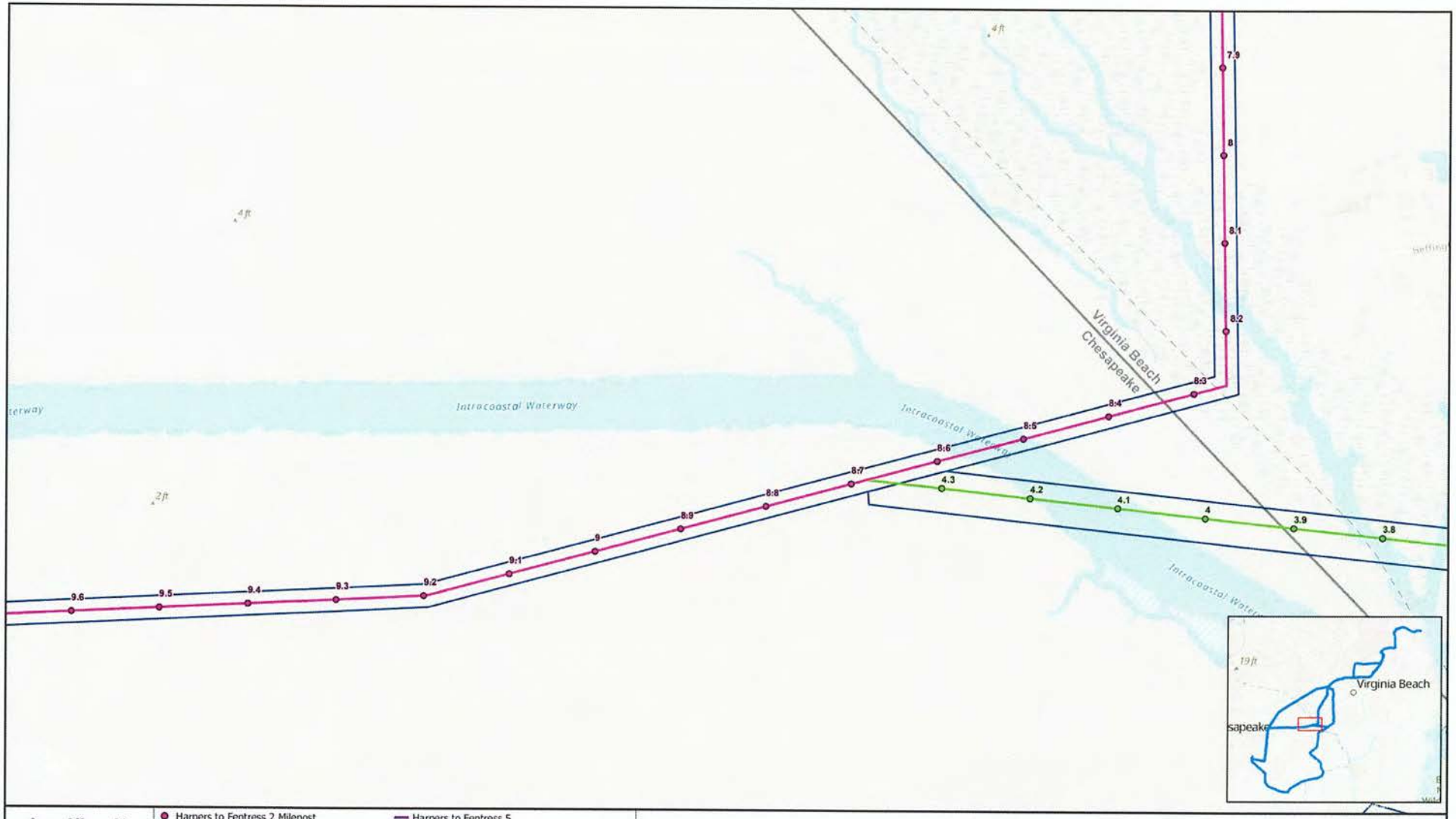
4ft
2ft
Intracoastal Waterway
Virginia Beach
Chesapeake
7.9
8
8.1
8.2
8.3
8.4
8.5
8.6
8.7
8.8
8.9
9
9.1
9.2
9.3
9.4
9.5
9.6
4.3
4.2
4.1
4
3.9
3.8
19ft
Virginia Beach
sapeake
0 0.05 0.1
Miles
1:6,500
Harpers to Fentress 2 Milepost
Line 2085 Route Variation
Route Segment - Overhead
Harpers to Fentress 2
Harpers to Fentress 5
Route Variations
Line #2085 Route Variation
Proposed Right-Of-Way
Dominion Energy
Appendix B1 - Page 18 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes
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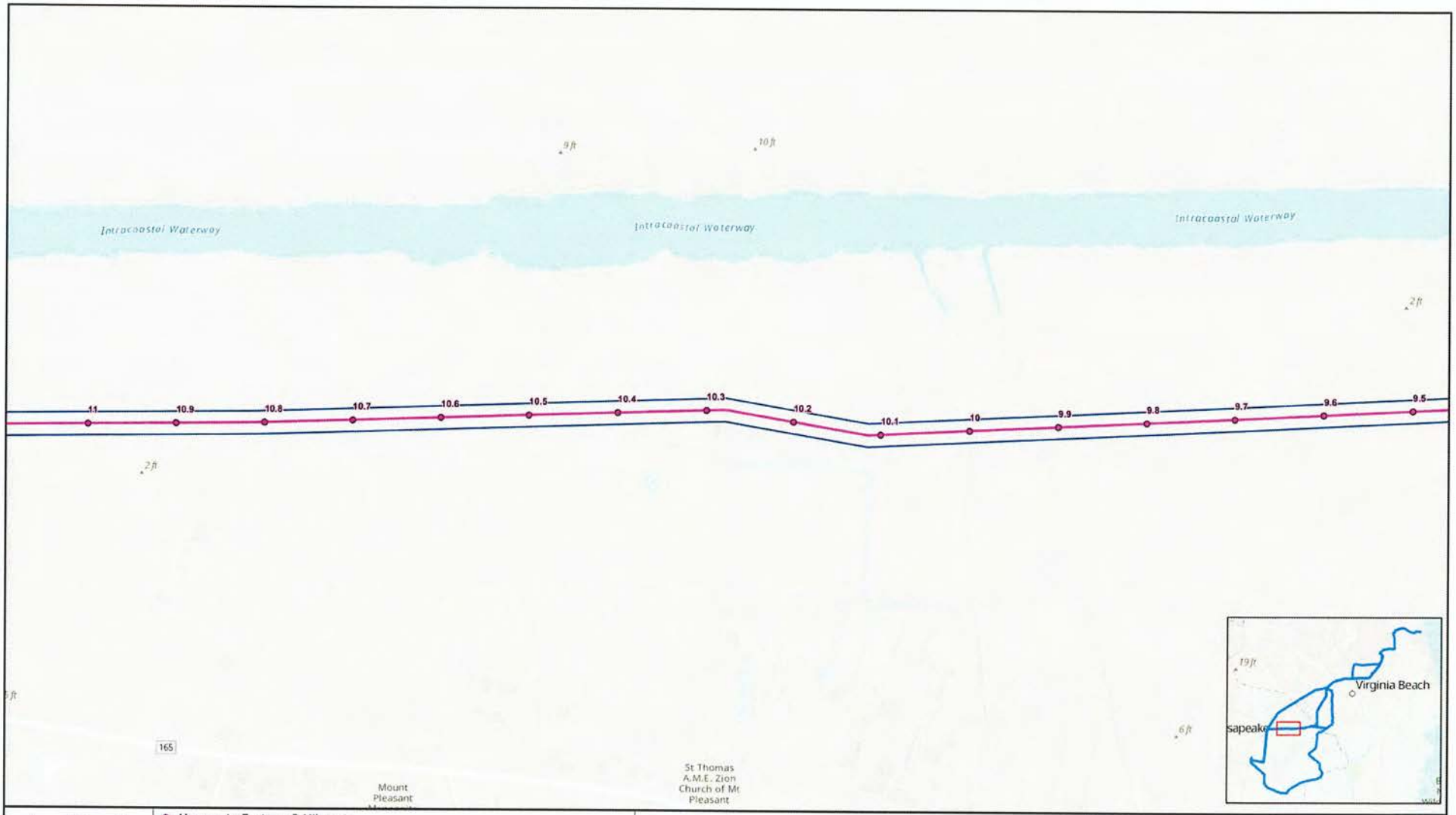
Intracoastal Waterway
Intracoastal Waterway
Intracoastal Waterway
9 ft
10 ft
2 ft
2 ft
11
10.9
10.8
10.7
10.6
10.5
10.4
10.3
10.2
10.1
10
9.9
9.8
9.7
9.6
9.5
165
Mount Pleasant
St Thomas A.M.E. Zion Church of Mt Pleasant
19 ft
6 ft
Virginia Beach
sapeake
0 0.05 0.1
Miles
1:6,500
Harpers to Fentress 2 Milepost
Route Segment - Overhead
Harpers to Fentress 2
Proposed Right-Of-Way
Dominion Energy
Appendix B1 - Page 19 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes
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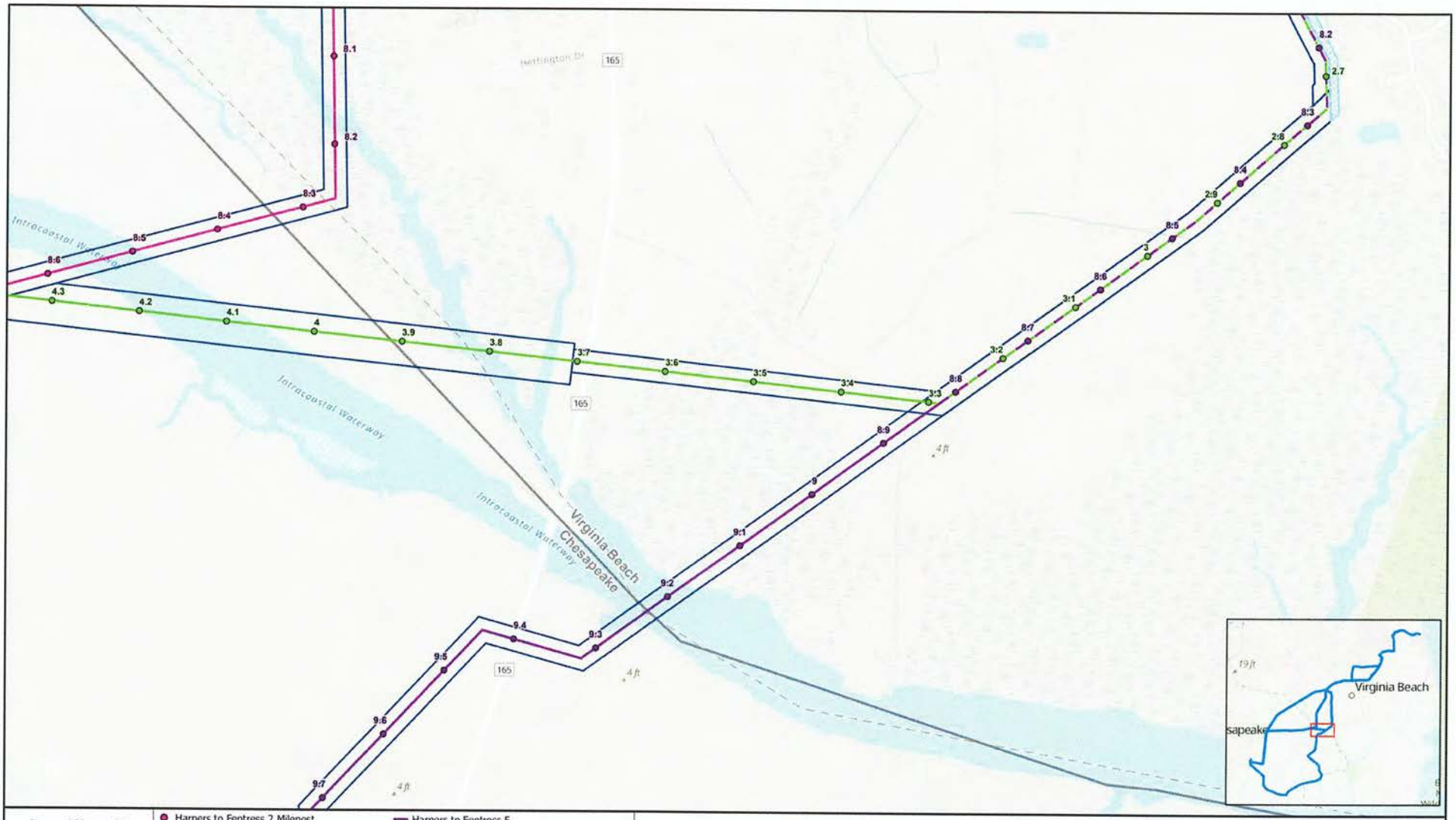

0 0.05 0.1
Miles

1:6,500

- Harpers to Fentress 2 Milepost
- Harpers to Fentress 5 Milepost
- Line 2085 Route Variation

Route Segment - Overhead

- Harpers to Fentress 2
- Harpers to Fentress 5

Route Variations

- Line #2085 Route Variation
- Existing Right-Of-Way
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 20 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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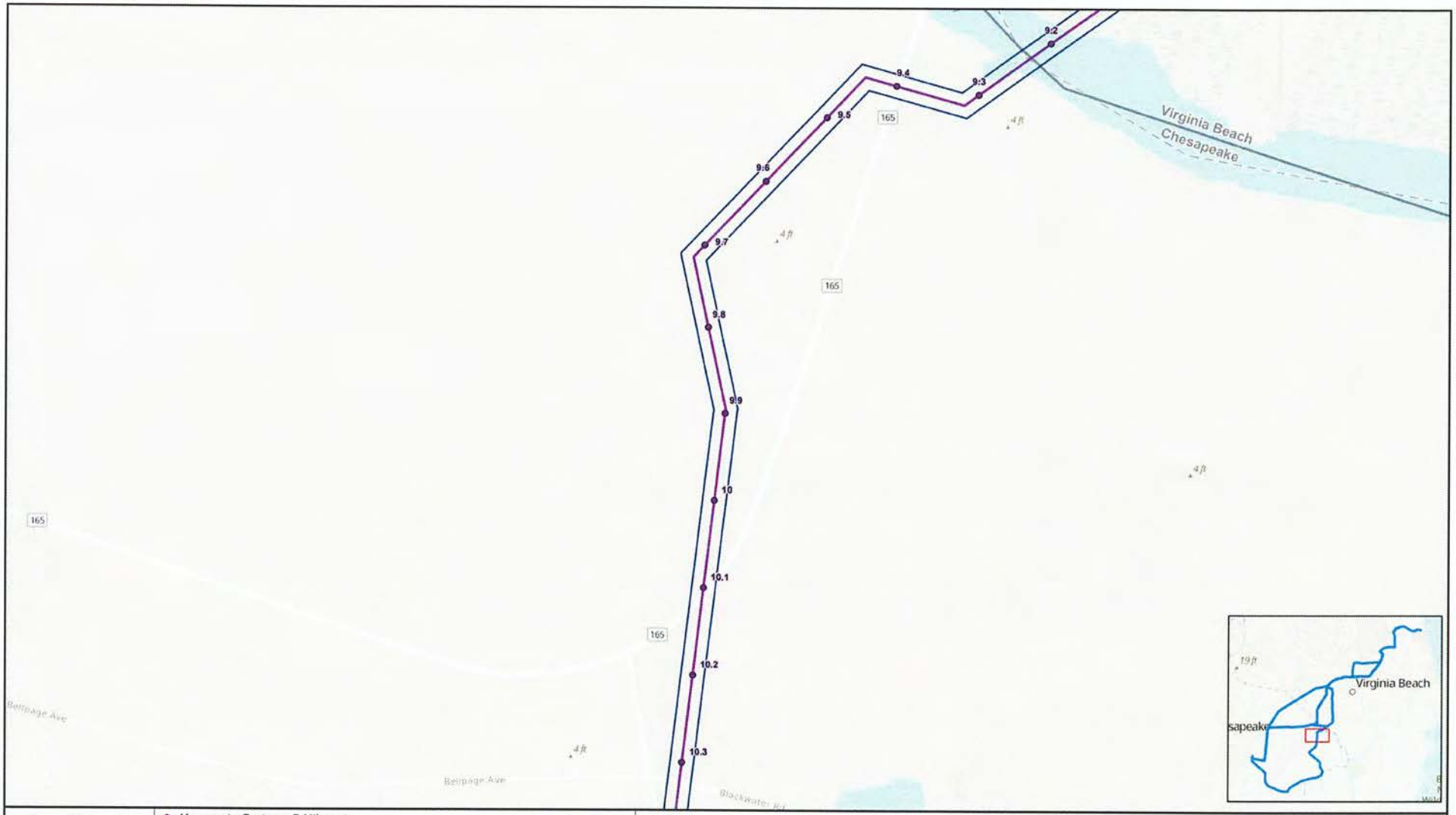

