

Bowers Hill Interchange Improvements Study

Environmental Assessment

April 2019



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FEDERAL HIGHWAY ADMINISTRATION
and
VIRGINIA DEPARTMENT OF TRANSPORTATION

ENVIRONMENTAL ASSESSMENT

BOWERS HILL INTERCHANGE IMPROVEMENTS STUDY

Chesapeake, Virginia

VDOT Project #: 0664-131-028, P101; UPC #: 111427

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ABBREVIATIONS & ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ACS	American Community Survey
APE	Area of Potential Effects
ASTM	American Society for Testing and Materials
CATT	Center for Advanced Transportation Technology
CEDAR	Comprehensive Environmental Data and Reporting System
CFR	Code of Federal Regulations
CIM	Citizen Information Meeting
CEQ	Council on Environmental Quality
CO	Carbon Monoxide
CPCL	Colonial Point Civic League
CTB	Commonwealth Transportation Board
CWA	Clean Water Act
DNH	Department of Natural Heritage
EA	Environmental Assessment
EB	Eastbound
EDR	Environmental Data Resources, Inc.
EIS	Environmental Impact Statement
EJ	Environmental Justice
EO	Executive Order
ESA	Environmental Site Assessment
ESC	Erosion & Sediment Control
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
GHG	Greenhouse Gas
GIS	Geographic Information System
HHS	Health and Human Services
HRCS	Hampton Roads Crossing Study
HRTPO	Hampton Roads Transportation Planning Organization
I-	Interstate
ICE	Indirect and Cumulative Effects
IPaC	Information for Planning and Conservation
LF	Linear Feet
LOD	Limits of Disturbance
L RTP	Long-Range Transportation Plan
MMMMBT	Monitor-Merrimac Memorial Bridge-Tunnel
MPH	Miles per Hour
MSAT	Mobile Source Air Toxics
NAAQS	National Ambient Air Quality Standards
NB	Northbound
NEPA	National Environmental Policy Act

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NHPA	National Historic Preservation Act
NLCD	Natural Land-Cover Dataset
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
PA	Programmatic Agreement
PCES	Project Cost Estimating System
PTI	Planning Time Index
ROD	Record of Decision
RITIS	Regional Integrated Transportation Information System
SB	Southbound
SEIS	Supplemental Environmental Impact Statement
SIP	State Implementation Plan
SWM	Stormwater Management
TIP	Transportation Improvement Program
TMDL	Total Maximum Daily Load
TRB	Transportation Research Board
USACE	United States Army Corps of Engineers
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VaFWIS	Virginia Fish and Wildlife Information Service
VDCR	Virginia Department of Conservation and Recreation
VDCR-DNH	Virginia Department of Conservation and Recreation–Department of Natural Heritage
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VDHR	Virginia Department of Historic Resources
VDOT	Virginia Department of Transportation
VEC	Virginia Employment Commission
VMT	Vehicle Miles Traveled
WB	Westbound
WOUS	Waters of the United States

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Chapter 1

Purpose and Need



Rte 191 Joliff Rd

EXIT 13A

BOWERS HILL INTERCHANGE IMPROVEMENTS STUDY

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1 PURPOSE AND NEED

1.1 INTRODUCTION

The Virginia Department of Transportation (VDOT), in coordination with the Federal Highway Administration (FHWA) as the lead federal agency, prepared this Environmental Assessment (EA) under the National Environmental Policy Act of 1969 (NEPA) for the Bowers Hill Interchange Improvements Study. The Bowers Hill Interchange Improvements Study considers operational improvements to the Bowers Hill interchange which includes the junction of Interstate (I-) 664, I-264, I-64, U.S. Route 460, U.S. Route 58, U.S. Route 13, and Virginia Route 191 (Jolliff Road) in the City of Chesapeake, Virginia (Chesapeake). The Study Area under evaluation is shown on **Figure 1-1**.

This EA is prepared in accordance with FHWA and Council on Environmental Quality (CEQ) regulations implementing NEPA. The content of the EA conforms to CEQ guidelines, which provide direction regarding implementation of the procedural provisions of NEPA, and the FHWA's *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (Technical Advisory T6640.8A, October 1987). As part of the EA, the environmental review process is carried out following the *National Environmental Policy Act and Clean Water Act (Section 404) Merged Process for Highway Projects in Virginia* (merged process),¹ between VDOT, the FHWA, the U.S. Army Corps of Engineers (USACE), the U.S. Environmental Protection Agency (USEPA), and the U.S. Fish and Wildlife Service (USFWS)².

This chapter presents the Purpose and Need for the improvements being considered as part of the Bowers Hill Interchange Improvements Study. The following sections describe the Study Area and existing transportation services; the history of the interchange leading to the initiation of the EA; and the current and future transportation needs in the Study Area. The chapter concludes with a purpose statement and a summary of the transportation needs.

1.2 STUDY AREA

The Bowers Hill interchange is located at the junction of I-664, I-264, I-64, and U.S. Route 460/58/13 in Chesapeake, Virginia (see **Figure 1-1**). Both I-264 and I-64 terminate within the interchange as they join to form I-664 which proceeds west and north through the interchange to Suffolk and points further north. The roadways which constitute the interchange provide connectivity between the Cities of Hampton and Newport News to the north; the Cities of Portsmouth, Norfolk, and Virginia Beach to the east; and the City of Suffolk to the west. The Study Area is large enough to encompass potential interchange improvement alternatives; this does not imply that impacts would occur to the entirety of the Study Area. Existing conditions on the major roadways within the Study Area are described in the subsequent sections.

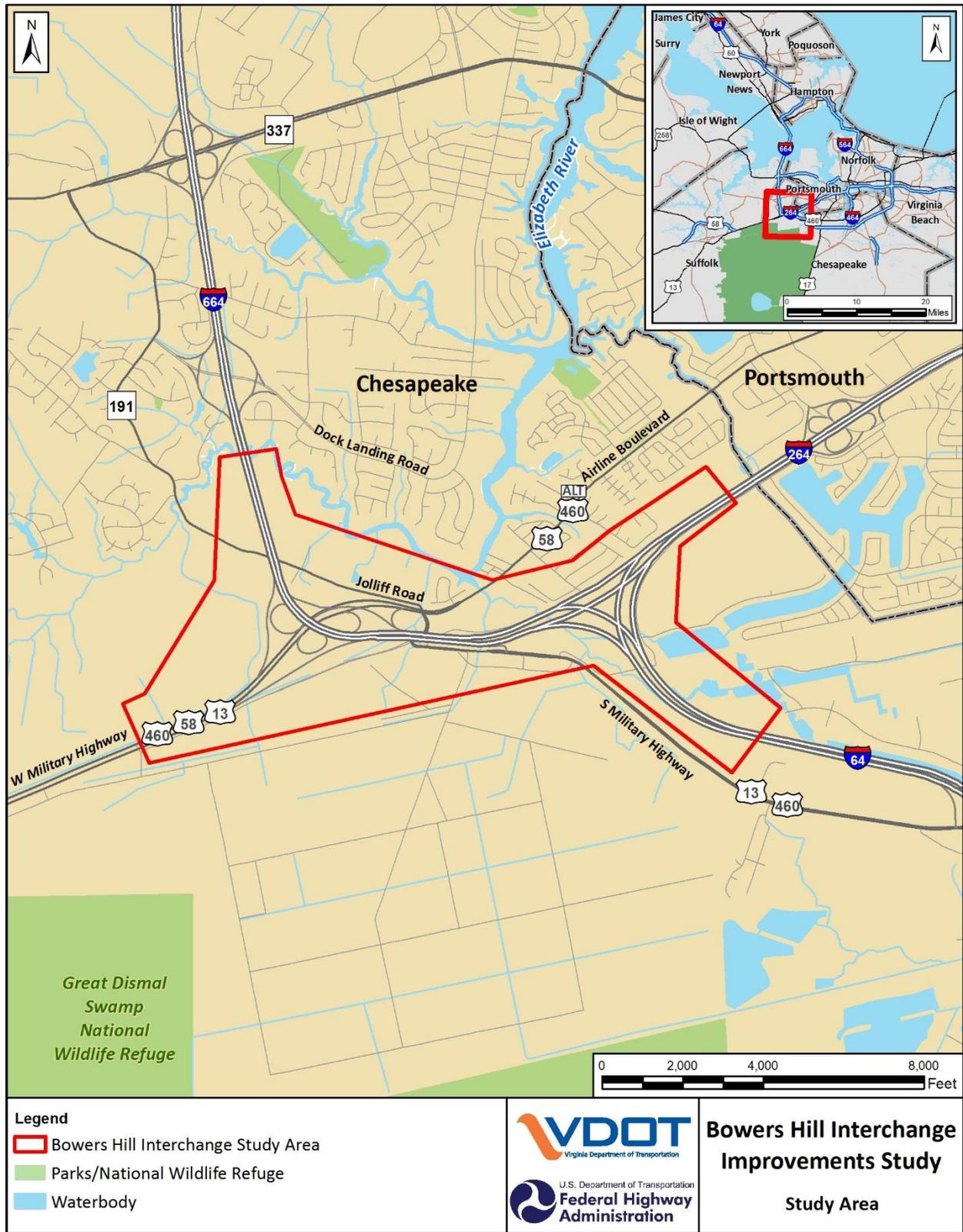
¹ The merged process facilitates an environmental review process and development of documentation that comply with the requirements of NEPA and provide sufficient information to support FHWA approval or Federal regulatory decision-making, including future permits issued by other Federal agencies. However, permits would not be obtained as part of this phase of the project. These would be attained prior to construction of the preferred alternative.

² The U.S. Fish and Wildlife Service declined to participate as a Concurring Agency in the study on October 19, 2018, as the "project has little potential to impact Service trust resources".

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Figure 1-1: Study Area



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1.2.1 Interstate 664

I-664 forms the northern leg of the Bowers Hill Interchange and provides a connection to Newport News via the Monitor-Merrimac Memorial Bridge-Tunnel (MMMBT) crossing of the Hampton Roads Harbor (**Figure 1-2**). Within the Study Area, I-664 provides two lanes of travel in each direction with 10-foot paved outside shoulders, 4-foot paved inside shoulders, and a posted speed of 60 miles per hour (MPH).

1.2.2 Interstate 264

I-264 forms the eastern leg of the interchange and it provides a connection to Portsmouth, I-464, and Norfolk via the Downtown Tunnel crossing of the Elizabeth River. Within the Study Area, I-264 provides two lanes of travel in each direction with 10-foot paved outside shoulders, 2-foot paved inside shoulders, and a posted speed of 55 MPH.

1.2.3 Interstate 64

I-64 forms the southern leg of the interchange and provides a connection to other roadways in Chesapeake and I-464 via the High Rise Bridge crossing of the Elizabeth River (Southern Branch). Within the Study Area, I-64 provides two lanes of travel in each direction with 10-foot paved outside shoulders, 4-foot paved inside shoulders, and a posted speed of 60 MPH.

1.2.4 U.S. Route 460/58/13 (West Military Highway)

U.S. Route 460/58/13 forms the western leg of the interchange and provides a connection to Suffolk and points located further west. It is classified as an Other Freeway or Expressway, although it has a number of at-grade intersections west of the Study Area. Within the Study Area, U.S. Route 460/58/13 provides three lanes of travel in each direction with 10-foot paved outside shoulders, 4-foot paved inside shoulders, and a posted speed of 60 MPH.

1.2.5 Jolliff Road/Airline Boulevard/West Military Highway/South Military Highway

An intersection of Jolliff Road (VA Route 191), Airline Boulevard (U.S. Route 58), West Military Highway (U.S. Route 58/13), and South Military Highway (U.S. Route 460/13 Alternate) is east of the U.S. Route 58/13 off-ramps from northbound (NB) I-664. Jolliff Road is classified as a Major Collector, Airline Boulevard a Minor Arterial, West Military Highway an Other Freeway or Expressway, and South Military Highway a Minor Arterial. Jolliff Road, north of the intersection provides one travel lane in each direction with graded shoulders and a posted speed limit of 35 MPH. Airline Boulevard, to the east of the interchange, provides one travel lane in each direction, a center two-way left turn lane, graded shoulders, and a posted speed limit of 35 MPH. It widens to two travel lanes in each direction as it approaches this intersection. South Military Highway is located to the south of the intersection and provides two travel lanes in each direction from the I-664 overpass to this intersection. Further west of the overpass, the eastbound (EB) direction is limited to one lane. Shoulder width is variable along the roadway within the Study Area and the posted speed limit is 35 MPH.

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1.3 HISTORY OF STUDY

The following presents a brief history of the origins of the current study and actions leading to the commencement of the Bowers Hill Interchange Improvements Study EA:

- **March - June 2001:** The Hampton Roads Crossing Study (HRCS) *Final Environmental Impact Statement (FEIS)* (FHWA, 2001a) and Record of Decision (ROD) (FHWA, 2001b) were issued. The ROD identified Candidate Build Alternative (CBA) 9 as the Selected Action. CBA-9 included widening I-664 through the Bowers Hill interchange to six conventional travel lanes.
- **January 2017:** The Hampton Roads Transportation Planning Organization (HRTPO) amended their *2040 Long-Range Transportation Plan (LRTP)* to include construction improvements at the Bowers Hill interchange (HRTPO, 2018a). The Hampton Roads Transportation Accountability Commission (HRTAC) is listed as the funding source and the document indicates that the project is included in the current 2040 LRTP financial plan.
- **April 2017:** FHWA issued the HRCS *Final Supplemental Environmental Impact Statement (SEIS)* re-evaluating options to improve accessibility, transit, emergency evacuation, and military and goods movement along the primary transportation corridors in the Hampton Roads region, including the I-64, I-664, I-564, and VA 164 corridors (FHWA, 2017a). To that end, the study evaluated improvements (one lane of widening in each travel direction) along I-664 from the MMMBT to the Bowers Hill Interchange in Chesapeake as part of Alternative C. The SEIS re-evaluated the findings of the FEIS and ROD that were approved by FHWA in 2001.
- **June 2017:** The FHWA issued a ROD (FHWA, 2017b) selecting Alternative A, which included roadway improvements from I-64 in Hampton to I-564 in Norfolk, and did not include the Bowers Hill Interchange, as the revised preferred alternative to address the purpose and need identified for the HRCS. The 2017 ROD replaced the ROD issued by FHWA on June 4, 2001 for CBA-9.
- **January 2018:** The *Bowers Hill Operational Analysis – Final Report* documents an operational analysis of NB I-664 in the Bowers Hill area in Chesapeake, VA (VDOT, 2018a). The project study limits along NB I-664 included the U.S. Route 58/13 Airline Boulevard on-ramp at the west end of the Study Area and the I-64/I-264 ramp merge. The primary objective of the study was to identify the causes of congestion and crashes and then to develop a set of feasible alternatives to mitigate the issues in the short- to intermediate-term time frame. Nine alternatives were evaluated in the report using existing condition traffic data including peak hour traffic counts, daily counts, and heavy vehicle percentages. At the time this EA was published, VDOT decided to move forward with the construction of Improvement Option 8 from the report. Improvement Option 8 includes construction of a U.S. Route 58 EB ramp extension and an auxiliary lane extending to near Dock Landing Road. As VDOT is progressing with these improvements independent of the Bowers Hill Interchange Improvements Study, these improvements are included as part of the No-Build condition for this study.

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1.4 NEEDS-EXISTING CONDITIONS

1.4.1 Overview

U.S. Route 460/58/13, I-664, I-264, and I-64 serve multiple transportation purposes, including commuter and tourism trips, freight movements, military mobility, and emergency evacuation needs. Existing demand within the Bowers Hill interchange exceeds the capacity of merge, diverge, and weaving segments during peak travel times. This is made worse by poor route continuity, creating operational deficiencies for vehicles traveling from southbound (SB) I-664 to westbound (WB) I-64 and EB I-64 to WB U.S. Route 460/58/13, as vehicles must make at least one lane change in the existing weaving segment. These weaving movements negatively affect safety within the interchange. The average crash rate for the I-664/I-64 corridor exceeds that of both state and Hampton Road average crash rates, suggesting a need to address conditions which contribute to safety issues. A high number of side-swipe and rear-end collisions occur in the Study Area due to weaving conditions and congestion, respectively. The interchange's high traffic volumes and inefficient weaving conditions lead to increased crashes, reduced speeds, and long, unpredictable travel times. Operational deficiencies, congestion, and capacity are discussed in the following sections.

1.4.2 Operational Deficiencies

Freeway traffic management and operation culminates from the policies, strategies, and technologies implemented to improve freeway performance (FHWA, 2006a). In its broadest context, freeway operations “entail a program to combat congestion and its damaging effects.” When deficiencies such as inefficient weave patterns negatively affect traffic operations, the damaging effects may include driver delay, inconvenience and frustration, reduced safety, and deteriorated air quality (FHWA, 2006a).

The Bowers Hill interchange contains an operationally deficient, mainline merging, diverging, and weaving segment³ within the Study Area. The weaving segment exists within the Study Area in the NB and SB directions at the junctions of I-664, U.S. Route 58, I-64, and I-264 (**Figure 1-2**). The figure uses colored arrows to depict the volumes for each roadway; the wider the arrow, the larger the volumes. The ramp entrances and exits are spaced closely and “merging” (vehicles entering a lane) and “diverging” (vehicles exiting a lane) maneuvers are made to and/or from a continuous auxiliary lane between the entry and exit ramps. The weaving movements occurring within the Study Area are different than those performed by non-weaving vehicles in the segment. Weaving vehicles must cross the mainline, through-traffic (forced lane change) to achieve their desired path from origin to destination. The non-weaving vehicles in this segment, may choose to change lanes to optimize their path (free lane change), or change lanes to accommodate merging traffic (cooperative lane change), but for these vehicles, a lane change is not required for their path from origin to destination.

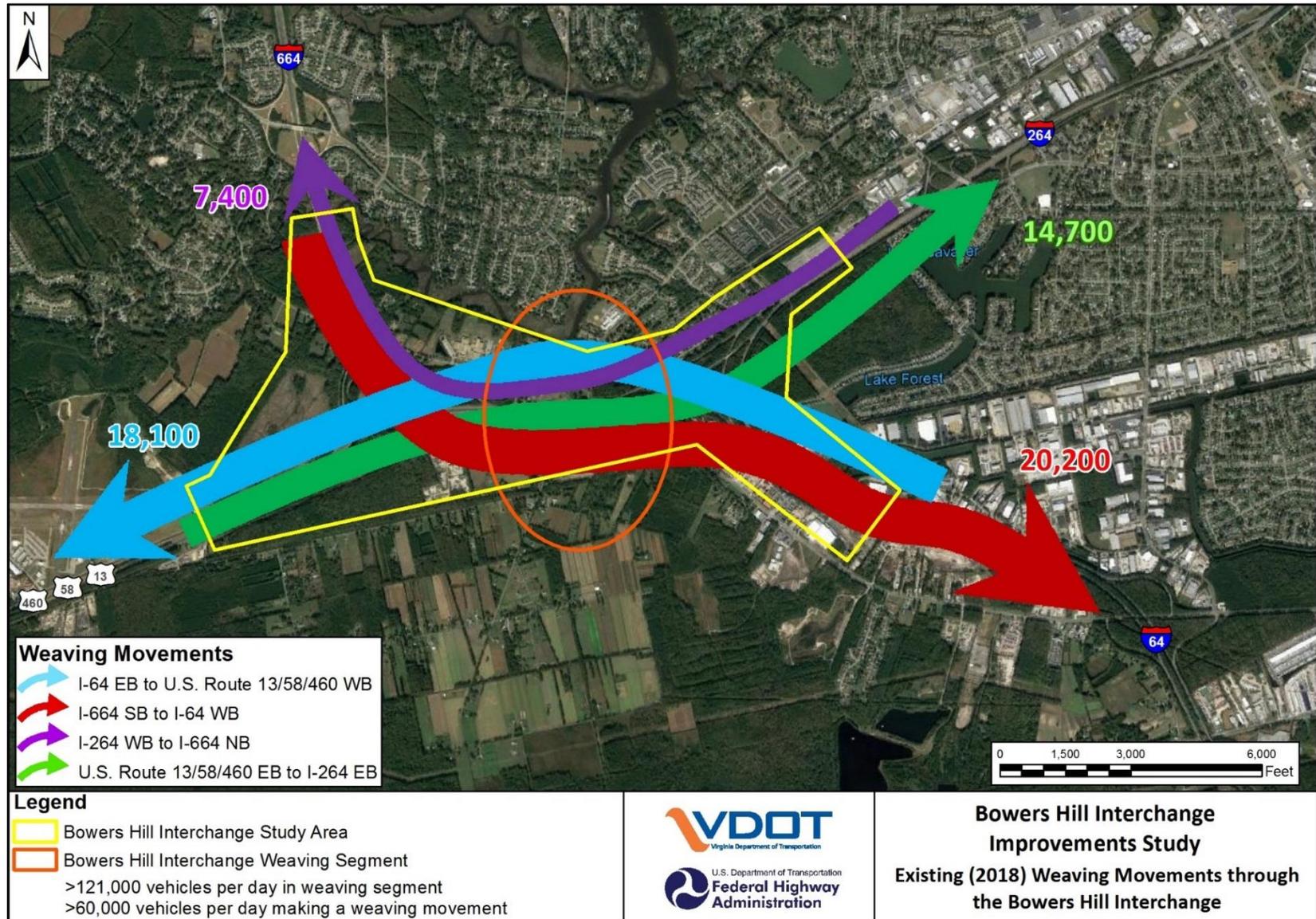
The total number of lanes entering the weaving segment from I-264 and I-64 (four travel lanes) is the same as the number of lanes exiting the weaving segment at Exit 13B (two travel lanes) and those continuing north on I-664 (two travel lanes) (**Figure 1-3**⁴). Thus, all traffic that is making a ramp-to-freeway or freeway-to-ramp movement must make a lane change. For example, in the SB direction, traffic from

³ Weaving segments are created when merge junctions are followed by diverge junctions on a roadway.

⁴ The proposed lanes shown in **Figure 1-3** are currently under construction by VDOT.

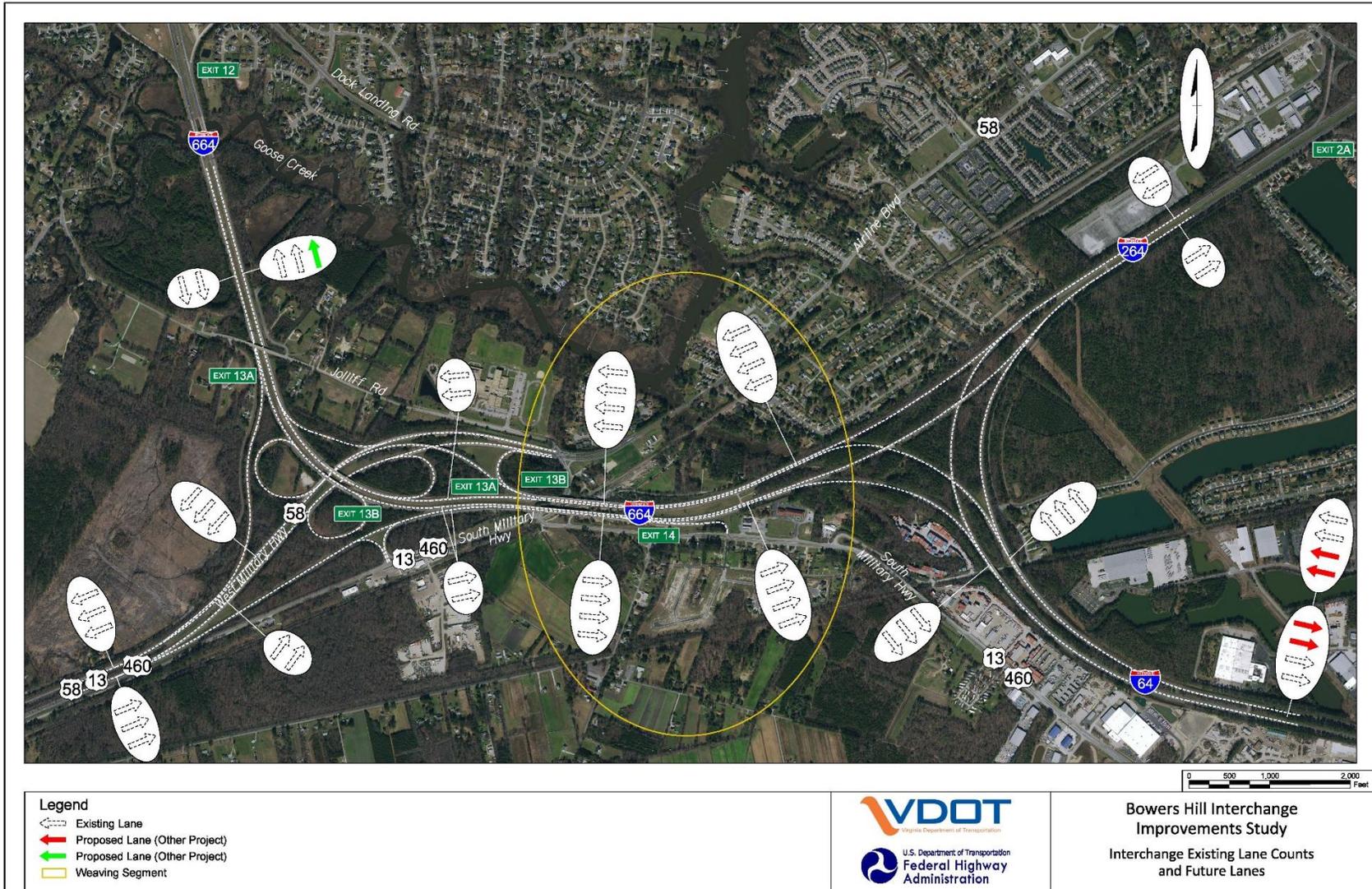
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Figure 1-2: Existing (2018) Weaving Movements through the Bowers Hill Interchange



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Figure 1-3: Interchange Existing Lane Counts and Future Lanes



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I-664 to I-64 must make a minimum of one lane change to continue the route, as well as traffic traveling from U.S. Route 58 to EB I-264. This weaving configuration creates a lane imbalance, which is undesirable as it limits operational flexibility (Transportation Research Board, 2010). Similarly, in the opposite direction, traffic from both WB I-264 to NB I-664 and I-64 to U.S. Route 58 must make one lane change to complete the route. Lane balance is not provided in this weaving segment affecting route continuity and transitions between intended routes.

“Origin” is the location where the trip begins, and “destination” is the location where a trip ends. Origin-destination patterns for the Study Area and beyond have been identified and are provided in the *Bowers Hill Interchange Improvements Study Traffic and Transportation Technical Report* (VDOT, 2019a). Origin-destination analysis provides a picture of the trip patterns and travel choices of a given area. The data collected includes information related to trip locations and purpose. The primary purpose of the origin-destination data analysis was to establish the major daily and peak period traffic flows through the Bowers Hill Study Area. The analysis provides an understanding of origin-destination patterns and of the relative magnitude of traffic flows through the Study Area.

Figure 1-2 shows that the weaving segment in the Bowers Hill interchange serves a high volume of daily traffic, and that these traffic streams must cross each other within the Bowers Hill interchange. Currently, approximately 121,800 vehicles per day travel through the weaving segment located in the center of the Study Area. As shown in **Table 1-1**, in the SB direction, an estimated 34,900 vehicles per day (14,700 from U.S. Route 58 to I-264 and 20,200 from I-664 to I-64) must find sufficient gaps between two adjacent lanes to make a weaving maneuver. In the NB direction, an estimated 25,500 vehicles per day (18,100 from I-64 to U.S. Route 58 and 7,400 from I-264 to I-664) must find sufficient gaps between two adjacent lanes to make a weaving maneuver. As the volume of weaving traffic increases during peak use periods within the Study Area, density increases, and there is insufficient distance for traffic to make weaving maneuvers. As defined in the *Highway Capacity Manual, Sixth Edition: A Guide for Multimodal Mobility Analysis*, breakdown of a weaving segment is expected to occur when the average density of all vehicles in the segment reaches 43 passenger cars per lane per mile (Transportation Research Board, 2016). Capacity analyses indicate that density along I-664 within certain segments of the Study Area is approaching this threshold in 2018 and is projected to exceed this threshold under 2040 No-Build conditions. Given the high volume of weaving traffic, the length of the weaving segment is insufficient during most of the peak period, resulting in lower speeds and congestion. Therefore, there is a need to address conditions which contribute to the operational deficiencies of the roadways in the Study Area.

Table 1-1: Existing (2018) Daily Weaving Segment Volumes

Route	Number of Vehicles Required to Make at least One Lane Change
SB I-664 to WB I-64	20,200
EB U.S. Route 460/58/13 to EB I-264	14,700
EB I-64 to WB U.S. Route 460/58/13	18,100
WB I-264 to NB I-664	7,400
Total	60,400

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1.4.3 Safety

Crashes are unpredictable and may result from sudden changes in speed (rear-end collisions) and weaving and merging maneuvers (sideswipes). Crash conditions can be aggravated by poor road or visibility conditions. After an incident occurs, crashes may cause lane closures and produce stop-and-go movements along the three interstate facilities (I-664, I-264, and I-64) and U.S. Route 460/58/13 in the Study Area. These non-recurring delays make travel unreliable through the interchange and may perpetuate a crash-congestion cycle where congestion leads to crashes, and crashes to congestion.

VDOT completed a safety analysis to examine crash locations and crash severity along Study Area roadways. Crash data from January 2013 to December 2017 was analyzed and plotted to conduct the analysis. The results of this analysis revealed that there were 433 mainline and 87 ramp crashes reported within the Study Area during the period of analysis. **Figure 1-4** depicts the location of mainline and ramp crashes occurring in the Study Area. Crash types are provided by type: rear end, fixed object, sideswipe, and other. **Table 1-2** and **Table 1-3** contain the number of crashes by major crash type and by severity for the mainline and ramp locations, respectively.

Table 1-2: Mainline Crash Types and Severity

Mainline Crash Type (2013-2017)	Fatal	Injury	Property Damage Only	Total
Rear-End	1	55	120	176
Fixed Object	3	43	73	119
Sideswipe - Same Direction	0	22	56	78
Other	0	26	27	53
Deer/Other Animal	0	1	6	7
Total	4	147	282	433

Source: VDOT 2013, 2014, 2015, 2016b

Table 1-3: Ramp Crash Types and Severity

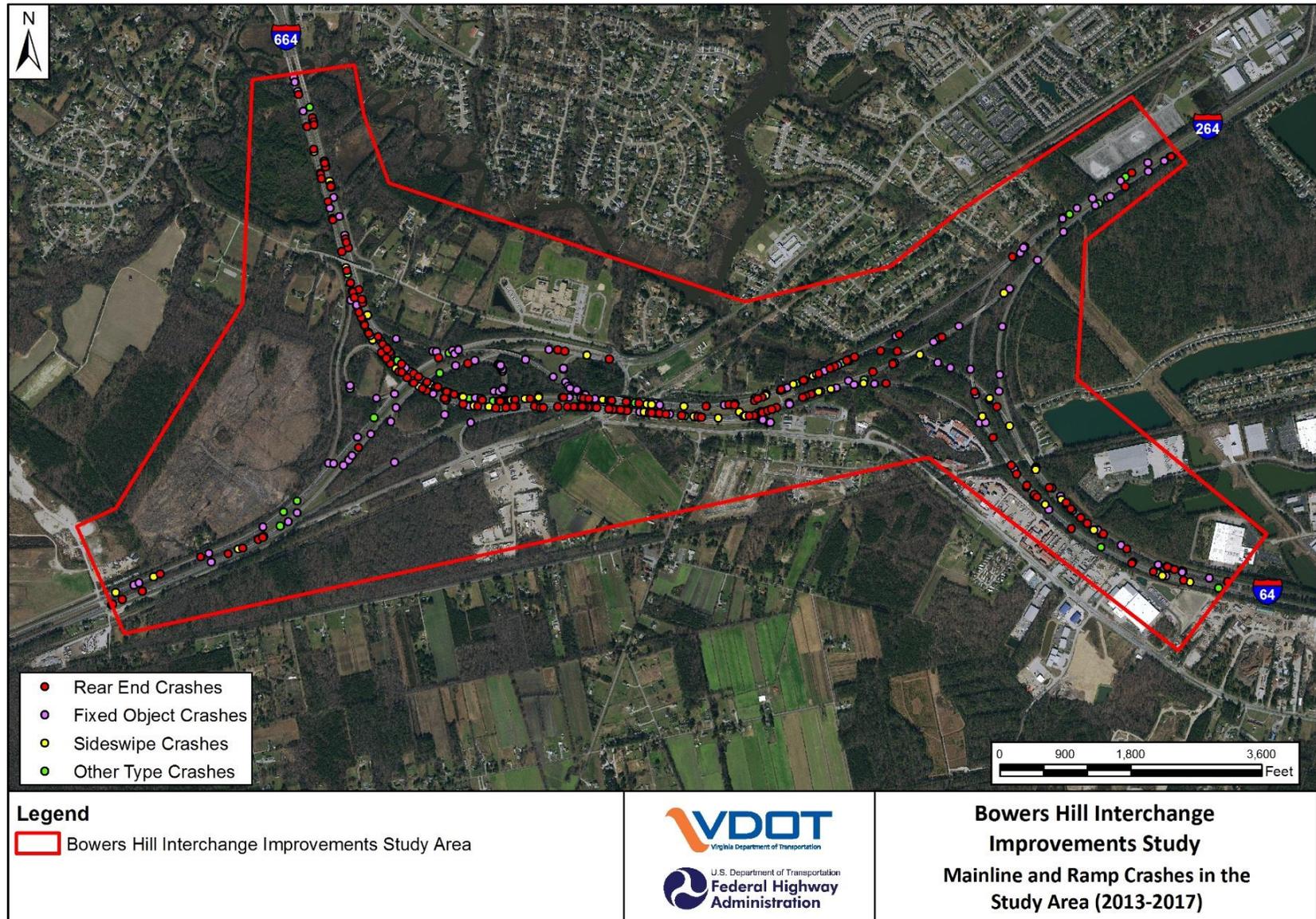
Mainline Crash Type (2013-2017)	Fatal	Injury	Property Damage Only	Total
Rear-End	0	3	5	8
Fixed Object	2	17	32	51
Sideswipe - Same Direction	0	1	2	3
Other	0	16	9	25
Deer/Other Animal	0	0	0	0
Total	2	37	48	87

Source: VDOT 2013, 2014, 2015, 2016b

Crashes resulting in property damage only accounted for approximately 65 percent of mainline crashes between 2013 and 2017 (**Table 1-2**). Approximately 34 percent of mainline crashes resulted in injuries and approximately one percent included a fatality. Ramp crashes during the same period had a higher level of severity. Approximately 43 percent of ramp crashes resulted in injuries and approximately two percent included a fatality (**Table 1-3**).

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Figure 1-4: Mainline and Ramp Crashes in the Study Area (2013-2017)



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As **Table 1-2** depicts, the predominant, mainline crash types within the Study Area are rear-end crashes, followed by fixed object crashes, same-direction sideswipes, and other type crashes. Examples of fixed object crashes include collisions with a guardrail, tree, utility pole/light support, traffic sign, or ditch. Other type crashes include head-on and angle collisions, and non-collisions where the vehicle leaves the roadway but does not impact another object.

It has been shown that there is a positive correlation between congestion and freeway accident levels (Maryland State Highway Administration, 2003). Specifically, high rates of rear-end collisions are one indicator of high congestion levels. Within the Study Area, rear-end crashes were located predominately along the I-664/I-64 mainlines. The majority of these crashes (approximately 63 percent) occurred during the peak travel periods of 6:00 AM – 9:00 AM and 3:00 PM – 6:00 PM, during daylight hours. Further, the majority of mainline crashes (approximately 72 percent) and ramp crashes (approximately 60 percent) occurred during dry road surface conditions, indicating that light or road conditions were not the primary cause of these crashes.

The congestion, which increases vehicle density and produces stop-and-go movements in the interchange during peak use periods, likely resulted in the rear-end crashes occurring within the Study Area. This is in agreement with results described in a report by the Washington State Department of Transportation titled, *Weave Analysis and Performance: The Washington Case Study* (Glad, R., J. Milton, and D. Olson [2001]). The large percentage of property damage only crashes (no injuries reported) indicates generally lower speeds and is also indicative of congested conditions within the interchange (**Table 1-2**).

Crashes due to changing lanes and merging, primarily related to vehicles entering or exiting a facility, or those changing lanes to maintain intended routes, are often sideswipe (same direction) crashes (Golob, T., W. Recker and V. Alvarez [2004]). Between 2013 and 2017, most sideswipe crashes (approximately 60 percent) occurred along the interstate mainline weaving segment located between the I-664/I-264 interchange and the U.S. Route 58 ramps. However, this section of roadway accounts for only approximately 20 percent of the mainline, interstate roadway length in the Study Area.

The fixed object and other type crashes were distributed throughout the Study Area along the interstate mainlines and primary routes. Ramp crashes occurred predominately within the U.S. Route 58 and U.S. Route 460/13 ramps in the western portion of the Study Area. Fixed object crashes followed by other type crashes were the most common ramp crashes that occurred during the period of analysis (**Table 1-3**).

The crash rate (in number of crashes per 100 Million Vehicles Miles Traveled) was computed for the mainline interstate segments of the Study Area and compared to average crash rates for similar facilities within all of Virginia and within VDOT's Hampton Roads District.⁵ The results are provided in **Table 1-4**. Where data is available to provide a comparison (2013-2016), the I-664/I-64 mainlines within the Study Area had a higher crash rate than both the Virginia and Hampton Roads average rates. For the SB I-664/WB I-64 mainline, the crash rate in the Study Area was over twice that of the State and Hampton Roads interstate averages. The crash rate peaked for the SB I-664/WB I-64 mainline in 2016. Therefore, as the

⁵ Consisting of Accomack, Isle of Wight, James City, Northampton, Southampton, Surry, Sussex and York Counties, and the Cities of Chesapeake, Emporia, Greenville, Hampton, Newport News, Norfolk, Portsmouth, Poquoson, and Virginia Beach.

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crash rates exceed the local and state average rates for similar facilities, there is a need to address conditions which contribute to safety issues in the Study Area.

Table 1-4: Average Crash Rates for All Crash Types

Year	State Interstate Average	Hampton Roads Interstate Average	SB I-664/ WB I-64 ¹	NB I-664/ EB I-64 ¹	EB I-264 ¹	WB I-264 ¹
2013	67.58	80.78	152.3	89.34	30.67	26.32
2014	70.94	88.96	171.74	130.37	127.46	50.58
2015	72.68	84.14	177.25	155.56	59.58	120.86
2016	72.33	89.3	190.44	132.81	84.56	23.49
2017	N/A ²	N/A ²	187.63	148.53	0	138.85

Source: VDOT 2013, 2014, 2015, 2016b

¹Rate for crashes within Study Area.

²2017 Statewide and Hampton Roads Averages are not available.

Rate exceeds both State and Hampton Roads averages. Rate exceeds State average.

1.4.4 Congestion and Capacity

1.4.4.1 Travel Demand

When planning and designing transportation improvements, the ability of a transportation investment to meet existing and reasonably foreseeable travel demand is among the most important considerations to be made. Congestion can occur when demand on a section of roadway exceeds the roadway's capacity; thus, creating a bottleneck. Sources of travel demand along Study Area roadways include commuting to jobs (including military) (HRTPO, 2018b), regional freight travel (HRTPO, 2017b), commercial travel, and travel to shopping, entertainment, and tourist destinations. The roadways in the Study Area provide access to some of the major employers in the region, including:

- Huntington Ingalls Industries, Inc. (Newport News Shipbuilding) via I-664;
- Norfolk Naval Shipyard via I-264;
- Chesapeake Regional Medical Center via I-64; and
- Navy Information Dominance Forces via I-664.

Freight and commercial travel along the Study Area roadways may begin or terminate at major distribution centers or ports, including those for:

- Ace Hardware, QVC, Target, and Unilever/Lipton via U.S. Route 460/58/13;
- Dollar Tree via I-64;
- Norfolk International Terminals via I-264 and I-664; and
- Virginia International Gateway Terminal via Route 164 and I-664.

Regional shopping and tourist destinations near the Study Area include:

- Chesapeake Square Mall via I-664;
- Great Dismal Swamp National Wildlife Refuge and Canal via U.S. Route 460/58/13 and I-64;
- Greenbrier Market Center via I-64; and
- MacArthur Center via I-264.

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The roadways in the Study Area are used by through freight traffic to destinations to the north via I-664, east via I-64 and I-264, and west via U.S. Route 460/58/13. The Virginia Commonwealth Transportation Board (CTB) has included the interchange as part of four Corridors of Statewide Significance including the Eastern Shore Corridor (U.S. Route 13), East-West Corridor (I-64), Heartland Corridor (U.S. Route 460), and Southside Corridor (U.S. Route 58). According to the *Virginia Multimodal Freight Plan*, these corridors represent “an integrated, multimodal network of transportation facilities that connect major centers of activity within and through the Commonwealth and promote the movement of people and goods essential to the economic prosperity of the state” (Virginia Office of Intermodal Planning and Investment, 2010).

The interchange and I-664 provide a direct connection to the MMMBT which was the most used facility (approximately 52 percent of total crossings) by trucks crossing the Hampton Roads harbor in 2015. I-64 between Bowers Hill and the High Rise Bridge carries the highest volume of trucks in the region, with over 7,400 trucks using the facility each weekday. The connection west to U.S. Route 460/58/13 was only slightly lower at 7,332 trucks per weekday (HRTPO, 2017c).

The Bowers Hill interchange is also important to commuters living west of the interchange in Suffolk and working in localities located to the east and northeast. The 2009-2013 commuting patterns of Suffolk residents indicate that most commuters (25,093 residents) travel to jobs located away from the City (HRTPO, n.d.). Approximately 70 percent of the Suffolk residents commute to jobs in Chesapeake, Norfolk, Portsmouth, and Virginia Beach. The interchange also provides an interstate connection for Chesapeake residents commuting to the Peninsula (Hampton and Newport News). As with Suffolk, the majority of Chesapeake commuters (63,351 residents) travel to other localities for work (HRTPO, n.d.). Of these, approximately six percent commute to the Peninsula and approximately 85 percent commute to the north and east to Norfolk, Portsmouth, or Virginia Beach.

Local travel demand is related in part to population growth. A growing population results in the need for additional mobility to intended destinations such as work, school, shopping, and recreational/tourism points of interest. The combined population of the localities constituting the HRTPO has grown approximately 50 percent from 1970 to 2010 (**Table 1-5**) (HRTPO, 2013). Between 1970 and 2010, the population of Chesapeake increased approximately 148 percent. The City’s dramatic growth has been spurred by the improvement of major transportation corridors such as I-664, I-64, and VA 164. Portsmouth’s population size has declined since 1970 by approximately 16 percent (HRTPO, 2013). Although not in the Study Area, the population growth in the Suffolk has increased travel demand along Study Area roadways as residents of Suffolk use U.S. Route 460/58/13 to access areas of Chesapeake, Norfolk, Portsmouth, and Virginia Beach to the east. Suffolk experienced an approximately 88 percent increase in population size during the time period analyzed.

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Table 1-5: Population Growth

Area	1970	2000	2010	Percent Change (1970-2010)
HRTPO Localities ¹	1,108,393	1,566,801	1,666,310	50.3%
Chesapeake	89,580	199,184	222,209	148.1%
Portsmouth	110,963	100,565	95,535	(16.1%)
Suffolk	45,024	63,677	84,585	87.8%

Source: HRTPO (2013)

¹Includes Gloucester County, Hampton, James City County, Newport News, Poquoson, Williamsburg, and York County on the Peninsula, and Chesapeake, Franklin, Isle of Wight County, Norfolk, Portsmouth, Southampton County, Suffolk, Surry County and Virginia Beach on the Southside.

An increase in employment results in travel demand for resident and commuter workers and increased freight/goods to supply growing businesses. Along with population growth, employment in Hampton Roads has increased since 1970 (**Table 1-6**) (HRTPO, 2013). Employment in the localities constituting the HRTPO increased approximately 83 percent during the study period. In addition, as with population growth, employment growth for Chesapeake surpassed the broader region. Between 1970 and 2010, employment totals in Chesapeake increased approximately 442 percent (HRTPO, 2013).

Table 1-6: Employment Growth (By Place of Work)

Area	1970	2000	2010	Percent Change (1970-2010)
HRTPO Localities	542,081	963,231	994,089	83.4%
Chesapeake	22,566	102,765	122,265	441.8%
Portsmouth	48,087	52,831	57,414	19.4%
Suffolk	18,055	26,273	33,914	87.8%

Source: HRTPO (2013)

Travel demand from all sources within the Study Area have resulted in the 2018 daily and peak hour traffic volumes, as well as truck volumes at key Study Area locations provided in **Table 1-7** and **Table 1-8**, respectively. Therefore, as this demand exceeds roadway capacity during peak use periods, a need exists to accommodate this demand by addressing capacity deficiencies in the Study Area.

Table 1-7: Existing (2018) Daily and Peak Hour Traffic Volumes at Key Study Area Locations

Location	East (South) Cardinal Direction			West (North) Cardinal Direction		
	Daily	AM	PM	Daily	AM	PM
I-664 north of Bowers Hill	45,600	4,005	3,385	46,000	3,525	3,960
I-664 between U.S. Route 460 Ramps and I-264/I-64 Ramps	61,500	5,295	4,175	60,300	4,115	5,625
I-64 south of Bowers Hill	42,800	2,675	3,135	45,000	3,695	3,550
I-264 east of Bowers Hill	29,900	3,245	1,760	29,200	1,385	3,060

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Location	East (South) Cardinal Direction			West (North) Cardinal Direction		
	Daily	AM	PM	Daily	AM	PM
U.S. Route 58 between I-664 and Jolliff Road	6,000	605	605	9,200	405	645

Table 1-8: Existing (2018) Truck Volumes and Percentages at Key Study Area Locations

Location	East (South) Cardinal Direction			West (North) Cardinal Direction		
	Daily	AM	PM	Daily	AM	PM
I-664 north of Bowers Hill	3,000 (7%)	197 (5%)	136 (4%)	3,050 (7%)	249 (7%)	104 (3%)
I-664 between U.S. Route 460 Ramps and I-264/I-64 Ramps	5,450 (9%)	305 (6%)	237 (6%)	5,750 (10%)	408 (10%)	227 (4%)
I-64 south of Bowers Hill	4,250 (10%)	206 (8%)	207 (7%)	4,500 (10%)	342 (9%)	169 (5%)
I-264 east of Bowers Hill	2,550 (9%)	182 (6%)	97 (6%)	2,800 (10%)	173 (12%)	137 (4%)
U.S. Route 58 between I-664 and Jolliff Road	600 (10%)	49 (8%)	42 (7%)	350 (4%)	86 (21%)	27 (4%)

1.4.4.2 Congestion

INRIX, a transportation data and analytics provider, aggregates speed and travel time information that is collected continuously on the Study Area's interstate and state facilities. INRIX data is made available through the University of Maryland's Center for Advanced Transportation Technology Laboratory (CATT Lab) Regional Integrated Transportation Information System (RITIS). Historic travel time and speed data from March 2018, from these sources, was analyzed to calculate average travel times and speeds for vehicles traveling through the Study Area along the mainline section of I-664 between Dock Landing Road and the I-64/I-264 ramp merge (approximately 2.6 miles), and to obtain performance measures regarding the variability in speed and travel time over the course of time. These measures were used to calibrate traffic operation models and to provide indications of reliability of the travel experience through the Study Area.

Although they are key performance measures, metrics such as travel time and speed do not provide any indication of the potential variability in travel time which occurs in the Study Area as those measures are an average taken over time. Therefore, Buffer Time and the Planning Time Index (PTI) metrics were utilized to measure the need for congestion relief in the Study Area. Buffer Time and the PTI are metrics used as part of FHWA's Operations Performance Measurement Program as well as by a number of State Departments of Transportation (FHWA, 2006b).

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The Buffer Time metric represents the amount of time that users should add to their free-flow travel times to arrive on time for 95 percent of planned trips. This metric is a measure of the reliability of travel time. A higher Buffer Time indicates a less reliable travel time. The PTI is a combined measure of travel time and reliability and indicates the ratio between planned time and free-flow travel time. A PTI close to 1 indicates that little additional time should be added for planned trips through the study segment in order to be on time for 95 percent of trips. Conversely, a PTI value of 2 or higher indicates that considerable additional time (beyond the free-flow travel time) should be planned to arrive on time for the majority of trips.

Buffer Time and PTI were determined for the section of I-664 between Dock Landing Road and the I-64/I-264 ramp merge. This section of roadway represents the main movement, and longest route through the Study Area, for which defining these measures would be meaningful. Average speed, actual travel time, and reliability data for this section are provided in **Table 1-9**. The table shows that the lowest average speeds for the mainline section analyzed occur during the PM period. As speed decreases there is a corresponding increase in travel time through the mainline section. These reductions in reliability are caused by congestion resulting from travel demand exceeding available highway capacity combined with operational deficiencies of the roadway segment. As traffic flows approach and exceed capacity, the higher traffic densities result in vehicles being more closely spaced, increasing the interaction among vehicles and distractions to drivers. When this happens, the flow becomes unstable, and abrupt stop-and-go traffic movements can occur.

Due to the unstable nature of the traffic flow, the exact onset, severity, and frequency of the congested conditions are difficult to predict, and the actual travel time may vary considerably from the average from one day to the next, especially when crashes or breakdowns result in lane restrictions or closures. Such non-recurring congestion (non-recurring because it happens differently every day) increases the unreliability of travel times in the Study Area. This is evidenced by the Buffer Time and PTI values for the mainline segment. For each time period and travel direction, additional time should be planned to arrive on time for 95 percent of trips. In addition, the highest PTI was calculated for the NB direction during the PM time period, when more than twice the free-flow travel time (PTI value of 2.16) should be planned to arrive on time to an intended destination.

**Table 1-9: Existing (2018) Weekday Peak Period Travel Time and Reliability Metrics
(6-9 AM and 3-7 PM)**

Cardinal Direction	Average Speed (MPH)		Actual Average Travel Time (min)		Density (pc/lane/mi)		Buffer Time (min)		Planning Time Index	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
East (South)	58	54	2.6	2.8	24.9	25.6	0.50	1.74	1.26	1.74
West (North)	58	49	2.9	3.4	22.9	27.0	0.15	2.92	1.07	2.16

Source: INRIX, Preliminary Operational Analysis
pc = passenger cars

These results are consistent with the findings included in the *HRTPO Annual Roadway Performance Report 2017 Edition* (HRTPO, 2017a). The report indicates that there was moderate congestion along both directions of the I-664 mainline, north of the U.S. Route 58 ramps, within the Study Area during the AM

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peak flow in 2016. Conditions in the Study Area worsened to severe for the NB direction between the U.S. Route 58 ramps and the I-264/I-64 interchange during the AM and PM peak periods. Both directions of I-64, south of the I-264/I-64 interchange in the Study Area, were categorized as having severe congestion in 2016. Therefore, with repeated results identifying that congestion occurs in the Study Area, combined with demonstrated poor reliability, there is a need for congestion relief along Study Area roadways.

1.4.4.3 Capacity

High travel demand coupled with inadequate capacity has the adverse effects on travel time and travel reliability in the Study Area demonstrated in **Table 1-9**. Traffic volumes within the weaving segment currently exceed capacity. Capacity in the weaving segment is a function of the volume of weaving and non-weaving traffic, the weaving segment configuration, and the number of lanes from which weaving maneuvers can be performed. In the SB direction, demand exceeds capacity approximately 60 percent of the time during the three-hour AM period and 25 percent of the time during the three-hour PM period. In the NB direction, demand exceeds capacity more than 80 percent of the time during the three-hour PM period.

In addition to demand exceeding capacity during peak periods, additional issues affect capacity in the Study Area. Lane drops and merges contribute to bottleneck conditions and traffic backups along the mainline of I-664 and I-64 in the Study Area. Capacity along NB I-664 from the I-264/I-64 weave to Exit 13B is reduced from four mainline travel lanes to two NB travel lanes beyond the exit (**Figure 1-3**). Approximately 1/3 of a mile beyond the weaving area, traffic from U.S. Route 460/58/13 merges into this two-lane section of roadway, increasing demand.

During existing peak demand periods these conditions cause congestion which may lead to traffic incidents due to decreased vehicle spacing. Incidents within the Study Area (such as crashes or temporary lane closures for maintenance or other activities) can further reduce capacity, with limited opportunities for incident management. Further, depending on the location of the incident or maintenance activity, capacity can be reduced to one lane, if only one other lane is unavailable. These activities and incidents can result in non-recurring congestion and delays beyond the congestion experienced during normal operation. Therefore, there is a need for additional capacity within the Study Area to accommodate demand for major movements (**Figure 1-2**) during peak periods at major merge and diverge points, and to better manage effects from traffic incidents and maintenance activities.

1.5 NEEDS-FUTURE CONDITIONS

1.5.1 Overview

It is anticipated that U.S. Route 460/58/13, I-664, I-264, and I-64 would remain critical links in the regional transportation network of the Hampton Roads region by 2040. The roadways would continue to serve multiple transportation purposes, including commuter, freight movements (HRTPO, 2017c), military mobility (HRTPO, 2018b), tourism, and emergency evacuation (VA Department of Emergency Management, 2018). However, as illustrated in **Section 1.4.4.3**, existing capacity is inadequate at peak travel times within the interchange, leading to reduced speeds and long and unpredictable travel times and congestion. In addition, the operational deficiencies within the interchange create inefficient weave conditions and traffic operations which affect route continuity and transitions between intended routes.

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These factors would continue to impact regional transportation accessibility and the performance of the roadways would worsen with predicted increases in travel demand as described below.

