Bowers Hill Interchange Improvements Study

SOCIOECONOMIC, LAND USE, AND RIGHT-OF-WAY TECHNICAL REPORT

April 2019
BOWERS HILL INTERCHANGE IMPROVEMENTS STUDY

SOCIOECONOMIC, LAND USE, AND RIGHT-OF-WAY TECHNICAL REPORT

Prepared in support of the Bowers Hill Interchange Improvements Study Environmental Assessment

VDOT Project #: 0664-131-028, P101; UPC #: 111427
Federal Project Number NHPP-664-7(067)

APRIL 2019
# TABLE OF CONTENTS

1 INTRODUCTION ......................................................................................................................... 1

1.1 Study Area ................................................................................................................................. 1

1.1.1 Interstate 664 .......................................................................................................................... 3

1.1.2 Interstate 264 .......................................................................................................................... 3

1.1.3 Interstate 64 .......................................................................................................................... 3

1.1.4 U.S. Route 460/58/13 (West Military Highway) ................................................................. 3

1.1.5 Jolliff Road/Airline Boulevard/West Military Highway/South Military Highway ............... 3

1.2 Purpose and Need ...................................................................................................................... 5

1.3 Alternatives .............................................................................................................................. 5

1.3.1 No-Build Alternative ........................................................................................................... 5

1.3.2 Alternative 1: Eastbound and Westbound U.S. Route 58 Braided Ramps ......................... 5

1.3.3 Alternative 2: Full Interchange Reconstruction ................................................................. 6

1.4 Regulatory Context .................................................................................................................. 9

1.5 General Methodology ............................................................................................................. 9

2 EXISTING CONDITIONS AND ENVIRONMENTAL CONSEQUENCES .................................... 11

2.1 Communities and Community Facilities ................................................................................ 11

2.1.1 Methodology ....................................................................................................................... 11

2.1.2 Existing Conditions ............................................................................................................. 12

2.1.3 Environmental Consequences ............................................................................................ 15

2.2 Population and Housing ......................................................................................................... 15

2.2.1 Methodology ....................................................................................................................... 15

2.2.2 Existing Conditions ............................................................................................................. 16

2.2.3 Environmental Consequences ............................................................................................ 17

2.3 Economic Resources ............................................................................................................. 18

2.3.1 Methodology ....................................................................................................................... 18

2.3.2 Existing Conditions ............................................................................................................. 18

2.3.3 Environmental Consequences ............................................................................................ 22

2.4 Land Use and Locality Plans ................................................................................................ 23

2.4.1 Methodology ....................................................................................................................... 23

2.4.2 Existing Conditions ............................................................................................................. 23
2.4.3 Environmental Consequences ................................................................. 25
2.5 Right-of-Way ................................................................................................. 26
  2.5.1 Methodology .......................................................................................... 26
  2.5.2 Existing Conditions ................................................................................. 26
  2.5.3 Environmental Consequences ................................................................. 26
2.6 Environmental Justice .................................................................................... 27
  2.6.1 Methodologies ........................................................................................ 27
  2.6.2 Existing Conditions ................................................................................ 28
  2.6.3 Environmental Consequences ................................................................. 31
  2.6.4 EJ Outreach ........................................................................................... 32
3 REFERENCES ..................................................................................................... 34

LIST OF TABLES
Table 2-1: Community Facilities ....................................................................... 12
Table 2-2: Population (2016) ........................................................................... 16
Table 2-3: Housing Characteristics (2016) ........................................................ 17
Table 2-4: Estimated Residential Impacts ............................................................. 17
Table 2-5: Employment Status (2016) ................................................................. 19
Table 2-6: Household Income (2016) (#/%) ....................................................... 19
Table 2-7: Commercial Businesses within the Study Area .................................. 20
Table 2-8: Estimated Commercial Impacts ......................................................... 22
Table 2-9: Existing (2011) Land Use in the Study Area ....................................... 23
Table 2-10: Land Use Conversion (percent) ....................................................... 25
Table 2-11: Property Impacts* .......................................................................... 26
Table 2-12: Environmental Justice Populations ................................................ 29
Table 2-13: Median Household Income (2016) .................................................. 31
LIST OF FIGURES

Figure 1-1: Study Area......................................................................................................................... 2
Figure 1-2: Existing Conditions.............................................................................................................. 4
Figure 1-3: Alternative 1: Eastbound and Westbound U.S. Route 58 Braided Ramps .......................... 7
Figure 1-4: Alternative 2: Full Interchange Reconstruction ................................................................. 8
Figure 1-5: Study Area Census Block Groups ......................................................................................... 10
Figure 2-1: Neighborhoods .................................................................................................................. 13
Figure 2-2: Community Facilities.......................................................................................................... 14
Figure 2-3: Businesses.......................................................................................................................... 21
Figure 2-4: HRTPO Land Use ............................................................................................................... 24
Figure 2-5: Environmental Justice Populations Block Groups ............................................................. 30


1 INTRODUCTION

The Virginia Department of Transportation (VDOT), in coordination with the Federal Highway Administration (FHWA) as the lead federal agency, is preparing an 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.

The 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), 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).