Appendix B1 - Page 21 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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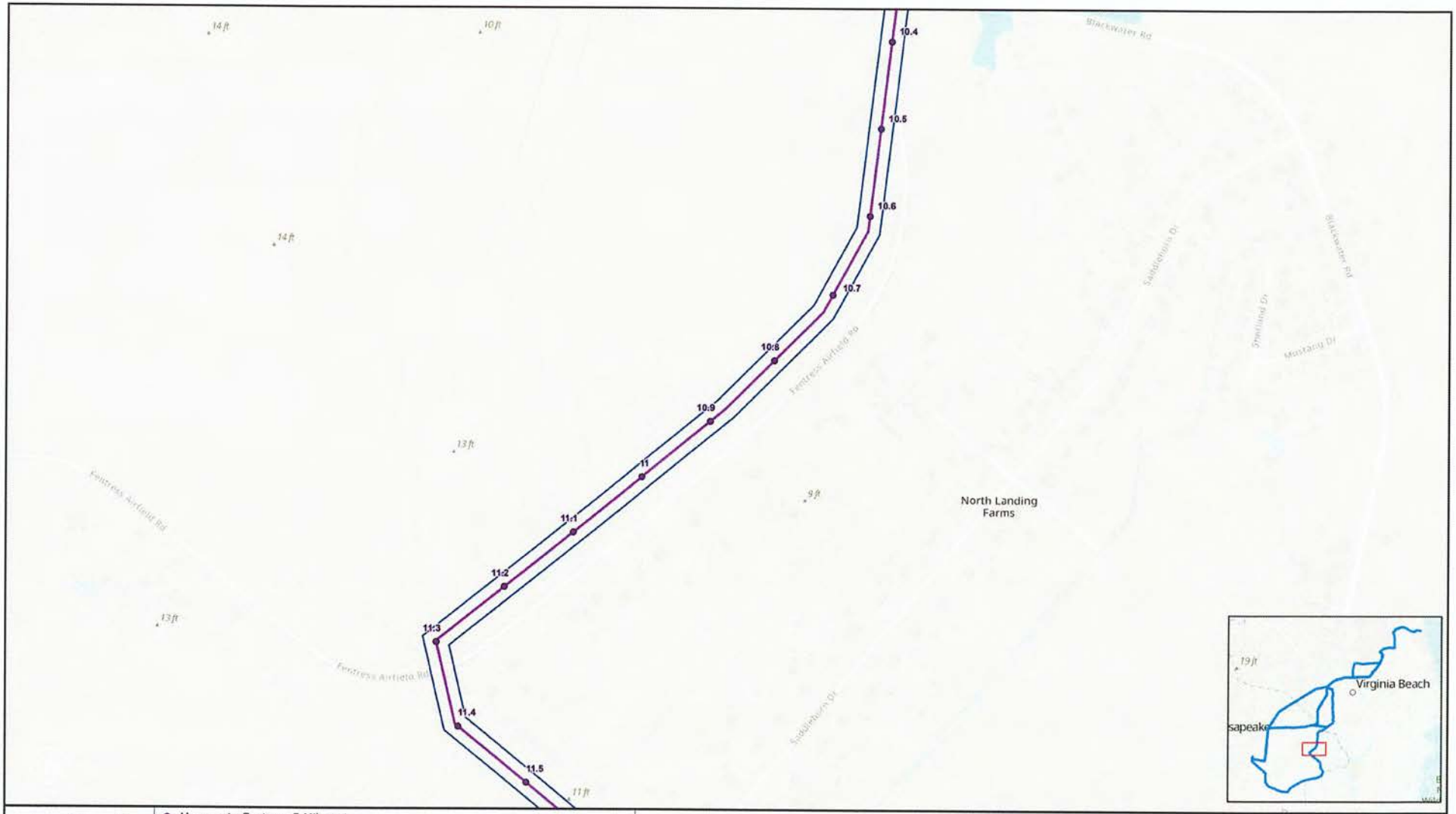

Appendix B1 - Page 22 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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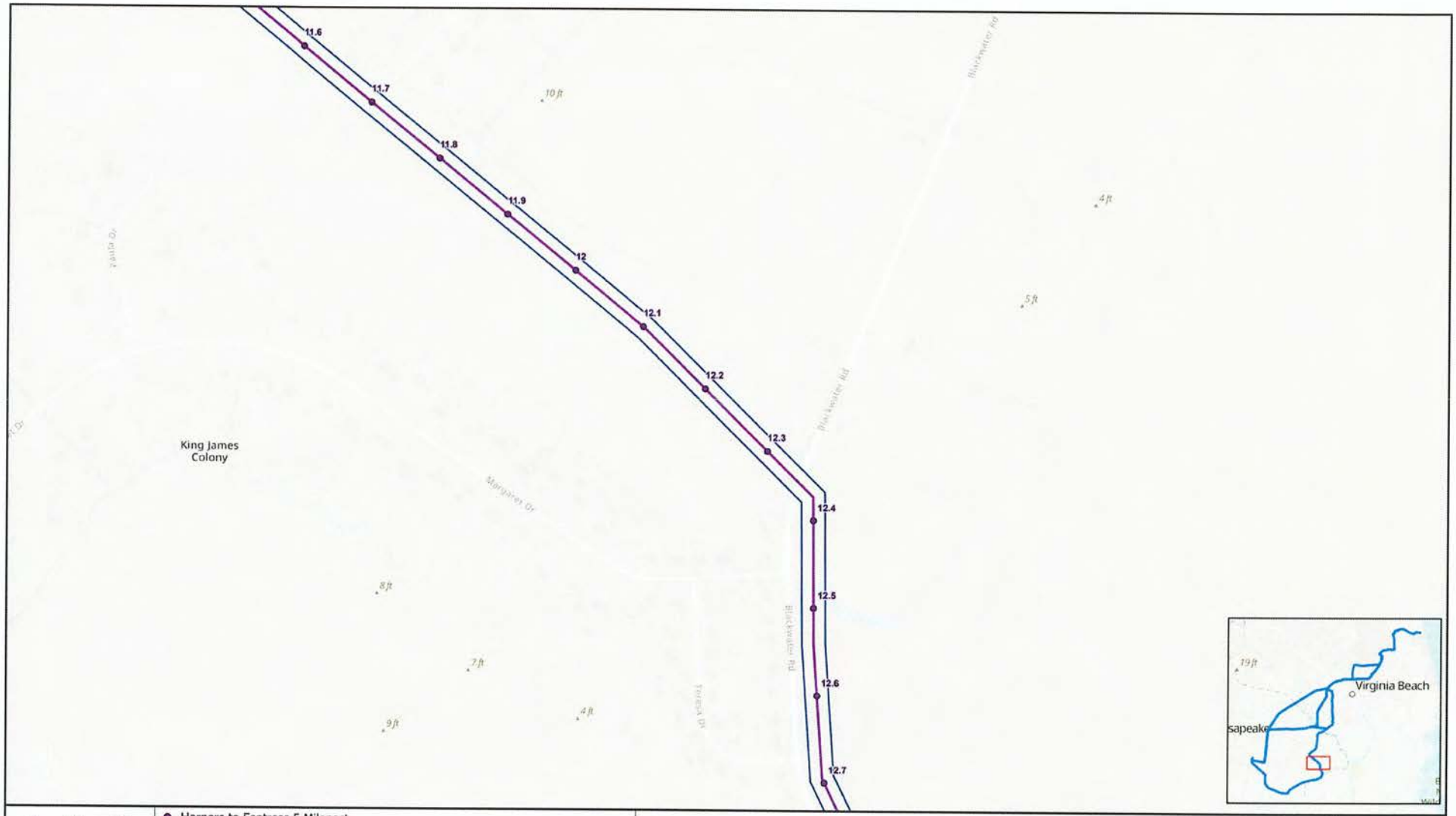

Appendix B1 - Page 23 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

Dominion Energy

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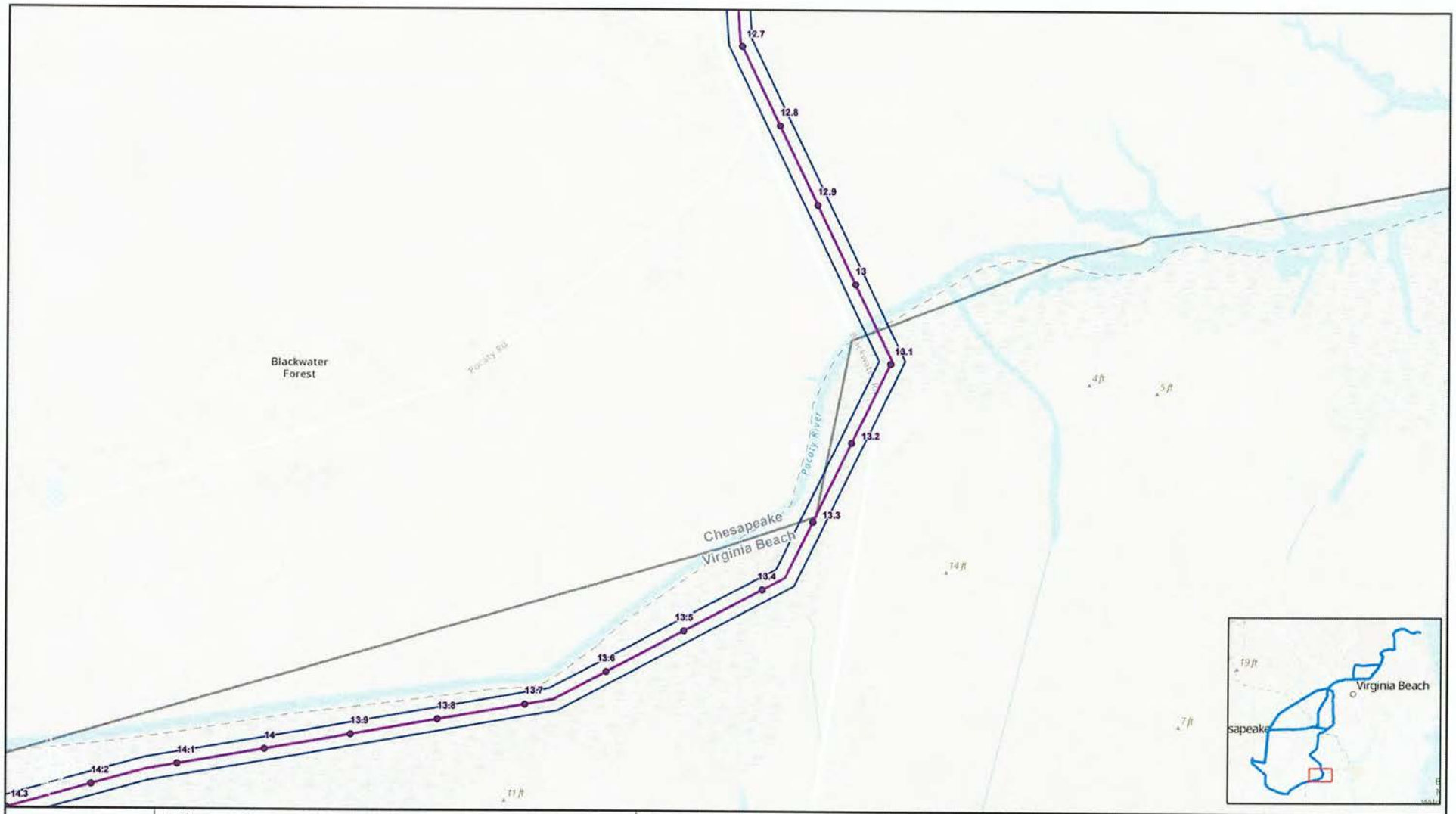

0 0.05 0.1
Miles

1:6,500

- Harpers to Fentress 5 Milepost

Route Segment - Overhead

- Harpers to Fentress 5
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 24 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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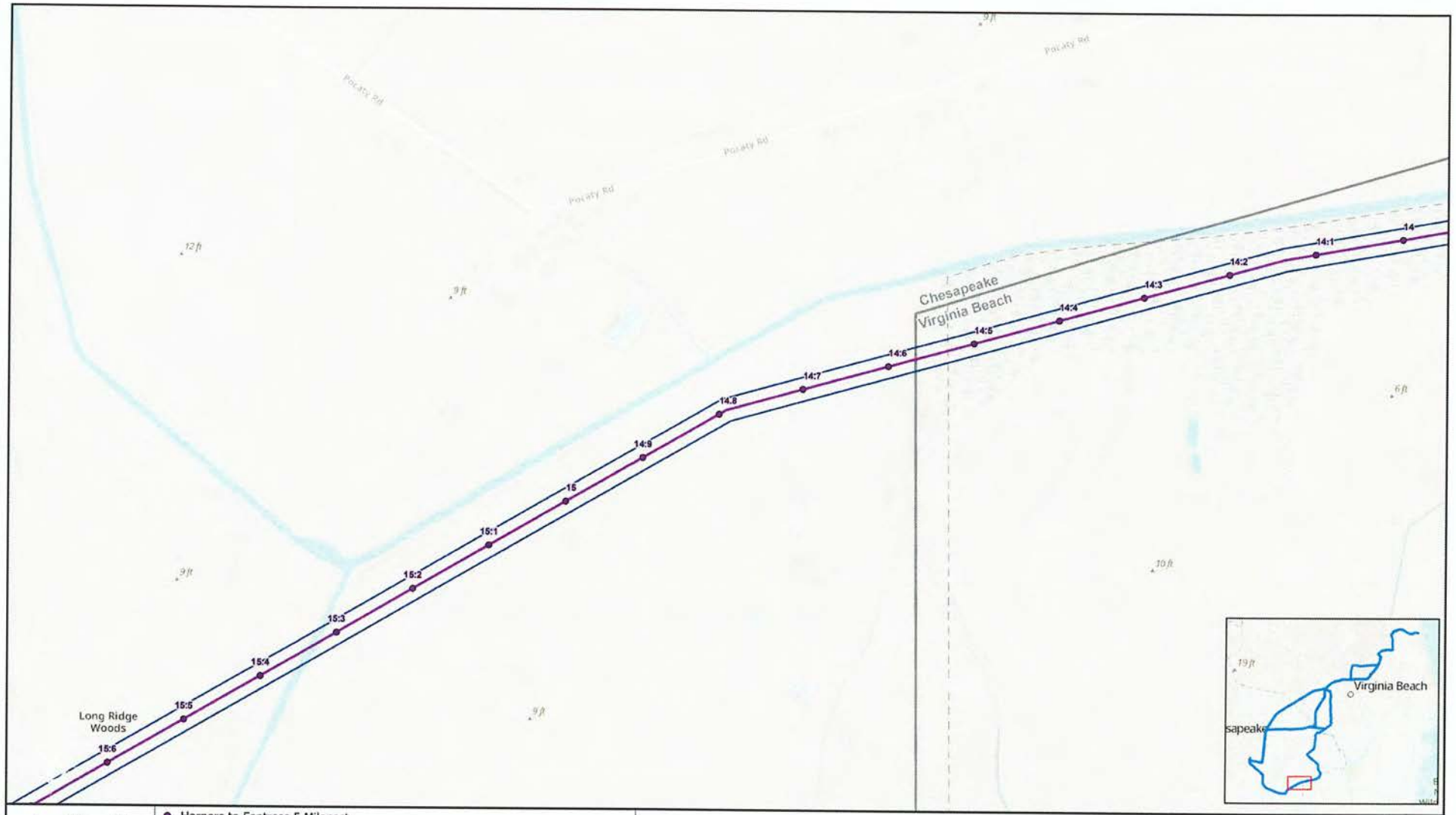
Pocaty Rd
Chesapeake
Virginia Beach
Long Ridge
Woods
15:6
15:5
15:4
15:3
15:2
15:1
15
14:9
14:8
14:7
14:6
14:5
14:4
14:3
14:2
14:1
14
Virginia Beach
0 0.05 0.1
Miles
1:6,500
Harpers to Fentress 5 Milepost
Route Segment - Overhead
Harpers to Fentress 5
Proposed Right-Of-Way
Dominion Energy
Appendix B1 - Page 25 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes
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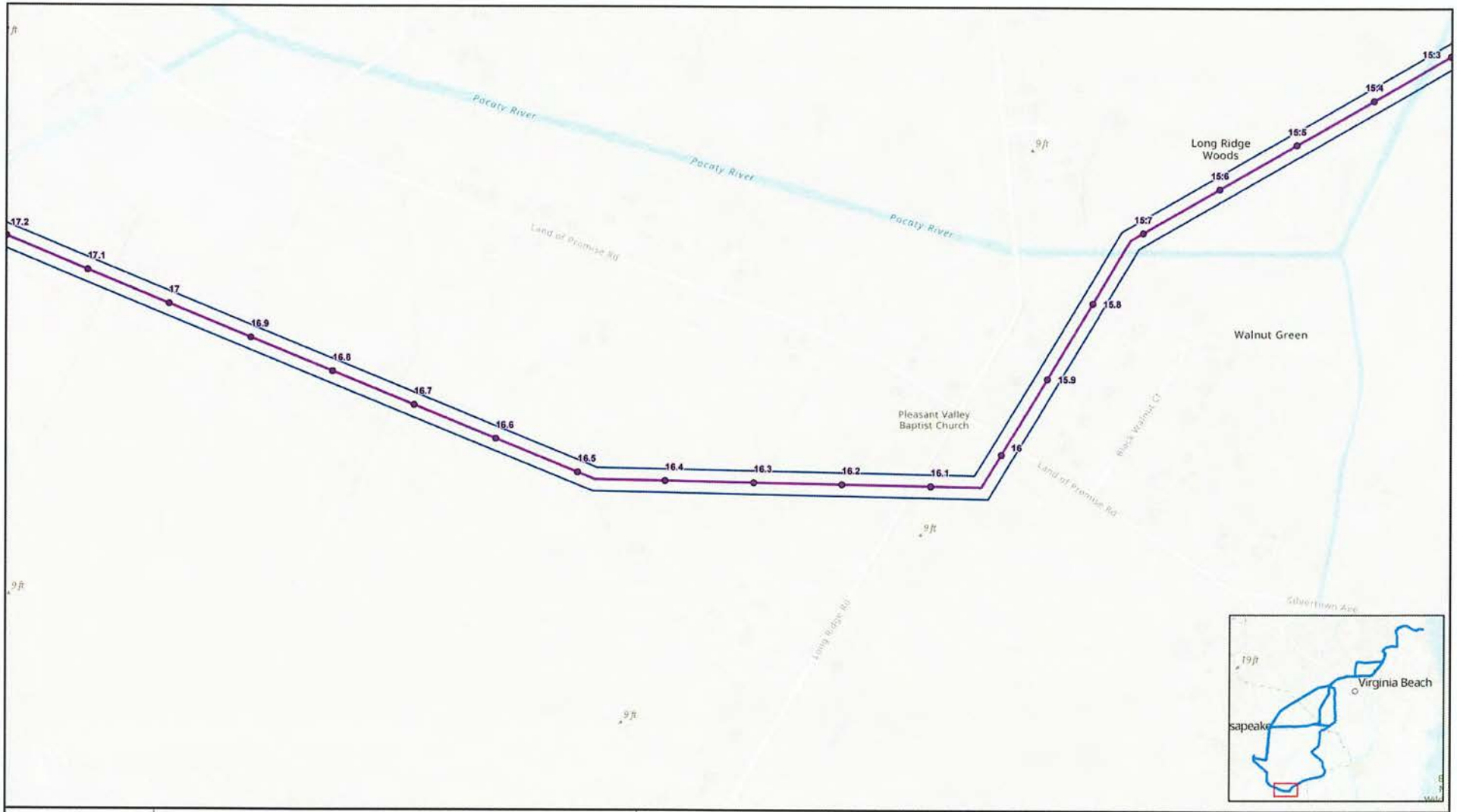