1.5.2 Operational Deficiencies

Other than the improvements resulting from the Bowers Hill Interchange Improvements Study, there are no currently-programmed comprehensive improvements to alleviate operational deficiencies along I-664, I-264, I-64, or U.S. Route 460/58/13 in the Study Area. The existing bottlenecks, such as where lanes diverge to I-264 from I-64, and where lanes diverge along NB I-664 at Exit 13B, create conditions where traffic demand exceeds the capacity of the merge, diverge, or weaving segment. Traffic conditions would become progressively worse due to substantially increased future traffic volumes (see **Section 1.5.4.1**), leading to even more severe congestion. It is estimated that by 2040, 141,000 vehicles per day would travel through the weaving segment located in the center of the Study Area (**Figure 1-5**), an approximate 16 percent increase over existing conditions (121,800 vehicles per day) (**Table 1-10**). In addition, it is estimated that approximately 70,100 vehicles per day would need to find sufficient gaps between two adjacent lanes to make a weaving maneuver (an approximate 16 percent increase over existing conditions). Those vehicles traveling between routes would find decreasing opportunities to find sufficient gaps between two adjacent lanes to make needed weaving maneuvers. Therefore, as with existing conditions, there will be a future need to address those conditions which contribute to the operational deficiencies of the roadways in the Study Area.

Table 1-10: No-Build (2040) Daily Weaving Segment Volumes

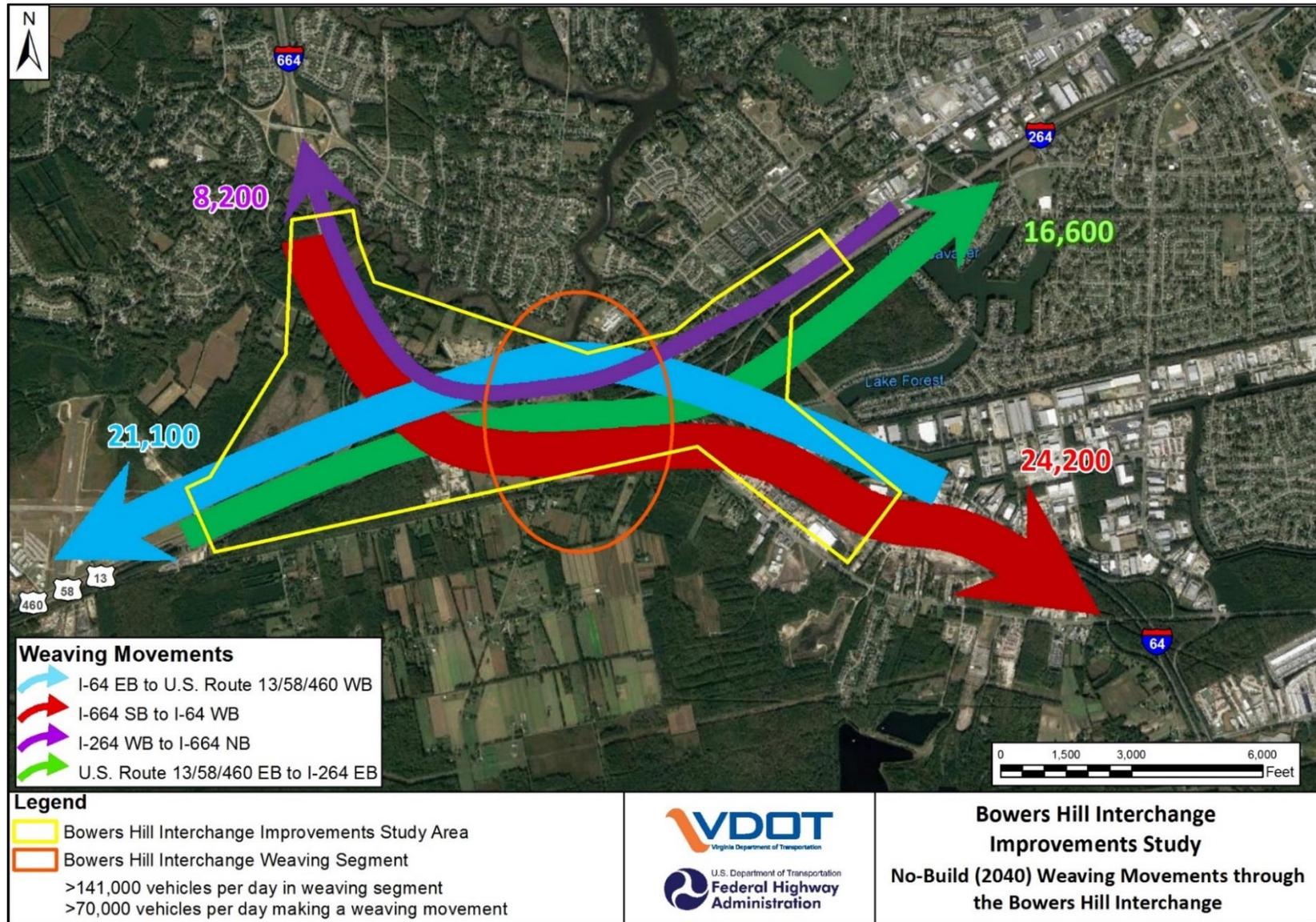
Route	Number of Vehicles Required to Make At least One Lane Change
SB I-664 to WB I-64	24,200
EB U.S. Route 460/58/13 to EB I-264	16,600
EB I-64 to WB U.S. Route 460/58/13	21,100
WB I-264 to NB I-664	8,200
Total	70,100

1.5.3 Safety

The existing operational deficiencies and congestion that contribute to crashes along Study Area roadways would continue into the future. Considering AM and PM peak traffic volumes along I-664, I-264, I-64, and U.S. Route 460/58/13 in the Study Area are expected to increase based on travel demand associated with forecasted increases in population and employment (as discussed in **Section 1.5.4.1**), crash totals would likely increase as well. Therefore, based on these projections, failure to provide roadway improvements would not serve to address present or projected safety issues.

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Figure 1-5: No-Build (2040) Weaving Movements through the Bowers Hill Interchange



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1.5.4 Congestion and Capacity

1.5.4.1 Travel Demand

Reasonably foreseeable demand for the roadways within the Bowers Hill Interchange Improvements Study Area has been determined by referring to forecasted population and employment growth, forecasted traffic projections, LRTPs, transportation planning organization forecasts, localities' comprehensive plans, and the Port of Virginia's *2065 Master Plan* (Port of Virginia, 2016).

Between 2010 and 2040, population is expected to increase within the HRTPO member localities by approximately 22 percent (HRTPO, 2013). This growth is anticipated to be surpassed by the Cities of Chesapeake and Suffolk which are expected to experience an approximate 42 percent increase, and 116% increase, in population size by 2040, respectively (**Table 1-11**). Employment is also expected to increase substantially within the HRTPO planning area and within Chesapeake and Suffolk over the same period (**Table 1-12**). The forecasted population and employment growth would increase travel demand along Study Area roadways as more people travel between home and work, as well as tourist, entertainment, and recreational destinations in the region.

Table 1-11: Population Growth

Area	2010	2040	Percent Change
HRTPO Localities	1,666,310	2,037,000	22.3%
Chesapeake	222,209	314,600	41.6%
Portsmouth	95,535	98,200	2.8%
Suffolk	84,585	182,700	116.0%

Source: HRTPO (2013)

Table 1-12: Employment Growth (By Place of Work)

Area	2010	2040	Percent Change
HRTPO Localities	994,089	1,277,700	28.5%
Chesapeake	122,265	167,000	36.6%
Portsmouth	57,414	70,400	22.6%
Suffolk	33,914	62,900	85.5%

Source: HRTPO (2013)

Chesapeake's *Comprehensive Plan Moving Forward Chesapeake 2035* establishes a development pattern map for the year 2050 in which the area located south of the center of the interchange is designated as a "Rural Area" for the year 2050. The City plans to retain these areas as a well-defined and protected belt of rural landscape. In other areas, the City plans to promote development, or redevelopment, to accommodate the anticipated population growth in the City.

The section of the Study Area, located along the I-664 corridor, is designated as a "Dispersed Suburban Development Area," where the purpose is to provide a transition area between the urban areas of the City and the outlying rural area (Chesapeake, 2016). This area is also within the "Suburban Overlay

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District” where mixed-use and infill development is authorized by City design guidelines (**Figure 1-6**). The City plans to revitalize, and in-fill with higher densities and higher quality mixed-use developments the designated “Compact Development Area” that is located along I-64 and south of I-264 in the Bowers Hill Study Area. As the City’s future land use recommendations will focus on growth in and around the Bowers Hill Study Area, the travel generated by this continuing growth will further increase traffic volumes within the Study Area by 2040, further increasing congestion on these major area roadways.

Traffic forecasts were developed using the HRTPO travel demand model, excluding improvements considered with the Bowers Hill Interchange Improvements Study. The future No-Build forecasts developed for this study incorporate all other transportation projects anticipated to be constructed by the year 2040, including full buildout of the High Rise Bridge Project and auxiliary lane and ramp extensions in the Study Area planned by VDOT’s Hampton Roads District (identified as “Other Project” on **Figure 1-3** in **Section 1.4.2**), and as such, are reflected in the travel demand forecasts.

The 2040 No-Build daily and peak hour traffic volumes at key locations for all traffic are provided in **Table 1-13**. For the mainline interstate roadways, the largest increase in demand (approximately 41 percent) would occur for total daily volumes for WB I-64, south of Bowers Hill. Other notable increases in demand along mainline interstate roadways within the Study Area include:

- An approximate 34 percent increase in the PM peak volume for WB I-64, south of Bowers Hill;
- An approximate 31 percent increase in the PM peak volume for SB I-664, north of Bowers Hill;
- An approximate 30 percent increase in the AM peak volume for EB I-64, south of Bowers Hill;
- An approximate 23 percent increase in the AM peak volume for NB I-664, north of Bowers Hill;
- An approximate 22 percent increase in total daily volume for WB I-264, east of Bowers Hill;
- An increase of approximately 20 percent in the AM peak volume within the weaving segment of NB I-664 between the U.S. Route 460 ramps and I-264/I-64 ramps;
- An approximate 19 percent increase in total daily volume for EB I-264, east of Bowers Hill; and
- An increase of approximately 18 percent in total daily volume within the weaving segment of SB I-664 between the U.S. Route 460 ramps and I-264/I-64 ramps.

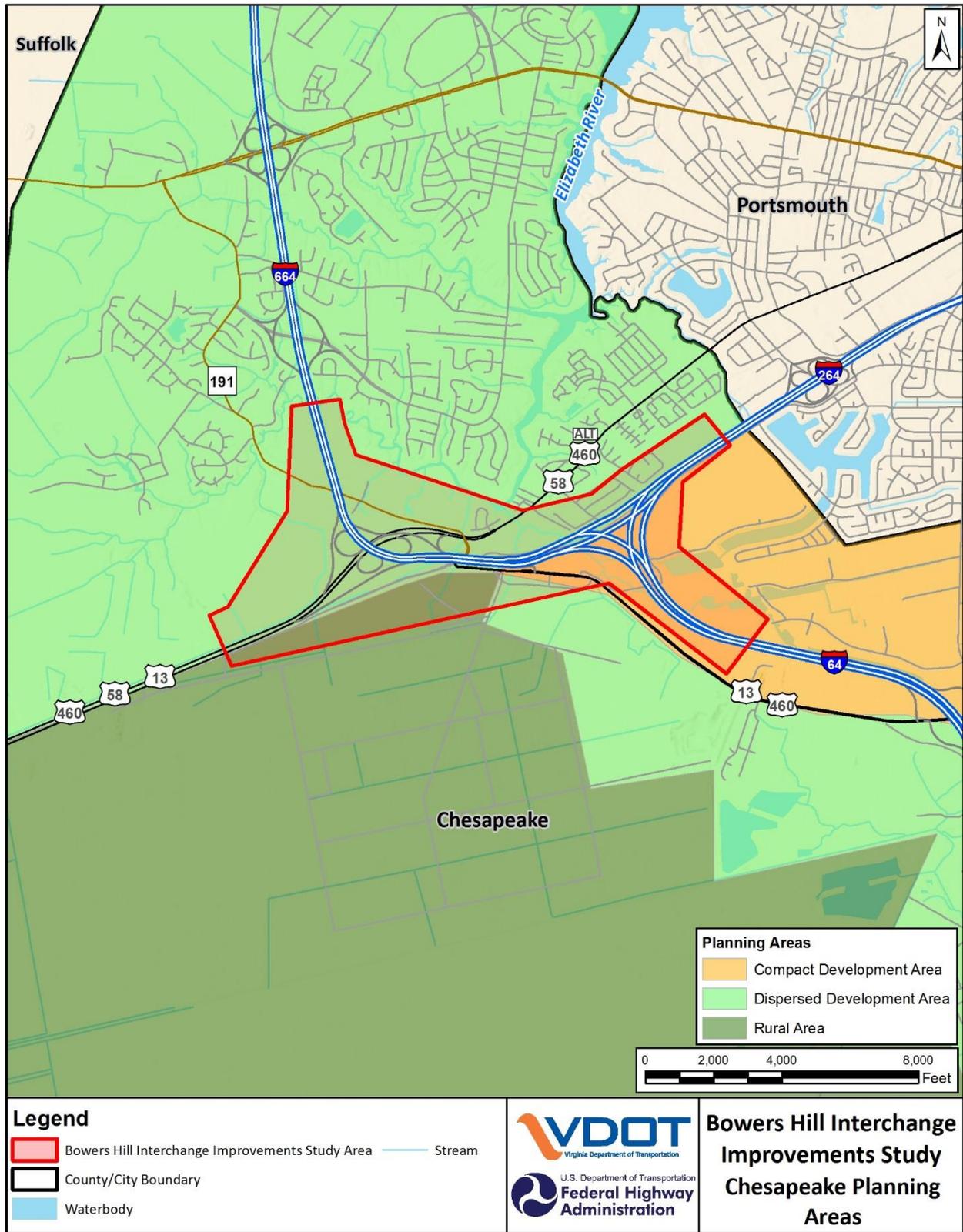
Table 1-13: Existing (2018) and No-Build (2040) Daily and Peak Hour Traffic Volumes at Key Study Area Locations

Location	East (South) Cardinal Direction			West (North) Cardinal Direction		
	Daily	AM	PM	Daily	AM	PM
I-664 north of Bowers Hill	[45,600] 56,800	[4,005] 4,985	[3,385] 4,420	[46,000] 56,500	[3,525] 4,340	[3,960] 4,845
I-664 between U.S. Route 460 Ramps and I-264/I-64 Ramps	[61,500] 72,400	[5,295] 5,945	[4,175] 4,845	[60,300] 68,700	[4,115] 4,955	[5,625] 6,610
I-64 south of Bowers Hill	[42,800] 60,200	[2,675] 3,540	[3,135] 4,210	[45,000] 60,300	[3,695] 4,795	[3,550] 4,420
I-264 east of Bowers Hill	[29,900] 35,700	[3,245] 3,480	[1,760] 1,820	[29,200] 35,700	[1,385] 1,675	[3,060] 3,740
U.S. Route 58 between I-664 and Jolliff Road	[6,000] 10,200	[605] 875	[605] 760	[9,200] 13,900	[405] 580	[645] 1,245

Numbers in [brackets] indicate existing (2018) values

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Figure 1-6: Chesapeake Planning Areas



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Table 1-14 contains the anticipated truck volumes at key Study Area locations for the 2040 No-Build condition. As with total daily volumes, truck volumes are anticipated to increase by 2040. Therefore, with the projected increases in daily, AM peak, PM peak, and truck demand along the Study Area roadways, it is expected that traffic conditions would worsen under projected 2040 volumes continuing the need for congestion relief.

Table 1-14: Existing (2018) and No-Build (2040) Truck Volumes at Key Study Area Locations

Location	East (South) Cardinal Direction			West (North) Cardinal Direction		
	Daily	AM	PM	Daily	AM	PM
I-664 north of Bowers Hill	[3,000] 3,735	[197] 245	[136] 180	[3,050] 3,745	[249] 305	[104] 125
I-664 between U.S. Route 460 Ramps and I-264/I-64 Ramps	[5,450] 6,415	[305] 340	[237] 275	[5,750] 6,550	[408] 490	[227] 265
I-64 south of Bowers Hill	[4,250] 5,980	[206] 275	[207] 280	[4,500] 6,030	[342] 445	[169] 210
I-264 east of Bowers Hill	[2,550] 3,045	[182] 195	[97] 100	[2,800] 3,425	[173] 210	[137] 165
U.S. Route 58 between I-664 and Jolliff Road	[600] 1,020	[49] 70	[42] 55	[350] 530	[86] 140	[27] 50

Numbers in [brackets] indicate existing (2018) values

1.5.4.2 Congestion

Travel demand generated by the projected population growth and increased jobs within, and near the Study Area, is anticipated to increase traffic volumes in the Study Area by approximately 92 percent along U.S. Route 58, and approximately 41 percent on the interstate mainline (I-64 WB south of Bowers Hill). The increase in traffic volumes within the fixed capacity system would result in greater congestion, increasing the potential for traffic incidents to occur. The increase in congestion would negatively affect travel times and decrease travel speeds (**Table 1-15**).

Table 1-15: No-Build (2040) Weekday Peak Period Average Speed and Travel Times (6-9 AM and 3-7 PM)

Cardinal Direction	Average Speed (MPH)		Average Travel Time (min)		Density (pc/lane/mi)	
	AM	PM	AM	PM	AM	PM
East (South)	51.5	51.5	4.3	4.3	29.2	31.6
West (North)	51.5	39.5	4.5	5.7	29.6	39.8

pc = passenger cars

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The current posted speed in the west/north direction is 60 MPH. It is anticipated that average travel speeds in this direction would decrease by approximately 10 MPH (approximately 19 percent) by 2040 during the PM peak (**Table 1-9** and **Table 1-15**). Average speeds in the AM peak period are anticipated to decrease by approximately 7 MPH (approximately 11 percent) for both main travel directions. As a result, average travel times are anticipated to increase from between 53 percent and 68 percent for all travel directions. Density is projected to deteriorate compared to existing conditions. The greatest increase in density (approximately 47 percent) is predicted to occur for the west/north direction. Therefore, these reductions in performance would further decrease the reliability of the Study Area roadways, impacting local, intrastate, and interstate travel using the interchange by 2040.

1.5.4.3 Capacity

The predicted high travel demand (**Section 1.5.4.1**), combined with operational deficiencies, if allowed to persist, are anticipated to further degrade performance along Study Area roadways by reducing travel speeds and lengthening travel times by 2040 (**Table 1-15**). The projected 2040 travel demand would exceed capacity in the mainline and weaving, merge, and diverge sections of the Study Area. The areas where capacity is limited would continue to act as bottlenecks, causing congestion, further increasing the possibility for traffic incidents to occur. Therefore, without improvements, these incidents would affect the trips for higher volumes of personal and commercial users by 2040.

1.6 PURPOSE AND NEED SUMMARY

The purpose of the Bowers Hill Interchange Improvements Study is to address current operational deficiencies, such as inefficient access configurations, while improving safety within weaving and transition areas at the junction of I-664, I-264, I-64, U.S. Route 460, U.S. Route 58, U.S. Route 13, and VA Route 191 (the Bowers Hill interchange). This study will also address current and future travel demand within the interchange.

The following needs have been identified for the study:

- Operational Deficiencies – current access configurations within the interchange create inefficient weave conditions and traffic operations affecting route continuity and transitions between intended routes;
- Safety – current conditions contribute to increased side-swipe crashes within the weaving area between the access and departure ramps of U.S. Route 460 and those of I-264, as well as rear-end crashes along the entire Study Area corridor of I-664 and I-64; and
- Congestion and Capacity – current and predicted future travel demand exceed interchange capacity which causes congestion and negatively affects travel times.

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Chapter 2

Alternatives



2 ALTERNATIVES

2.1 PREVIOUS STUDY CONCEPTS

VDOT completed an operational analysis of NB I-664 through the Bowers Hill interchange, evaluating nine improvement alternatives, and reported the results of the analysis in the report titled *Bowers Hill Operational Analysis – Final Report (Operational Analysis)* (VDOT, 2018a). Two alternatives reviewed in the 2018 analysis were reconsidered with the Bowers Hill Interchange Improvements Study as potential long-term improvement options for the interchange, either as independent improvements, or improvements combined with other alternatives (hybrid alternatives). The remaining seven alternatives were eliminated from reconsideration with the Bowers Hill Interchange Improvements Study as they provided little improvement over existing conditions. For the Bowers Hill Interchange Improvements Study, the two remaining alternatives were evaluated as potential concepts and modeled for the 2040 design year to determine if they would provide a long-term solution for the entire interchange. Improvements proposed with these concepts are described as follows:

- **Improvement #5:** This concept would develop a bypass to separate traffic from WB I-264 to U.S. Route 58 and NB I-664 by eliminating the weave in the current condition. It would widen the existing I-664 bridge over the I-64 ramp and also reconfigure the existing lane arrangements on I-264 by directing traffic to U.S. Route 58 into the right lane and traffic from I-64 into the center two lanes while preserving all local access connections. The existing forth (outside) lane would be striped out and then become the entrance lane from the new bypass ramp for traffic from WB I-264 to NB I-664. This concept was carried forward and considered as **Concept B** in the Bowers Hill Interchange Improvements Study.
- **Improvement #8:** This concept is currently being developed by VDOT as a separate project and adds an auxiliary lane by extending the acceleration lane from the EB U.S. Route 58 to NB I-664 on-ramp to the existing third lane on the bridge over Goose Creek, a distance of approximately 4,000 feet. Improvements provided would include additional capacity, acceleration length, and weaving room for traffic entering I-664 NB from WB U.S. Route 58 while preserving all local access connections. This concept was carried forward and considered as **Concept A2** in the Bowers Hill Interchange Improvements Study.

These two concepts (A2 and B) were carried forward along with seven additional concepts that were developed for the Study. Concepts A, A2, B, and C were evaluated to determine if they could provide a long-term solution for the entire interchange, while limiting construction to the widening of existing facilities. Concepts D, E, F, and G were initially developed to provide larger-scale improvements for the entire interchange within the existing interchange footprint, while potentially addressing the purpose and need for the study. Concept H was considered to provide large-scale improvements for the entire interchange without being confined to the existing interchange area. A brief summary of each concept is provided below. A justification for not retaining the concept for detailed analysis in the EA is provided in **Table 2-1**. More detail is provided in the *Bowers Hill Interchange Improvements Study Alternatives Technical Report* (VDOT, 2019b).

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- **Concept A2** would consist of the improvements proposed with Improvement #8 in VDOT's Operational Analysis but includes an extension of the auxiliary lane through to the WB U.S. Route 58 on ramp.
- **Concept A** would add an auxiliary lane along northbound I-664 from Exit 13 (U.S. Route 460/58/13) to the existing third lane on the bridge over Goose Creek similar to Concept A2 and Improvement #8. The additional lane would become a "choice" lane, where either ramp can be taken from that lane, at Exit 13B for either WB U.S. Route 58 or NB I-664. This concept would also widen the existing I-664 bridge over U.S. Route 58 and extend each of the existing acceleration lanes from EB and WB U.S. Route 58 onto NB I-664. The improvements proposed with Concept A would also extend through the interchange beyond Exit 13B.
- **Concept B** would consist of the same improvements as proposed with **Improvement #5** in VDOT's Operational Analysis.
- **Concept C** incorporates the improvements from both Concept A and Concept B described above.
- **Concept D** would add a third lane along SB I-664 from the U.S. Route 58 EB entrance ramp to EB I-64, a distance of approximately 14,300 feet. For the opposite movement a third lane would be added from EB I-64 to NB I-664, a distance of approximately 8,500 feet. This concept would replace two existing bridges along EB I-64 to NB I-664, widen the two existing I-64 bridges over the railroad, and widen the existing bridge carrying SB I-664 over South Military Highway (U.S. Route 460/13).
- **Concept E** would separate various movements by developing barrier-separated lanes and braided ramps for traffic from SB I-664 and EB U.S. Route 58 to EB I-264 and I-64. In the opposite direction new ramps and barrier would separate traffic from WB I-264 and EB I-64 to NB I-664 and EB/WB U.S. Route 58. This concept also includes a proposed continuous SB auxiliary lane along I-664 between the entrance ramp from Dock Landing Road and the exit ramp to U.S. Route 58.
- **Concept F** is similar to Concept E in that it would separate various movements by developing barrier-separated lanes and braided ramps for traffic from SB I-664 and EB U.S. Route 58 to EB I-264 and WB I-64. In the opposite direction new ramps and barrier would separate traffic from WB I-264 and EB I-64 to NB I-664 and EB/WB U.S. Route 58. However, with this concept, a new loop and ramp would be constructed and extend to the east of the existing WB I-64 to EB I-264 travel lanes. The new lane would require construction of a new bridge to span Rotunda Avenue and a new bridge to cross over the I-264 travel lanes. This would result in additional property impacts and increased cost.
- **Concept G** would reconstruct a majority of the interchange to separate mainline traffic between U.S. Route 58/I-264 and I-664/I-64 through the proposed interchange. In this concept, barrier would separate the SB I-664 to I-64 and the EB U.S. Route 58 to EB I-264 traffic, and movements between the facilities would be accommodated with new braided and direct connector ramps. In the opposite direction barrier would separate traffic from WB I-264 to WB U.S. Route 58 and EB I-64 to NB I-664 with a similar series of braided and direct connector ramps to accommodate the major movements. Also, similar to Concept E, this concept also includes a proposed continuous

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SB auxiliary lane along I-664 between the entrance ramp from Dock Landing Road and the exit ramp to U.S. Route 58.

- As with Concept G, **Concept H** would reconstruct a majority of the interchange to separate main lane traffic between U.S. Route 58/I-264 and I-664/I-64 through the proposed interchange. SB I-664 to WB I-64 traffic would be relocated to a new roadway which would be constructed to the south of the existing interchange, along an abandoned railroad line located to the north of Sondej Avenue. A new ramp and roadway would connect to these two new lanes to redirect EB U.S. Route 460/58/13 traffic intending to reach WB I-64.

Table 2-1: Verification for Not Retaining for Detailed Analysis in the EA

Concept	Source	Justification
Concept A2	VDOT Operational Analysis - 2018	<p>This concept was modeled for the 2040 design year and it was determined through the evaluation process that it would no longer provide sufficient operational benefits by 2040, as mainline volumes on NB I-664 and traffic entering NB I-664 from WB U.S. 58 would exceed capacity of this segment. This concept also does not address the existing mainline weave condition which affects safety. Therefore, this concept does not address the long-term solution and goal of improving operational deficiencies, capacity and congestion, and safety in the broader interchange area for the major movements and was eliminated as a potential Build Alternative for this study.</p> <p>However, the VDOT Hampton Roads District plans to construct these improvements by November 13, 2019 as part of the Bowers Hill Interim Improvements Project (UPC 112897) to provide short-term operational benefits along NB I-664 in the interchange. These improvements are considered as part of the existing and No-Build condition for the Bowers Hill Interchange Improvements Study.</p>
Concept A	Bowers Hill Interchange Improvements Study	<p>Similar to Concept A2, this concept was modeled for the 2040 design year and it was determined through the evaluation process that it would no longer provide sufficient operational benefits by 2040. This concept also does not address the existing mainline weave condition which affects safety. Therefore, this concept does not address the long-term solution and goal of improving operational deficiencies, capacity and congestion, and safety in the broader interchange area for the major movements and was eliminated as a potential Build Alternative for this study.</p>
Concept B	VDOT Operational Analysis - 2018	<p>The Concept does not address the operational deficiencies, capacity and congestion, and safety needs in the broader interchange area for the major movements including between I-64 to I-664 and U.S. Route 460/58/13 and I-264. In the 2040 design year, this concept does not provide sufficient capacity to accommodate the projected travel demand, and it does not provide any improvements along SB I-664.</p> <p>Therefore, independently, the concept does not provide a long-term solution to the needs identified in the Study Area. Improvements proposed with this concept are either incorporated into the existing and No-Build conditions (Concept A2) or incorporated into another potential improvement (Concept E).</p>

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Concept	Source	Justification
Concept C	Bowers Hill Interchange Improvements Study	<p>The improvements would provide additional capacity, as well as acceleration length and weaving room for traffic entering NB I-664 from WB U.S. Route 58 and would reduce congestion and improve operations by separating the current weave in the center of the interchange and providing dedicated lane assignments for some movements. However, this concept was eliminated from detailed study as a potential Build Alternative, as the improvements proposed do not provide a long-term solution for improving operations of the overall interchange (no added capacity from EB I-64 to NB I-664 or along SB I-664), nor does it eliminate the mainline weaving movements. In the 2040 design year, this concept does not provide sufficient capacity to accommodate the projected travel demand.</p> <p>Therefore, this concept was eliminated from detailed study as it does not address the long-term solution and goal of improving operational deficiencies, congestion, and safety in the broader interchange area for the major movements.</p>
Concept F	Bowers Hill Interchange Improvements Study	<p>This concept would improve operations by optimizing lane balance, reducing weave conflicts, and separating major through movements. However, the concept was eliminated from detailed study as it would have provided similar transportation benefits as Concept E but would require a long flyover bridge with a less than desirable design speed. This concept would also have a greater potential for private property impacts and would increase vehicles miles travelled through the interchange (due to the longer ramp length from EB I-64) without significant operational benefits.</p>
Concept H	Bowers Hill Interchange Improvements Study	<p>This concept would improve operations by optimizing lane balance, reducing weave conflicts, and separating major through movements. However, it would eliminate many local access connections and would be more impactful to private properties than other concepts being considered. This concept also bisects the northern portion of the Sunray Agricultural Historic District, located north, and south of Sondej Avenue in Chesapeake. Local traffic would be diverted to adjacent interchanges and these changes in traffic patterns at adjacent interchanges, and parallel roadways, would be significant, resulting in capacity improvements that would be required beyond the Study Area. For these reasons the concept was eliminated from detailed study in the EA.</p>

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2.2 CURRENT STUDY CONCEPTS

Six concepts were eliminated during the preliminary screening (**Table 2-1**). The three remaining concepts were presented to the Participating, Cooperating, and Concurring agencies on August 8, 2018 in accordance with the study's agency-approved coordination plan and to the public for consideration and comment at the study's Citizen Information Meeting (CIM) held on August 22, 2018. These included:

- Optimize Lane Balance (i.e. Concept D)
- Eastbound and Westbound U.S. Route 58 Braided Ramps (i.e. Concept E)
- Full Interchange Reconstruction (i.e. Concept G)

Following the CIM, VDOT compiled and considered the written and oral comments provided by the public, and further refined the three concepts prior to an agency meeting held on October 10, 2018. VDOT recommended to the federal Concurring Agencies at the meeting that only two Build Alternatives, Eastbound and Westbound U.S. Route 58 Braided Ramps (Concept E) and Full Interchange Reconstruction (Concept G), be carried forward for detailed study in the EA as only they would achieve all three elements of the Purpose and Need detailed in the *Alternatives Technical Report* and summarized in **Table 2-2**.

VDOT recommended that the Optimize Lane Balance concept (Concept D) not be retained for further analysis due to its inability to address the specified operational deficiency need (mainline weave condition) in the Study Area. As detailed in **Section 1.4.2**, conflict occurs between weaving and mainline vehicles in the merging, diverging, and weaving segment located in the middle of the interchange, thus affecting existing (**Section 1.4.3**) and predicted future safety conditions (**Section 1.5.3**). As the Optimize Lane Balance concept does not separate the weaving movements along the mainline, the federal Concurring Agencies provided concurrence on October 10, 2018, eliminating the Optimize Lane Balance alternative from consideration and carrying forward the two remaining Build Alternatives, and a No-Build Alternative, for detailed analysis.

Table 2-2: Ability of Concepts to Meet Purpose and Need Elements

Concept	Operational Deficiencies	Improve Safety	Congestion and Capacity
Optimize Lane Balance	No	Yes	Yes
Eastbound and Westbound U.S. Route 58 Braided Ramps	Yes	Yes	Yes
Full Interchange Reconstruction	Yes	Yes	Yes

2.3 ALTERNATIVES EVALUATED IN THIS EA

The Build Alternatives were developed based on the AASHTO *Policy on the Geometric Design of Highways and Streets* (AASHTO, 2011a), the *Road Design Manual* (VDOT, 2018b), *2016 Road and Bridge Standards* (VDOT, 2016), *Manual of the Structure and Bridge Division* (VDOT, 2018c), *A Policy on Design Standards Interstate System* (AASHTO, 2016), and the *Roadside Design Guide* (AASHTO, 2011b). Structural design parameters guided the design of new structures, or replaced structures, near the existing CSX and Norfolk Southern rail lines based on standard minimum vertical clearance requirements for railroads. Mainline and interchange geometric design guidelines used in the development of alternatives are provided in greater detail in the *Alternatives Technical Report* (VDOT, 2019b).

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The two retained Build Alternatives include a variety of elements that contribute to the typical section and create the complete end-to-end alternatives including the roadway design and structure modifications. Several roadside design options were considered for the Build Alternatives including a full open section with a 6-to-1 slope, a guardrail section with 2-to-1 slope, and a retaining wall section. These planning-level design requirements are preliminary and will be evaluated further during final design and construction. The roadside design options were applied to the proposed alternatives based on the existing roadside conditions and constraints. If remaining in use, existing roadways were generally widened to the outside, while sections of new roadways were located in the median where feasible.

2.3.1 No-Build Alternative

In accordance with the implementing regulations for NEPA (40 Code of Federal Regulations [CFR] § 1502.14(d)), the No-Build Alternative has been retained for detailed study and serves as a benchmark for comparison with the Build Alternatives. The No-Build Alternative would retain the existing configuration of the Bowers Hill Interchange including access roads and ramps as described in the *Alternatives Technical Report* (VDOT, 2019b). Only planned maintenance improvements, and those proposed independently by VDOT (Concept A2), would occur within the Study Area. Existing conditions are shown on **Figure 2-1**. Typical sections under the No-Build scenario are provided on **Figure 2-2**.

2.3.2 Alternative 1: Eastbound and Westbound U.S. Route 58 Braided Ramps

Alternative 1 would retain much of the existing infrastructure, all local access connections, and widen existing I-664 in both directions within the Study Area. These improvements would provide additional lanes and barrier separation of movements between U.S. Route 58, I-664, I-264, and I-64 at existing weave/merge conflict points within the main interchange area. In the SB direction of I-664 the continuous auxiliary lane would be included between Dock Landing Road and the WB U.S. Route 58 exit ramp. In the NB direction, the additional (third) lane continuing to NB I-664 would tie into the new auxiliary lane from the WB U.S. Route 58 entrance ramp to Dock Landing Road, which is being constructed under a separate project, creating a lane drop at the Dock Landing Road interchange. Widening of existing roadways would provide room for additional travel lanes and barrier within the main interchange, new ramps, and modifications to existing ramps would further reduce conflict points and improve operations.

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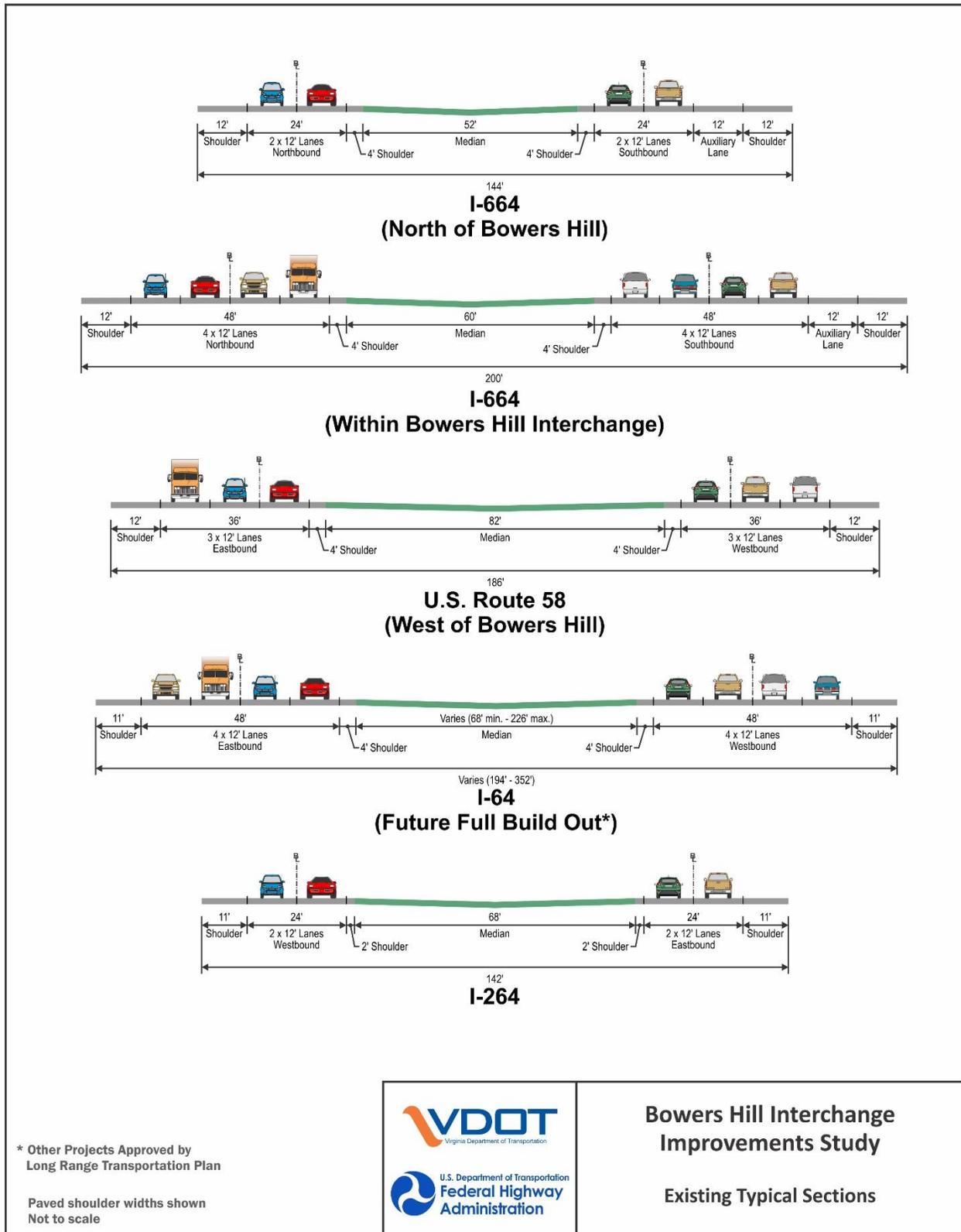
Figure 2-1: Existing Conditions



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Figure 2-2: Existing Typical Sections



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In the NB direction, the existing two-lane ramp from I-64 to I-664 would remain and a new single lane flyover ramp would be constructed to the right of the existing ramp, separated by barrier, providing access to EB U.S. Route 58. A new single lane ramp from WB I-264 to NB I-664 would be constructed parallel to but separate from the ramps from I-64 in the main portion of the interchange. NB and WB traffic would be separated by barrier. The ramp from Airline Boulevard to NB I-664 would remain. Eastbound the existing U.S. Route 58 ramp would become a two-lane barrier separated roadway through the interchange with direct ramp connections to EB I-264 and WB I-64. Traffic from EB U.S. Route 58 would access Airline Boulevard by following U.S. Route 460 to South Military Highway. A new flyover ramp would be constructed from EB U.S. Route 58 to EB I-264. Existing local access from U.S. Route 58 to South Military Highway would be maintained. Alternative 1 is depicted on **Figure 2-3**. Alternative 1 Typical Sections are shown on **Figure 2-4**.

The existing two-lane section of I-264 would split with one lane (inside) providing a barrier separated direct connection to NB I-664, the other lane (outside) would provide barrier separated access to WB U.S. Route 58 by using the existing ramp at Exit 13A. Proposed lane and ramp additions for Alternative 1 include:

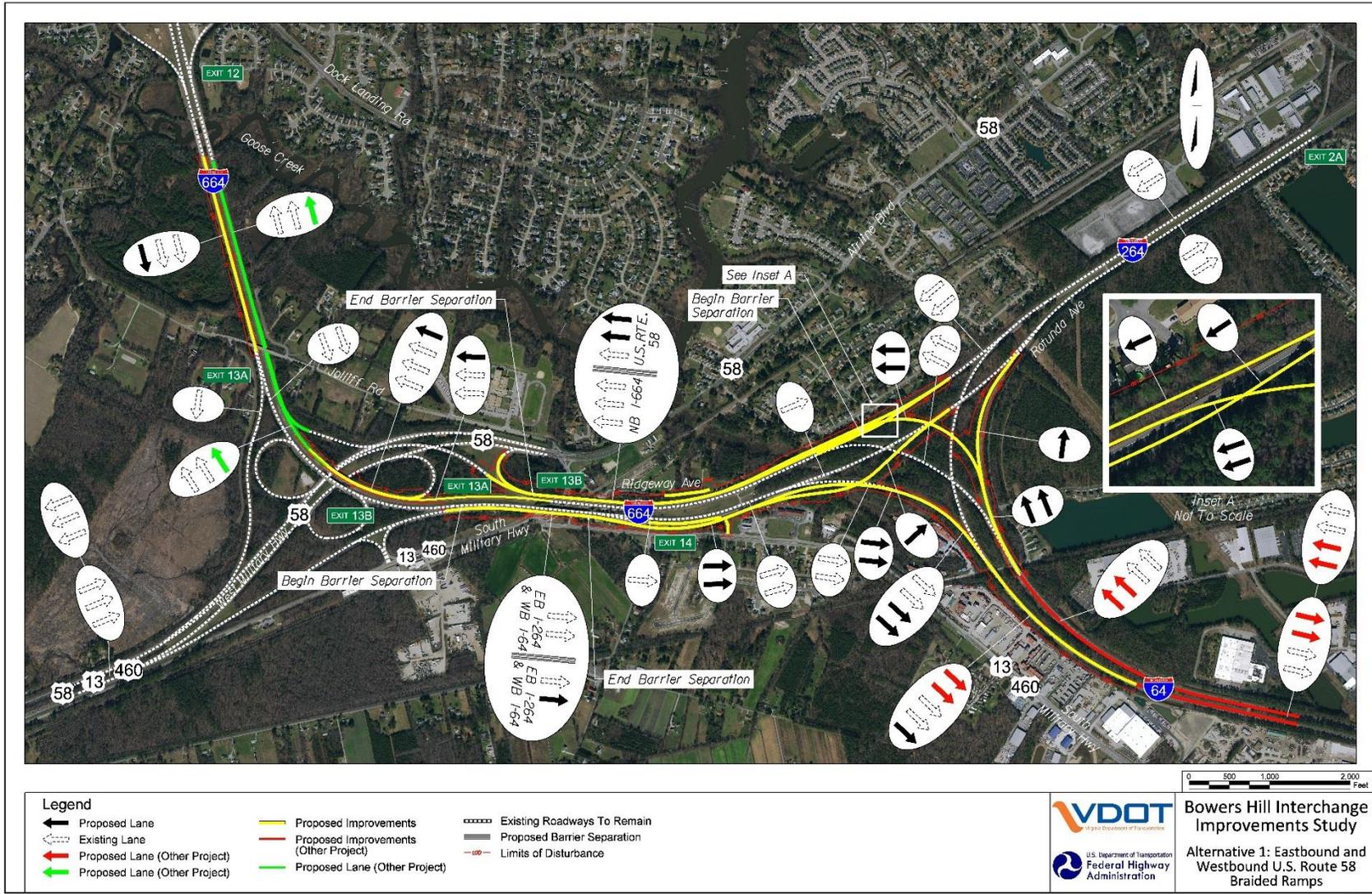
- Extend the auxiliary lane along SB I-664 from Dock Landing Road to WB U.S. Route 58 exit ramp (2,500 LF);
- Extend the auxiliary lane along NB I-664 from the EB U.S. Route 58 entrance ramp to the current VDOT improvements NB to Dock Landing Road (1,000 LF);
- Widen to barrier separate existing EB U.S. Route 58 and SB I-664 (1,800 LF);
- Add a two-lane braided ramp from EB U.S. Route 58 to WB I-64 (4,500 LF);
- Add a one-lane ramp from the U.S. Route 58 two-lane braided ramp to EB I-264 (2,800 LF);
- Widen to add one-lane on WB I-64 (3,700 LF);
- Reduce the existing SB I-664 to EB I-264 ramp to one-lane (2,100 LF);
- Add a two-lane braided ramp from EB I-64 to U.S. Route 58 (4,200 LF);
- Realign the EB I-64 to EB I-264 ramp (1,700 LF);
- Add a one-lane ramp from WB I-264 to U.S. Route 58 (3,000 LF);
- Add a one-lane ramp from WB I-264 to NB I-664 (1,800 LF);
- Widen to barrier separate NB I-664 from U.S. Route 58 from the WB I-64 merge to the WB U.S. Route 58 exit ramps (3,200 LF); and
- Realign Ridgeway Avenue (800 LF).

Illustrative planning level design for Alternative 1 is provided in the plan sheets (**Appendix A**).

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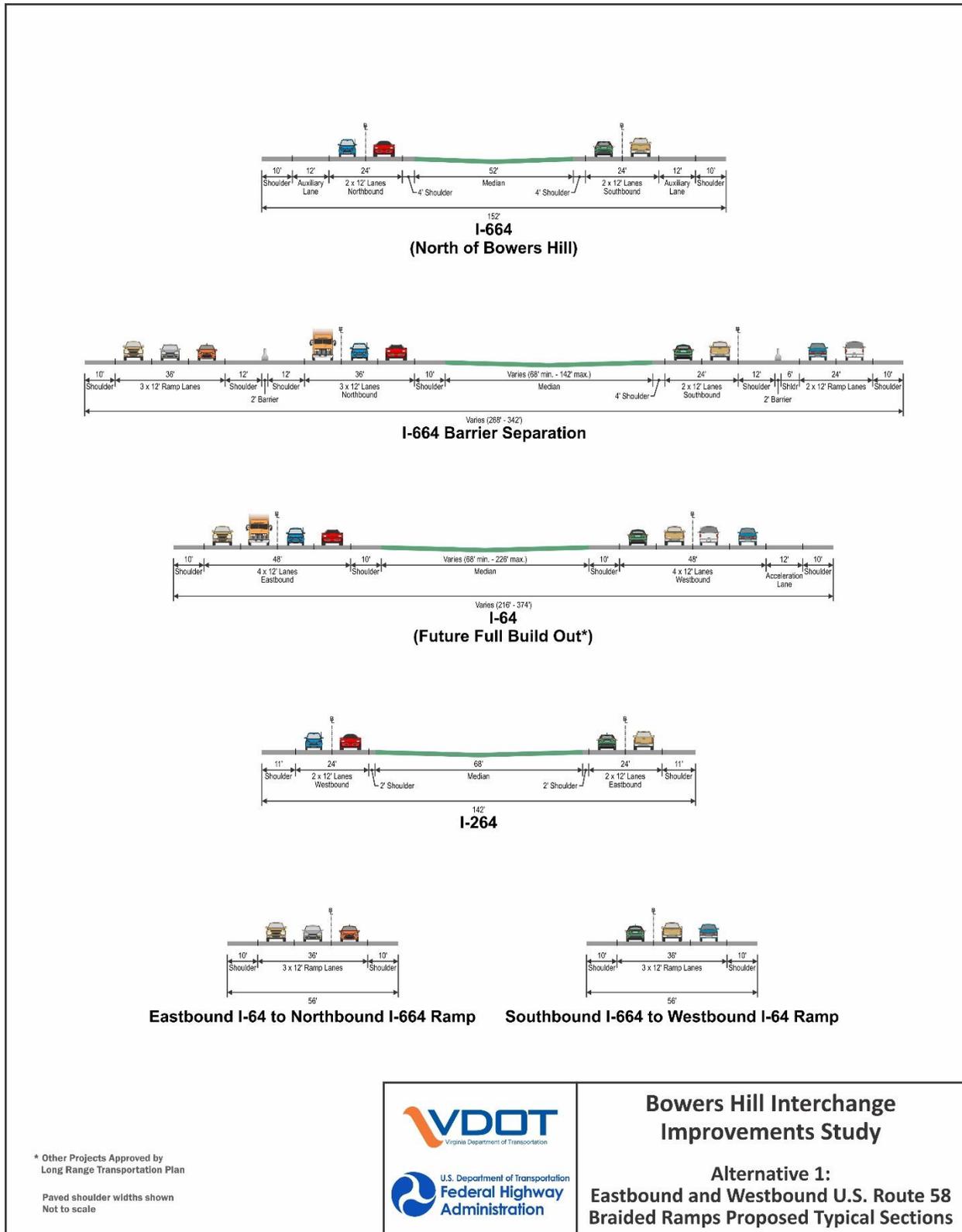
Figure 2-3: Alternative 1: Eastbound and Westbound U.S. Route 58 Braided Ramps



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Figure 2-4: Alternative 1: Eastbound and Westbound U.S. Route 58 Braided Ramps Proposed Typical Sections



* Other Projects Approved by Long Range Transportation Plan
Paved shoulder widths shown
Not to scale



Bowers Hill Interchange Improvements Study
Alternative 1:
Eastbound and Westbound U.S. Route 58 Braided Ramps Proposed Typical Sections

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2.3.3 Alternative 2: Full Interchange Reconstruction

Alternative 2 includes the development of braided ramps similar to Alternative 1; however, it would provide additional barrier separation of major movements by realigning NB I-664 within the main interchange area. As a result, a significant portion of existing NB I-664 would not be utilized in this design and some local movements would be redirected or eliminated. In the SB direction of I-664 the continuous auxiliary lane would be included. In the NB direction, the additional (third) lane continuing to NB I-664 would tie into the new auxiliary lane from the WB U.S. Route 58 entrance ramp to Dock Landing Road, which is being constructed under a separate project. Functionally, this would create a lane drop at the Dock Landing Road interchange. Additional travel lanes and barrier would be added within the main interchange to separate traffic from SB I-664 and EB U.S. Route 58 to WB I-64 and EB I-264, respectively. The existing ramp from SB I-664 to WB I-64 would be widened to three lanes.

In the NB direction, the existing ramp from I-64 to I-664 would be reconstructed/widened to three lanes and would come in on the right of a new two-lane ramp from WB I-264. A new single lane ramp from WB I-264 to NB I-664 would be constructed parallel but separate from the three-lane ramp from I-64. In the main portion of the interchange, NB and WB traffic would be separated by barrier with slip ramps providing access from I-64 to WB U.S. Route 58 and Airline Boulevard (via NB I-664). The ramp from Airline Boulevard to NB I-664 would be realigned. Eastbound U.S. Route 58 would be realigned as a new two-lane roadway that would be barrier separated through the interchange with a direct connection to EB I-264. Traffic from EB U.S. Route 58 would access Airline Boulevard by following U.S. Route 460 to South Military Highway. The existing two-lane ramp from EB U.S. Route 58 to SB I-664 would provide one lane to WB I-64 and the second lane would be dropped at the realigned exit ramp to South Military Highway. A new flyover ramp would be constructed from EB U.S. Route 58 to I-664 NB. Existing local access from U.S. Route 58 to South Military Highway would be maintained. Alternative 2 is depicted on **Figure 2-5**. Alternative 2 Typical Sections are shown on **Figure 2-6**.

I-264 WB would be realigned to provide a new two-lane ramp with direct access to WB U.S. Route 58. The existing two-lane section of I-264 would split with one lane on new parallel alignment through the main interchange with a direct connection to NB I-664, the other lane would split off to a new one-lane flyover ramp with direct access to WB I-64. Proposed lane and ramp additions for Alternative 2 include:

- Extend the auxiliary lane along SB I-664 from Dock Landing Rd. to WB U.S. Route 58 exit ramp (2,500 LF);
- Realign and construct U.S. Route 58 EB and WB between I-664 and I-264 (8,800 LF);
- Construct a new one-lane flyover ramp from EB U.S. Route 58 to NBI-664 (5,100 LF);
- Widen and reconstruct SB I-664 to provide barrier separated lanes adjacent to realigned EB U.S. Route 58 (7,200 LF);
- Realign and construct the SB I-664 exit to South Military Highway (1,300 LF);
- Widen to add one lane to the ramp from SB I-664 to WB I-64 (3,200 LF);
- Widen to add one lane to the ramp from EB I-64 to NB I-664 (3,000 LF);

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- Realign and construct three lanes of NB I-664 from the EB I-64 to NB I-664 ramp to the Jolliff Road overpass (8,100 LF);
- Construct a new one lane flyover ramp from WB I-264 to WB I-64 (3,500 LF);
- Construct a new one lane ramp from WB I-264 to NB I-664 (2,900 LF);
- Realign and construct the NB I-664 to Airline Boulevard exit ramp (2,000 LF);
- Realign and construct a single lane ramp from WB U.S. Route 58 to NB I-664 (1,400 LF);
- Restripe the existing ramp from Airline Boulevard to WB U.S. Route 58 to one-lane (2,200 LF); and
- Realign Ridgeway Avenue (1,500 LF).

The following indirect local access connections would be eliminated with this alternative:

- Airline Boulevard to EB I-264 via Military Highway and SB I-664; and
- S. Military Hwy to EB I-264.