The purpose of this Socioeconomic, Land Use, and Right-of-Way Technical Report is to present the existing conditions and assessment of potential direct impacts of the evaluated alternatives to socioeconomic resources. The resources evaluated herein include communities and community facilities, population and housing, economic resources, land use and right-of-way (ROW), and minority and low-income Environmental Justice (EJ) populations. The methods used for this analysis were defined in the Resource Identification and Impact Analysis Methodologies document for the Bowers Hill Interchange Improvements Study which received agency concurrence on June 13, 2018. This document first provides an overview of the study with a description of the methods used to assess the potential direct effects.

1.1 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

---

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”.
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.

1.1.1 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).

1.1.2 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.

1.1.3 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.

1.1.4 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.

1.1.5 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.
Figure 1-2: Existing Conditions
1.2 PURPOSE AND NEED

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.

1.3 ALTERNATIVES

1.3.1 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. Only planned maintenance improvements and those proposed independently by VDOT would occur within the Study Area.

1.3.2 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.

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 1-3.

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.

1.3.3 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 1-4.

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.
Figure 1-3: Alternative 1: Eastbound and Westbound U.S. Route 58 Braided Ramps
Figure 1-4: Alternative 2: Full Interchange Reconstruction
1.4 Regulatory Context
NEPA calls for integrated use of the social sciences in assessing impacts on the “human environment.” The CEQ’s regulations for implementing the procedural provisions of NEPA indicates the “human environment” shall be interpreted comprehensively to include not only the natural and physical environment, but the relationship of people with that environment (40 CFR §1508.14). Federal agencies need to assess not only ecological effects, but also “aesthetic... cultural, economic [or] social... effects”, “whether direct, indirect, or cumulative” (40 CFR §1508.8). The FHWA Technical Advisory T6640.8A Guidance for Preparing and Processing Environmental and Section 4(f) Documents indicates that NEPA documents would consider social impacts, to the extent they are distinguishable, for changes to neighborhoods or community cohesion; travel patterns and accessibility (e.g., vehicular, commuter, bicycle, or pedestrian); and impacts to school districts, recreation areas, places of worship, businesses, police and fire protection stations, etc.

1.5 General Methodology
The methodology to complete the socioeconomic resources, land use and right-of-way analyses for this study was developed in consultation with cooperating and participating agencies and per the Section 404 Merged Process Agreement. The socioeconomic resources within the Bowers Hill Interchange Improvements Study Area were identified using data from the U.S. Census Bureau, Geographic Information Systems (GIS) data, VDOT’s Comprehensive Environmental Data and Reporting System (CEDAR) data (Version: August 2018), Google Earth, local and regional comprehensive plans, and Hampton Roads Transportation Planning Organization (HRTPO) 2011 land use compilations, aerial photographs, and field reconnaissance.

Census block groups within the Study Area were included for analysis with data based on the 2012-2016 American Community Survey (ACS) five-year datasets and included the following six block groups: 213.01.1, 214.04.4, 215.01.1, 215.01.2, 215.01.3, and 215.01.4 (Figure 1-5). ACS data is based on sample surveys that can have large margins of error at the Census block group level. Thus, when ACS block group data was used in this study, it was the best available information at the time and/or was more reflective of existing conditions in the Study Area. More resource-specific methodology is included in this document under land use and each socioeconomic resource evaluated.

Potential relocations from the acquisition of right-of-way that could impact socioeconomic resources in the Study Area were determined by using GIS software to overlay each Build Alternative’s limit-of-disturbance (LOD) on to tax parcel data for the Study Area acquired from the City of Chesapeake. The LOD was developed using the estimated limits of construction plus an additional 30-foot buffer area. The LOD represents a worst-case scenario and may be refined during final design. Individual residential and business property owners potentially subject to property impacts were not contacted at this planning stage. VDOT would contact affected property owners during more detailed design when final property impacts are determined.
Figure 1-5: Study Area Census Block Groups
2 EXISTING CONDITIONS AND ENVIRONMENTAL CONSEQUENCES

2.1 COMMUNITIES AND COMMUNITY FACILITIES

2.1.1 Methodology
Transportation improvements have the potential to directly affect communities and community cohesion in several ways. Communities consist of primarily residential areas and intermixed community facilities and community services such as grocery stores and gas stations. Community cohesion, as used in this analysis, is a loosely defined concept of community identity potentially based on shared ethnicity; coherent design features in a community’s layout and aesthetics; and spatial cohesion gained by accessibility to neighbors, community facilities, goods, and services. The level of cohesion in residential communities may vary depending on how long residents have stayed or plan to stay in the area and the accessibility to services and community facilities. Transportation impacts to community cohesion “may be beneficial or adverse, and may include splitting neighborhoods, isolating a portion of a neighborhood or an ethnic group, or separating residents from community facilities” (FHWA, 1987). Construction and expansion of existing transportation corridors can disrupt community cohesion by changing connectivity between residential neighborhoods (i.e., physically dividing communities); relocating residents; disrupting access to community facilities, either on a temporary or permanent basis; and introducing noise and visual elements incompatible with existing surrounding conditions (FHWA, 1996; FHWA, 1998). However, transportation projects may also enhance access within communities by improving connectivity.

Community facilities were identified in the Study Area. The Study Area was evaluated for the presence of the following types of community facilities, and these were mapped in GIS if present:

- Schools;
- Police/Fire/Rescue Stations;
- Government Offices;
- Libraries;
- Parks and Public Access Conservation Areas;
- Waste Disposal Facilities;
- Post Offices;
- Hospitals;
- Places of Worship;
- Cemeteries;
- Community Centers;
- Airports;
- Transit Stops;
- Transit Routes;
- Recreational Trails (bicycle, shared use paths, water trails, etc.); and
- Public Recreational Facilities (athletic fields, playgrounds, etc.).