0 0.05 0.1
Miles

1:6,500

- Harpers to Fentress 5 Milepost

Route Segment - Overhead

- Harpers to Fentress 5
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 26 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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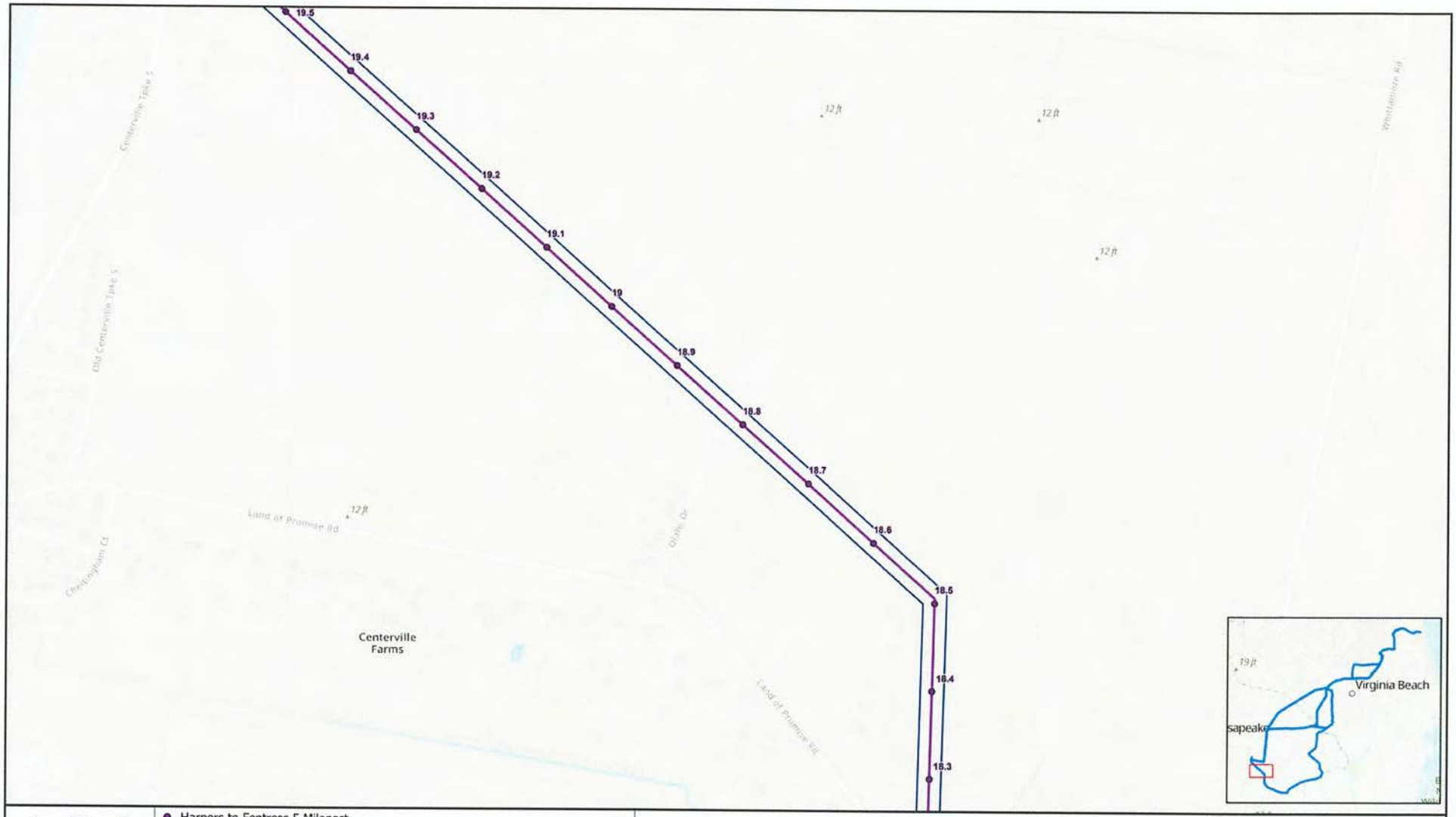
Appendix B1 - Page 27 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes



0 0.05 0.1
Miles

1:6,500

- Harpers to Fentress 5 Milepost

Route Segment - Overhead

- Harpers to Fentress 5
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 28 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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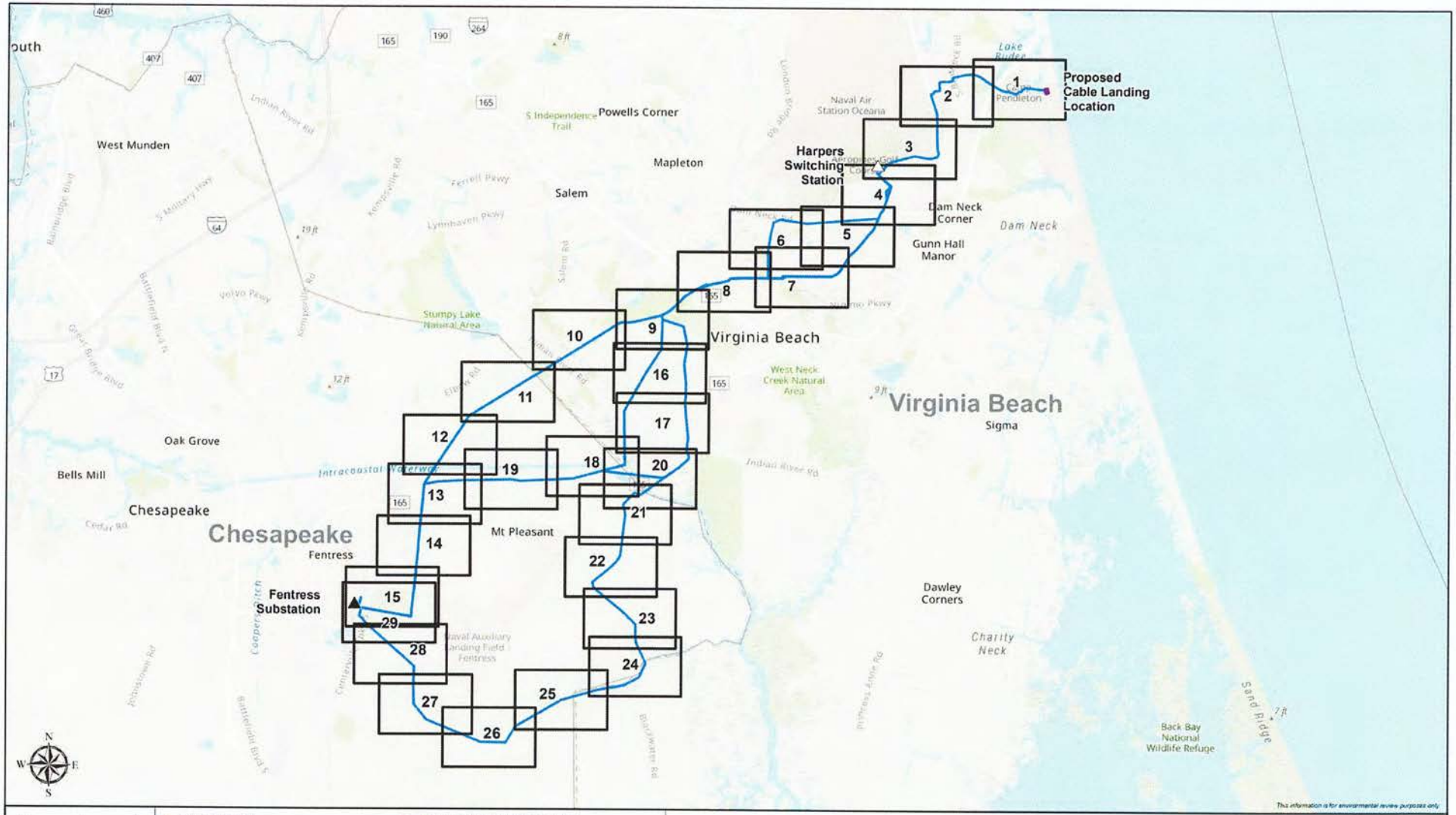
Appendix B1 - Page 29 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes



Appendix B1
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities Index Map

Dominion Energy

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0 0.05 0.1
Miles

1:6,500

- Cable Landing to Harpers Milepost
- **Route Segment - Underground**
- Cable Landing to Harpers
- HDD
- Surface Trenched Right-Of-Way
- Surface Trenched ROW - Manhole Location
- Temporary Construction Easement
- Proposed Cable Landing Location

Dominion Energy

Appendix B1 - Page 1 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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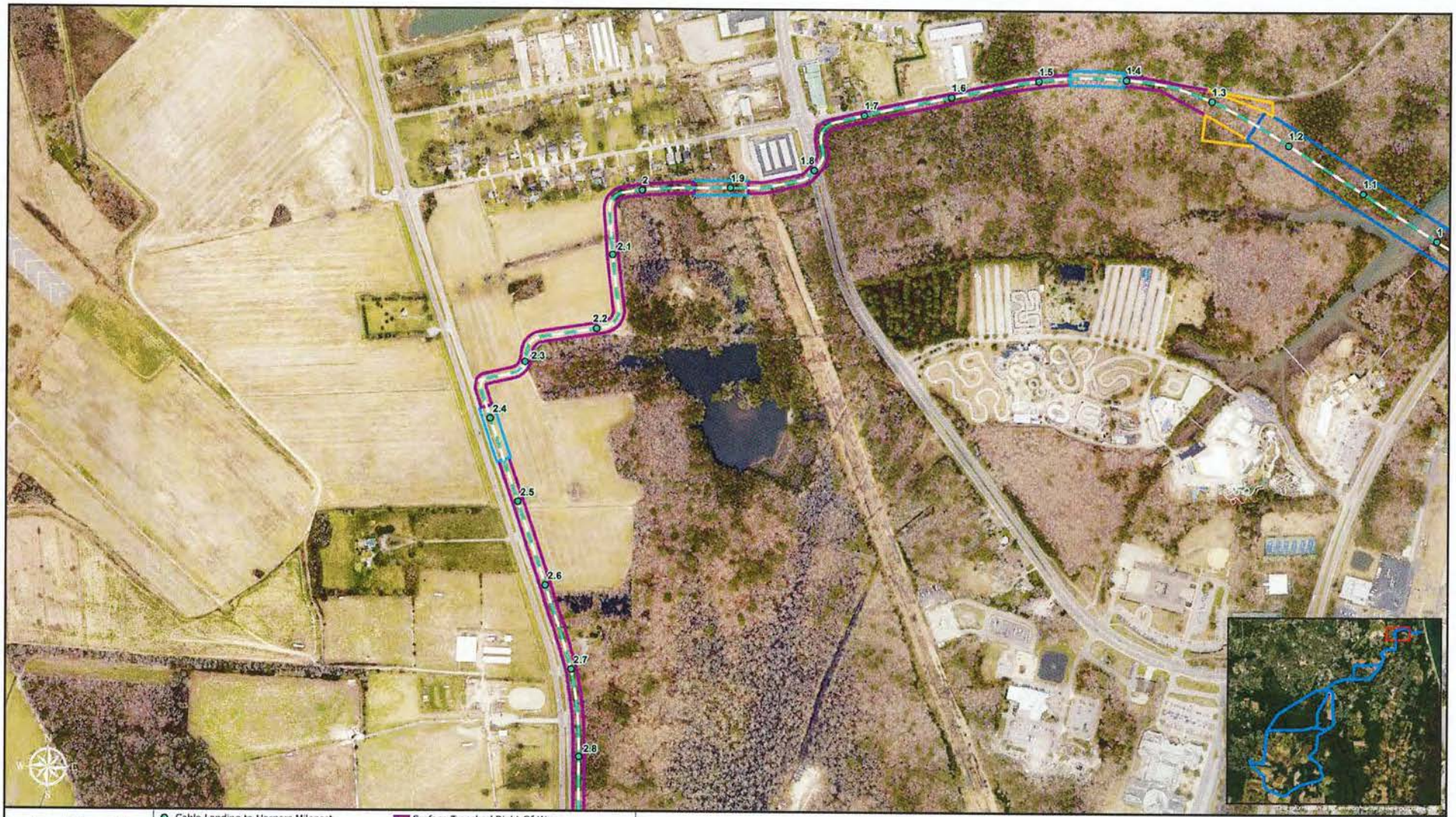

Appendix B1 - Page 2 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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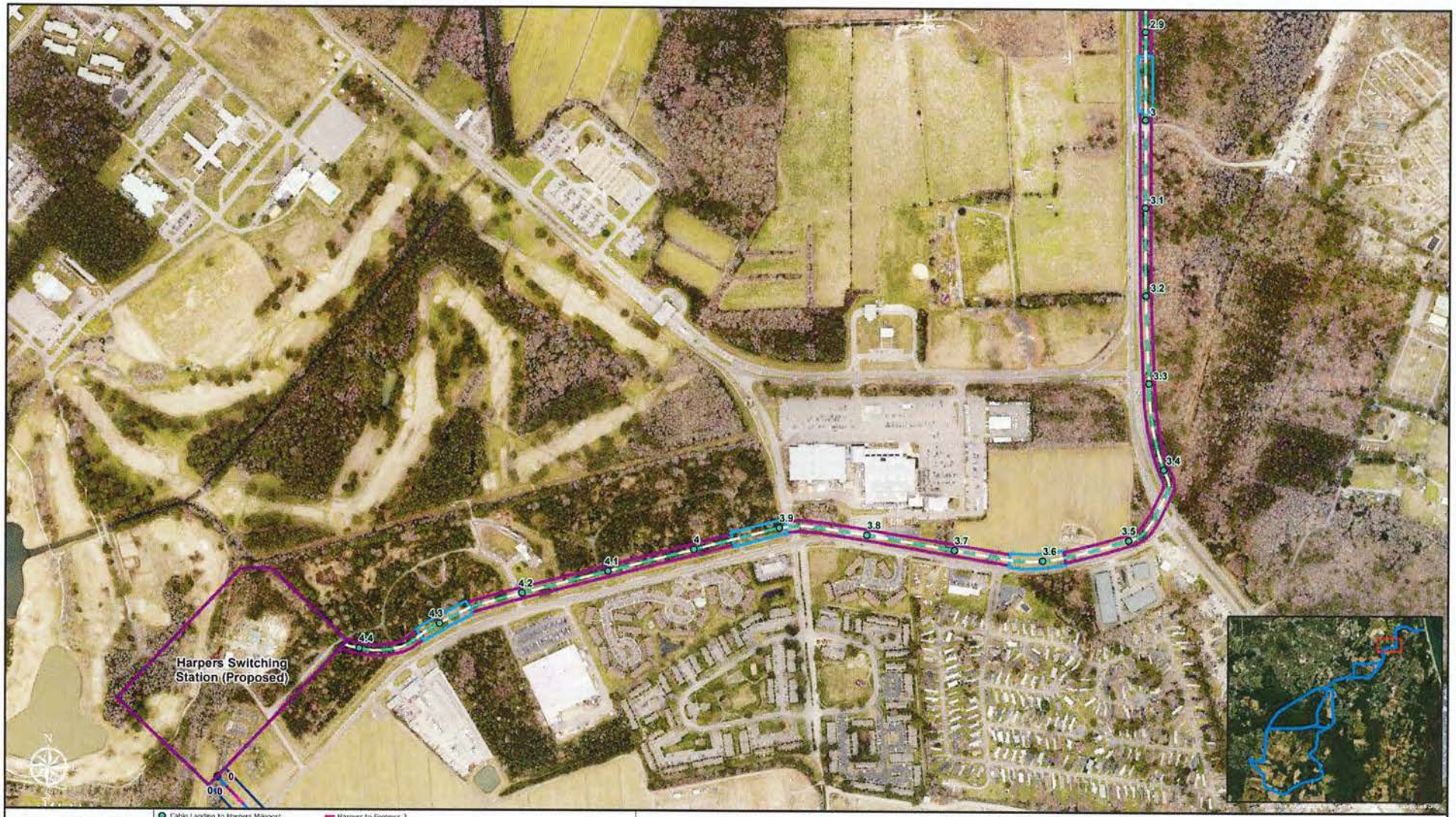

Appendix B1 - Page 3 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

Dominion Energy

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Harpers Switching Station (Proposed)
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0.2
0.1
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0 0.05 0.1
Miles
1:6,500
Harpers to Fentress 1 Milepost
Harpers to Fentress 2 Milepost
Harpers to Fentress 5 Milepost
Dam Neck Route Variation
Route Segment - Overhead
Harpers to Fentress 1
Harpers to Fentress 2
Harpers to Fentress 5
Route Variations
Dam Neck Route Variation
Proposed Right-Of-Way
Aboveground Facility
Dominion Energy
Appendix B1 - Page 4 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes
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0 0.05 0.1
Miles
1:6,500
Harpers to Fentress 1 Milepost
Harpers to Fentress 2 Milepost
Harpers to Fentress 5 Milepost
Dam Neck Route Variation
Route Segment - Overhead
Harpers to Fentress 1
Harpers to Fentress 2
Harpers to Fentress 5
Route Variations
Dam Neck Route Variation
Proposed Right-Of-Way
Dominion Energy
Appendix B1 - Page 5 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes
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0 0.05 0.1
Miles

1:6,500

- Dam Neck Route Variation

Route Variations

- Dam Neck Route Variation
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 6 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