The following local access connections would be redirected with access being gained via South Military Highway:

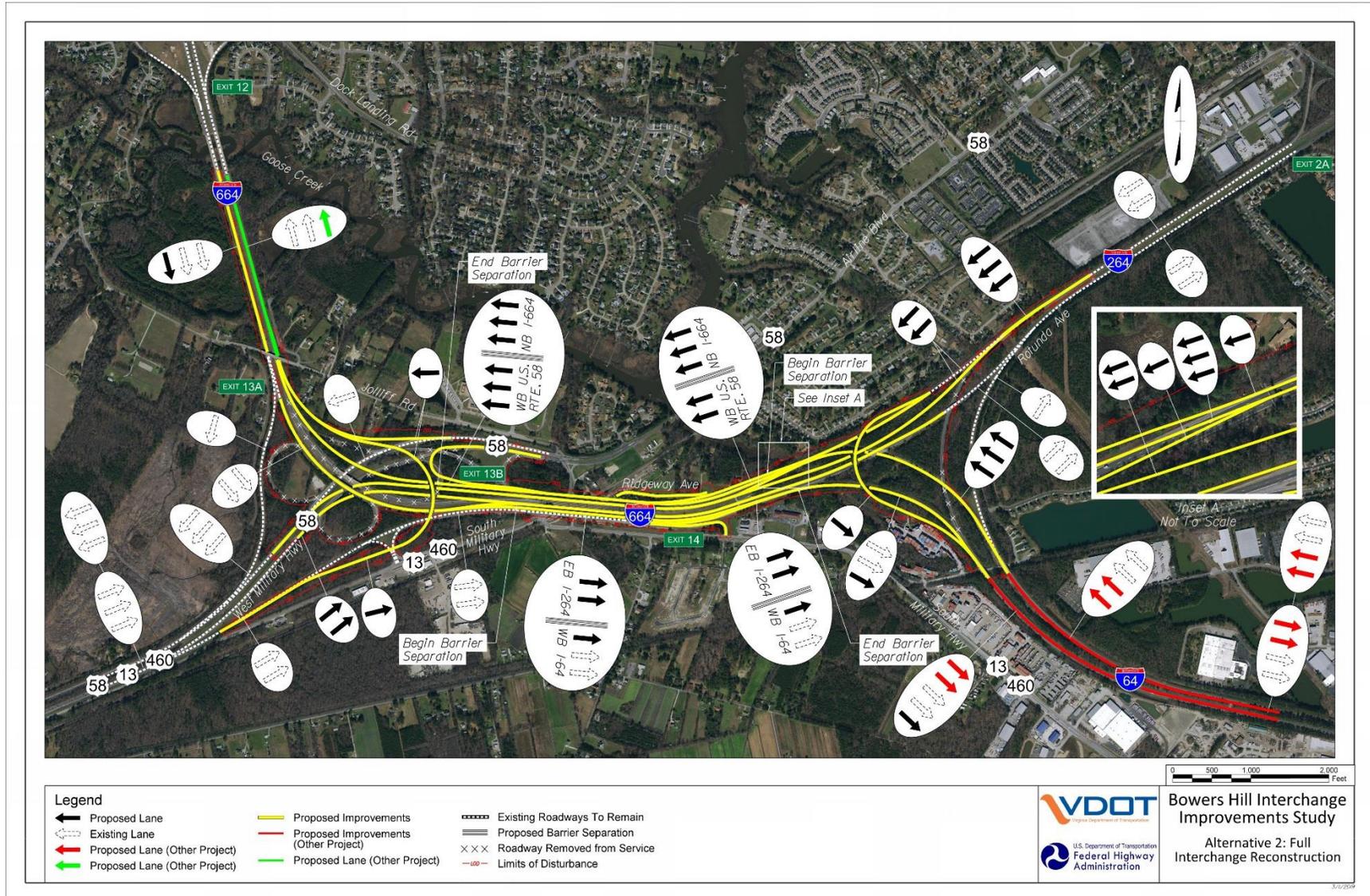
- EB U.S. Route 58 to Airline Boulevard;
- SB I-664 to Airline Boulevard; and
- Airline Boulevard to WB I-64.

Illustrative planning level design for Alternative 2 is provided in the plan sheets (**Appendix A**).

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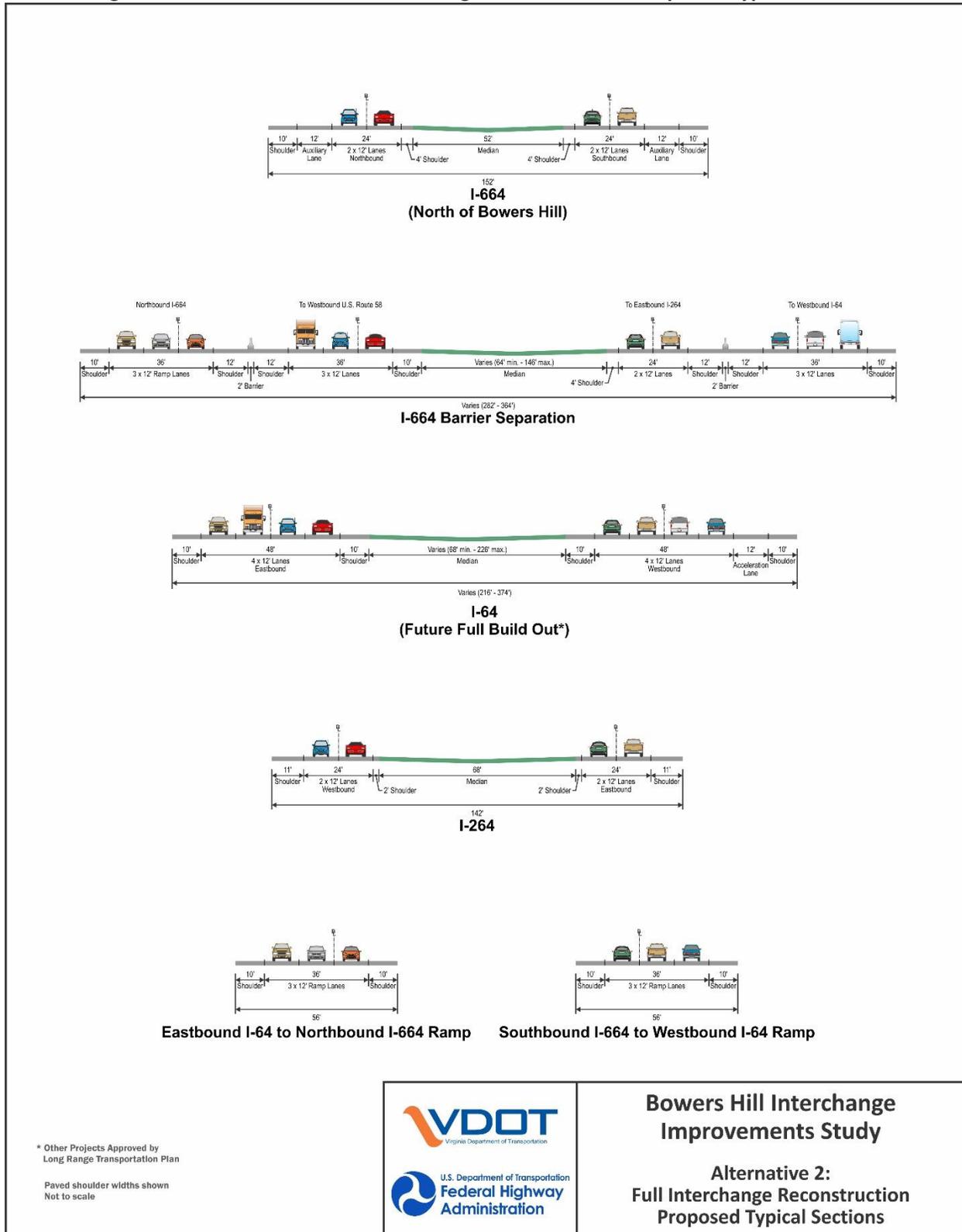
Figure 2-5: Alternative 2: Full Interchange Reconstruction



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Figure 2-6: Alternative 2: Full Interchange Reconstruction Proposed Typical Sections



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2.4 LIMITS-OF-DISTURBANCE

A planning-level Limit of Disturbance (LOD) was developed for each Build Alternative based on the cross-section limits of construction (cut/fill) and the roadside design options as described in. The LODs are based on planning-level engineering and design which accommodates potential temporary and permanent impacts, and construction access. The LODs for this study also encompass 30 feet from the limits of construction. The LODs have been used to quantify environmental impacts and serve as the proposed right-of-way line when located outside of existing right-of-way. For the purposes of this analysis, it was assumed that land and water resources within the entirety of each LOD would be impacted and no distinction was made to differentiate between which improvements would be on structure (potentially reducing impacts) and which would be on cut/filled ground.

Detailed stormwater management (SWM) plans have not been completed as part of the NEPA effort for this study and would occur during final design. The LOD includes a buffer beyond the proposed construction limits where SWM facilities may be placed. Additional activities and features that could occur beyond the LOD include: signage; maintenance of traffic activities; noise barriers (placement determined by final design noise analysis); and detailed SWM design. The noise analysis contained in this EA was conducted in accordance with 23 CFR 772 using planning level design data. Final design traffic data would inform more detailed noise analysis during the final design and permitting phases of the study, after the issuance of a NEPA decision from FHWA. Final noise analysis would dictate the final selection and placement of noise barriers that may fall outside of the NEPA LOD. If final design includes noise barriers outside the NEPA LOD, subsequent studies would be required. During final design, noise barriers may not be included beyond the area of proposed roadway improvements. All roadside design values meet VDOT and AASHTO design standards.

2.5 COST ESTIMATES

Preliminary construction cost estimates for the two Build Alternatives were initially developed using the VDOT Project Cost Estimating System (PCES), Version 8.00 for the roadway and Version 1.2 for the bridges. Due to the complex nature of the project, and as the design was further refined, it was determined that the construction cost should be estimated by using major item costs developed from the Open Roads models. Additional information, including the spreadsheets, can be found in Appendix C of the *Alternatives Technical Report* (VDOT, 2019a).

In addition to construction costs, the estimated costs for the anticipated right-of-way and utilities needed for each Build Alternative were developed using PCES. The anticipated right-of-way costs assumed that the parcels would fall in the Rural density category. Assumptions also included that property access would be affected; therefore, right-of-way negotiations include complete and partial acquisitions along with relocations. More detailed information on right-of-way is provided in **Section 3.2**.

The utility cost is based on current aerial photography and Geographic Information Service (GIS) information. Assumptions were made to include costs for certain utilities such as power poles and lines, communications, water lines, sewer lines, and gas lines. A summary of the estimated project cost for each Build Alternative is provided in **Table 2-3**.

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Table 2-3: Total Project Cost Estimates

Cost Estimate Element	Alternative 1	Alternative 2
Preliminary Engineering	\$25,046,000	\$36,254,500
Right-of-Way and Utilities	\$25,403,000	\$17,805,000
Construction Cost	\$399,633,463	\$578,490,700
Total Project Estimate (2032)	\$450,082,463	\$632,550,200

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Chapter 3

Existing Conditions and Environmental Consequences



3 EXISTING CONDITIONS & ENVIRONMENTAL CONSEQUENCES

This chapter contains the existing environmental conditions of the resources in the Study Area and potential impacts (environmental consequences) of the No-Build and Build Alternatives. The methods used for this analysis are defined in the respective technical report for each section of this chapter. The human and natural environmental resources were identified to analyze how the proposed alternatives could potentially affect the environment. The discussion in this chapter is limited to the data, information, and issues that would have a bearing on possible impacts and those needed for the identification of a preferred alternative.

As discussed in **Section 1** and shown on **Figure 1-1**, the Study Area has been developed as the area surrounding the roadways that comprise the Bowers Hill Interchange. The Study Area is large enough to encompass potential interchange improvement alternatives; this does not imply that impacts would occur to the entirety of the Study Area. The impacts presented in this chapter have been estimated using the LOD for each Build Alternative (see **Section 2.4** for more detail). The LOD includes the area that would be permanently impacted by the improvements plus an additional 30 feet to account for potential temporary impacts during construction. The LOD is based on planning level engineering and would be refined during more detailed levels of design that would follow the FHWA NEPA decision. **Table 3-1** provides a summary of the impacts by alternative. More detailed information is provided, by resource, in this section and in the technical reports that have been prepared for this Study.

Table 3-1: Impacts Summary Matrix

Resource	No-Build Alternative	Alternative 1	Alternative 2
Land Use Conversion (percent)¹	0	100%	100%
Residential	0	17.7%	21.6%
Commercial	0	1.3%	0.1%
Industrial	0	41.8%	22.7%
Open Space	0	39.2%	55.6%
Right-of-Way (acres)	0	8.8	17.9
Residential	0	2.6	4.6
Commercial	0	0.2	<0.1
Industrial	0	1.7	1.7
Open Space	0	4.3	11.6
Other	0	0	<0.1
Potential Residential Relocations	0	11	2
Potential Commercial Relocations	0	3	0
Census Block Groups with Environmental Justice Populations Present (#)	0	3	3

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Resource	No-Build Alternative	Alternative 1	Alternative 2
Conservation Site (acres)	0	0	0.6
Forested Area (acres)	0	53.2	109.9
Threatened and Endangered Species Habitat (acres)	0	55.2	111.9
<i>NLE Bat Habitat</i>	0	53.2	109.9
<i>Canebrake Rattlesnake Habitat</i>	0	2.0	2.0
River Basins (acres)	0	111.1	210.6
Navigable Waters (linear feet)	0	530	504
Wetlands (acres)	0	7.8	31.7
Streams (linear feet)	0	4,101	2,795
Tidal Waters (acres)	0	<0.1	<0.1
Other Waters (acres)	0	1.0	1.9
Floodplains (acres)	0	9.7	8.7
100-Year	0	5.0	4.5
500-Year	0	4.7	4.2
Prime Farmland Soils (acres)	0	2.3	15.4
Air Quality	Minor Short-term Impacts		
Impacted Noise Receptors (#) ²	72	53	70
Potential Hazardous Materials Sites (#)	0	7	4

1. Land use information is presented as the percentage of the overall area to be converted from its present use. For more information see **Section 3.4**.
2. Denotes the number of receptors that approach or exceed the FHWA Noise Abatement Criteria.

3.1 COMMUNITIES AND COMMUNITY FACILITIES

The methodology for assessing communities and community facilities along with greater detail on existing conditions, environmental consequences, and potential mitigation are provided in the *Bowers Hill Interchange Improvements Study Socioeconomic, Land Use, and Right-of-Way Technical Report* (VDOT, 2019c).

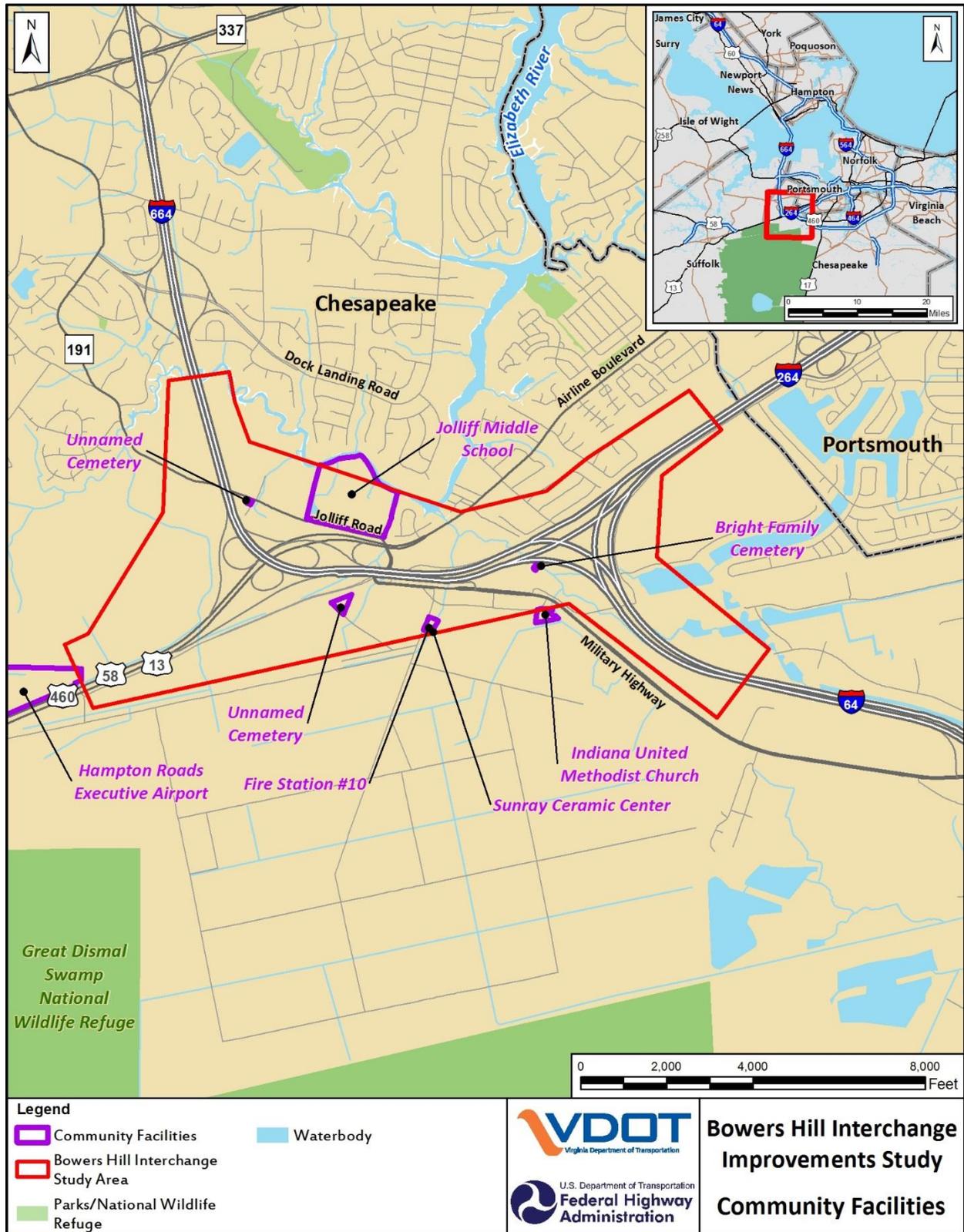
3.1.1 Existing Conditions

Residential communities within the Bowers Hill area are concentrated in the northern and eastern part of the Study Area (see **Figure 3-1**). Residential access along the Study Area roadways is limited due to the majority of roads being interstates. There are residences along portions of South Military Highway, Homestead Road, Indiana Avenue, Jolliff Road, and Ridgeway Avenue. Additionally, the community of Colonial Point is located in the center and northeastern portion of the Study Area. Colonial Point neighborhood access is provided from Airline Boulevard and other local roadways.

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Figure 3-1: Community Facilities



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Eight community facilities including one school, one fire station, one community center, one church, three cemeteries, and one airport were identified in the Study Area and are listed in **Table 3-2** and shown on **Figure 3-1**.

Table 3-2: Community Facilities

Facility	Location/Address
Jolliff Middle School	1021 Jolliff Rd
Fire Station # 10	629 Homestead Rd
Sunray Ceramic Center	621 Homestead Rd
Indiana United Methodist Church	4505 Indiana Ave
Bright Family Cemetery ¹	Rotunda Ave
Unnamed Cemetery	Jolliff Rd
Unnamed Cemetery	Seldon Rd
Hampton Roads Executive Airport	5164 W Military Hwy

¹ The Bright Family Cemetery is located on private property and is not accessible by the public.

3.1.2 Environmental Consequences

3.1.2.1 No-Build Alternative

The No-Build would not result in any project related construction and would therefore not impact any communities, community facilities, or community cohesion surrounding the Bowers Hill Interchange.

3.1.2.2 Alternative 1

The Bright Family Cemetery is located within the LOD of Alternative 1 but would not be directly impacted by the improvements. The proposed new ramp adjacent to the cemetery is on structure and would bridge the cemetery property. The location of the one known grave is not within the LOD. Additionally, a retaining wall has been added to the outside of the ramp to reduce the extent of cut/fill needed to construct the roadway. This cemetery is not accessible by the public.

Implementation of Alternative 1 would not create new physical barriers that would hinder community interaction. The proposed improvements, including new access ramps, would be constructed within the existing transportation right-of-way or newly acquired undeveloped portions of parcels located directly adjacent to the current roadways that comprise the Bowers Hill Interchange. Furthermore, the enhanced operations of the interchange would improve the efficiency of weaving conditions, traffic operations, and transitions throughout the interchange which would improve both safety and congestion by reducing cut through traffic on local roads. Based on these factors, Alternative 1 would not adversely impact community connectivity or cohesion.

3.1.2.3 Alternative 2

Under Alternative 2 no community facilities would be impacted. Like Alternative 1, there would be no new physical barriers that would adversely impact community connectivity or cohesion. Improvements are located within or adjacent to existing transportation facilities and would not create new physical barriers that would hinder community interaction. Furthermore, the enhanced operations of the interchange would improve the efficiency of weaving conditions, traffic operations, and transitions throughout the interchange which would improve both safety and congestion by reducing cut through traffic on local roads.

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3.2 RIGHT-OF-WAY

Property impacts are classified as either partial or total acquisitions:

- Total Acquisition: This occurs when any of the following criteria are met:
 - A portion of the primary structure is impacted;
 - Access is cut off;
 - 50 percent or more of the overall property is acquired;
 - Property is bisected by the proposed improvement; or
 - Proposed improvement comes within twenty feet of the primary structure.
- Partial Acquisition: This occurs when a portion of a parcel is acquired, and that portion does not include a primary structure.

More detailed information on population, housing and right-of-way is provided in the *Socioeconomic, Land Use, and Right-of-Way Technical Report* (VDOT, 2019c).

3.2.1 Existing Conditions

The Study Area contains portions of six U.S. Census block groups (see **Figure 3-2**). The Study Area block groups contain a population of 12,397 people in several communities and neighborhoods. Area neighborhoods are shown on **Figure 3-3**. A total of 572 residential parcels are located within the Study Area. Assuming each residential parcel has at least one home associated with it, this comprises 12 percent of the total housing units in the study Census block groups.

The calculated existing right-of-way is based on the parcel data collected from the City of Chesapeake (Chesapeake, 2017b). The areas without parcel classification, and which lined up with the general area of roadways, were included as a part of the existing Bowers Hill Interchange right-of-way. There are approximately 575 parcels within the Bowers Hill Interchange Study Area.

3.2.2 Environmental Consequences

3.2.2.1 No-Build Alternative

The No-Build Alternative would not result in any project related construction and would therefore not impact population, housing, or right-of-way.

3.2.2.2 Alternative 1

Alternative 1 would impact 38 parcels totaling 9.1 acres. The majority of the impacted acreage is open space. Property impacts by alternative are provided in **Table 3-3**.

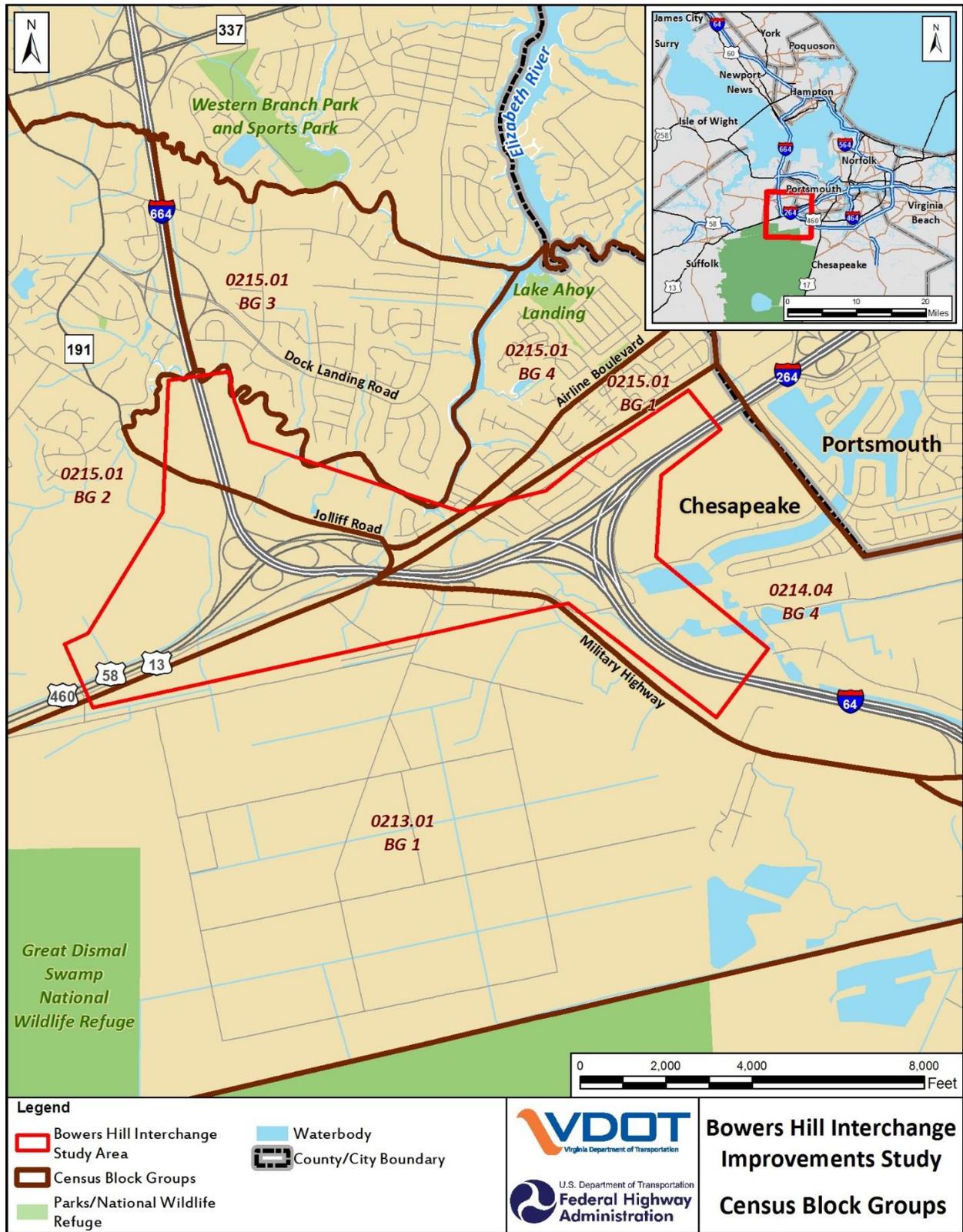
Of the 15 residential properties that would be impacted, 11 would require relocations. The majority of the impacted properties are located along Spring Meadow Crescent in the Cedar Grove Acres neighborhood.

Property impacts in the Study Area would be further assessed and potentially minimized during final design phases of the study. There will be ongoing coordination with area property owners to prevent or minimize short- and long-term disruptions.

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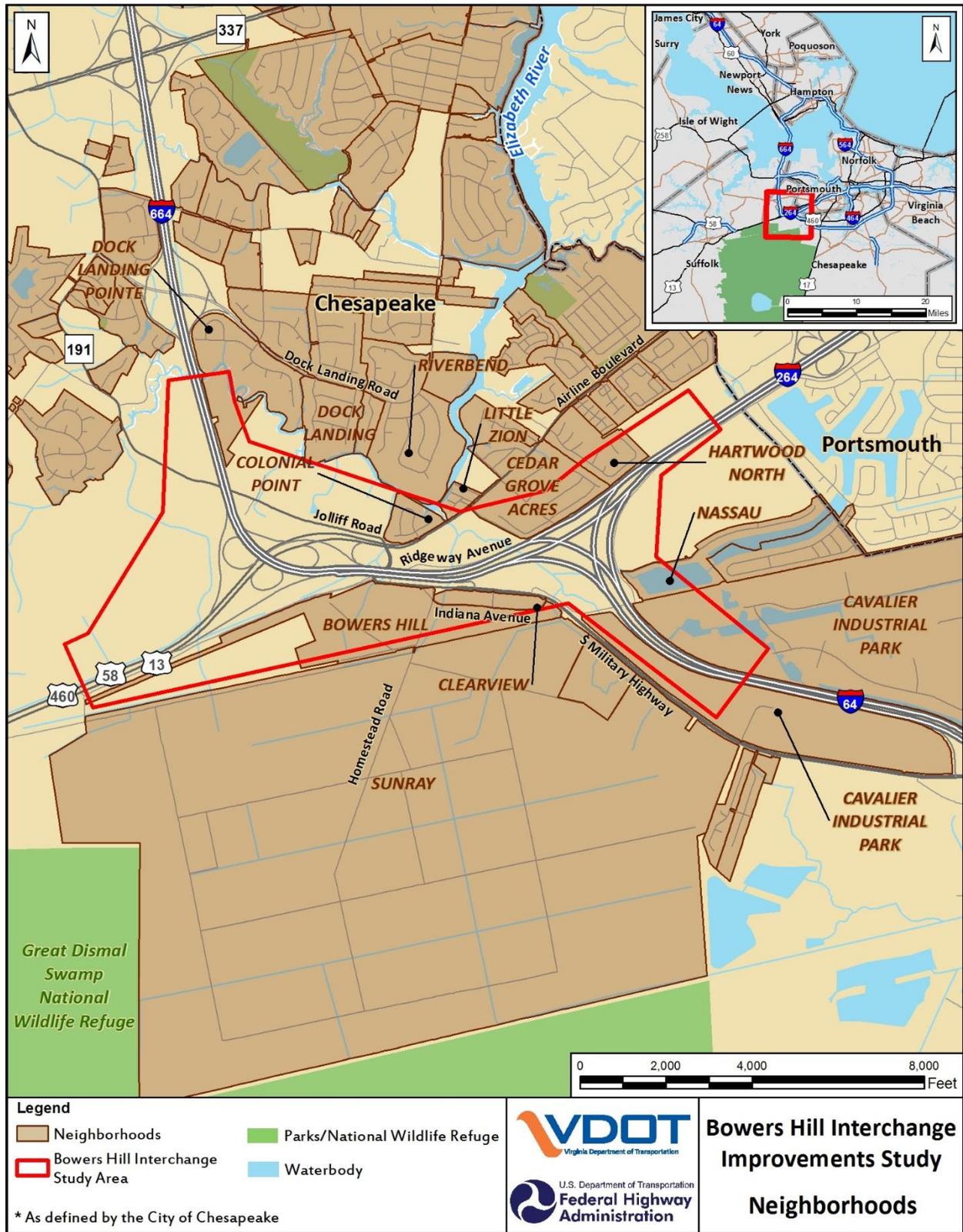
Figure 3-2: Study Area Census Block Groups



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Figure 3-3: Neighborhoods



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Table 3-3: Property Impacts

Property Type	No-Build Alternative	Alternative 1 (number/acres)	Alternative 2 (number/acres)
Commercial/Industrial	0	8 / 1.9	2 / 1.7
Open Space	0	15 / 4.3	13 / 11.6
Residential	0	15 / 2.6	19 / 4.6
Other	0	0 / 0	1 / <0.1
Total	0	38 / 8.8	35 / 17.9
Residential Relocations	0	11	2
Commercial/Industrial Relocations	0	3	0

3.2.2.3 Alternative 2

Property impacts for Alternative 2 are shown in **Table 3-3**. Alternative 2 would impact 35 parcels totaling 17.9 acres. Like Alternative 1, the majority of the impacted acreage is open space. Alternative 2 would result in impacts to 19 residential properties totaling 4.6 acres; two of these properties would require relocations. The majority of the impacted properties are located along Spring Meadow Crescent in the Cedar Grove Acres neighborhood.

Property impacts in the Study Area would be further assessed and potentially minimized during final design phases of the study. There will be ongoing coordination with area property owners to prevent or minimize short- and long-term disruptions.

3.2.2.4 Mitigation

All affected property owners would be compensated for the fair market value of the acquired portion of land and any structures acquired for the construction of the Preferred Alternative. Additionally, any individual, family, business, or non-profit organization relocated as a result of the acquisition of real property is eligible to receive reimbursement for the fair market value of property acquired, as well as moving costs. This process is known as relocation assistance. In accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (as amended, 1987), relocated property owners would be provided relocation assistance advisory services together with the assurance of the availability of decent, safe, and sanitary housing. Relocation resources would be made available to all relocated people.

Currently, there appears to be adequate available housing surrounding the Study Area given the difference between total housing units and total occupied housing units identified in the *Socioeconomic, Land Use, and Right-of-Way Technical Report* (VDOT, 2019c).

3.3 ECONOMIC RESOURCES

The methodology for assessing economic resources along with greater detail on existing conditions, environmental consequences, and potential mitigation are provided in the *Socioeconomic, Land Use, and Right-of-Way Technical Report* (VDOT, 2019c).

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3.3.1 Existing Conditions

According to American Community Survey (ACS) five-year data, Virginia and City of Chesapeake, all have an estimated 65-66 percent of individuals in the labor force. Within the block groups that comprise the Study Area, the highest employment proportion is 83.3 percent in Block Group 215.01.1, and the lowest is 52.8 percent in Block Group 213.01.1. According to the Chesapeake City Community Profile (VEC, 2018), the largest employers within the City of Chesapeake are the Chesapeake City Public School Board, City of Chesapeake, Chesapeake General Hospital, Wal-Mart, and Sentara Healthcare. The largest industries by employment are Government, Retail Trade, Local Government, Accommodation and Food Services, and Construction (VEC, 2018).

Several commercial businesses are located within and adjacent to the Bowers Hill Interchange; the fourteen businesses located within the Study Area are summarized in **Table 3-4**. Most businesses in the Study Area are accessed via east-west oriented frontage roads paralleling U.S. Route 460/58/13 such as South Military Highway on the south side of the interchange and Airline Boulevard and Jolliff Road on the north side. The interstate access ramps and median crossovers, such as Snowden Street, provide access to the businesses along the frontage roads. More detail on access to local businesses is provided in the Socioeconomic, Land Use, and Right-of-Way Technical Report (VDOT, 2019c).

Table 3-4: Commercial Businesses within the Study Area

Business Name	Location	Number of Employees
Aim Services Inc	4801 W Military Hwy	20-49
Americas Best Value Inn	4433 S Military Hwy	10-19
Bowers Hill Inn	4725 W Military Hwy	1-4
Capital Concrete	4709 W Military Hwy	30-49
CD Hauling	4711 W Military Hwy	5-14
Chesbay Distributing Co Inc	3928 Cook Blvd	50-99
Frank's Trucking Center/ Horizon Freight Systems	4717 W Military Hwy	50-99 (combined)
Hoffman Beverage Co	4105 S Military Hwy	20-49
LAP Convenience Store	4515 S Military Hwy	1-9
Mid Atlantic Leasing Corp	4209 S Military Hwy	10-19
Norfolk County Rifle Range Inc	4321 S Military Hwy	1-4
Sumitomo Drive Technologies	4200 Holland Blvd	281
Tidewater Express Truck Repair Shop	4209 S Military Hwy	10-19
Western Branch Concrete Inc	1149 Jolliff Rd	5-9

Source: <http://chesapeakeva.biz/datacenter/businesses/> and individual business websites, as applicable.

In addition to the Bowers Hill Interchange being utilized for local businesses, larger businesses in the region and those accessing the major area ports also utilize the interchange as it contains important routes for freight and intermodal traffic. Besides use of the Bowers Hill interchange, no alternate routes are suitable for efficient regional truck traffic without crossing the Hampton Roads Harbor. The Port of Virginia plans to double its capacity by 2040 and would increase container throughput on the Southside (Port of Virginia, 2016); therefore, it is likely that use of the Bowers Hill Interchange would continue to increase.

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3.3.2 Environmental Consequences

3.3.2.1 No-Build Alternative

The No-Build Alternative would not affect income, employment, or businesses in the Study Area and no loss of tax revenues would occur.

3.3.2.2 Alternative 1

The proposed improvements under Alternative 1 would impact three commercial businesses located within the Study Area along Military Highway: one located just west of where I-664 crosses over West Military Highway/Alt U.S. Route 460, and two located just east of the ramp from I-664 and Rotunda Avenue (see **Table 3-3**). All three of the impacted commercial properties would require relocation. As with the residential relocations, the acquisition of right-of-way and the relocation of commercial properties would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970. Assurance is given that relocation resources would be available to all relocated businesses. Ongoing coordination with area businesses, particularly those located adjacent to proposed improvements or detour routes, would occur to prevent or minimize both short and long-term disruptions. Additional efforts to minimize property impacts would be evaluated during the design phase.

Improved travel through the Bowers Hill Interchange resulting from implementation of Alternative 1 would have a positive impact on both local and regional businesses. Local businesses would benefit from the reduction in delays on local roadways.

Alternative 1 would provide temporary jobs in the area during construction. The extent, location, and duration of temporary jobs would vary, but would be similar under both build alternatives.

3.3.2.3 Alternative 2

Alternative 2 would impact less than 0.1 acre of a commercial business property, located just east of the ramp from I-664 and Rotunda Avenue. Under Alternative 2, there would be no commercial business relocations. As with the residential relocations, the acquisition of right-of-way and the relocation of commercial properties would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970. Assurance is given that relocation resources would be available to all relocated businesses. Ongoing coordination with area businesses, particularly those located adjacent to proposed improvements or detour routes, would occur to prevent or minimize both short and long-term disruptions. Additional efforts to minimize property impacts would be evaluated during the design phase.

Improved travel through the Bowers Hill Interchange resulting from implementation of Alternative 2 would have a positive impact on both local and regional businesses. Local businesses would benefit from the reduction in delays on local roadways.

Like Alternative 1, Alternative 2 would provide temporary jobs in the area during construction. The extent, location, and duration of temporary jobs would vary, but would be similar under both build alternatives.

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3.4 LAND USE AND LOCALITY PLANS

The methodology for assessing land use along with greater detail on existing conditions, environmental consequences, and potential mitigation are provided in the *Socioeconomic, Land Use, and Right-of-Way Technical Report* (VDOT, 2019c).

3.4.1 Existing Conditions

Approximately 1,430 acres are encompassed by the Study Area. As summarized in **Table 3-5**, and shown on **Figure 3-4**, the existing (2011) land use within the Study Area, and directly adjacent to the Bowers Hill Interchange, is predominantly Open Space, followed by Transportation, Residential, and Industrial uses.

Table 3-5: Existing (2011) Land Use in the Study Area

Land Use Class	Acres	Percent of Study Area
Agriculture	70.5	4.9
Commercial	15.2	1.1
Industrial	165.7	11.5
Institutional	53.9	3.7
Open Space	470.4	32.9
Residential	226.9	15.9
Transportation	428.3	30.0
Total	1,430.9	100

Source: HRTPO, 2011 (the most recent available data).

Land use in the Study Area is consistent with Chesapeake land use plans. *Chesapeake's Comprehensive Plan Moving Forward Chesapeake 2035* establishes a development pattern map for the year 2050 in which the Bowers Hill Interchange occupies primarily the "dispersed suburban development areas" and smaller portions of "rural areas" to the south of the interchange, where the purpose is to provide a transition between the urban areas of the City and the outlying rural area (Chesapeake, 2016). This area is also within the Suburban Overlay District where mixed use and infill development are authorized by City design guidelines. According to the City of Chesapeake's plan, further growth and development is permitted to occur in designated Major Activity Centers and lands zoned commercial and industrial. South of the Bowers Hill Interchange Study Area is designated as a "rural area" for the year 2050. The City plans to retain this area as a well-defined and protected belt of rural landscape.

3.4.2 Environmental Consequences

3.4.2.1 No-Build Alternative

The No-Build Alternative would not result in any land use conversion.

3.4.2.2 Alternative 1

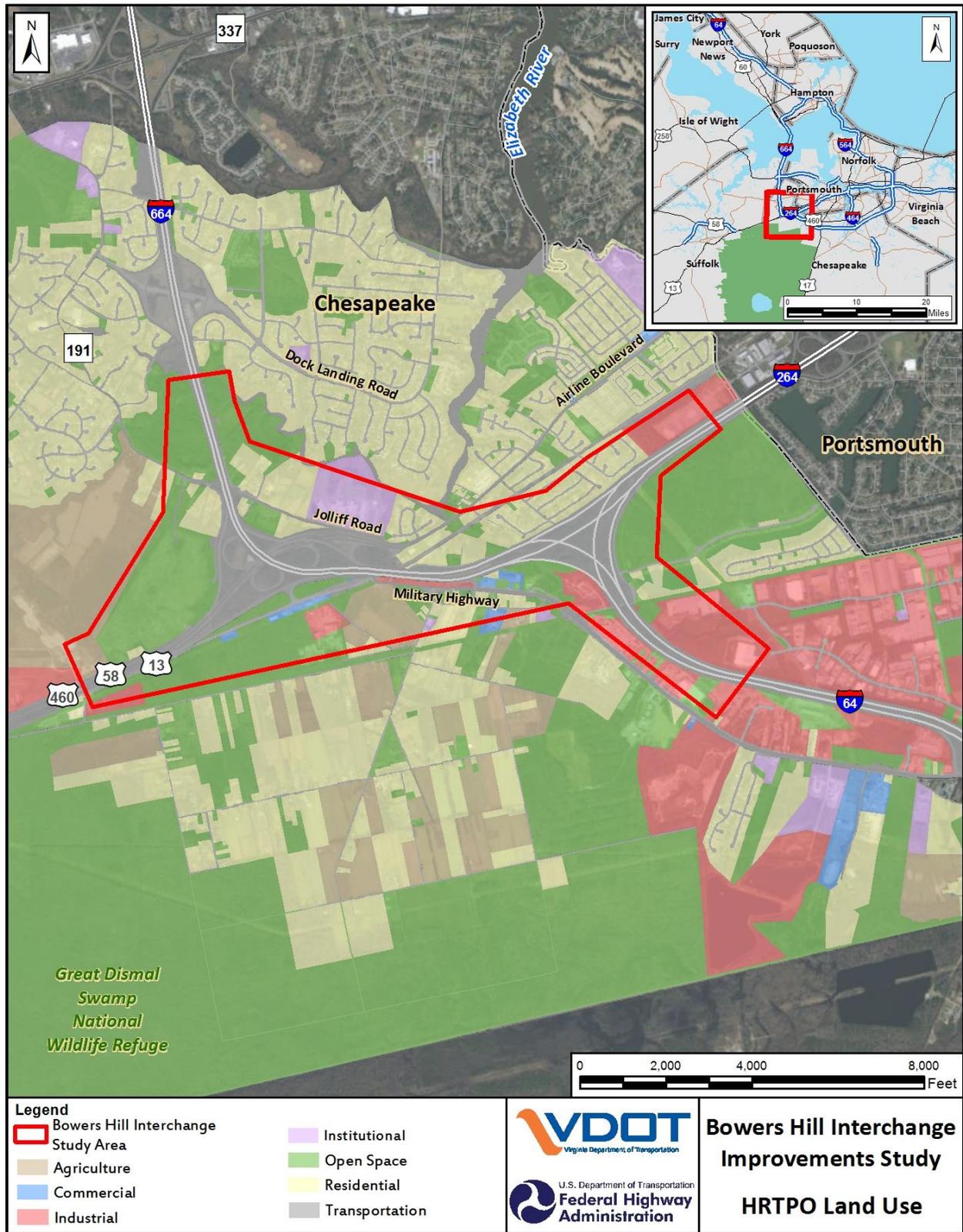
The conversion of land from its present use to transportation use would be a direct impact of construction of the Build Alternatives. **Table 3-6** provides a breakdown of the land use conversion percentages for each alternative.

Under Alternative 1 the largest land use conversion would occur to industrial land (41.8 percent) followed by open space (39.2 percent). These conversions would occur as surrounding property is converted to transportation use and absorbed into right-of-way.

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Figure 3-4: HRTPO Land Use



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Table 3-6: Land Use Conversion

Land Use Class	No-Build Alternative	Alternative 1 Percent	Alternative 2 Percent
Agriculture	0	0%	0%
Commercial	0	1.3%	0.1%
Industrial	0	41.8%	22.7%
Institutional	0	0%	0%
Open Space	0	39.2%	55.6%
Residential	0	17.7%	21.6%
Total Land Converted	0	100%	100%

Notes: Existing land designated as Transportation is not included in the conversion calculations.

Land use data is provided by the HRTPO (2011) and varies from the parcel data used to calculate right-of-way impacts.

3.4.2.3 Alternative 2

Under Alternative 2 the largest land use conversion would occur to open space (55.6 percent) followed by industrial (22.7 percent). These conversions would occur as surrounding property is converted to transportation use and absorbed into right-of-way.

3.5 ENVIRONMENTAL JUSTICE

This EJ analysis has been prepared in accordance with the definitions, methodologies, and guidance provided in Executive Order (EO) 12898; the Council on Environmental Quality (CEQ) *Environmental Justice Guidance Under the National Environmental Policy Act* (1997a); U.S. Department of Transportation (U.S. DOT) Order 5610.2(a) *Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (2012 revision); FHWA EJ Order 6640.23A *FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (2012); FHWA memorandum *Guidance on Environmental Justice and NEPA* (2011); the FHWA *Environmental Justice Reference Guide* (2015); and FHWA Technical Advisory T6640.8A: *Guidance for Preparing and Processing Environmental and Section 4(f) Documents*.

The strategies developed under Executive Order 12898 and the U.S. DOT/FHWA policies on EJ take the appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal transportation projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law, while ensuring EJ communities are proactively provided meaningful opportunities for public participation in project development and decision-making.

The methodology for assessing environmental justice along with greater detail on existing conditions, environmental consequences, and potential mitigation are provided in the *Socioeconomic, Land Use, and Right-of-Way Technical Report* (VDOT, 2019c).

3.5.1 Existing Conditions

3.5.1.1 EJ Populations - Minority

The minority and Hispanic or Latino population data for the Study Area block groups is summarized in **Table 3-7**. Ethnic Hispanic or Latino individuals may be of any race and are therefore counted separately.

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Table 3-7: Environmental Justice Populations

Geographic Area		Total Population	Total Minority Population		Hispanic or Latino		Potential EJ Population
			No.	%	No.	%	
Virginia		8,001,024	2,514,172	31.4%	631,825	7.9%	N/A
Chesapeake		222,209	83,197	37.4%	9,706	4.4%	N/A
HRTPO Localities		1,659,252	638,359	35.0%*	89,017	4.0%*	N/A
Study Area	BG 213.01.1	963	136	14.1%	14	1.5%	No
	BG 214.04.4	983	886	90.1%	30	3.1%	Yes
	BG 215.01.1	1,937	1,635	84.4%	62	3.2%	Yes
	BG 215.01.2	2,882	577	20.0%	72	2.5%	No
	BG 215.01.3	2,942	792	26.9%	70	2.4%	No
	BG 215.01.4	2,389	2,115	88.5%	93	3.9%	Yes
Study Block Group Total		12,096	6,141	50.8%	341	2.8%	N/A

Source: U.S. Census Bureau (2018) Tables DEC 10 PL P1 and DEC 10 SF1 P9

Notes: Red text represents areas that exceed CEQ's 50 percent minority population definition.

*Hampton Roads Transportation Planning Organization average minority percent.

Three Study Area block groups located in the center of and just east of the interchange exceed the 50 percent threshold for a minority population and are therefore considered EJ communities. Overall the percentage of minority population in the Study Area exceeds the 50 percent population benchmark. No other Study Area block groups exceed the meaningfully greater threshold of 35.0 percent, based on the HRTPO's average minority population, and are not considered areas of potential EJ concern. No Study Area block groups exceed the 4.0 percent threshold for Hispanic or Latino, based on the HRTPO data. **Figure 3-5** depicts Study Area block groups that are identified as EJ communities.

3.5.1.2 EJ Populations – Low-Income

For this EJ analysis, low-income populations have been identified where the median household income for a Census block group is at or below, the 2016 U.S. Department of Health and Human Services (HHS) poverty threshold for a family of four (\$24,300). Median household income in 2016 ranged from \$41,667 to \$95,357 in the study block groups; thus, no block groups in the Study Area had a median household income below the HHS poverty threshold and none are identified as low-income.

While none of the block groups in the Study Area exceed the low-income threshold, three block groups (213.01.1, 215.1.1, and 215.01.4) have median incomes that are significantly lower than the other block groups in the Study Area (the *Socioeconomic, Land Use, and Right-of-Way Technical Report* for more detailed information).

3.5.2 Environmental Consequences

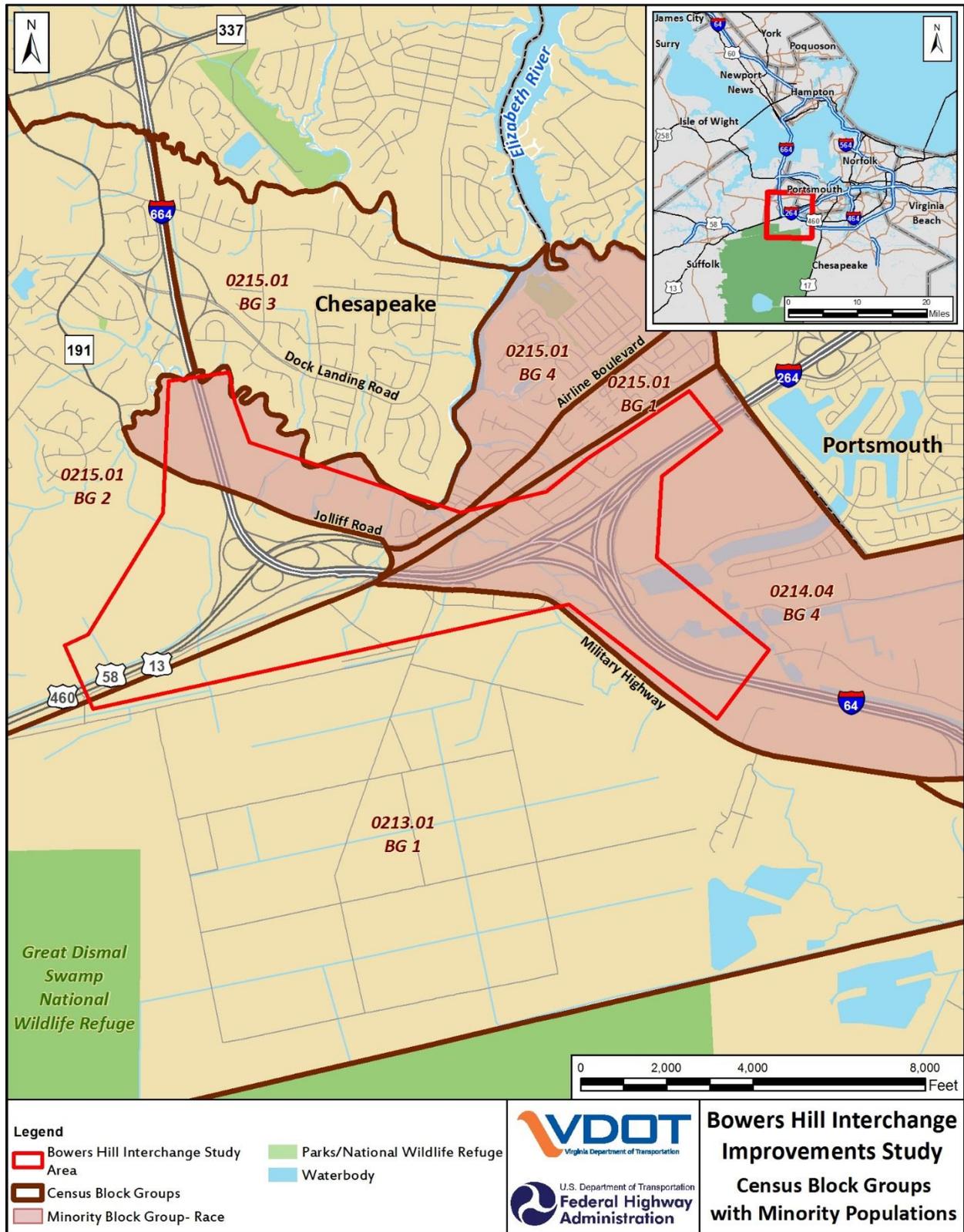
3.5.2.1 No-Build Alternative

The No-Build Alternative would not result in right-of-way acquisition and therefore would not impact low-income or minority populations.

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Figure 3-5: Environmental Justice Populations Block Groups



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3.5.2.2 Alternative 1

Under Alternative 1, two of the three block groups containing EJ populations would be impacted from right-of-way acquisitions (Block Groups 214.04.4 and 215.01.4). All (11) of the residential relocations and two of the three commercial relocations would occur within EJ Block Group 214.04.4.

Under Alternative 1, access would be modified in minority population areas but would impact all users of the facility. Alternative 1 would cause noise impacts to both environmental justice populations and other residents. Consideration of mitigation for noise impacts (e.g., noise barriers) is provided in **Section 3.14**. Other construction effects such as dust and visual disturbance may occur but would impact both minority and non-EJ population areas within the Study Area and would be temporary.

All of the residential areas within the Study Area (located in the northern and eastern parts of the Study Area) also fall within the EJ Block Groups. The impacts are located in the area in which the complex configuration of existing roadways converge and there are no reasonable opportunities to move improvements elsewhere where EJ Block Groups are not present. Furthermore, the project-related improvements to operational deficiencies, safety, and congestion and capacity would benefit both minority populations and non-minority populations and persons of varying income.

Therefore, the impacts from Alternative 1 would not result in a disproportionately adverse impact on minority or low-income populations.

3.5.2.3 Alternative 2

Under Alternative 2, all three block groups containing EJ minority populations would be impacted from right-of-way acquisitions. Both residential relocations would occur within EJ Block Group 214.04.4.

Under Alternative 2, access would be modified in minority population areas but would impact all users of the facility. Consideration of mitigation for noise impacts (e.g., noise barriers) is provided in **Section 3.14**. Other construction effects such as dust and visual disturbance may occur but would impact both minority and non-EJ population areas within the Study Area and would be temporary.

All of the residential areas within the Study Area (located in the northern and eastern parts of the Study Area) also fall within the EJ Block Groups. The impacts are located in the area in which the complex configuration of existing roadways converge and there are no reasonable opportunities to move improvements elsewhere where EJ Block Groups are not present. Furthermore, the project-related improvements to operational deficiencies, safety, and congestion and capacity would benefit both minority populations and non-minority populations and persons of varying income.

Therefore, the impacts from Alternative 2 would not result in a disproportionately adverse impact on minority or low-income populations.

3.5.3 EJ Outreach

Identification of and outreach to EJ populations began by sending scoping letters to local governments, planning organizations, and elected officials in the Study Area requesting information to support the consideration of these population groups. These local parties are knowledgeable about minority and low-income areas and concerns in their communities.

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VDOT hosted a virtual scoping meeting from May 10, 2018 to June 9, 2018 and a CIM August 22, 2018 to provide project information and opportunity for comments from the public, including EJ populations. Over 80 percent of survey respondents indicated that they often or always experience traffic and congestion when they travel through the study area, whereas half of respondents experience an accident or disabled vehicle only sometimes. The majority (87 percent) of respondents feel that improvements are needed within the Study Area as the interchange poses safety and congestion issues. Almost half of respondents (46 percent) cite the interchange configuration and the resulting merging required as the reason for needing improvements in the Study Area, while 29 percent feel that the population and resulting traffic have exceeded the capacity intended for the roadways within the Study Area. Survey respondents ranked “Streamline the merge” (40 percent) as the most important improvement needed in the Study Area, with “Ease congestion” (25 percent) coming in as a close second. More than half of respondents ranked “Protect the wetlands/environment” as the lowest priority. In terms of other improvements, comments centered around the common themes of fixing the merge/configuration of the intersection, as well as increasing capacity and improving visibility and signage along the corridor. About 4 percent of respondents specifically suggests flyovers as a solution to the interchange issue.

To accommodate EJ populations, the CIM was located within one of the Study Area block groups that contains EJ populations and in close proximity to and accessible from the other two Study Area block groups that contain EJ populations. More information is provided in **Chapter 4**.

