CHESAPEAKE
BAY CROSSING STUDY
TIER 1 NEPA

ALTERNATIVES REPORT

Maryland
Transportation
Authority

JULY 2020

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1.0 INTRODUCTION

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 1 National Environmental Policy Act (NEPA), referred to as the "Bay Crossing Study." As announced by Governor Larry Hogan in 2016, the Bay Crossing Study is the critical first step to begin addressing existing and future congestion at the William Preston Lane Jr. Memorial (Bay) Bridge and its approaches along US 50/US 301. The study encompasses a broad geographic area, spanning nearly 100 miles of the Bay from the northern-most portion of the Bay in Harford and Cecil counties to the southern border with Virginia between St. Mary's and Somerset counties.

This report includes an overview of the Purpose and Need for the study, a description of the range of preliminary alternatives considered, an environmental inventory, discussion of the screening process, and the screening analysis results.

1.1 Purpose and Need

The purpose of the Chesapeake Bay Crossing Study: Tier 1 NEPA is to consider corridors for providing additional capacity and access across the Chesapeake Bay in order to improve mobility, travel reliability and safety at the existing Governor William Preston Lane Jr. Memorial (Bay) Bridge. Evaluation of any potential new crossing corridor alternative will include an assessment of existing and potentially expanded transportation infrastructure needed to support additional capacity, improve travel times, and accommodate maintenance activities, while considering financial viability and environmental responsibility. The Tier 1 NEPA analysis will consider a "No-Build" alternative and address the following needs listed under **Section 1.1.1** through **1.1.4**. The Purpose and Need elements form the basis of the alternatives screening, including corridor alternatives and modal and operational alternatives (MOAs) as described in **Section 4.0** through **6.0**.

1.1.1 Adequate Capacity

The existing two spans of the Bay Bridge, which are part of US 50/US 301 between Anne Arundel and Queen Anne's counties, Maryland, carry increasing volumes of travelers. Congestion resulting from high regional travel demand by weekday commuter and summer weekend recreation trips is expected to worsen by the planning horizon year of 2040 due to planned growth in population and employment. Additional capacity is needed to address existing congestion, future congestion, and related safety concerns, all resulting from increasing travel volume on the Bay Bridge and approach transportation network.

1.1.2 Dependable and Reliable Travel Times

The anticipated population increase in communities on both sides of the Chesapeake Bay and associated increase in commuter travel, as well as expected increased tourism and recreational travel, will continue to stress mobility across and around the Bay. Marylanders and visitors need dependable Chesapeake Bay crossing options with reliable operating speeds and travel times that provide access to employment and recreation areas, as well as facilitate emergency services and evacuation events.

1.1.3 Flexibility to Support Maintenance and Incident Management in a Safe Manner

Maintenance and rehabilitation activities will increase and exacerbate congestion as the Bay Bridge ages. Additional capacity is needed to maintain flexible options for safe travel during maintenance and for management of other incidents on the Bay Bridge. Safety of travelers, maintenance workers and incident responders will also be considered during corridor alternative development.

1.1.4 Additional Considerations

Additional capacity across the Chesapeake Bay and/or improvements to existing facilities must be financially viable. In order to assess potential additional Bay crossings, it is necessary to consider the means to pay for the development, operation and maintenance of such facilities.

The Chesapeake Bay is a critical environmental resource in Maryland; therefore, any Bay Crossing improvements must take into account the sensitivity of the Bay, including existing environmental conditions and the potential for any new capacity to adversely impact the Bay and the important natural, recreational, socio-economic and cultural resources it supports.

2.0 RANGE OF ALTERNATIVES

The preliminary range of alternatives for the Bay Crossing Study includes the No-Build Alternative, 14 corridor alternatives, and four modal and operational alternatives (MOAs).

2.1 No-Build Alternative

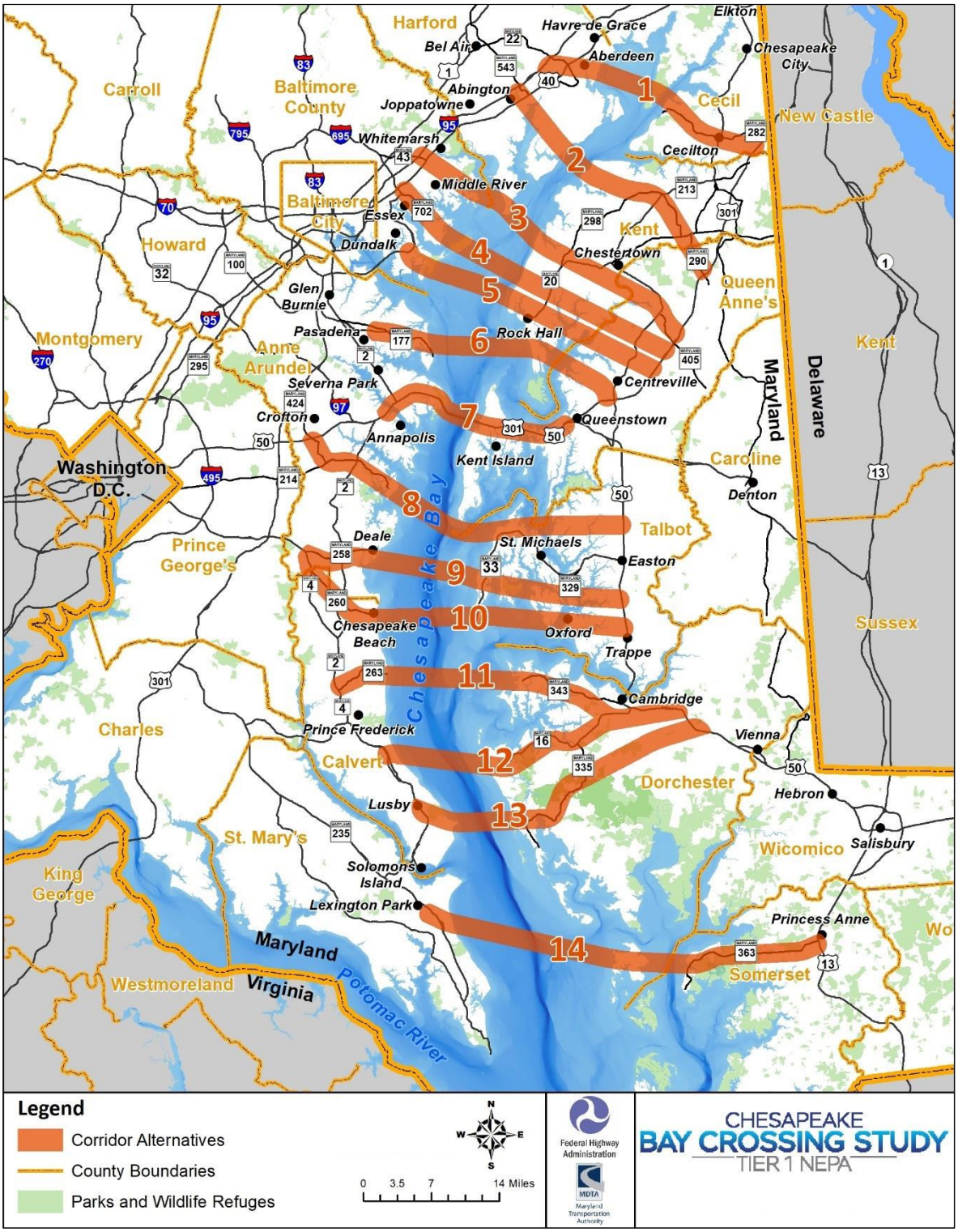
The No-Build Alternative is included as a baseline for comparison to the alternatives described below. The No-Build Alternative includes all currently planned and programmed infrastructure projects as of Project Scoping in 2017. The No-Build Alternative would include regular maintenance at the existing Bay Bridge, located between Anne Arundel County and Queen Anne's County. The No-Build Alternative would be updated as needed during Tier 2 to reflect future projects that were not planned and programmed as of Project Scoping in 2017, such as implementation of all-electronic tolling and the removal of the existing toll plaza. The No-Build Alternative includes existing transportation systems management/travel demand management (TSM/TDM) measures including contraflow lanes on the existing Bridge, as well as any planned and funded TSM/TDM measures as of Project Scoping in 2017, such as automated contraflow lanes (reversible lanes).

2.2 Corridor Alternatives

The screening evaluation considered two categories of alternatives: corridor alternatives and MOAs. This section describes development of a range of approximately two-mile wide corridor alternatives for locating new roadway capacity. An initial 14 corridor alternatives were evaluated based on the screening process described in **Section 4.0**. The type of crossing, such as a bridge or tunnel, is not evaluated or identified in Tier 1.

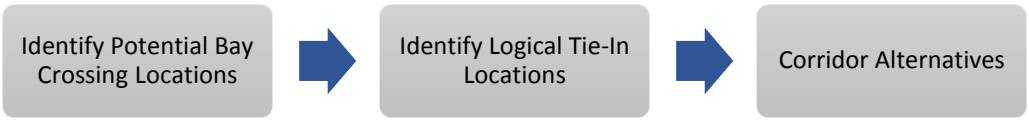
The locations for the corridor alternatives are shown in **Figure 1**.

Figure 1: Corridor Alternatives



To develop the range of corridors, potential Chesapeake Bay crossing locations were identified, followed by locations where the potential crossings would tie into the existing roadway network (**Figure 2**).

Figure 2: Corridor Alternative Development Methodology



2.2.1 Tie-In Locations

For each crossing location, the transportation network tie-in locations were identified based on the considerations below:

- **Eastern Shore Tie-Ins:**
  - All corridors ended at US 50, US 301, or US 13.
  - Corridors followed existing state routes where possible.
  - Corridors followed a relatively straight alignment from the Chesapeake Bay crossing to the tie-in with US 50, US 301, or US 13.
- **Western Shore Tie-Ins:**
  - Corridors followed existing state routes and ended at a limited-access highway where possible.
  - Corridors in southern Maryland, where there are no limited-access highways, followed relatively straight alignments and ended at the nearest major regional routes (e.g., MD 2/4 or MD 235).

2.2.2 Corridor Alternative Locations

A description of each corridor alternative location is presented in **Table 1**. The table identifies and provides rationale for the range and location of corridors. The table is ordered from north to south through the study area along the Chesapeake Bay. The identified range of corridor alternatives (as shown in **Figure 2**) is highlighted blue in **Table 1**. Corridor alternatives were not identified in locations that are unshaded.

Table 1: Corridor Alternative Locations

Location	Description/Rationale
North of Corridor 1	• Close to I-95/US 301 route around Bay • Mouth of Susquehanna River • Proximity to Havre de Grace
Corridor 1	• Connects Aberdeen and Cecilton • Follows MD 22 and ties into existing I-95 interchange on Western Shore • Follows MD 282 on Eastern Shore

Location	Description/Rationale
South of Corridor 1 and North of Corridor 2	• Mouth of Sassafras River • Would pass through developed section of Aberdeen Proving Ground (APG)
Corridor 2	• Connects Abingdon and Chestertown • Undeveloped portion of APG • Follows MD 298/290 on Eastern Shore and ties into existing MD 543/I-95 interchange on Western Shore
South of Corridor 2 and North of Corridor 3	• Would pass through developed section of APG • Mouth of Gunpowder River on Western Shore • Mouth of Bush River on Western Shore
Corridor 3	• Connects White Marsh and Chestertown • Ties into existing MD 43/I-95 interchange on Western Shore; follows portions of MD 20 and MD 405 on the Eastern Shore. Much of the corridor does not follow existing road network on the Eastern Shore, ties into US 301.
South of Corridor 3 and North of Corridor 4	• Proximity to Middle River • Proximity to Martin State Airport on Western Shore
Corridor 4	• Connects Essex and Rock Hall • Follows MD 702 and ties into existing I-695 interchange on Western Shore; does not follow existing road network on the Eastern Shore to tie into US 301.
South of Corridor 4 and North of Corridor 5	• Mouth of Back River on Western Shore
Corridor 5	• Connects Dundalk and Rock Hall • Requires a short connection to I-695 on Western Shore; does not follow existing road network on Eastern Shore to tie into US 301.
South of Corridor 5 and North of Corridor 6	• Mouth of Patapsco River on Western Shore
Corridor 6	• Connects Pasadena and Centreville • Follows MD 177 and ties in with MD 100 on Western Shore; does not follow existing road network on Eastern Shore to tie into US 301.
South of Corridor 6 and North of Corridor 7	• Mouth of Magothy River on Western Shore
Corridor 7	• Follows existing road network along US 50/301 from west of the Severn River on the Western Shore to US 50/301 split on the Eastern Shore. Includes location of existing Bay Bridge
South of Corridor 7 and North of Corridor 8	• Mouth of Severn River on Western Shore • Proximity to Annapolis • South River on Western Shore

Location	Description/Rationale
Corridor 8	• Connects Crofton and Easton • Follows MD 214/424 and ties into existing US 50 interchange on Western Shore. Does not follow existing road network on Eastern Shore to connect to US 50.
South of Corridor 8 and North of Corridor 9	• Limited infrastructure on both shores • Would pass through St. Michaels
Corridor 9	• Connects Deale and Easton • Follows MD 258 and ties into existing MD 4 interchange on Western Shore; follows portions of MD 329 and MD 33 to tie into US 50 on the Eastern Shore.
South of Corridor 9 and North of Corridor 10	• Proximity to Corridors 9 and 10
Corridor 10	• Connects Chesapeake Beach and Trappe • Follows MD 260 and ties into MD 4 on Western Shore; does not follow existing road network on Eastern Shore to connect to US 50.
South of Corridor 10 and North of Corridor 11	• Mouth of Choptank River on Eastern Shore
Corridor 11	• Connects Prince Frederick and Cambridge • Follows MD 263 on Western Shore • Follows MD 343 on Eastern Shore
South of Corridor 11 and North of Corridor 12	• Mouth of Little Choptank River on Western Shore
Corridor 12	• Connects Prince Frederick and Cambridge • Requires a short connection to MD 2/4 on Western Shore • Follows MD 16 on Eastern Shore
South of Corridor 12 and North of Corridor 13	• Proximity to Corridors 12 and 13
Corridor 13	• Connects Lusby and Cambridge • Requires a short connection to MD 2/4 on Western Shore; follows a portion of MD 335 on the Eastern Shore
South of Corridor 13 and North of Corridor 14	• Mouth of Patuxent River on Western Shore • Proximity to Naval Air Station Patuxent River on Western Shore • Limited infrastructure on Eastern Shore • Proximity to Blackwater National Wildlife Refuge on Eastern Shore
Corridor 14	• Connects Lexington Park and Princess Anne • Requires a short connection to MD 235 on Western Shore • Follows MD 363 on Eastern Shore

Location	Description/Rationale
South of Corridor 14	• Limited infrastructure on both shores • Southern extent of study area

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2.3 Modal and Operational Alternatives (MOAs)

In addition to the corridor alternatives, four stand-alone Modal and Operation Alternatives (MOAs) were evaluated to determine if a different mode, or operational changes without additional crossing capacity, could meet the Purpose and Need for the study. The MOAs are referred to as "stand-alone" because the evaluation is intended to determine whether each could meet the Purpose and Need without the implementation of any other build alternative.

The intent of the Tier 1 phase of the study is to identify a corridor location; the specific alignment of a potential new crossing will not be defined in Tier 1. Additionally, combinations of alternatives, such as MOAs in combination or corridors in combination with MOAs, will be further evaluated in Tier 2 to determine whether such a combination could satisfy the transportation needs and other considerations stated in the BCS Purpose and Need.