Community facilities within the Study Area have been identified using readily available data such as Google Earth mapping, local and regional comprehensive plans, and field verified, where necessary. Impacts to community facilities were quantitatively qualitatively assessed by determining the number of relocated facilities or any changes that would impact the function or accessibility of community facilities.
In this analysis, impacts to communities and community cohesion were assessed by: identifying the number of residential relocations within individual communities, whether improvements would form physical barriers to neighborhoods and community connectivity, whether access to community facilities would be closed, and potential noise and visual impacts.

2.1.2 Existing Conditions

The Study Area is in the Hampton Roads region within the City of Chesapeake, Virginia. Most of the Study Area is open space/undeveloped, with the next largest area occupied by transportation facilities. (see Section 2.4 Land Use and Locality Plans). Neighborhood areas (as defined by the City) are concentrated in the northern and eastern part of the Study Area (see Figure 2-1).

Residential access along the Study Area roadways is limited due to the majority of roads being larger 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. The residences in the Colonial Point neighborhood are a mix of ranch and split-level single-family homes, generally constructed between 1965 and 1975.

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 2-1 and shown on Figure 2-2.

Table 2-1: Community Facilities

<table>
<thead>
<tr>
<th>Facility</th>
<th>Location/Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jolliff Middle School</td>
<td>1021 Jolliff Rd</td>
</tr>
<tr>
<td>Fire Station # 10</td>
<td>629 Homestead Rd</td>
</tr>
<tr>
<td>Sunray Ceramic Center</td>
<td>621 Homestead Rd</td>
</tr>
<tr>
<td>Indiana United Methodist Church</td>
<td>4505 Indiana Ave</td>
</tr>
<tr>
<td>Bright Family Cemetery¹</td>
<td>Rotunda Ave</td>
</tr>
<tr>
<td>Unnamed Cemetery</td>
<td>Jolliff Rd</td>
</tr>
<tr>
<td>Unnamed Cemetery</td>
<td>Seldon Rd</td>
</tr>
<tr>
<td>Hampton Roads Executive Airport</td>
<td>5164 W Military Hwy</td>
</tr>
</tbody>
</table>

¹. The Bright Family Cemetery is located on private property and is not accessible by the public.
Figure 2-1: Neighborhoods
Figure 2-2: Community Facilities

Legend
- Community Facilities
- Bowers Hill Interchange
- Study Area
- Waterbody

Bowers Hill Interchange Improvements Study
Community Facilities

Great Dismal Swamp
National Wildlife Refuge

Chesapeake
Portsmouth

Unnamed Cemetery
Jolliff Middle School
Jolliff Road
Bright Family Cemetery

Hampton Roads Executive Airport
Fire Station #10
Indiana United Methodist Church
Sunray Ceramic Center
2.1.3 Environmental Consequences

2.1.3.1 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.

2.1.3.2 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 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. These factors combined would minimize the potential for adverse impacts to community connectivity or cohesion.

2.1.3.3 Alternative 2
Under Alternative 2 no community facilities would be impacted. Like Alternative 1, there 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.

2.2 Population and Housing

2.2.1 Methodology
Population and housing were identified based on the 2012-2016 ACS five-year data at the Census block group level available online at American FactFinder. Figure 1-5 shows the Census block groups within the Study Area. Data were gathered for the Census block groups within and immediately adjacent to the Study Area and compared to similar data for the City of Chesapeake, and Virginia. Direct long-term and short-term impacts to population and housing were assessed by identifying the number of potential residential relocations for the alternatives.

Potential relocations include all total property acquisitions where there is a primary structure located on the property. Potential relocations may also occur on parcels that are partially acquired where a primary structure would be impacted, or access would be cut off. Potential relocations are identified as residences (individual/families), businesses, and other (including state-owned land, city-owned land,
religious institutions, schools, cemeteries, and parks/recreation areas). Potential relocations are based on planning-level property estimates.

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.

Right-of-way impacts are provided in greater detail in Section 2.5.

### 2.2.2 Existing Conditions

The 2016 populations of Virginia, City of Chesapeake, and the block groups that comprise the Study Area are provided in Table 2-2. The Study Area contains portions of six US Census block groups (see Figure 1-5). The Study Area block groups contain a population of 12,397 people. The block groups with the largest populations are located in the northern and eastern portions of the Study Area.

<table>
<thead>
<tr>
<th>Geographic Area</th>
<th>Population # / %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virginia</td>
<td>8,310,301</td>
</tr>
<tr>
<td>City of Chesapeake</td>
<td>233,194</td>
</tr>
<tr>
<td>Study Area Block Group Total</td>
<td>12,397 / 100%</td>
</tr>
<tr>
<td>Block Group 213.01.1</td>
<td>848 / 6.8%</td>
</tr>
<tr>
<td>Block Group 214.04.4</td>
<td>1,077 / 8.7%</td>
</tr>
<tr>
<td>Block Group 215.01.1</td>
<td>1,931 / 15.6%</td>
</tr>
<tr>
<td>Block Group 215.01.2</td>
<td>2,968 / 23.9%</td>
</tr>
<tr>
<td>Block Group 215.01.3</td>
<td>3,136 / 25.3%</td>
</tr>
<tr>
<td>Block Group 215.01.4</td>
<td>2,437 / 19.7%</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates

Housing characteristics for 2016 are provided in Table 2-3. A total of 4,693 housing units are in the Study Area block groups, approximately 93 percent of which are occupied. Although 4,693 homes are within the Study Area block groups boundary (see Figure 1-5), not all are within the Study Area itself. 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.