ERM

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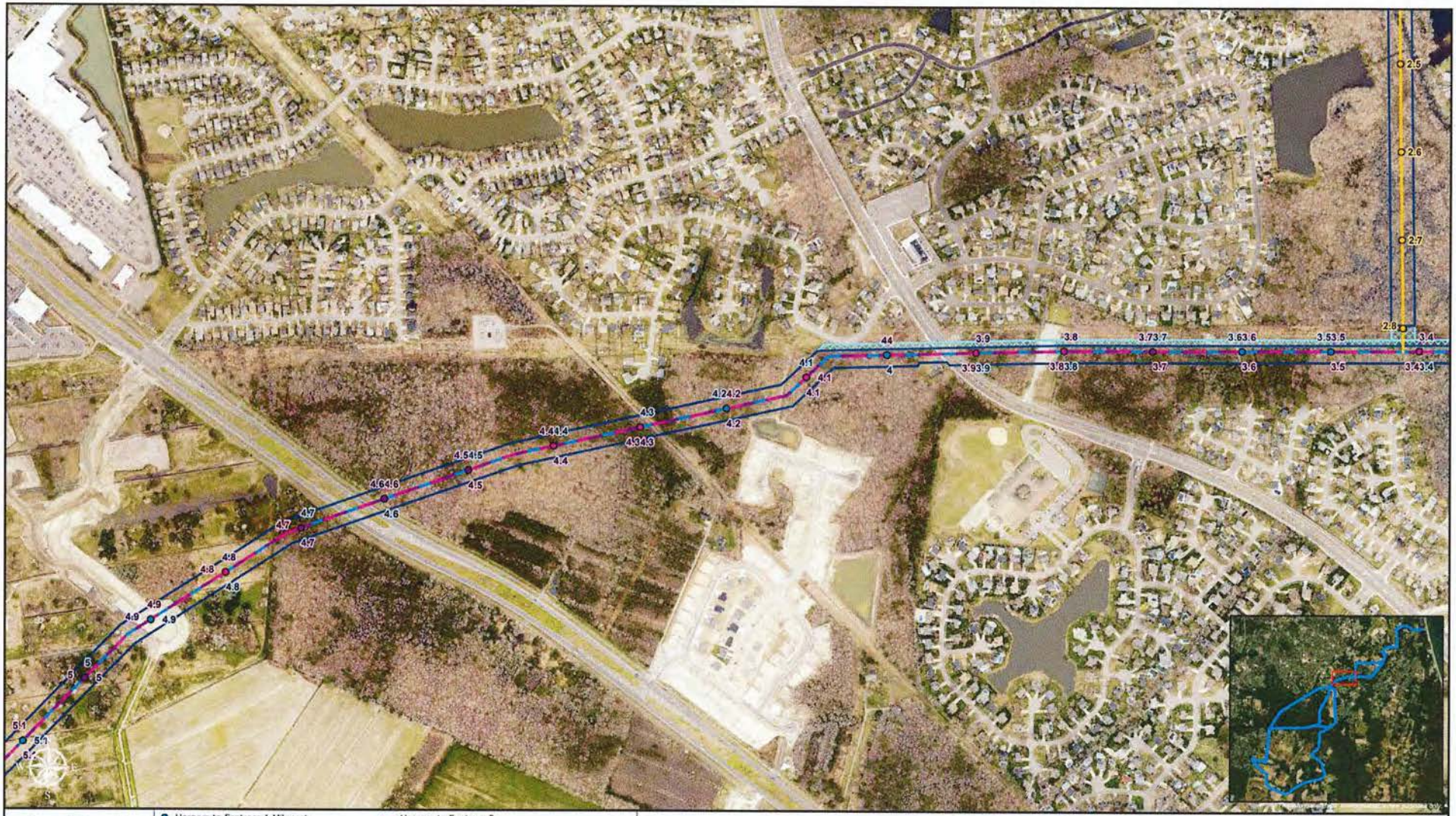
Appendix B1 - Page 7 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes



Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities

Dominion Energy Virginia

Virginia Beach and Chesapeake, VA

Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

Dominion Energy

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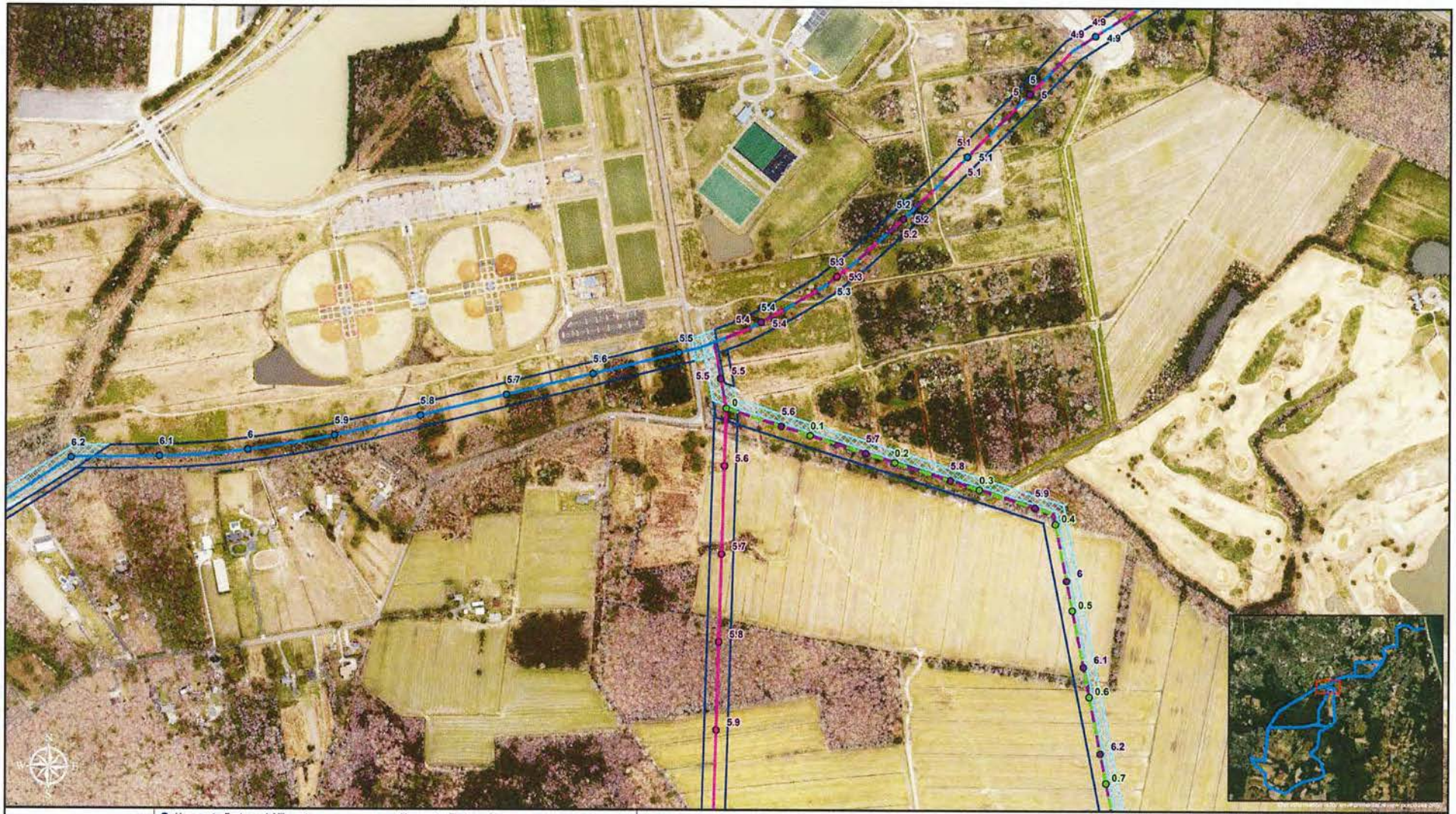

Appendix B1 - Page 9 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

Dominion Energy

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0 0.05 0.1
Miles

1:6,500

- Harpers to Fentress 1 Milepost

Route Segment - Overhead

- Harpers to Fentress 1
- Existing Right-Of-Way
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 10 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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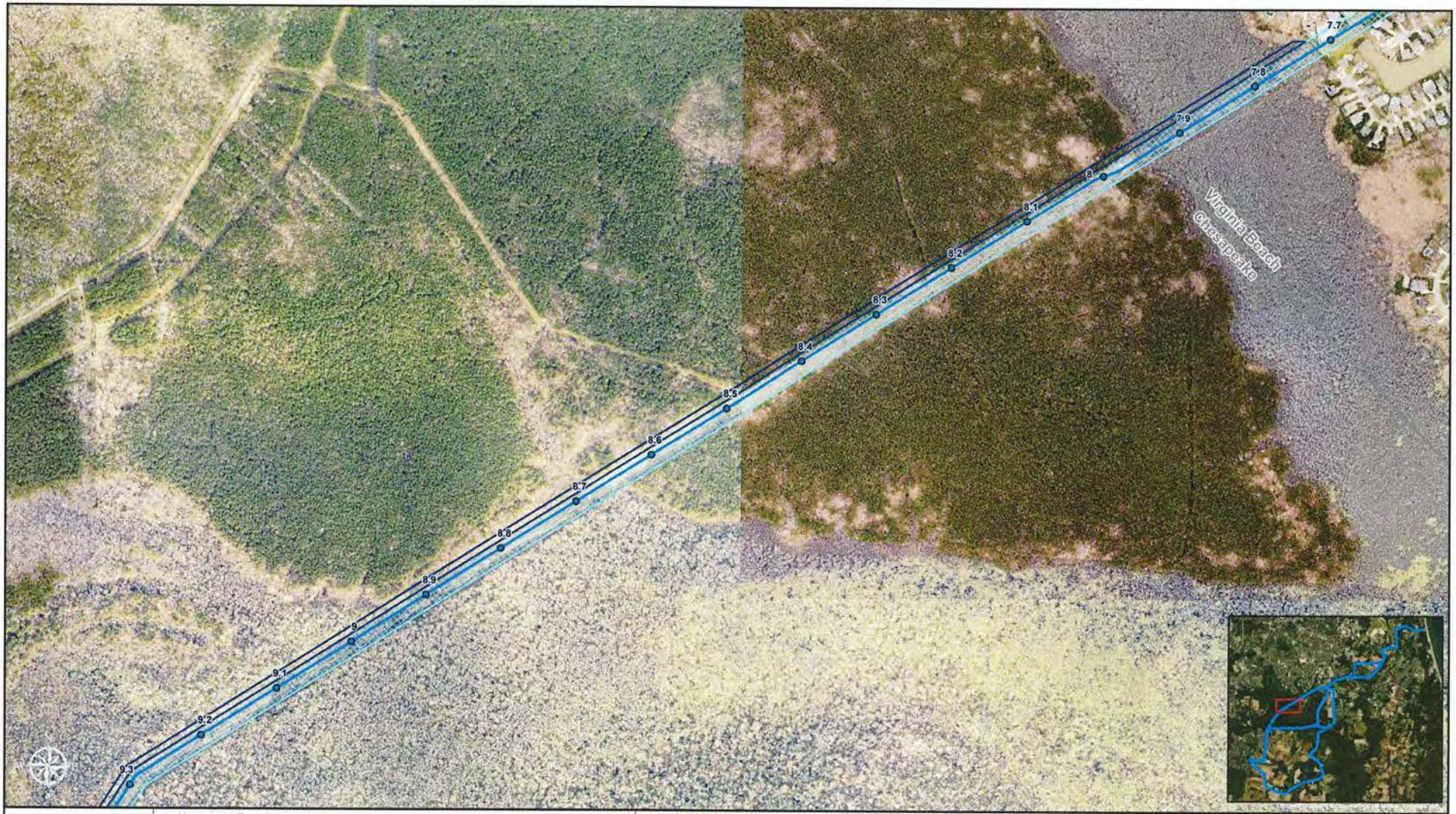

0 0.05 0.1
Miles

1:6,500

- Harpers to Fentress 1 Milepost

Route Segment - Overhead

- Harpers to Fentress 1
- Existing Right-Of-Way
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 11 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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Miles

1:6,500

- Harpers to Fentress 1 Milepost

Route Segment - Overhead

- Harpers to Fentress 1
- Existing Right-Of-Way
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 12 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

ERM

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Appendix B1 - Page 13 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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Appendix B1 - Page 14 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

Dominion Energy

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Pocaty Substation
Proposed Fentress Substation Expansion
Fentress Existing Substation
12.3
13.4
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Miles
1:6,500
Harpers to Fentress 1 Milepost
Harpers to Fentress 2 Milepost
Harpers to Fentress 5 Milepost
Route Segment - Overhead
Harpers to Fentress 1
Harpers to Fentress 2
Harpers to Fentress 5
Existing Right-Of-Way
Proposed Right-Of-Way
Aboveground Facility
Existing Substation
Dominion Energy
Appendix B1 - Page 15 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes
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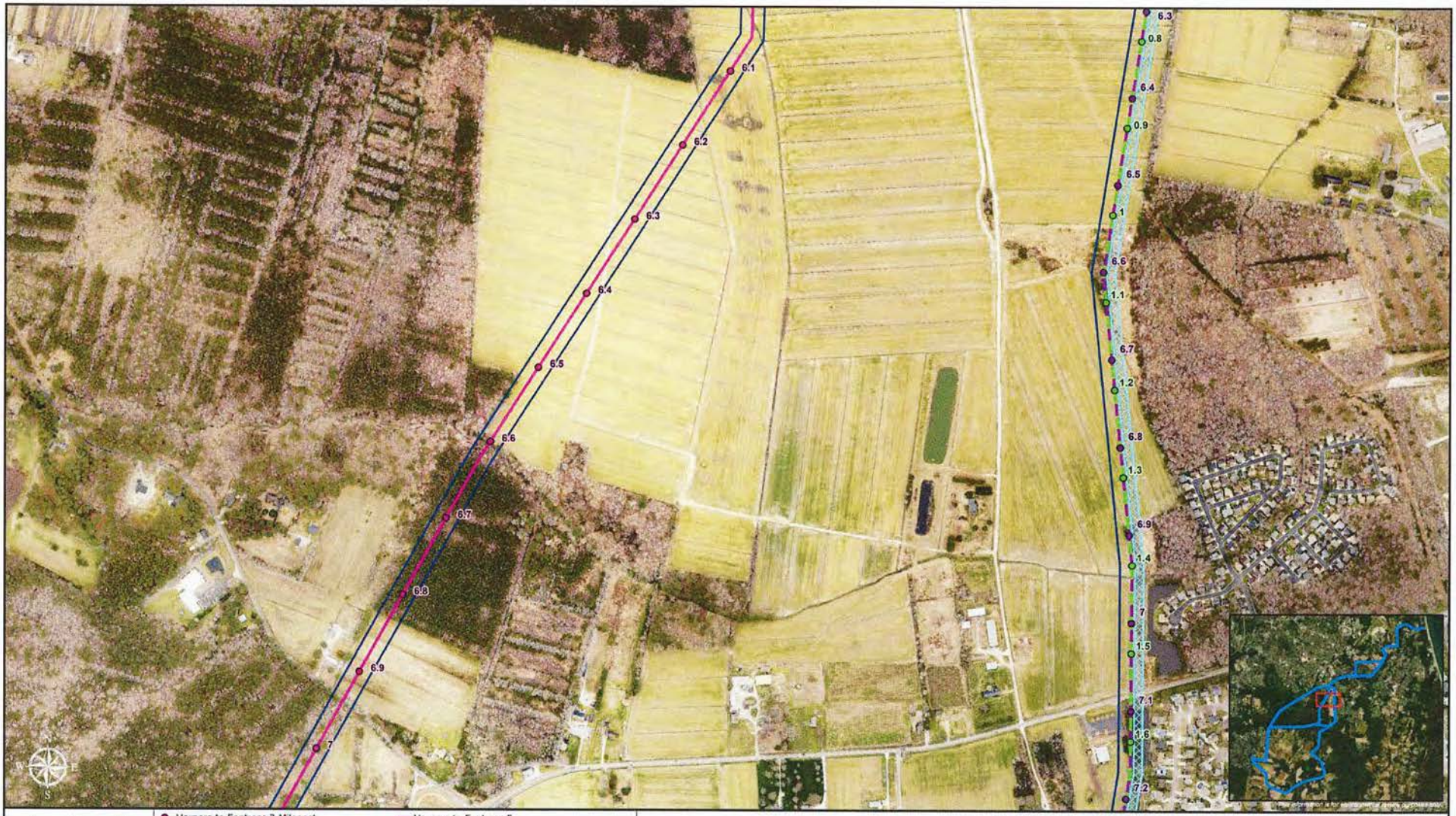