A meeting was held on Sunday, October 21, 2018 with the Colonial Point Civic League, at their request, to provide an overview and current status of the Bowers Hill Interchange Improvements Study. The Colonial Point neighborhood is located within one of the Study Area block groups that contains EJ populations. The community expressed concerns about the limits of disturbance for the study, whether the neighborhood would be affected, and if there would be improvements to the Jolliff Road intersection where congestion and safety are presently an issue. VDOT advised that improvements to Jolliff Road were not part of the Bowers Hill Interchange Improvements Study, but the intersection of Jolliff Road and Airline Boulevard was within the preliminary limits of disturbance and the interchange improvements may improve the traffic conditions on Jolliff Road. The community also expressed concern about potential tree clearing, tolling, and noise.

A second meeting was held with the Colonial Point Civic League on February 10, 2019 to discuss results of the traffic study and recommended improvements to the Bowers Hill Interchange. Attendees from the community asked VDOT questions about the proposed improvements, noise impacts and abatement, impacts to trees, extent and timing of nearby projects (including the High Rise Bridge), and lane markings/signage.

3.6 WILDLIFE AND HABITAT

The methodology for assessing wildlife and habitat along with greater detail on existing conditions, environmental consequences, and potential mitigation are provided in the *Bowers Hill Interchange Improvements Study Natural Resources Technical Report* (VDOT, 2019d).

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3.6.1 Existing Conditions

The Study Area is located within the eastern portion of the Coastal Plain physiographic province of Virginia that includes a variety of upland forest communities and large expanses of freshwater wetlands and stream systems. The upland forests that originally covered much of this area have been extensively cleared, or altered at some point in the past, reducing the quality of, or eliminating habitat in, the Coastal Plain (Fleming and Patterson, 2017). The following sections discuss the presence of conservation lands, a general analysis of landcover types, habitat conditions, and potential for wildlife.

3.6.1.1 Conservation Habitat

A portion of the Great Dismal Swamp: Northwest Section Conservation Site was located within the Study Area at the time of project scoping but the site was subsequently reduced in size due to an in-house conservation site automation process implemented by the Virginia Department of Conservation and Recreation–Department of Natural Heritage (VDCR-DNH) (VDCR-DNH, 2018). During this process, the name of the conservation site at this location was also changed to the Bowers Hill Interchange Conservation Site which occurs north of U.S. Route 460/58/13 and west of I-664 as shown on **Figure 3-6**. The natural heritage resource of concern at the Bowers Hill Interchange Conservation Site is the state endangered Canebrake Rattlesnake (*Crotalus horridus*). The Bowers Hill Interchange Conservation Site has a biodiversity significance ranking of B4 on a scale of B1-B5, B1 being most significant. Conservation sites are designated and utilized by VDCR as a tool to identify land management needs and protection priorities for rare species and communities and as a screening tool for potential conflicts with proposed roads and development. See **Section 3.7: Threatened, Endangered, and Special Status Species** Section for further discussion on the suitability of habitat within the site and potential impacts to the Canebrake Rattlesnake resulting from proposed improvements.

Additional conserved lands include three VDOT wetland mitigation sites and one Virginia Department of Environmental Quality (VDEQ) preservation site, as depicted on **Figure 3-6**. No park lands, or conservation easements such as those under management of the Virginia Outdoors Foundation, or VDCR Conservation Reserve Enhancement Program, occur in the Study Area.

Land cover classes identified in the Study Area using the 2011 Natural Land-Cover Dataset (NLCD) (Homer et al., 2015) include open water, developed open space, developed low/medium/high intensity, barren land, herbaceous, deciduous, mixed and evergreen forest, scrub/shrub, herbaceous, cultivated crops, woody wetlands, and emergent herbaceous wetlands. According to data, approximately 30 percent of the Study Area is identified as forested, including woody wetlands, and nearly 60 percent is identified as developed.

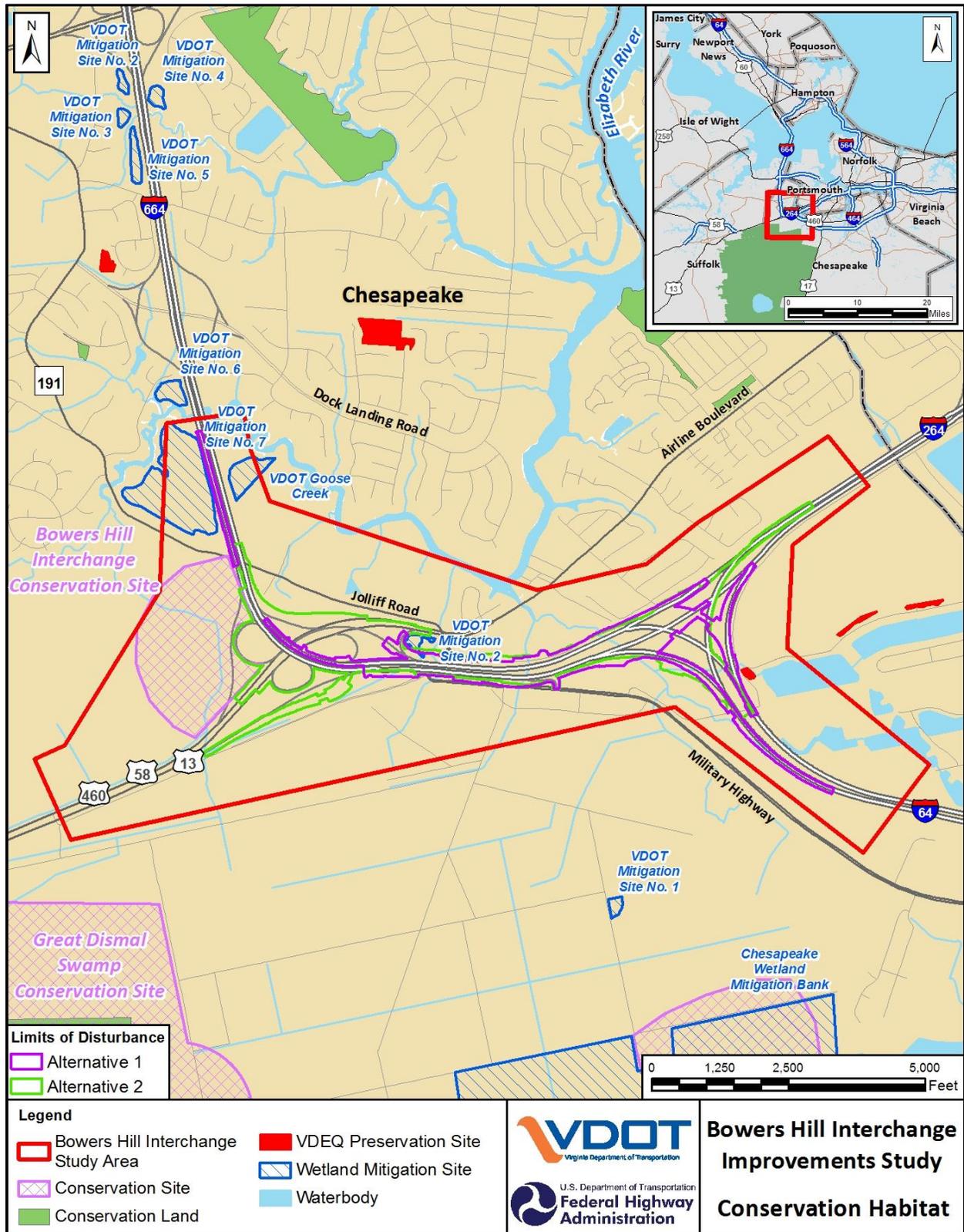
3.6.1.2 Habitat Condition

The VDCR-DNH Natural Landscape Assessment (VDCR, 2017) identifies the ecological integrity of habitat in the region as depicted on **Figure 3-6**. These areas are identified as ecological cores and receive a designation based upon an assessment of 50 attributes including information on rare species and habitats, environmental diversity, species diversity, patch characteristics, patch context, and water quality benefits. Larger, more biologically-diverse areas are generally given higher scores and categorized by VDCR as “Outstanding,” “Very High,” or “High.” All scored areas within the Study Area received an integrity rating of “General,” the lowest scored category. The ecological core area which is coincident with the Bowers Hill Interchange Conservation Site, and located west of I-664 and east of the Hampton Roads Executive

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Figure 3-6: Conservation Habitat



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Airport, was logged in 2016. As the VDCR Natural Landscape Assessment is based on NLCD 2011 data, the core data has not been updated to include this cover change. As shown in **Figure 3-7** the four ecological core areas are currently separated from one another by Study Area roadways.

The forested areas in the Study Area are typical of loblolly, loblolly-hardwood, and sweetgum-yellow poplar forests (Eyre, 1980), and could provide habitat for typical terrestrial wildlife species inhabiting the region. Wetland areas are typical of Coastal Plain Depression Swamps and Ponds and Non-Riverine Flatwoods and Swamps (Fleming and Patterson, 2017). Forested habitat within the Study Area lies within the ramps and loops located within the I-664 and U.S. Route 58 portion of the interchange and the I-264 and I-64 portion of the interchange. Forested habitat within the ramps and loops located within the I-664 and U.S. Route 58 portion of the interchange, and the I-264 and I-64 portion of the interchange, are considered habitat islands. The fragmented nature of these forested areas reduces their capacity to support wildlife. Seasonally flooded wetlands provide suitable breeding habitat for amphibians. Areas of semi-permanently to permanently flooded wetlands provide suitable habitat for aquatic species and waterfowl occurring in the region. Open natural areas within the Study Area may provide suitable forage for insect species. A list of additional species that may occur within the project limits is provided in the Virginia Fish and Wildlife Information Service (VaFWIS) database results in Appendix B of the *Natural Resources Technical Report* (VDOT, 2019d). More information on forested areas and vegetation is also included in the *Natural Resources Technical Report* (VDOT, 2019d).

3.6.2 Environmental Consequences

3.6.2.1 No-Build Alternative

No project-related construction or changes to the natural environment would occur under the No-Build Alternative. Thus, project-related environmental effects to wildlife and habitat would not occur.

3.6.2.2 Alternative 1

Alternative 1 would impact both terrestrial wildlife and habitat. No direct impacts to the Bowers Hill Interchange Conservation Site or VDEQ preservation site would occur with construction of Alternative 1 improvements and ecological cores would remain intact. The majority of the land cover impacts from Alternative 1 improvements would be to developed lands. Impacts to forested communities with Alternative 1, as identified by the NLCD data, are 10.3 acres. The majority of forest clearing would occur mainly within fragmented areas of linear habitat in the transportation right-of-way, within the loop ramps separated by existing roadways, or in edge habitat. It is unclear to what extent the impacts would change habitat from its current condition because the existing roadways currently pose a substantial barrier to terrestrial wildlife movement, as access to habitat is limited to direct crossings of multiple lanes of traffic traveling at highway speeds. In addition, the existing roadways and surrounding industrial development have effectively fragmented wildlife populations and habitat within the Alternative 1 LOD. Construction of Alternative 1 improvements would reduce the size of, or in the case of the area located in the median of I-664 on the eastern side of the interchange; eliminate, currently fragmented habitat in the Study Area. Alternative 1 improvements would not impact the Bowers Hill Interchange Conservation Site.

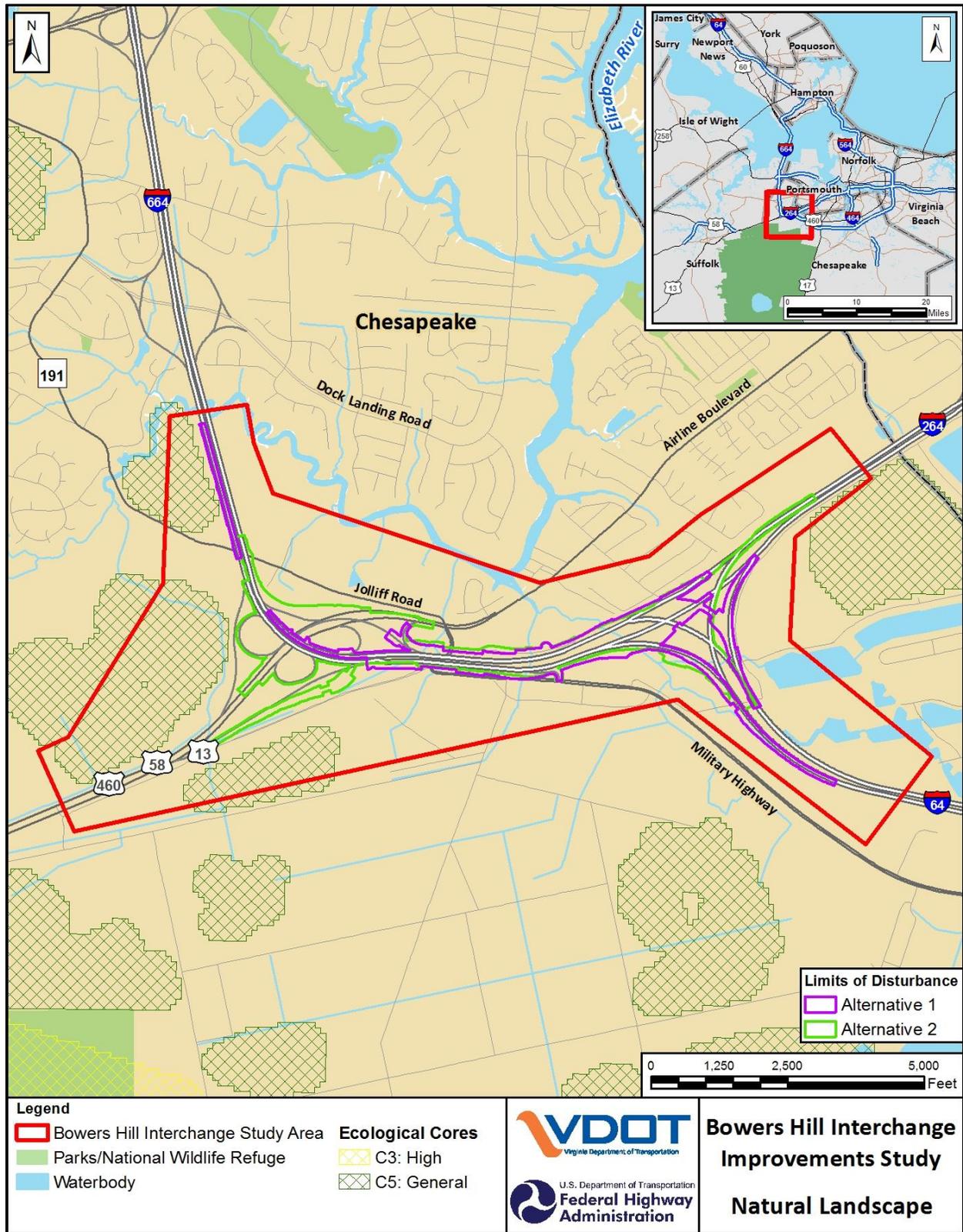
3.6.2.3 Alternative 2

Alternative 2 has the potential to impact the Bowers Hill Interchange Conservation Site (0.6 acre), and the natural landscape ecological core at the same location. The proposed impacts would not cause any

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Figure 3-7: Natural Landscape



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fragmentation, and although the impact may result in a minor shift of low-quality edge habitat into these areas, no substantial impacts to these areas would be expected. Alternative 2 would not impact the VDEQ preservation site located on the east side of the Study Area. The majority of the land cover impacts for Alternative 2 improvements would be to developed lands. Impacts to forested communities with Alternative 2 are approximately 21.2 acres, as identified by the NLCD data. The majority of forest clearing would occur within fragmented areas of linear habitat in the right-of-way.

3.7 THREATENED, ENDANGERED, AND SPECIAL STATUS SPECIES

The methodology for assessing threatened, endangered, and special status species along with greater detail on existing conditions, environmental consequences, and potential mitigation are provided in the *Natural Resources Technical Report* (VDOT, 2019d).

3.7.1 Existing Conditions

The roadway bridges in the Study Area may provide nesting habitat for species such as the barn swallow (*Hirundo rustica*), as well as for owls. The flat decks under roadway bridges, vertical structures, structural cavities, and pier footings provide locations for nest building or egg laying. The eggs and nests of these species are protected under the Migratory Bird Treaty Act.

Seventeen species were identified from the database query results. Of the 17 species included in the query results, 16 were listed only in the VaFWIS database and have not been confirmed as occurring within 2 miles of the Study Area. Therefore, these 16 species were eliminated from further consideration in accordance with Virginia Department of Game and Inland Fisheries (VDGIF)'s VaFWIS Coordination Recommendations. The recommendations indicate that coordination is required only for those species listed as "confirmed" in the Study Area search results and only the Canebrake Rattlesnake (*Crotalus horridus*) remained as a potential species requiring analysis. Although it was not confirmed with the VaFWIS search results, the Northern Long-eared Bat (NLEB) (*Myotis septentrionalis*) was included in the Information, Planning, and Consultation System (IPaC) search results provided by USFWS. Therefore, two species (Canebrake Rattlesnake and NLEB) were evaluated as potentially occurring in the Study Area (Table 3-8).

Table 3-8: Threatened and Endangered Species Mapped within the Vicinity of the Study Area

Species	Status	Source of Listing
Northern Long-eared Bat (<i>Myotis septentrionalis</i>)	Federally and State Threatened	IPaC, VaFWIS
Canebrake Rattlesnake (<i>Crotalus horridus</i>)	State Endangered	VaFWIS, VDCR-DNH

Threatened and Endangered Species Habitat Assessment

Northern Long-eared Bat – Suitable foraging and summer roosting habitat is present for NLEB within the Study Area. Smaller fragmented areas of forest and individual trees may provide suitable roosting habitat, but in general would be considered suboptimal habitat. Aquatic resources provide sources of water for the bats and habitat for insects used as forage. Forested areas, easements, road edges, and waterways can provide corridors for movement between habitat areas. Fragmented communities surrounded by

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development and within the right-of-way are generally less suitable for use by the bats. Trees of three-inch dbh or greater may provide suitable habitat for maternity roosts. These areas may also provide suitable day and night roosts for bats.

For the purposes of this study, all forested areas are considered potential summer bat roosting habitat. Acreages of roosting habitat were quantified based upon forest cover identified on aerial photography and reconciled with areas that were identified as currently deforested during the field assessment. The total acreage of estimated NLEB summer roosting habitat is included in **Table 3-9**.

Table 3-9: Acreages of Potential Threatened and Endangered Species Habitat within the Study Area

Species	Acres of Habitat
Northern Long-eared Bat ¹ (<i>Myotis septentrionalis</i>)	657.5
Canebrake Rattlesnake (<i>Crotalus horridus</i>)	412.5

¹ Represents acreage of suitable summer roosting habitat.

Canebrake Rattlesnake – Areas of suitable Canebrake Rattlesnake habitat are present on the north and south side of U.S. Route 460/58/13 within the Study Area, west of the I-664 Interchange, and east of the I-264 and I-64 Interchange. However, the existing roadways and industrial development have effectively fragmented populations of the Canebrake Rattlesnake north and south of U.S. Route 460/58/13, south of I-664 in the center of the interchange, and east of the EB I-64 to EB I-264 travel lanes in the eastern portion of the Study Area (VDGIF, 2011). The quantity of Canebrake Rattlesnake habitat within the Study Area is provided in **Table 3-9**.

All potential habitat for the Canebrake Rattlesnake identified through the evaluation of offsite resources and onsite determination is depicted on the Threatened and Endangered Species Habitat Map provided in Appendix A of the *Natural Resources Technical Report* (VDOT, 2019d). The quantity of Canebrake Rattlesnake habitat within the Study Area is provided in **Table 3-9**.

3.7.2 Environmental Consequences

3.7.2.1 No-Build Alternative

The No-Build Alternative would not involve any construction or changes to the natural environment. As a result, project-related environmental effects to listed wildlife species and habitat from the No-Build Alternative would not occur.

3.7.2.2 Alternative 1

Construction of Alternative 1 improvements could potentially impact threatened and endangered species and their habitat (**Table 3-10**). Forest clearing for Alternative 1 would occur mainly within fragmented areas of linear habitat in the right-of-way, within the loop ramps separated by existing roadways, or in edge habitat. These areas are all unlikely to be utilized as roosts by NLEB as roosts would not be expected in close proximity to the existing transportation corridors. In addition, according to the VDGIF Northern Long-Eared Bat Winter Habitat and Roost Trees Application, no confirmed maternity roost trees or hibernacula are located within the vicinity of the Study Area (VDGIF, 2018a). Therefore, harm to roosting NLEB from tree removal would be unlikely in these areas, and a permit would not be required from the

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USFWS in accordance with the mechanism for achieving Section 7 compliance detailed in the *Programmatic Biological Opinion on Final 4(d) rule for the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions* (USFWS, 2016). If the same remains true at the time of permitting Alternative 1, VDOT and FHWA may rely upon these findings and the activities excepted from take prohibitions to fulfill their project-specific Section 7 responsibilities.

Forest clearing within the Alternative 1 LOD would reduce the cover of roadside vegetation, which has been shown to reduce the crossing of roadways by bats and can cause them to expend more energy trying to find suitable crossings (Voigt and Kingston, 2016), which could potentially affect NLEB. However, due to the current barriers presented by the existing infrastructure, the effect of Alternative 1 on travel corridors for NLEB should be negligible.

Suitable foraging habitat for NLEB is present within the Alternative 1 LOD. Direct impacts to natural resources, and increases in noise and lighting, can negatively impact the use of adjacent habitat for foraging; however, due to the substantial presence of suitable foraging habitat outside of the LOD, these impacts should not substantially affect populations of NLEB.

Table 3-10: Threatened and Endangered Species Habitat Impacts within the LOD

Species	Alternative 1 (Acres)	Alternative 2 (Acres)
Northern Long-eared Bat ¹ (<i>Myotis septentrionalis</i>)	53.2	110.0
Canebrake Rattlesnake (<i>Crotalus horridus</i>)	2.0	2.0

¹ Represents acreage of suitable summer roosting habitat.

Approximately two acres of potential Canebrake Rattlesnake habitat was identified within the LOD of Alternative 1. The potential habitat is located west of I-664 and north of Jolliff Road in the northern portion of the Study Area. As the presence of existing suitable Canebrake Rattlesnake habitat is limited within the LOD of Alternative 1, tree clearing and roadway construction in this area would not be anticipated to substantially affect the species.

Through coordination with the resource agencies during permitting, impact avoidance measures may be utilized and include practices such as conducting contractor education seminars to discuss the importance of the species, how to identify them, and who to notify if encountered. Installing drift/silt fence along the boundaries of construction would discourage the Canebrake Rattlesnake from entering the construction zone. Mowing areas prior to, and during construction, could also discourage snakes from entering areas due to lack of vegetative cover.

3.7.2.3 Alternative 2

Forest clearing for Alternative 2 would occur mainly within fragmented areas of linear habitat in the right-of-way, within the loop ramps separated by existing roadways, or in edge habitat. Impacts to suitable NLEB roosting habitat within the LOD of Alternative 2 would occur in areas unlikely to be utilized as roosts for reasons described for Alternative 1. As no confirmed maternity roost trees or hibernacula are located within the vicinity of the Study Area, VDOT and FHWA may rely upon previous findings and the activities excepted from take prohibitions to fulfill their project-specific Section 7 responsibilities. Impacts to foraging habitat and travel corridors would be similar to those described for Alternative 1.

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The area of potentially impacted Canebrake Rattlesnake habitat associated with Alternative 2 would occur west of I-664 and north of Jolliff Road in the northern portion of the Study Area. As the presence of existing suitable Canebrake Rattlesnake habitat is limited in this area, roadway improvements would not be anticipated to substantially affect the species. The potential avoidance measures discussed for Alternative 1 could reduce conflict between the animals and construction activities associated with Alternative 2 improvements.

3.8 NAVIGABLE WATERS

The methodology for assessing navigable waters along with greater detail on existing conditions, environmental consequences, and potential mitigation are provided in the *Natural Resources Technical Report* (VDOT, 2019d).

3.8.1 Existing Conditions

The Study Area contains portions of two watersheds: 020802080203 (Deep Creek-Southern Branch Elizabeth River) and 020802080205 (Western Branch Elizabeth River) (USGS, 2018). No Study Area waterways, within these watersheds, are included as navigable waters on the USACE or United States Department of Transportation (USDOT) lists. However, the USACE, by definition, considers all tidal waters as navigable. Tidal waters in the Study Area include Goose Creek and its tidal tributaries. Therefore, the total channel length of navigable waters in the Study Area is 6,792 linear feet and these occur along the northern boundary of the Study Area, and through the north-central portion of the Study Area, to the west of Goodman Street in Chesapeake.

3.8.2 Environmental Consequences

3.8.2.1 No-Build Alternative

No project-related construction or changes to the natural environment would occur under the No-Build Alternative. Thus, project-related environmental effects to navigable waters would not occur.

3.8.2.2 Alternative 1

Alternative 1 contains approximately 530 linear feet of navigable waters as defined by the USACE. The navigable waters occur in the interchange where a tidal tributary of Goose Creek extends underneath of the merged roadways of EB I-64 and WB I-264, to the southwest of Goodman Street in Chesapeake. Impacts to navigable waters, and potential avoidance and minimization measures, would be considered during the Clean Water Act (CWA) permitting of the Preferred Alternative. In addition, compensatory mitigation for impacts to jurisdictional navigable waters would be considered at that time. For information on the permitting of impacts to jurisdictional navigable waters, including Waters of the U.S. (WOUS), see the *Natural Resources Technical Report* (VDOT, 2019d).

3.8.2.3 Alternative 2

Alternative 2 contains approximately 504 linear feet of navigable waters. The navigable waters occur in the north-central portion of the interchange and west of Goodman Street in Chesapeake. For information on the permitting of impacts to jurisdictional navigable waters, including WOUS, see the *Natural Resources Technical Report* (VDOT, 2019d).

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3.9 WATERS OF THE U.S.

The methodology for assessing waters of the U.S. along with greater detail on existing conditions, environmental consequences, and potential mitigation are provided in the *Natural Resources Technical Report* (VDOT, 2019d).

3.9.1 Existing Conditions

Total acreage of delineated wetlands within the Study Area is presented in tabular form by Cowardin classification in **Table 3-11**. **Table 3-12** contains the total size of delineated waters within the Study Area, separated by Cowardin classification. The location and extent of delineated wetlands, streams, and open water areas are depicted in **Figure 3-8**. A detailed map of these boundaries and their Cowardin classifications can be found in Appendix D of the *Natural Resources Technical Report* (VDOT, 2019d). Although they are not shown in the included mapping, pipes and culverts provide connections between sections of jurisdictional ditches, streams, and tidal waters within the Study Area. These features transport Study Area surface waters to downstream areas and are prevalent and widely distributed.

Table 3-11: Jurisdictional Wetlands within the Study Area

Cowardin Abbreviation	Cowardin Description	Acreage within Study Area
E2FO	Estuarine Intertidal Forested	0.4
E2SS	Estuarine Intertidal Scrub/Shrub	0.8
E2EM	Estuarine Intertidal Emergent	26.0
PFO	Palustrine Forested	251.4
PSS	Palustrine Scrub/Shrub	72.0
PEM	Palustrine Emergent	19.6
Total		370.2

Table 3-12: Jurisdictional Waters within the Study Area

System Abbreviation	System Description	Size within Study Area
E1UB	Estuarine Subtidal Unconsolidated Bottom	9.1 acres
JD/PUBx	Jurisdictional Ditch/Palustrine Unconsolidated Bottom Excavated	8.1 acres
R2	Lower Perennial Stream	1,802 linear feet
R3	Upper Perennial Stream	13,379 linear feet
R4	Intermittent Stream	11,065 linear feet
R6	Ephemeral Stream	480 linear feet

Three VDOT wetland mitigation sites are located within the Study Area and their delineated acres are included in the feature totals in **Table 3-11**. VDOT Mitigation Site No. 7 is located on the west side of I-664 in the northern portion of the Study Area and is predominately composed of palustrine forested wetlands (approximately 30.2 acres) with areas of scrub/shrub (approximately 1.3 acre) and emergent wetlands (approximately 0.9 acre). The VDOT Goose Creek Mitigation Site is located east of I-664 opposite of Site No. 7. This site is predominately an estuarine emergent wetland (approximately 6.1 acres) with a narrow estuarine scrub/shrub fringe (approximately 0.5 acre) and is dominated by a large monoculture of the highly-invasive plant, common reed (*Phragmites australis*). The VDOT Mitigation Site No. 2 is located within a loop at the eastern end of the Bowers Hill interchange, which contains approximately 1.5 acre of

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Figure 3-8: Waters of the U.S.



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a palustrine forested wetland connected to a perennial stream that drains north towards the Elizabeth River. The site is dominated by English ivy (*Hedera helix*), a mediumly-invasive plant species. The locations of the three mitigation sites are depicted on **Figure 3-9**.

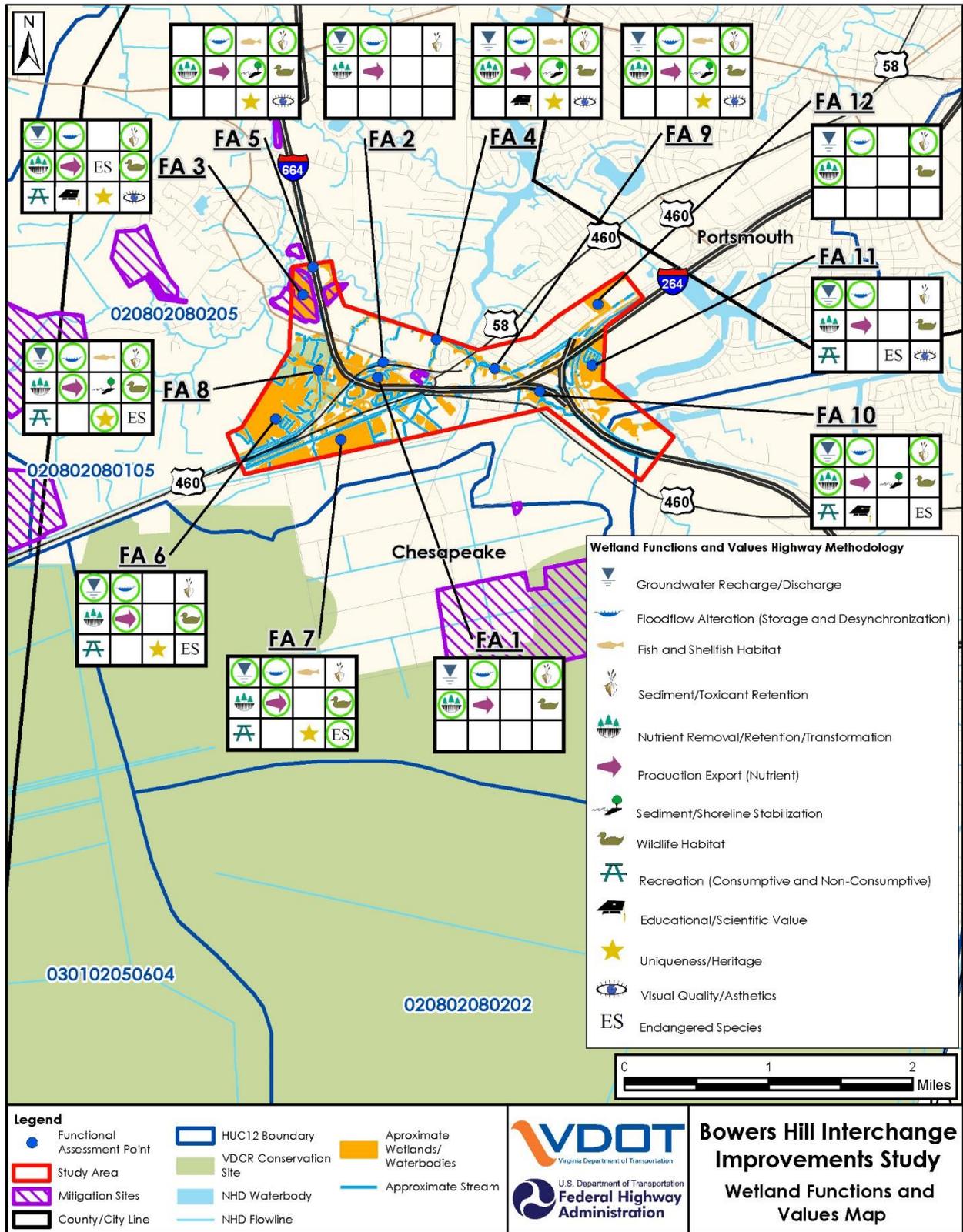
3.9.1.1 Functional Assessment

A total of twelve representative wetland plots for the functions and values assessments were evaluated and are shown in **Figure 3-9**. These areas were selected to provide an overview of the functions and values of all wetlands within the Study Area. Location FA 1 represents fragmented wetlands within cloverleafs and interchanges. Location FA 2 represents ditches and/or altered linear wetlands that are located within interchanges, the median or within the right-of-way adjacent to the roadways. Other areas were selected to reflect a variety of palustrine and estuarine habitats with varying degrees of encroachment of development and existing roadways, fragmentation, and other conditions. Under the Highway Method, a consistent primary function recorded for all wetlands was Floodflow Alteration. Other primary functions present in many wetland areas include Groundwater Recharge/Discharge, Sediment/Toxicant Retention, and Nutrient Removal. Primary functions for wetlands with less disturbance and fragmentation include Production Export and Wildlife Habitat, as well as areas with Endangered Species Habitat. Fragmented, altered, and historically disturbed wetlands associated with the existing roadways do retain many functions of less disturbed wetlands. Values identified in the Highway Methodology however, are lacking within the wetlands represented by location FA 1 and FA 2 and vary between other less disturbed wetlands, with many values being limited by a lack of public access to the locations. **Figure 3-8** and **Figure 3-9** and **Table 3-13** show the results of the wetland functions and values assessment. Evaluation forms for each representative location are included in Appendix E of the *Natural Resources Technical Report* (VDOT, 2019d).

All assessed wetlands provide Floodflow Alteration, Nutrient Removal, and Sediment/Toxicant Retention. Their position in the landscape and proximity to a road network and potential stormwater flows provide the opportunity for all the wetlands to perform these functions. Nearly all assessed wetlands provide Groundwater Recharge/Discharge, Production Export, and Wildlife Habitat. Their ability to produce food or other usable products and to serve as wildlife habitat is largely a function of their vegetative composition. Three assessed wetlands, represented by FA 3, FA 4, and FA 8, retain more suitable functions and values than other wetlands within the Study Area. Each of them provides 11 of the 13 measured functions and values and each occurs in the western half of the Study Area. They are considered to be indicative of lesser disturbed wetlands in the Study Area. Location FA 3 occurs within a VDOT wetland mitigation site. The lowest scoring wetlands, represented by FA 2 and FA 12, are located north of I-664 and I-264, respectively. They are indicative of wetlands that are in ditches and that receive direct surface runoff.

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Figure 3-9: Wetland Functions and Values Map



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Table 3-13: Functional Assessment Results

Functions and Values	Representative Wetlands											
	FA 1	FA 2	FA 3	FA 4	FA 5	FA 6	FA 7	FA 8	FA 9	FA 10	FA 11	FA 12
Groundwater Recharge/Discharge	X	X	X	X		X	X	X	X	X	X	X
Floodflow Alteration	X	X	X	X	X	X	X	X	X	X	X	X
Fish and Shellfish Habitat				X	X		X	X	X			
Sediment/Toxicant Retention	X	X	X	X	X	X	X	X	X	X	X	X
Nutrient Removal	X	X	X	X	X	X	X	X	X	X	X	X
Production Export	X	X	X	X	X	X	X	X	X	X	X	
Sediment/Shoreline Stabilization				X	X			X	X	X		
Wildlife Habitat	X		X	X	X	X	X	X	X	X	X	X
Recreation			X			X	X	X		X	X	
Educational/Scientific Value			X	X						X		
Uniqueness/Heritage			X	X	X	X	X	X	X			
Visual Quality/Aesthetics			X	X	X				X		X	
Endangered Species Habitat			X			X	X	X		X	X	

Note: Primary functions/values are **bolded** highlighted in red.

3.9.2 Environmental Consequences

3.9.2.1 No-Build Alternative

No project-related construction or changes to the natural environment would occur under the No-Build Alternative. Thus, project-related environmental effects to WOUS would not occur.

3.9.2.2 Alternative 1

Alternative 1 would potentially impact estuarine and palustrine wetland systems. The wetland impact values within the LOD of Alternative 1, listed by Cowardin classification, are presented in **Table 3-14**. Most impacts would occur in altered or fragmented palustrine wetland systems located within VDOT's existing right-of-way in the center of the I-664/U.S. Route 58, and I-64/I-264 interchanges. With Alternative 1, the greatest potential impacts would be to palustrine forested wetlands. Following these, the greatest potential impacts are anticipated to estuarine intertidal estuarine emergent and palustrine emergent wetlands. Impacts to these wetlands would likely result from fills associated with bridge approaches and abutments, and roadway cut/fill slopes. However, as mentioned in **Section 2.4**, no differentiation was made between those roadway features constructed on structure (less wetland impact) and those which would occur within fill areas (more wetland impact). No impacts are anticipated to either estuarine intertidal scrub/shrub or estuarine intertidal forested wetlands with Alternative 1.

All wetlands provide valuable ecological services, yet as demonstrated in the functional assessment results detailed in **Section 3.9.1.1**, the functions and values provided by wetlands can vary by their degree of disturbance and location. Most wetland impacts associated with Alternative 1 would occur to wetlands similar to, or including, those assessed with functional assessment points FA 1 and FA 2 (**Figure 3-9**). As discussed above, location FA 1 represents fragmented wetlands within cloverleaves and interchanges and location FA 2 represents ditches and/or altered linear wetlands that are located within interchanges, the median, or within the right-of-way adjacent to the roadways. These are two of the points with the fewest

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functions and values within the Study Area (**Table 3-14**). It can be assumed that other disturbed wetlands occurring in the LOD of Alternative 1 would have similarly-disturbed functions and values. Less disturbed, and higher-functioning wetlands, similar to those evaluated at locations FA 4 and FA 8, are anticipated to occur in limited amounts within the LOD of Alternative 1. Therefore, substantial impacts to high-functioning wetlands are not anticipated with Alternative 1 improvements as the majority of potentially impacted wetlands would have limited functions and values. Those wetlands impacted may provide limited amounts of Groundwater Recharge/Discharge, Floodflow Alteration, Sediment/ Toxicant Retention, Nutrient Removal/Retention, and Threatened or Endangered Species Habitat, but would generally not provide Fish and Shellfish Habitat, Production Export, Sediment/Shoreline Stabilization, Recreation, Educational/Scientific Value, Uniqueness/Heritage, or Visual Quality/Aesthetics. If present, avoidance and minimization of impacts to wetlands with higher-ranking functions and values would be considered during detailed design.

Table 3-14: Impacts to Wetlands

Cowardin Abbreviation	Cowardin Description	Alternative 1 (Acres)	Alternative 2 (Acres)
E2FO	Estuarine Intertidal Forested	0.0	0.0
E2SS	Estuarine Intertidal Scrub/Shrub	0.0	0.0
E2EM	Estuarine Intertidal Emergent	1.0	0.9
PFO	Palustrine Forested	6.2	26.4
PSS	Palustrine Scrub/Shrub	0.3	0.2
PEM	Palustrine Emergent	0.3	4.2
Total		7.8	31.7

Alternative 1 would potentially impact tidal waters, jurisdictional ditches, and streams. Widening of the roadways by hardening shoulders, or by adding lanes, could require the extension of existing culverts under the roadways. Relocated lanes could require new culverts or bridges where they currently do not exist in the right-of-way. The potential impacts to waters within Alternative 1 are presented in **Table 3-15**. Impacts are listed by Cowardin classification. These lengths and acreages are based upon the LOD but may be reduced through further avoidance and minimization measures during detailed design.

Table 3-15: Impacts to Waters

System Abbreviation	System Description	Alternative 1	Alternative 2
E1UB	Estuarine Subtidal Unconsolidated Bottom	<0.1 Acre	<0.1 Acre
JD/PUBx	Jurisdictional Ditch/Palustrine Unconsolidated Bottom Excavated	1.0 Acre	1.9 Acre
R2	Lower Perennial Stream	356 Linear Feet	0 Linear Feet
R3	Upper Perennial Stream	1,310 Linear feet	1,647 Linear feet
R4	Intermittent Stream	2,401 Linear feet	1,148 Linear feet
R6	Ephemeral Stream	36 Linear feet	0 Linear feet

Less than 0.1 acre of estuarine subtidal unconsolidated bottom impacts would potentially occur with Alternative 1 improvements. These impacts would be located within the tidal tributary to Goose Creek located north of, and between, the NB and SB I-664 travel lanes, and southwest of Goodman Street in

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Chesapeake, and would result from the introduction of fill material associated with culvert lengthening and cut/fill slopes. Less than 0.1 acre of impacts would occur to Mitigation Site No. 2 near the center of the interchange. Alternative 1 would impact jurisdictional ditches and excavated palustrine unconsolidated bottom systems such as stormwater ponds, agricultural ditches, and jurisdictional roadside and trackside ditches. These systems are distributed throughout the interchange and would be disturbed associated with cut/fill slopes. Impacts to ditches and streams would result from culvert installation and lengthening and cut/fill slopes.

As the Bowers Hill Interchange Improvements Study advances beyond the NEPA review and concurrence points included in the merged process, additional design measures to avoid or minimize unavoidable impacts to WOUS may be identified in advance, or as part of the permitting process; therefore, reducing the compensatory mitigation requirements. These measures may include use of the smallest practicable roadway footprint to avoid and minimize the impact to WOUS by using the steepest practicable fill slopes and/or retaining walls. See the *Natural Resources Technical Report* (VDOT, 2019d) for additional discussions regarding permit requirements.

3.9.2.3 Alternative 2

Impacts to wetlands associated with Alternative 2 would likely result from fills associated with bridge approaches and abutments, and roadway cut/fill slopes. Also, most wetland impacts associated with Alternative 2 would occur to wetlands similar to, or including, those assessed with functional assessment points FA 1 and FA 2 (**Figure 3-9**), which represent fragmented and disturbed wetlands with fewer functions and values. While the LOD of Alternative 2 is greater in size, the disturbance is still largely confined to areas within the ramps and loops of the interchange.

Alternative 2 improvements would result in impacts to estuarine subtidal unconsolidated bottoms, jurisdictional ditches, streams, and Mitigation Site No. 2 (0.2 acre). Impact avoidance and minimization measures, and compensatory mitigation options, would be considered if Alternative 2 proceeds to the permitting phase. See the *Natural Resources Technical Report* (VDOT, 2019d) for additional discussions regarding permit requirements.

3.10 WATER QUALITY

The methodology for assessing water quality along with greater detail on existing conditions, environmental consequences, and potential mitigation are provided in the *Natural Resources Technical Report* (VDOT, 2019d).

3.10.1 Existing Conditions

According to the latest *Virginia Water Quality Assessment 305(b)/303(d) Integrated Report* released by VDEQ, approximately 2,346 linear feet of Goose Creek, and approximately 880 linear feet of a tidal tributary, are listed as impaired waters in the Study Area (VDEQ, 2018). According to the VDEQ report, both waterways do not support aquatic life nor open water aquatic life designated uses due to low dissolved oxygen levels. The aquatic life designated use is assessed, based on water quality standards, to determine if the waterbody supports the propagation, growth, and protection of a balanced indigenous population of aquatic life which may be expected to inhabit a waterbody. The open water aquatic life designated sub-use is evaluated in waters of the Chesapeake Bay, and its tidal tributaries, to determine if

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the open water areas protect the survival, growth, and propagation of a balanced, indigenous population of aquatic life.

The major suspected sources of the impairments are industrial and municipal point source discharges, loss of riparian habitat, and nonpoint sources (including atmospheric deposition and wet weather discharges). Total Maximum Daily Loads have been established and approved by the USEPA for the Chesapeake Bay Basin (Total Nitrogen, Total Phosphorus, and Sediment), and the Elizabeth River Watershed (Enterococci bacteria), both of which include the Study Area. The Chesapeake Bay Basin total maximum daily load (TMDL) has not yet been approved by the State Water Control Board (VDEQ, 2019).

3.10.2 Environmental Consequences

3.10.2.1 No-Build Alternative

No project-related construction or changes to the natural environment would occur under the No-Build Alternative. Thus, project-related environmental effects to currently impaired waters would not occur.

3.10.2.2 Alternative 1

Impaired waters do occur in the Study Area; however, they do not extend into the LOD of Alternative 1. Therefore, Alternative 1 would not directly disturb impaired waters. Construction of Alternative 1 would increase impervious surface area in the LOD. Therefore, the potential exists that stormwater runoff would also increase. The increase in stormwater runoff associated with Alternative 1 has the potential to carry increased amounts of roadway pollutants downstream to impaired waters which could impact water quality. The indirect effects of Alternative 1 on downstream/impaired waters, and possible avoidance/mitigation measures, are discussed in the *Bowers Hill Interchange Improvements Study Indirect and Cumulative Effects Technical Report* (VDOT, 2019e).

Alternative 1 could result in temporary impacts to water quality during roadway construction through increased sedimentation from land disturbing activities and occurrences of petroleum spills from construction equipment in the LOD. These direct impacts to water quality would be mitigated through use of strict erosion and sediment control and stormwater measures and the associated required monitoring protocols, as specified in the State Water Control Law. In addition, implementation of required best management practices would minimize the negative direct impacts to water quality in the LOD and in downstream waters. These stormwater management facilities would not be located within WOUS.

3.10.2.3 Alternative 2

Impaired waters do not extend into the LOD of Alternative 2. Therefore, Alternative 2 would not directly disturb impaired waters. The potential for indirect effects to water quality exists with Alternative 2 due to increases in impervious surface area. These effects are discussed in the *Indirect and Cumulative Effects Technical Report* (VDOT, 2019e). Alternative 2 could result in temporary impacts to water quality due to land disturbance and construction activities, but these direct impacts to water quality would be mitigated through use of strict erosion and sediment control and stormwater measures and the associated required monitoring protocols.

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3.11 FLOODPLAINS

The methodology for assessing floodplains along with greater detail on existing conditions, environmental consequences, and potential mitigation are provided in the *Natural Resources Technical Report* (VDOT, 2019d).

3.11.1 Existing Conditions

The Study Area has approximately 125 acres within the 100-year floodplain and 51 acres in the 500-year floodplain (FEMA, 2018). Approximately three quarters of the Study Area lies within 2,000 feet of FEMA-mapped 100-year floodplains. The 100-year floodplain includes those areas that statistically have a one percent chance of being flooded in any given year. The 500-year floodplain includes those areas that statistically have a 0.2 percent chance of being flooded in any given year. The floodplains occurring within the Study Area are associated with Goose Creek and its tributaries (**Figure 3-10**).

3.11.2 Environmental Consequences

3.11.2.1 No-Build Alternative

No project-related construction or changes to the natural environment would occur under the No-Build Alternative. Thus, project-related environmental effects to floodplains would not occur.

3.11.2.2 Alternative 1

No new floodplain crossings are necessary for Alternative 1 improvements. Alternative 1 would involve additional encroachment within regulatory floodplains as documented in **Table 3-16**. The impacts would include 100-year and 500-year floodplain impacts associated with an expanded crossing of those floodplains located in the interchange where a tidal tributary of Goose Creek currently extends underneath of the merged roadways of EB I-64 and WB I-264, to the southwest of Goodman Street in Chesapeake.

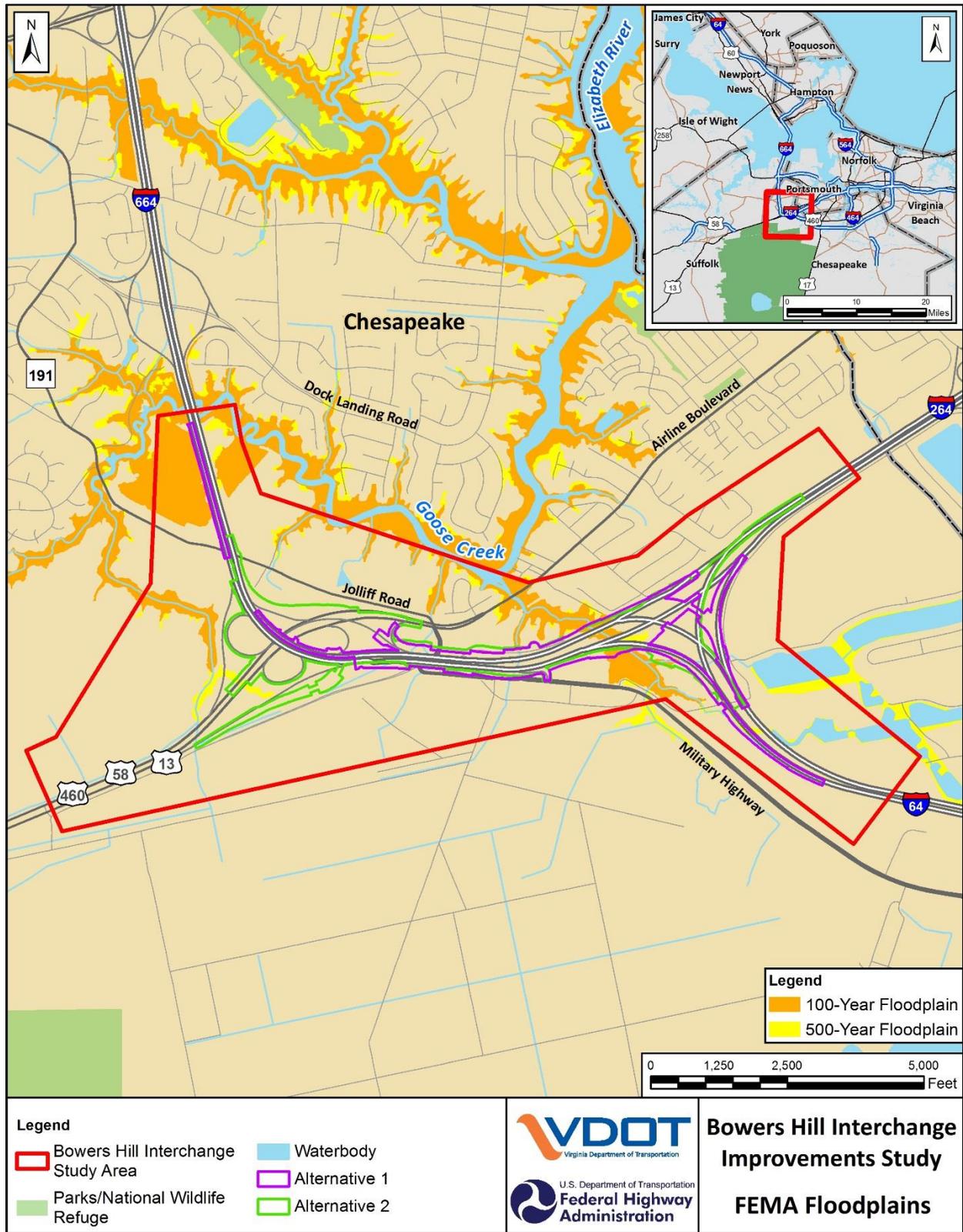
It is not anticipated that Alternative 1 would pose a substantial flooding risk due to the expanded crossing. It would be designed consistent with procedures for the location and hydraulic design of highway encroachments on floodplains contained in 23 CFR 650 Subpart A. Also, it is not expected to increase flood elevations, the probability of flooding, or the potential for property loss and hazard to life. Finally, it is not anticipated that impacts from the alternative would have substantial adverse impacts on natural and beneficial floodplain values due to the expanded crossing.

The majority of floodplain encroachment from Alternative 1 would be from the perpendicular crossing of floodplains, not from longitudinal encroachments. Perpendicular crossings would result in less floodplain fill, maximizing floodwater conveyance and storage compared to longitudinal encroachments. As mentioned in **Section 2.4**, no differentiation was made between those roadway features constructed on structure (less floodplain impact) and those which would occur within fill areas (more floodplain impact). If Alternative 1 were to proceed to detailed design and permitting, the actual encroachments may be different based upon the total extent of fill required for construction of the improvements.

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Figure 3-10: FEMA Floodplains



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Table 3-16: Impacts to Floodplains

Floodplain	Alternative 1 (Acres)	Alternative 2 (Acres)
100-Year	5.0	4.5
500-Year	4.7	4.2
Total	9.7	8.7

3.11.2.3 Alternative 2

Alternative 2 would include additional encroachment upon the 100-year and 500-year floodplains in the Study Area. These encroachments would occur within the Goose Creek tributary floodplains as well as within a portion of the 500-year floodplain located north of West Military Highway, and south of the I-664 SB travel lanes. It is anticipated that if advanced to a detailed design, Alternative 2 would not pose a substantial flooding risk, nor is it anticipated that the alternative would increase flood elevations, the probability of flooding, or the potential for property loss and hazard to life due to the expansion of floodplain encroachments. The actual encroachments values realized with a detailed design may be different based upon the total extent of fill required for construction of the improvements.

3.12 FARMLANDS

The methodology for assessing farmlands along with greater detail on existing conditions, environmental consequences, and potential mitigation are provided in the *Natural Resources Technical Report* (VDOT, 2019d).

3.12.1 Existing Conditions

Statewide data provided by the Virginia Department of Forestry indicates that there are no Agricultural and Forestal Districts within the Study Area. Citywide data obtained from the Natural Resources Conservation Service (NRCS) indicates that the Study Area contains the acreages of prime and statewide important farmland soils provided in **Table 3-17** (Soil Survey Staff, 2018). Prime farmland soils occur in the western half of the Study Area, both east and west of I-664, in the central portion of the Study Area, south of I-664, and in the northeast and southeast along I-264 and I-64, respectively.

NRCS cropland data identifies agricultural croplands as occurring in the Study Area (Soil Survey Staff, 2018). Identified crop types include corn, soybean, other types of hay/non-alfalfa, and double crops of winter wheat and soybean. Almost all of the cropland areas coincide with soils identified as prime farmland soils (if drained). The majority occur south of I-664, in the center of the Study Area. **Figure 3-11** shows the extent of identified croplands, and farmland soils, in the Study Area.