2.3.1 Transportation Systems Management/Travel Demand Management (TSM/TDM)

This alternative would consist of infrastructure and operational changes that would improve operations of the existing roadway network without adding major new infrastructure capacity. TSM/TDM improvements are typically relatively low-cost projects and/or practices that can be implemented without major impacts compared to new capacity. Specific examples of TSM/TDM improvements could include:

- Implementing All Electronic Tolling (AET). This improvement would include replacing the existing toll booths with an overhead toll gantry that would collect electronic tolls at highway speeds. The toll plaza would be removed, and vehicles would no longer slow down to drive through a toll plaza to pay the toll. (AET was implemented at the Bay Bridge in Spring 2020.)
- Implementing Variable Tolls. This improvement would include adjusting toll rates to encourage a more equal distribution of trips throughout the day. Toll rates would generally be lower during the off-peak period, which could influence some drivers to change their trip times to avoid paying a higher toll.

It is possible that MDTA will implement future TSM/TDM improvements separately from the Bay Crossing Study. The results of this screening analysis would not preclude such improvements from implementation.

2.3.2 Ferry Service

This alternative would consist of implementing a ferry service across the Chesapeake Bay. The alternative would include construction of ferry terminals at one or more locations on each shore. It is assumed that the ferry service would provide one or more alternate crossing route for vehicles that would otherwise cross the Bay Bridge. This alternative could also include roadway improvements between the existing roadway network and the proposed ferry terminals.

2.3.3 Bus Rapid Transit

This alternative would consist of a new Bus Rapid Transit (BRT) service between major destinations on the Eastern and Western Shores. It is assumed that the BRT service would use the existing Bridge to cross the Bay.

The potential BRT routes are assumed to service commuters traveling on Non-Summer Weekdays and for leisure travelers on Summer Weekends traveling to/from the Eastern Shore beach areas. For Non-Summer Weekdays, transit travel is assumed to occur from the Eastern Shore, i.e. Kent Island and Queen Anne's County, to the Western Shore, i.e. Annapolis, Baltimore, and Washington DC, via the Bay Bridge in the AM Peak Hour. In the PM Peak Hour, reverse travel is assumed to occur from the Western Shore to the Eastern Shore via the Bay Bridge. The potential BRT routes were identified in consideration of existing travel patterns.

2.3.4 Rail Transit

This alternative would consist of construction of a new rail line and implementation of a new rail service between major destinations on the Eastern and Western Shores. It is assumed that a new Chesapeake Bay crossing would need to be constructed to support such a rail line. The Rail transit alternative includes consideration of both Heavy Rail Transit (HRT) and Light Rail Transit (LRT). HRT is a railway transit mode with the capacity for a heavy volume of traffic. It is typically characterized by high speed and rapid acceleration of passenger rail cars operating singly or in multi-car trains on fixed rails, with separate rights-of-way and high platform loading. LRT is a transit mode with a lower volume of traffic capacity compared to HTR, generally characterized by passenger rail cars operating singly or in short trains on fixed rails in shared or exclusive right-of-way, low or high platform loading, and power drawn from an overhead electric line[1].

As with the BRT Alternative, potential rail transit routes are assumed to service commuters traveling on Non-Summer Weekdays and for leisure travelers on Summer Weekends traveling to/from the Eastern Shore beach areas. For Non-Summer Weekdays, transit travel is assumed to occur from the Eastern Shore, i.e. Kent Island and Queen Anne's County, to the Western Shore, i.e. Annapolis, Baltimore, and Washington DC, via the Bay Bridge in the AM Peak Hour. In the PM Peak Hour, reverse travel is assumed to occur from the Western Shore to the Eastern Shore via the Bay Bridge.

3.0 ENVIRONMENTAL INVENTORY

The environmental inventory portion of the screening identified natural, socioeconomic, and cultural resources present in the corridor alternatives. It should be emphasized that this environmental *inventory* does not reflect environmental *impacts*; rather, the inventory consists of the total amount of each resource present within each 2-mile wide corridor. Specific alignments are not being developed in detail during Tier 1; thus the environmental inventory is used as a useful

[1] Definitions for HRT and LRT are from the Federal Transit Administration (FTA) National Transit Database Glossary. https://www.transit.dot.gov/ntd/national-transit-database-ntd-glossary

indicator of the types of resources that would be present, their overall prevalence, and the magnitude of potential impacts in comparison to other corridor alternatives. Moreover, crossing alignments identified during Tier 2 would require a much smaller footprint than a two-mile wide corridor.

The environmental inventory is not intended to be a complete list of environmental resources present in the corridor alternatives. Rather, the resources included were identified to be broadly representative of the numerous different kinds of resources likely to be encountered, with an emphasis on resources with regulatory protection. Agency input was also considered in identifying the resources to include in this screening-level inventory. A more detailed inventory of environmental features covering additional resources within the CARA will be included in the DEIS and supporting environmental technical reports.

The MOAs were analyzed differently from the corridor alternatives because they are not location-specific. Potential environmental effects from MOAs were evaluated qualitatively, to compare the relative extent of resources likely to be affected.

For some resources, it was possible to determine that no avoidance could likely occur within a corridor alternative, such as where a resource covers the full width of the corridor alternative. However, for most resources, there may be opportunities to avoid and minimize impacts to resources based on the location of a specific alignment (identified during Tier 2). The criteria in the environmental inventory are listed below, followed by a more detailed description.

- Total Area of Corridor
- Sensitive Lands: Military, Parks and Wildlife Refuges
- Community: Residential Land Use, Priority Funding Areas, Low Income and Minority Census Tracts
- Prime Farmland
- Cultural Resources
- Aquatic Resources: Area of Open Water, Submerged Aquatic Vegetation, Natural Oyster Bars
- Wetlands, Perennial Streams, and Floodplains
- Terrestrial Habitat: Forested Land, Chesapeake Bay Critical Areas, Sensitive Species Project Review Areas
- Coastal Barrier Resources Act (CBRA) Protected Lands
- Description of Potential Indirect Effects

3.1 Total Area

The total area for each corridor is reported in acres. While this is not quantifying a specific environmental resource, it is a useful measure of comparison for the overall amount of land and water within a corridor, and thus the total area within which the various resources are distributed.

Because each corridor is 2 miles wide, the total area primarily differs based on the total length and different tie-in points of each corridor.

3.2 Sensitive Lands

An inventory of sensitive lands within the corridors was developed to include military installations, parks, and wildlife refuges. These are areas that would potentially constrain the location of improvements based on their ownership and/or use, and that would likely lead to major practical challenges for implementation of a corridor alternative as discussed in **Section 4.1.2**.

Military installations were included in the environmental inventory due to their sensitive institutional use. Acquiring military property and providing public access to the interior of a facility may be contrary to the mission of the installation. Furthermore, military installations also may have hazardous material considerations such as unexploded ordnance (UXO). Military facilities may in some cases be too large to feasibly avoid within a particular corridor. Area of military facilities is reported in acres.

Parks and wildlife refuges are afforded protection from Section 4(f) of the US Department of Transportation (USDOT) Act of 1966. Section 4(f) stipulates that any use of protected parks and wildlife refuges for transportation right-of-way, or detrimental impacts from the proximity of transportation facilities, must be avoided if there are feasible and prudent alternatives to that impact. Some properties such as working forestry lands or easement properties would potentially require further evaluation to determine if they qualify for Section 4(f) protection. Area of parks and wildlife refuges is reported in acres.

3.3 Community

An inventory of residential land use, priority funding areas (PFAs), and low-income and minority populations was conducted within the corridors. These metrics provide information on the presence of communities and other developed land uses, as well as presence of low income and minority populations.

Residential land use was identified based on the Maryland Department of Planning (MDP) statewide Land Use Land Cover (LULC) dataset from 2010 and is reported in acres. For this inventory, the analysis did not consider differences in density of residential land use.

PFAs are existing communities and places designated by local governments where investment is intended to support future growth. Presence of PFAs within a corridor indicates that new transportation infrastructure may be more compatible with planned land uses in the corridor. However, because PFAs also encompass areas with existing development, the presence of PFAs may also be correlated with a greater likelihood of direct impacts to developed areas. The PFAs are reported in acres.

Low-income and minority populations were identified based on US Census Tracts using the 2016 US Census American Community Survey (ACS) 5-year estimates. Census tracts were considered potential locations of low-income populations if the proportion of the population below the poverty level was either greater than 50 percent, or at least 10 percentage points higher than the statewide

average. Census tracts were considered to contain minority populations if the minority population was either greater than 50 percent, or at least 10 percentage points higher than the statewide average.

Executive Order 12898 and the US DOT/FHWA policies on environmental justice (EJ) require agencies and sponsors undertaking projects like a potential new Chesapeake Bay crossing to take steps to identify and address effects on minority and low-income populations, while ensuring EJ communities are provided opportunities for participation. The inventory of such communities includes the total number of census tracts with EJ populations identified that are within some portion of each corridor. Specific impacts to potential EJ communities will not be identified during Tier 1; more detailed analysis will occur during Tier 2.

3.4 Prime Farmland

Prime farmland is a designation by the US Department of Agriculture (USDA). Prime farmland soils and farmland of statewide importance were identified based on USDA Natural Resources Conservation Service (NRCS) soil mapping GIS data. Developed areas such as residential, commercial, industrial, or transportation land use based on the MDP LULC data were excluded, as they are not available for agricultural land use. Areas within PFAs were also excluded from this inventory, as they are designated for development rather than agricultural use. The inventory did not include existing agricultural use if it was not classified as prime farmland. The area of prime farmland within each corridor is reported in acres.

3.5 Cultural Resources

Cultural resources are subject to protection under Section 106 of the National Historic Preservation Act and Section 4(f) of the US Department of Transportation Act. The inventory of cultural resources included known historic buildings, historical districts, and archeological sites eligible for listing on the National Register of Historic Places (NRHP) and National Historic Landmarks (NHL). The cultural resource inventory was based on the number of NRHP-listed or eligible properties within each corridor. It should be noted that the overall study area has not been completely surveyed for cultural resources. Therefore, gaps in the data are likely to exist where the presence of cultural resources was not known based on readily available information from the Maryland Inventory of Historic Properties (MIHP) database. Less developed areas that have not been thoroughly surveyed, particularly on the Eastern Shore, are places where data gaps are likely to exist. Additional data will be sought for such areas within the CARA and documented in the EIS.

3.6 Aquatic Resources

The inventory of aquatic resources within the corridors included area of open water, area of submerged aquatic vegetation (SAV), and area of natural oyster bars reported in acres.

The area of open water was measured in acres and is based on 2010 LULC data from MDP.

The area of SAV was included as a measure of the presence of important natural aquatic habitat. Because SAV changes from year to year, the inventory included the most recent five years of SAV

growth as recorded in GIS data from the Maryland Department of the Environment (MDE) (2012-2016).

Natural oyster bars are important natural resources as part of healthy aquatic ecosystems, as well as economically important sources of oyster harvest. They are considered the most sensitive oyster resources because they are irreplaceable in their natural form. They were identified based on GIS data from the Maryland Department of Natural Resources (MDNR).

3.7 Wetlands, Perennial Streams, and Floodplains

Impacts to water resources such as wetlands, perennial streams, and 100-year floodplains are subject to state and federal laws such as the Clean Water Act, the Rivers and Harbors Act of 1899, and others. . Impacts to jurisdictional streams and wetlands require a permit from MDE and the US Army Corps of Engineers (USACE). The USACE permit process, as stated in Section 230.10(a), requires that there must be no "practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences."

Wetlands and floodplains within the corridors were quantified in acres, and the length of perennial streams reported in miles. Wetlands data was acquired from MDE via Maryland iMap, and perennial streams were quantified via the National Hydrography Dataset (NHD) from the US Geological Survey (USGS). Floodplains were identified using Federal Emergency Management Agency (FEMA) 100-Year floodplain mapping.

3.8 Terrestrial Habitat

The inventory of terrestrial habitat within the corridors included forested land, Chesapeake Bay Critical Areas, and Sensitive Species Project Review Areas (SSPRAs). Forested land was identified based on 2010 MDP LULC GIS data. Forest impacts would be subject to the Maryland Forest Conservation Act, Reforestation Law, and Roadside Tree Law. Forested land is reported in acres. The Chesapeake Bay Critical Area Protection Program was established in 1984 to limit development in the area of land within 1,000 feet of the tidal influence of the Bay to promote the overall environmental health of the Chesapeake Bay. These areas were identified using GIS data from MDE, reported in acres. SSPRAs represent the general locations of documented rare, threatened and endangered (RTE) species. The number and acreage of SSPRAs within each corridor is reported based on GIS data from MDNR.

3.9 Coastal Barrier Resources Act Protected Lands

The 1982 Coastal Barrier Resources Act (CBRA) was implemented to designate relatively undeveloped coastal barriers as ineligible for most new federal expenditures and financial assistance. There are two types of designations within the CBRA: System Units and Otherwise Protected Areas (OPAs). New federal expenditures including new or expanded roads are prohibited within System Units. CBRA mapping was obtained from US Fish and Wildlife Service (FWS) GIS data, and is reported in acres and number of system units.

3.10 Description of Potential Indirect Effects

The inventory includes a qualitative discussion of potential land use changes that may result from a new crossing. There are numerous factors that would influence potential land use changes resulting from a corridor, and it is not possible to determine precisely the changes in land use that would result from a new corridor. However, this discussion identified three factors that can assist in predicting the magnitude of potential indirect effects that may occur.

The first factor is location relative to undeveloped land and PFAs. Undeveloped land, such as farmland and forest, could be vulnerable to pressure for new development if a new crossing provides new access to that land. Locating a new crossing adjacent to PFAs may be more consistent with planned land uses.

The second factor was new access within commute distance of a major employment center. A typical commute time in Maryland is roughly 30 to 45 minutes, and generally areas within this 45-minute drive of an employment center would be expected to experience the highest demand for residential development. According to 2016 US Census American Community Survey 5-year estimates, the average commute time for workers age 16 and over in Maryland is 32 minutes. Drive times were approximated based on existing speed limits.

The third factor considered under this criterion is consistency with county master plans. This included whether each county master plan has considered the placement of a new crossing within that county, and whether such a crossing would be consistent with the goals and outcomes of the county master plan.

3.11 Results

The results of the environmental inventory are detailed in **Table 2**.