Appendix B1 - Page 16 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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1.9
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2
7.6
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7.7
2.2
7.8
2.3
7.9
2.4
8
2.5
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Miles
1:6,500
Harpers to Fentress 2 Milepost
Harpers to Fentress 5 Milepost
Line 2085 Route Variation
Route Segment - Overhead
Harpers to Fentress 2
Harpers to Fentress 5
Route Variations
Line #2085 Route Variation
Existing Right-Of-Way
Proposed Right-Of-Way
Dominion Energy
Appendix B1 - Page 17 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes
ERM
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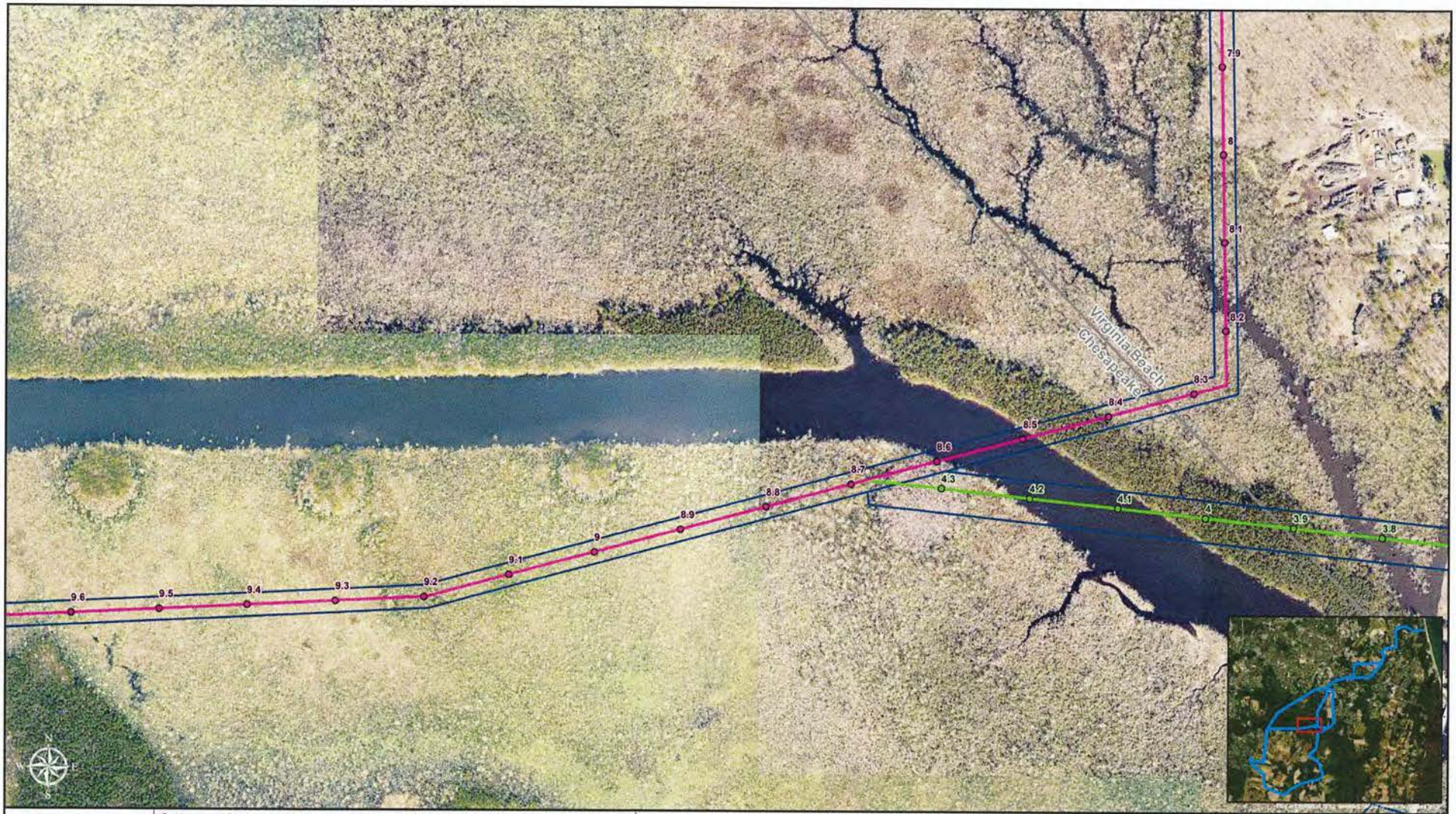

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Miles

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- Harpers to Fentress 2 Milepost
- Line 2085 Route Variation

Route Segment - Overhead

- Harpers to Fentress 2
- Harpers to Fentress 5

Route Variations

- Line #2085 Route Variation
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 18 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

ERM

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0 0.05 0.1
Miles

1:6,500

- Harpers to Fentress 2 Milepost

Route Segment - Overhead

- Harpers to Fentress 2
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 19 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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Appendix B1 - Page 20 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

Dominion Energy

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Appendix B1 - Page 21 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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0 0.05 0.1
Miles

1:6,500

- Harpers to Fentress 5 Milepost

Route Segment - Overhead

- Harpers to Fentress 5
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 22 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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0 0.05 0.1
Miles

1:6,500

- Harpers to Fentress 5 Milepost

Route Segment - Overhead

- Harpers to Fentress 5
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 23 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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Miles

1:6,500

- Harpers to Fentress 5 Milepost

Route Segment - Overhead

- Harpers to Fentress 5
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 24 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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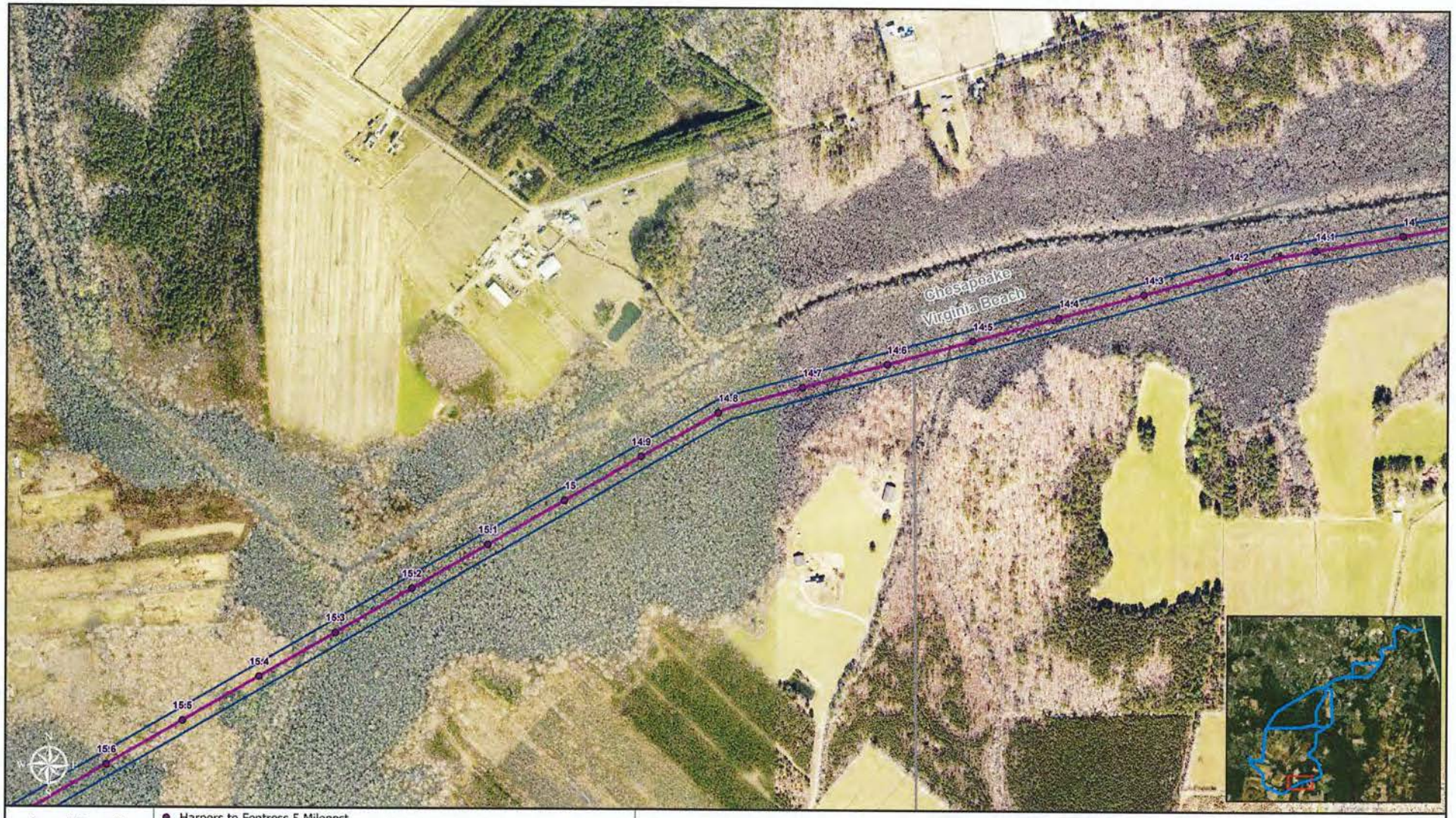

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Miles

1:6,500

- Harpers to Fentress 5 Milepost

Route Segment - Overhead

- Harpers to Fentress 5
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 25 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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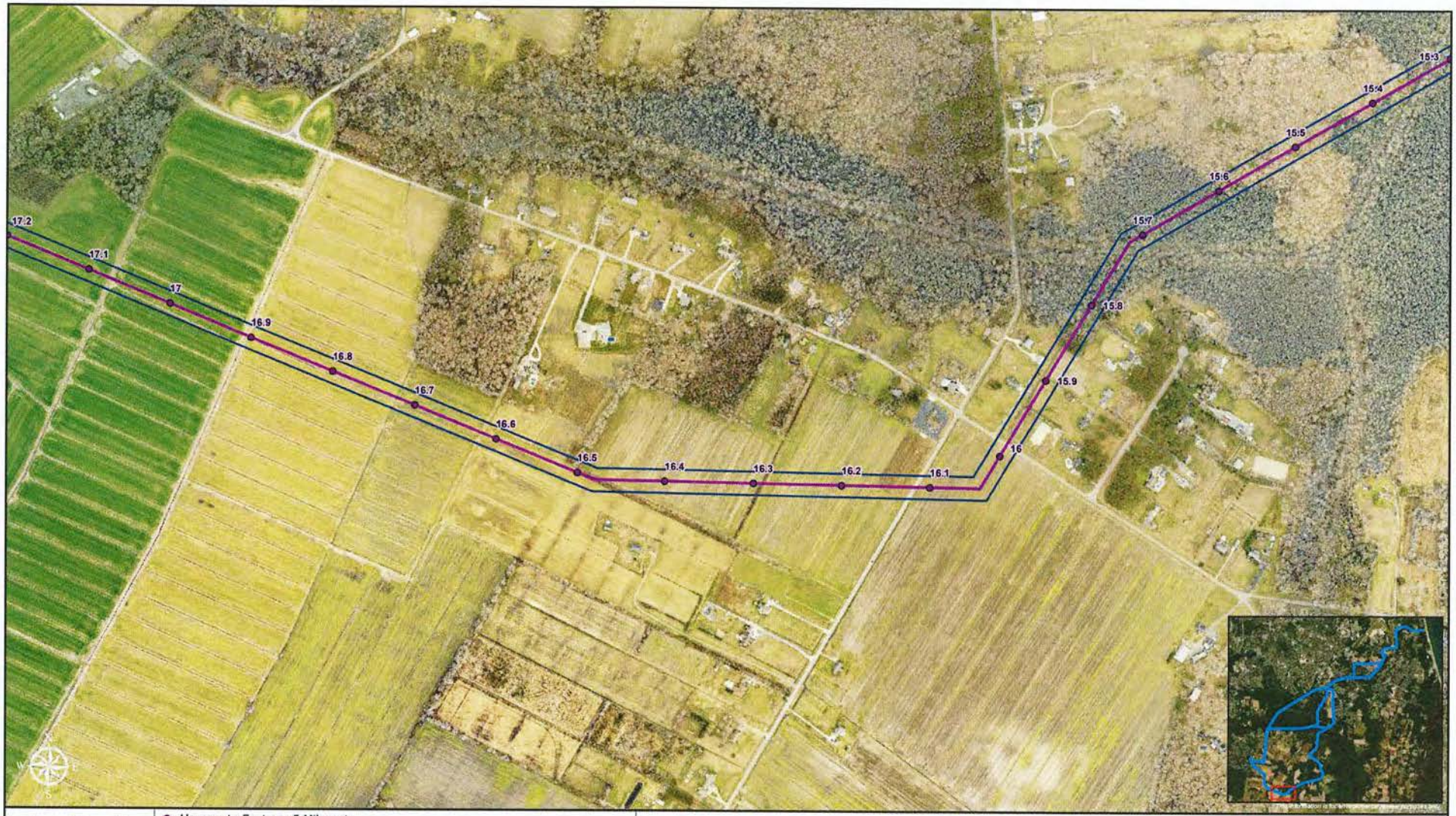
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15.7
15.6
15.5
15.4
15.3
0 0.05 0.1
Miles
1:6,500
Harpers to Fentress 5 Milepost
Route Segment - Overhead
Harpers to Fentress 5
Proposed Right-Of-Way
Dominion Energy
Appendix B1 - Page 26 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes
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0 0.05 0.1
Miles

1:6,500

- Harpers to Fentress 5 Milepost

Route Segment - Overhead

- Harpers to Fentress 5
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 27 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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0 0.05 0.1
Miles

1:6,500

- Harpers to Fentress 5 Milepost

Route Segment - Overhead

- Harpers to Fentress 5
- Proposed Right-Of-Way

Dominion Energy

Appendix B1 - Page 28 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

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Appendix B1 - Page 29 of 29
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Overhead Routes

Dominion Energy

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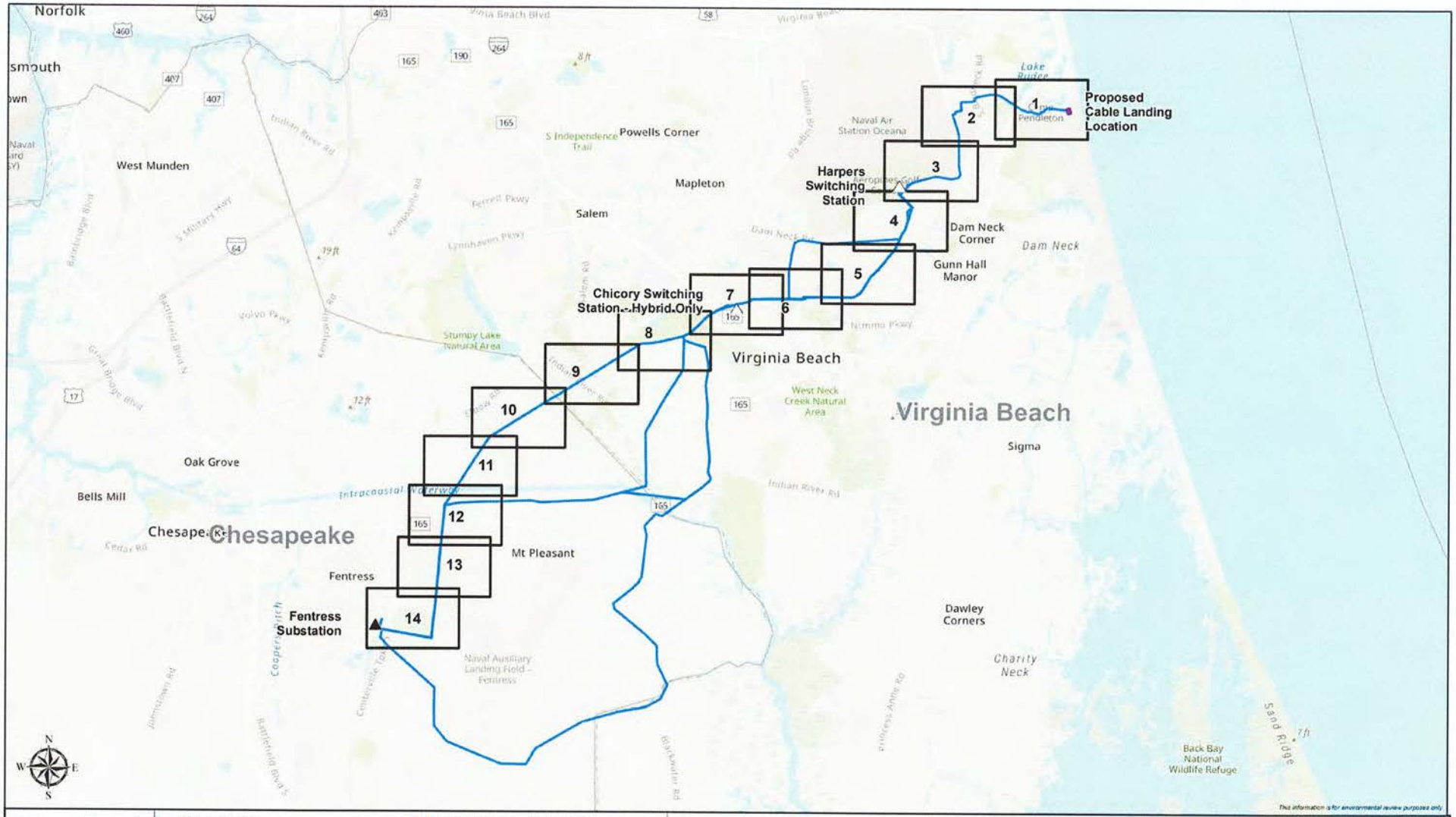