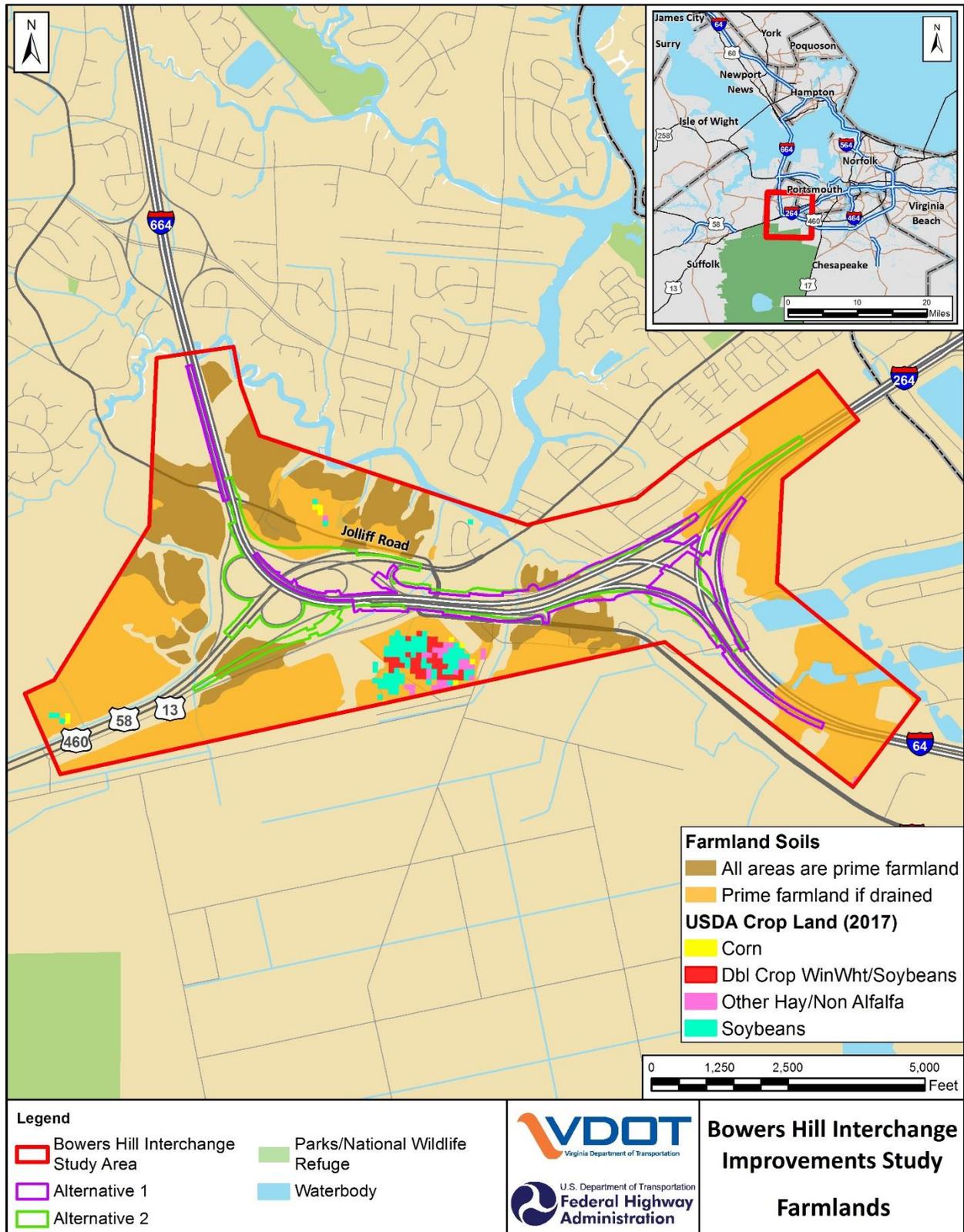
Table 3-17: Prime, Unique, or Important Farmland Soils within the Study Area

Soil	Acres
Prime Farmland	211.1
Prime Farmland if Drained	505.3
Farmland of Statewide Importance	0
Farmland of Local or Unique Importance	0

Note: Soil Survey Staff (2018)

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Figure 3-11: Farmlands



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3.12.2 Environmental Consequences

3.12.2.1 No-Build Alternative

No project-related construction or changes to the natural environment would occur under the No-Build Alternative. Thus, project-related environmental effects to farmland and farmland soil resources would not occur.

3.12.2.2 Alternative 1

According to the data obtained using the NRCS cropland data layer, no identified croplands occur within the LOD of Alternative 1. Alternative 1 has the potential to impact a small amount (approximately 2.3 acres) of prime farmland soils (including prime farmland if drained) located in the LOD. This is approximately 0.5 percent of the overall amount of identified farmland soils in the Study Area. FHWA submitted an NRCS-CPA-106 Farmland Conversion Impact Rating for Corridor Type Projects Form to the NRCS to determine if farmland impacts from Alternative 1 exceed the recommended allowable level determined by NRCS. FHWA determined that the anticipated impacts associated with Alternative 1 do not exceed allowable levels, and alternative actions such as modifications or mitigation were not necessary. For more information on the review completed for impacts to farmland soils, see the *Natural Resources Technical Report* (VDOT, 2019d).

3.12.2.3 Alternative 2

No identified croplands occur within the LOD of Alternative 2. Alternative 2 has the potential to impact approximately 15.4 acres of farmland soils located in the LOD. This is approximately 3.2 percent of the overall amount of identified farmland soils in the Study Area. These impacts would occur within the western half of the Study Area where these soils are prevalent. Similar to Alternative 1, FHWA submitted an NRCS-CPA-106 Farmland Conversion Impact Rating for Corridor Type Projects Form to the NRCS to determine if farmland impacts from Alternative 2 exceed the recommended allowable level determined by NRCS. As with Alternative 1, FHWA determined that the anticipated impacts associated with Alternative 2 do not exceed allowable levels, and alternative actions such as modifications or mitigation were not necessary.

3.13 AIR QUALITY

The methodology for assessing air quality along with greater detail on existing conditions, environmental consequences, and potential mitigation are provided in the *Bowers Hill Interchange Improvements Study Air Quality Technical Report* (VDOT, 2019f).

3.13.1 Existing Conditions

3.13.1.1 Regional Air Quality Status

The USEPA Green Book⁶ lists the City of Chesapeake as being in attainment for all of the National Ambient Air Quality Standards (NAAQS). Notwithstanding that listing in the USEPA Green Book, federal conformity requirements, including specifically 40 CFR 93.114⁷ and 40 CFR 93.115⁸, apply for the project as the area

⁶ USEPA Green Book: <https://www3.epa.gov/airquality/greenbook/faq.html>

⁷ See: <https://www.gpo.gov/fdsys/pkg/CFR-2014-title40-vol20/xml/CFR-2014-title40-vol20-sec93-114.xml>

⁸ See: <https://www.gpo.gov/fdsys/pkg/CFR-2014-title40-vol20/xml/CFR-2014-title40-vol20-sec93-115.xml>

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in which it is located is one affected by a recent court decision⁹ that reinstates conformity requirements nationwide associated with the 1997 ozone NAAQS that had previously been eliminated with the revocation by the USEPA of that NAAQS in 2015. Therefore, the project must be included in a currently conforming plan and program.

3.13.1.2 Transportation Plan and Program Status

The project is currently included in the Hampton Roads Transportation Planning Organization (HRTPO) FY 2018 – 2021 Transportation Improvement Program (TIP) [UPC # 111427 (preliminary engineering only)] and the HRTPO 2040 LRTP (HRTPO, 2017c). The most recent conformity analysis¹⁰ was completed in August 2018, with FHWA and Federal Transit Administration (FTA) issuing a conformity finding on October 29, 2018 for the TIP and Constrained LRTP covered by that analysis.

3.13.1.3 Project-Level Conformity Determination

As noted previously, the project is included in the TIP, LRTP, and conformity analysis; therefore, the project-conformity requirements (specifically 40 CFR 93.114 and 93.115) are met, as well as the consultation requirement (40 CFR 93.112), as documented in the *Bowers Hill Interchange Improvement Study Air Quality Technical Report* (VDOT, 2019f).

3.13.2 Environmental Consequences

3.13.2.1 Carbon Monoxide

As the project is located in a region that is in attainment of the NAAQS for carbon monoxide (CO), only NEPA applies, and USEPA project-level (“hot-spot”) transportation conformity requirements do not apply. For purposes of NEPA, the potential for CO impacts from the project in terms of potential violations of the NAAQS was assessed and no potential impacts were identified.

Eleven intersections were identified within the Study Area. The project intersections meet the criteria for the application of the Federal Highway Administration and Virginia Department of Transportation Programmatic Agreement for Project-Level Air Quality Analyses for Carbon Monoxide (April 2016) (2016 FHWA-VDOT PA); therefore, a project-specific quantitative analysis is not needed for the eleven intersections. Two interchange locations were studied in detail for Alternative 1 and Alternative 2 in the Base year (2018), Advanced year (2025), Opening year (2037), and Design year (2040). Each of these scenarios were evaluated using worst-case assumptions and USEPA models. These assumptions included worst-case grade separation configuration with receptors located in close proximity to the cross-over point (inside the right-of-way) and where the highest modeled concentrations would be observed. The results of the modeling for each of the interchanges indicated that, despite worst-case assumptions for traffic volume, roadway configuration, and receptor placement, the modeled worst-case CO concentrations remain well below the CO NAAQS at all receptor locations for each interchange and option.

⁹ See: [https://www.cadc.uscourts.gov/internet/opinions.nsf/217B6778AE3EC89C8525823600532AE0/\\$file/15-1115-1718293.pdf](https://www.cadc.uscourts.gov/internet/opinions.nsf/217B6778AE3EC89C8525823600532AE0/$file/15-1115-1718293.pdf). The court decision addresses the 2015 revocation by USEPA of the 1997 ozone NAAQS for which this region was previously in maintenance. Pending any further legal changes, the immediate effect of the February court decision is to reinstate conformity requirements that had been eliminated with the revocation by USEPA of that NAAQS.

¹⁰ See: https://www.hrtpo.org/library/view/359/hampton-roads-virginia-eight_hour-ozone-maintenance-area-regional-conformity-analysis-2040-long-range-transportation-plan-and-fy-18_21-transportation-improvement-program/

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3.13.2.2 Mobile Source Air Toxics

FHWA guidance (2016¹¹) specifies Mobile Source Air Toxics (MSATs) to include acrolein, benzene, 1,3 butadiene, diesel particulate matter, formaldehyde, naphthalene, and polycyclic organic matter. Following FHWA guidance, which specifies three possible tiers of analysis and associated criteria depending on specific project circumstances, this project may be categorized as one with higher potential MSAT effects based on the criteria specified in FHWA guidance and the forecast traffic volumes for this project. A quantitative assessment was therefore conducted for the project, following FHWA guidance for projects with higher potential impacts.

Overall, best available information indicates that nationwide regional levels of MSATs are expected to decrease in the future due to ongoing fleet turnover and the continued implementation of increasingly more stringent emission and fuel quality regulations. Nonetheless, technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects effectively limit meaningful or reliable estimates of MSAT emissions and effects of this project at this time. While it is possible that localized increases in MSAT emissions may occur as a result of this project, emissions will likely be lower than present levels in the Design year of this project as a result of USEPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent between 2010 and 2050. Although local conditions may differ from these national projections in terms of fleet mix and turnover, vehicle-miles-travelled (VMT) growth rates, and local control measures, the magnitude of the USEPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the Study Area are likely to be lower in the future in nearly all cases.

3.13.2.3 Climate Change and Greenhouse Gases

Consistent with the related VDOT Resource Document (Section 4.7) protocol, a climate change and greenhouse gas (GHG) analysis is not required for this project as an EA and not an Environmental Impact Statement (EIS) is being prepared.

3.13.2.4 Mitigation

Emissions may be produced in the construction of this project from heavy equipment and vehicle travel to and from the site, as well as from fugitive sources. Construction emissions are short term or temporary in nature. To mitigate these emissions, all construction activities are to be performed in accordance with VDOT *Road and Bridge Specifications*.¹²

The Virginia Department of Environmental Quality (VDEQ) provides general comments for projects by jurisdiction. Their comments in part address mitigation.¹³ For the City Chesapeake, VDEQ comments relating to mitigation are “...all reasonable precautions should be taken to limit the emissions of VOC and NOx. In addition, the following VDEQ air pollution regulations must be adhered to during the construction

¹¹ FHWA, “INFORMATION: Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents”, October 18, 2016. See: http://www.fhwa.dot.gov/environment/air_quality/air_toxics/

¹² See <http://www.virginiadot.org/business/const/spec-default.asp>

¹³ Spreadsheet entitled: “DEQ SERP Comments rev8b”, March 2017

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of this project: 9 VAC 5-130, Open Burning restrictions¹⁴; 9 VAC 5-45, Article 7, Cutback Asphalt restrictions;¹⁵ and 9 VAC 5-50, Article 1, Fugitive Dust precautions.”¹⁶

3.14 NOISE

The methodology for assessing noise along with greater detail on existing conditions, environmental consequences, and potential mitigation are provided in the *Bowers Hill Interchange Improvements Study Noise Analysis Technical Report* (VDOT, 2019g).

3.14.1 Existing Conditions

Ambient short-term measurement noise levels are provided in **Table 3-18** as equivalent sound levels (Leq), along with site address. The measured “Total” Leq range from a low of 58 dBA at 4624 Westborough Drive (Site M-01) to a high of 72 dBA at 4433 S Military Highway (Site ST3). These measurements are for model validation and do not necessarily represent worst-case existing noise levels, but they show the measured total Leqs and the “traffic-only” Leqs are the same at all sites, which indicates that traffic is the dominant source of noise at each location. No existing noise barriers are present within the Study Area.

Table 3-18: Short-Term Noise Measurement Results

Site	Address	Total Leq, dB(A)	Traffic Only Leq, dB(A)
ST1	4117 Cedar Grove Crescent	65	65
ST2	3933 Spring Meadow Crescent	67	67
ST3	4433 S Military Highway	72	72
ST4	1401 Rotunda Ave	62	62
M35	1204 Jolliff Road	68	68
M36	1432 Branchview Way	66	66
M-01	4624 Westborough Drive	58	58
M-02	4505 Westborough Drive	59	59
M-03	4544 South Military Highway	66	66
M-04	4512 South Military Highway	63	63

Existing noise was assessed for 2018; No-Build and Build noise environments were assessed for Design Year 2040.

Numerous receptors are predicted to experience noise levels that exceed impact criteria for the Worst-Hour Existing condition, particularly those front-row properties with direct exposure to the roadways. See **Table 3-19** for predicted Worst-Hour Existing noise level ranges, which includes noise levels for design-year No-Build and Build Alternative conditions. No-Build and Build noise levels are discussed in the following sections.

¹⁴ See: <http://leg1.state.va.us/000/reg/TOC09005.HTM#C0130>

¹⁵ See: <http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC5-45-760>

¹⁶ See: <http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC5-50-60>

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Table 3-19: Predicted Worst-Hour Noise Levels for Modeled Receptors

CNE ID	Area Land Use and Description	Range of Predicted Worst-Hour L_{eq} Exterior Noise Levels, dB(A)			
		Existing 2018	No-Build 2040	Alt. 1 2040	Alt. 2 2040
01	Single-family residences adjacent to I-664 SB, to the north and south of Jolliff Road, on Jolliff Road and Branchview Way.	58 – 69	59 – 70	58 – 70	59 – 70
02	America's Best Value Inn swimming pool and single-family residences north of Indiana Ave and south of I-664 EB off S Military Highway.	58 – 74	58 – 75	56 – 66	58 – 74
03	Single-family residences to the east of I-64 on Rotunda Avenue and Grand Isle Drive.	61 – 66	62 – 68	64 – 69	62 – 66
04	Single-family residences adjacent to I-264 WB and I-664 WB on Spring Meadow Crescent, Goodman Street and Keaton Way.	56 – 72	58 – 73	57 – 72	57 – 72
05	Single-family residences and mobile homes to the north of I-664 on Airline Boulevard and Ridgeway Avenue.	61 – 72	62 – 73	61 – 64	63 – 69
06	Jolliff Middle School track and sports field, plus single-family residences adjacent to U.S. Routes 13, 58 and 460 on Flintfield Crescent and Westborough Drive.	58 – 65	59 – 66	59 – 63	59 – 66
07	Single family residences adjacent to I-664 NB, to the north and south of Jolliff Road, on Jolliff Road and Summerest Drive.	57 – 70	58 – 71	58 – 71	58 – 74

3.14.2 Environmental Consequences

3.14.2.1 No-Build Alternative

The No-Build Alternative retains the existing configuration of the Bowers Hill Interchange and is modeled with worst noise hour traffic conditions predicted for the 2040 design year. No-Build Alternative noise levels are generally 1 dB(A) greater than existing noise levels, and are generally similar to, or slightly less than Build levels (**Table 3-20**).

Table 3-20: Noise Impacts by CNE and Land Use

CNE ID	Residential Dwelling Unit Category B Impacts ¹			
	Existing 2018	No-Build 2040	Alt. 1 2040	Alt. 2 2040
01	2	3	3	4
02	13	13	10	16
03	3	6	7	3
04	32	39	29	31
05	2	2	0	1
06	0	6	NA ²	11
07	4	4	4	4

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CNE ID	Residential Dwelling Unit Category B Impacts ¹			
	Existing 2018	No-Build 2040	Alt. 1 2040	Alt. 2 2040
Total	55	72	53	70

¹ For Existing and No-Build conditions, denotes the number of receptors that approach or exceed the FHWA NAC, rather than impacts as defined in Section 2.3. Determination of impact applies to the Build condition only.

²CNE 06 is not within the study limit for Alternative 1.

3.14.2.2 Alternative 1

Numerous noise impacts are predicted for the Worst-Hour No-Build and Alternative 1 conditions. Build condition noise impacts are predicted at all CNEs that are within the 500-foot study limit for Alternative 1. Alternative 1 is predicted to impact 53 residences due to noise levels approaching or exceeding the NAC. In some cases, the lower number of Build impacts relative to No-Build reflects the potential for property acquisitions with Alternative 1, as with CNEs 02, 04 and 05. See **Table 3-20** for a summary of noise impacts.

3.14.2.3 Alternative 2

As with Alternative 1, numerous noise impacts are predicted for the Worst-Hour Alternative 2 conditions. Alternative 2 is predicted to impact 70 residences. In some cases, the lower number of Build impacts relative to No-Build reflects the potential for property acquisitions with Alternative 2.

3.14.3 Noise Abatement

When the predicted Design Year Build Alternative scenario noise levels approach or exceed the NAC during the loudest hour of the day or cause a substantial increase in existing noise, consideration of traffic noise reduction measures is warranted. If it is found that such mitigation measures would cause adverse social, economic, or environmental effects that outweigh the benefits received, they may be dismissed from consideration.

Noise barrier analyses are warranted for all CNEs with noise impacts. Noise barriers were studied at impacted CNEs 01, 02, 03, 04 and 07 for Alternative 1. All noise barriers are assumed to be physically feasible and were evaluated at various lengths and panel heights of 15 feet to 30 feet, in 5-foot increments, to determine whether they meet acoustic feasibility, design goal, and reasonableness criteria.

Potential noise barriers are determined to be feasible and reasonable at CNE 04 for Alternative 1 (**Table 3-21**). Noise barriers that are shown to be feasible and reasonable in the preliminary design may not be feasible and reasonable in final design. All noise barriers would be further evaluated in final design to determine any engineering constraints associated with constructing the noise barrier. More information is provided in the *Noise Analysis Technical Report* (VDOT, 2019g).

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Table 3-21: Summary of Barrier Characteristics – Alternative 1

CNE ID	Barrier Length (Feet)	Barrier Height (Feet)	Surface Area (SF)	Feasible ?	Total Benefits	Cost @ \$42 per SF	Barrier Square Feet per Benefited Receptor	Reasonable? (SF per Benefit <1,600)
01	971	15	14,565	Yes	4	\$611,730	3,641	No
02	2,653	30	79,590	No				
03	1,384	15	20,760	Yes	9	\$871,920	2,307	No
04	4,554	15	68,310	Yes	57	\$2,869,020	1,198	Yes
07	1,603	15	24,045	Yes	5	\$1,009,890	4,809	No

Noise barriers were studied at impacted CNEs 01 through 07 for Alternative 2. Potential noise barriers are determined to be feasible and reasonable at CNE 04 for Alternative 2 (**Table 3-22**). Noise barriers that are shown to be feasible and reasonable in the preliminary design may not be feasible and reasonable in final design. If it proceeds to final design, all noise barriers would be further evaluated for Alternative 2 improvements to determine any engineering constraints associated with constructing the noise barrier.

Table 3-22: Summary of Barrier Characteristics – Alternative 2

CNE ID	Barrier Length (Feet)	Barrier Height (Feet)	Surface Area (SF)	Feasible?	Total Benefits	Cost @ \$42 per SF	Barrier SF per Benefited Receptor	Reasonable? (SF per Benefit <1,600)
01	804	30	24,120	No				
01	971	15	14,565	Yes	4	\$611,730	3,641	No
02	3,024	30	90,720	No				
03	1,384	30	41,520	Yes	9	\$1,743,840	4,613	No
04	5,085	15	76,275	Yes	85	\$3,203,550	897	Yes
05	771	15	11,565	Yes	1	\$485,730	11,565	No
06	1,452	15	21,780	Yes	10	\$914,760	2,178	No
07	1,522	15	22,830	Yes	5	\$958,860	4,566	No

Any noise barriers identified in this document must satisfy VDOT’s feasibility and reasonableness criteria. Therefore, the noise barrier design parameters and cost identified in this document are preliminary and should not be considered final. A final decision on the feasibility and reasonableness of noise barriers would be made during final design. At that time the affected public would be given an opportunity to decide whether they are in favor of construction of the noise barrier.

3.15 HAZARDOUS MATERIALS

The methodology for assessing hazardous materials along with greater detail on existing conditions, environmental consequences, and potential mitigation are provided in the *Bowers Hill Interchange Improvements Study Hazardous Materials Technical Report* (VDOT, 2019h).

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3.15.1 Existing Conditions

The results of the federal and state regulatory database listing review for contaminated and hazardous waste, including handling, storage, disposal, or release sites within one mile of the Study Area were compiled and evaluated for the potential for additional mobilization or exposure due to project construction. A total of 58 sites were identified within one mile of the improvements. Details of the sites are provided in the *Hazardous Materials Technical Report* (VDOT, 2019h).

3.15.2 Environmental Consequences

The 58 known sites were evaluated for the potential impact on project construction due to their type of contamination, and location relative to the LOD of each alternative. **Table 3-23** summarizes the number of High, Moderate, and Low priority sites located within ½ mile of the Build Alternatives. The properties listed as High, Moderate, and Low priority sites were identified due to documented or observed handling, storage, release, or transport of contaminated materials. Thirteen of the 58 sites were eliminated from the risk assessment because either they are located greater than ½ mile from the improvements, have no history of contamination or spills, or are located down- or cross- gradient and over 500 feet from the improvements.

Table 3-23: Project Sites of Concern

Hazmat Ranking	Number of Sites within ½ mile of Build Alternatives
None	13
Low	26
Moderate	13
High	6

3.15.2.1 No-Build Alternative

The No-Build would not result in any project related construction and would therefore not impact any hazardous materials sites within the Bowers Hill Interchange.

3.15.2.2 Alternative 1

Based on the EDR Database Report reviewed, CEDAR data, and cross checking with the findings of the HRCS and U.S. Route 460/58/13 Connector Study, two high and medium priority sites, and three low priority sites are located within the LOD of Alternative 1 (**Table 3-24**). The primary contaminants of concern at these sites include biological contamination, solid waste, petroleum products, paint, volatile organic compounds, lead, and heavy metals. See the *Hazardous Materials Technical Report* (VDOT, 2019h) for figures displaying the location of priority sites in the Study Area.

Should the alternative advance, prior to or during right-of-way acquisition, a Phase I Environmental Site Assessment (ESA), consistent with the current American Society for Testing and Materials (ASTM) method is recommended. Findings from the ASTM Phase I ESA would be used to determine the applicability for an ASTM Phase II ESA. Any necessary remediation would be conducted in compliance with federal and state environmental laws and would be coordinated with the USEPA, VDEQ, and other regulatory agencies, as necessary. The potential impacts would not influence FHWA's NEPA decision.

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Table 3-24: Sites of Concern Relative to the LOD

Site	Alternative 1 Location	Alternative 2 Location	Hazmat Ranking	Contaminants of Concern
Jolliff Road Emergency Landfill	Approximately 445' away and downslope from LOD	Within LOD	High	Petroleum products, metals, PCBs
Right-of-Way	Approximately 90' from LOD; similar elevation	Approximately 45' from LOD; similar elevation	Low	Biological contamination
Hog Farm	Within LOD	Within LOD	Medium	Biological contamination
Ray Callaway Residence	Approximately 200' from LOD; similar elevation	Approximately 210' from LOD; similar elevation	High	Petroleum products
Royal Pest Solutions	Within LOD	Approximately 125' away and downslope from LOD	High	Solid waste, petroleum products, paint, volatile organic compounds
Chesbay Distributing Co.	Approximately 300' away and downslope from LOD	Over 500' away and downslope from LOD	Low	Petroleum products, pH
Sumitomo Machinery	Approximately 270' away and downslope from LOD	Over 1,100' away and downslope from LOD	Low	Unknown
Ruan Leasing Co.	Approximately 100' away from LOD; similar elevation	Over 1,250' away and downslope from LOD	Medium	Petroleum products
W.E. Curling	Within LOD	Over 1,600' away and downslope from LOD	Low	Petroleum products
Hoffman Beverage Co.	Approximately 10' away from LOD; similar elevation	Over 1,900' away and downslope from LOD	Low	Petroleum products
Residence	Within LOD	Approximately 10' away from LOD; similar elevation	Low	Petroleum products
Norfolk County Rifle Range	Within LOD	Within LOD	Low	Lead, heavy metals
Bowers Hill Motel	Within LOD	Approximately 10' away from LOD; similar elevation	Medium	Petroleum products
Happy Shopper	Within LOD	Within LOD	High	Petroleum products, metals
Southern Pines Tract	Approximately 45' away from LOD; similar elevation	Approximately 130' away and downslope from LOD	Low	Unknown

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Site	Alternative 1 Location	Alternative 2 Location	Hazmat Ranking	Contaminants of Concern
City of Chesapeake	Approximately 85' away from LOD; similar elevation	Approximately 130' away and downslope from LOD	Low	Biological contamination, metals
Frank's Trucking Center	Approximately 360' away from LOD; similar elevation	Approximately 130' away from LOD; similar elevation	High	Petroleum products, metals
Capital Concrete	Approximately 570' away from LOD; similar elevation	Approximately 380' away from LOD; similar elevation	Low	Unknown
Moore Residence	Approximately 630' away from LOD; similar elevation	Approximately 630' away from LOD; similar elevation	Medium	Petroleum products, metals, solid waste

3.15.2.3 Alternative 2

Based on information contained in the reviewed sources, two high priority sites, and one medium and low priority site are located within the LOD of Alternative 2 (**Table 3-24**). The primary contaminants of concern at these sites are similar to those listed for Alternative 1. See the *Hazardous Materials Technical Report* (VDOT, 2019h) for figures displaying the location of these priority sites in the Study Area.

Should the alternative advance, prior to or during right-of-way acquisition, a Phase I ESA, consistent with the current ASTM method is recommended. Findings from the ASTM Phase I ESA would be used to determine the applicability for an ASTM Phase II ESA. Any necessary remediation would be conducted in compliance with federal and state environmental laws and would be coordinated with the USEPA, VDEQ, and other regulatory agencies, as necessary. The potential impacts would not influence FHWA's NEPA decision.

3.16 HISTORIC RESOURCES

Potential effects on historic resources were assessed in accordance with the requirements of Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) (54 U.S.C. 306108) and its implementing regulations (36 CFR Part 800). Section 106 requires federal agencies to take into account the effects of their undertakings on "historic properties", defined as buildings, structures, sites, districts and objects, generally at least 50 years of age, that are listed on or eligible for listing on the National Register of Historic Places (NRHP). The Section 106 process is undertaken by federal agencies in consultation with the State Historic Preservation Officer (SHPO), who in Virginia is the director of the Virginia Department of Historic Resources (VDHR); the Advisory Council on Historic Preservation (ACHP), as appropriate; federally-recognized Indian tribes; representatives of local government; and other parties with a demonstrated interest in an undertaking.

For the purposes of Section 106, an Area of Potential Effects (APE) was defined for the study. The APE is the geographic area within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties. The LOD for each Build Alternative was used to define the portion of the APE within which ground disturbance from construction activities may occur. The geographic area

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in which potential visual or noise effects may occur extended outward from the LOD. The boundaries of the APE for architectural and archaeological resources, along with the methodologies used to identify or assess the potential for historic properties within the APE, are presented in detail in two technical reports, *Bowers Hill Interchange Improvements Study Historic Architectural Survey Management Summary* (VDOT, 2019i) and *Bowers Hill Interchange Improvements Study Archaeological Assessment Technical Report* (VDOT, 2019j). The SHPO concurred on the definition of the APE in January 2019.

3.16.1 Architectural Resources, Existing Conditions

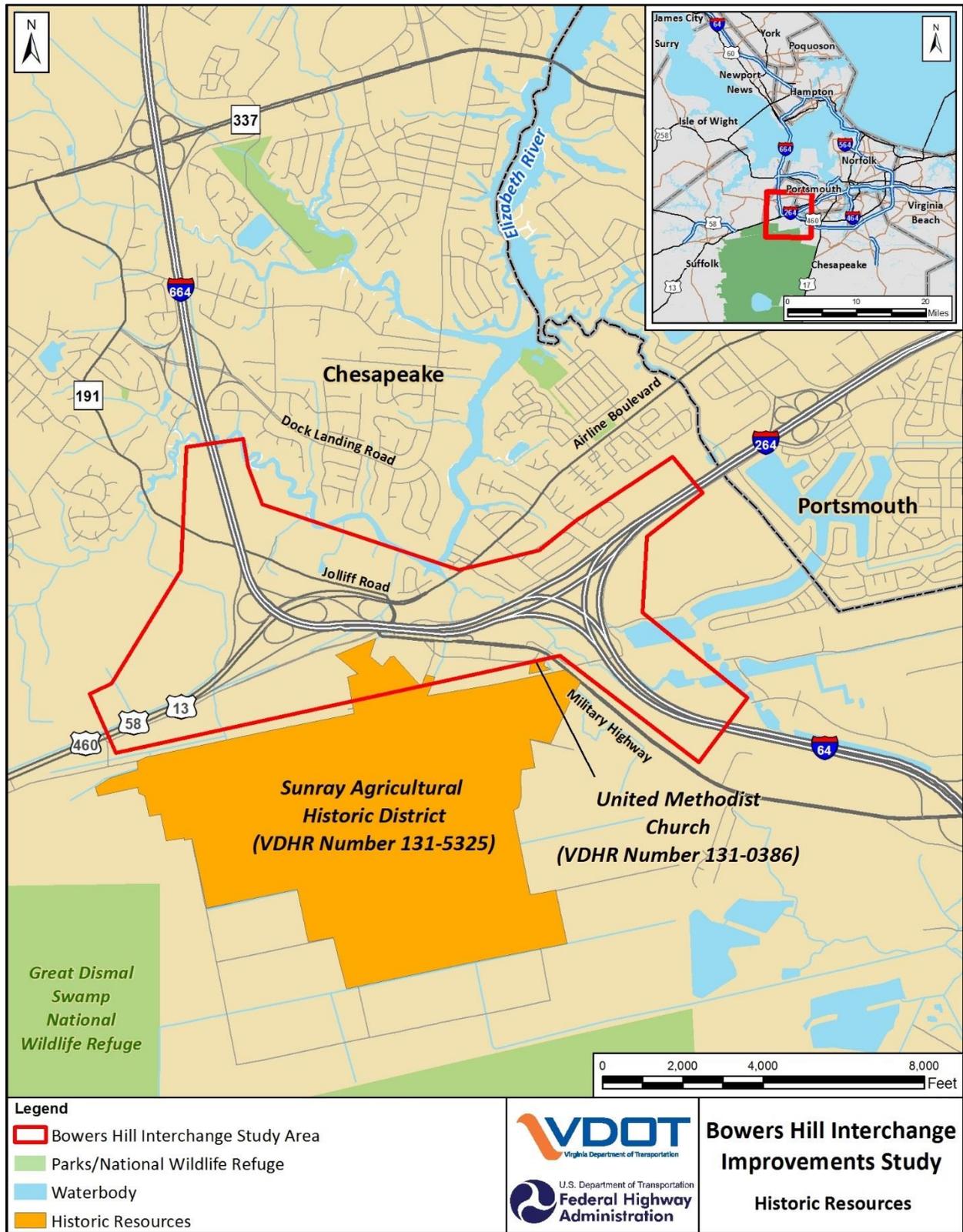
Archival research and field surveys conducted on all buildings, structures, and districts within the APE that were 45 years or older in 2018 identified two architectural historic properties: Sunray Agricultural Historic District (VDHR Inventory No. 131-5325) and the Indiana United Methodist Church (131-0386) shown on **Figure 3-12**. The portion of Sunray Agricultural Historic District within the boundaries of the APE contains two individual resources, 604 Homestead Road (131-5325-0173) and Herz Cemetery (131-5044), which are contributing resources to the historic district but are not individually eligible for listing in the NRHP. The SHPO concurred with these findings on March 4, 2019. Documentation on one additional architectural resource, the Bright Family Cemetery, remains to be completed, assessed against NRHP eligibility criteria, and coordinated with the SHPO and other consulting parties.

Sunray Agricultural Historic District (131-5325), listed on the NRHP May 29, 2007, is a planned agrarian community of Polish immigrants dating to the early 20th century. The 1264-acre district consists of 281 contributing buildings, structures, sites, and objects and is significant under NRHP Criteria A and C for the period 1908-1956 in the areas of agriculture, community planning and development, and ethnic heritage. The district is characterized by agricultural fields and single-family dwellings. An institutional core is located at the entrance of the district on Homestead Avenue near the Virginian Railroad Line where such buildings as the 1922 Sunray School and the 1916 St. Mary's Catholic Church are situated.

The Indiana United Methodist Church (131-0386) is potentially significant under NRHP Criterion A for its association with the Nansemond Indian Nation under the theme of Ethnic Heritage. For the purpose of applying the requirements of Section 106 of the NHPA to the Bowers Hill Interchange Study, VDOT is assuming the NRHP eligibility of the property. The resource is located at 4505 Indiana Avenue, near the intersection of Indiana Avenue with South Military Highway. The approximately 3.25-acre property includes a Carpenter Gothic-style church, constructed around 1924, a cemetery, and a shed building. The Indiana United Methodist Church formed around 1850 as a mission church for members of the close-knit Nansemond Indian community living in the Bowers Hill area and sits on land donated by a married couple, Joseph Bright and Elizabeth Bass Bright, who were members of this community. The original church building burned in 1862 and was rebuilt in 1872, and a school serving as a separate public school for Nansemond children was constructed on the site in the 1890s. The school building burned in the early 1900s and the second church building burned in 1921. A new school and the present church were constructed around 1924. The second school building burned in 1928 and was not replaced. Throughout the early and mid-twentieth century, the church was the center of the Nansemond community, and as recently as 2009, monthly tribal meetings were held at the church.

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Figure 3-12: Historic Resources



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The Bright Family Cemetery is a 0.186-acre, rectangular parcel surrounded on three sides by a parcel holding the Norfolk County Rifle Range, located at 4321 S. Military Highway. The cemetery parcel consists of an elevated section of woodlands at the southwest end and marshland at the northeast end. One marked grave, that of Sylvester Bright (1863-1926), is located near the southwest end of the parcel. It is unknown at present whether the cemetery contains additional marked or unmarked graves. Research suggests that Sylvester Bright was the son of Joseph and Elizabeth Bass Bright, who donated the land on which the Indiana United Methodist Church was built.

3.16.2 Architectural Resources, Environmental Consequences

In accordance with the requirements of Section 106 of the NHPA, VDOT has considered how the two proposed Build Alternatives might affect the two architectural historic properties located within the APE. Under the Section 106 regulations, an “effect” is an “alteration to the characteristics of a historic property qualifying it for the National Register” [36 CFR §800.16(i)]. An effect is adverse when it alters a qualifying characteristic of the property “in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association” [36 CFR §800.5(a)(1)]. The assessments of effect presented below are only preliminary and have not been coordinated with the SHPO and other consulting parties. As design and engineering of the Build Alternatives advances, these preliminary assessments will be taken into account and efforts will be made to avoid or minimize any adverse effects. These efforts will be undertaken in consultation with the SHPO and other consulting parties to the Section 106 process, who will also be provided the opportunity to comment on final determinations of effect.

3.16.2.1 No-Build Alternative

No project-related improvements would take place under the No-Building Alternative, thus, no effects to architectural historic properties would occur.

3.16.2.2 Alternative 1

There are no architectural historic properties within the LOD for Alternative 1, thus there would be no direct disturbance to either property. The Sunray Agricultural Historic District is located to the south of the Bowers Hill interchange and under present conditions relatively short sections of the existing highway structures comprising the interchange can be seen from the portions of the historic district north of the Virginian Railway along Old State, Homestead, and Seldon roads. The new flyover ramp from EB U.S. Route 58 to EB I-264 proposed under Alternative 1 would be visible from the historic district from these same locations and in these same sections of the interchange. Although the flyover is more elevated than the existing highway infrastructure, the change in the view from the Sunray Agricultural Historic District should not result in any diminishment of the integrity of the district’s historic setting and feeling. The location of the 66 dBA noise contour as predicted in the preliminary noise analysis for Alternative 1 in 2040, and predicted changes in noise levels at residences just north of the district boundary on Homestead Road, suggest the historic district would experience no discernable changes in noise levels, see *Noise Analysis Technical Report* (VDOT, 2019g). Thus, Alternative 1 may affect the Sunray Agricultural Historic District, but the effect is not expected to be adverse.

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The Indiana United Methodist Church lies on the south side of S. Military Highway. Because an additional distance of roughly 800 feet, much of it wooded, separates the location of the church property from the closest improvements to the Bowers Hill Interchange proposed under Alternative 1, there should be no change to the historic setting of the church. The change in noise level at a residence on S. Military Highway just west of the church parcel which is predicted in the preliminary noise analysis for Alternative 1 suggests there should be no discernable change in noise level at the church. Thus, it is anticipated that Alternative 1 would have no effect on the Indiana United Methodist Church.

3.16.2.3 Alternative 2

There are no architectural historic properties within the LOD for Alternative 2, thus there would be direct disturbance to either property. The Sunray Agricultural Historic District (131-5325) is located to the south of the Bowers Hill interchange and under present conditions relatively short sections of the existing highway structures comprising the interchange can be seen from the portions of the historic district north of the Virginian Railway along Old State, Homestead, and Seldon roads. The only change to the interchange proposed under Alternative 2 that might be seen from these locations is a new flyover ramp from EB U.S. Route 58 to I-664 NB, but this ramp would be hidden from view from within the historic district behind existing vegetation. The location of the 66 dBA noise contour as predicted in the preliminary noise analysis for Alternative 2 in 2040, and predicted changes in noise levels at residences just north of the district boundary on Homestead Road, suggest the historic district would experience no discernable changes in noise levels, see *Noise Analysis Technical Report* (VDOT, 2019g). Thus, Alternative 2 should have no effect on the Sunray Agricultural Historic District.

The Indiana United Methodist Church lies on the south side of S. Military Highway. Because an additional distance of roughly 800 feet, much of it wooded, separates the location of the church property from the closest improvements to the Bowers Hill Interchange proposed under Alternative 2, there should be no change to the historic setting of the church. The change in noise level at a residence on S. Military Highway just west of the church parcel which is predicted in the preliminary noise analysis for Alternative 2 suggests there should be no discernable change in noise level at the church. Thus, it is anticipated that Alternative 2 will have no effect on the Indiana United Methodist Church.

3.16.3 Archaeological Resources, Existing Conditions

Several archaeological surveys associated with other transportation or water infrastructure projects have previously been conducted within portions of the LOD for the present study. These earlier studies have identified seven archaeological sites within the LOD, see **Table 3-25**. Three of these seven sites have previously determined by the SHPO as not qualifying for listing on the NRHP. The remaining four sites have not been evaluated against NRHP eligibility criteria, but three of these four sites may have been destroyed by previous construction.

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Table 3-25: Known Archaeological Sites within the LOD

VDHR ID	Resource Type	Association	NRHP Status
44CS0040	Indeterminate	Middle Woodland (300-1000 A.D.)	Not Evaluated; Destroyed (1980)
44CS0041	Indeterminate	Paleo-Indian to Late Woodland (10,000 B.C. – 1600 A.D.)	Not Evaluated; Destroyed (1980)
44CS0044	Indeterminate	Paleo-Indian to Late Woodland (10,000 B.C. – 1600 A.D.)	Not Evaluated; Destroyed (1980)
44CS0079	Camp	Middle Woodland (300-1000 A.D.)	SHPO: Not Eligible (2003)
44CS0080	Dwellings	Reconstruction and Growth to New Dominion (1866 A.D. – Present)	Not Evaluated (1987)
44CS0233	Indeterminate	Early Archaic to Late Woodland (8,000 B.C. – 1600 A.D.)	SHPO: Not Eligible; Destroyed (2014)
44CS0269	Procurement Camp	Middle Woodland (300-1000 A.D.)	SHPO: Not Eligible (2003)

For the purpose of determining where additional archaeological survey still needs to be conducted in order to ensure that all archaeological sites within the LOD that are eligible for listing on the NRHP are taken into account, VDOT reviewed the geographic coverage and findings of the previous archaeological surveys and considered present environmental conditions and ground disturbance within the LOD. Based on this assessment five areas (totaling 53 acres) within the LOD are recommended for further archaeological survey. The SHPO concurred with this recommendation on March 4, 2019.

3.16.4 Archaeological Resources, Environmental Consequences

As allowed under the Section 106 regulations [36CFR Part 800.4(b)(2)] when alternatives under consideration consist of corridors or large land areas, VDOT has chosen to defer completion of the additional survey and evaluation efforts needed to ensure identification of all archaeological sites eligible for the NRHP that might be affected by the Bowers Hill Interchange Improvements Study until after the selection of a Preferred Alternative. From the information contained in the report, *Archaeological Assessment Technical Report* (VDOT, 2019j), that describes the archaeological sites presently known to be located within the LOD and assesses the potential of the APE to contain additional sites, VDOT has concluded that, in relation to their historic significance, any archaeological historic properties that might be affected by the Bowers Hill Interchange Improvements Study would meet the regulatory exception to the requirements of Section 4(f) approval: the sites likely would be important chiefly for the information they contain, which can be retrieved through data recovery, and would have minimal value for preservation in place [23 CFR 774.13(b)(1)]. The SHPO concurred with this finding on March 4, 2019.

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3.16.4.1 No-Build Alternative

The No-Build Alternative would not result in any project related construction and would therefore not impact any archaeological sites within the Bowers Hill Interchange.

3.16.4.2 Alternative 1

The LOD under Alternative 1 contains a total of 111 acres. Nine (9) of these acres are recommended for additional archaeological survey to ensure identification of all archaeological sites eligible for the NRHP that might be affected by the Bowers Hill Interchange Improvements Study. These survey areas are assessed as having moderate to high potential for containing archaeological sites.

3.16.4.3 Alternative 2

The LOD under Alternative 2 contains a total of 211 acres. Thirty-five (35) of these acres are recommended for additional archaeological survey to ensure identification of all archaeological sites eligible for the NRHP that might be affected by the Bowers Hill Interchange Improvements Study. These survey areas are assessed as having moderate to high potential for containing archaeological sites.

3.16.5 Completion of the Section 106 Process

Once a Preferred Alternative has been selected and preliminary engineering has been further refined, VDOT and FHWA will reassess the effects of the project on architectural historic properties and coordinate the findings with the SHPO and other consulting parties. Should any of the architectural historic properties be adversely affected, FHWA and VDOT will consult with the SHPO and other parties to the Section 106 process to determine appropriate measures that would avoid, minimize, or mitigate the adverse effects. These measures would constitute commitments that would be incorporated as stipulations in a legally binding agreement document executed by the FHWA, the SHPO, the ACHP, VDOT, and other parties as appropriate to conclude the Section 106 process. Presently, VDOT and FHWA anticipate that the agreement document would take the form of a Programmatic Agreement that would also stipulate the process VDOT would follow to complete efforts to identify archaeological historic properties potentially affected by the selected alternative, assess the undertaking's effect on those sites, and identify measures that would resolve any adverse effects by avoiding, minimizing, or mitigating for them.

3.17 SECTION 4(F)

3.17.1 Existing Conditions

Coordination was undertaken with the City of Chesapeake and VDHR to identify any publicly owned parks, recreation areas, and wildlife and waterfowl refuges and historic sites of national, state, or local significance within or in close proximity to the Study Area. **Table 3-26** identifies the Section 4(f) properties by name, official with jurisdiction, whether or not it would incur a Section 4(f) use. A total of three Section 4(f) properties are within or in close proximity to the Study Area. These properties include one public recreation area and two historic sites. **Figure 3-13** provides the locations of the Section 4(f) properties.

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Table 3-26: Section 4(f) Properties

Property	Official with Jurisdiction	Section 4(f) Use-Alternative 1	Section 4(f) Use-Alternative 2
Jolliff Middle School	City of Chesapeake	No	No
Sunray Agricultural Historic District (VDHR Number 131-5325)	VDHR	No	No
Indiana United Methodist Church (VDHR Number 131-0386)	VDHR	No	No

Sources: *City of Chesapeake Public Schools, 2018. VDHR, 2018.*

3.17.2 Environmental Consequences

3.17.2.1 No-Build Alternative

The No-Build Alternative would not result in any project related construction and would therefore not impact any properties eligible for protection under Section 4(f) sites within the Bowers Hill Interchange.

3.17.2.2 Alternative 1

Alternative 1 would not impact either of the properties eligible for protection under Section 4(f). Neither the Indiana United Methodist Church nor any of the contributing resources to the Sunray Agricultural Historic District are located within LOD of Alternative 1. The northern edge of an agricultural field associated with a contributing resource to the historic district, 604 Homestead Road, is located near (approximately 100 feet) the limits of the proposed alternatives but would not be impacted.

3.17.2.3 Alternative 2

Alternative 2 would not impact either of the properties eligible for protection under Section 4(f). Neither the Indiana United Methodist Church nor any of the contributing resources to the Sunray Agricultural Historic District are located within LOD of Alternative 2. The northern edge of an agricultural field associated with a contributing resource to the historic district, 604 Homestead Road, is located near (approximately 100 feet) the limits of the proposed alternatives but would not be impacted.

3.18 INDIRECT AND CUMULATIVE EFFECTS

The methodology for assessing indirect and cumulative effects along with greater detail on existing conditions, environmental consequences, and potential mitigation are provided in the *Indirect and Cumulative Effects Technical Report* (VDOT, 2019e).

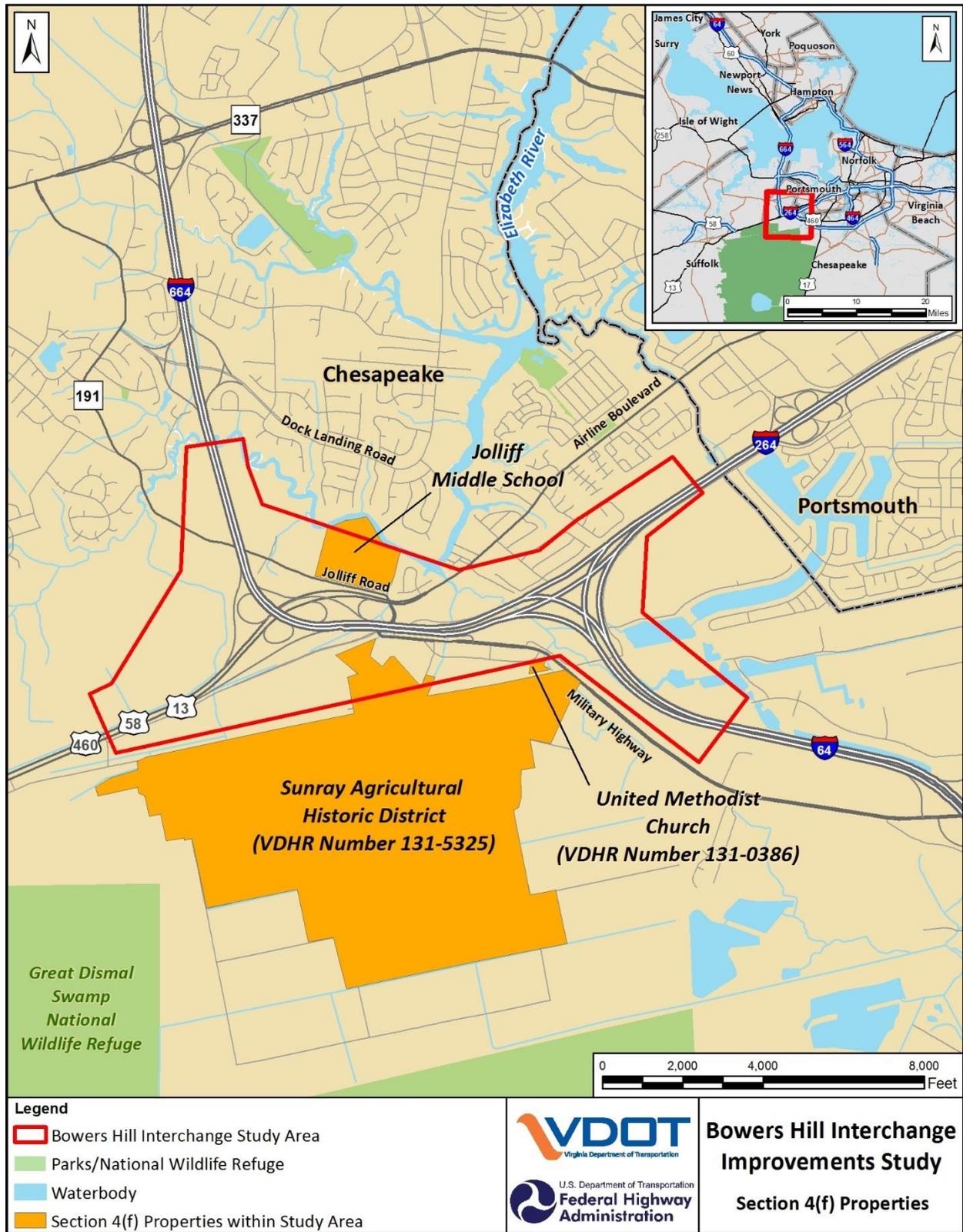
3.18.1 Indirect Effects Analysis

3.18.1.1 No-Build Alternative

The No-Build Alternative would not result in project-related construction or any associated property acquisitions; therefore, no direct or indirect impacts would occur. No project-related induced growth is expected to result from implementing the No-Build Alternative.

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Figure 3-13: Section 4(f) Properties



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3.18.1.2 Alternative 1

Alternative 1 would not alter the relationship between the interchange interstates and adjoining communities and all local road crossings would be maintained; therefore, indirect effects to community cohesion would be minor. Because the improvements would be primarily within existing right-of-way, direct impacts to socioeconomic resources would be limited, minimizing the potential for substantial indirect effects. Because most of the land use conversions from other land use to transportation land use under Alternative 1 would be relatively narrow, occur along existing roadways, and the total acres converted would be relatively low (16 acres), no substantial indirect effects to planned land use in the Study Area is anticipated with Alternative 1. Indirect effects to businesses could include potential benefits from increased access and travel reliability for customers and deliveries, including potential increased visitation. The potential minor indirect effects could occur to all persons using the Bowers Hill Interchange; therefore, no disproportionately high and adverse indirect impact to minority populations would occur.

Alternative 1 could indirectly change natural processes in the Natural Resources ICE Study Area. For example, habitat fragmentation resulting from implementation of Alternative 1 can have wide-ranging indirect effects to wildlife, resulting in less interior habitat; lower diversity due to smaller habitat patches; isolation of populations; increased vulnerability to competition and predation; restricting wildlife movements; increased risk of invasive species; and generally reduced biological diversity.

Forest clearing would occur mainly within fragmented areas within the loop ramps separated by existing roadways or in edge habitat. Habitat loss through clearing could indirectly impact the protected NLEB species through the fragmentation of suitable forage and summer roost habitat. Mitigation measures would be developed and incorporated to offset direct and indirect effects.

An increase in the amount of impervious surface in the Study Area could indirectly increase the amount and velocity of runoff in streams located in and downstream of the direct impacts area, indirectly impacting water quality and human and wildlife uses. Strict erosion and sediment control measures would reduce the potential indirect impacts of Alternative 1 to water quality, aquatic habitat, and wildlife from stormwater runoff.

Indirect effects such as changes to floodwater storage capacity, vegetation, nutrient cycling, and aquatic life movement can alter wetland functions. Direct impacts from cut/fill would result in loss of all wetland functions within the immediate footprint of the impact and indirectly contribute to habitat fragmentation effects. The magnitude of the effects to wetland functions directly and indirectly impacted from conversion and hydrologic floodplain encroachment could alter hydrologic flow through the floodplain, indirectly leading to more severe flooding in terms of flood height, duration, and erosion. The potentially adverse indirect effects to the floodplain functions could be avoided and minimized through compliance with regulations. As most construction under Alternative 1 would be within existing right-of-way and the limited new right-of-way is within lower quality habitat, potential indirect effects would be limited.

The removal of existing vegetation and construction impacts could enable the spread of existing invasive species over native plants that could indirectly impact sensitive wildlife species; however, the spread of invasive species would be minimized by following VDOT's Road and Bridge Specifications manual, Chapter 40 of Title 3.2 of the Code of Virginia, and other applicable regulations.

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All effects of Alternative 1 to archaeological and historic architectural properties, including indirect effects, have been considered under Section 106 of the NHPA as described in the *Archaeological Assessment Technical Report* (VDOT, 2019j) and *Historical Architectural Survey Management Summary* (VDOT, 2019i). Portions of the Area of Potential Effects with a high potential for archaeological remains that have not been previously inventoried will be intensively surveyed in later phases of the project. It is not expected that any archeological sites identified from later intensive survey would embody characteristics important for preservation in place, therefore, there would be no potential for indirectly impacting access for public interpretation.