Table 2: Environmental Inventory

CORRIDOR	Total Area	Sensitive Lands		Community			Prime Farmland[2]	Cultural: National Register Listed or Eligible Properties	Aquatic Resources			Wetlands, Perennial Streams and Floodplain	Terrestrial Habitat			CBRA[4] Protected Lands	Description of Potential Indirect Effects
		Military	Parks and Wildlife Refuges	Residential Land Use	Priority Funding Areas	Low Income and Minority Census Tracts[1]			Area of Open Water	Submerged Aquatic Vegetation	Natural Oyster Bars		Forested Land	Chesapeake Bay Critical Areas	SSPRAs[3]		
Measure	**Acres**	**Acres**	**Acres**	**Acres**	**Acres**	**Count**	**Acres**	**Count**	**Acres**	**Acres**	**Acres**	• **Wetland Acres** • **Streams Miles** • **Floodplain Acres[5]**	**Acres**	**Acres**	**Acres (Count)**	**Acres**	• **Location relative to undeveloped land and Priority Funding Areas** • **New access within commute distance[6] of major employment center** • **Addressed by County Master Plans**
Corridor 1: Harford to Cecil	32,000	400	1,600	2,900	6,800	2	11,500	4	10,100	3,300	0	• 600 • 30 • 1,300	5,900	3,800	2,500 (7)	0	• Highly developed on the Western Shore, mostly PFAs. Eastern Shore is rural with smaller developed areas and PFAs. • New access on the Eastern Shore within commute distance of Baltimore area. • County master plans do not assume or recommend new crossing.
Corridor 2: Harford to Kent	37,000	4,700	300	2,800	9,000	1	16,100	4	6,300	400	0	• 2,800 • 40 • 3,500	9,200	4,700	5,600 (16)	0	• Highly developed on the Western Shore, mostly PFAs. Eastern Shore is rural with smaller developed areas and PFAs. • New access on the Eastern Shore within commute distance of Baltimore area. • Harford County master plan does not assume or recommend new crossing. Kent County master plan opposes new crossing.
Corridor 3: Baltimore to Kent (North)	43,000	1,800	700	3,400	6,900	0	17,800	12	12,400	600	100	• 1,800 • 60 • 5,900	8,600	7,700	7,500 (27)	0	• Highly developed on the Western Shore, mostly PFAs. Eastern Shore is rural with smaller developed areas and PFAs. • New access on the Eastern Shore within commute distance of Baltimore area. • Baltimore County and Queen Anne's master plans do not assume or recommend new crossing. Kent County master plan opposes new crossing.
Corridor 4: Baltimore to Kent (Central)	43,000	0	1,600	4,400	5,600	4	19,300	6	14,000	300	300	• 2,600 • 30 • 4,200	9,000	12,200	8,900 (22)	0	• Highly developed on the Western Shore, mostly PFAs. Eastern shore is rural with smaller developed areas and PFAs. • New access on the Eastern Shore within commute distance of downtown Baltimore. • Baltimore County and Queen Anne's master plans do not assume or recommend new crossing. Kent County master plan opposes new crossing.
Corridor 5: Baltimore to Kent (South)	38,000	0	1,500	3,100	3,900	0	14,900	2	15,200	200	1,600	• 1,900 • 30 • 3,400	6,200	7,800	4,400 (11)	0	• Highly developed on the Western Shore, mostly PFAs. Eastern Shore is rural with smaller developed areas and PFAs. • New access on the Eastern Shore within commute distance of downtown Baltimore. • Baltimore County and Queen Anne's master plans do not assume or recommend new crossing. Kent County master plan opposes new crossing.

CORRIDOR	Total Area	Sensitive Lands		Community			Prime Farmland[2]	Cultural: National Register Listed or Eligible Properties	Aquatic Resources			Wetlands, Perennial Streams and Floodplain	Terrestrial Habitat			CBRA[4] Protected Lands	Description of Potential Indirect Effects
		Military	Parks and Wildlife Refuges	Residential Land Use	Priority Funding Areas	Low Income and Minority Census Tracts[1]			Area of Open Water	Submerged Aquatic Vegetation	Natural Oyster Bars		Forested Land	Chesapeake Bay Critical Areas	SSPRAs[3]		
Measure	**Acres**	**Acres**	**Acres**	**Acres**	**Acres**	**Count**	**Acres**	**Count**	**Acres**	**Acres**	**Acres**	• **Wetland Acres** • **Streams Miles** • **Floodplain Acres[5]**	**Acres**	**Acres**	**Acres (Count)**	**Acres**	• **Location relative to undeveloped land and Priority Funding Areas** • **New access within commute distance[6] of major employment center** • **Addressed by County Master Plans**
Corridor 6: Anne Arundel to Kent	35,000	0	900	5,700	1,600	0	9,500	2	18,000	100	5,400	• 1,200 • 30 • 2,300	4,500	4,900	2,300 (17)	0	• Moderately developed on the Western Shore, with some PFAs. Eastern Shore is rural, with few developed areas and PFAs. • Would create new access on Eastern Shore within commute distance of Baltimore and Annapolis, relatively close to existing crossing. • Anne Arundel County master plan accounts for existing crossing, does not assume or recommend crossing in new location. Kent County master plan opposes new crossing.
Corridor 7: Existing Location of Bay Bridge	28,000	40	1,300	6,600	7,900	0	5,600	9 (2 National Historic Landmarks)	9,600	200	2,600	• 1,500 • 30 • 5,500	4,500	9,800	2,300 (22)	200 (1 System Unit)	• Moderately developed area on both shores with PFAs in close proximity. • Follows existing access to major employment centers; corridor parallels existing crossing. • Master Plans account for existing crossing. Queen Anne's does not assume or recommend new crossing. Anne Arundel County master plan supportive of increased capacity on US 50/301.
Corridor 8: Anne Arundel to Talbot	47,000	0	1,200	6,800	3,500	0	15,100	11	20,400	500	6,500	• 2,100 • 40 • 4,000	8,600	8,200	5,100 (17)	<100 (2 System Unit)	• Western shore is moderately developed with PFAs near Annapolis. Eastern Shore is mostly rural, with PFAs near St. Michaels and Easton. • New access on the Eastern Shore within commute distance of Annapolis, nearly within commute distance of Baltimore. • County master plans do not assume or recommend new crossing.
Corridor 9: Anne Arundel to Talbot	45,000	0	<100	5,000	1,900	0	13,100	5	21,500	1,900	8,600	• 1,200 • 30 • 6,300	7,000	11,100	4,100 (11)	0	• Western shore is mostly rural, with includes PFAs and development near Deale. Eastern Shore is rural with PFAs and development concentrated around Easton. • Western shore would have new connection to Easton. New connection to Eastern Shore, potentially within commute distance of Washington, DC vicinity. • County master plans do not assume or recommend new crossing.
Corridor 10: Calvert to Talbot	48,000	0	<100	7,600	4,600	0	10,400	11	23,400	700	9,600	• 1,000 • 40 • 3,000	8,000	6,800	2,700 (8)	300 (2 System Units)	• Western shore is largely rural with PFAs and development surrounding Chesapeake Beach. Eastern Shore is mostly rural with PFAs and development concentrated around Easton. • New connection to Eastern Shore, potentially within commute distance of Washington, DC area. • County master plans do not assume or recommend new crossing.

CORRIDOR	Total Area	Sensitive Lands		Community			Prime Farmland[2]	Cultural: National Register Listed or Eligible Properties	Aquatic Resources			Wetlands, Perennial Streams and Floodplain	Terrestrial Habitat			CBRA[4] Protected Lands	Description of Potential Indirect Effects
		Military	Parks and Wildlife Refuges	Residential Land Use	Priority Funding Areas	Low Income and Minority Census Tracts[1]			Area of Open Water	Submerged Aquatic Vegetation	Natural Oyster Bars		Forested Land	Chesapeake Bay Critical Areas	SSPRAs[3]		
Measure	**Acres**	**Acres**	**Acres**	**Acres**	**Acres**	**Count**	**Acres**	**Count**	**Acres**	**Acres**	**Acres**	• **Wetland Acres** • **Streams Miles** • **Floodplain Acres[5]**	**Acres**	**Acres**	**Acres (Count)**	**Acres**	• **Location relative to undeveloped land and Priority Funding Areas** • **New access within commute distance[6] of major employment center** • **Addressed by County Master Plans**
Corridor 11: Calvert to Dorchester (North)	48,000	0	100	5,100	4,000	2	17,700	3	17,800	1,400	4,300	• 4,000 • 30 • 6,200	12,300	6,500	9,300 (50)	300 (1 System Unit)	• Western shore is primarily rural with small developed areas and PFAs. Eastern Shore is rural, with development and PFAs surrounding Cambridge. • New connections on Western Shore to Cambridge. New connection to Eastern Shore would be nearly within typical commute to Washington DC area. • County master plans do not assume or recommend new crossing.
Corridor 12: Calvert to Dorchester (Central)	41,000	0	2,500	3,300	4,100	2	18,100	5	12,900	100	700	• 6,200 • 20 • 11,300	12,700	8,000	12,200 (52)	0	• Both shores largely undeveloped except for PFAs around Cambridge and other small towns. • Enhanced access to Cambridge and Patuxent Naval Air Station. • County master plans do not assume or recommend new crossing.
Corridor 13: Calvert to Dorchester (South)	43,000	0	5,000	1,400	1,200	0	19,200	2	8,800	300	100	• 7,800 • 30 • 14,100	16,600	13,200	22,800 (68)	600 (1 System Unit)	• Low intensity development along the Western Shore. Minimal development along the Eastern Shore through full corridor. • Enhanced access to Cambridge and Patuxent Naval Air Station. • County master plans do not assume or recommend new crossing.
Corridor 14: St. Mary's to Dorchester	54,000	500	5,600	3,100	5,200	2	4,400	12	28,700	1,200	4,300	• 4,500 • 40 • 15,400	8,300	8,700	8,600 (9)	500 (2 System Units)	• Low intensity development along the Western Shore with PFAs near Naval Air Station Patuxent. Largely undeveloped along the Eastern Shore with small PFAs. • Enhanced access to Cambridge and Patuxent Naval Air Station. • County master plans do not assume or recommend new crossing.

Notes: Calculations in Table 2 reflect an inventory of existing conditions within the study corridors and do not convey potential impacts from construction of a crossing.
There would be flexibility to avoid and minimize impacts to specific resources within the corridor; however, it is unlikely that all resources from any given category could be avoided if present in a corridor.
[1]Census Tracts with low income and/or racial or ethnic minority population either 50% or greater, or 10% above statewide average.
[2]Undeveloped prime farmland soils and farmland of statewide importance outside of Priority Funding Areas
[3]Sensitive Species Project Review Areas
[4]Coastal Barrier Resources Act
[5] FEMA 100-Year Floodplain
[6]Commute distance is estimated 45-minute drive or less to opposite shore

4.0 CORRIDOR ALTERNATIVE SCREENING PROCESS

The Bay Crossing Study Purpose and Need includes three elements: adequate capacity, dependable and reliable travel times, and flexibility to support maintenance and incident management at the existing Bay Bridge. Environmental responsibility and financial viability are additional considerations in the study. All three of these elements and both considerations were used as the basis for evaluating the corridor alternatives and the MOAs.

The Purpose and Need emphasizes that a new crossing within any proposed corridor needs to address existing and future traffic conditions at the existing Bay Bridge, taking into account both non-summer weekday and high-volume summer weekend conditions. A traffic analysis was conducted to analyze whether each corridor alternative could meet the Purpose and Need.

A two-phased screening approach was employed for the corridor alternative screening. The corridor alternative screening approach is summarized in the following list and detailed in the sections below. From the perspective of traffic relief and congestion management, the calculation of adequate capacity for summer weekend and non-summer weekday Average Daily Traffic (ADT), was an effective means of distinguishing the performance of the identified potential corridors relative to the stated BCS Purpose and Need. Assessment of this measure, in addition to identification of high-level practical challenges associated with existing land uses within the potential corridors helped narrow down the range of reasonable corridors. However, with respect to at least five of the potential corridors, additional traffic analysis and further land use considerations were recommended to further screen corridors for detailed analysis in the Tier 1 Draft EIS. Those additional factors are described below.

- Phase 1
    - Adequate Capacity
        - 2040 Summer Weekend Average Daily Traffic (ADT) at the Existing Crossing
        - 2040 Non-Summer Weekday ADT at the Existing Crossing
    - Practical Challenges: unavoidable impacts to major resources (such as Aberdeen Proving Ground or Blackwater National Wildlife Refuge)

Corridors that met the adequate capacity metric in the Phase 1 analysis were advanced to Phase 2.

- Phase 2
    - Dependable and Reliable Travel Times
        - 2040 Summer Weekend – Daily hours with queue length of 4 miles or greater
        - 2040 Non-Summer Weekday – Daily hours with queue length of 1 mile or greater
        - 2040 Summer Weekend – Hours with LOS E or F

    - 2040 Non-Summer Weekday – Hours with LOS E or F
  - Flexibility to Support Maintenance and Incident Management at the Existing Bridge: Additional travel time required to divert from the existing Bridge to a new crossing
  - Environmental Inventory, Indirect and Cumulative Effects
  - Financial Viability

Environmental and financial information was developed for all 14 corridors prior to the two-phase screening. Environmental considerations included information from the environmental inventory and the potential for indirect effects (described in **Section 3.0**). Financial considerations were assessed by analyzing engineering factors such as the length and complexity of each crossing. Sensitive lands identified in the environmental inventory were included in Phase 1 of the screening; other environmental and financial considerations were applied in Phase 2.

Section 4.1 and **Section 4.2** below provide a more detailed explanation of the screening criteria in Phase 1 and Phase 2, respectively. The results of the corridor alternative screening are discussed in **Section 5.0**.

4.1 Phase 1 Corridor Alternative Screening

For Phase 1, the quantitative measure of ADT in 2040 was first applied to measure each corridor alternative's ability to provide adequate capacity to reduce congestion at the existing Bridge. In addition to this essential traffic evaluation, other important practical considerations were included in Phase 1 to determine if one or more practical challenges rendered a proposed corridor alternative unreasonable, such as unavoidable impacts to Aberdeen Proving Ground or Blackwater National Wildlife Refuge. Upon completion of the Phase 1 analysis, corridor alternatives that met the capacity metric and did not demonstrate major practical challenges were evaluated in a Phase 2 analysis to further distinguish among the various proposed corridor alternatives.

4.1.1 Adequate Capacity to Relieve Congestion at the Existing Bridge

Corridor alternatives that would reduce the 2040 ADT at the existing Bridge below existing (2017) ADTs on either non-summer weekdays or summer weekends were deemed to meet the Purpose and Need element for adequate capacity. In 2017, the existing Bridge experienced ADT volumes of 118,600 vehicles per day (vpd) on summer weekends and 68,600 vpd on non-summer weekdays.

The traffic analyses used the 2017 existing conditions and modeled 2040 No-Build conditions for comparison. The traffic screening was based on travel demand forecasting using the Maryland Department of Transportation State Highway Administration (MDOT SHA) Maryland Statewide Transportation Model (MSTM). A more detailed description of the travel demand forecasting methodology will be documented in a separate technical memorandum.

The screening included modeled summer weekend traffic and non-summer weekday traffic because of the differing origin and destination (O&D) patterns corresponding to these time frames. Summer weekend ADT reflected the increased demand resulting from travelers to summer vacation destinations such as Ocean City, MD. Non-summer weekday ADT reflected more typical

conditions, with more of the demand from commuters. (A more detailed discussion of O&D data can be found in the *Purpose and Need Statement*.)

To understand how many vehicles would use each corridor alternative, the traffic projections were based on an unconstrained model that did not limit the corridor alternative in capacity or access. Traffic estimates included existing and currently planned land use. The traffic projections were based on currently approved future land use and regional travel demand modeling.

4.1.2 Practical Challenges

An additional consideration for Phase 1 was whether a corridor alternative could face major practical challenges due to its location. Corridor alternatives that would pass through large areas of sensitive lands, such as Aberdeen Proving Ground or Blackwater National Wildlife Refuge, were identified in this step. While numerous smaller areas of sensitive or protected land were identified in the environmental inventory, this step identified only sensitive or protected lands that would extend the entire two mile width of a corridor and well beyond, thus resulting in no potential for avoidance. Smaller areas of sensitive or protected land would not pose the same degree of practical challenge as those that encompass the full width of a corridor.

4.2 Phase 2 Corridor Alternative Screening

In Phase 2, the corridor alternatives that met the Phase 1 capacity criteria were evaluated to determine how they would impact performance at the existing crossing based on queue lengths/durations, hours of unacceptable levels of service (LOS)[2], and diversion travel times. This Phase 2 analysis also considered financial viability and environmental factors present in each corridor alternative, including the potential for indirect environmental effects. Queue lengths/durations and hours of unacceptable LOS were used to measure the Purpose and Need element of dependable and reliable travel times; diversion travel times were used to measure the Purpose and Need element of flexibility to support maintenance and incident management at the existing Bridge.