Appendix B2
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities Index Map

Dominion Energy

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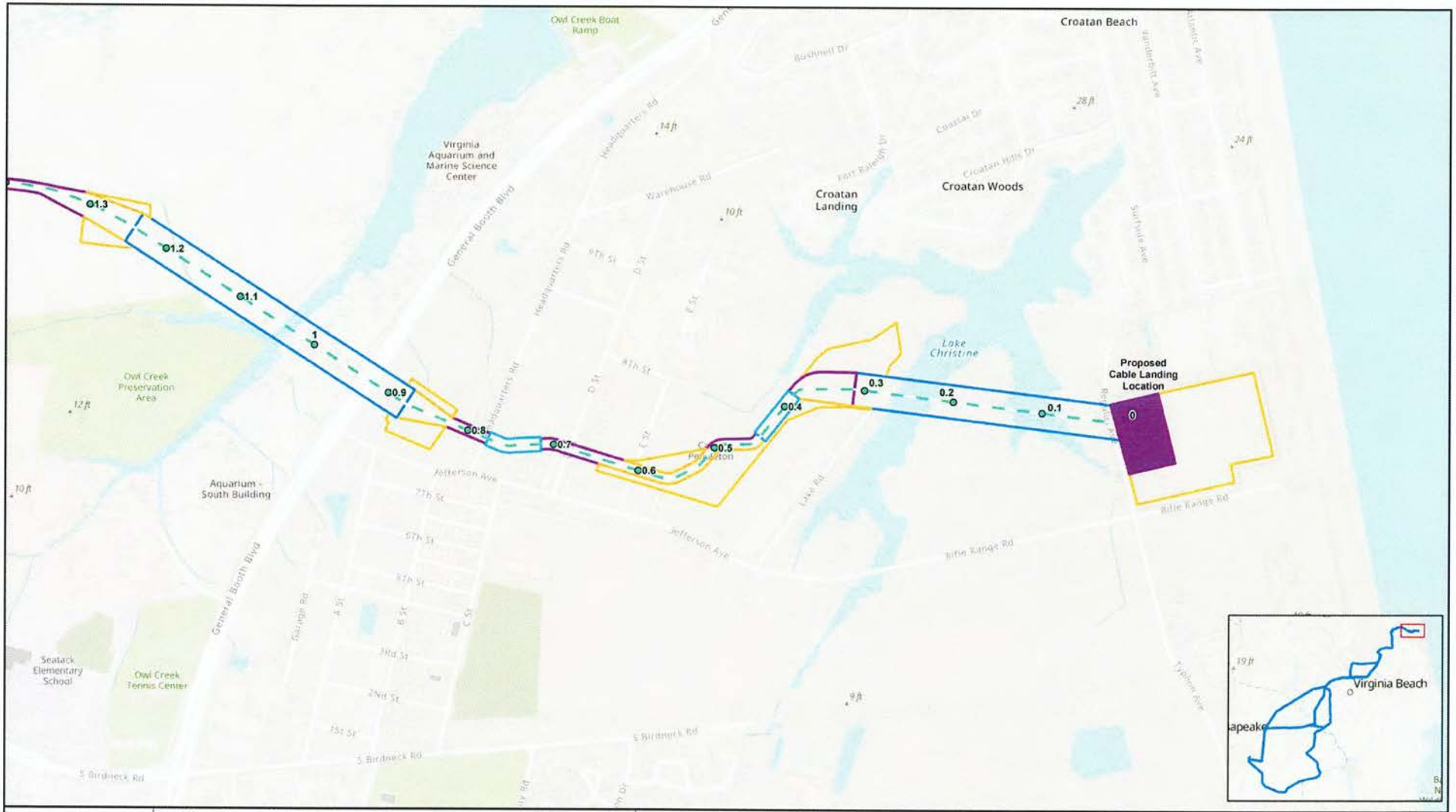

Appendix B2 - Page 1 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

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0 0.05 0.1
Miles

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- Cable Landing to Harpers Milepost
- **Route Segment - Underground**
- Cable Landing to Harpers
- HDD
- Surface Trenched Right-Of-Way
- Surface Trenched ROW - Manhole Location
- Temporary Construction Easement

Dominion Energy

Appendix B2 - Page 2 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

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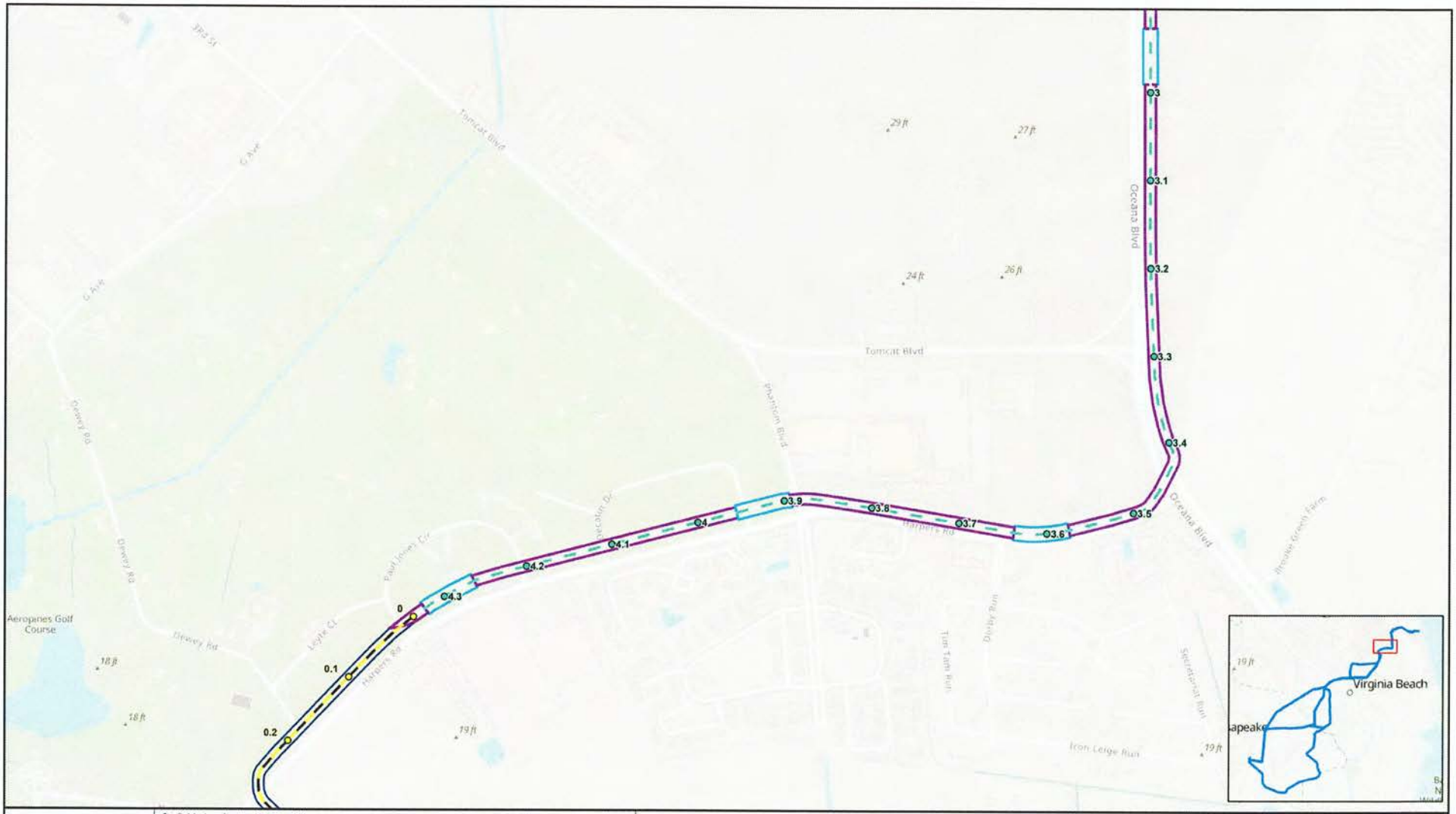

Appendix B2 - Page 3 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

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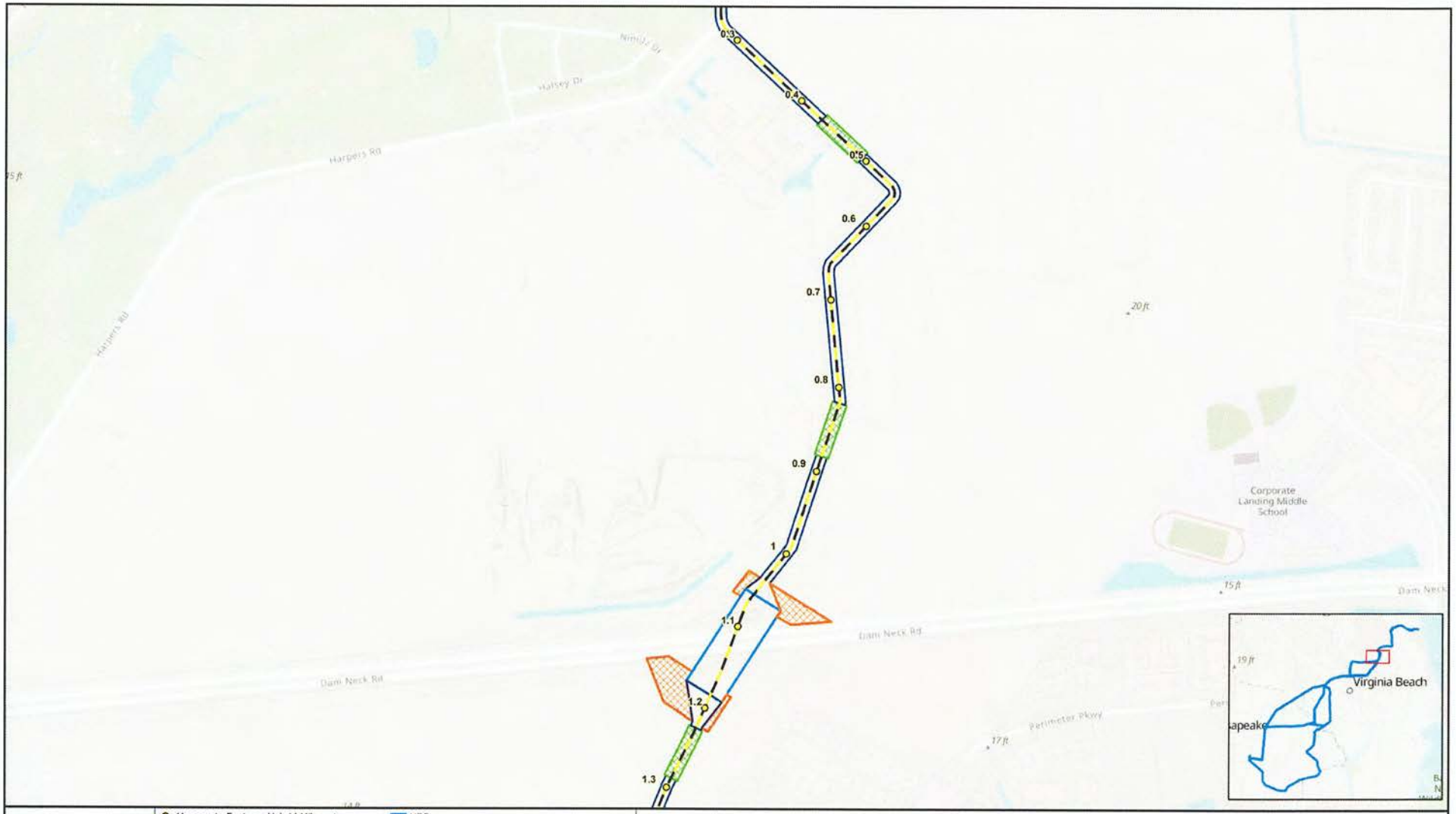

Appendix B2 - Page 4 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

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Miles

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- Harpers to Fentress Hybrid Milepost
- **Route Segment - Underground**
- Harpers to Fentress - Hybrid Route
- Proposed Right-Of-Way
- HDD
- HDD Extra Workspace
- Proposed Right-Of-Way - Manhole Location

Dominion Energy

Appendix B2 - Page 5 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

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- Harpers to Fentress Hybrid Milepost
- **Route Segment - Underground**
- Harpers to Fentress - Hybrid Route
- Proposed Right-Of-Way
- HDD
- HDD Extra Workspace
- Proposed Right-Of-Way - Manhole Location

Dominion Energy

Appendix B2 - Page 6 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

ERM

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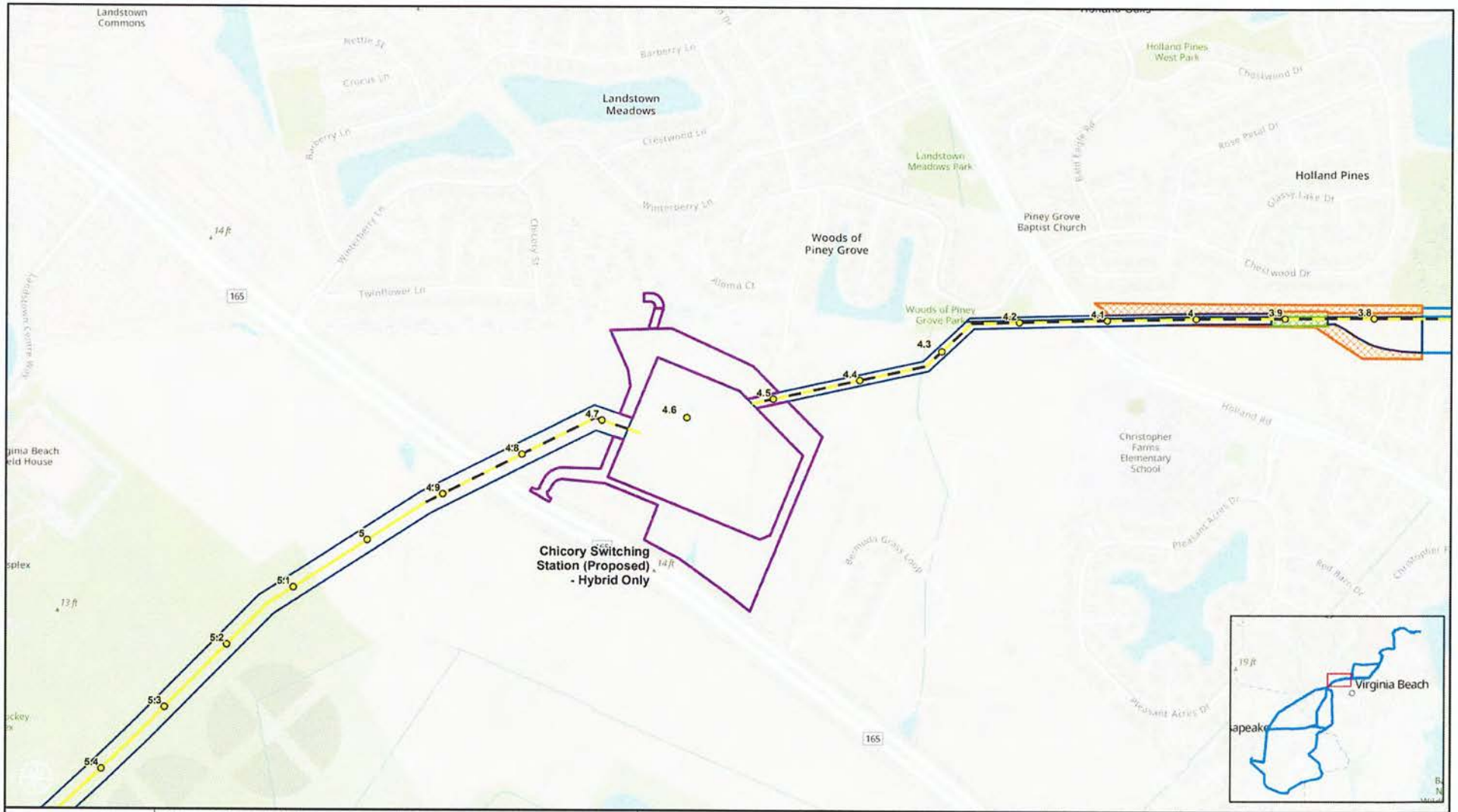

Appendix B2 - Page 7 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

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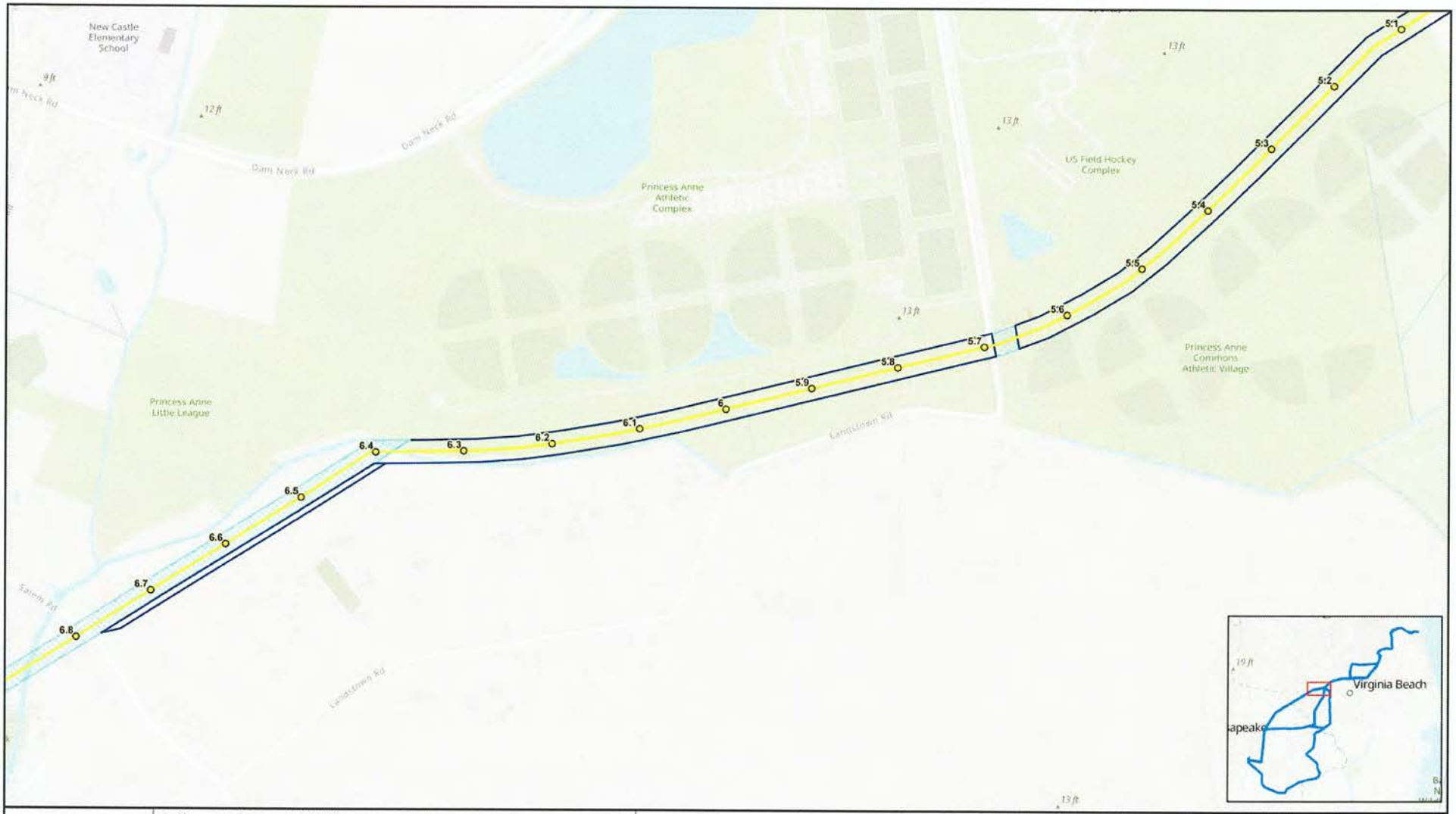