The potential indirect effects or impacts to air quality are not expected to be significant given available information from pollutant-specific analyses (CO and MSATs). These analyses demonstrate that, in the future: 1) air quality impacts from CO will not cause or contribute to violations of the CO NAAQS and 2) MSAT emissions will be significantly lower than they are today. Emissions from construction vehicles and dust generated from construction activities will impact the air quality of the immediate area; however, construction emissions are short term or temporary in nature.

Induced growth could occur under Alternative 1 because it would increase capacity and reduce congestion, making the area near the interchange more attractive for users and increasing access to surrounding land. The impacts of induced growth under Alternative 1 could include wildlife loss; habitat loss, fragmentation, and degradation; changes in wildlife population; alterations of hydrology; and the imperilment of protected species. Any Federal or state-sponsored development or development on Federal or state land could be regulated to minimize potential impacts. However, induced growth associated with Alternative 1 would likely be limited by wetlands and open water areas where permits and mitigation would be required to develop and by the availability of undeveloped land. Impacts of induced growth on historic resources can include direct and indirect effects; however, development projects funded, permitted, or on lands controlled by federal and state agencies must take into account effects on historic properties by complying with Section 106 of the NHPA and the Virginia Antiquities Act and Burial Law, respectively. In addition, historic preservation commissions and historic and cultural preservation overlay zoning districts, including the Sunray Historic District south of the I-664 Bowers Hill interchange area, could also reduce indirect impacts to historic properties from altering the setting, feeling and association.

3.18.1.3 Alternative 2

Alternative 2 would have similar types of indirect impacts to socioeconomic resources as described for Alternative 1. Alternative 2 would also eliminate certain accesses that could potentially impact community cohesion from creating barriers to accessing neighbors and community services as described in *the Indirect and Cumulative Effects Technical Report*. Because the potential diversions from access elimination under Alternative 2 would have relatively short travel distances and times (in some cases even shorter than existing access), no substantial indirect impact to community cohesion or community facilities is anticipated under Alternative 2. The diversions from access eliminations under Alternative 2 could also indirectly adversely affect businesses by slightly increasing travel times and distances for company vehicles and customers. Conversely, these indirect effects to some businesses could be outweighed by potential benefits from overall increased access and travel reliability for customers and deliveries.

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Alternative 2 would marginally increase the separation distance between neighborhoods and services on the south and north sides of the Bowers Hill Interchange.

Alternative 2 would not relocate any businesses, and therefore, would not have potential indirect effects to the local economy or employment from relocations. Because indirect construction impacts would be short term and temporary, no substantial indirect impact to the local economy would occur. Similar to Alternative 1, Alternative 2 indirect impacts to socioeconomic resources would be minor. For the same reasons as Alternative 1, Alternative 2 is not anticipated to have disproportionate high and adverse indirect effects to minority populations.

Similar to Alternative 1, Alternative 2 could indirectly change natural processes in the Natural Resources ICE Study Area due to habitat loss. Measures to minimize indirect impacts of Alternative 2 to natural resources, would be developed in consultation with federal and state regulators, similar to Alternative 1.

All effects of Alternative 2 to archaeological and historic architectural properties, including indirect effects, are described in the *Archaeological Assessment Technical Report* (VDOT, 2019j) and *Historical Architectural Survey Management Summary* (VDOT, 2019i).

The potential indirect effects or impacts to air quality are not expected to be significant given available information from pollutant-specific analyses (CO and MSATs). These analyses demonstrate that, in the future: 1) air quality impacts from CO will not cause or contribute to violations of the CO NAAQS and 2) MSAT emissions will be significantly lower than they are today. Emissions from construction vehicles and dust generated from construction activities will impact the air quality of the immediate area; however, construction emissions are short term or temporary in nature.

As described for Alternative 1, Alternative 2 could have both beneficial long-term and short-term adverse effects to socioeconomic resources from induced growth. However, that growth would be constrained by the same conditions as described for Alternative 1, and likely occur as infill and increased residential density occurring in areas designated for growth by Chesapeake and Portsmouth. Development associated with induced growth from Alternative 2 improvements could impact natural resources as described for Alternative 1; however, federal, state, and local regulations could reduce potential adverse impacts. Any resulting induced development could be subject to review, approval, and/or permits from local, state, or federal agencies (including the USACE) before any impacts could occur.

3.18.2 Cumulative Effects Analysis

Cumulative effects consist of the direct and indirect effects of the alternatives under consideration in the Bowers Hill EA in combination with the effects of past, present, and reasonably foreseeable actions. Future development would likely result in the development of surrounding undeveloped land, redevelopment or infill development. Protection by federal, state, and local regulations could limit future adverse effects to resources. More detail on cumulative effects is provided in the *Indirect and Cumulative Effects Technical Report* (VDOT, 2019e).

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3.18.2.1 No-Build Alternative

Because the No-Build Alternative would not result in project-related construction or any associated property acquisitions, no incremental cumulative effects to socioeconomic, natural, or historic resources would occur.

3.18.2.2 Alternative 1

Past and present actions have shaped the current state of land use, socioeconomic, natural, and historic resources within the respective ICE Study Areas. These actions have been both beneficial and adverse to socioeconomic, natural, and historic resources. Although Alternative 1 would have minor impacts to socioeconomic resources, coupled with past, present, and future actions, the overall cumulative effects of all actions should be beneficial to socioeconomic resources. The incremental cumulative effects of Alternative 1 to natural resources in the Natural Resources ICE Study Area would be minor and limited to the Study Area. The incremental impact of Alternative 1 to historic resources would be minor. Adherence to current and future regulatory requirements and planning practices would minimize the minor cumulative effects of Alternative 1, and the cumulative effects of other present and future projects, on natural and historic resources in the Study Area. Regarding the potential for cumulative effects to air quality, the regional conformity analysis conducted by VDOT demonstrates that the incremental impact of the proposed project on mobile source emissions, when added to the emissions from other past, present, and reasonably foreseeable future actions, is in conformance with the State Implementation (Air Quality) Plan (SIP) and will not cause or contribute to a new violation, increase the frequency or severity of any violation, or delay timely attainment of the NAAQS established by USEPA.

3.18.2.3 Alternative 2

Similar to Alternative 1, Alternative 2 would have minor incremental cumulative effects to socioeconomic, natural, and historic resources in the respective ICE Study Areas. Adherence to current and future regulatory requirements and planning practices would minimize the minor cumulative effects of Alternative 2, and the cumulative effects of other present and future projects, on natural and historic resources in the Study Area. Regarding the potential for cumulative effects to air quality, the regional conformity analysis conducted by VDOT demonstrates that the incremental impact of the proposed project on mobile source emissions, when added to the emissions from other past, present, and reasonably foreseeable future actions, is in conformance with the SIP and will not cause or contribute to a new violation, increase the frequency or severity of any violation, or delay timely attainment of the NAAQS established by USEPA.

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Chapter 4

Coordination and Comments



4 COORDINATION AND COMMENTS

4.1 NATIONAL ENVIRONMENTAL POLICY ACT AND ENVIRONMENTAL REVIEW PROCESS

The NEPA process includes extensive technical analyses to evaluate the potential impacts of a reasonable range of alternatives investigated as part of the review process. It also provides a framework for meeting other environmental review requirements, such as those under the Endangered Species Act of 1973 (ESA), the National Historic Preservation Act of 1966 (NHPA), and the CWA.

The EA is being prepared with cooperation from the following federal agencies – the USACE and USEPA. **Table 4-1** lists each Concurring (Cooperating) Agency and describes the agencies’ involvement in the study development. Concurring agencies participate in the concurrence process at each study milestone and provide comment on the draft technical documentation and EA. In addition to the participation of each Concurring Agency based on their regulatory jurisdiction or special expertise, a number of other agencies and stakeholders, as well as the public, have provided input and support on the development of the EA and associated technical reports.

Table 4-1: Concurring Agency Involvement in the Bowers Hill Interchange Improvements Study

Agency	Responsibilities/Involvement
USACE	Permitting jurisdiction under Section 404 of the CWA and Section 10 of the Rivers and Harbors Appropriation Act; participate in concurrence process on methodologies for environmental analysis, Purpose and Need, range of alternatives, preferred alternative [†] , and any proposed conceptual mitigation, as well as comments on draft technical documentation and the EA made publicly available.
USEPA	Permitting jurisdiction under Section 404/401 of the CWA, authority under Section 309 of the Clean Air Act to review and comment on federal action and authority over sole source aquifers and hazardous waste sites, as well as special expertise regarding water supply reservoirs, drinking water, air quality, and wetlands; participate in concurrence process on methodologies for environmental analysis, Purpose and Need, range of alternatives, preferred alternative, and conceptual mitigation, as well as comment on draft technical documentation and the EA made publicly available.

4.2 AGENCY COORDINATION

In cooperation with FHWA, VDOT has coordinated with federal, state, and local agencies throughout the duration of the Bowers Hill Interchange Improvements Study. The agency coordination that has occurred as part of the study is summarized in the subsequent sections.

4.2.1 Scoping

Per 43 CFR §46.235, *NEPA scoping process*, and §46.305, *Public involvement in the environmental assessment process*, scoping is not required in the development of an EA, but the Lead Agency has the discretion to include it as part of the EA process. Scoping introduces and explains the project approach and provides an opportunity to bring stakeholders together to help ensure timely reviews and the identification of possible obstacles that could interfere with the process.

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On March 12, 2018 VDOT mailed scoping letters and attached questionnaires for agencies to provide input on issues and resources related to the Study. Letters were submitted via mail or email to the following agencies:

FEDERAL:

- Advisory Council on Historic Preservation
- National Oceanic and Atmospheric Administration- National Marine Fisheries Service
- United States Army Corps of Engineers- Norfolk District
- United States Department of Agriculture- Forest Service
- United States Department of Agriculture- Natural Resources Conservation Service
- United States Department of Homeland Security- Federal Emergency Management Agency
- United States Department of Housing and Urban Development
- United States Department of Transportation- Federal Railroad Administration
- United States Department of Transportation- Federal Transit Administration
- United States Department of Transportation- Federal Aviation Administration
- United States Department of the Interior- Fish and Wildlife Service
- United States Department of the Interior- National Park Service
- United States Department of the Interior- Office of Environmental Policy and Compliance
- United States Environmental Protection Agency

STATE:

- The Port of Virginia
- Virginia Department of Agriculture and Consumer Services
- Virginia Department of Aviation
- Virginia Department of Conservation and Recreation
- Virginia Department of Conservation and Recreation- Division of Natural Heritage
- Virginia Department of Emergency Management
- Virginia Department of Environmental Quality
- Virginia Department of Forestry
- Virginia Department of Game and Inland Fisheries
- Virginia Department of Health
- Virginia Department of Historic Resources
- Virginia Department of Housing and Community Development
- Virginia Department of Mines, Minerals and Energy
- Virginia Department of Rail and Public Transportation
- Virginia Department of State Police
- Virginia Economic Development Partnership
- Virginia Marine Resources Commission

LOCAL:

- City of Chesapeake
- City of Portsmouth
- City of Suffolk

OTHER:

- Chesapeake Bay Foundation
- CSX Corporation

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- Hampton Roads Transit
- Hampton Roads Transportation Accountability Commission
- Hampton Roads Transportation Planning Organization
- Virginia Outdoors Foundation

Several agencies responded to the scoping letter and questionnaires (**Appendix C**). Agencies varied in their responses from requesting the completion of specific environmental and sociocultural analyses to providing suggestions for specific improvements. Coordination of impacts associated with both the HRCS and U.S. Route 460/58/13 Connector Study was noted. Agencies also requested continued coordination throughout project development.

4.2.2 Cooperating and Participating Agencies

According to CEQ regulation (40 CFR 1508.5), a Cooperating Agency is defined as any Federal agency, other than a lead agency, that has jurisdiction by law or special expertise with respect to any environmental impact involved in the proposed project or project alternative.

CEQ regulations (40 CFR Section 1501.6) permit a Cooperating Agency to assume on request of the Lead Agency responsibility for developing information and preparing environmental analyses including portions of the environmental impact statement concerning which the Cooperating Agency has special expertise. An additional distinction is that, pursuant to 40 CFR 1506.3, "a cooperating agency may adopt without recirculation of the environmental impact statement of a lead agency when, after an independent review of the statement, the cooperating agency concludes that its comments and suggestions have been satisfied." Aside from the Cooperating Agencies designated as such via the Section 404 merged process (USACE and USEPA), no other agency accepted the invitation to serve as a Cooperating Agency for the Bowers Hill Interchange Improvements Study EA.

Pursuant to 23 CFR 771.111(d) local, state, regional, and federal agencies expected to have an interest in the study were invited to serve as Participating Agencies. Participating Agencies provide advice over the course of the study regarding purpose and need, potential alternatives, environmental issues, and study methodologies. They also review and comment on environmental documentation to reflect the views and concerns of their respective agencies.

Agency Meetings

Additional agency coordination is ongoing and includes regularly scheduled meetings and consultation in accordance with federal and state regulations, including:

- Monthly Agency Partnering meetings
- Coordination with the VDHR
- Coordination with USACE
- Coordination with VDEQ

4.2.3 Section 106 Consulting Parties

Pursuant to Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended, 54 U.S.C. 306108), VDOT, in cooperation with FHWA, identified and invited parties entitled to be consulting parties to participate in the identification of historic properties and evaluation of effects on such properties in accordance with 36 CFR § 800.3(f). The consulting parties include:

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- City of Chesapeake, Department of Planning
- Delaware Nation
- Hampton Roads Executive Airport
- Nansemond Indian Nation
- St. Mary Catholic Church
- Sunray Farmers Association
- Virginia Department of Historic Resources (DHR)

Consulting parties have reviewed and commented on study documents including the *Historical Architectural Survey Management Summary* (VDOT, 2019i) and *Archaeological Assessment Technical Report* (VDOT, 2019j). These documents included the identification of historic properties. Consulting parties will be provided further opportunity to comment on the likely effects to historic properties, and they will be involved in the preparation of a Programmatic Agreement (PA), should one be prepared at the conclusion of the Section 106 process.

4.3 PUBLIC INVOLVEMENT

4.3.1 Virtual Scoping Meeting

From May 10 until June 9, 2018, VDOT held a virtual scoping meeting and survey to solicit public input that would inform the study. VDOT promoted the survey using public relations efforts to solicit news stories around the survey, as well as through advertisements in the newspaper, online and through social media. Surveys were conducted anonymously and aggregated for the results.

There were a total of 365 surveys completed during the comment period. Approximately 87 percent of respondents feel that improvements are needed within the Study Area citing safety and congestion issues. Approximately 46 percent cite the interchange configuration and the resulting merging required as the reason for needing improvements in the Study Area. According to the respondents, the improvement most needed in the Study Area is streamlining the merge movements. The second most needed improvement is reducing congestion. Additional comments centered around the common themes of fixing the merge/configuration of the intersection, as well as increasing capacity and improving visibility and signage along the corridor. About four percent of respondents specifically suggest flyovers as a solution to the interchange issues.

4.3.2 Citizen Information Meeting

A CIM was held August 22, 2018 to provide an opportunity for the public to review exhibits on the project's Purpose and Need and alternatives development, as well as discuss their project questions and concerns with representatives from VDOT. An informational video, project display boards, handout, and comment sheets were available at the meetings and posted on the Project website. The meeting was held at Jolliff Middle School in Chesapeake. During the meeting, VDOT representatives were available to discuss the project and explain display boards. Approximately 100 persons attended the CIM. **Table 4-1** summarizes the sources for the comments received.

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Table 4-2: Public Comment Sources

Comment Type	Number
Written Comments Submitted at the CIM	30
Oral Comments Recorded by the Stenographer at the CIM	1
Written Comments Mailed to VDOT after the CIM	4
Online Comments Submitted through the Website	35
Online Comments Submitted through Social Media	220
Total	290

Nearly all respondents (91 percent) felt improvements are needed in the Bowers Hill Interchange due to safety concerns with weaving and merging. Of the three alternative concepts presented at the CIM, the majority of respondents (65 percent) felt that the “Full Interchange Reconstruction” is the best option for the Interchange, with “Eastbound and Westbound Route 58 Braided Ramps” coming in second (22 percent) and “Optimize Lane Balance” last (17 percent). *Note on written comment forms, some people selected more than one alternative concept.

Respondents who do not feel improvements are needed are primarily concerned with the cost and disruption to traffic. These are also the reasons respondents selected “Optimize Lane Balance,” as they feel it is the most cost effective and least disruptive solution to address the concerns. Some also felt that there are other areas in the region that need improvements more than this Interchange and that the issue with weaving reside with drivers and not necessarily the road structure. Several also commented that issues in the Interchange could be resolved by adding needed capacity on I-664 and Route 58.

Cost and construction duration are also reasons respondents selected “Eastbound and Westbound Route 58 Braided Ramps.” Several respondents indicated that a full interchange reconstruction was too costly and did not provide a significant increase in benefits over this option. They felt the Braided Ramps would resolve the issues with weaving and merging in the Interchange that are the primary concern.

Those who selected “Full Interchange Reconstruction” feel it is the best long-term solution to accommodate future growth in the region. They indicated the other alternative concepts would only provide a temporary solution and would rather address all the issues needed to streamline the Interchange in the future. Several respondents recommended flyovers in the Full Interchange Reconstruction to alleviate the weaving and merging currently required.

Comments regarding other improvements needed in the Bowers Hill Interchange Study Area revolve around the following topics:

- Issues with Exit ramps causing backups onto the Interstate (7 percent). Specifically mentioned are:
 - I-664S to Exit 14 - the Military Highway ramp, especially with the tractor trailers exiting and wanting to turn left onto Military Highway
 - I-664N to Exit 11 – Portsmouth Boulevard ramp backs ups with traffic, which then will cause traffic to overflow to the Dock Landing exit to avoid the traffic lights on Portsmouth Boulevard

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- Sound barriers (8 percent) to reduce noise pollution to residents in the area
- Better signage (8 percent) – include more signage, signage earlier and also ensuring the travel signs to the Oceanfront reflect the layout of the roads (264 on left and 64 on right)
- More capacity on the roads (10 percent) – specifically on I-664 and U.S. Route 58
- 16 percent of respondents provided input on improvements needed for other roadways in the region

The remaining comments included road conditions (paving and lighting), tolls/HOT lanes, secondary roads and the need for traffic lights at those intersections, and general feedback on the presentation.

4.3.3 Public Hearing

A Location Public Hearing will be held May 9, 2019, after the EA is made available for public comment. Materials presented at the Hearing will be available on the study website. The purpose of the Public Hearing is to present the findings of the EA, provide discussion between the public and VDOT, and to obtain comments on the EA and the overall study. Comments on the EA will be collected for 30 days after the EA is made available to the public. Comments will be used to inform the identification of a Preferred Alternative, the CTB action, and request for a NEPA decision from FHWA. All comments received during the comment period will be included in the project record.

4.3.4 Additional Coordination Efforts

4.3.4.1 Study Website and Email List

Information for the Study, including the EA and all technical documentation, is available to the public through the following VDOT website:

http://www.virginia.gov/projects/hamptonroads/bowers_hill_interchange_improvements_study.asp

As the Study progresses, meeting information and materials will be posted online, including comment forms for the public to provide feedback. A study email list has been compiled for those who wish to receive period updates via email.

4.3.4.2 Targeted Community Outreach

On October 21, 2018, two representatives from VDOT met with the Colonial Point Civic League (CPCL) in Chesapeake to provide an overview and current status of the Bowers Hill Interchange Improvements Study. Approximately 19 people were in attendance.

Handouts were provided illustrating the Study Area and preliminary LOD for both the “Full Interchange Reconstruction” and “Eastbound and Westbound U.S. Route 58 Braided Ramps” options. Virginia DOT representatives explained the next steps in the process and noted concerns of the CPCL with regard to whether their neighborhood would be affected. Additional comments noted were concerns over increased noise levels and the tolling of roads through the Bowers Hill Interchange.

A second meeting was held with the Colonial Point Civic League on February 10, 2019 to discuss results of the traffic study and recommended improvements to the Bowers Hill Interchange. Attendees from the community asked VDOT questions about the proposed improvements, noise impacts and abatement, impacts to trees, extent and timing of nearby projects (including the High Rise Bridge), and lane markings/signage.

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References



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- 23 Code of Federal Regulations (CFR) § 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*, 2010.
- 23 Code of Federal Regulations (CFR) § 774, *Parks, Recreation Areas, Wildlife and Waterfowl Refuges, and Historic Sites (Section 4(f))*, 2018.
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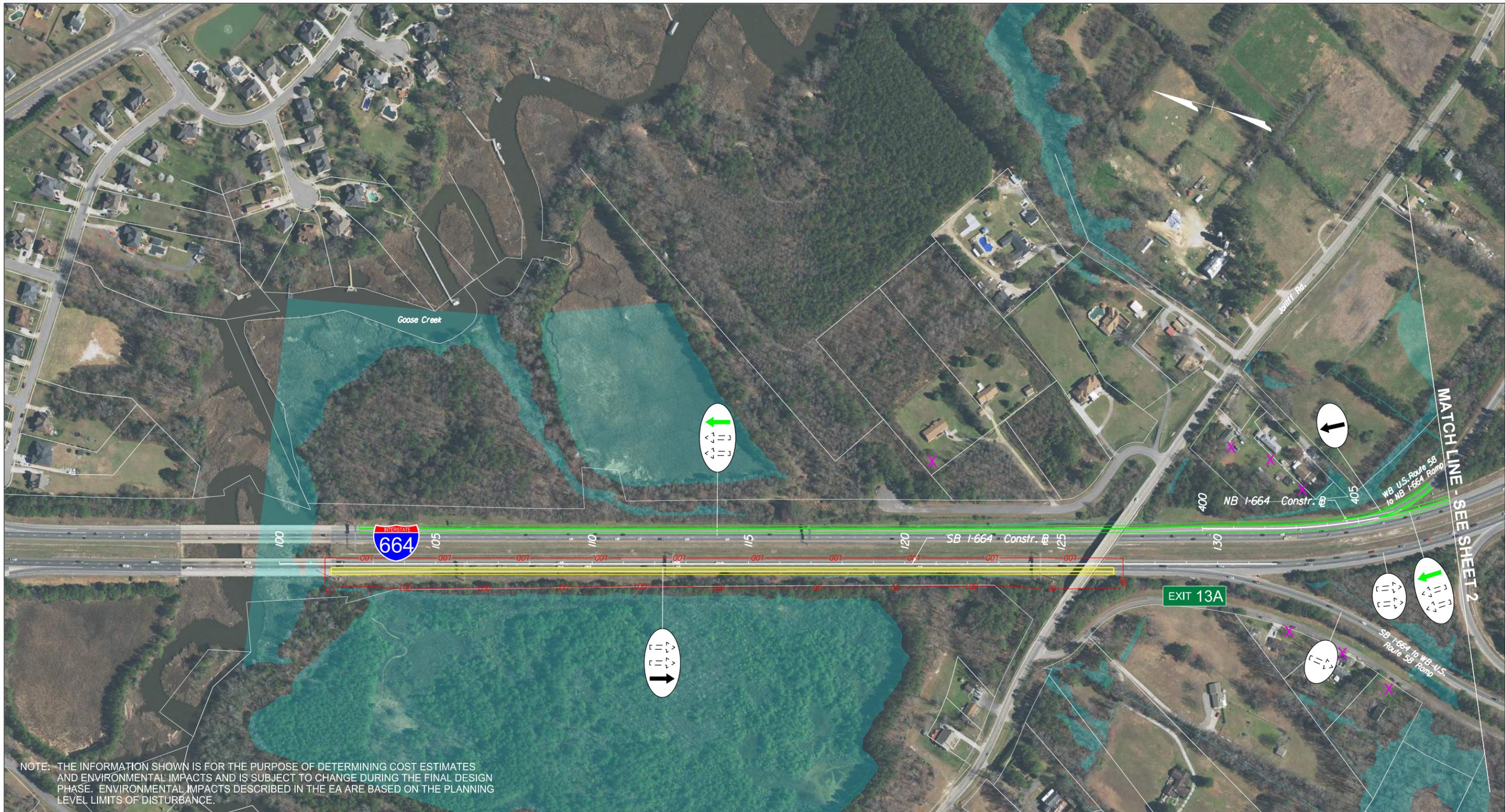
Bowers Hill Interchange Improvements Study

Environmental Assessment

Appendix A

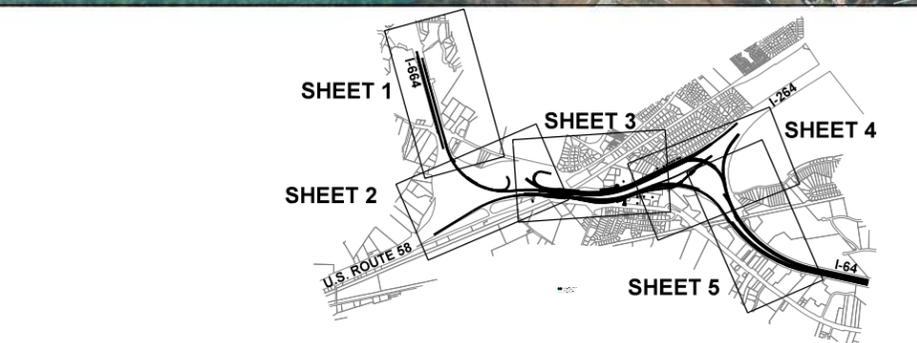
Alternatives Mapping





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LEGEND	
	PARCEL BOUNDARY
	LIMITS OF DISTURBANCE
	PROPOSED PAVEMENT REMOVAL
	PROPOSED ROADWAY IMPROVEMENTS
	PROPOSED BRIDGE IMPROVEMENTS
	PROPOSED AUXILIARY LANE (OTHER PROJECT)
	PROPOSED IMPROVEMENTS (OTHER PROJECT)
	PROPOSED EASTBOUND U.S. ROUTE 58 BRAIDED RAMP
	PROPOSED WESTBOUND U.S. ROUTE 58 BRAIDED RAMP
	WETLANDS/WATERS
	HISTORIC PROPERTIES
	PROPOSED LANE
	EXISTING LANE
	PROPOSED LANE (OTHER PROJECT)
	AUXILIARY LANE (OTHER PROJECT)
	POTENTIAL DISPLACEMENTS
	POTENTIAL DISPLACEMENTS
	IMPACTED NOISE RECEPTORS



KEY MAP

Aerial Imagery Copyright 2017
Commonwealth of Virginia

0' 150' 300' 600'

SCALE: 1" = 300'

Bowers Hill Interchange Improvements Study
Alternative 1: Eastbound and Westbound U.S. Route 58 Braided Ramps

APRIL 2019

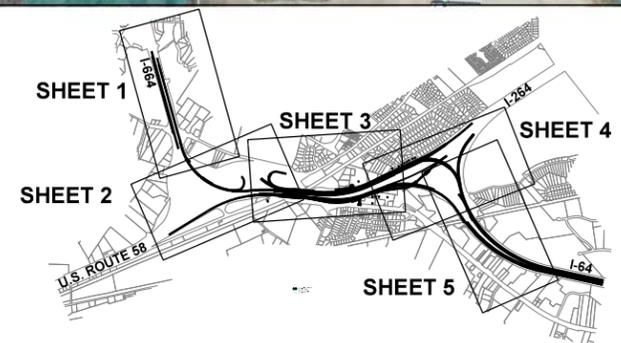
SHEET 1 OF 5



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LEGEND

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|-------|---|-----|--------------------------------|
| — | PARCEL BOUNDARY | — | WETLANDS/WATERS |
| - - - | LIMITS OF DISTURBANCE | — | HISTORIC PROPERTIES |
| ▨ | PROPOSED PAVEMENT REMOVAL | → | PROPOSED LANE |
| ▨ | PROPOSED ROADWAY IMPROVEMENTS | → | EXISTING LANE |
| ▨ | PROPOSED BRIDGE IMPROVEMENTS | → | PROPOSED LANE (OTHER PROJECT) |
| ▨ | PROPOSED AUXILIARY LANE (OTHER PROJECT) | → | AUXILIARY LANE (OTHER PROJECT) |
| ▨ | PROPOSED IMPROVEMENTS (OTHER PROJECT) | Ⓡ Ⓟ | POTENTIAL DISPLACEMENTS |
| ▨ | PROPOSED EASTBOUND U.S. ROUTE 58 BRAIDED RAMP | X | IMPACTED NOISE RECEPTORS |
| ▨ | PROPOSED WESTBOUND U.S. ROUTE 58 BRAIDED RAMP | | |



0' 150' 300' 600'
SCALE: 1" = 300'

Bowers Hill Interchange Improvements Study
Alternative 1: Eastbound and Westbound U.S. Route 58 Braided Ramps

VDOT
Virginia Department of Transportation

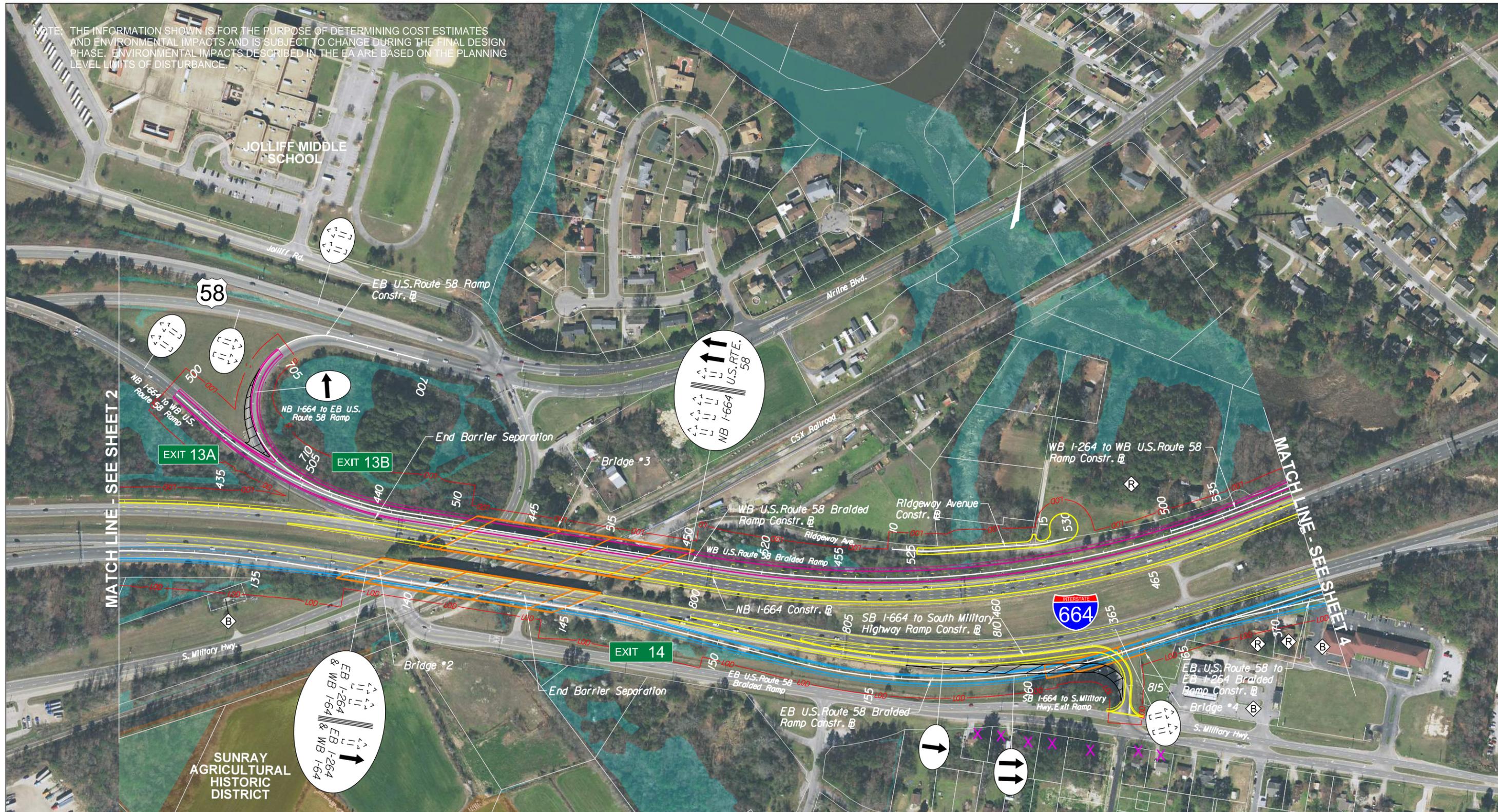
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Federal Highway Administration

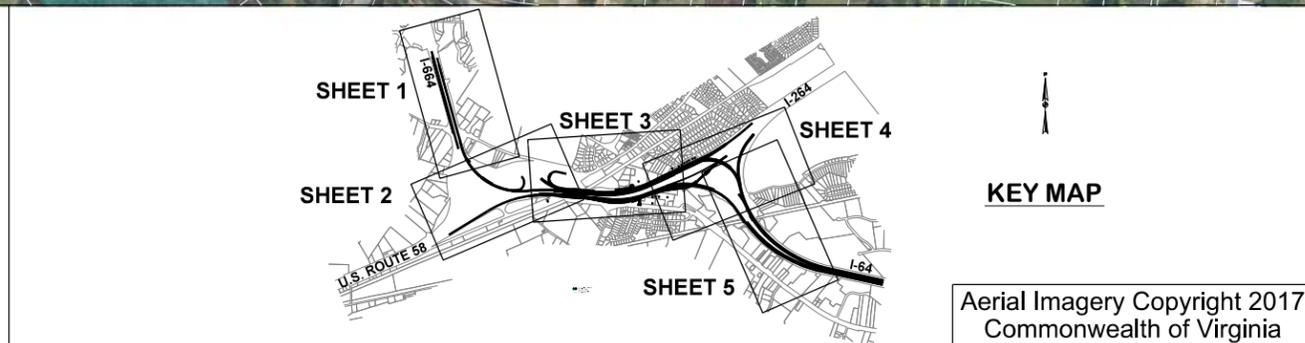
SHEET 2 OF 5

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LEGEND	
	PARCEL BOUNDARY
	LIMITS OF DISTURBANCE
	PROPOSED PAVEMENT REMOVAL
	PROPOSED ROADWAY IMPROVEMENTS
	PROPOSED BRIDGE IMPROVEMENTS
	PROPOSED AUXILIARY LANE (OTHER PROJECT)
	PROPOSED IMPROVEMENTS (OTHER PROJECT)
	PROPOSED EASTBOUND U.S. ROUTE 58 BRAIDED RAMP
	PROPOSED WESTBOUND U.S. ROUTE 58 BRAIDED RAMP
	WETLANDS/WATERS
	HISTORIC PROPERTIES
	PROPOSED LANE
	EXISTING LANE
	PROPOSED LANE (OTHER PROJECT)
	AUXILIARY LANE (OTHER PROJECT)
	POTENTIAL DISPLACEMENTS
	POTENTIAL DISPLACEMENTS
	IMPACTED NOISE RECEPTORS



0' 150' 300' 600'

SCALE: 1" = 300'

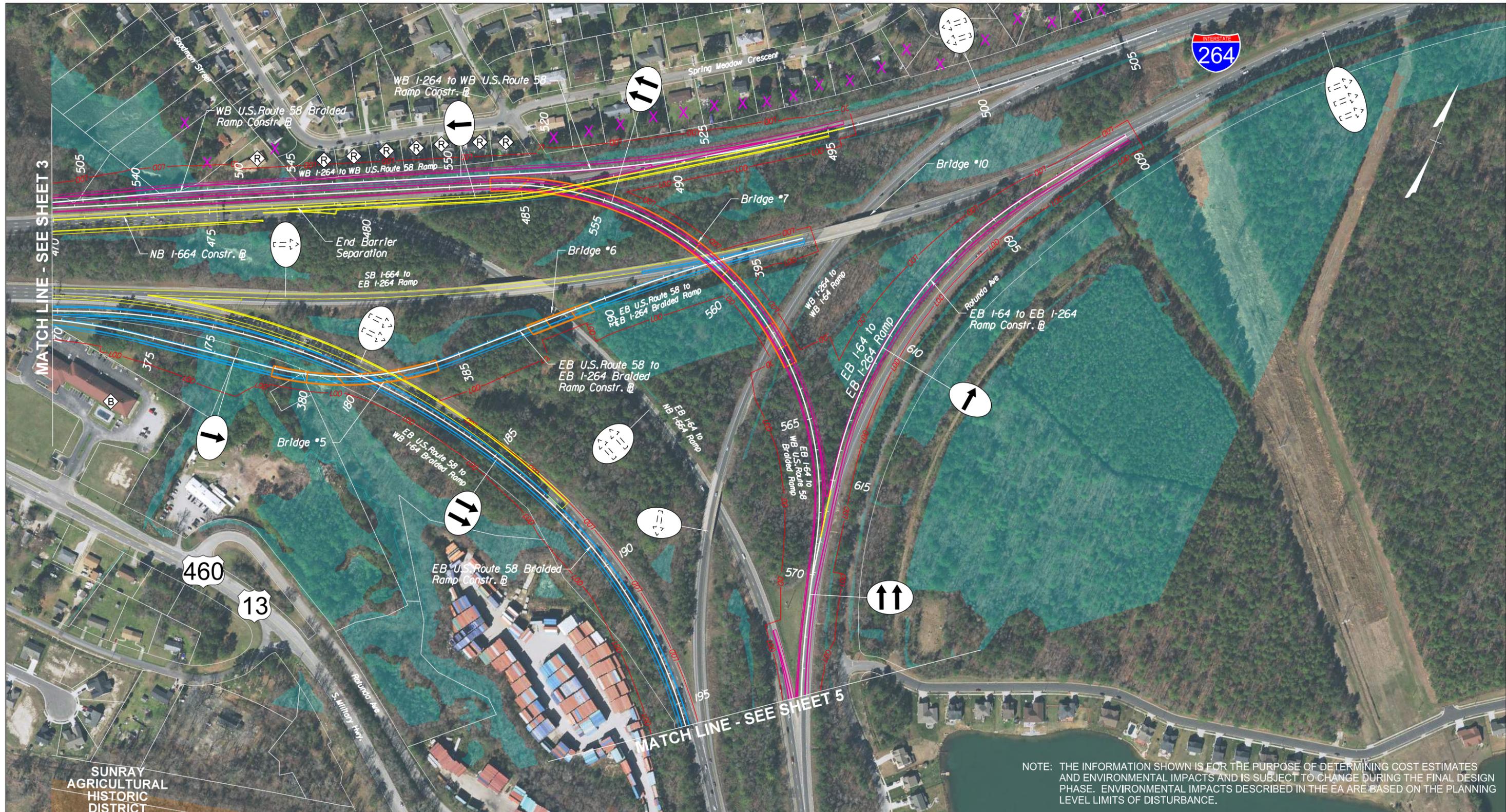
Bowers Hill Interchange Improvements Study
 Alternative 1: Eastbound and Westbound U.S. Route 58 Braided Ramps

VDOT
 Virginia Department of Transportation

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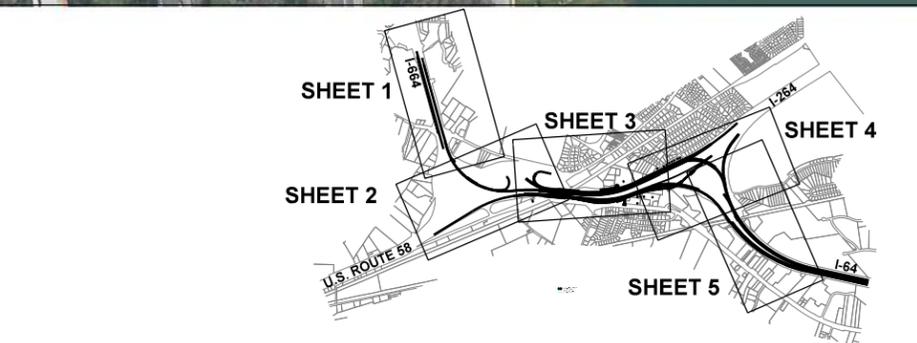
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SHEET 3 OF 5



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	PARCEL BOUNDARY
	LIMITS OF DISTURBANCE
	PROPOSED PAVEMENT REMOVAL
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	PROPOSED AUXILIARY LANE (OTHER PROJECT)
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	PROPOSED LANE (OTHER PROJECT)
	AUXILIARY LANE (OTHER PROJECT)
	POTENTIAL DISPLACEMENTS
	POTENTIAL DISPLACEMENTS
	IMPACTED NOISE RECEPTORS



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0' 150' 300' 600'
SCALE: 1" = 300'

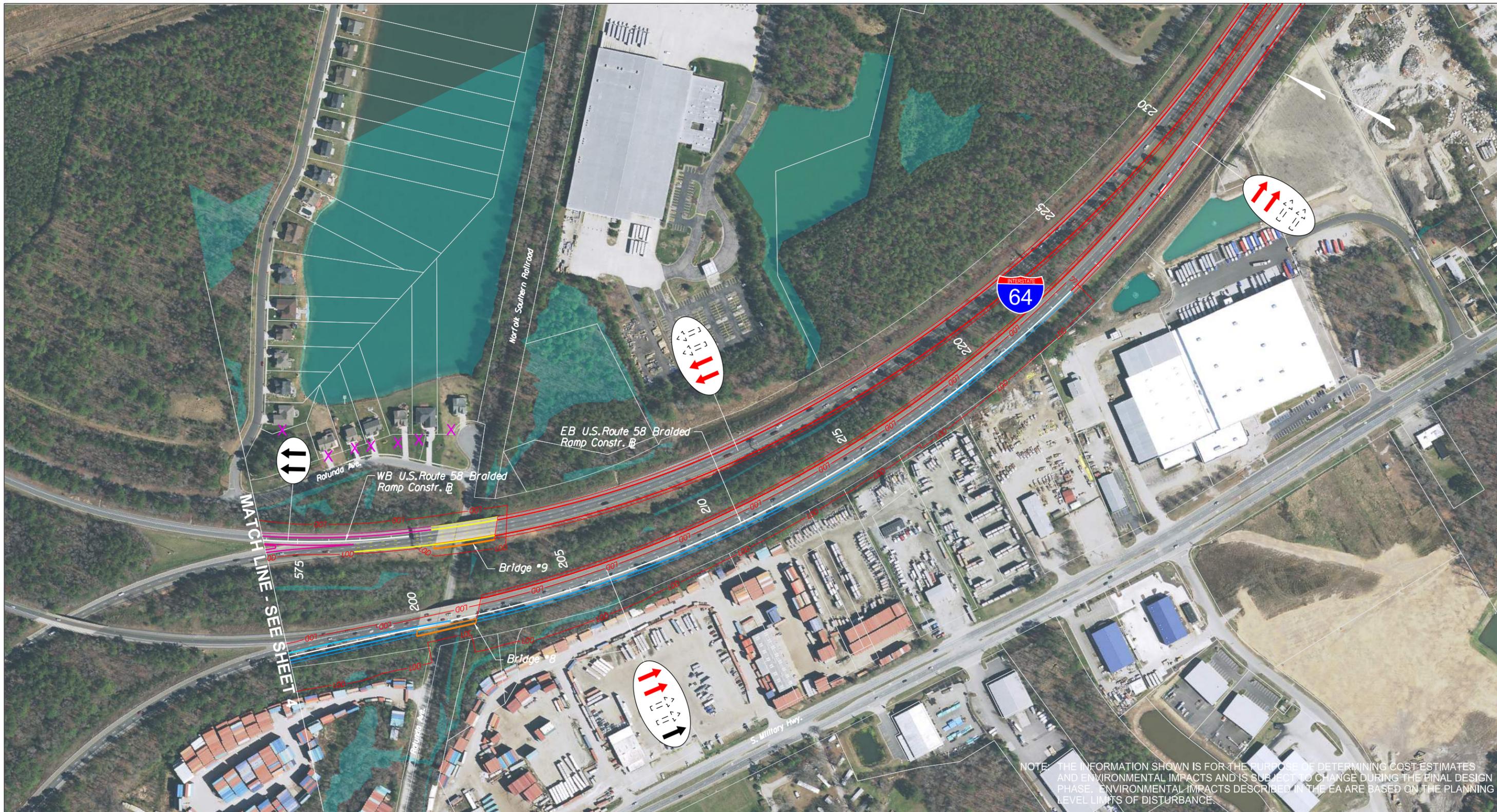
Bowers Hill Interchange Improvements Study
Alternative 1: Eastbound and Westbound U.S. Route 58 Braided Ramps

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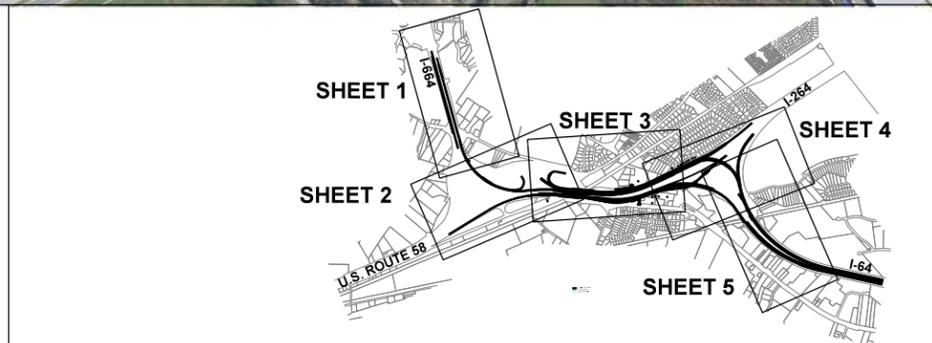
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LEGEND	
	PARCEL BOUNDARY
	LIMITS OF DISTURBANCE
	PROPOSED PAVEMENT REMOVAL
	PROPOSED ROADWAY IMPROVEMENTS
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	WETLANDS/WATERS
	HISTORIC PROPERTIES
	PROPOSED LANE
	EXISTING LANE
	PROPOSED LANE (OTHER PROJECT)
	AUXILIARY LANE (OTHER PROJECT)
	POTENTIAL DISPLACEMENTS
	POTENTIAL DISPLACEMENTS
	IMPACTED NOISE RECEPTORS



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SCALE: 1" = 300'

Bowers Hill Interchange Improvements Study
Alternative 1: Eastbound and Westbound U.S. Route 58 Braided Ramps

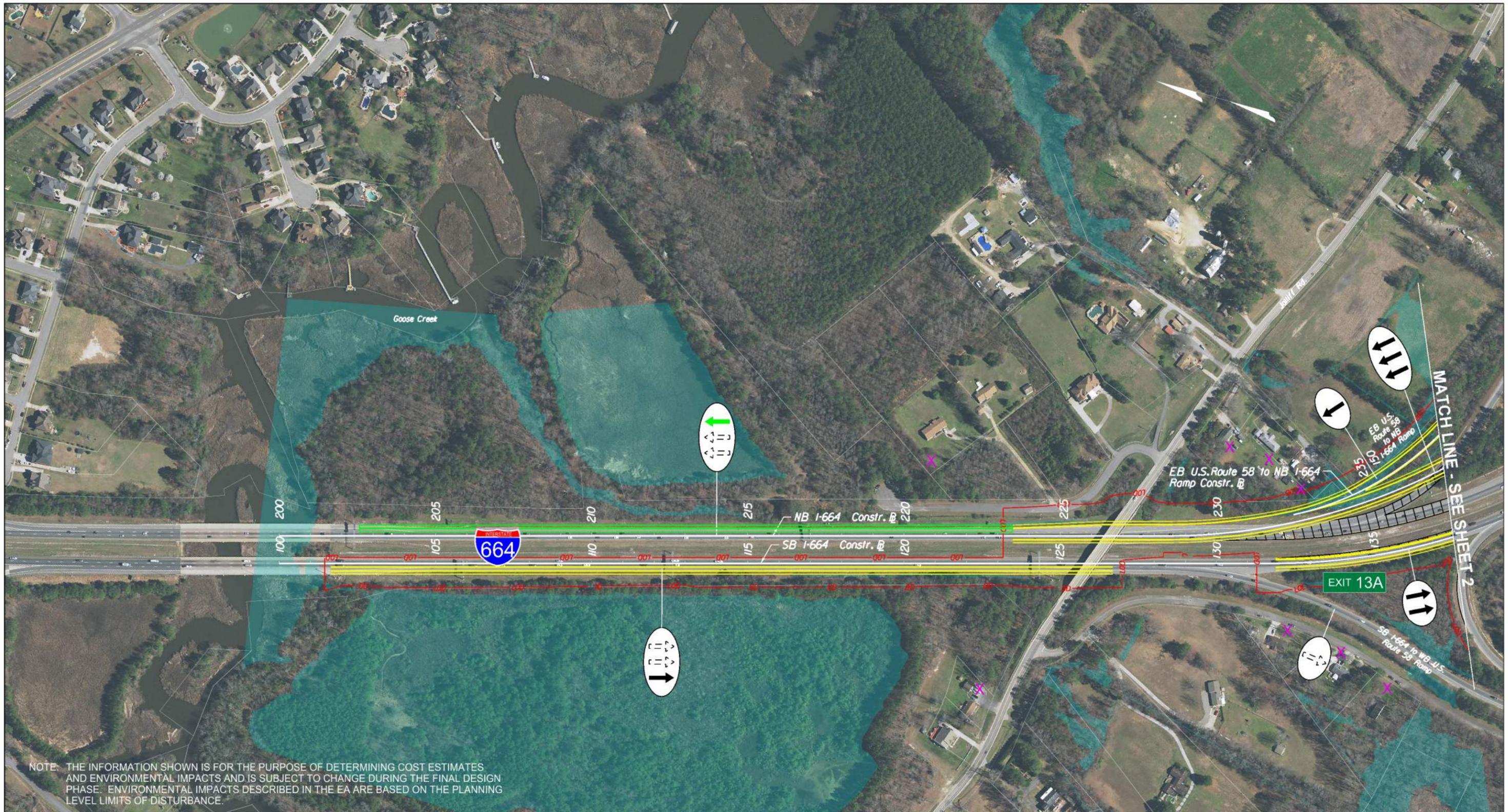
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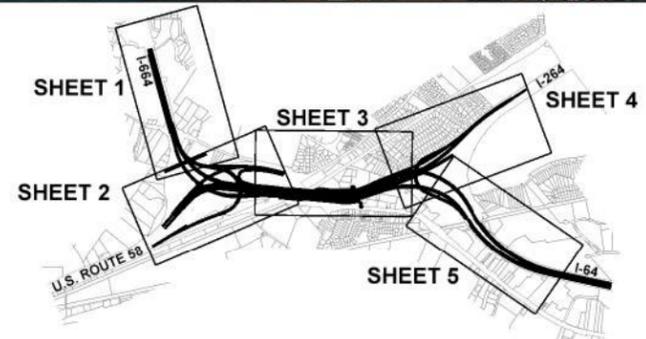
SHEET 5 OF 5



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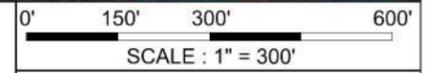
LEGEND

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| PROPOSED BRIDGE IMPROVEMENTS | AUXILIARY LANE (OTHER PROJECT) |
| PROPOSED AUXILIARY LANE (OTHER PROJECT) | POTENTIAL DISPLACEMENTS |
| PROPOSED IMPROVEMENTS (OTHER PROJECT) | IMPACTED NOISE RECEPTORS |
| WETLANDS/WATERS | |



KEY MAP

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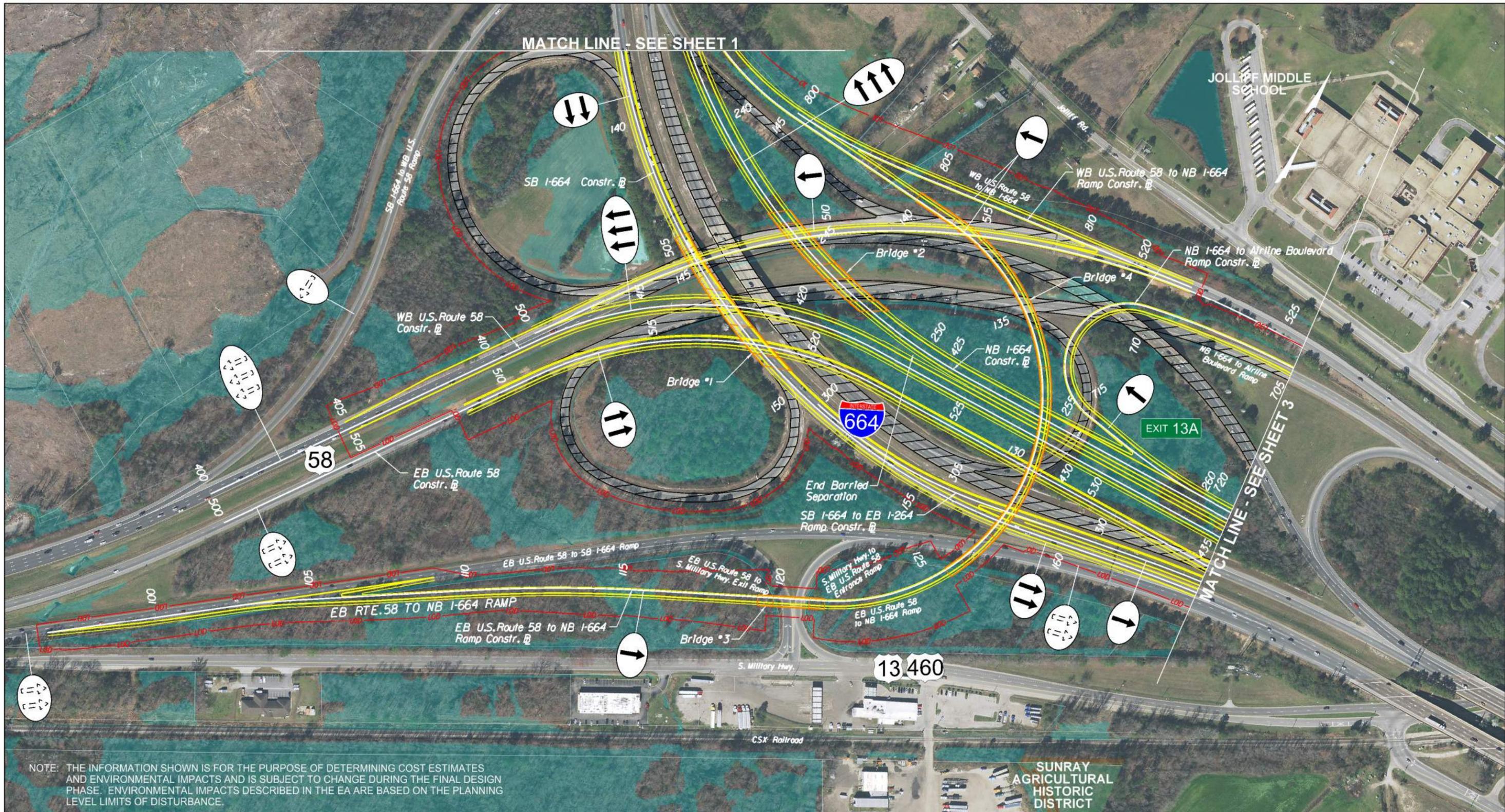
**Bowers Hill Interchange
Improvements Study**