4.2.1 Dependable and Reliable Travel Times

Travel times during congested conditions are highly variable, so queue lengths and durations were used to provide an assessment of the Purpose and Need element of dependable and reliable travel times. The analysis considered the duration of time that queue lengths of more than one mile on non-summer weekdays and more than four miles on summer weekends would be present at the existing Bridge in 2040. Currently, the queue lengths at the existing Bridge do not extend more than one mile for more than one hour on non-summer weekdays, and not more than four miles for more than one hour on summer weekends. The one-mile for more than one hour and four-mile for more than one hour criteria were selected to allow direct comparison, as these are the queue lengths/durations that occur in existing conditions. These queue lengths are expected to worsen by 2040 in the No-Build condition, with the existing Bridge expected to experience queue lengths

[2] Level of Service (LOS) is used to describe traffic flow on a scale of "A" to "F". ("A" is the best and "F" is the worst).

extending more than one mile for nine hours on non-summer weekdays and extending four miles or greater for nine hours on summer weekends. Corridor alternatives with one-mile and four-mile queues for lengths/durations that are not greater than one hour above existing conditions were deemed to sufficiently meet this Purpose and Need element.

The number of hours the existing Bridge will experience LOS of E or F in 2040 was evaluated to provide a comparison of the ability of the corridor alternatives to meet the need of improving travel times. Currently, the Bay Bridge experiences 3 hours with LOS E or F on non-summer weekdays (all in the eastbound direction) and 19 hours on summer weekends (with 10 hours in the eastbound direction and 9 hours in the westbound direction). This is expected to worsen by 2040 to 7 hours on non-summer weekdays (with 5 hours in the eastbound direction and 2 hours in the westbound direction) and 22 hours on summer weekends (with 12 hours in the eastbound direction and 10 hours in the westbound direction). (See **Table 3**.)

Table 3: Hours with LOS E or F

Timeframe	Non-Summer Weekdays – Hours with LOS E or F			Summer Weekend – Hours with LOS E or F		
	Eastbound	Westbound	Total	Eastbound	Westbound	Total
Existing (2017)	3	0	3	10	9	19
No-Build (2040)	5	2	7	12	10	22

4.2.2 Flexibility to Support Maintenance and Incident Management at the Existing Bridge

Flexibility to support maintenance and incident management at the existing Bridge was measured by estimating the additional travel time required for vehicles diverted from the existing Bridge to a new crossing in the event of a full or partial bridge closure. Diversion was measured from the US 50/US 301 split near Grasonville on the Eastern Shore to the US 50/US 301/MD 3 interchange near Bowie on the Western Shores. The current travel time between these end points is approximately 36 minutes. This 36-minute travel time was used as a benchmark for evaluation of travel time diversion. Given that the goal of a potential new crossing is to improve flexibility, it would not be reasonable for a corridor alternative to more than double the existing travel time between these end points to divert from the existing Bridge to a new crossing. Such a crossing, therefore, would not sufficiently meet the Purpose and Need element of providing an adequate level of flexibility for maintenance and incident management.

Corridor alternatives located the furthest from the existing Bridge would provide minimal opportunity for traffic diversion during maintenance and incident management. Corridor alternatives closer to the existing Bridge would be better for diverting traffic during maintenance.

4.2.3 Environmental Considerations

Environmental responsibility is an additional consideration of the Purpose and Need. Each corridor alternative contains substantial environmental resources, as identified in the environmental inventory. Additionally, a new crossing within a corridor would likely lead to indirect effects on environmental resources resulting from pressure for land use changes and new

development. The extent of the pressure would vary based on factors such as proximity to major employment centers and availability of undeveloped land.

The inventory of environmental features and evaluation of potential indirect and cumulative effects were completed for all corridors, regardless of whether they were eliminated in Phase 1 of the screening. As shown in Table 2, all corridors contain substantial environmental resources. Because the composition of the inventory within each corridor is markedly different, a suitable differentiation between corridors on the basis of environmental considerations could not be made at this stage.

In certain situations, environmental resources considered in the inventory such as military land and Blackwater NWR spanning the full width of a corridor were given particular consideration due to the practical difficulties they would pose, as described in **Section 4.1.2.**

4.2.4 Cost and Financial Considerations

In addition to the needs described in the Purpose and Need, financial viability was identified as an additional important project consideration. Cost and financial considerations were developed for all corridors, regardless of whether they were carried forward past Phase 1 of the screening, to ensure complete information for the full range of corridors. The cost of a new crossing would be a key factor in the financial viability of a new crossing. Cost estimates have not yet been prepared for the corridor alternatives, so engineering factors were used to compare the potential magnitude of cost among alternatives. The cost and financial considerations are presented in two categories: complexity of crossing and scope of approach infrastructure. Cost and financial considerations are outlined in the list below, then described in more detail.

- Complexity of Crossing
    - Approximate Length of Chesapeake Bay Crossing
    - Approximate Length of Deep Water Crossing
    - Number of Channel Crossings
- Scope of Approach Infrastructure
    - Approximate Length of On-Land Improvements
    - Approximate Length of Other Water Crossings

Complexity of crossing was intended to evaluate the overall degree of complexity required to build the crossing of the Chesapeake Bay. It is expected that corridor alternatives that would require crossings of greater length, with longer deep water crossings, and with more channel crossings would require greater expense to construct.

The approximate length of Chesapeake Bay crossing was estimated by measuring the distance across the Chesapeake Bay along the centerline of each corridor alternative. The result is presented in miles.

The approximate length of deep water crossing was defined as the longest continuous portion of the crossing where the water depth is greater than 50 feet. The deep water area was estimated

using GIS bathymetry contour data. Deep water crossings are anticipated to be generally more complex to construct, requiring deeper piers and longer spans (for bridges) or deeper tunnels relative to shallower areas of the Bay. The result is presented in miles.

Navigational channels were identified using digital nautical navigation mapping along the Chesapeake Bay and adjacent waterways within the corridor alternatives. Channel crossings would potentially increase the complexity of the structures required because a potential new crossing would need to achieve adequate clearance to maintain navigability. This could potentially require higher structures and longer spans in these locations.

The scope of approach infrastructure criteria was intended to estimate the overall length and complexity of infrastructure required to tie into logical termini on both sides of the Bay.

Estimated length in miles of the on-land improvements was measured along the centerline of the corridor alternative and included all areas that are not major water crossings. The result is presented in miles.

The approximate length of other water crossings is the total distance required to cross all other major waterways aside from the Chesapeake Bay. The total was estimated based on 2010 MDP LULC data, so only waterways which are large enough to be included as open water in the LULC dataset are counted. Minor crossings such as small streams were not included. The result is presented in miles.

5.0 CORRIDOR ALTERNATIVE SCREENING RESULTS

5.1 Phase 1 Screening Results

Table 4 includes the results of the Phase 1 traffic analysis, measuring each corridor alternative's ability to meet the project need of providing adequate capacity to relieve congestion at the existing Bay Bridge. The existing conditions (2017) and No-Build 2040 scenario are included for comparison.

Table 4: Screening Results – 2040 ADT

CORRIDOR ALTERNATIVE	2040 Summer ADT				2040 Weekday ADT			
	Existing Bridge	Existing Bridge: Change from 2017	Proposed Crossing	Combined Crossings	Existing Bridge	Existing Bridge: Change from 2017	Proposed Crossing	Combined Crossings
Measure	ADT	Change in ADT	ADT	ADT	ADT	Change in ADT	ADT	ADT
Existing (2017)	118,600	N/A	N/A	118,600	68,600	N/A	N/A	68,600
No-Build (2040)	135,300	+16,700	N/A	135,300	84,300	+15,700	N/A	84,300
Corridor 1	130,300	+11,700	36,400	166,700	82,800	+14,200	16,000	98,800
Corridor 2	128,400	+9,800	32,700	161,100	81,900	+13,300	11,100	93,000
Corridor 3	123,500	+4,900	33,900	157,400	78,500	+9,900	10,700	89,200
Corridor 4	121,300	+2,700	35,200	156,500	76,600	+8,000	12,000	88,600
Corridor 5	116,600	-2,000	40,800	157,400	73,600	+5,000	15,000	88,600
Corridor 6	111,200	-7,400	45,700	156,900	69,600	+1,000	18,200	87,800
Corridor 7	79,700	-38,900	79,700	159,400	44,900	-23,700	44,900	89,800
Corridor 8	104,300	-14,300	55,200	159,500	68,100	-500	20,000	88,100
Corridor 9	118,300	-300	36,800	155,100	76,900	+8,300	9,100	86,000
Corridor 10	121,300	+2,700	32,200	153,500	78,600	+10,000	7,100	85,700
Corridor 11	125,300	+6,700	25,700	151,000	80,500	+11,900	5,000	85,500
Corridor 12	127,200	+8,600	22,300	149,500	81,500	+12,900	4,100	85,600
Corridor 13	129,000	+10,400	18,400	147,400	82,700	+14,100	2,900	85,600
Corridor 14	133,000	+14,400	8,500	141,500	83,800	+15,200	1,200	85,000

Note: all ADTs are presented in vehicles per day (vpd)

The traffic screening results show that corridor alternatives closer to the existing Bay Bridge would be more effective at diverting traffic from the existing Bridge to a new crossing. While most of the corridor alternatives would provide some benefit compared to the 2040 No-Build scenario, few of the corridor alternatives would provide relief compared to existing conditions. Thus, for most of the corridor alternatives, traffic congestion at the Bay Bridge would continue to worsen through 2040 even with a new crossing.

The Phase 1 corridor alternative screening traffic analysis results showed that the corridor alternatives located closest to the existing location (which is within Corridor 7) would divert the most traffic away from the existing Bay Bridge. Most corridor alternatives, particularly those farthest away from the existing Bridge, would not decrease traffic in 2040 on the existing Bay Bridge relative to existing ADT. Specifically, Corridors 1 through 4 and Corridors 10 through 14 would not reduce traffic (ADT) at the existing Bridge to below existing levels on either non-summer weekdays or summer weekends; therefore, they do not meet the Purpose and Need element of providing adequate capacity to reduce congestion at the existing Bridge.

Only Corridors 5, 6, 7, 8 and 9 would reduce traffic volumes at the existing Bay Bridge on summer weekends in 2040 to below existing levels, and only Corridors 7 and 8 would reduce traffic volumes at the existing Bay Bridge on non-summer weekdays to below existing levels. Corridors 5, 6, 7, 8 and 9 therefore meet the Purpose and Need element of providing adequate capacity by reducing 2040 ADT at the existing Bridge to below existing levels on non-summer weekdays and/or summer weekends.

Figure 3 shows the 2040 change from existing ADT at the Bay Bridge for both non-summer weekday (blue) and summer weekend traffic (orange), based on the information in **Table 4**. The bars that extend upward show an increase in 2040 traffic relative to existing conditions, and the bars that extend downward show a decrease in 2040 traffic relative to existing conditions.

Figure 4 shows the non-summer weekday traffic volumes on the Bay Bridge and the new crossing for each corridor alternative. This shows the total volumes of traffic that would be using the existing crossing for each corridor alternative, and the No-Build. **Figure 5** shows the same for summer weekend traffic.

The northernmost corridor alternatives would see an increase in total volume to a greater extent than the southernmost crossings, due to diversion of traffic from other northern routes. While this may provide some benefit to those other northern routes, these corridor alternatives would not support the goal of relieving congestion at the existing Bay Bridge.

Corridor 2 and Corridor 13 would each have major practical challenges due to their location. Corridor 2 would pass through the Aberdeen Proving Ground, a United States Army facility, with no apparent potential for avoidance. Corridor 13 would pass through Blackwater National Wildlife Refuge, with limited opportunity for avoidance of the resource.

Because they would all reduce 2040 ADT below current levels at the existing Bridge on non-summer weekdays and/or summer weekends, and would not have any known major practical challenges, Corridors 5, 6, 7, 8 and 9 were further evaluated in Phase 2 screening.

Figure 3: Change in ADT at the Bay Bridge between Existing Conditions and 2040 (vpd)

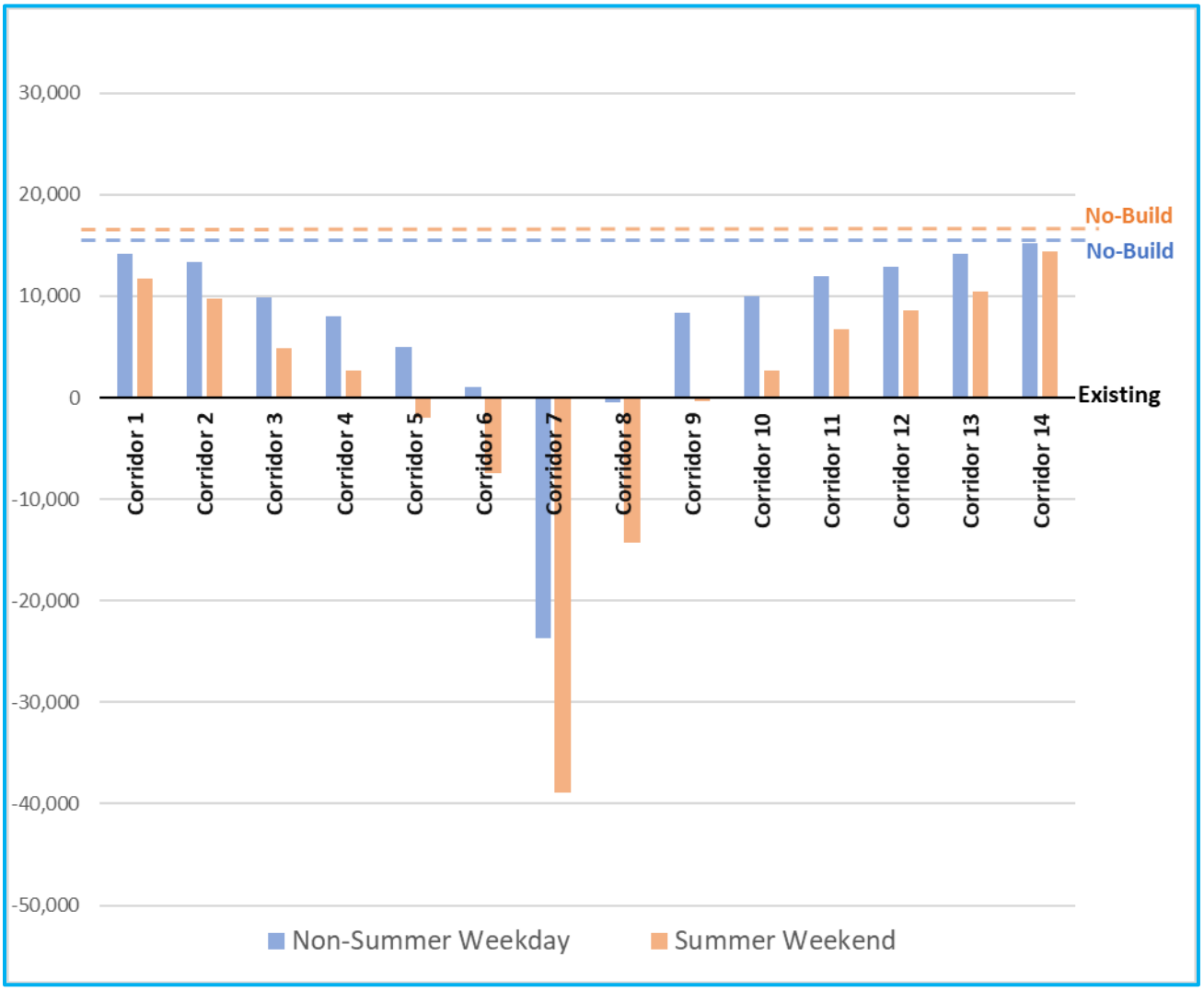


Figure 4: Non-Summer Weekday Traffic Volumes (vpd)