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- Harpers to Fentress Hybrid Milepost

Route Segment - Overhead

- Harpers to Fentress - Hybrid Route
- Proposed Right-Of-Way
- Existing Right-Of-Way

Dominion Energy

Appendix B2 - Page 8 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

ERM

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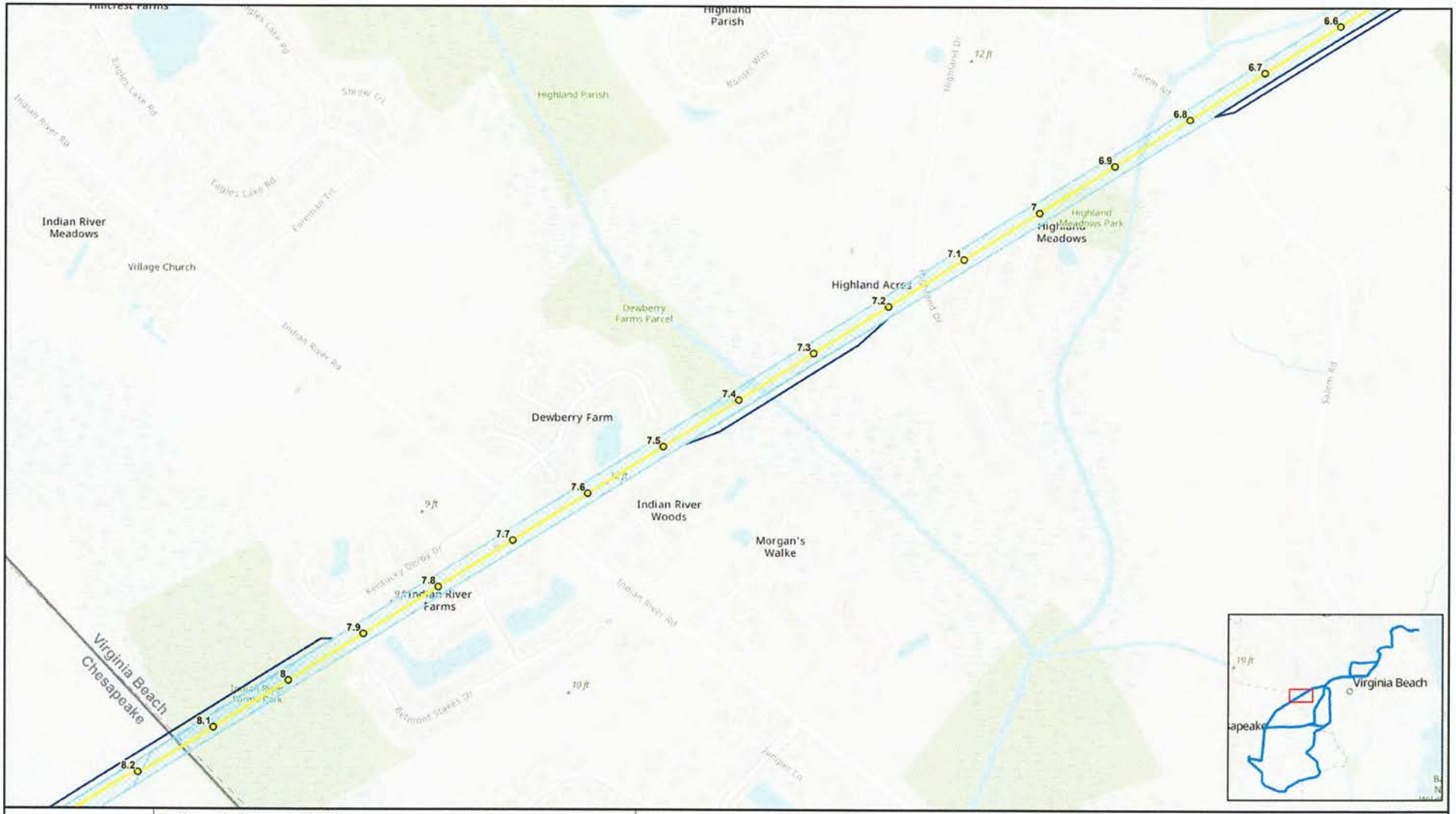
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Indian River Meadows
Village Church
Highland Acres
Dewberry Farms Parcel
Dewberry Farm
Indian River Woods
Morgan's Walke
Indian River Farms
Virginia Beach
Chesapeake
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Miles
1:6,500
Harpers to Fentress Hybrid Milepost
Route Segment - Overhead
Harpers to Fentress - Hybrid Route
Proposed Right-Of-Way
Existing Right-Of-Way
Dominion Energy
Appendix B2 - Page 9 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route
ERM
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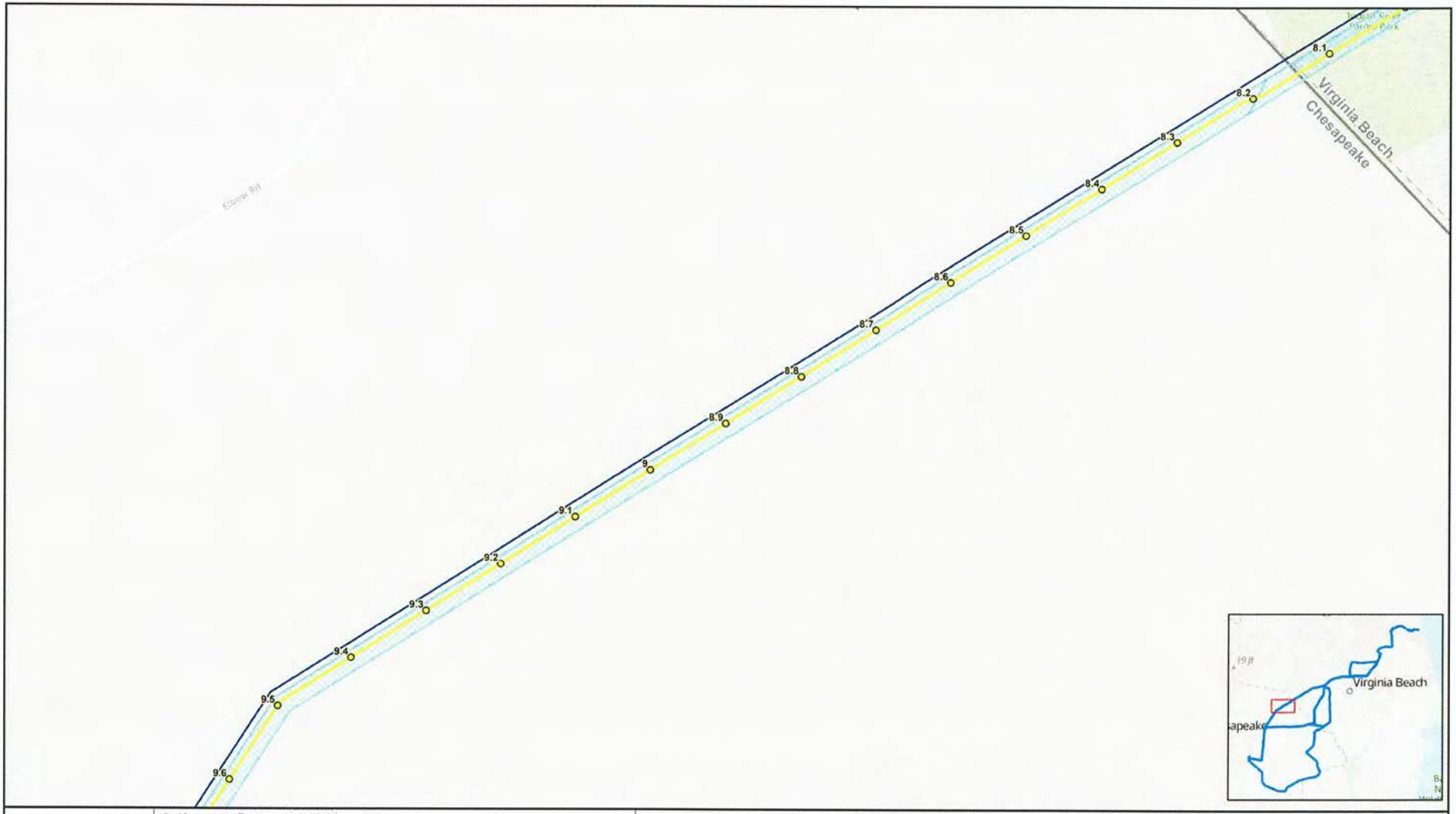

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- Harpers to Fentress Hybrid Milepost

Route Segment - Overhead

- Harpers to Fentress - Hybrid Route
- Proposed Right-Of-Way
- Existing Right-Of-Way

Dominion Energy

Appendix B2 - Page 10 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

ERM

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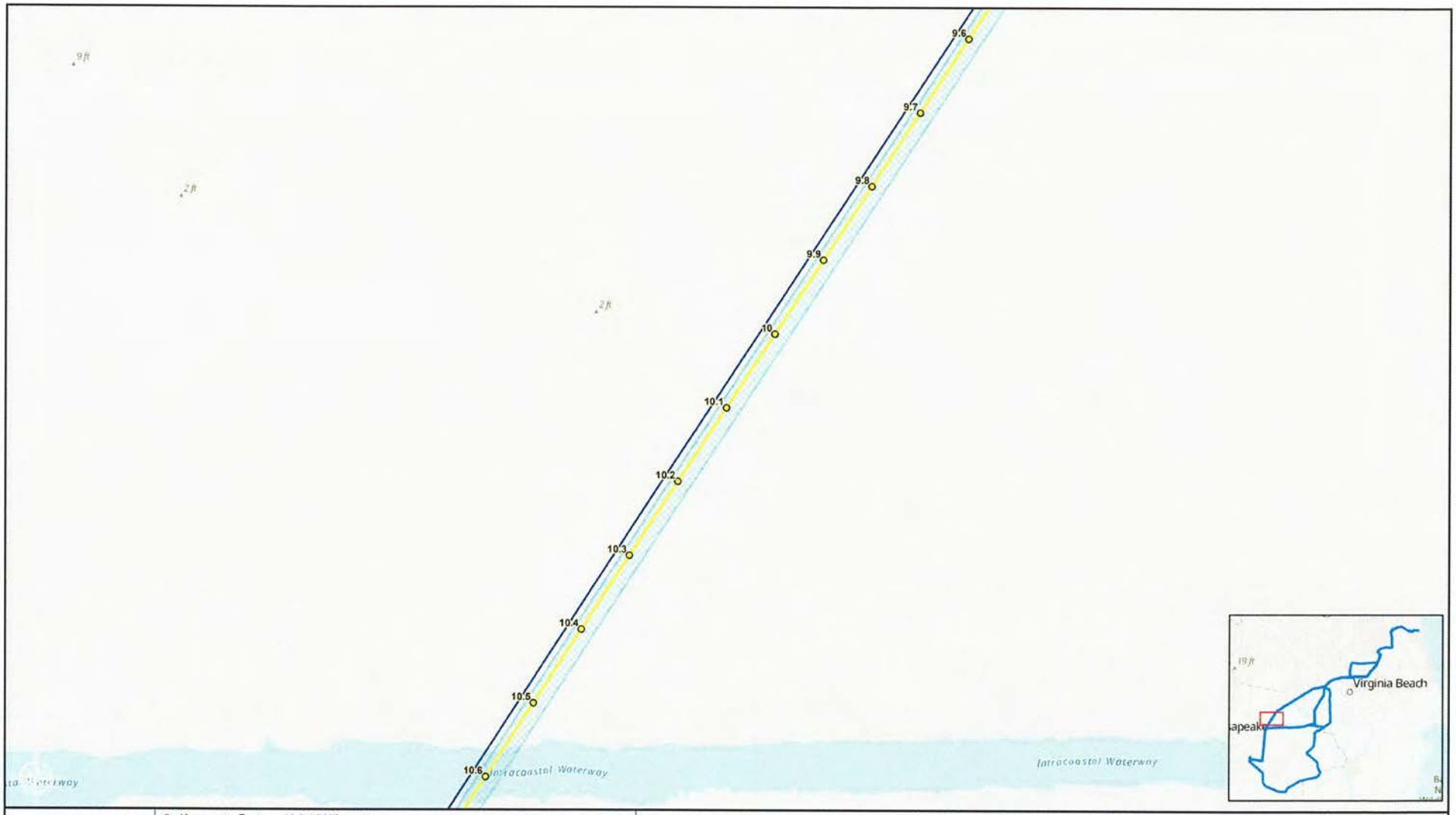

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Miles

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- Harpers to Fentress Hybrid Milepost

Route Segment - Overhead

- Harpers to Fentress - Hybrid Route
- Proposed Right-Of-Way
- Existing Right-Of-Way

Dominion Energy

Appendix B2 - Page 11 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

ERM

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Appendix B2 - Page 12 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

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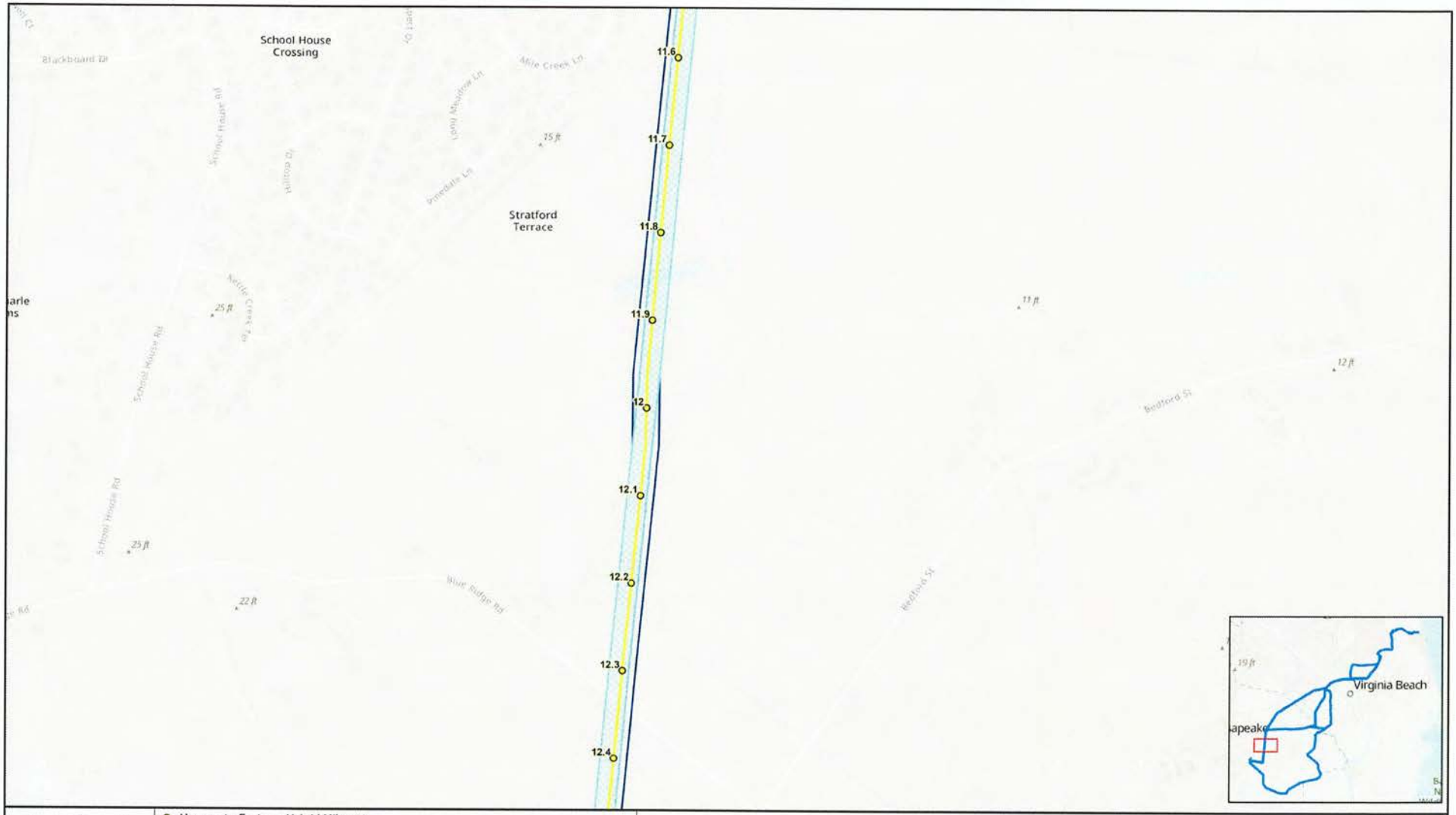

