A. SOCIOECONOMIC EFFECTS

1. Social Effects

This section presents information on how the US 50 Crossing Study alternatives would affect people, their residences, businesses, neighborhoods and communities, and community facilities and services.

a. Displacement and Property Effects

The No-Build and Rehabilitation Alternative (Alternative 2) would not require any property acquisition or the displacement of any residential, commercial or other structures within the project area.

Alternative 4 Modified: Fixed Span Bridge

Alternative 4 Modified would displace 25 buildings consisting of 13 residential and 12 commercial structures, and would require approximately 5.5 acres of right-of-way (ROW) acquisition; 1.1 acres of residential and 4.4 acres of commercial ROW. The acquisitions and displacements associated with this alternative are located west of Baltimore Avenue between N. Division Street and Third Street, primarily in the areas north and south of First Street (see **Figure IV-1**).

Alternative 5: South Parallel Bridge

Alternative 5 would displace 10 buildings: 8 residential and 2 commercial. All of the residential impacts would occur to seasonal homes or apartments along Caroline Street (see **Figure IV-2**). Alternative 5 would also require approximately 3 acres of ROW acquisition from 24 separate properties. These impacts occur almost exclusively south of North Division Street, displacing all the properties in the block west of St. Louis Avenue and approximately half of those in the block east of St. Louis Avenue. The Shell Gasoline Service Station at the corner of Philadelphia Avenue and North Division Street would also be displaced to provide the connection to westbound US 50 from Philadelphia Avenue.

Alternative 5A: North Parallel Bridge

Alternative 5A would displace 8 buildings: 6 residential and 2 commercial, the fewest of the alternatives that propose a new bridge. Alternative 5A would require 3 acres of ROW acquisition from 17 separate properties, primarily located on either side of the existing bridge tie-in to Division Street and on the west side of Philadelphia Avenue at North Division Street (see **Figure IV-3**). The Shell Gasoline Service Station at the corner of Philadelphia Avenue and US 50 would also be displaced to provide the connection to westbound US 50 from Philadelphia Avenue

Displacements and property effects resulting from each of the alternatives are summarized in **Table IV-1.**

Table IV-1: Displacements and Property Acquisitions by Alternative

	Alt. 1 (No-Build)	Alt. 2	Alt. 4 Modified	Alt. 5	Alt. 5A
Number of Potential Displacements (buildings / units)					
Residential	0	0	13 / 39-51	8 / 9-11	6 / 26-30
Commercial	0	0	12 / 12	2/ 2	2 / 2
Total	0	0	25 / 51-63	10 / 11-13	8 / 28-32
Right of Way Required (Acres)					
Residential	0	0	1.1	1	1
Commercial	0	0	4.4	2	2
Total	0	0	5.5	3	3
Number of Properties Impacted					
Residential	0	0	19	10	6
Commercial	0	0	28	14	11
Total	0	0	47	24	17

b. Relocation Process

Property owners affected by displacement or ROW acquisition will receive relocation assistance in accordance with the *Summary of the Relocation Assistance Program of the Maryland State Highway Administration* (**Appendix D**). This act requires that the project shall not proceed into any phase that will cause the relocations of any persons or proceed with any construction project until it has furnished assurances that all displaced persons will be satisfactorily relocated to comparable decent, safe, and sanitary housing within their financial means, or that such housing is in place and has been made available to the displaced person. Payments for cost of moving are also provided. All property owners from whom fee simple and perpetual ROW easements would be obtained would be compensated according to the Uniform Act and paid fair market value for the affected property. Given the recent development in Ocean City and the surrounding area, there appears to be sufficient properties available on the market to accommodate any persons displaced by this project.

Figure IV-1: Alternative 4 Modified

Figure IV-2: Alternative 5

Figure IV-3: Alternative 5A

Title VI Statement

It is the policy of the SHA to ensure compliance with the provisions of Title VI of the Civil Rights Act of 1964 and related civil rights laws and regulations which prohibit discrimination on the grounds of race, color, sex, national origin, age, or physical or mental handicap in all the SHA program projects funded in whole or in part by the Federal Highway Administration (FHWA). The SHA will not discriminate in highway planning, highway design, highway construction, right-of-way acquisitions, or the provision of relocation advisory assistance. This policy has been incorporated in all levels of the highway planning process to ensure that proper consideration may be given to the social, economic, and environmental effects of all highway projects. Alleged discriminatory actions should be addressed for investigation to the Equal Opportunity Section of the SHA, to the attention of Mrs. Jennifer Jenkins, Chief, Office of Equal Opportunity, 707 North Calvert Street, Baltimore, Maryland 21202.

c. Environmental Justice

Based on the information provided by U.S. Census data, the Ocean City Department of Planning and Community Development, the Worcester County Department of Social Services, the Worcester County Board of Education, Ocean City Elementary School, public outreach efforts, and field reviews conducted by the MD SHA, no known minority or low-income census block groups with "meaningful greater" percentage of minority or low-income populations have been identified within the study area. It is anticipated that none of the alternatives will have a disproportionately high and adverse effect to minority populations and low-income populations.

d. Effects on Neighborhoods and Communities

This section reflects a preliminary comparison of the effects to neighborhoods and communities according to the alternatives. Effects on communities typically fall into 3 categories: community cohesion; access and mobility; and quality of life. Air and noise impacts are not considered as part of this analysis. The air and noise analyses are presented in **Section IV.E** and **IV.F**.