Alternative 2: Full
Interchange Reconstruction



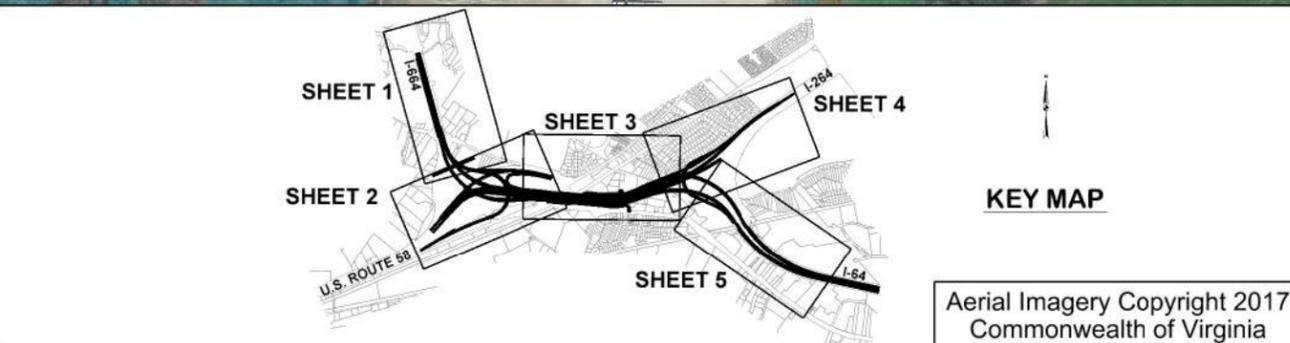
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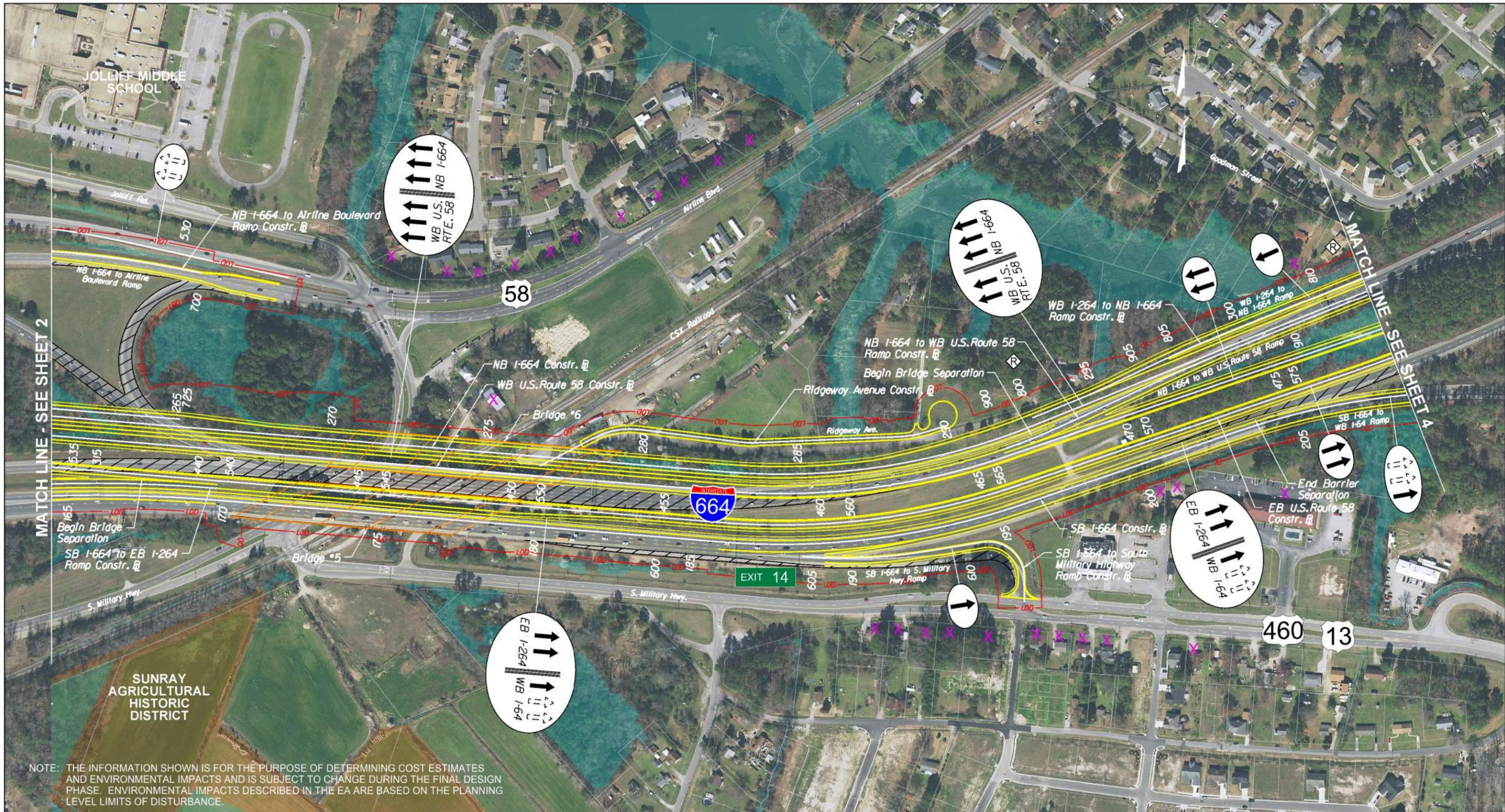
Bowers Hill Interchange Improvements Study
Alternative 2: Full Interchange Reconstruction

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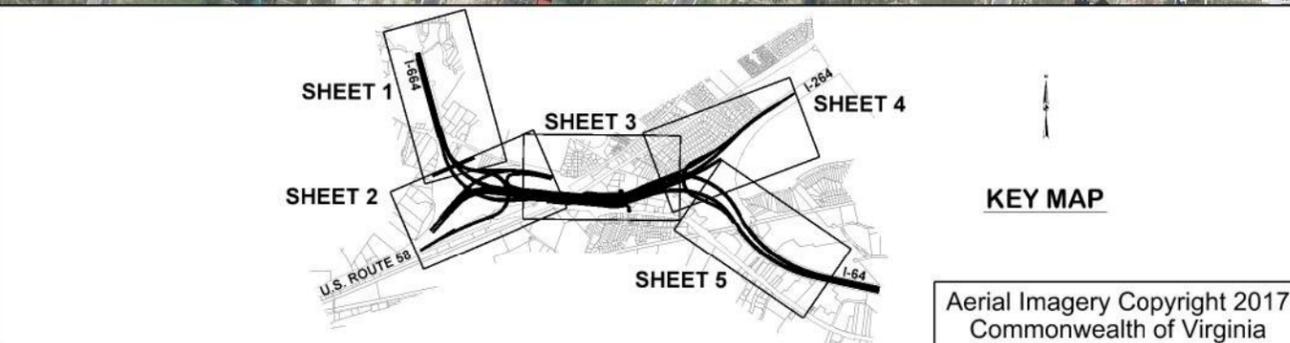
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0' 150' 300' 600'

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Bowers Hill Interchange Improvements Study

Alternative 2: Full Interchange Reconstruction

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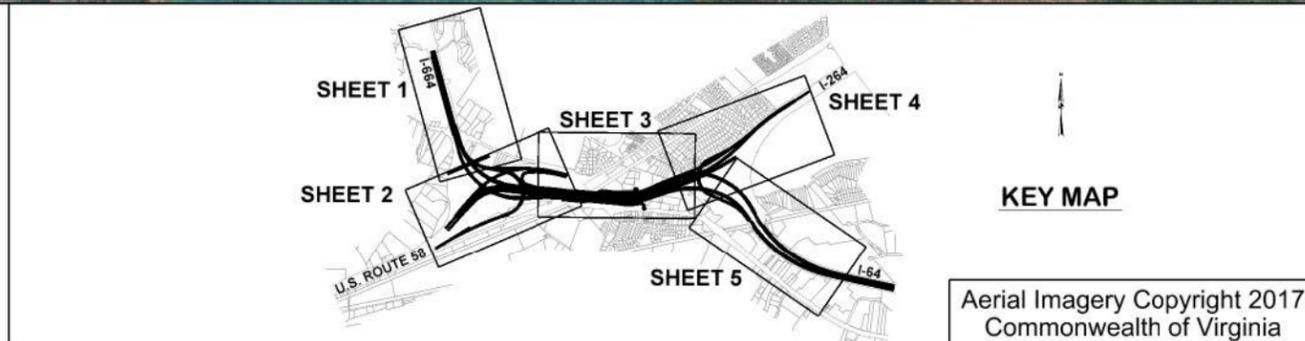
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	POTENTIAL DISPLACEMENTS
	IMPACTED NOISE RECEPTORS
	HISTORIC PROPERTIES



0' 150' 300' 600'

SCALE : 1" = 300'

Bowers Hill Interchange Improvements Study

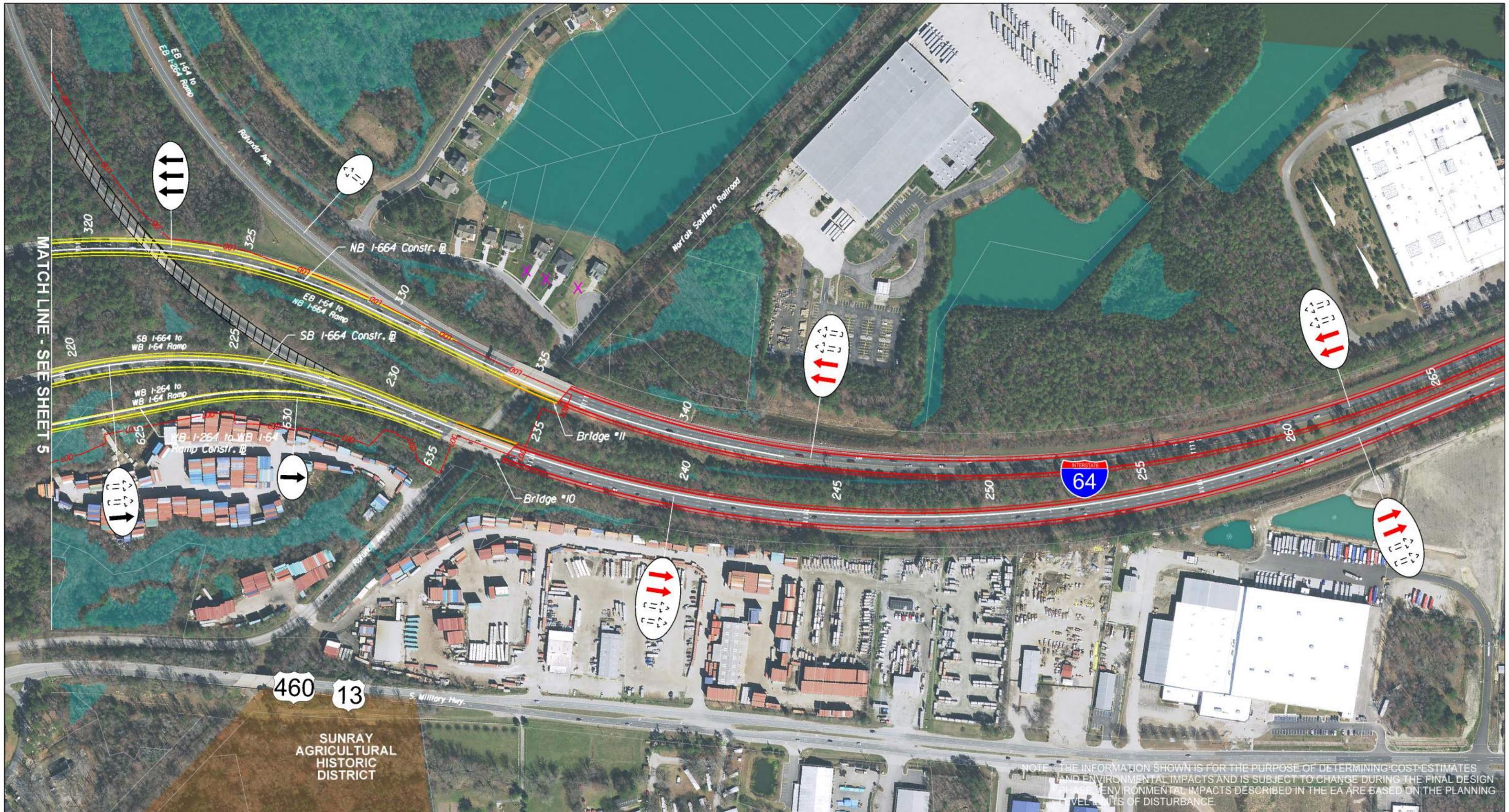
Alternative 2: Full Interchange Reconstruction

VDOT
Virginia Department of Transportation

APRIL 2019

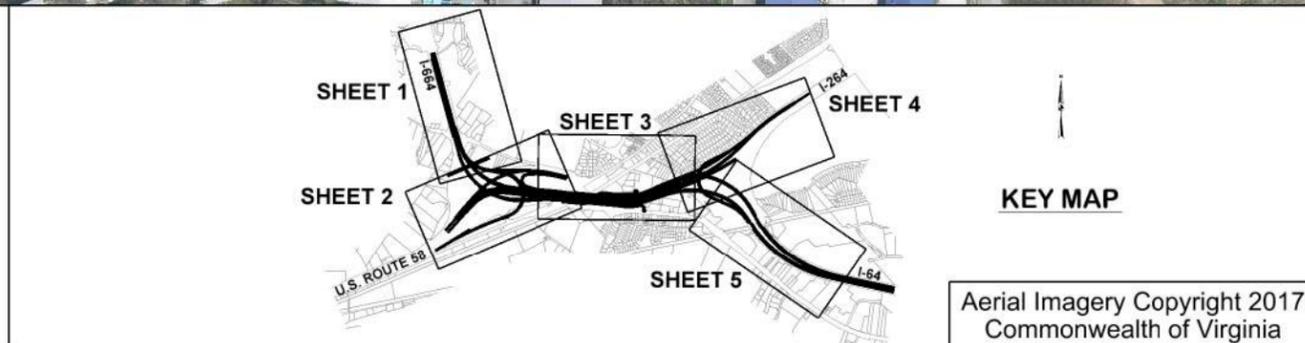
U.S. Department of Transportation
Federal Highway Administration

SHEET 4 OF 5



NOTE: THE INFORMATION SHOWN IS FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS AND IS SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE. ENVIRONMENTAL IMPACTS DESCRIBED IN THE EA ARE BASED ON THE PLANNING LEVEL LIMITS OF DISTURBANCE.

LEGEND	
	PARCEL BOUNDARY
	LIMITS OF DISTURBANCE
	PROPOSED PAVEMENT REMOVAL
	PROPOSED ROADWAY IMPROVEMENTS
	PROPOSED BRIDGE IMPROVEMENTS
	PROPOSED AUXILIARY LANE (OTHER PROJECT)
	PROPOSED IMPROVEMENTS (OTHER PROJECT)
	WETLANDS/WATERS
	HISTORIC PROPERTIES
	PROPOSED LANE
	EXISTING LANE
	PROPOSED LANE (OTHER PROJECT)
	AUXILIARY LANE (OTHER PROJECT)
	POTENTIAL DISPLACEMENTS
	POTENTIAL DISPLACEMENTS
	IMPACTED NOISE RECEPTORS



0' 150' 300' 600'

SCALE : 1" = 300'

Bowers Hill Interchange Improvements Study

Alternative 2: Full Interchange Reconstruction

VDOT
Virginia Department of Transportation

APRIL 2019

U.S. Department of Transportation
Federal Highway Administration

SHEET 5 OF 5

Aerial Imagery Copyright 2017 Commonwealth of Virginia

Bowers Hill Interchange Improvements Study

Environmental Assessment

Appendix B

Agency Correspondence



BOWERS HILL INTERCHANGE IMPROVEMENTS STUDY

City of Chesapeake

VDOT Project Number: 0664-131-028, P101; UPC 111427

DHR Project Review No. 2018-0199

The Department of Historic Resources concurs with the following findings of the Virginia Department of Transportation (VDOT):

- The Area of Potential Effects (APE) contains three architectural historic properties listed on the National Register of Historic Places (NRHP) in 2007: Sunray Agricultural Historic District (VDHR No. 131-5325) and two resources that contribute to the district but which are not individually eligible for the NRHP, the Hertz Cemetery (131-5044) and the House at 604 Homestead Road (131-5325-0173).
- Indiana United Methodist Church (131-0386) is potentially eligible for the NRHP under Criterion A for its association with the Nansemond Indian Nation under the theme of Ethnic Heritage. VDOT will assume the church's NRHP-eligibility for the purpose of applying Section 106 to the Bowers Hill Interchange Improvements Study.
- The remaining architectural resources within the APE that are listed in Tables 1 - 3 are not eligible for the NRHP either individually or as contributing elements to a NRHP-eligible historic district.
- The areas described in Section 6.1.2 of the report, *Bowers Hill Interchange Improvements Study: Archaeological Assessment Technical Report*, dated February 2019, and prepared by Rummel Klepper & Kahl, LLP for VDOT, are the only areas that warrant archaeological survey in order for VDOT to complete efforts to identify, at the Phase I level, all archaeological sites within the project's direct effects APE that may be eligible for the NRHP.
- The potential historical significance of any archaeological site located within the project's direct effects APE likely would lie chiefly in the information the site may contain (which can be retrieved through data recovery), and the site would have minimal value for preservation in place.


Julie V. Langan, Director
Virginia Department of Historic Resources
Virginia State Historic Preservation Officer

4 March 2019
Date

2018-0199

Gary Szymanski, President
Sunray Farmers Association
4509 Sunray Avenue
Chesapeake, VA 23321

13 November, 2018

Mary Ellen Hodges, Cultural Resources Planner
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219-2000

RE: U.S. Route 460 Connector Study
State Project No. 0058-061-015, P101; UPC: 106694
DHR Project Review No. 2018-0084

Dear Ms. Hodges,

The Sunray Farmers Association has agreed to act as a consulting party to the Section 106 Review Process for this project and the related Bowers Hill Interchange Project. The Sunray Agricultural Historic District recognizes the significance of a group of Polish immigrants that established the first permanent Polish settlement in Virginia. This settlement was established on land that was formerly part of the Franklin Land and Lumber Company and, prior to that had been within the range of the Nansemond Indian Tribe. The Historic District is defined by an area shown in the decision documentation, and the project does not appear to directly impact the Sunray Area. We are most concerned about potential impacts related to our community access during construction, harmful traffic diversions through the agricultural district, and increasing noise generated by the traffic volume. Our road network will not support diverted truck traffic either, physically or geometrically, and this is already an existing problem. We also ask that construction laydown and staging areas not be located either in, or at the entrance to, our community - another current problem.

As a local, self-identified, historian, I offer the following comments with regard to the historic resources in the Bowers Hill area. I have also offered a copy of my book, *"The History of The Sunray Colony,"* for use in understanding the Sunray Agricultural District resource. I have recently completed substantial research for an upcoming book on Civil War activity in the Bowers Hill area and the comments I offer are in historical chronological order and are as pertain to the Bowers Hill Area, and apply to this project and the Interchange Project.

1. Predating the Revolutionary War was “The Road from Portsmouth to Suffolk,” now known as Jolliff Road, Indiana Avenue, and Galberry Road, through the Bowers Hill Area. The advancing troops heading to the Battle of Great Bridge used this road and it had significant historic value during the actions of the Civil War. It is recorded that Colonel Woodford’s troops stopped and received provisions from Nansemond Indians near the location of the Indiana United Methodist Church at Bowers Hill. Hall’s Mill and the Forrest Entrenchment are located near the Bowers Hill Interchange on Jolliff Road.

2. Forrest Entrenchment on Jolliff Road was built by the Louisiana 3rd under the direction of Confederate Commodore French Forrest, of the Gosport Navy Yard. The Entrenchment was occupied by the Confederates to guard the Road at Halls Mill on Goose Creek. French Forrest was a veteran of the Mexican War, and as Commodore of the Gosport Yard would oversee the reconstruction of the *Merrimac* into the Ironclad, *Virginia*. The *Virginia* would participate in the most renowned sea battle of the Civil War.

The earthworks of Forrest Entrenchment remain to this day. Union troops of the Indiana 13th would retake this area in 1862. Lt Col. William Frederick Niemeyer was the Confederate Commander of the Forrest Entrenchment. He was later famously killed at the Battle of Spotsylvania Courthouse.

3. The Seaboard and Roanoke Railroad is disregarded in this study. Its importance in the Civil War cannot be ignored. The Seaboard and Roanoke ran from Portsmouth to Weldon, NC, then to Petersburg. Running through Bowers Hill, it transported troops on both sides of the conflict. Its trains moved cannons and contraband the Confederates took from the Shipyard at its fall in 1861 to crucial conflict points westward. The Railroad moved the steel and lumber needed to outfit the *Virginia*. It would transport the evacuating Rebels out of the area to Petersburg when the Union retook the Shipyard in 1862. Union Troops would use the Railroad as they proceeded to Suffolk for the Siege of Suffolk Battle. The Seaboard Railroad at Bowers Hill was so critical that a Union Camp was established at Bowers Hill to guard the Railroad and the parallel Norfolk to Petersburg Railroad in the swamp, plus “The Road” from Portsmouth to Suffolk. Union Troops tore up the Railroad in the area of Windsor, Virginia to prevent Longstreet’s forces from moving back into Suffolk.

The current project highway directly parallels the efficient route selected for this railroad. Its construction through the Dismal Swamp muck is significant in and of itself. The Railroad has gone through several name changes including the Seaboard Airline Railroad, The Seaboard Railroad, and currently, the CSX Railroad. The current stone railroad bridge over Goose Creek is certainly not insignificant, due to the materials and methods of construction.

4. The Union Camp at Bowers Hill Railhead: From May 1862 until at least August 1863, Union forces set up camp at Bowers Hill to control the Road to

Suffolk and the Seaboard and Roanoke Railroad. Among Union Regiments stationed there were the Indiana 13th and the New York 169th Volunteers, the Pennsylvania 12th, and others.

In correspondence from this camp, and there are many, the Bowers Hill area is described precisely, and many soldiers rested here from rigorous campaigns on the Peninsula and at the Siege of Suffolk. The Camp is sometimes referred to as Camp Foster, after the Commanding General of the Department of Virginia, Robert S. Foster. Colonel John McConihe of the 169th NY Volunteers wrote several significant letters from this camp as he recovered from an arm wound he received at the Battle of Shiloh. His Regiment was at approximately 600 men while camped at Bowers Hill, and he also died a gallant death in a subsequent battle.

A significant military review took place at this location in July of 1863, which included General Foster and several Commanders with significant staff and guard. The Union Troop activities while camped here are well documented in northern newspapers including the *New York Times* and the *Troy Daily Whig*.

5. Churches of Historic importance in Bowers Hill include Indiana United Methodist Church on Indiana Avenue and Military Highway. The church site was once an Indian Schoolhouse of the Nansemond Indians as alluded above. Ceremonies at the church as it exists today were held with the Chief in full headdress. The Indian Schoolhouse was burned down several times, once by the occupying Union forces at Bowers Hill.

St. Mary's Catholic Church on Homestead Road in the Historic District was, and remains, central to the Polish community settled there. The Church, Parish Hall, and Rectory were all constructed in the 1915 timeframe, and remain as-constructed with minor improvements and upgrades. The Parish is as vibrant as ever and hosts an annual Polish Festival that has steadily grown in popularity. The Sunray Schoolhouse on Sunray Avenue, constructed in 1920, is also critical to the history of the Sunray Community. In addition, the Sunray Farmers Association owns a small cemetery on a triangular parcel near Franks Trucking Center on Military Highway. Several graves of the early Polish settlers are in the cemetery.

6. Hampton Roads Executive Airport, often informally referred to as the Bowers Hill Airport or the Portsmouth/Chesapeake Airport: Members of our community have described clearing the land for this airport with two-cylinder John Deere Tractors. They relayed stories of using kit-built aircraft as part of the Civil Air Patrol to drop bags of trash that would direct fire on enemy submarines off Ocean View during World War II. In the 1960's locals could take a plane ride for 2 cents a pound. Access to this airport is extremely dangerous, and should be a focus of this project.

My intention in providing these comments is to assist in the proper and complete documentation of the Historic Resources in the area, as well as to protect the integrity of the Sunray Rural Agricultural Historic District. Though some of these comments refer to resources not directly in the project area, they work together to give a more complete picture. Please feel free to contact me with questions regarding these comments.

Respectfully,

Gary Szymanski, P.E.
President, Sunray Farmers Association
757-642-4839

cc: Sunray Farmers Association Records



United States Department of the Interior

FISH AND WILDLIFE SERVICE



Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

October 19, 2018

Mr. Mack Frost
Federal Highway Administration
400 North 8th Street, Suite 750
Richmond, VA 23219

Re: Invitation to Serve as Participating,
Cooperating, and Concurring Agency:
Bowers Hill Interchange Improvement
Study; Federal Project #: NHPP-664-
7(067); State Project #: 0664-131-028,
P101; UPC: 111427

Dear Mr. Frost:

In response to your letter dated March 13, 2018 soliciting participation in the National Environmental Policy Act process for the Bowers Hill Interchange Improvement Study, the U.S. Fish and Wildlife Service (Service) Virginia Field Office will not be serving as a cooperating nor participating agency in the preparation of the Environmental Assessment for this project, as described in the National Environmental Policy Act and Clean Water Act (Section 404) Merged Process for Highway Projects in Virginia.

This project has little potential to impact Service trust resources. We encourage you to utilize our online project review process that can, if necessary and appropriate, lead to an individual response regarding compliance with provisions of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended, and Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c, 54 Stat. 250), as amended. We have developed a website that provides the steps and information necessary to allow any individual or entity needing review of their project, at any stage, to complete a review and come to the appropriate conclusion. This site can be accessed at: <http://www.fws.gov/northeast/virginiafield/endangered/projectreviews.html>.

Specific inquiries related to potential impacts to the Service's Great Dismal Swamp National Wildlife Refuge should be directed to:

Mr. Frost

Page 2

Chris Lowie
Refuge Manager
Great Dismal Swamp National Wildlife Refuge
3100 Desert Road
Suffolk, VA 23434
757-986-3705 ext. 28
chris_lowie@fws.gov

If you have additional questions or require any additional information, please contact Troy Andersen of this office at (804) 824-2428 or via email at troy_andersen@fws.gov.

Sincerely,

Cindy Schulz
Field Supervisor
Virginia Ecological Services

cc: Corps, Norfolk, VA (Attn: Lee A. Fuerst)
EPA, Philadelphia, PA (Attn: Barbara Okorn)
Service, Suffolk, VA (Attn: Chris Lowie)
VDOT, Richmond, VA (Attn: Scott Smizik)
VDOT, Suffolk, VA (Attn: Jennifer Salyers)
VDOT, Suffolk, VA (Attn: Eric Stringfield)
VDOT, Suffolk, VA (Attn: Bruce Duvall)

From: [Salyers, Jennifer](#)
To: [Travis R. Comer](#)
Subject: Fwd: Project Name: NEPA Programs Agency Meeting Presentation Materials for Bowers Hill Interchange Improvements Study
Date: Tuesday, September 11, 2018 11:29:18 AM

Travis,

FYI - This was sent in response to the agency meeting invite. I'm not sure we got a response during scoping.

thanks,

Jenny Salyers, PMP
Location Studies Project Manager
1401 E. Broad Street
Richmond, VA 23219
Phone (804) 371-6706
Cell (804) 317-5658
Jennifer.Salyers@VDOT.Virginia.gov

----- Forwarded message -----

From: Warren, Arlene <arlene.warren@vdh.virginia.gov>
Date: Tue, Sep 11, 2018 at 10:41 AM
Subject: Project Name: NEPA Programs Agency Meeting Presentation Materials for Bowers Hill Interchange Improvements Study
To: Jennifer.Salyers@vdot.virginia.gov

Project Name: NEPA Programs Agency Meeting Presentation Materials for Bowers Hill Interchange Improvements Study

Project #: N/A

UPC #: N/A

Location: Chesapeake VA

Bowers Hill Interchange

VDH – Office of Drinking Water has reviewed the above project. Below are our comments as they relate to proximity to **public drinking water sources** (groundwater wells, springs and surface water intakes). Potential impacts to public water distribution systems or sanitary sewage collection systems **must be verified by the local utility.**

The following public groundwater wells are located within a 1-mile radius of the project site:

PWS ID Number	City/County	System Name	Facility Name
3550775	CHESAPEAKE	SUNRAY ARTESIAN WATER SUPPLY	DRILLED WELL

The following surface water intakes are located within a 5-mile radius of the project site:

PWS ID		
--------	--	--

Number	System Name	Facility Name
3550051	CITY OF CHESAPEAKE - NORTHWEST RIVER SYS	IN-TOWN LAKES-NORTH INTAKE
3550051	CITY OF CHESAPEAKE - NORTHWEST RIVER SYS	IN TOWN LAKES -SOUTH INTAKE

The project is not within the watershed of any public surface water intakes.

Best Management Practices should be employed, including Erosion & Sedimentation Controls and Spill Prevention Controls & Countermeasures on the project site.

Materials should be managed while on site and during transport to prevent impacts to nearby surface water.

The Virginia Department of Health – Office of Drinking Water appreciates the opportunity to provide comments. If you have any questions, please let me know.

Best Regards,

Arlene Fields Warren

GIS Program Support Technician

Office of Drinking Water

Virginia Department of Health

109 Governor Street

Richmond, VA 23219

(804) 864-7781

June 8, 2018

Ms. Jennifer Salyers
VDOT Project Manager
1401 East Broad Street
Richmond, VA

BY EMAIL

Re: Scoping Comments for the Bowers Hill Interchange Improvements Study

Dear Ms. Salyers:

The Southern Environmental Law Center would like to provide the following comments on the scoping process for the Environmental Assessment (EA) being prepared for the Bowers Hill Interchange Improvements Study. SELC is a non-partisan, non-profit organization that works throughout Virginia to promote transportation and land use decisions that strengthen our communities, protect our natural resources, and improve our quality of life.

We appreciate the opportunity to comment at this early stage. The Bowers Hill Interchange is clearly an important component of the transportation network in Hampton Roads, serving as the connection between a number of significant interstate, national, and state highway routes. However, this interchange is also surrounded by significant natural resources, including numerous wetlands and habitat areas. In planning for improvements at this location, it will be critical to avoid and minimize impacts to these resources to the greatest extent possible. The need to carefully plan these improvements is further heightened by the Hampton Roads region's severe vulnerability to sea level rise and the effects of climate change. Since few specifics have been provided thus far about potential improvement options for the interchange, our comments below will focus on these natural resource issues.

Natural Resources in the Project Area

The recent Hampton Roads Crossing Study Supplemental Environmental Impact Statement (SEIS) included a review of potential environmental impacts from making improvements to the Bowers Hill Interchange,¹ which were incorporated into a number of the proposed Build Alternatives under consideration. The Draft SEIS indicated that the Bowers Hill Interchange improvements—identified as “Alignment Segment 1” for purposes of the environmental impacts analysis—would result in some of the greatest impacts on wetlands (23.6 acres), terrestrial habitat (54.6 acres), and threatened and endangered species habitat (22.2 acres) of the 14 Alignment Segments reviewed for the project.²

¹ FHWA & VDOT, *Hampton Roads Crossing Study Draft Supplemental Environmental Impact Statement* (July 2016), available at http://www.hamptonroadscrossingstudy.org/learn_more/hrcs_draft_seis.asp (hereinafter “Draft SEIS”).

² See Draft SEIS, *Appendix A: Alignment Segments & OIS* at A-10.

Indeed, in its comments on the Draft SEIS, the U.S. Army Corps of Engineers specifically noted that anticipated wetlands impacts from this segment and one other would be “especially large,” and urged avoidance of these resources in selecting a preferred alternative for the project.³ We share the Corps’ concerns about the potential impacts on these wetlands as well as the various habitat areas in the vicinity of the Bowers Hill Interchange, and urge you to carefully review these resources in the upcoming EA and prioritize the avoidance and protection of them in the development of improvement options for consideration in this study.

Sea Level Rise and Climate Change

Another reason it is imperative that this study carefully consider and avoid impacts to these wetlands and habitat areas is that they play an important role in contributing to the region’s natural resiliency to the effects of climate change. This issue is a critical one for Hampton Roads, which is among the areas most threatened by future sea level rise in the world. The Hampton Roads Transportation Planning Organization has stressed the particular importance of addressing sea level rise in relation to this project as well, since the Bowers Hill Interchange area is significantly vulnerable to tidal and storm surge flooding.⁴ It is essential to protect existing natural resources to enhance both the resiliency of the region in general and of infrastructure in this area.

In addition to protecting existing natural resources in the vicinity of the project, a comprehensive review of design elements of the project is needed to further limit the vulnerability of any improvements.

Thank you for your consideration of these comments, and we look forward to participating in this study as it moves forward.

Sincerely,



Travis Pietila
Staff Attorney

³ Letter from Gregory Steele, Corps of Engineers to Ed Sundra, FHWA and Scott Smizik, VDOT (Sept. 19, 2016).

⁴ Letter from Robert Crum, HRTPO to Jennifer Salyers, VDOT entitled “Environmental Assessment (EA) for Bowers Hill Interchange” (Apr. 10, 2018).



Salyers, Jennifer <jennifer.salyers@vdot.virginia.gov>

Re: Bowers Hill Interchange Improvements Study - UPC 111427

1 message

Paxton, Kathryn <kathryn.paxton@vdacs.virginia.gov>
To: "Salyers, Jennifer (VDOT)" <Jennifer.Salyers@vdot.virginia.gov>

Fri, Apr 13, 2018 at 4:50 PM

Jennifer,

I apologize for the late response. VDACS would be happy to be a participating agency for the Bowers Hill Interchange Improvements Study. I regret that I wasn't able to participate in the initial meeting, but have reviewed the information that was provided. I will be happy to participate going forward. Please let me know if you need any additional information from us at this point. Thanks.

Kathryn Paxton
Policy Analyst
Virginia Department of Agriculture and Consumer Services

On Mon, Mar 12, 2018 at 3:00 PM, Salyers, Jennifer (VDOT) <Jennifer.Salyers@vdot.virginia.gov> wrote:

Good afternoon,

The Virginia Department of Transportation (VDOT), on behalf of the Federal Highway Administration (FHWA), have initiated an Environmental Assessment (EA), pursuant to the National Environmental Policy Act of 1969, as amended (NEPA), to evaluate potential transportation improvements at the Bowers Hill Interchange that includes a confluence of Interstate 664, Interstate 264, Interstate 64, [U.S. Route 460](#), [U.S. Route 58](#), and Route 191 (Jolliff Road) in Chesapeake, Virginia. VDOT is requesting scoping comments and extending your agency an invitation to become a Participating Agency to support the development of the Environmental Assessment that is currently underway. Please see the attached invitation letter, vicinity map, and Draft Coordination Plan for further information.

We would ask that you please provide your response to this invitation and any comments regarding the study as well as comments that you might have on the Draft Coordination Plan no later than April 10, 2018.

Should you have any questions, please contact me directly at (804) 371-6706. We appreciate your support and look forward to further coordination with your agency.

Thank you,

Jenny Salyers, PMP

Location Studies Project Manager

[1401 E. Broad Street](#)

[Richmond, VA 23219](#)

Phone (804) 371-6706

Cell (804) 317-5658

4/16/2018

Commonwealth of Virginia Mail - Re: Bowers Hill Interchange Improvements Study - UPC 111427

Jennifer.Salyers@VDOT.Virginia.gov

--

Kathryn Paxton
Policy Analyst

Office of Policy, Planning and Research

Virginia Department of Agriculture and Consumer Services
(804) 786-5175



Salyers, Jennifer <jennifer.salyers@vdot.virginia.gov>

Fwd: Bowers Hill Interchange Improvements Study - UPC 111427

1 message

Meade, Jonathan <jonathan_meade@nps.gov>

Wed, Apr 11, 2018 at 12:15 PM

To: Jennifer.Salyers@vdot.virginia.gov

Cc: Terry Brown <terry_e_brown@nps.gov>, Jennifer Maver <jennifer_maver@nps.gov>, "Sams, Cheryl" <cheryl_sams@nps.gov>

Dear Ms. Salyers:

Thank you for the opportunity to review your project scope for the Bowers Hill Interchange that includes a confluence of Interstate 664, Interstate 264, Interstate 64, U.S. Route 460, U.S. Route 58, and Route 191 (Jolliff Road) in Chesapeake, Virginia and the invitation to be a participating agency. We studied the project area and we see no specific NPS interests within, therefore we decline your invitation to be a participating agency.

If the project scope changes where you feel that the NPS might be able to contribute to the project, please don't hesitate to contact us again.

Thank you,

Jon Meade

Jonathan Meade
Associate Regional Director,
Resource Stewardship and Science
Northeast Regional Office, NPS
U.S. Custom House
200 Chestnut Street, 5th Floor
Philadelphia, PA 19106
jonathan_meade@nps.gov
215-597-9014 office
267-294-4891 mobile



Be in the know in NERO: https://sites.google.com/a/nps.gov/nero_communications/nps-northeast-region

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From: "Salyers, Jennifer (VDOT)" <Jennifer.Salyers@vdot.virginia.gov>
To: "gay_vietzke@nps.gov" <gay_vietzke@nps.gov>
Cc: "Terry_E_Brown@nps.gov" <Terry_E_Brown@nps.gov>
Subject: **Bowers Hill Interchange Improvements Study - UPC 111427**

Good afternoon,

The Virginia Department of Transportation (VDOT), on behalf of the Federal Highway Administration (FHWA), have initiated an Environmental Assessment (EA), pursuant to the National Environmental Policy Act of 1969, as amended (NEPA), to evaluate potential transportation improvements at the Bowers Hill Interchange that includes a confluence of Interstate 664, Interstate 264, Interstate 64, U.S. Route 460, U.S. Route 58, and Route 191 (Jolliff Road) in Chesapeake, Virginia. VDOT is requesting scoping comments and extending your agency an invitation to become a Participating Agency to support the development of the Environmental Assessment that is currently underway. Please see the attached invitation letter, vicinity map, and Draft Coordination Plan for further information.

We would ask that you please provide your response to this invitation and any comments regarding the study as well as comments that you might have on the Draft Coordination Plan no later than April 10, 2018.

Should you have any questions, please contact me directly at (804) 371-6706. We appreciate your support and look forward to further coordination with your agency.

Thank you,

Jenny Salyers, PMP

Location Studies Project Manager

1401 E. Broad Street

Richmond, VA 23219

Phone (804) 371-6706

Cell (804) 317-5658

Jennifer.Salyers@VDOT.Virginia.gov

6 attachments



ATT00001

1K



BowersHill_CoordinationPlan_03.12.18.pdf

374K



Bowers Hill_Scoping_Vicinity_Map_Inset.pdf

1742K



ATT00002

1K



NPS_GayVietzke_03122018.pdf

701K



ATT00003

April 10, 2018

Ms. Jennifer Salyers, Environmental Division
Virginia Department of Transportation
1401 East Broad Street
Richmond, VA 23219

RE: Environmental Assessment (EA) for Bowers Hill Interchange

Dear Ms. Salyers:

Thank you for your letter of March 12, 2018 inviting us to be a Participating Agency in the preparation of the EA, asking us to provide comments on the coordination plan; transportation needs; and social, economic, or natural resources within the study area, and inviting us to the first agency coordination meeting.

We accept your invitation to be a Participating Agency. Robert B. Case, PE, PhD, HRTPO Chief Transportation Engineer (rcase@hrtpo.org) will be your point of contact.

Our comments follow:

Coordination Plan for Agency and Public Involvement

HRTPO staff recommends that the date that your assessment of environmental and socioeconomic impacts will occur be outlined clearly in this document. HRTPO staff also requests that the type of approach(es) used to arrive at the assessment be clearly outlined. HRTPO staff recommends that a CIA (Community Impact Assessment) be conducted, and that the finding be shared with the public and stakeholders.

Transportation Needs

Due to the proposed 8 lanes of the I-64 Southside / High-Rise Bridge Widening- Phase II project planned for 2037, improvement of the Bowers Hill interchange will be *required* in the distant future, but—due to the congestion appearing at the interchange on a daily basis, to be exacerbated by increased volumes from the I-64 Southside / High-Rise Bridge Widening- Phase I project currently underway—improvement of this interchange may be *advisable* much sooner.

Social, Economic, or Natural Resources

Concerning environmental justice, we look forward to reviewing your demographic analysis of the area.

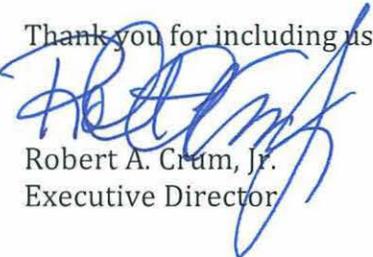
Climate change and its impacts are a major concern in Hampton Roads. We recommend that VDOT account for climate change impacts in the planning, design, and construction of any improvements to the Bowers Hill Interchange. Specifically, the area near the Bowers Hill Interchange is significantly vulnerable to tidal and storm surge flooding. We recommend that VDOT consider incorporating an assessment of how recurrent flooding and sea level rise will affect the proposed improvements and include adaptation strategies in the design of any specific projects. Guidance for how to incorporate sea level rise into project planning is available from both NOAA ("[Global and Regional Sea Level Rise Scenarios for the United States](https://tidesandcurrents.noaa.gov/publications/techrpt83)" <https://tidesandcurrents.noaa.gov/publications/techrpt83> [Global and Regional SLR Scenarios for the US final.pdf](https://tidesandcurrents.noaa.gov/publications/techrpt83)) and the U.S. Army Corps of Engineers ("[Climate Change Adaptation – Comprehensive Evaluation of Projects with Respect to Sea-Level Change](http://www.corpsclimate.us/ccaceslcurves.cfm)" - <http://www.corpsclimate.us/ccaceslcurves.cfm>).

In addition to sea level rise, recent research suggests that precipitation patterns may change significantly as result of climate change. Efforts by both FHWA ("[HEC 17 – Highways in the River Environment: Extreme Events, Risk, and Resilience](https://www.fhwa.dot.gov/engineering/hydraulics/pubs/hif16018.pdf)" <https://www.fhwa.dot.gov/engineering/hydraulics/pubs/hif16018.pdf>) and the City of Virginia Beach ("[Analysis of Historical and Future Heavy Precipitation](https://www.hrpdcva.gov/uploads/docs/5A%20Attachment%20AnalysisofHistoricalandFutureHeavyPrecipitationFinalrev20180326.pdf)" [https://www.hrpdcva.gov/uploads/docs/5A Attachment AnalysisofHistoricalandFutureHeavy Precipitation Finalrev 20180326.pdf](https://www.hrpdcva.gov/uploads/docs/5A%20Attachment%20AnalysisofHistoricalandFutureHeavyPrecipitationFinalrev20180326.pdf)) suggest that precipitation intensity and quantity will increase. VDOT should consider using the FHWA guidance and the Virginia Beach study to develop appropriate designs for any potential projects at the interchange.

Improving public access to natural and coastal resources for recreation is another area of emphasis for Hampton Roads communities. The Bowers Hill Interchange is co-located with a segment of the East Coast Greenway, a major regional multi-use trail. We recommend that the study incorporate potential impacts to this resource and potential opportunities for improving the trail during the interchange improvement process.

Mr. Case plans to attend the April 11, 2018 meeting in Richmond.

Thank you for including us in this project.



Robert A. Crum, Jr.
Executive Director



Salyers, Jennifer <jennifer.salyers@vdot.virginia.gov>

RE: Bowers Hill Interchange Improvements Study - UPC 111427

Sherry Earley <searley@suffolkva.us>

Tue, Apr 10, 2018 at 10:25 AM

To: "Salyers, Jennifer (VDOT)" <Jennifer.Salyers@vdot.virginia.gov>

Cc: Eric Nielsen <enielsen@suffolkva.us>, Scott Mills <smills@suffolkva.us>, "Robert E. Lewis" <RELEWIS@suffolkva.us>

Jennifer – Suffolk would like to accept the invitation to become a Participating Agency in this effort. We also plan to get written comments to you later today.

Also, I don't think I will be able to attend the meeting in Richmond tomorrow, but would like to participate remotely, will you be sending out instructions on how to dial in?

Thank you,

Sherry B. Earley, P.E.

Asst. Director of Public Works/City Engineer

City of Suffolk

442 W. Washington St.

P.O. Box 1858

Suffolk, Va. 23439

757-514-7703

From: Salyers, Jennifer (VDOT) [mailto:Jennifer.Salyers@VDOT.Virginia.gov]

Sent: Monday, March 12, 2018 3:21 PM

To: Sherry Earley

Subject: FW: Bowers Hill Interchange Improvements Study - UPC 111427

Hi Sherry,

I apologize. I had your name spelled incorrectly in the email below.

Thanks,

Jenny

Subject: Bowers Hill Interchange Improvement Study – Scoping Questionnaire

Chesapeake, Virginia

State Project Number: 0664-131-028, P101; UPC: 111427

Federal Project Number: NHPP-664-7(067)

1. Do you anticipate or are you aware of any organized opposition to transportation improvements in the study area? **I am not aware of any organized opposition to transportation improvements in the study area.**
2. Will transportation improvements in the study area potentially disrupt a community or planned development? **Study area is outside of Suffolk jurisdiction**
3. Where do transportation improvements within the study area rank among the City's specific transportation improvement needs? **Improvements within the study area are outside Suffolk jurisdiction, but do have a major impact on reliable accessibility to our city. This project ranks high among specific transportation improvement needs.**
4. Is the City considering any future mass transit options for this corridor? **The City is not considering mass transit options for this corridor at this time, but believe options for future mass transit should be considered for the corridor.**
5. In this scoping package we have provided a snapshot of recent economic and social data from the U.S. Census Bureau within the study area. Do you concur this data reflects your current jurisdictional population profile? Additionally, please identify locations in the study area where you feel potential minority or low-income Environmental Justice populations should be considered. **Data was not provided in the package received.**
6. Please provide any additional input on potential positive and negative indirect effects that could occur through the implementation of transportation improvements within the study area. Any pertinent reports or documents that may support your conclusions would be greatly appreciated. **Ongoing studies including the Hampton Roads Regional Connectors Study and the US Route 460/58/13 Connector Study both have overlaps of this study area and should be coordinated closely to ensure impacts and schedules for implementation are considered in the resulting recommendations for each of these studies.**
7. Please provide any other comments or feedback that you feel may be beneficial to the development of this study. **As with the other studies mentioned above, consideration of the growth of freight traffic, both truck and rail, through the study area should be of prime consideration, including consideration of possible new technologies to be integrated into the study recommendations.**



Salyers, Jennifer <jennifer.salyers@vdot.virginia.gov>

Environmental Assessment for the Bowers Hill Interchange Improvement Study

2 messages

Earl Sorey <easorey@cityofchesapeake.net>

Tue, Apr 10, 2018 at 4:34 PM

To: "Jennifer.salyers@vdot.virginia.gov" <Jennifer.salyers@vdot.virginia.gov>, "scott.smizik@vdot.virginia.gov"

<scott.smizik@vdot.virginia.gov>

Cc: "James E. Baker" <jeBaker@cityofchesapeake.net>, Eric Martin <emartin@cityofchesapeake.net>, "Robert N. Geis" <rgeis@cityofchesapeake.net>

Ms. Salyers,

Thank you for reaching out to the City of Chesapeake relative to the Bowers Hill EA. We would definitely like to serve as a Participating Agency for this effort. I, along with other members of my staff, will participate in tomorrow's webinar for scoping and agency coordination.

We have also attached the completed Scoping Questionnaire and will gladly provide any additional documentation that you may need.

This is an important project for the City and Hampton Roads Region and we look forward to working with you on this effort.

Best regards,

Earl Sorey, P.E.

Assistant Director of Public Works

757-382-6513 Direct

757-297-6998 Mobile

**Bowers Hill EA - questionnaire.docx**

15K

Scott Smizik <scott.smizik@vdot.virginia.gov>

Tue, Apr 10, 2018 at 4:49 PM

To: Salyers Jennifer ekx32715 <jennifer.salyers@vdot.virginia.gov>

4/11/2018

Commonwealth of Virginia Mail - Environmental Assessment for the Bowers Hill Interchange Improvement Study

Let's plan to discuss expected internal/external politics soon. Also to prepare to brief new District management on where we are.

[Quoted text hidden]

--

Scott Smizik

Location Studies Project Manager
Virginia Department of Transportation
Environmental Division
1401 East Broad Street
Richmond, Virginia 23219
Desk: (804) 371-4082
Cell: (804) 306-0920
Fax: (804) 786-7401
Scott.Smizik@VDOT.Virginia.gov

Subject: Bowers Hill Interchange Improvement Study – Scoping Questionnaire
Chesapeake, Virginia
State Project Number: 0664-131-028, P101; UPC: 111427
Federal Project Number: NHPP-664-7(067)

1. Do you anticipate or are you aware of any organized opposition to transportation improvements in the study area?

The City of Chesapeake is not aware of any organized opposition at this time. The Sunray community (National Historic District) will need to be engaged to ensure the integrity of the neighborhood is maintained. There are also low-income neighborhoods, many with elderly residents, near Bowers Hill, who will also need to be engaged to make sure there are no displacements and that neighborhood access is maintained.

2. Will transportation improvements in the study area potentially disrupt a community or planned development?

The Sunray community is just south of Bowers Hill and is a national historic district. There is limited development occurring within the northern limits of this community, but it has historically been an agricultural community with single-family homes and large lots. The development occurring in the northern limits of Sunray along S. Military Highway was approved in phases from 2012-2014 for 76 single family homes.

3. Where do transportation improvements within the study area rank among the City's specific transportation improvement needs?

The improvement of I-64 from Bowers Hill to I-464 has long been a top transportation priority for the City. With the I-64/High Rise Bridge Phase 1 Improvements moving forward, we believe improvement of the Bowers Hill Interchange will be critical to ensuring local and regional mobility.

4. Is the City considering any future mass transit options for this corridor?

The Comprehensive Plan contains an action strategy whereby commuter rail is recommended to travel between Harbor Park in Norfolk and downtown Suffolk. Bowers Hill would serve as an important activity node along this proposed transit line to serve nearby employment centers (Cavalier Industrial Park, Hampton Roads Executive Airport). There is also a proposed express bus service from downtown Suffolk to Harbour View in Suffolk with a stop in Bowers Hill. The proposed passenger high speed rail between Richmond and Norfolk is also planned to pass through Bowers Hill and a stop is proposed for this location.

5. In this scoping package we have provided a snapshot of recent economic and social data from the U.S. Census Bureau within the study area. Do you concur this data reflects your current jurisdictional population profile? Additionally, please identify locations in the study area where you feel potential minority or low-income Environmental Justice populations should be considered.

Airline Boulevard has lower income neighborhoods (Ahoy Acres, Holly Cove) with an aging housing stock and population.

6. Please provide any additional input on potential positive and negative indirect effects that could occur through the implementation of transportation improvements within the study area. Any pertinent reports or documents that may support your conclusions would be greatly appreciated.

VDOT previously conducted a feasibility study for the proposed Pleasant Grove Parkway. This study included options that would impact the Bowers Hill Interchange.

7. Please provide any other comments or feedback that you feel may be beneficial to the development of this study.

The City is prepared to serve as a Participating Agency for this effort and looks forward to working with VDOT on this effort.



Salyers, Jennifer <jennifer.salyers@vdot.virginia.gov>

Bowers Hill Interchange Improvement Study, Project # 0064-131-028, P101, UPC 111427

1 message

Wright, James <wrightj@portsmouthva.gov>
To: "Salyers, Jennifer (VDOT)" <Jennifer.Salyers@vdot.virginia.gov>
Cc: "Baldwin, Bob" <baldwinb@portsmouthva.gov>

Tue, Apr 10, 2018 at 1:20 PM

Jennifer,

The City of Portsmouth is pleased to submit the following responses to the scoping questionnaire for this project. We look forward to serving as a participating agency during the study for this important project.

- 1- The City of Portsmouth is not aware of any organized opposition to the transportation improvements in the Bowers Hill study area.

- 2- The proposed transportation improvements will impact the City Portsmouth transmission water mains that are located in this corridor. These water mains supply drinking water and provide fire protection for the City of Portsmouth Southside and portions of Chesapeake in the study area. A recent study of the transmission water mains has identified and prioritized projects to upgrade these critical facilities.

- 3- The Bowers Hill project is a significant transportation project that will impact travel at the western edge of the City of Portsmouth with respect to interstate travel and impact local roadways such as Greenwood Drive, Airline Blvd and Hodges Ferry Road, as motorists will seek to avoid conflicts near this interchange by using city roads.

- 4- N/A (mass transit in the corridor)

- 5- N/A (environmental justice impacts in the corridor)

- 6- Respectfully request that the spacing for the ramps at Dock Landing Road be examined in this project. These ramps appear to be a frequent source of conflict –

accidents, congestion, etc. Reconfiguration in some manner would greatly improve traffic flow in and around Bowers Hill.

7- The study area should be extended to include the first traffic signal heading eastbound on Airline Boulevard. As stated previously, Airline Boulevard is impacted by motorists seeking to avoid conflicts at this interchange. The traffic management plan should examine areas outside of the study area (specifically local roads – see #3) to determine the traffic impacts during construction. The environmental document should identify the proposed location and type of stormwater management facilities to provide a more accurate cost estimate and to be able to assess constructability concerns. Lastly, there are significant wetland impacts in the corridor. This document should not only identify the types of wetlands present but also identify a means to avoid and minimize potential impacts with respect to regulatory concerns.