Dominion Energy

Appendix B2 - Page 13 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

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Centerville Baptist Church
Pocaty Substation
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14.1
14.2
14.3
Proposed Fentress Substation Expansion
Fentress Existing Substation
Fire Station 06
Site One Landscape Supply
Sewell Commerce Park
Battlefield Golf Club
United House Prayer A P C R A F
Carriage House Commons
Emerald Lakes
Green Haven
Whittamore Rd
Murray Dr
Meggett Dr
Clearwater Ln
Blue Ridge Rd
Virginia Beach
15 ft
22 ft
12 ft
19 ft
9 ft
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Miles
1:6,500
Harpers to Fentress Hybrid Milepost
Route Segment - Overhead
Harpers to Fentress - Hybrid Route
Aboveground Facility
Proposed Right-Of-Way
Existing Right-Of-Way
Existing Substation
Dominion Energy
ERM
Appendix B2 - Page 14 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route
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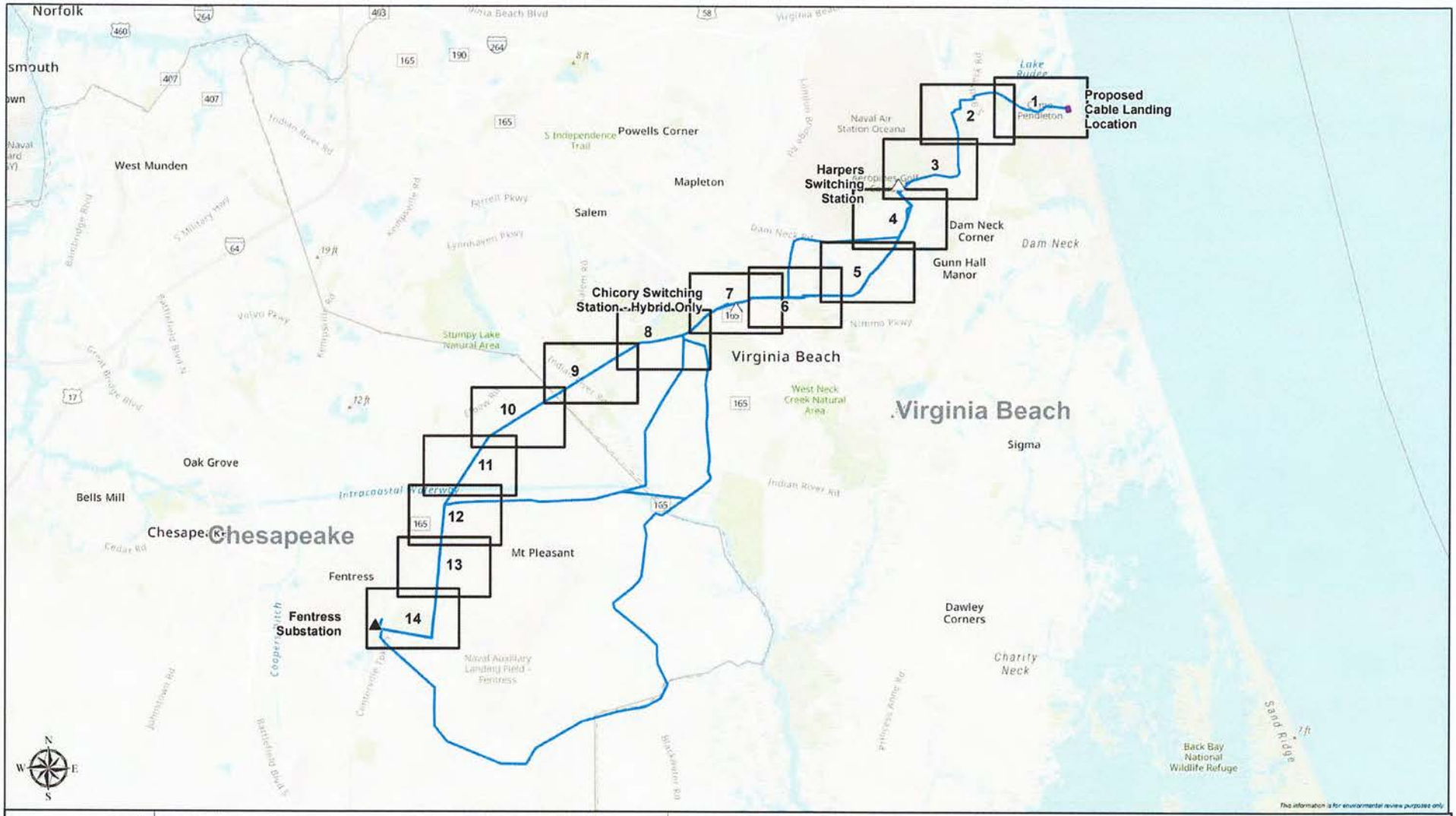

Appendix B2
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities Index Map

Dominion Energy

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- Cable Landing to Harpers Milepost
- **Route Segment - Underground**
- Cable Landing to Harpers
- HDD
- Surface Trenched Right-Of-Way
- Surface Trenched ROW - Manhole Location
- Temporary Construction Easement
- Proposed Cable Landing Location

Dominion Energy

Appendix B2 - Page 1 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

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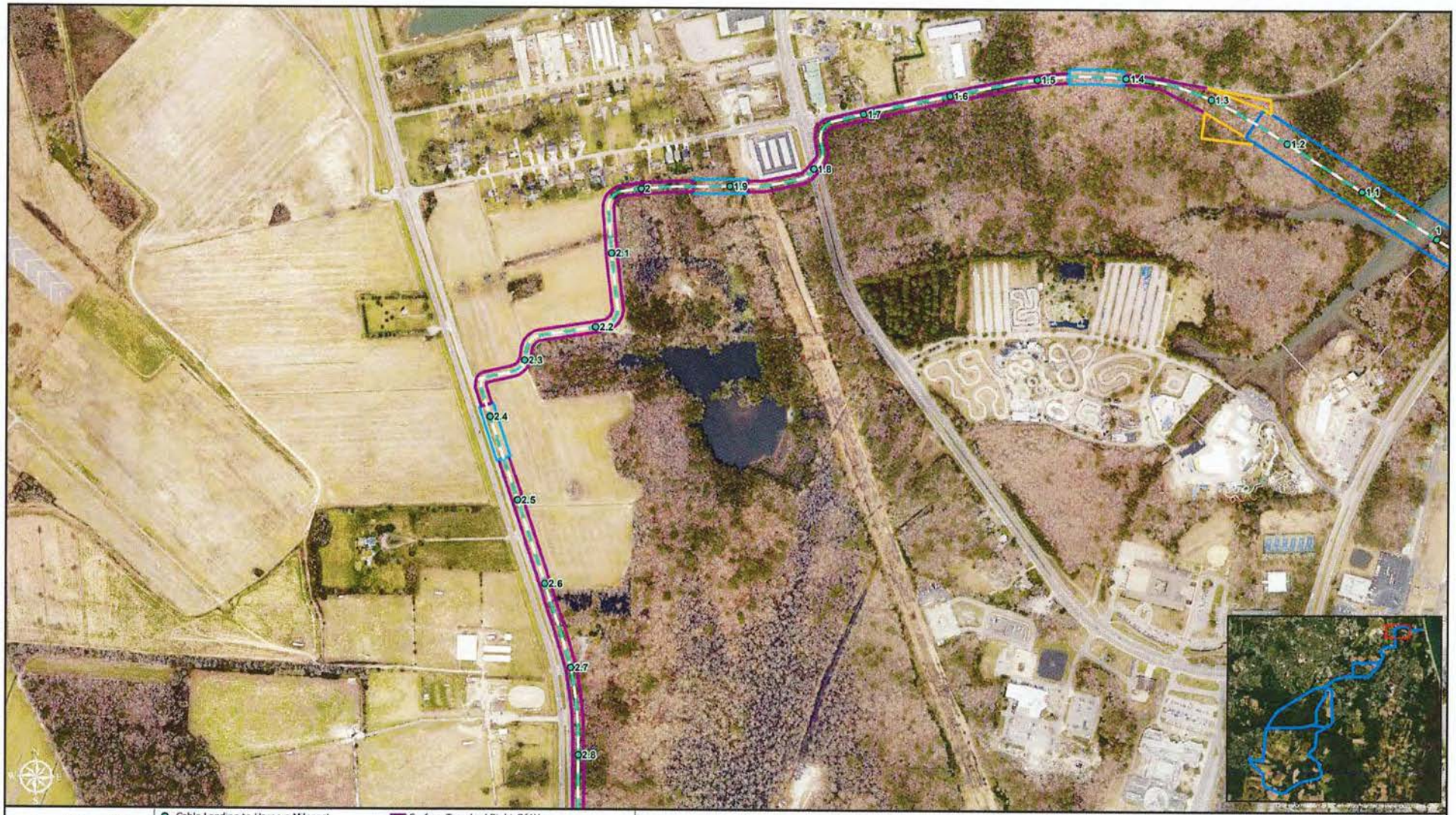

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- Cable Landing to Harpers Milepost
- **Route Segment - Underground**
- Cable Landing to Harpers
- HDD
- Surface Trenched Right-Of-Way
- Surface Trenched ROW - Manhole Location
- Temporary Construction Easement

Dominion Energy

Appendix B2 - Page 2 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

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Appendix B2 - Page 3 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

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- Harpers to Fentress Hybrid Milepost
- **Route Segment - Underground**
- Harpers to Fentress - Hybrid Route
- Proposed Right-Of-Way
- HDD
- HDD Extra Workspace
- PWI Proposed Right-Of-Way - Manhole Location

Dominion Energy

Appendix B2 - Page 4 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

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Appendix B2 - Page 5 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

Dominion Energy

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- Harpers to Fentress Hybrid Milepost
- **Route Segment - Underground**
- Harpers to Fentress - Hybrid Route
- Proposed Right-Of-Way
- HDD
- HDD Extra Workspace
- Proposed Right-Of-Way - Manhole Location

Dominion Energy

Appendix B2 - Page 6 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

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Appendix B2 - Page 7 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

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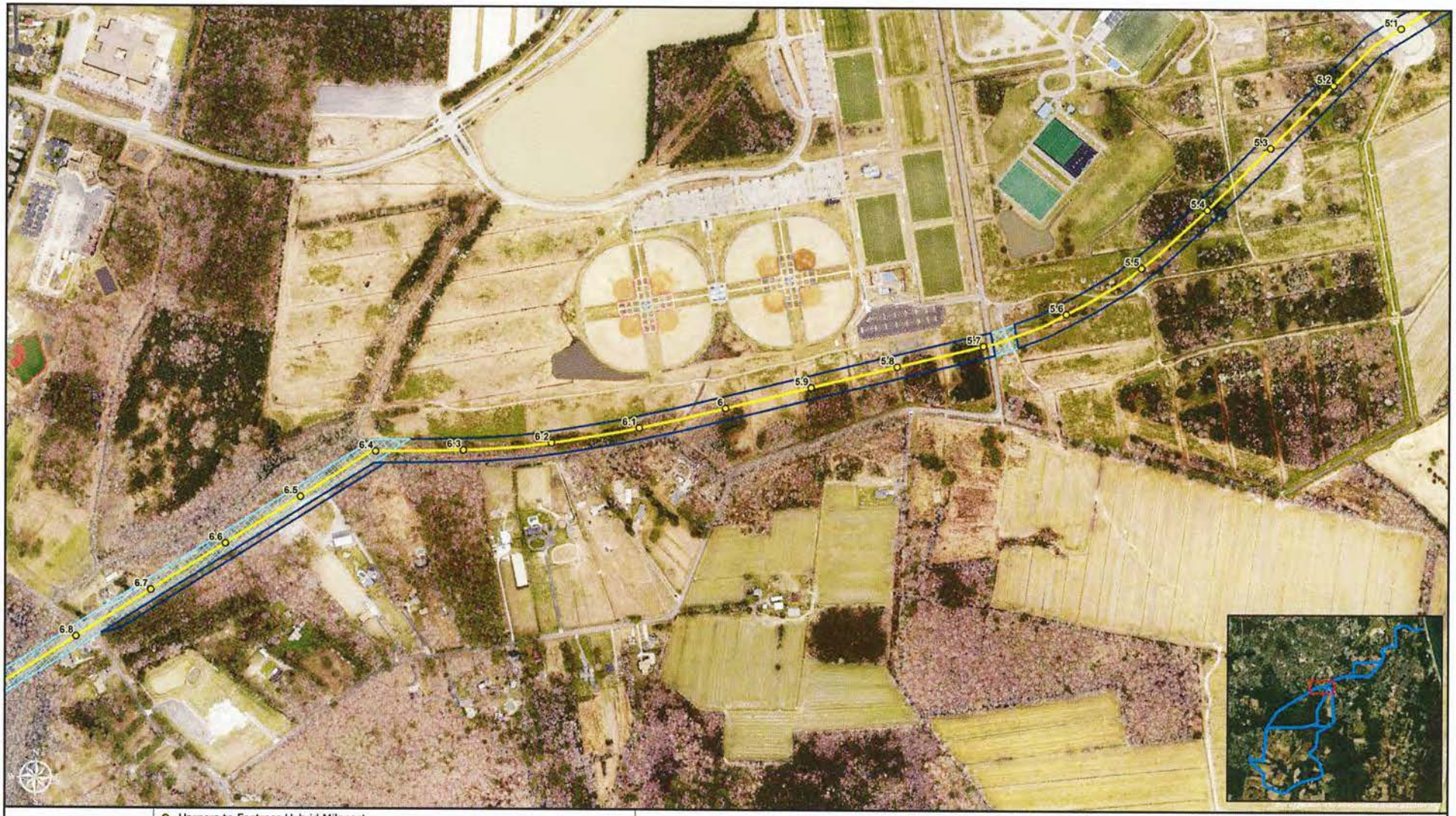
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Miles
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Harpers to Fentress Hybrid Milepost
Route Segment - Overhead
Harpers to Fentress - Hybrid Route
Proposed Right-Of-Way
Existing Right-Of-Way
Dominion Energy
Appendix B2 - Page 8 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route
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Miles

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- Harpers to Fentress Hybrid Milepost

Route Segment - Overhead

- Harpers to Fentress - Hybrid Route
- Proposed Right-Of-Way
- Existing Right-Of-Way

Dominion Energy

Appendix B2 - Page 9 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

ERM

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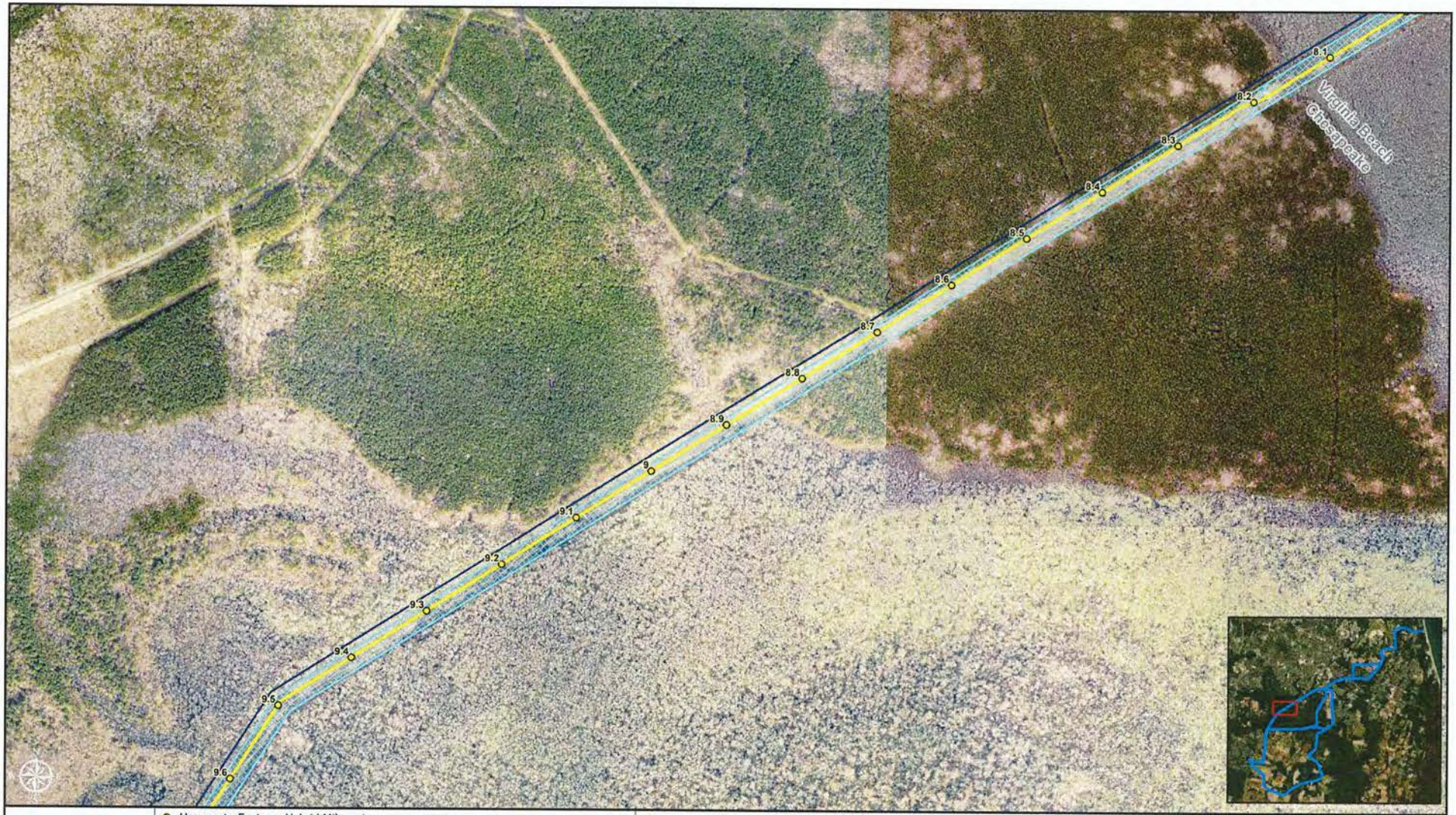

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- Harpers to Fentress Hybrid Milepost

Route Segment - Overhead

- Harpers to Fentress - Hybrid Route
- Proposed Right-Of-Way
- Existing Right-Of-Way

Dominion Energy

Appendix B2 - Page 10 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

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- Harpers to Fentress - Hybrid Route
- Proposed Right-Of-Way
- Existing Right-Of-Way

Dominion Energy

Appendix B2 - Page 11 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

ERM

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- Harpers to Fentress Hybrid Milepost

Route Segment - Overhead

- Harpers to Fentress - Hybrid Route
- Proposed Right-Of-Way
- Existing Right-Of-Way

Dominion Energy

Appendix B2 - Page 12 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

ERM

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- Proposed Right-Of-Way
- Existing Right-Of-Way

Dominion Energy

Appendix B2 - Page 13 of 14
Coastal Virginia Offshore Wind Commercial Project - Virginia Facilities
Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
Project Facilities - Cable Landing to Harpers and Harpers to Fentress Hybrid Route

ERM

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Appendix B2 - Page 14 of 14
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Dominion Energy Virginia
Virginia Beach and Chesapeake, VA
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