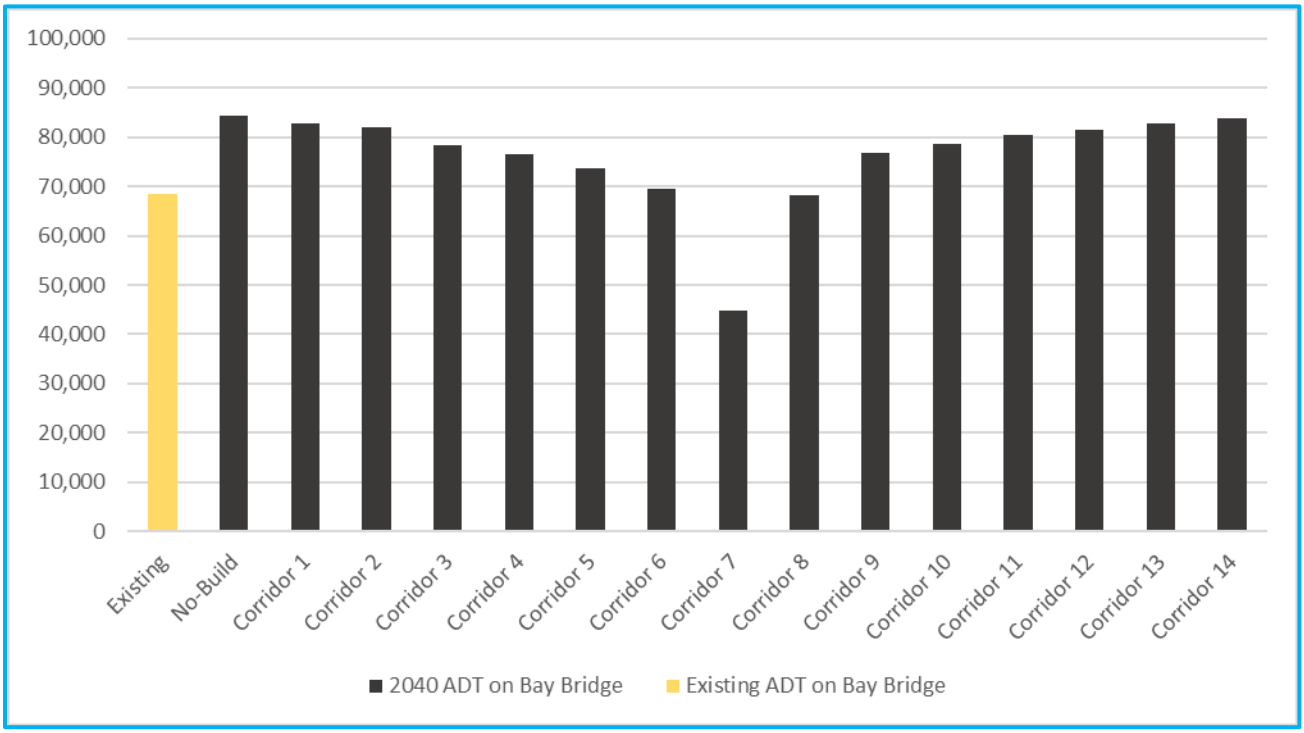
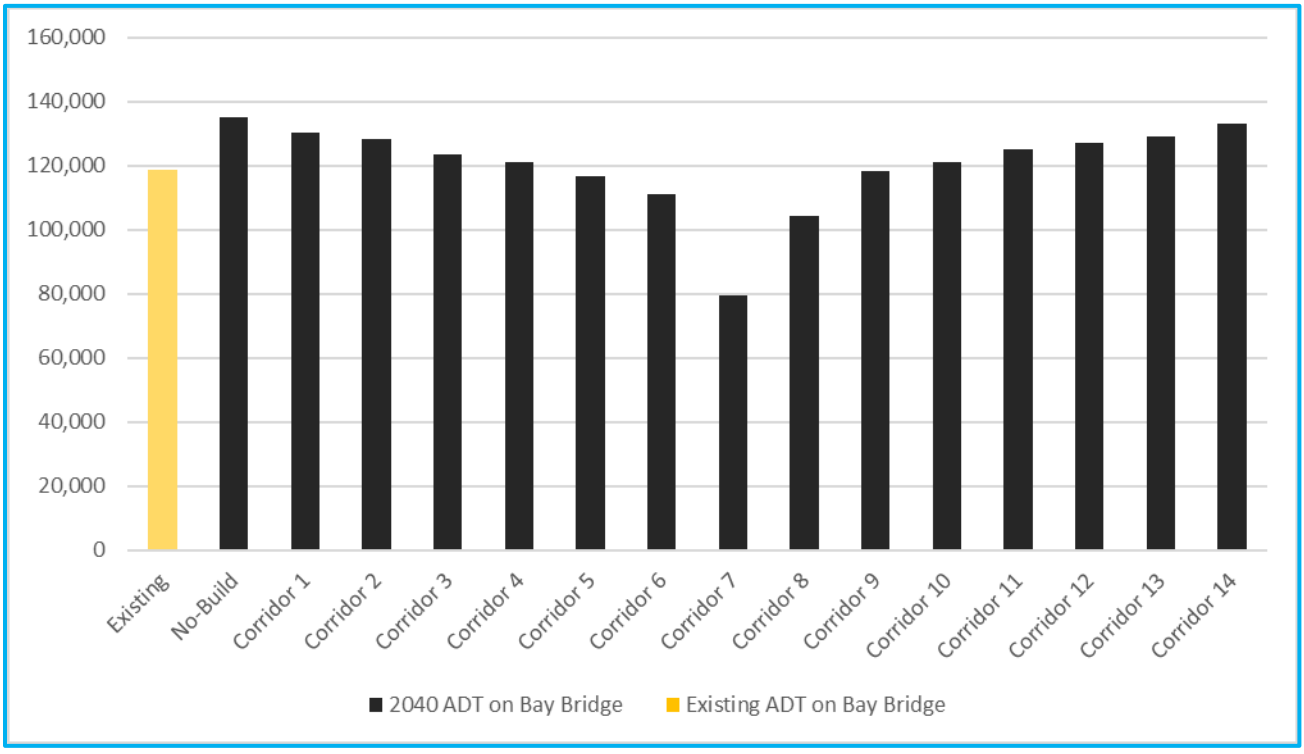


Figure 5: Summer Weekend Traffic Volumes (vpd)



5.2 Phase 2 Screening Results

The Phase 2 screening of Corridors 5, 6, 7, 8 and 9 showed that queue lengths/durations and hours with LOS of E or F increase as the corridor alternatives get further away from the existing Bridge. Additionally, corridor alternatives located closer to the existing Bridge would provide better flexibility to support maintenance and incident management at the existing Bridge because traffic could more easily divert to a new crossing.

With Corridor 7, future queue lengths/durations at the existing Bridge would be comparable to existing conditions. Queue lengths/durations for Corridors 6 and 8 would be similar to those for Corridor 7 on summer weekends and would have a slightly greater length/duration on non-summer weekdays (**See Table 5**). Corridors 5 and 9 would have queue lengths/durations similar to those for Corridors 6, 7, and 8 on summer weekends, but would have substantially greater queue lengths/durations on non-summer weekdays compared to existing conditions. Therefore Corridors 5 and 9 would not meet the project need to provide dependable and reliable travel times.

Table 5: Queue Lengths/Durations

Corridor Alternative	Non-Summer Weekday – Hours with 1 Mile Queue or Greater	Summer Weekend – Hours with 4 Mile Queue or Greater
5	3	0
6	1	0
7	0	0
8	1	0
9	6	1

Corridor 7 would result in the fewest hours with LOS E or F at the existing Bridge, with none in either direction in 2040 on non-summer weekdays (a reduction of three hours total) and none in either direction on summer weekends (a reduction of 19 hours total). Each of the other corridor alternatives would experience a minimum of 4 hours of LOS E or F in 2040 on non-summer weekdays (an increase of one hour total) and a minimum of 10 hours of LOS E or F on summer weekends (a decrease of 9 hours total). The change in hours of LOS E or F at the existing Bridge is shown on **Table 6**.

Table 6: Hours with LOS E or F at the Existing Bridge

Corridor Alternative	Non-Summer Weekday Hours* with LOS E or F (Change from Existing)	Summer Weekend Hours* with LOS E or F (Change from Existing)
5	+2	-1
6	+1	-5
7	-3	-19
8	+1	-9
9	+2	-1

**Total of eastbound and westbound hours combined*

If traffic needed to divert from the existing Bay Bridge, Corridor 7 would provide the shortest alternate route, with essentially the same travel time as the existing Bay Bridge (36 minutes). Corridors 6 and 8 would also have acceptable diversion times, as each corridor alternative would increase travel times by approximately 26 minutes. Corridors 5 and 9 would increase travel times by approximately 40 to 43 minutes. **Table 7** presents the additional travel times for diversion. Because Corridors 5 and 9 would more than double the existing travel times for traffic diverted to a new corridor alternative in the event of a closure on the existing Bridge, they would not sufficiently meet the Purpose and Need element of flexibility to support maintenance and incident management.

These analyses focused on the crossings of the Bay in each corridor, rather than on their approach roadways. Thus, potential closures on those approach roadways were not considered. However, it should be noted that Corridor 7 is unique among the corridors, in that it contains the existing Bay Bridge and its approach roadways on US 50/US 301. Potential alignments within the corridors have not been studied in Tier 1; however, a new Bay crossing in Corridor 7 could conceivably utilize existing US 50/US 301 for much of its approach. If this were to be the case, and if a closure were to occur on the US 50/US 301 approach rather than on the Bay crossing itself, both crossings (the existing Bay Bridge and a new crossing) could be closed. If a Tier 2 Study results from this Tier 1 Study, and if Corridor 7 is selected for additional analysis in that Tier 2 Study, this possibility would be considered in the development and analysis of alternative alignments.

Table 7: Diversion Travel Times

Corridor Alternative	Additional Travel Time for Diversion (min)
5	43
6	26
7	0
8	26
9	40

In summary, Corridors 6, 7, and 8 meet all the Purpose and Need elements. Corridor 7 meets the Purpose and Need to a greater extent than all other corridors as a result of the substantial impact on queue lengths and duration, improved LOS at the existing Bridge, and the minimal additional travel time for diversion. Corridors 5 and 9 do not sufficiently meet all of the Purpose and Need elements due to excessive diversion travel times resulting in poor flexibility to support maintenance and incident management. Corridors 5 and 9 also provide minimal improvement to dependable and reliable travel times, as demonstrated by the queue lengths/durations and hours of LOS E or F. These results are summarized in the bullets below.

Corridor 6

- Reduces the duration of unacceptable LOS at the existing Bay Bridge on summer weekends but not on non-summer weekdays.
- Relieves congestion at the existing Bay Bridge on summer weekends but not on non-summer weekdays.
- Reduces backups at the existing Bay Bridge on summer weekends and non-summer weekdays.
- Provides a more efficient diversion route than Corridor 5 and Corridor 9, but not as efficient as Corridor 7.
- Less compatible with existing land-use patterns, resulting in greater potential for indirect effects.

Corridor 7

- Best reduces the duration of unacceptable LOS on summer weekends and non-summer weekdays.
- Best relieves congestion at the existing Bay Bridge compared to all other corridors on both non-summer weekdays and summer weekends.
- Reduces backups at the existing Bay Bridge on summer weekends and non-summer weekdays.
- Provides the best diversion route, requiring less additional travel time for diversion from the Bay Bridge compared to Corridor 5, Corridor 6, Corridor 8 and Corridor 9.
- More compatible with existing land-use patterns, resulting in fewer indirect effects.

Corridor 8

- Reduces the duration of unacceptable LOS at the existing Bay Bridge on summer weekends but not on non-summer weekdays.
- Relieves congestion at the existing Bay Bridge on both non-summer weekdays and summer weekends.
- Reduces backups at the existing Bay Bridge on summer weekends and non-summer weekdays.
- Provides a more desirable diversion route than Corridor 5 and Corridor 9, but not as efficient as Corridor 7.
- Less compatible with existing land-use patterns, resulting in greater potential for indirect effects.

5.2.1 Environmental Considerations

The environmental inventory results (see **Table 2**) show that all the corridor alternatives contain substantial environmental resources due to the size of the corridors (two miles wide and 22 to 43 miles long). However, the distribution of features is noticeably different among the corridors,

depending largely on existing land uses, geographic distribution, and the location along the Chesapeake Bay. There is not a clear pattern nor any outlier corridors with substantially fewer resources.

Some corridor alternatives, such as Corridor 7, include a smaller area and thus somewhat smaller resource inventory overall due to shorter crossings or less infrastructure required to connect to logical termini. Other corridors included greater overall area due to longer crossings, and/or more on-land infrastructure required to connect to logical termini. Corridor 8, for example, required a longer overall length than Corridors 5, 6, 7 and 9 due to both a relatively long crossing and a lack of four-lane infrastructure on either side of the Bay in its vicinity for suitable tie-in points. (More detailed discussion of corridor length is included in **Section 5.2.2** below. Discussion of corridor development and tie-in points is presented in **Section 2.2**.) However, in most cases, each corridor contains high numbers of some resources and low numbers of other resources, making them difficult to distinguish on the basis of the environmental inventory.

A new crossing within a corridor could lead to indirect effects on environmental resources resulting from pressure for land use changes and new development. The extent of the pressure would vary based on factors such as new access in proximity to a major employment center and availability of undeveloped land. While any crossing will have indirect effects, Corridors 3, 4, and 5 would have the greatest potential to induce indirect and cumulative effects from new development on the Eastern Shore due to their proximity to the Baltimore Metropolitan area. A substantial number of comments received from the public and public officials expressed similar concerns about the potential for induced development and indirect effects. These concerns have led to many public comments regarding the detrimental effects of a new crossing in Kent County. Corridors 6, 7, 8 and 9 do not have the same potential for indirect effects because they are further from the Baltimore Metropolitan area, closer to the existing crossing, and would not pass through as much farmland on the Eastern Shore that is potentially vulnerable to development. Consideration of the direct and indirect effects of the CARA will be further developed in the Tier 1 EIS.

5.2.2 Cost and Financial Considerations

As shown in **Table 8**, the corridor alternatives range in total length from approximately 22 miles (Corridor 7) to 43 miles (Corridor 14). The length of the Bay crossings range from approximately 4 miles (Corridors 2 and 7) up to 17 miles (Corridor 14). The length of on-land improvements ranges from approximately 14 miles (Corridor 6) up to 26 miles (Corridor 13). A longer corridor alternative would be more expensive to construct, as would a longer deep water crossing.

In general, the construction of any new crossing would cost in the billions of dollars. As such, it is important that any corridor alternative would be able to sufficiently meet the Purpose and Need for the project and provide a level of improvement that would justify such a substantial investment.

Table 8: Cost and Financial Considerations

CORRIDOR ALTERNATIVE	Complexity of Crossing			Scope of Approach Infrastructure		Total Corridor Length
	Approximate Length of Chesapeake Bay Crossing	Approximate Length of Deep Water Crossing	Number of Channel Crossings	Approximate Length of On-Land Improvements	Approximate Length of Other Water Crossings	
Measure	**Miles**	**Miles**	**Count**	**Miles**	**Miles**	**Miles**
Existing	4	2	3	N/A	N/A	N/A
Corridor 1	7	0	2	18	1	25
Corridor 2	4	0	2	24	2	29
Corridor 3	5	0	1	24	6	34
Corridor 4	8	0	3	23	3	34
Corridor 5	9	0	6	19	3	30
Corridor 6	11	0	2	14	3	28
Corridor 7	4	2	3	17	1	22
Corridor 8	12	2	3	21	4	37
Corridor 9	11	2	7	19	5	35
Corridor 10	10	1	4	19	8	37
Corridor 11	13	2	5	24	1	38
Corridor 12	9	2	3	23	1	33
Corridor 13	6	2	3	26	2	34
Corridor 14	17	3	2	22	4	43

Note: All corridor alternatives are included for comparison. Lengths are rounded to the closest mile. Gray shaded rows are corridor alternatives evaluated in Phase 2 of the corridor alternative screening.