Thank you for your consideration.

JW

James E Wright, Jr, P.E., CSM
City Engineer
Department of Engineering and Technical Services
[801 Crawford Street](#)
[Portsmouth, VA 23704](#)
Phone: (757) 393.8592
Fax: (757) 393.5148

terrestrial and feed on a variety of small animals including small mammals, birds, and amphibians (Mitchell & Schwab, 1991).

The primary threats to the Canebrake rattlesnake are the loss of habitat due to development activities and persecution by humans (Mitchell, 1994). Please note that the coastal plain populations of the Canebrake rattlesnake are currently classified as endangered by the Virginia Department of Game and Inland Fisheries (VDGIF).

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations. Due to the legal status of the Canebrake rattlesnake, DCR also recommends coordination with Virginia's regulatory authority for the management and protection of this species, the VDGIF, to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please re-submit project information and map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis/> or contact Ernie Aschenbach at 804-367-2733 or Ernie.Aschenbach@dgif.virginia.gov.

The remaining DCR divisions have no comments regarding the scope of this project. Thank you for the opportunity to comment.

Cc: Ernie Aschenbach, VDGIF

Literature Cited

- Gibbons, W. and Dorcas, M. 2005. Snakes of the southeast. University of Georgia Press. Athens, GA. 253 pp.
- Mitchell, J.C. 1994. The reptiles of Virginia. Smithsonian Institution Press. Washington, DC. pp. 296 - 302.
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- NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: April 6, 2010).



Salyers, Jennifer <jennifer.salyers@vdot.virginia.gov>

Re: Bowers Hill Interchange Improvements Study- UPC 111427

1 message

Baker, T. Stewart <stewart.baker@vdem.virginia.gov>

Tue, Apr 10, 2018 at 11:37 AM

To: "Salyers, Jennifer (VDOT)" <Jennifer.Salyers@vdot.virginia.gov>

Cc: Bruce Sterling <bruce.sterling@vdem.virginia.gov>, Stewart Baker <stewart.baker@vdem.virginia.gov>

Jennifer,

Pursuant to the Bowers Hill Interchange Improvement Study - Scoping Questionnaire that you forwarded to the Virginia Department of Emergency Management (VDEM), in which you invited the VDEM to be a Participating Agency, I provide the following in response to the questions you presented.

1. Are there any existing evacuation plans or studies specifically addressing the study area?

Yes there is an existing evacuation plan and several studies that address the study area. The Commonwealth of

Virginia Emergency Operations Plan addresses this area specifically regarding tropical and hurricane evacuations as

developed in the Virginia Hurricane Evacuation Study. Additionally VDOT has conducted several studies both independently and with the directly impacted localities and agencies regarding the bottleneck impacts the Bowers Hill

Interchange presents causing severe impacts to the regional evacuation times.

2. If so, do any studies include evacuation modeling for existing or future conditions along the study area, including flooding?

Not to my knowledge, however, the VDEM developed general flooding impacts to the identified evacuation routes by

utilizing available Digital Elevation Models and overlaying them on available orthographic data to identify the segments

of roadway that would be subject to flooding impacts from major storm surge events. Additionally, there is the Sea,

Lake Overland Surge from Hurricanes (SLOSH) Tool that can provide projected storm surge impacts from tropical

events that may affect the study area and Hampton roads Region.

3. Are there any studies that identify the need for transportation improvements in the study area to facilitate evacuation?

Yes. The previously referenced VDOT Bowers Hill Interchange Evacuation Improvement Studies did make several

recommendations that would increase the throughput of traffic through the interchange thereby positively impacting

the travel time by reducing the extended clearance time projections that currently exist in current evacuation planning projections.

If you have any questions regarding the above please don't hesitate to contact me. Regarding the planned initial meeting scheduled for April 11th, I will be unable to participate due to another previously scheduled commitment. I will endeavor to participate in future such meetings.

Regards,

T. Stewart Baker
Region 5 Technical Specialist
Virginia Dept. of Emergency Management
804-516-5772
Stewart.Baker@vdem.virginia.gov

On Mon, Mar 12, 2018 at 2:54 PM, Salyers, Jennifer (VDOT) <Jennifer.Salyers@vdot.virginia.gov> wrote:

Good afternoon,

The Virginia Department of Transportation (VDOT), on behalf of the Federal Highway Administration (FHWA), have initiated an Environmental Assessment (EA), pursuant to the National Environmental Policy Act of 1969, as amended (NEPA), to evaluate potential transportation improvements at the Bowers Hill Interchange that includes a confluence of Interstate 664, Interstate 264, Interstate 64, [U.S. Route 460](#), [U.S. Route 58](#), and Route 191 (Jolliff Road) in Chesapeake, Virginia. VDOT is requesting scoping comments and extending your agency an invitation to become a Participating Agency to support the developme

nt of the Environmental Assessment that is currently underway. Please see the attached invitation letter, vicinity map, and Draft Coordination Plan for further information.

We would ask that you please provide your response to this invitation and any comments regarding the study as well as comments that you might have on the Draft Coordination Plan no later than April 10, 2018.

Should you have any questions, please contact me directly at (804) 371-6706. We appreciate your support and look forward to further coordination with your agency.

Thank you,

Jenny Salyers, PMP
Location Studies Project Manager
[1401 E. Broad Street](#)
[Richmond, VA 23219](#)
Phone (804) 371-6706
Cell (804) 317-5658
Jennifer.Salyers@VDOT.Virginia.gov



Salyers, Jennifer <jennifer.salyers@vdot.virginia.gov>

Bowers Hill Interchange Improvement Study Environmental Assessment Scoping

3 messages

Okorn, Barbara <Okorn.Barbara@epa.gov>

Tue, Apr 10, 2018 at 6:59 AM

To: "Frost, Mack (FHWA)" <Mack.Frost@dot.gov>, "Salyers, Jennifer (VDOT) (Jennifer.Salyers@VDOT.Virginia.gov)" <Jennifer.Salyers@vdot.virginia.gov>

Cc: "Fuerst, Lee A CIV USARMY CENAO (US)" <Lee.A.Fuerst@usace.army.mil>, "Allen-Grimes, Alice W CIV USARMY CENAO (US)" <Alice.W.Allen-Grimes@usace.army.mil>

Mack,

EPA has reviewed your letter dated March 13, 2018 regarding the Bowers Hill Interchange Improvement Study. The proposed Environmental Assessment (EA) will evaluate potential transportation improvements at the Bowers Hill Interchange in Chesapeake, Virginia.

We understand that the study is being done in compliance with the National Environmental Policy Act (NEPA) and CEQ regulations implementing NEPA. Please find below recommendations for the scope of analysis for the proposed study.

- The EA should include a clear and robust justification of the underlying purpose and need for the proposed action. The purpose and need statement is important because it helps explain why the proposed action is being undertaken and what objectives the project intends to achieve. The purpose of the proposed action is typically the specific objective of the activity. The need should explain the underlying problem for why the project is necessary.
- We suggest the EA clearly explain this project in relation to the [Route 460/58/13](#) and HRCS Re-evaluation and why it is an independent project.
- Alternatives analysis should include the suite of other activities or solutions that were considered and the rationale for not carrying these alternatives forward for detailed study.
- The document should describe potential impacts to the natural and human environment. Existing resources should be identified and EPA encourages that adverse impacts to natural resources, especially wetlands and other aquatic resources, be avoided and minimized.
- A robust narrative describing aquatic resources and functions should be included in the EA. We suggest at a minimum, a narrative should be provided that includes: a discussion of hydrology, including sources and direction of flow; the vegetative communities in the impact area, including size of trees (dbh), percent canopy cover, understory and other components such as woody debris and snags, and presence of invasive species; soil type(s); and an assessment of expected functions based on the HGM type, ecological community, and surrounding land-use. Photos should be included. The 460 EIS study methodology should be considered a template. Some information on resources may be gained from public websites including:
 - EnviroMapper1: <https://www.epa.gov/waterdata/waters-watershed-assessment-tracking-environmental-results-system>
 - Envirofacts2: <https://www3.epa.gov/enviro/>
 - NEPAassist3: <https://www.epa.gov/nepa/nepassist>
 - 303(d) Listed Impaired Waters: <https://www.epa.gov/exposure-assessment-models/303d-listed-impaired-waters>
- Stormwater ponds, best management practices (BMPs) and construction staging areas should not be located in wetlands and streams. Stormwater management alternatives that address the existing and

new construction should be considered and are encouraged.

- EPA suggests coordinating with other appropriate federal, state and local resource agencies on possible impacts to wetlands, streams, historic resources and/or rare, threatened and endangered species. As needed, assessment of aquatic resources functions should be provided. We would be pleased to coordinate with VDOT and the U.S. Army Corps of Engineers on this work. It is our understanding based on the National Environmental Policy Act and Clean Water Act Merged Process for Highway in Projects in Virginia that some level of resource mapping will be available during the alternatives state in process.
- An evaluation of air quality and community impacts, including noise, light and possible traffic impacts, should be included in the document. General conformity status should be included in the document.
- The EA should include an analysis of any hazardous sites or materials, and the status of any ongoing or past remediation efforts in the project area. This includes any groundwater contamination.
- We recommend the EA include consideration of extreme weather events in particular in association with resiliency design.
- The document should address potential indirect and cumulative effects in the project areas; analysis may aid in the identification of resources that are likely to be adversely affected by multiple projects, and sensitive resources that could require additional avoidance or mitigation measures. It is suggested that a secondary and cumulative effects analysis begin with defining the geographic and temporal limits of the study; this is generally broader than the study area of the project. The cumulative impact analysis should evaluate impacts to environmental resources that have the potential to be impacted by the project (i.e. wetlands, surface water, etc).
- We will be providing comments on the proposed socioeconomic, environmental justice, natural resource, and indirect and cumulative impacts methodologies that were recently distributed. We will also be providing comments on the coordination plan separately.

Thank you for coordinating with EPA on this project. We look forward to working with you as more information becomes available. Please let me know if you have any questions on the recommended topics above.

Barb

1 The Watershed Assessment, Tracking & Environmental Results System (WATERS) unites water quality information previously available only from several independent and unconnected databases

2 Includes enforcement and compliance information

3 NEPAassist is a tool that facilitates the environmental review process and project planning in relation to environmental considerations. The web-based application draws environmental data dynamically from EPA Geographic Information System databases and web services and provides immediate screening of environmental assessment indicators for a user-defined area of interest. These features contribute to a streamlined review process that potentially raises important environmental issues at the earlier stages of project development.

Barbara Okorn

4/10/2018

Commonwealth of Virginia Mail - Bowers Hill Interchange Improvement Study Environmental Assessment Scoping

Office of Environmental Programs (3EA30)

U.S. Environmental Protection Agency Region III

[1650 Arch Street](#)

[Philadelphia, PA 19103-2029](#)

[Office: 215-814-3330](#)

Salyers, Jennifer <jennifer.salyers@vdot.virginia.gov>

Tue, Apr 10, 2018 at 7:05 AM

To: Scott Smizik <scott.smizik@vdot.virginia.gov>, Caleb Parks <caleb.parks@vdot.virginia.gov>

FYI

[Quoted text hidden]

--

Jenny Salyers, PMP

Location Studies Project Manager

1401 E. Broad Street

Richmond, VA 23219

Phone (804) 371-6706

Cell (804) 317-5658

Jennifer.Salyers@VDOT.Virginia.gov

Salyers, Jennifer <jennifer.salyers@vdot.virginia.gov>

Tue, Apr 10, 2018 at 7:07 AM

To: "Travis R. Comer" <tcomer@rkk.com>, Maggie Berman <mberman@rkk.com>, Eric Almquist <ealmquist@rkk.com>

Travis,

I'll post this one on the DMS site, but I wanted you to have it now since there is a lot to think about with how we will approach Purpose and Need.

Thanks,

Jenny

[Quoted text hidden]

-



Reply to
Attention of

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

April 9, 2018

Special Projects Virginia Regulatory Section
NAO-2018-00531, Bowers Hill Interchange Improvement Study
Federal Project Number: NHPP-6664-7(067)
State Project Number: 0664-131-028, P101; UPC: 111427

Mr. Mack Frost
Environmental Specialist
Federal Highway Administration, Virginia Division
400 North 8th Street, Suite 750
Richmond, Virginia 23219-4825

Dear Mr. Frost:

This letter is in response to your letter dated March 13, 2018 soliciting scoping comments for a study you have undertaken to evaluate transportation improvements at the Bowers Hill interchange that includes the junction of Interstate 664, Interstate 264, Interstate 64, U.S. Route 460, U.S. Route 58, and Route 191 (Jolliff Road) in Chesapeake, Virginia. In accordance with the National Environmental Policy Act (NEPA), an Environmental Assessment (EA) is being prepared with the Federal Highway Administration (FHWA) as the lead federal agency and the Virginia Department of Transportation (VDOT) as the Joint Lead Agency to FHWA.

It is likely the project will impact waters and/or wetlands regulated by the Norfolk District Army Corps of Engineers (USACE) under Section 10 of the Rivers and Harbors Act of 1899 and/or Section 404 of the Clean Water Act (33 U.S.C. 1344), and a permit or permits will likely be required for the improvements. USACE cannot agree to the evaluation of only one alternative for the proposed project if wetlands and/or waters of the U.S. are expected to be impacted. USACE recommends the evaluation and study of additional alternatives as detailed in the itemized responses below.

USACE will participate as a cooperating agency in the preparation of the Environmental Assessment (EA) and as a concurring agency as part of the MERGED PROCESS. We recommend coordination with the Cooperating Agencies of draft sections of the EA prior to publishing the document. Such coordination will help to minimize future delays or problems that can be addressed earlier in the process. We wish to participate in any interagency meetings and field reviews for this project to the extent possible.

We would like to emphasize that before you develop and evaluate alternatives, waters and wetlands should be identified and mapped, and you should document how impacts to aquatic resources are avoided and minimized by the preliminary alternatives you identify. We request regular coordination with the appropriate state and Federal agencies prior to making any decisions regarding the range and elimination of alternatives. While USACE recommends a jurisdictional determination, you should consider, at a minimum, all available information such as aerial photography, U.S.G.S. quad sheets, National Wetland Inventory (NWI) maps, and soil mapping of the study area, as well as review of aerial photography (including color infrared aerials) by a qualified reviewer. Should FHWA and/or VDOT perform the assessment of jurisdictional areas through remote sensing, USACE recommends field verification of any areas which FHWA and/or VDOT notes need further evaluation. The more accurate the delineation, the better for the purposes of alternative analysis and project development that incorporates avoidance and minimization of aquatic resources. USACE understands that due to the purpose of improving an existing interchange, alternative options may be constrained however additional alternatives must be developed and examined.

The current proposed study area includes a VDOT tidal mitigation bank, Goose Creek. In addition, another large VDOT mitigation site constructed as partial compensation for impacts from the construction of the I-664 project is potentially within the study area. VDOT should coordinate with Suffolk District staff to insure all former mitigation sites in the vicinity of the project have been identified. Measures to avoid and minimize impacts to streams and wetlands, such as bridging and alignment shifts, should be incorporated wherever practicable, and the environmental document should discuss avoidance and minimization measures considered. Relocation of streams and any impacts to mitigation sites should be avoided.

Our regulations require that we consider a full range of public interest factors and conduct an alternatives analysis in order to identify the least environmentally damaging practicable alternative (LEDPA), which is the only alternative we can authorize.

In addition to wetland and waters impacts, we must consider factors such as land use (including displacements of homes and businesses), floodplain hazards and values, water supply and conservation, water quality, safety, cost, economics, threatened and endangered species, historic and cultural resources, and environmental justice.

Identifying potential compensation for stream and wetland impacts early in the process of project development is critical. Wetland impacts are typically compensated at 2:1 for forested, 1:5:1 for scrub/shrub, and 1:1 for emergent. Typically, we require stream compensation for unavoidable stream impacts to greater than 300 linear feet of stream at a crossing. However, we also consider

the cumulative impacts to streams from a given project, and may require compensation for shorter lengths of stream if there are many impacts at close proximity, or if there are multiple impacts to the same stream and/or its direct tributaries. USACE would consider all impacts at an interchange to be part of a single and complete project. We encourage natural channel design to the extent practicable for streams that must be relocated. We utilize the Unified Stream Methodology for determining how much stream compensation is required for projects. The use of mitigation bank credits or Virginia Aquatic Resources Trust Fund released credits within the watershed are the preferred methods for providing compensation for stream and wetland impacts. This proposed study area encompasses one watershed, Hampton Roads, HUC 02080208.

As part of the Corps of Engineers designation of lead federal agency authority, please note the following:

The proposed project may affect historic and cultural resources. Many projects funded by the Federal Highway Administration (FHWA) require permits from the Corps of Engineers. These projects are subject to compliance with Section 106 of the National Historic Preservation Act of 1966.

According to 36 CFR 800.2(a)(2):

"...If more than one Federal agency is involved in an undertaking, some or all [of] the agencies may designate a lead Federal agency, which shall identify the appropriate official to serve as the agency official who shall act on their behalf, fulfilling their collective responsibilities under section 106. Those Federal agencies that do not designate a lead Federal agency remain individually responsible for their compliance with this part."

Pursuant to the above provision, FHWA is hereby designated as the lead federal agency to fulfill the collective Federal responsibilities under Section 106 for the following undertaking:

Bowers Hill Interchange Improvement Study (UPC: 111427)

The Corps authorizes FHWA to conduct Section 106 coordination on its behalf, including all required tribal coordination. Any Memorandum of Agreement prepared by FHWA under 36 CFR 800.6 should include the following clause in the introductory text:

"WHEREAS, pursuant to Section 10 and/or Section 404 of the Clean Water Act, a Department of the Army permit will likely be required from the Corps of Engineers for this project, and the Corps has designated FHWA as the lead federal agency to fulfill federal responsibilities under Section 106; and

In accordance with 50 CFR 401.07, FHWA is also designated as the lead Federal agency for consultation with the U. S. Fish and Wildlife Service and the National Marine Fisheries Service (NMFS) concerning potential effects to Federally-listed threatened and endangered species.

In addition, FHWA is designated as the lead Federal agency for consultation with NMFS for Essential Fish Habitat, as required under Section 305(b)(2) of the Magnuson Stevens Fishery Conservation and Management Act.

We appreciate your consideration including USACE in the early planning stages of this study and look forward to working with you.

Should you have any questions, you may contact Lee Fuerst at 757-201-7832 or lee.fuerst@usace.army.mil.

Sincerely,

Handwritten signature of Kimberly A. Prisco-Baggett in cursive script.

Kimberly A. Prisco-Baggett, MBA
Chief, Special Projects Section

cc:
Virginia Department of Transportation
Virginia Department of Historic Resources
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
Virginia Department of Environmental Quality

April 9, 2018

USACE Norfolk District
Special Projects Virginia Regulatory Section
NAO-2018-00531, Bowers Hill Interchange Improvement Study
Federal Project Number: NHPP-6664-7(067)
State Project Number: 0664-131-028, P101; UPC: 111427

RE: Scoping Questionnaire Response

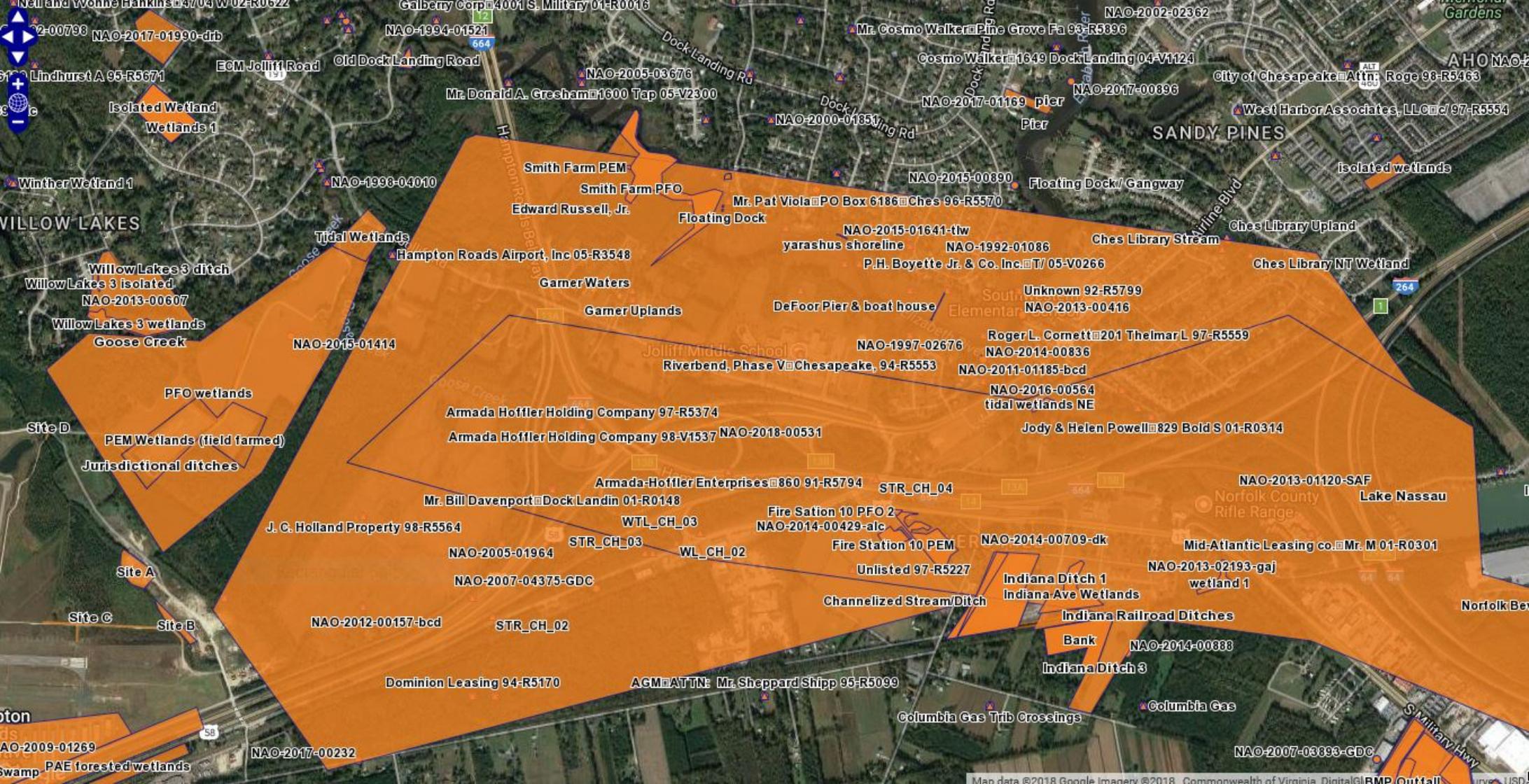
You included a list of questions with your letter dated March 13, 2018, and we have the following responses, which pertain only to aquatic resources:

1. We do not have available any historic imagery or mapping. All of our imagery has been acquired from publically available sources.
2. We recommend that in establishing a study area boundary for analyzing indirect and cumulative effects, you include an area of sufficient size to include any indirect downstream effects, such as potential water quality effects from roadway runoff, as well as cumulative effects the watershed has experienced. You may find that the boundary of the entire watershed is needed to sufficiently address these effects to aquatic resources. You should obtain information regarding impaired waters in the region and ascertain the basis for their designation as imparied, which may provide helpful information for establishing a greographic study area for your analysis of potential indirect and cumulative effects to streams. In determining a timeframe for evaluating cumulative effects, we recommend you consider the dates of construction of the highway and interstate systems that are within and adjacent to the study area in setting a past date.
3. There are valid permits as well as preliminary jurisdictional determinations of delineated wetlands and/or waters of the U.S. within the proposed project area. We can provide VDOT with a record of impacts from authorized projects in the watershed, although the data are incomplete and most accurate only back to about 2007. At such time as you are conducting your cumulative effects analysis, if you will contact us we will provide the most current information. Attached is a map of permitted projects within the proposed study area to include their USACE number, as currently found in our database. It should be noted that the location shown may not be accurate, especially for older project numbers. Should VDOT require additional documentation, such as jurisdictional determinations, on any of these permitted projects within the study area, a Freedom of Information Act (FOIA) request would be required to be submitted. Instructions on how to submit a FOIA request can be viewed

at: <http://www.nao.usace.army.mil/Library/Freedom-of-Information-Act/>
Alternatively, any permitted projects and their corresponding applications that were received and processed through the Virginia Marine Resources Commission, can be viewed on its publically available website.

We recommend coordination with local VDOT district offices to insure identification of any mitigation sites and/or preservation sites within the study area.

4. We have no specific comments at this time regarding potential induced growth, economic development and investment, or improved stormwater management but we agree that such effects should be considered as you develop your study. When developing your stormwater management plan, all stormwater facilities should be located outside of jurisdictional areas.
5. As part of your planning judgement process, we request that you coordinate with USACE and other federal agencies regarding the methodologies you propose to use for identifying resources for both direct and indirect impact analysis as well as the cumulative effects analysis. We do not have any tools to share that would be of use in indentifying indirect and cumulative effects other than our Regulatory database, from which we can provide some information about authorized impacts (as noted above). We recommend you refer to Virginia's record of identified impaired waters as one indicator of cumulative effects to surface waters. You may also wish to refer to the Virginia Department of Environmental Quality's WetCat program which will provide information regarding the condition of wetlands in the watershed, which can serve as an indicator of cumulative effects.
6. We have no further comments at this time other than those included above in this letter.



22-00798 NAO-2017-01990-drb
Lindhurst A 95-R5671
EGM Jolliff Road
Old Dock Landing Road
Isolated Wetland
Wetlands 1
Winther Wetland 1

NAO-1934-01521
Galberry Corp 4001 S. Military 01-R0016
NAO-2005-03676
Mr. Donald A. Gresham 1600 Tap 05-V2300

NAO-2002-02362
Mr. Cosmo Walker Pine Grove Fa 93-R5896
Cosmo Walker 1649 Dock Landing 04-V1124
NAO-2017-01169 pier
NAO-2017-00896
Pier

SANDY PINES
City of Chesapeake Attn: Roge 98-R5463
West Harbor Associates, LLC d/ 97-R5554
Isolated wetlands

WILLOW LAKES
Willow Lakes 3 ditch
Willow Lakes 3 isolated
NAO-2013-00607
Willow Lakes 3 wetlands
Goose Creek

NAO-1998-04010
Tidal Wetlands
Hampton Roads Airport, Inc 05-R3548
Smith Farm PEM
Smith Farm PFO
Edward Russell, Jr.
Floating Dock

NAO-2015-00890
Mr. Pat Viola PO Box 6186 Ches 96-R5570
Floating Dock / Gangway
NAO-2015-01641-tiw
yarashus shoreline
NAO-1992-01086
P.H. Boyette Jr. & Co. Inc T/ 05-V0266

Ches Library Stream
Ches Library Upland
Ches Library NT Wetland
Unknown 92-R5799
NAO-2013-00416

PFO wetlands
Site D
PEM Wetlands (field farmed)
Jurisdictional ditches
NAO-2015-01414

Gamer Waters
Gamer Uplands
Armada Hoffler Holding Company 97-R5374
Armada Hoffler Holding Company 98-V1537 NAO-2018-00531

DeFoor Pier & boat house
NAO-1997-02676
Riverbend, Phase V Chesapeake, 94-R5553
NAO-2011-01185-bcd
NAO-2016-00564
tidal wetlands NE

NAO-2013-01120-SAF
Lake Nassau
Norfolk County Rifle Range

Site A
Site B
Site C

Mr. Bill Davenport Dock Landin 01-R0148
J. C. Holland Property 98-R5564
NAO-2005-01964
STR_CH_03
WTL_CH_03
WL_CH_02

Armada-Hoffler Enterprises 860 91-R5794
Fire Sation 10 PFO 2
NAO-2014-00429-alc
Fire Station 10 PEM
Unlisted 97-R5227

Mid-Atlantic Leasing co. Mr. M 01-R0301
NAO-2013-02193-gaj
wetland 1

PAE forested wetlands
NAO-2009-01269
NAO-2017-00232

NAO-2007-04375-GDC
STR_CH_02
Dominion Leasing 94-R5170
AGM ATTN: Mr. Sheppard Shipp 95-R5099

Channelized Stream/Ditch
Indiana Ditch 1
Indiana Ave Wetlands
Indiana Railroad Ditches
Bank
Indiana Ditch 3

NAO-2014-00888
Columbia Gas
Columbia Gas Trib Crossings

NAO-2012-00157-bcd

NAO-2012-00157-bcd

NAO-2014-00709-dk
NAO-2013-02193-gaj
wetland 1

NAO-2014-00888

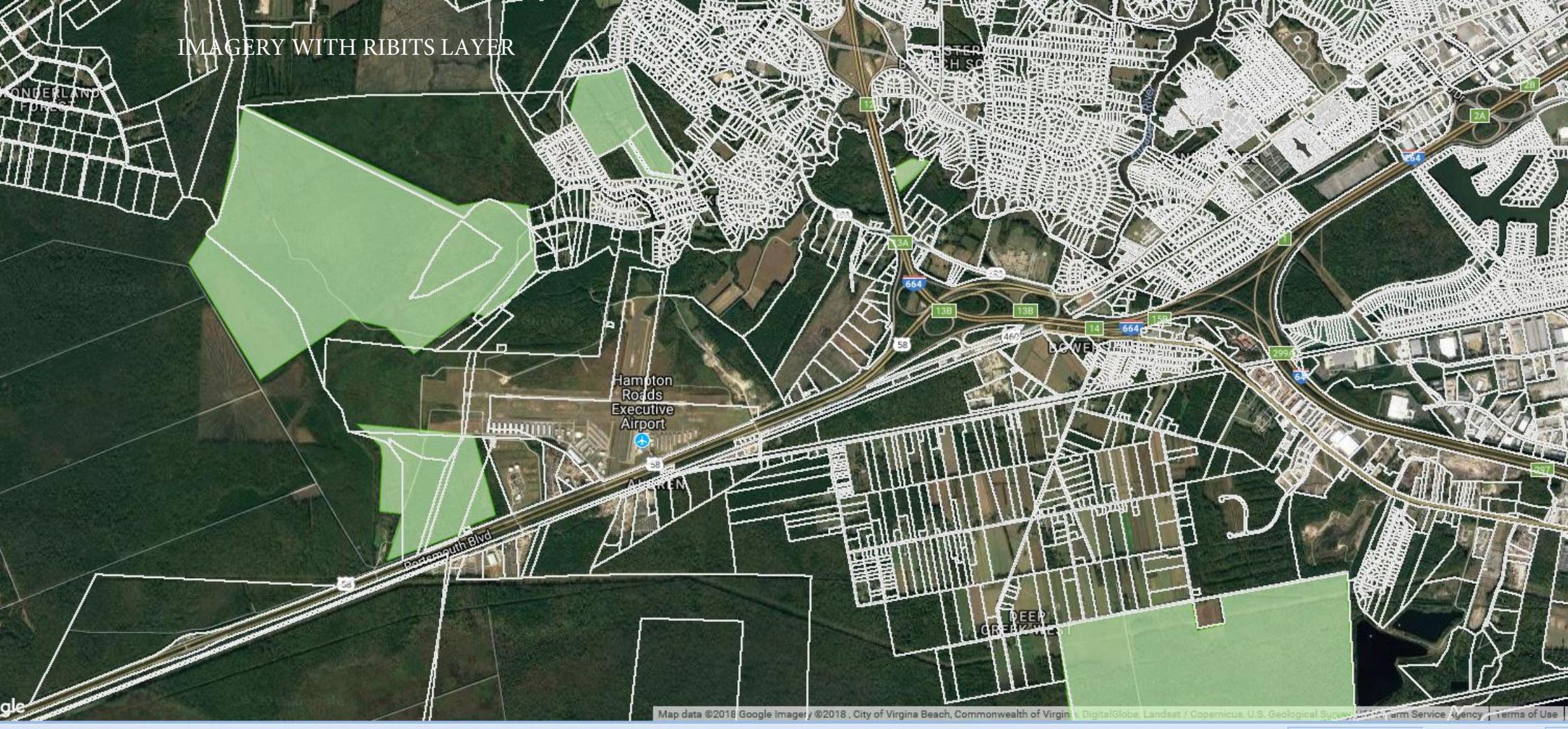
NAO-2009-01269
NAO-2017-00232

NAO-2017-00232

NAO-2007-03893-GDC

NAO-2007-03893-GDC

IMAGERY WITH RIBITS LAYER





**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029**

March 28, 2018

Mr. Mack Frost
Environment Specialist
Federal Highway Administration, Virginia Division
400 North 8th Street, Suite 750
Richmond, Virginia 23219-4825

RE: Cooperating and Concurring Agency request for the development of an Environmental Assessment under the National Environmental Policy Act of 1969 for the Bowers Hill Interchange Improvement Study, Chesapeake, Virginia

Dear Mr. Frost:

The U.S. Environmental Protection Agency (EPA) has received the invitation to become a Cooperating and Concurring Agency in the development of an Environmental Assessment (EA) for the above referenced project. The EA is being prepared pursuant to the National Environmental Policy Act (NEPA) and the Council on Environmental Quality (CEQ) NEPA regulations (40 CFR parts 1500-1508).

The CEQ has determined that a Cooperating Agency has the responsibility to assist the lead agency by involvement in the NEPA process at the earliest possible time. This participation includes engaging in the scoping process; in developing information and preparing environmental analyses including portions of the Environmental Assessment where the Cooperating Agency has special technical expertise; and in making available staff support at the lead agency's request to enhance the lead agency's interdisciplinary capabilities. Our role as a Cooperating Agency in support of the subject EA will consist of providing comments on general NEPA compliance and Clean Water Act (CWA) Section 404 issues as well as providing technical support in the development of the EA. The EPA would like the opportunity to contribute in the EA process in the following manner:

- Identification of significant issues;
- Provide technical assistance in the development of the analysis of alternatives and their environmental impact; and
- Technical assistance on Environmental Justice, cumulative impacts, etc.

The benefits of Cooperating Agency engagement in the preparation of NEPA analyses include disclosing relevant information early in the analytical process and establishing a mechanism for addressing intergovernmental issues. Other benefits include fostering intra- and intergovernmental trust and a common understanding and appreciation for various governmental roles in the NEPA process, as



well as enhancing agencies' ability to adopt environmental documents. We also agree to be a Concurring Agency as specified in the NEPA/404 Memorandum of Understanding and the draft Coordination Plan for this project.

Due to resource constraints, we may limit our attendance of project meetings and hope that video or telephone conference opportunities may be made available. Given reasonable time frames, we would be pleased to review preliminary project documentation including preliminary draft versions of the EA. CEQ guidance recognizes that, while the lead agency has overall responsibility for the content of the EA, status as a Cooperating Agency should not be construed as expressing agreement with the lead agency regarding the conclusions to be drawn from the EA or selection of the preferred alternative. In addition, EPA has a number of independent responsibilities related to the proposed project, including our responsibilities pursuant to Section 309 of the Clean Air Act (CAA), Sections 402(d) and 404(b), (c), and (q) of the CWA.

EPA appreciates the opportunity to engage as a Cooperating and Concurring Agency in the development of the documentation to satisfy the requirements of NEPA and the Clean Water Act for the Bowers Hill Interchange Improvement Study EA while, consistent with CEQ guidance, we retain our independent obligations and right under Section 309 (a) of the CAA to review and comment on an environmental document. If there are any questions or concerns, please feel free to contact Barbara Okorn, staff person for the project, at 215-814-3330.

Sincerely,



Barbara Rudnick
NEPA Program Manager
Office of Environmental Programs





COMMONWEALTH of VIRGINIA

DEPARTMENT of STATE POLICE

Chesapeake, Va.

March 27, 2018

To: Captain Caren M. Sterling

From: First Sergeant Keith J. Whitley

Subject: Issues and Recommendations for Improvement of Bowers Hill Interchange

The following are issues I see with the Bowers Hill interchange that contribute to accidents and traffic congestion. Each issue is followed by a recommendation that I believe would improve traffic conditions and reduce the number of accidents in the area.

Issue 1:

The .5 mile of I-664 north and south in Bowers Hill are 4 to 5 lanes wide including off ramps. There is a right shoulder, but no left shoulder. This leaves disabled motorist or accidents that occur in the left 2 lanes confined in their lanes causing traffic back-ups and more accidents. Vehicles that are moveable cannot safely move across 2 or 3 lanes to the right shoulder which in turn causes prolonged traffic back-ups and additional accidents.

Recommendation:

Widen the roadway through the Bowers Hill interchange and create a left shoulder for vehicles travelling in the left of 4 lanes to move to if they become disabled or are involved in a traffic accident where the vehicles are moveable.

Issue 2:

The ramp from Route 58 east to I-664 north is too sharp and the right to left grade of the roadway on the ramp should be steeper. We see this in the number of tractor trailer accidents on this ramp. As the trucks are going up the ramp the sharpness of the turn along with the low grade of the roadway causes the tractor trailer's centrifugal force to tilt it to the left. The tractor trailers then overturn on the ramp. This ramp causes the predominant number of tractor trailer accidents in the Bowers Hill interchange.

Recommendation:

Broaden the radius of this ramp and steepen the right to left grade.

Issue 3:

I-664 north starts with traffic simultaneously merging off I-64 east and I-264 west into 4 lanes plus an exit ramp for approximately .5 miles through the interchange. The traffic coming off I-64 east make up the left 2 of 4 lanes and the traffic coming off I-264 west make up the right 2 of 4 lanes. Then at the end of the .5 mile the four lanes split with the left 2 lanes continuing on I-664 north and the right 2 lanes turning into the exit ramp for Route 58 west. As the 2 lanes of I-64 east and 2 lanes of I-264 west come together there are a large number of vehicles coming off I-64 east merging to the right 2 lanes to take the Route 58 exit and a large number of vehicles coming off I-264 west merging left to get onto I-664 north. The large number of vehicles all merging together causes dangerous traffic conditions and drastically increases the probability of accidents.

Recommendation:

Create a fly-over from I-64 east to Route 58 west. This would alleviate over half of the lane changing in the .5 mile of the interchange and drastically reduce the congestion and probability of accidents.

Issue 4:

The ramp from I-664 south to I-64 west has very little sight distance and a narrow right shoulder. This presents an issue when vehicles start to back up on I-64 west near the interchange during the morning and evening commutes. The large number of vehicles taking this ramp often come around the turn and are having to slam on brakes due to the traffic congestion ahead and due to the short sight distance as you are taking the ramp.

Also, the right shoulder on this ramp is too narrow for disabled vehicles or vehicles involved in an accident to safely pull onto. The minimal sight distance around the curve of the ramp puts disabled motorists and law enforcement personnel stopped with the disabled vehicle in a dangerous position. The vehicles coming around the curve are travelling at 60 mph and have little to no sight distance to move over and prepare for what is ahead.

Recommendation:

Widen the shoulder of the ramp and remove the trees to the right of the ramp to give motorist a better sight distance as to what issues or traffic conditions they are approaching.

KJW



COMMONWEALTH of VIRGINIA

Department of Historic Resources

2801 Kensington Avenue, Richmond, Virginia 23221

Matt Strickler
Secretary of Natural Resources

Julie V. Langan
Director

Tel: (804) 367-2323
Fax: (804) 367-2391
www.dhr.virginia.gov

21 March 2018

Ms Jennifer Sayers, Environmental Division
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 232319

RE: Bowers Hill Interchange Improvement Study, initiation of Environmental Assessment consultation
City of Chesapeake
VDOT Project No. 0664-131-028, P101; UPC 111427
DHR File No. 2018-0199

Dear Ms Sayers:

The Department of Historic Resources (DHR) has received your letter of 12 March 2018 initiating consultation on the development of an Environmental Assessment (EA) for the proposed Bowers Hill Interchange Improvement Study and inviting us to participate in an upcoming scoping and agency coordination meeting. Your 12 March correspondence also requested DHR comment on the proposed approach for the environmental review process, as documented in an attached draft Coordination Plan which accompanied your letter. Please accept the following as DHR's comments on the draft Coordination Plan:

- Section 2.0 Agency Implementation Procedures: A new subsection (i.e. 2.4) should be added to discuss how the agency will plan to include local governments, the public, and local historical societies and preservation organizations that have demonstrated interests in historic properties within the defined study boundaries.
- Table 1: Under Responsibilities/Involvement for FHWA please include mention of Section 106 of the National Historic Preservation Act. Pursuant to Section 106 it is the lead federal agency's responsibility to take into account the effects of its undertaking on historic properties listed in or eligible for the National Register of Historic Places (NRHP) and to afford the Advisory Council on Historic Preservation an opportunity to comment.
- Table 1: The DHR, as the State Historic Preservation Office in Virginia, has a role and responsibility under the National Environmental Policy Act and Section 106 to review and comment on the effects of federal actions to historic properties listed in and eligible for the NRHP. Please include DHR in Table 1.

Administrative Services
10 Courthouse Ave.
Petersburg, VA 23803
Tel: (804) 862-6408
Fax: (804) 862-6196

Eastern Region Office
2801 Kensington Avenue
Richmond, VA 23221
Tel: (804) 367-2323
Fax: (804) 367-2391

Western Region Office
962 Kime Lane
Salem, VA 24153
Tel: (540) 387-5443
Fax: (540) 387-5446

Northern Region Office
5357 Main Street
PO Box 519
Stephens City, VA 22655
Tel: (540) 868-7029
Fax: (540) 868-7033

Page 2
21 March 2018
Ms Jennifer Saylers

The DHR appreciates the opportunity to provide comments on the draft Coordination Plan and to participate in the Bowers Hill Interchange Improvement Study process. We anticipate sending a representative to the 11 April 2018 scoping and agency coordination meeting at the Patrick Henry Building.

If you have any questions about our comments, please contact me at (804) 482-6090.

Sincerely,



Marc Holma, Architectural Historian
Division of Review and Compliance

C. Mr. Mack Frost, FHWA



COMMONWEALTH of VIRGINIA

Mark K. Flynn
Director

Department of Aviation
5702 Gulfstream Road
Richmond, Virginia 23250-2422

V/TDD • (804) 236-3624
FAX • (804) 236-3635

March 15, 2018

Ms. Jenny Salyers
Location Studies Project Manager
1401 East Broad Street
Richmond, Virginia 23219

RE: Environmental Assessment and Improvement Study for the Bowers Hill Interchange

Dear Ms. Salyers:

Thank you for your March 12th letter regarding the Bowers Hill Interchange. The Department does wish to be a Participating Agency in the Environmental Assessment effort for this project. Please consider me your primary contact with the Department of aviation for this project. Unfortunately, I will not be able to attend the April 11th meeting in person nor via conference call due to a prior travel commitment. However, I will attempt to have a representative from our agency attend in my place.

You have asked that the Department of Aviation to provide input and highlight potential positive and negative effects to resources under our agency's jurisdiction. To this end, I would like to address a potential impact to a public-use airport in the vicinity of the proposed Bowers Hill Interchange. The Hampton Roads Executive Airport is located approximately 7,000 feet West of the interchange. The airport is classified as a Reliever airport in the Virginia Air Transportation System Plan. The intent of the Reliever classification is to provide alternate general aviation facilities to a region in order to reduce and congestion at our Commercial Service Airports. In this case, Hampton Roads Executive Airport is a reliever for Norfolk International.

The main concern we have pertains to height restrictions in the vicinity of the Airport. Hampton Roads Executive Airport is a federally obligated airport which means they must comply with federal standards. One such standard is FAR Part 77. This federal code section, in part, defines the slopes to and from an airport that must remain clear of obstructions that could create a hazard to aircraft arriving or departing the airport. Additionally, we would want to ensure that any future approach to the airport will remain clear as well. Since the airport has indicated they are interested in pursuing an instrument approach to Runway 28, the FAA and Commonwealth of Virginia should endeavor to keep a 34:1 approach slope to,

Ms. Salyers
March 15, 2018
Page 2

and a 40:1 departure slope from the Runway 28 end. This could potentially become a factor in the design of any above grade improvements to the interchange.

If you have additional questions regarding this matter, I will be happy to discuss our concerns with you in greater detail. Additionally, I look forward to working with you throughout this project. Please advise me of all future meeting dates and times.

Sincerely,

A handwritten signature in black ink, appearing to read "S. Scott Denny", is written over the typed name and title.

S. Scott Denny
Senior Aviation Planner
Virginia Department of Aviation

c: Mindy Lee, FAA/WADO via e-mail

From: [Browder, Jake - NRCS, Smithfield, VA](#)
To: [Salyers, Jennifer \(VDOT\)](#)
Subject: RE: Bowers Hill Interchange Improvements Study - UPC 111427 USDA
Date: Monday, March 12, 2018 3:43:51 PM

Good Afternoon,

Thank you for the invitation, but NRCS will decline the invitation to participate.

Kindly,

Jake Browder
Acting District Conservationist
Chesapeake Service Center

From: Salyers, Jennifer (VDOT) [mailto:Jennifer.Salyers@VDOT.Virginia.gov]
Sent: Monday, March 12, 2018 3:30 PM
To: Bricker, Jack - NRCS, Richmond, VA <Jack.Bricker@va.usda.gov>
Cc: Browder, Jake - NRCS, Smithfield, VA <jake.browder@va.usda.gov>
Subject: Bowers Hill Interchange Improvements Study - UPC 111427 USDA

Good afternoon,

The Virginia Department of Transportation (VDOT), on behalf of the Federal Highway Administration (FHWA), have initiated an Environmental Assessment (EA), pursuant to the National Environmental Policy Act of 1969, as amended (NEPA), to evaluate potential transportation improvements at the Bowers Hill Interchange that includes a confluence of Interstate 664, Interstate 264, Interstate 64, U.S. Route 460, U.S. Route 58, and Route 191 (Jolliff Road) in Chesapeake, Virginia. VDOT is requesting scoping comments and extending your agency an invitation to become a Participating Agency to support the development of the Environmental Assessment that is currently underway. Please see the attached invitation letter, vicinity map, and Draft Coordination Plan for further information.

We would ask that you please provide your response to this invitation and any comments regarding the study as well as comments that you might have on the Draft Coordination Plan no later than April 10, 2018.

Should you have any questions, please contact me directly at (804) 371-6706. We appreciate your support and look forward to further coordination with your agency.

Thank you,

Jenny Salyers, PMP
Location Studies Project Manager

1401 E. Broad Street
Richmond, VA 23219
Phone (804) 371-6706
Cell (804) 317-5658
Jennifer.Salyers@VDOT.Virginia.gov

This electronic message contains information generated by the USDA solely for the intended recipients. Any unauthorized interception of this message or the use or disclosure of the information it contains may violate the law and subject the violator to civil or criminal penalties. If you believe you have received this message in error, please notify the sender and delete the email immediately.

From: [Lasher, Terrance J. \(DOF\)](#)
To: [Salyers, Jennifer \(VDOT\)](#)
Cc: [Lewis, Robert K. \(DOF\)](#)
Subject: RE: Bowers Hill Interchange Improvements Study - UPC 111427
Date: Monday, March 12, 2018 3:20:23 PM

Thank you Jennifer. We are happy to be involved in the process. Please continue to keep us posted on developments. See you on the 11th.

Terry

Terrance Lasher
Regional Forester, Eastern Region
Virginia Department of Forestry
11301 Pocahontas Trail, Providence Forge, VA 23140
(804) 966-5092 (o)
(540) 270-2396 (c)
(804) 966-9801 (f)
Email: terry.lasher@dof.virginia.gov
Web: www.dof.virginia.gov
VDOF: Protecting and Serving since 1914

From: Salyers, Jennifer (VDOT)
Sent: Monday, March 12, 2018 2:55 PM
To: Lasher, Terrance J. (DOF) <Terry.Lasher@dof.virginia.gov>
Cc: Lewis, Robert K. (DOF) <Robbie.Lewis@dof.virginia.gov>
Subject: Bowers Hill Interchange Improvements Study - UPC 111427

Good afternoon,

The Virginia Department of Transportation (VDOT), on behalf of the Federal Highway Administration (FHWA), have initiated an Environmental Assessment (EA), pursuant to the National Environmental Policy Act of 1969, as amended (NEPA), to evaluate potential transportation improvements at the Bowers Hill Interchange that includes a confluence of Interstate 664, Interstate 264, Interstate 64, U.S. Route 460, U.S. Route 58, and Route 191 (Jolliff Road) in Chesapeake, Virginia. VDOT is requesting scoping comments and extending your agency an invitation to become a Participating Agency to support the development of the Environmental Assessment that is currently underway. Please see the attached invitation letter, vicinity map, and Draft Coordination Plan for further information.

We would ask that you please provide your response to this invitation and any comments regarding the study as well as comments that you might have on the Draft Coordination Plan no later than April 10, 2018.

Should you have any questions, please contact me directly at (804) 371-6706. We appreciate your support and look forward to further coordination with your agency.

Thank you,

Jenny Salyers, PMP
Location Studies Project Manager
1401 E. Broad Street
Richmond, VA 23219
Phone (804) 371-6706
Cell (804) 317-5658
Jennifer.Salyers@VDOT.Virginia.gov



COMMONWEALTH of VIRGINIA

Jennifer L. Mitchell
Director

DEPARTMENT OF RAIL AND PUBLIC TRANSPORTATION
600 EAST MAIN STREET, SUITE 2102
RICHMOND, VA 23219-2416

(804) 786-4440
FAX (804) 225-3752
Virginia Relay Center
800-828-1120 (TDD)

March 22, 2018

Ms. Jennifer Salyers
Environmental Division
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219

Re: Environmental Assessment for the Bowers Hill Interchange Improvement Study
Project Number: 0664-131-028, P101, UPC 111427

Dear Ms. Salyers:

The Virginia Department of Rail and Public Transportation (DRPT) would like to acknowledge the receipt of your letter dated March 12, 2018 regarding VDOT's request of DRPT to act as a Participating Agency in the Bowers Hill Interchange Improvement Project Environmental Assessment (EA). DRPT agrees to participate in the EA study as a Participating Agency. Nick Ruiz, Rail Planner, will serve as DRPT's point of contact. He can be reached at nick.ruiz@drpt.virginia.gov or 804-625-2026.

DRPT is aware that one active rail line and one abandoned rail right-of-way run through the study area indicated on the map that was provided—the CSX Portsmouth Subdivision and a now-abandoned Norfolk Southern line. The CSX rail line carries intermodal freight from the Port of Virginia's Portsmouth Marine Terminal, and has an interchange with the Norfolk Portsmouth Belt Line Railroad that provides access to several other regional port facilities. There is currently no passenger service on this line. In addition, the Bowers Hill area has been identified in past rail planning studies as the potential location of a suburban passenger rail station for the Chesapeake area. The potential station location, identified in the Richmond to Hampton Roads Tier I EIS Study, would be situated in the vicinity of where I-64 crosses the now-abandoned Norfolk Southern right-of-way near Rotunda Avenue. Current conventional speed Amtrak service operates on the active Norfolk Southern tracks to the south and outside of the Bowers Hill Interchange study area.

March 22, 2018

Page 2 of 2

DRPT looks forward to participating in Scoping and subsequent NEPA-related activities for the Bowers Hill Interchange Study and will contribute meaningful feedback to the study team as requested.

Sincerely,

A handwritten signature in black ink, appearing to read "Michael McLaughlin". The signature is written in a cursive style with a large initial "M".

Michael McLaughlin
DRPT Chief of Rail

cc: Ms. Jennifer Mitchell, Director
Ms. Emily Stock, Manager of Rail Planning

From: [ImpactReview](#)
To: [Salyers, Jennifer \(VDOT\)](#)
Cc: [Brett Glymph](#)
Subject: RE: Bowers Hill Interchange Improvements Project - UPC 111427
Date: Monday, March 12, 2018 3:32:10 PM

Ms. Salyers,

The Virginia Outdoors Foundation has reviewed the project referenced above. As of 12 March 2018, there are not any existing nor proposed VOF open-space easements within the immediate vicinity of the project.

Please contact VOF again for further review if the project area changes or if this project does not begin within 24 months. Thank you for considering conservation easements.

Thanks,
Mike

Mike Hallock-Solomon, AICP
Virginia Outdoors Foundation

From: Salyers, Jennifer (VDOT) [mailto:Jennifer.Salyers@VDOT.Virginia.gov]
Sent: Monday, March 12, 2018 1:47 PM
To: Brett Glymph <bglymph@vofonline.org>
Cc: ImpactReview <impactreview@vofonline.org>
Subject: Bowers Hill Interchange Improvements Project - UPC 111427

Good afternoon,

The Virginia Department of Transportation (VDOT), on behalf of the Federal Highway Administration (FHWA), have initiated an Environmental Assessment (EA), pursuant to the National Environmental Policy Act of 1969, as amended (NEPA), to evaluate potential transportation improvements at the Bowers Hill Interchange that includes a confluence of Interstate 664, Interstate 264, Interstate 64, U.S. Route 460, U.S. Route 58, and Route 191 (Jolliff Road) in Chesapeake, Virginia. VDOT is requesting scoping comments to support the development of the Environmental Assessment that is currently underway. Please see the attached scoping letter and vicinity map.

We would ask that you please provide your comments regarding the study no later than April 10, 2018.

Should you have any questions, please contact me directly at (804) 371-6706. We appreciate your support and look forward to your agency's input.

Thank you,

Jenny Salyers, PMP
Location Studies Project Manager
1401 E. Broad Street
Richmond, VA 23219
Phone (804) 371-6706
Cell (804) 317-5658
Jennifer.Salyers@VDOT.Virginia.gov

Bowers Hill Interchange Improvements Study

Environmental Assessment

Appendix C

List of Technical Reports



BOWERS HILL INTERCHANGE IMPROVEMENTS STUDY
Environmental Assessment

APPENDIX C: LIST OF TECHNICAL REPORTS

- Air Quality Technical Report
- Alternatives Technical Report
- Archaeological Assessment Technical Report
- Architectural Survey Management Summary
- Hazardous Materials Technical Report
- Indirect and Cumulative Effects Technical Report
- Natural Resources Technical Report
- Noise Analysis Technical Report
- Socioeconomic, Land Use, and Right-of-Way Technical Report
- Traffic and Transportation Technical Report