Of the occupied units in the Study Area block groups, most (approximately 68.1 percent) are owner-occupied, compared to approximately 42.7 percent in Chesapeake. The Study Area housing is spread out
throughout the Study Area, but the majority of it (66.1 percent) is found in study Block Groups 215.01.2, 215.01.3, and 215.01.4.

Table 2-3: Housing Characteristics (2016)

<table>
<thead>
<tr>
<th>Geographic Area</th>
<th>Total Housing Units</th>
<th>Total Occupied Housing Units</th>
<th>Owner-Occupied Units (#/%)</th>
<th>Tenant-Occupied Units (#/%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virginia</td>
<td>3,445,357</td>
<td>3,090,178</td>
<td>2,032,761 / 65.8%</td>
<td>1,057,417 / 34.2%</td>
</tr>
<tr>
<td>City of Chesapeake</td>
<td>87,807</td>
<td>82,573</td>
<td>57,851 / 70.1%</td>
<td>24,722 / 29.9%</td>
</tr>
<tr>
<td>Study Area Block Group Total</td>
<td>4,693</td>
<td>4,360</td>
<td>3,305 / 75.8%</td>
<td>1,055 / 24.2%</td>
</tr>
<tr>
<td>Block Group 213.01.1</td>
<td>403</td>
<td>369</td>
<td>334 / 90.5%</td>
<td>35 / 9.5%</td>
</tr>
<tr>
<td>Block Group 214.04.4</td>
<td>415</td>
<td>383</td>
<td>362 / 94.5%</td>
<td>21 / 5.5%</td>
</tr>
<tr>
<td>Block Group 215.01.1</td>
<td>771</td>
<td>740</td>
<td>213 / 28.8%</td>
<td>527 / 71.2%</td>
</tr>
<tr>
<td>Block Group 215.01.2</td>
<td>1,042</td>
<td>989</td>
<td>933 / 94.3%</td>
<td>56 / 5.7%</td>
</tr>
<tr>
<td>Block Group 215.01.3</td>
<td>1,146</td>
<td>1,112</td>
<td>996 / 89.6%</td>
<td>116 / 10.4%</td>
</tr>
<tr>
<td>Block Group 215.01.4</td>
<td>916</td>
<td>767</td>
<td>467 / 60.9%</td>
<td>300 / 39.1%</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates

2.2.3 Environmental Consequences

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

2.2.3.2 Alternative 1
Alternative 1 would result in impacts to 15 residential properties totaling 2.6 acres; 11 of these properties would require relocations. The majority of the impacted properties are located along Spring Meadow Crescent in the Cedar Grove Acres neighborhood.

A summary of the impacts to residential properties for each of the Build Alternatives is provided in Table 2-4. Additional information on right-of-way is provided in Section 2.5.

Table 2-4: Estimated Residential Impacts

<table>
<thead>
<tr>
<th>Impact</th>
<th>No-Build</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Properties Impacted (#/acres)</td>
<td>0 / 0</td>
<td>15 / 2.6 acres</td>
<td>19 / 4.6 acres</td>
</tr>
<tr>
<td>Residential Relocations</td>
<td>0</td>
<td>11</td>
<td>2</td>
</tr>
</tbody>
</table>

2.2.3.3 Alternative 2
As shown in Table 2-4, 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.

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, farm, 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 without discrimination.

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 Table 2-3. A desktop review of real estate websites, to include both housing for sale and rent, verified there is sufficient housing available within and adjacent to the Study Area. VDOT has the ability, and if necessary, is willing to provide housing of last resort, including the purchase of land or dwellings; repair to existing dwellings to meet decent, safe, and sanitary conditions; relocation, or remodeling of dwellings purchased by VDOT; or construction of new dwellings. Assurance is given that all relocated families and individuals would be relocated to suitable replacement housing; all replacement housing would be fair housing available to all persons without regard to race, color, religion, sex, or national origin; and all replacement housing would be within the financial means of the relocated people. Each person would be given sufficient time to negotiate for and obtain possession of replacement housing. No residential occupants would be required to move from property needed for the Build Alternatives until comparable decent, safe, and sanitary replacement dwellings have been made available to them.

2.3 Economic Resources

2.3.1 Methodology
This economic analysis focuses on economic resources within the Study Area (including employment and household income ranges) and impacts to businesses located in the Study Area. Business information, including location and staff numbers, were obtained from the Chesapeake Economic Development Department website and other online business information resources. Direct long-term and short-term impacts to economics were assessed by identifying the business property impacts and acquisitions, number of impacted buildings or structures, and lost parking. Employment and income information was obtained from the 2012-2016 ACS five-year dataset for the Census block groups in the Study Area. These employment and income data were the most reflective of conditions within the Study Area today.