5.3 Summary of Corridor Alternative Screening Results

The corridor alternative screening results are summarized in **Table 9**. Corridors 6, 7, and 8 are recommended to be carried forward, and are highlighted in **Table 9**. The No-Build Alternative will also be retained for additional study and, as such, is also highlighted.

Table 9: Corridor Alternative Screening Recommendations Summary

Corridor Alternative	Status	Rationale
No-Build	**Retain**	The No-Build Alternative would not relieve traffic congestion and improve travel times on the existing Bay Bridge and would not impact environmental resources. The No-Build Alternative will be retained throughout the NEPA process to serve as a baseline of comparison. The No-Build Alternative includes existing TSM/TDM measures such as contraflow lanes on the existing Bridge, as well as any planned and funded TSM/TDM measures such as automated contraflow lanes.

Corridor Alternative	Status	Rationale
1	Eliminate (Phase 1)	Corridor 1 would not draw enough traffic to relieve traffic congestion on the existing Bay Bridge relative to existing conditions and would therefore not meet the need of providing adequate capacity. Weekday non-summer crossings at the existing Bridge would increase by 14,200 vpd and summer weekend crossings would increase by 11,700 vpd over existing conditions. Corridor 1 contains substantial environmental resources, including 3,300 acres of Submerged Aquatic Vegetation (SAV), the highest among all corridors, and 1,600 acres of parks and wildlife refuges. Corridor 1 does not meet the Bay Crossing Study Purpose and Need.
2	Eliminate (Phase 1)	Corridor 2 would not draw enough traffic to relieve traffic congestion on the existing Bay Bridge relative to existing conditions and would therefore not meet the need of providing adequate capacity. Weekday non-summer crossings at the existing Bridge would increase by 13,300 vpd and summer weekend crossings would increase by 9,800 vpd over existing conditions. Corridor 2 passes through the Aberdeen Proving Ground, a United States Army facility located adjacent to Aberdeen, Maryland, with no apparent potential for avoidance resulting in major practical challenges. Corridor 2 contains substantial environmental resources, including 16,100 acres of prime farmland. Corridor 2 does not meet the Bay Crossing Study Purpose and Need.
3	Eliminate (Phase 1)	Corridor 3 would not draw enough traffic to relieve traffic congestion on the existing Bay Bridge relative to existing conditions and would therefore not meet the need of providing adequate capacity. Weekday non-summer crossings at the existing **B**ridge would increase by 9,900 vpd and summer weekend crossings would increase by 4,900 vpd over existing conditions. Corridor 3 would potentially cause major indirect effects on the Eastern Shore resulting from increased demand for urban development. Corridor 3 would create a direct new connection from the Baltimore area employment center to Kent County, and expose large areas of undeveloped farmland to substantial new pressure for development. Corridor 3 contains substantial environmental resources, including 17,800 acres of prime farmland and 60 miles of perennial streams. Corridor 3 does not meet the Bay Crossing Study Purpose and Need.

Corridor Alternative	Status	Rationale
4	Eliminate (Phase 1)	Corridor 4 would not draw enough traffic to relieve traffic congestion on the existing Bay Bridge relative to existing conditions and would therefore not meet the need of providing adequate capacity. Weekday non-summer crossings at the existing Bridge would increase by 8,000 vpd and summer weekend crossings would increase by 2,700 vpd over existing conditions. Corridor 4 could potentially cause major indirect effects on the Eastern Shore resulting from increased demand for urban development. Corridor 4 would create a direct new connection from the Baltimore area employment center to Kent County, and expose large areas of undeveloped farmland to substantial new pressure for development. Corridor 4 contains substantial environmental resources, including 1,600 acres of parks and wildlife refuges, 19,300 acres of prime farmland, and 12,200 acres of Chesapeake Bay Critical Area. Corridor 4 does not meet the Bay Crossing Study Purpose and Need.

Corridor Alternative	Status	Rationale
5	Eliminate (Phase 2)	Corridor 5 would provide some traffic benefit on summer weekends, but weekday non-summer traffic would increase compared to existing conditions on the Bay Bridge. Summer weekend crossings at the existing Bridge would be reduced by 2,000 vpd over existing conditions. Weekday non-summer crossings at the existing Bridge would result in an increase of 5,000 vpd over existing conditions. Because it improves summer weekend ADT below existing conditions, Corridor 5 is considered to meet the need for adequate capacity. Corridor 5 would not result in greater queue lengths/durations at the existing crossing on summer weekends, but on non-summer weekdays, queues longer than 1 mile would be expected for 3 hours. This would be greater queue lengths/durations than currently occurs at the existing Bridge. In addition, Corridor 5 would be expected to have LOS E or LOS F conditions for 5 hours on non-summer weekdays (with 3 hours in the eastbound direction and 2 hours in the westbound direction) and 18 hours on summer weekends (with 10 hours in the eastbound direction and 8 hours in the westbound direction). This would be a greater total number of hours than at the existing Bridge today on non-summer weekdays and a slight reduction on summer weekends. This minimal reduction of one hour of LOS E or F at the existing Bridge, combined with the expected increase on non-summer weekdays, is not considered reasonable particularly in comparison to Corridors 6, 7, and 8. Therefore, Corridor 5 would not sufficiently meet the need for dependable and reliable travel times. Corridor 5 would require an estimated additional travel time of 43 minutes for vehicles diverted from the existing Bridge, resulting in a total travel time of 79 minutes. Because this would more than double the existing travel time of 36 minutes, Corridor 5 does not sufficiently meet the need for flexibility to support maintenance and incident management at the existing Bridge. Corridor 5 contains substantial environmental resources including 14,900 acres of prime farmland, 6,200 acres of forested land, 15,200 acres of open water, and 1,500 acres of parks and wildlife refuges. Corridor 5 could potentially cause major indirect effects on the Eastern Shore resulting from increased demand for urban development. Corridor 5 creates a direct new connection from the Baltimore area employment center to Kent County, and exposes large areas of undeveloped farmland to substantial new pressure for development. Corridor 5 does not meet the Bay Crossing Study Purpose and Need.

Corridor Alternative	Status	Rationale
6	**Retain**	Corridor 6 would provide traffic benefit on summer weekends, but weekday non-summer traffic would increase compared to existing conditions on the Bay Bridge. Summer weekend crossings would be reduced by 7,400 vpd over existing conditions. Weekday non-summer crossings at the existing Bridge would increase by 1,000 vpd. Because it improves summer weekend ADT below existing conditions, Corridor 6 meets the need for adequate capacity. Corridor 6 would not result in greater queue lengths/durations at the existing crossing than currently exists on summer weekends although it would result in a longer queue for one hour on non-summer weekdays. Corridor 6 would result in LOS E or LOS F conditions at the existing Bridge for 4 hours on non-summer weekdays (with 3 hours in the eastbound direction and 1 hours in the westbound direction) and 14 hours on summer weekends (with 9 hours in the eastbound direction and 5 hours in the westbound direction). This would be a greater total number of hours than at the existing Bridge today on non-summer weekdays, but a lower number of hours than at the existing Bridge today on summer weekends. Corridor 6 would therefore meet the need for dependable and reliable travel times. It is estimated that Corridor 6 would require only 26 minutes of additional travel time for vehicles diverted from the existing Bridge. Thus, Corridor 6 meets the need for flexibility to support maintenance and incident management at the existing Bridge. Corridor 6 contains substantial environmental resources, including 18,000 acres of open water, 5,400 acres of natural oyster bars, and 900 acres of parks and wildlife refuges. Corridor 6 would have indirect effects, but likely less induced growth compared to Corridors 3, 4, and 5. Corridor 6 meets the Bay Crossing Study Purpose and Need.

Corridor Alternative	Status	Rationale
7	**Retain**	Corridor 7 would meet the need of providing adequate capacity; providing benefit for both non-summer weekdays and summer weekends. Corridor 7 would result in an estimated reduction of 23,700 vpd on non-summer weekdays on the Bay Bridge compared to existing conditions, and a reduction of 38,900 vpd on summer weekends on the Bay Bridge compared to existing conditions. Corridor 7 would not result in greater queue lengths/durations than existing conditions at the existing crossing on summer weekends or on non-summer weekdays. In addition, there would be no hours of LOS E or F operation at the existing Bridge on summer weekends or non-summer weekdays. Corridor 7 would therefore meet the need for dependable and reliable travel times. Additionally, it is estimated that Corridor 7 would meet the need for flexibility to support maintenance and incident management at the existing Bridge, requiring no additional travel time to divert vehicles from the existing crossing to the new crossing. Among all corridors, Corridor 7 has the lowest total area (28,000 acres), and the lowest area of forested land (4,500 acres). It also compares favorably to other corridors in other categories including prime farmland (5,600 acres), area of open water (9,600 acres), wetlands (1,500 acres), and length of streams (30 miles). Corridor 7 would result in adding new capacity to the existing transportation network in relative proximity to the existing Bay Bridge, which would be more compatible with existing land use patterns and plans. Corridor 7 would have indirect effects, but likely less induced growth compared to Corridors 3, 4 or 5. Corridor 7 meets the Bay Crossing Study Purpose and Need.

Corridor Alternative	Status	Rationale
8	**Retain**	Corridor 8 would meet the need of providing adequate capacity; providing traffic benefit on both non-summer weekday and summer weekends. Weekday non-summer crossings at the existing Bridge would be reduced by 500 vpd, and summer weekend crossings would be reduced by 14,300 vpd over existing conditions. Corridor 8 would not result in greater queue lengths/durations than existing conditions at the existing crossing on summer weekends although it would result in a longer queue for one hour on non-summer weekdays. Corridor 8 would be expected to have LOS E or LOS F conditions at the existing Bridge for 4 hours on non-summer weekdays (with 3 hours in the eastbound direction and 1 hours in the westbound direction) and 10 hours on summer weekends (with 8 hours in the eastbound direction and 2 hours in the westbound direction). This would be a greater number of hours than at the existing Bridge today on both non-summer weekdays, and a lower number of hours at the existing Bridge on summer weekends. Overall, Corridor 8 would meet the need for dependable and reliable travel times. Additionally, it is estimated that Corridor 8 would require 26 minutes of additional travel time for vehicles diverted from the existing Bridge. Thus, Corridor 8 meets the need of providing flexibility to support maintenance and incident management at the existing Bridge. Corridor 8 contains substantial environmental resources, including 20,400 acres of open water, 6,500 acres of natural oyster bars, and 8,600 acres of forested land. Corridor 8 would have indirect effects, but likely less induced growth compared to Corridors 3, 4, or 5. Corridor 8 meets the Bay Crossing Study Purpose and Need.

Corridor Alternative	Status	Rationale
9	Eliminate (Phase 2)	Corridor 9 would provide some traffic benefit on summer weekends, but weekday non-summer traffic would increase compared to existing conditions on the Bay Bridge. Weekday non-summer crossings at the existing Bridge would increase by 8,300 vpd over existing conditions. Summer weekend crossings would be reduced by 300 vpd. Because it improves summer weekend ADT below existing conditions, Corridor 9 meets the need for adequate capacity. Corridor 9 would result in a queue of four miles or greater at the existing crossing for one hour per day during summer weekends, and a queue length of one mile or greater at the existing crossing for six hours on non-summer weekdays. These queues would be much longer than currently occur at the existing Bridge and are considered unreasonable particularly in comparison to other corridor alternatives such as 6, 7 and 8. Corridor 9 would also be expected to have LOS E or LOS F conditions for 5 hours on non-summer weekdays (with 3 hours in the eastbound direction and 2 hours in the westbound direction) and 18 hours on summer weekends (with 10 hours in the eastbound direction and 8 hours in the westbound direction). This would be a greater number of hours than at the existing Bridge today on non-summer weekdays, and a slightly lower number of hours at the existing Bridge on summer weekends. This improvement of LOS, combined with the increase in hours with LOS E or F on non-summer weekdays, is considered unreasonable particularly in comparison with other corridor alternatives such as 6, 7 and 8. Overall, Corridor 9 does not sufficiently meet the need for dependable and reliable travel times. Corridor 9 would require an estimated additional travel time of 40 minutes for vehicles diverted from the existing Bridge, resulting in a total travel time of 76 minutes. Because this would more than doubles the existing travel time of 36 minutes, Corridor 9 would not sufficiently meet the need for flexibility to support maintenance and incident management at the existing Bridge. Corridor 9 contains substantial environmental resources, including 8,600 acres of natural oyster bars and 11,100 acres of Chesapeake Bay Critical Areas. Corridor 9 does not meet the Bay Crossing Study Purpose and Need.
10	Eliminate (Phase 1)	Corridor 10 would not draw enough traffic to relieve traffic congestion on the existing Bay Bridge relative to existing conditions and would therefore not meet the need of providing adequate capacity. Weekday non-summer crossings at the existing Bridge would increase by 10,000 vpd and summer weekend crossings would increase by 2,700 vpd over existing conditions. Corridor 10 contains substantial environmental resources including a large area of open water within the corridor (23,400 acres), due to relatively long crossings required. Corridor 10 also includes 7,600 acres of residential land use and 9,600 acres of natural oyster bars. Corridor 10 does not meet the Bay Crossing Study Purpose and Need.

Corridor Alternative	Status	Rationale
11	Eliminate (Phase 1)	Corridor 11 would not draw enough traffic to relieve traffic congestion on the existing Bay Bridge relative to existing conditions and would therefore not meet the need of providing adequate capacity. Weekday non-summer crossings at existing Bridge would increase by 11,900 vpd and summer weekend crossings would increase 6,700 vpd over existing conditions. Corridor 11 contains substantial environmental resources, including 5,100 acres of residential land use, 1,400 acres of SAV, and 4,000 acres of wetlands. Corridor 11 does not meet the Bay Crossing Study Purpose and Need.
12	Eliminate (Phase 1)	Corridor 12 would not draw enough traffic to relieve traffic congestion on the existing Bay Bridge relative to existing conditions and therefore does not meet the need of providing adequate capacity. Weekday non-summer crossings at the existing Bridge would increase by 12,900 vpd and summer weekend crossings would increase by 8,600 vpd over existing conditions. Corridor 12 contains substantial environmental resources, including 2,500 acres of parks and wildlife refuges, 6,200 acres of wetlands, 18,100 acres of prime farmland, 8,000 acres of Chesapeake Bay Critical Areas, and 12,200 acres of SSPRAs. Corridor 12 does not meet the Bay Crossing Study Purpose and Need.
13	Eliminate (Phase 1)	Corridor 13 would not draw enough traffic to relieve traffic congestion on the existing Bay Bridge relative to existing conditions and would therefore not meet the need of providing adequate capacity. Weekday non-summer crossings at the existing Bridge would increase by 14,100 vpd and summer weekend crossings would increase by 10,400 vpd over existing conditions. Corridor 13 contains substantial environmental resources, including 5,000 acres of parks and wildlife refuges, 7,800 acres of wetlands, 16,600 acres of forested land, 19,200 acres of prime farmland, 13,200 acres of Chesapeake Bay Critical Areas, and 22,800 acres of SSPRAs. Corridor 13 passes through Blackwater National Wildlife Refuge, with no apparent opportunity for avoidance of the resource and resulting in major practical challenges. Corridor 13 does not meet the Bay Crossing Study Purpose and Need.

Corridor Alternative	Status	Rationale
14	Eliminate (Phase 1)	Corridor 14 would not draw enough traffic to relieve traffic congestion on the existing Bay Bridge relative to existing conditions, and would therefore not meet the need of providing adequate capacity. Weekday non-summer crossings at the existing Bridge would increase by 15,200 vpd and summer weekend crossings would increase by 14,400 vpd over existing conditions. Corridor 14 would attract low volumes from the existing Bridge, resulting in minimal improvement over the No-Build condition. Corridor 14 requires the longest Chesapeake Bay crossing (17.1 miles) of all the corridor alternatives. Corridor 14 contains substantial environmental resources, including 5,600 acres of parks and wildlife refuges, 28,700 acres of open water, 1,200 acres of SAV, 4,300 acres of natural oyster bars, 4,500 acres of wetlands, 8,700 acres of Chesapeake Bay Critical Areas, and 8,600 acres of SSPRAs. Corridor 14 does not meet the Bay Crossing Study Purpose and Need.

Note: All corridor alternative traffic estimates are for year 2040 scenario.

6.0 MODAL AND OPERATIONAL ALTERNATIVES SCREENING

The Modal and Operational Alternatives (MOAs) were developed as part of the range of alternatives to determine if a different mode, or operational changes, could meet the BCS Purpose and Need as stand-alone alternatives. In other words, this Tier 1 screening is intended to determine if any of these MOAs could meet the Purpose and Need independent of other corridor alternatives or MOAs.

The MOAs are evaluated based on the Purpose and Need elements of adequate capacity, dependable and reliable travel times, and flexibility to support maintenance and incident management at the existing Bridge. The MOA screening also includes discussion of environmental and financial considerations.

6.1 Transportation Systems Management/Travel Demand Management (TSM/TDM)

TSM/TDM improvements typically allow a transportation facility to work slightly better than it would without the TSM/TDM improvements. TSM/TDM strategies attempt to make more efficient use of existing infrastructure and optimize the use of existing capacity, in lieu of creating additional infrastructure. Given the anticipated increase in ADT at the Bay Bridge by 2040 (15,700 additional vehicles per day during non-summer weekdays and 16,700 additional vehicles on summer weekends), the TSM/TDM alternative is not expected to meet the needs for adequate capacity or improved travel times as a standalone alternative.

MDTA has already implemented some TSM/TDM improvements at the Bridge such as contraflow lanes and will continue to make TSM/TDM improvements under the No-Build scenario such as automated contraflow. This MOA would include new TSM/TDM measures beyond what was planned at the time of Project Scoping or implemented.

Volumes are expected to increase by approximately 22 percent on Non-Summer Weekdays and by approximately 14 percent on Summer Weekends by 2040. TSM/TDM improvements such as variable tolls or all electronic tolling (the latter of which was implemented at the Bay Bridge in Spring 2020) would not reduce ADT at the existing crossing, rather they would be designed to more efficiently distribute trips through the day and improve the flow of traffic. This strategy would not be reasonably expected to reduce ADT on the Bay Bridge below existing conditions in 2040.

All electronic tolling is expected to have some positive effect on traffic flow; however, the presence of congestion for westbound travelers on the Bridge today, where there is no toll plaza, indicates that the toll plaza is not the only impediment to traffic.

TSM/TDM improvements would not meet the project need of providing flexibility to support maintenance and incident management at the existing Bridge. Strategies such as variable tolling that would aim to shift traffic to night time hours could potentially impede flexibility for maintenance to occur at night.

TSM/TDM improvements would be feasible to implement with relatively low-cost and minimal environmental impacts compared to new infrastructure. Construction of new toll facilities such as overhead toll gantries are expected to be implemented within existing right-of-way.

The TSM/TDM alternative would not meet the Purpose and Need as a stand-alone alternative.

6.2 Ferry Service

MDTA analyzed ferry service in the 2019 *Chesapeake Bay Crossing Study Tier 1 NEPA Modal and Operational Alternative: Chesapeake Bay Ferry Service* (2019 Ferry Service Report) (See **Appendix A**). The 2019 Ferry Service Report evaluates a 2003 Draft Ferry Evaluation (2003 Study) to determine the validity of previous findings and conclusions. The 2003 Study was determined to be methodologically sound, with valid conclusions, and was updated as with relevant traffic data in 2019. The 2003 Study, and the 2019 Ferry Service Report examined four potential routes in detail: Canton to Rock Hall, Chesapeake Beach to Cambridge, Solomons Island to Cambridge, and Solomons Island to Crisfield. These were identified and evaluated to understand their potential operating costs, environmental impacts, ridership, revenue, and economic benefits.

6.2.1 Ferry Service Ridership Demand Estimates

Table 10 below summarizes the peak daily vehicle volumes for the four ferry routes determined by the 2003 Study, as evaluated in the 2019 Ferry Service Report. The vehicle volumes shown in **Table 10** represent the upper end of a range of ridership estimates. The ridership demand estimates presented reflect the anticipated demand for ferry service at the specified locations; ferry capacity estimates are discussed in **Section 6.2.2** below.

Table 10: Ferry Route Daily Vehicle Volumes

Route	Weekday Summer (veh./day)	Weekend Summer (veh./day)
Canton to Rock Hall	110	160
Chesapeake Beach to Cambridge	550	2,700
Solomons Island to Cambridge	125	1,000
Solomons Island to Crisfield	60	200

The 2003 Study concluded that the ridership for the routes analyzed ranged from 25,000 to 335,000 vehicles annually. The 335,000 figure represented 1.4% of the 24 million vehicles crossing the Bay Bridge in 2003.

Traffic volumes on the existing Bay Bridge have continued to grow since 2003. Although volumes dropped around 2008, total volumes on a daily and annual basis are greater now than when the 2003 Study was completed.

Summer weekend peak volumes remain higher than weekday peak period volumes, as was documented in the 2003 Study and in the 2015 Bay Bridge Life Cycle Cost Analysis conducted by MDTA. Weekday traffic patterns remain similar to those in 2003 when heavy westbound AM volumes and eastbound PM volumes were primarily commuter-based. Summer weekend traffic patterns also remain similar to those in 2003 when heavy eastbound volumes on Fridays and westbound volumes on Sundays were identified as travel or leisure-based.

The current one to two-hour delays on a summer weekend at the Bay Bridge are comparable to the one-hour delay cited by the 2003 Study. Based upon this delay, the overall suitability of a ferry as an alternative travel mode for crossing the Chesapeake Bay has not increased enough to affect the 2003 Study's conclusions.

6.2.2 Ferry Service Capacity

The 2019 *Ferry Service Report* analyzed the capacity of a potential ferry route using the capacities, headways, schedules, and vessel counts from the 2003 Study to determine the maximum capacity of a potential ferry route.

The ferry service parameters include:

- Scheduled Sailing Hours: 16 hours (5:00am to 9:00pm)
- Trip Headway: 2 hours (per sailing)
- Number of vessels: 2
- Total sailings per day: 18
- Vessel vehicle capacity: 54 cars (maximum.)
- Vessel passenger capacity: 149 (maximum.)
- Assumed vehicle usage rate: 100%
- Assumed passenger usage rate: 100%

The 2019 Ferry Service Report found that one ferry route could convey a maximum estimated capacity of 972 vehicles per day, as shown in **Table 11**. These numbers do not represent actual demand, but give an indication of the total number of potential trips a ferry route could provide.

In 2040, daily volumes at the Bay Bridge are expected to be approximately 15,700 higher on non-summer weekdays and 16,700 higher on summer weekends than they are today. Thus, a ferry service operating at maximum capacity could accommodate less than five percent of the growth in volume and would not reduce existing volumes. Given the anticipated increase in ADT at the Bay Bridge by 2040, it is not expected that a ferry service would effectively relieve congestion and improve travel times at the existing Bay Bridge. Therefore, ferry service, as a standalone alternative, does not meet the Purpose and Need of the Tier 1 study.

Table 11: Comparison of Daily Existing and Projected Bay Bridge Traffic Volumes and Ferry Capacity

Time Frame	Existing 2017 ADT	Projected 2040 No-Build ADT	Maximum Daily Ferry Vehicle Capacity	Ferry as a percentage of 2040 volumes
Non-Summer Weekday Average	68,600	84,300	972	1.15%
Summer Weekend Average	118,600	135,300	972	0.72%

The improvements required to implement a ferry service, including terminals on both sides of the Bay, would be relatively low cost compared to construction of a new crossing. The study estimated that fare revenues generated by most ferry route locations would not be enough to cover operational costs. Environmental impacts of a ferry service would be dependent on location and the number of terminals but would likely be less extensive overall compared to a new crossing. Need for roadway approach infrastructure upgrades could require additional environmental impact.

Ferry service does not meet the Bay Crossing Study Purpose and Need as a stand-alone alternative.

6.3 Bus Rapid Transit

As discussed in the *Chesapeake Bay Crossing Study: Tier 1 NEPA Modal and Operational Alternative: Transit Service* (2019 Transit Service Report) (**Appendix B**), MDTA performed an evaluation of a Transit Study conducted in 2007 for MDTA and the Maryland Transit Administration to analyze Bus Rapid Transit (BRT). The 2007 Study stated that "transit service alone will not provide a significant benefit to summer weekend or peak period weekday traffic." The recent 2019 Transit Service Report by MDTA yielded a similar conclusion.

The methodology adopted in the 2019 Transit Service Report is very similar to the 2007 Transit Study with the exception of enhanced ridership factors that were calibrated using existing transit routes and ridership information that did not exist in 2007. The following steps were taken to estimate the potential transit ridership in this study.

1) Analysis of Potential Transit Route and Ridership

a) **Origins and Destinations:** Determine origin-destination zones for the potential transit markets.
b) **Existing Transit Data:** Compile transit routes, operations, and ridership data for transit currently operating across the Bay Bridge.
c) **Ridership Factors for Origins and Destinations:** Develop and calibrate "ridership factors" using the existing ridership along the existing transit routes with the specific origin-destination auto person trips from the Bay Bridge Maryland Statewide Transportation Model (MSTM)[3]. Extend ridership factors for all potential transit origins and destinations.
d) **Estimation of Potential Ridership:** Apply the ridership factors to origin-destination pairs for potential current and future transit ridership based on the auto person-trips from the Bay Bridge MSTM model.

2) Level of Traffic Relief to the Bay Bridge Due to Transit
   a) **Potential Congestion Relief at the Bay Bridge:** Compute the estimated ridership and congestion relief from the number of vehicles that would no longer use the existing Bay Bridge.

The potential transit ridership was calculated for existing and 2040 future conditions for Non-Summer Weekdays. Sixteen zones were selected for the destinations on the western shore including the destinations of the existing transit service.

In both 2017 and 2040 future conditions, two major destinations of the potential ridership were Washington DC and Anne Arundel County (North). Washington DC has the high calibrated ridership factor of 10 percent and Anne Arundel County (North) has a very large number of auto-person-trips that is almost 40 percent of the total auto-person-trips in both existing and 2040 future conditions. Baltimore City, Baltimore County, and Montgomery County also have moderate amounts of potential ridership. In 2017, the total ridership of AM and PM Peak Hours for Non-Summer Weekday was estimated as 1,081. In 2040, the total ridership was estimated as 1,410.

The ridership for Summer Weekends represents leisure trip patterns that are different from weekday commute patterns. The potential transit ridership for both existing and 2040 future conditions for Summer Weekends was calculated using the potential ridership factors for eleven zones on the eastern shore. The zones selected for the destinations included major destinations for leisure (including, but not limited to, Ocean City and Sussex County, DE).

In both 2017 and 2040 conditions, two major destinations of the potential ridership were Queen Anne's County (South) / Caroline County and Sussex County, DE. Queen Anne's County has a very large number of person-trip-ends that is approximately 34 percent of the total auto-person-trips in both 2017 and 2040 conditions. Sussex County, DE has relatively high number of trip-ends and a ridership factor of 2 percent. Talbot County and Ocean City with Worcester County

[3] As discussed in Section 4.1.1,the Bay Bridge MSTM model is an adapted version of MDOT SHA's Maryland Statewide Transportation Model.

(North) have moderate numbers of trip-ends following the two major destinations. Under 2017 conditions, the total daily ridership for Summer Weekends was estimated to be 3,543. Under 2040 conditions, the total daily ridership was estimated to be 4,485.

In MDTA's 2019 Transit Service Report, the potential BRT ridership was estimated for the existing and future years for both Non-Summer Weekdays and Summer Weekends, and the ridership was converted into a number of daily equivalent vehicle trips due to transit to evaluate traffic relief at the Bay Bridge. As shown in **Table 12**, BRT would have potential to remove an average of 588 cars from the Bay Bridge on weekdays and 1,548 cars on summer weekends in 2040. Given the anticipated increase in ADT at the Bay Bridge by 2040 (15,700 additional vehicles per day during non-summer weekdays and 16,700 additional vehicles on summer weekends), it is not expected that BRT would effectively relieve congestion and improve travel times at the existing Bay Bridge.

Table 12: Comparison of Daily Existing and Projected Bay Bridge Traffic Volumes and Traffic Relief

Time Frame	Existing 2017	Projected 2040 No-Build	Traffic Relief due to BRT/Rail	Traffic Relief due to BRT/Rail as a percentage of 2040
Average Weekday	68,600	84,300	588	0.70%
Average Summer Weekend	118,600	135,300	1,548	1.14%

BRT service operating in existing facilities would require relatively minimal infrastructure improvements such as maintenance facilities. Most or all cost of the alternative would be related to operation of the bus service. BRT service operating on a dedicated transitway would likely require more substantial capital expense.

BRT operating on existing roadways and using the existing Bay Bridge would result in minimal impacts to environmental features. BRT operating on a dedicated transitway would likely require greater environmental impacts.

Based on the analysis above, BRT would not meet the Bay Crossing Study Purpose and Need as a stand-alone alternative.

6.4 Rail Transit

Similar to BRT, rail transit (including LRT or HRT) was evaluated in the 2019 Transit Service Report. The ridership estimates in **Section 6.1.3** were developed to also reflect the potential ridership of a rail transit alternative. Rail transit would have the same limited potential for traffic relief as BRT, shown in **Table 12**. LRT or HRT would have potential to remove an average of 588 cars from the Bay Bridge on an average weekday and 1,548 cars on an average summer weekend in 2040. Given the anticipated increase in ADT at the Bay Bridge by 2040 (15,700 additional vehicles per day during non-summer weekdays and 16,700 additional vehicles on

summer weekends), it is not expected that LRT or HRT would effectively relieve congestion and improves travel times at the existing Bay Bridge.

Rail transit would likely require substantial infrastructure improvements, including construction of a new crossing and approach infrastructure. Additionally, this alternative may include the cost of acquiring new transit vehicles and operational costs.

Construction of new rail transit facilities would likely require substantial environmental impacts due to the need for a new crossing structure and approach infrastructure.

Rail transit would not meet the Purpose and Need for the Bay Crossing Study as a stand-alone alternative.

6.5 MOA Results Summary

Based on the MOA screening analysis results, none of the MOAs are recommended to be carried forward for further evaluation as standalone alternatives. TSM/TDM, Ferry Service, BRT, and Rail Transit would each fail to meet the Purpose and Need of the study because they would not provide adequate capacity to relieve congestion at the existing Bridge, provide dependable and reliable travel times, or provide flexibility to support maintenance and incident management at the existing Bridge.

The TSM/TDM, Ferry Service, and BRT alternatives will be evaluated in more detail in combination with other alternatives in Tier 2. Rail transit is eliminated from further consideration due to the high expected cost and low ridership estimates.