2.3.2 Existing Conditions

2.3.2.1 Employment
Table 2-5 outlines the 2016 employment status within the Study Area block groups, City of Chesapeake, and Virginia. According to ACS five-year data, Virginia and City of Chesapeake, all have an estimated 65-66 percent of individuals in the labor force. As defined by the ACS, the labor force includes the civilian and U.S. Armed Forces population over 16 years of age working as paid employees, the self-employed (including farmers), or those who worked 15 hours or more as unpaid workers for a family farm/business. Excluded from the labor force are those over 16 years of age who are students, homemakers, and unpaid volunteers; retirees; those institutionalized; and those who worked less than 15 hours per week as unpaid workers for a family farm/business. The unemployed are over 16 years of age and not currently working but are actively looking for work and are generally available to work.
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. Table 2-6 displays the number of households per income ranges in Virginia, City of Chesapeake, and the Study Area block groups in 2016.

Table 2-5: Employment Status (2016)

<table>
<thead>
<tr>
<th>Geographic Area</th>
<th>Total</th>
<th>In Labor Force (%)</th>
<th>Not in Labor Force (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virginia</td>
<td>6,653,111</td>
<td>4,403,124 / 66.2%</td>
<td>2,249,987 / 33.8%</td>
</tr>
<tr>
<td>City of Chesapeake</td>
<td>183,209</td>
<td>121,543 / 66.3%</td>
<td>61,666 / 33.7%</td>
</tr>
<tr>
<td>Study Area Block Group Total</td>
<td>9,221</td>
<td>5,973 / 64.8%</td>
<td>3,248 / 35.2%</td>
</tr>
<tr>
<td>Block Group 213.01.1</td>
<td>710</td>
<td>375 / 52.8%</td>
<td>335 / 47.2%</td>
</tr>
<tr>
<td>Block Group 214.04.4</td>
<td>933</td>
<td>551 / 59.1%</td>
<td>382 / 40.9%</td>
</tr>
<tr>
<td>Block Group 215.01.1</td>
<td>1,343</td>
<td>1,119 / 83.3%</td>
<td>224 / 16.7%</td>
</tr>
<tr>
<td>Block Group 215.01.2</td>
<td>2,292</td>
<td>1,583 / 69.1%</td>
<td>709 / 30.9%</td>
</tr>
<tr>
<td>Block Group 215.01.3</td>
<td>2,326</td>
<td>1,480 / 63.6%</td>
<td>846 / 36.4%</td>
</tr>
<tr>
<td>Block Group 215.01.4</td>
<td>1,617</td>
<td>865 / 53.5%</td>
<td>752 / 46.5%</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

Table 2-6: Household Income (2016) (#/%)  

<table>
<thead>
<tr>
<th>Geographic Area</th>
<th>Less than $24,999</th>
<th>$25,000-$49,999</th>
<th>$50,000-$74,999</th>
<th>$75,000-$99,999</th>
<th>$100,000-$149,999</th>
<th>$150,000-$199,999</th>
<th>More than $200,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virginia</td>
<td>557,428 / 18.0%</td>
<td>634,940 / 20.4%</td>
<td>534,344 / 17.2%</td>
<td>394,504 / 12.7%</td>
<td>491,975 / 15.8%</td>
<td>228,637 / 7.4%</td>
<td>263,088 / 8.5%</td>
</tr>
<tr>
<td>City of Chesapeake</td>
<td>12,950 / 15.2%</td>
<td>17,411 / 20.5%</td>
<td>16,211 / 19.1%</td>
<td>12,717 / 15.0%</td>
<td>15,312 / 18.0%</td>
<td>5,888 / 6.9%</td>
<td>4,498 / 5.3%</td>
</tr>
<tr>
<td>Study Area Block Group Total</td>
<td>2,083</td>
<td>2,083 / 32.1%</td>
<td>1,650 / 25.4%</td>
<td>883 / 13.6%</td>
<td>657 / 10.1%</td>
<td>609 / 9.4%</td>
<td>414 / 6.4%</td>
</tr>
<tr>
<td>Block Group 213.01.1</td>
<td>147 / 29.9%</td>
<td>181 / 36.9%</td>
<td>54 / 11.0%</td>
<td>26 / 5.3%</td>
<td>70 / 14.3%</td>
<td>13 / 2.6%</td>
<td>0 / 0%</td>
</tr>
<tr>
<td>Block Group 214.04.4</td>
<td>699 / 46.6%</td>
<td>504 / 33.6%</td>
<td>129 / 8.6%</td>
<td>51 / 3.4%</td>
<td>50 / 3.3%</td>
<td>68 / 4.5%</td>
<td>0 / 0%</td>
</tr>
<tr>
<td>Block Group 215.01.1</td>
<td>601 / 56.8%</td>
<td>130 / 12.3%</td>
<td>92 / 8.7%</td>
<td>136 / 12.9%</td>
<td>99 / 9.4%</td>
<td>0 / 0%</td>
<td>0 / 0%</td>
</tr>
<tr>
<td>Block Group 215.01.2</td>
<td>36 / 3.3%</td>
<td>225 / 20.7%</td>
<td>180 / 16.5%</td>
<td>203 / 18.7%</td>
<td>194 / 17.8%</td>
<td>142 / 13.1%</td>
<td>108 / 9.9%</td>
</tr>
<tr>
<td>Block Group 215.01.3</td>
<td>223 / 17.5%</td>
<td>145 / 11.4%</td>
<td>262 / 20.5%</td>
<td>206 / 16.1%</td>
<td>167 / 13.1%</td>
<td>191 / 15.0%</td>
<td>82 / 6.4%</td>
</tr>
<tr>
<td>Block Group 215.01.4</td>
<td>377 / 35.2%</td>
<td>465 / 43.4%</td>
<td>166 / 15.5%</td>
<td>35 / 3.3%</td>
<td>29 / 2.7%</td>
<td>0 / 0%</td>
<td>0 / 0%</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

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).

As shown in Figure 2-3, several commercial businesses are located within and adjacent to the interchange. Table 2-7 identifies 14 that are located within the Study Area. The table provides the name, addresses, and the estimated number of employees per business. Many of the businesses within the Study Area are located along Military Highway.

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

Source: [http://chesapeakeva.biz/datacenter/businesses/](http://chesapeakeva.biz/datacenter/businesses/) and individual business websites, as applicable.

Per Figure 2-3, 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.

In addition to the Bowers Hill Interchange being utilized for local businesses, larger businesses in the Hampton Roads region and those accessing the major area ports also utilize the interchange. Between 2013 and 2015, the top two truck routes (based on weekday truck volumes) within Hampton Roads traveled through the Bowers Hill Interchange Improvements Study Area (HRTPO, 2017b). I-64 between Military Highway and the I-264/I-64 interchange averaged 7,402 trucks per weekday while U.S. Route 460/58/13 averaged 7,332 trucks per day. These roadways are important routes for freight and intermodal traffic entering and exiting the region from the Port of Virginia’s Southside terminals. These include the Norfolk International Terminals, Portsmouth Marine Terminal, and Virginia International Gateway.

Besides use of the Bowers Hill interchange, no alternate routes are suitable for efficient truck traffic originating in these Southside terminals needing to travel west of I-664 to access I-95 without crossing the Hampton Roads Harbor. This is because most routes are minor arterials to local roads that are low speed with signalized intersections, have little to no access control and narrow travel lanes, and turn lanes are not provided in many locations. Moderate congestion impedes traffic along both directions of
the I-664/I-64 mainline within the Study Area during the AM peak flow in 2017. Severe congestion impedes traffic in the PM for the I-664/I-64 mainline in the NB direction during the same period. Trucks using these facilities to access Port facilities or depart the region are subject to this congestion and time delays. As HRTPO states in their Hampton Roads Regional Freight Study (HRTPO, 2017b), “this congestion adversely impacts the economic competitiveness of the region, and is a primary concern facing those carrying freight to, from, or within Hampton Roads.” The Port plans to double the capacity of the Port of Virginia by 2040 and would increase container throughput on the Southside (Port of Virginia, 2016). It is likely that use of the Bowers Hill Interchange would increase with the projected increase in truck shipments of freight/goods for those movements leaving the region to the west to reach I-95 via U.S. Route 58 or U.S. Route 460.

2.3.3 Environmental Consequences

2.3.3.1 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.

2.3.3.2 Alternative 1
The proposed improvements under Alternative 1 would impact eight commercial and industrial properties located within the study area (see Table 2-8); three of which would require relocation. More detail on right-of-way impacts is provided in Section 2.5.

<table>
<thead>
<tr>
<th>Impact</th>
<th>No-Build</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial / Industrial Properties Impacted</td>
<td>0 / 0</td>
<td>8 / 1.9 acres</td>
<td>2 / 1.7 acres</td>
</tr>
<tr>
<td>(#/acres)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial / Industrial Relocations</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

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.

2.3.3.3 Alternative 2
Alternative 2 would impact two commercial and industrial properties totaling 1.7 acres. Under Alternative 2, there would be no commercial or industrial relocations.

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.

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. Impacts to businesses in the Study Area would be minimized through careful planning during future phases of the study. 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.

2.4 LAND USE AND LOCALITY PLANS

2.4.1 Methodology

Existing land use in the Study Area and surrounding land was gathered to provide a baseline for analysis of the potential impacts of the alternatives. The most recent available data was compiled by HRTPO in 2011 and was supplemented from local comprehensive and land use plans, aerial photography, and field reconnaissance. The following land use classifications are used in this analysis:

- Agricultural;
- Commercial;
- Industrial;
- Institutional;
- Open Space;
- Residential; and
- Transportation.

The Open Space class includes parks and recreation, greenways, resource conservation, and historical and cultural area categories (HRTPO 2011). The Transportation class is the total of remaining unclassified areas in the land use data. Impacts were assessed based on conversion of other land uses to transportation use.

2.4.2 Existing Conditions

The lands in the north and south parts of the Study Area are mainly classified as Open Space, with increased development towards the interchanges at the eastern and western ends. This development consists mainly of industrial and institutional land uses, with notable areas such as KPVG to the east and the SPSA Regional Landfill towards the west, with few residential parcels.

Approximately 1,430 acres are encompassed by the Study Area. As summarized in Table 2-9, and shown on Figure 2-4, the existing (2011) land use (the most recent available data) within the Study Area is predominantly Open Space, followed by Transportation, Residential, and Industrial uses.

<table>
<thead>
<tr>
<th>Land Use Class</th>
<th>Acres</th>
<th>Percent of Study Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>70.5</td>
<td>4.9%</td>
</tr>
<tr>
<td>Commercial</td>
<td>15.2</td>
<td>1.1%</td>
</tr>
<tr>
<td>Industrial</td>
<td>165.7</td>
<td>11.5%</td>
</tr>
<tr>
<td>Institutional</td>
<td>53.9</td>
<td>3.7%</td>
</tr>
<tr>
<td>Open Space</td>
<td>470.4</td>
<td>32.9%</td>
</tr>
<tr>
<td>Residential</td>
<td>226.9</td>
<td>15.9%</td>
</tr>
<tr>
<td>Transportation</td>
<td>428.3</td>
<td>30.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,430.9</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

*Source: HRTPO, 2011*
Figure 2-4: HRTPO Land Use
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, 2014). 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.