7.0 PUBLIC INVOLVEMENT

This section provides a brief overview of major public involvement activities to date and public comments received.

7.1 Website

The Bay Crossing Study website (www.baycrossingstudy.com) was developed and launched in October 2017 to share project information and gather feedback from the public. The website provides background information on the study and will be updated throughout the development of the EIS to provide pertinent information to the public and agencies. All public comments received are posted to the website.

7.2 Public Meetings

Three rounds of public meetings have been held thus far. The November 2017 Online Scoping Meeting was held to seek input on the project scope and purpose and need. That meeting included a virtual presentation and in-person viewing locations. The Spring 2018 public meetings were held at six locations between May 8 and May 22, 2018 to present and solicit comments on the Purpose and Need, the environmental review process, corridor development, and screening process. Information was also provided on scoping activities and public comments.

Seven Open House Meetings were held in Fall 2019 to present the range of alternatives considered, the screening analysis and results, and the preliminary CARA. These meetings were held at the following times and locations:

- September 24th at Kent County High School
- September 26th at Calvert High School
- October 1st at Middle River Middle School
- October 2nd at Anne Arundel Community College
- October 3rd at Talbot County Community Center
- October 9th at Kent Island High School
- October 28th at Annapolis High School

Advertising methods for the Fall 2019 Open House Meetings included:

- Website announcements
- Press release
- Emails to the project mailing list, stakeholders and elected officials
- Digital advertising in 11 online publications including Latin Opinion, Avenue News, Afro, El Tiempo Latino, Washington Hispanic, Cecil Daily, My Eastern Shore, Southern MD News, Star Dem, Aegis, Baltimore Sun, and Capital Gazette.
- Print ads in 21 publications including Latin Opinion, Baltimore Sun, Bay Times, Cecil Whig, Star Democrat, Tidewater Trader, Times Record, Bay Side Gazette, Salisbury Independent, Washington Post, Dundalk Eagle, Avenue News, Kent County News, Dorchester Star, Washington Hispanic, Enterprise, Calvert Recorder, Record Observer, Aegis, Afro American, and Maryland Gazette.
- Social media outreach on Facebook and Twitter

The meetings were attended by 1025 people, and 726 comments were received, as detailed below in **Section 7.3.2.**

7.3 Public Comments

Public comments are presented in two sections below. First, in **Section 7.3.1,** is a summary of the comments received between November 15, 2017 and July 31, 2019. These include all comments received from the initiation of the project until the Fall 2019 Open House meetings. Comments received during and after the Fall 2019 Open Houses are presented in **Section 7.3.2.** These are discussed separately because new information on the Corridor Alternatives, MOA, and preliminary CARA was made available to the public in conjunction with the Fall 2019 Open House Meetings.

7.3.1 Comments Received Prior to Fall 2019 Open House Meetings

MDTA received over 1,100 comments between November 15, 2017 and August 26, 2019. Comments were submitted via the project website, email, comment cards (at meetings) and letters. All public comments are available for review on the project website at baycrossingstudy.com, and have been divided into nine general topic areas: recommendations for a specific crossing location (35 percent), environmental or land use considerations (18 percent), miscellaneous comments (12 percent), modal and operational (10 percent), general opposition to the study or improvements (10 percent), traffic and infrastructure comments (10 percent), general support for the study or improvements (three percent), requests for information (two percent), and bicycle and pedestrian recommendations (less than 1 percent). **Table 13** includes the list of comments by topic. Percentages were rounded to the closest one percent. Descriptions of comments in each of the topical categories has been included in the following sections.

Table 13: Comments by Topic – November 2017 to August 2019

Topic	Percent of Comments
Recommendations for a specific crossing location	35%
Environmental or land use considerations	18%
Miscellaneous comments	12%
Modal and operational alternatives	10%
General opposition to the study or improvements	10%
Traffic and infrastructure comments	10%
General support for the study or improvements	3%
Requests for information	2%
Bicycle and Pedestrian recommendations	<1%

7.3.1.1 Recommendations for a Specific Crossing Location

Recommendations for a specific crossing location were those that included information about a specific location or general area that the commenter favors for a crossing. Included within these comments were recommendations from commenters stating that the crossing should be located at a specific location rather than another specific location.

7.3.1.2 Environmental or Land Use Considerations

These comments expressed concern about the project's potential impacts on the human and natural environment. Topics of concern included wildlife habitat, farmland, aesthetics, historic or cultural resources, water quality, and others. Some commenters expressed concern regarding the potential for new development resulting from a new crossing corridor, and the potential impacts that the development would have to existing communities, land use, and natural resources.

7.3.1.3 Miscellaneous Comments

The "miscellaneous" category includes all comments not categorized into the other topic areas. These comments covered a broad range of issues such as safety, evacuation, cost estimates, or other projects and priorities.

7.3.1.4 Modal and Operational Alternatives to a Crossing

Comments that recommended different transportation modes rather than constructing a new roadway crossing were included in this category. These comments included recommendations like investing in rail or transit service, using a ferry, implementing electronic toll lanes, or instituting traffic management strategies like toll rate flexibility during peak times.

7.3.1.5 General Opposition to the Study or Improvements

Comments in this category expressed opposition to the study or the need for a new crossing. Many comments included concerns over harm to existing communities and the environment. These comments indicated opposition to the project as a whole but did not reference any specific areas of concern or specific crossing locations.

7.3.1.6 Traffic and Infrastructure Comments

Comments regarding traffic and infrastructure covered an array of topics related to engineering, infrastructure, traffic, and similar topics. Roadway capacity issues, concerns about specific intersections, and safety issues were discussed. Comments that reflected on roadway capacity issues often indicated why certain areas should be considered (or not considered) as a result of current traffic or infrastructure. A common concern was the potential for traffic impacts on local infrastructure resulting from a new crossing location. Many expressed the need to ensure that the capacity of local roads feeding into a new crossing would be considered.

7.3.1.7 General Support for the Study or Improvements

Some comments expressed general support for the Bay Crossing Study and any associated improvements, either citing a need for change, or generally indicating approval. Comments in this category occasionally provided general recommendations to build a bridge or a tunnel. These comments did not reference particular areas or crossing locations.

7.3.1.8 Requests for Information

Requests for information were included among the public comments. These commenters asked for meeting information, requested that they be added to the mailing list, or asked specific questions related to the study process.

7.3.1.9 Bicycle and Pedestrian Recommendations

The project also received comments about bicycle and pedestrian infrastructure. These comments discussed bicycle and pedestrian access, and requests to include bike and pedestrian facilities in crossing improvements.

7.3.2 Comments Received During and After Fall 2019 Open House Meetings

A total of 705 comments were received as of February 29, 2020 , including letters, emails, website comments, public meeting comment cards, and MDTA customer survey cards.

Written comments received have been summarized based on the categories below. Many comments are included in multiple categories.

- For or Against a Specific Corridor
- Other Alternatives

- General Support
- General Opposition
- Environmental, Cultural and Socioeconomic Issues
- Bicycle and Pedestrian Access
- Engineering, Traffic, and Transportation
- Requests for Study Information
- Other

7.3.2.1 For or Against a Specific Corridor

Information on each of the 14 corridor alternatives was presented to the public at the Fall 2019 Open Houses. Corridors 6, 7, and 8 were highlighted in the materials to collect public input on the recommendation to carry forward as the CARA. Comment cards provided at the public meeting and on the website included a section for comments specifically on the preliminary CARA, Corridors 6, 7, and 8. Written comments were also included in this category where commenters indicated support or opposition to any of the corridors, not solely the preliminary CARA. Table 14 below summarizes the number of comments indicating a preference for or against each of the preliminary CARA. A total of 96 comments were specific to corridors other than the preliminary CARA. Some commenters indicated more than one preference.

Table 14: Comments For or Against the Preliminary CARA

Preliminary CARA	In Favor	Opposed
Corridor 6	60	216
Corridor 7	208	165
Corridor 8	86	240

7.3.2.2 Other Alternatives

A total of 129 comments mentioned other alternatives/modes or non-corridor options including the MOA evaluated in the screening. Many commenters in this category advocated for options aside from a new crossing to relieve congestion such as ferry service, bus service, electronic toll lanes, toll rate flexibility during peak times, and rail.

7.3.2.3 General Support

A total of 73 commenters expressed general support for the study or a new crossing. Commenters in this category often emphasized the importance of existing problems at the Bay Bridge and the need to address them.

7.3.2.4 General Opposition

There were 71 comments expressing general opposition to the study or a new crossing. These included comments expressing support for the No Build Alternative. Commenters expressed concerns over impacts to communities and the environment, among other issues.

7.3.2.5 Environmental, Cultural and Socioeconomic Issues

There were 218 comments that touched on environmental issues such as natural resources, communities, cultural resources, and agriculture. Comments in this category expressed concerns with potential impacts to resources such as the Chesapeake Bay, wildlife, and wetlands. Commenters also noted the potential impact of sea level rise on Chesapeake Bay environment and infrastructure. Concerns with potential impacts to cultural resources, land use, communities, and agricultural lands were also common themes.

7.3.2.6 Bicycle and Pedestrian

Four comments included the topic of bicycle and pedestrian access. These comments included suggestions for bicycle and/or pedestrian access on a new crossing, as well as general questions as to whether bicycle and pedestrian access has been considered.

7.3.2.7 Engineering, Traffic and Transportation

A total of 395 comments were included in the category of engineering, traffic and transportation. A broad range of issues were mentioned in these comments such as roadway capacity concerns, discussion of specific roadways and intersections, concerns about safety, roadway maintenance issues, comments on the study traffic analysis, and comments on the type of crossing. Common themes included concerns over the impact of a new crossing on local roadways, discussion of how the existing crossing affects local traffic, and concerns that a new crossing would lead to increased traffic on local roadways.

7.3.2.8 Requests for Study Information

There were 21 comments requesting specific information about the study. For example, questions about how to view project materials online or questions about meeting locations were included in this category.

7.3.2.9 Other

A total of 87 comments did not fit into any of the other categories and were classified as "other". Examples of these include comments regarding cost or funding, the Bay Crossing study process, the Open House meeting format, and questions unrelated to other topic areas.

7.3.2.10 Checkboxes: Important Factors in Selecting the Preferred Corridor Alternative

In addition to the information above, the comment forms included the prompt, "Which three factors are most important to you in selecting the preferred Corridor Alternative?" Commenters were given seven options to choose from. The check box options and number of commenters checking each box are provided in **Table 15**.

Table 15: Checkbox Prompt Responses

Check Box Factors	Number of Commenters Selecting
Community / Development Impacts	388
Reducing congestion	363
Environmental impacts	343
Safety	192
Cost	120
Engineering /Construction	85
Other	82

8.0 CONCLUSIONS

The results of the alternative screening presented a clear pattern among the corridor alternatives. The traffic metrics were designed to determine the level of demand for each corridor alternative and whether the trips through each corridor alternative would divert traffic away from the existing Bay Bridge. The results showed that the diversion of traffic away from the Bay Bridge is greatest for corridor alternatives in closest proximity to the existing Bay Bridge, and lowest for those farthest away.

Corridors 1 through 4 and 10 through 14 would not meet the Purpose and Need because they would not provide adequate capacity to reduce 2040 congestion at the existing crossing below current levels, as measured by the Phase 1 evaluation of ADT. Corridors 2 and 13 would also result in substantial practical challenges due to their locations passing through Aberdeen Proving Ground and Blackwater National Wildlife Refuge, respectively. Therefore, Corridors 1 through 4 and 10 through 14 were eliminated in Phase 1.

Phase 2 considered Corridors 5 through 9 in more detail. More detailed traffic analysis for Corridors 5 through 9 showed that Corridor 5 would not provide an acceptable level of flexibility for incident diversion and would cause potentially major indirect effects on the Eastern Shore. Corridor 9 would also require substantial additional travel time for incident diversion and would result in unreasonably long duration of queues on summer weekends at the existing crossing (six hours with queues of one mile or greater on non-summer weekdays). Both Corridors 5 and 9 would only provide a minimal level of improvement to hours of LOS E or F at the existing crossing in 2040.

The cost and financial feasibility considerations, as measured by engineering metrics such as length and complexity, were highly dependent on location. No corridor alternatives were shorter overall compared to Corridor 7, where the existing Bay Bridge is located due to a relatively short crossing location and availability of existing on-land infrastructure for tie-in locations.

The ability of Corridors 5 and 9 to only partially meet the Purpose and Need is especially challenging given the anticipated magnitude of cost for a new corridor alternative, expected to be multiple billions of dollars. Therefore, while Corridors 5 and 9 each partially meet the Purpose and Need, they are not recommended to be retained for analysis in the Draft EIS. Corridors 6, 7, and 8 would have a greater ability to meet the Purpose and Need than all the other corridor alternatives. Corridor 7 has demonstrated the greatest overall ability to meet the Purpose and Need.

The environmental inventory showed that every corridor contains substantial environmental resources, and no new crossings could be built without likely causing substantial environmental impacts. The environmental inventory did not provide a suitable differentiation between the corridors. Corridors that are shorter overall such as Corridor 7 would likely result in fewer overall direct impacts. Corridor alternatives near the southern end would likely have the most substantial impacts due to the prevalence of sensitive resources such as wetlands and wildlife refuges. All corridors would have indirect effects, but some corridor alternatives such as Corridors 3, 4 and 5 would have potentially greater indirect effects resulting from demand for new development on the Eastern Shore.

Public input collected at the Fall 2019 Open Houses reinforced the emphasis on reducing congestion as a key factor in identifying the preliminary CARA. Members of the public identified "reducing congestion" as a high priority for identifying corridors to carry forward. Corridors 6, 7 and 8 achieve the goal of reducing congestion better than all other corridors.

In accordance with NEPA, Corridors 6, 7 and 8 are recommended to be carried forward as the CARA because they are the only corridors to sufficiently meet the Purpose and Need. Only Corridors 6, 7 and 8 sufficiently meet all elements including adequate capacity, dependable and reliable travel times, and provide flexibility to support maintenance and incident management at the existing Bridge.

While Corridors 6, 7, and 8 are all recommended to be carried forward for further evaluation, the screening results show that Corridor 7 has advantages over Corridors 6 and 8. The advantages of Corridor 7 include better congestion relief at the existing Bay Bridge, more effective reduction of duration of unacceptable LOS, more effective backup reduction at the Bay Bridge, the best diversion route, and better compatibility with existing land-use patterns likely resulting in fewer indirect effects.

Based on the analysis, all MOAs are recommended to be eliminated from further consideration as standalone alternatives. However, three of the MOAs – TSM/TDM, BRT and Ferry Service – would be considered in combination with other alternatives during the Tier 2 Bay Crossing Study. Rail would not be further evaluated due to high cost and low ridership expected. MDTA would also consider the TSM/TDM, Ferry Service and BRT MOAs in combination with new roadway capacity in the Preferred Corridor location during Tier 2.

Despite TSM/TDM being recommended for elimination as a stand-alone alternative, MDTA will continue to implement existing TSM/TDM measures on the existing Bay Bridge. Any corridor alternative advanced from Tier 1 of the Bay Crossing Study would be evaluated with TSM/TDM

measures during Tier 2. Furthermore, TSM/TDM could be implemented on either the existing Bay Bridge or a new corridor alternative should MDTA complete future, separate studies that determine these improvements are warranted.

Based on these screening results, Alternative 6, Alternative 7, and Alternative 8 (**Figure 6)** are recommended to be carried forward as the Corridor Alternatives Retained for Analysis (CARA). These corridor alternatives would be finalized as the CARA upon concurrence from the cooperating agencies.

Figure 6 Preliminary Corridor Alternatives Retained for Analysis (CARA)