### 2.4.3 Environmental Consequences

#### 2.4.3.1 No-Build Alternative

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

#### 2.4.3.2 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 2-10* 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).

<table>
<thead>
<tr>
<th>Land Use Class</th>
<th>No-Build Alternative</th>
<th>Alternative 1 Percent</th>
<th>Alternative 2 Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Commercial</td>
<td>0</td>
<td>1.3%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Industrial</td>
<td>0</td>
<td>41.8%</td>
<td>22.7%</td>
</tr>
<tr>
<td>Institutional</td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Open Space</td>
<td>0</td>
<td>39.2%</td>
<td>55.6%</td>
</tr>
<tr>
<td>Residential</td>
<td>0</td>
<td>17.7%</td>
<td>21.6%</td>
</tr>
<tr>
<td><strong>Total Land Converted</strong></td>
<td><strong>0</strong></td>
<td><strong>100%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

*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 ROW impacts.

#### 2.4.3.3 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.
2.5 **RIGHT-OF-WAY**

2.5.1 **Methodology**

New right-of-way may be acquired for the Build Alternatives. Anticipated impacts to property were identified by using GIS to overlay the conceptual LOD on parcel data obtained from the city of Chesapeake. The LOD includes both the area where improvements are anticipated and the area necessary for construction access to implement the improvements. This analysis is planning-level only and additional property survey, along with advanced engineering and design, would be completed should the project advance to develop a detailed understanding of right-of-way impacts.

2.5.2 **Existing Conditions**

The calculated existing right-of-way is based on the parcel data collected from the City of Chesapeake (Chesapeake, 2017). 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.

2.5.3 **Environmental Consequences**

2.5.3.1 **No-Build Alternative**

The No-Build Alternative would not result in right-of-way acquisition.

2.5.3.2 **Alternative 1**

Alternative 1 would impact 38 parcels totaling 8.8 acres. The majority of the impacted acreage is open space. Property impacts by alternative are provided in Table 2-11.

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.

**Table 2-11: Property Impacts***

<table>
<thead>
<tr>
<th>Property Type</th>
<th>No-Build Alternative</th>
<th>Alternative 1 (number/ acres)</th>
<th>Alternative 2 (number/ acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial/Industrial</td>
<td>0</td>
<td>8 / 1.9</td>
<td>2 / 1.7</td>
</tr>
<tr>
<td>Open Space</td>
<td>0</td>
<td>15 / 4.3</td>
<td>13 / 11.6</td>
</tr>
<tr>
<td>Residential</td>
<td>0</td>
<td>15 / 2.6</td>
<td>19 / 4.6</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0 / 0</td>
<td>1 / &lt;0.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>0</td>
<td><strong>38 / 8.8</strong></td>
<td><strong>35 / 17.9</strong></td>
</tr>
</tbody>
</table>

*Anticipated impacts to property were identified by using GIS to overlay the conceptual LOD on parcel data obtained from the city of Chesapeake.

2.5.3.3 **Alternative 2**

Property impacts for Alternative 2 are shown in the table above. Alternative 2 would impact 35 parcels totaling 17.9 acres. Like Alternative 1, the majority of the impacted acreage is open space.

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.
2.6 **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* (1997); 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.

**2.6.1 Methodologies**

**2.6.1.1 Identification of EJ Populations – Minority**

Executive Order 12898 and the U.S. DOT/FHWA EJ Orders are concerned with identifying minority and low-income populations. The Bowers Hill Interchange improvements EJ analysis is based on the following definition for a minority population:

Any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who would be similarly affected by a proposed U.S. DOT/FHWA program, policy, or activity (U.S. DOT and FHWA EJ Orders). For the purposes of this analysis, a minority population is present when: (a) the minority population of the affected area exceeds 50 percent of total population or (b) the minority population percentage in the affected area is "meaningfully greater" than the minority population percentage in the general population or other appropriate unit of geographical analysis (CEQ, 1997). For the purposes of this study, the minority population for a census block group would be found to be "meaningfully greater" than surrounding block groups in the Study Area if its minority population is greater than the value of the average minority population percentage of the HRTPO member localities or the minority population percentage of Chesapeake, whichever establishes the lower and more conservative threshold.

The methods used for this analysis were defined in the *Resource Identification and Impact Analysis Methodologies* document for the Bowers Hill Interchange Improvements Study which received agency concurrence on June 13, 2018.

Data on race and ethnicity have been gathered from the 2010 U.S. Decennial Census for Virginia, the localities, and the U.S. Census block groups that make up the Study Area. The U.S. Census evaluates race and ethnicity separately allowing respondents to claim more than one race or ethnicity. The Decennial
Census also provides a more accurate count of minority residents than those available from the five-year ACS estimations. Therefore, the 2010 Decennial Census minority data are most appropriate for this analysis.

2.6.1.2 Identification of EJ Populations - Low-Income
The Bowers Hill Interchange Improvements Study EJ analysis is based on the following definition for a low-income population:

Any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who would be similarly affected by a proposed U.S. DOT/FHWA program, policy, or activity (U.S. DOT/FHWA EJ Orders). In the Bowers Hill Interchange improvements analysis, a low-income population would be present in study block groups where the median household income is below the U.S. Department of Health and Human Services (U.S. HHS) poverty level for the average household size in the study block groups.

The 2016 U.S. HHS poverty guidelines are used for this study as they are most appropriate for comparing the latest available median household income at the block group level from the five-year 2012-2016 ACS data.

The methods used for this analysis were defined in the Resource Identification and Impact Analysis Methodologies document for the Bowers Hill Interchange Improvements Study which received agency concurrence on June 13, 2018.

2.6.2 Existing Conditions

2.6.2.1 EJ Populations - Minority
The minority and Hispanic or Latino population data for the Study Area block groups is summarized in Table 2-12. Ethnic Hispanic or Latino individuals may be of any race and are therefore counted separately.

Three Study Area block groups located in the center of the interchange and east of the interchange exceed the 50 percent threshold for a minority population and are therefore areas of potential EJ concern. 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. The Hispanic or Latino population threshold (4.0 percent) is based on the average percentage of Hispanic or Latino populations in the HRTPO. No block groups exceed the Hispanic or Latino population threshold. Figure 2-5 depicts Study Area block groups that are considered potential areas of EJ concern. One scoping comment received from the City of Portsmouth (Participating Agency) indicated that the City was not aware of any EJ concerns or potential impacts within the Study Area.
Table 2-12: Environmental Justice Populations

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

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.

2.6.2.2 EJ Populations – Low-Income

This analysis used the U.S. Census Bureau’s ACS 5-Year (2012-2016) Estimates, Median Income in the Past 12 Months (in 2016 Inflation-Adjusted Dollars) to generate median household income data at the Census block group level. In the Study Area block groups (BG), 2.78 persons on average occupy households based on the ACS 2012-2016 5-Year data. The ACS 2012-2016 Census block group margin of error for average household size averaged to 0.43 persons. Therefore, for this EJ analysis, low-income populations have been identified where the median household income for a Census block group within the Study Area is at or below the 2016 U.S. Department of Health and Human Services (HHS) poverty threshold for a family of four to be conservative and to account for the margin of error. The HHS poverty threshold was $24,300 for a family of four in 2016. As shown in Table 2-13, 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 for that year, 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 (see Table 2-13).
Table 2-13: Median Household Income (2016)

<table>
<thead>
<tr>
<th>Geographic Area</th>
<th>Median Household Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virginia</td>
<td>$66,149</td>
</tr>
<tr>
<td>City of Chesapeake</td>
<td>$69,978</td>
</tr>
<tr>
<td>Study Area Median</td>
<td>$65,580</td>
</tr>
<tr>
<td>Block Group 213.01.1</td>
<td>$48,266</td>
</tr>
<tr>
<td>Block Group 214.04.4</td>
<td>$78,250</td>
</tr>
<tr>
<td>Block Group 215.01.1</td>
<td>$41,667</td>
</tr>
<tr>
<td>Block Group 215.01.2</td>
<td>$90,417</td>
</tr>
<tr>
<td>Block Group 215.01.3</td>
<td>$95,357</td>
</tr>
<tr>
<td>Block Group 215.01.4</td>
<td>$45,522</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates

2.6.3 Environmental Consequences
A disproportionately high and adverse effect on minority and low-income population locations is defined by the FHWA EJ Order as an impact that:

- Would be predominately borne by a minority and / or low-income population, or
- Would be suffered by the minority population and / or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that would be suffered by the nonminority population and / or non-low-income population.

Per the FHWA Memorandum Guidance on Environmental Justice and NEPA (December 16, 2011), the impacts of the Build Alternative to minority and low-income populations were compared with respect to the impacts on the overall population within the Study Area (Census block groups that intersect with the Build Alternative).

2.6.3.1 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.

2.6.3.2 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 the Noise Analysis Technical Report (VDOT, 2019). 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.

2.6.3.3 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 the Noise Analysis Technical Report (VDOT, 2019). 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.

2.6.4 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. One scoping letter response from the City of Portsmouth indicated that no EJ community impacts were anticipated to result from the Bowers Hill Interchange Improvements Study.

A virtual meeting was held from May 10, 2018 to June 9, 2018. The virtual meeting provided project information through the study website and provided opportunity for comments from the public including EJ populations. VDOT hosted a Citizen Information Meeting (CIM) August 22, 2018 at the Jolliff Middle School to present the purpose and need and solicit citizen input on conceptual plans for improving the Bowers Hill Interchange. 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. Both the scoping meeting and CIM provided opportunity for the public to learn about the study and to provide input and comments to the study team.

The meeting notifications were advertised on the project website, widely disseminated local media, including the Legacy- Hampton Roads which is a minority publication, and through email blasts. Comments on the study were accepted in person, via mail, online and via email. The survey results played a key role in determining the alternatives that were retained for detailed analysis. The CIM was
also held in the evening at a convenient time for the public to attend, in a location close to publicly accessible bus routes, and in a facility compliant with the Americans with Disabilities Act. Input from these public meetings will inform future outreach and identify additional locations, as well as provide insight into expanding study outreach to EJ populations in the future.

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. Representatives from VDOT will continue to coordinate with the Colonial Point Civic League throughout the duration of the study, including during final design and construction of the project.

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 REFERENCES