Community cohesion refers to a personal recognition of belonging to a neighborhood or community through social interaction. Effects on community cohesion can be seen through changes in interaction among persons and groups, including change to social relationships and patterns. Impacts to community cohesion can result from a loss or an influx of residents due to residential structure displacements or from a physical barrier dividing or isolating a neighborhood or community.

Access and mobility refer to both vehicular and pedestrian access to other residents, businesses, community facilities, and public services within the community. Vehicular access can be affected in different ways including availability of parking, changes to traffic patterns, or closure of roads. Pedestrian access can be affected in the creation or loss of sidewalks or crosswalks in a community. All new sidewalks and pedestrian facilities will be designed in accordance with applicable ADA (Americans with Disabilities Act/Section 504 of Rehabilitation Act) requirements.

Quality of life is an aggregate of community cohesion, access and mobility, as well as health and safety concerns and social changes. Examples of health and safety concerns that can affect quality of life include changes in response times of police, fire, and emergency services. Examples of social change that can affect quality of life include displacements of neighbors, community facilities, or businesses.

The No-Build Alternative and Alternative 2 (Rehabilitation) would have no direct affects on neighborhoods or communities. However, operational deficiencies of the existing bridge would not be addressed, and the frequency of drawbridge openings is expected to continue impacting local residents, commuters, and boaters that use the existing bridge. The continued bridge openings would affect mobility across the bridge, especially during peak summer periods. Also, the size of the existing bridge would continue to limit recreational and pedestrian use of the structure. Alternative 2 would provide a new fishing pier and wider sidewalks, which would enhance the recreational opportunities of the area, but would also require closure of the bridge during the rehabilitation operation. The No-Build Alternative and Alternative 2 would continue to affect the quality of life of the users due to continued traffic congestion and potential user conflicts.

Alternative 4 Modified: Fixed Span Bridge

Alternative 4 Modified would result in the displacement of 25 buildings (13 residential and 12 commercial), and partially isolate portions of two blocks due to having the new bridge to the north and the existing bridge to the south. The displacements are located west of Baltimore Avenue between N. Division Street and Third Street, and include both residential and commercial properties. The residential displacements include 3 single residences (109 Baltimore Avenue, 105 Wilmington Avenue, and 109 Wilmington Avenue), Nowalk on First Street Condominiums, located at 101 Philadelphia Avenue (6 to 8 units), Déjà vu Cottages, located at 207 and 209 First Street (2 single-unit buildings), a portion of the South Bridge Apartments, located at 11 Philadelphia Avenue (6 to 8 units), a rental property at 39 First Street, an unnamed apartment building at 111 Philadelphia Avenue (4 to 6 units), an unnamed apartment building at 9 Philadelphia Avenue (2 to 4 units), an unnamed apartment building at 104 Philadelphia Avenue (4 to 6 units), an unnamed apartment building at 106 Philadelphia Avenue (6 to 8 units), and the Morning Glory Apartments, located at 205 Philadelphia Avenue (5 units). Approximately 39 to 51 residential units would be displaced by Alternative 4 Modified.

The commercial displacements include the George Bert Cropper Inc. concrete plant (2 buildings), the Harrison Group Sales Office, Melvin's Old Towne Steak House, a Shell Gasoline service station (2 buildings), Sub Station Restaurant, 1 office building containing the Atlantic Group Account Services and the Dough Roller Corporate Office, Western Auto, Coolies Grill, and the Sea Breeze Hotel.

Alternative 4 Modified would require 5 acres of right of way from a variety of residential and commercial properties, including 8 privately owned parking lots and the Ocean City Municipal Parking Lot located at First Street and St. Louis Avenue. The number of parking spaces potentially lost was not able to be tallied; however, the loss of parking spaces would translate to a loss of future income for the lot owners.

Cohesion impacts associated with this alternative would most likely occur in the blocks encompassed by the existing bridge, Baltimore Avenue and Third Street. In addition to the 25 building displacements in this area, the remaining parcels would be partially isolated between the existing bridge and the proposed bridge. These properties include mixed residential uses (including single family homes, apartments, condominiums, and vacation rental properties), hotels (including smaller motels and larger resort style properties), the Ocean City Baptist Church, parking areas, and mixed retail establishments. The degree to which this area currently harbors a sense of community and cohesion is unknown, but would depend in part upon the relative numbers of permanent residents, transient residents (seasonal visitors), and business owners and their employees, and the extent of interactions between and among these groups.

Alternative 4 Modified would also affect traffic patterns by providing inbound traffic with direct access to northbound Baltimore Avenue, as well as to southbound Philadelphia Avenue. The new traffic pattern would remove inbound vehicular traffic from North Division Street, making access of this area by inbound traffic more difficult. It would also move the ramps associated with the bridge closer to buildings that are currently several blocks from the bridge. Access to properties located between the new bridge and the existing bridge (described in the previous paragraph) would become more circuitous, requiring several turns on side roads versus current conditions that provide a nearly direct connection via First Street.

Alternative 4 Modified would have very little effect on the West Ocean City community, requiring only minor property impacts north of the existing bridge, and not requiring any residential or commercial displacements. Temporary traffic delays may be experienced by residents of the West Ocean City community who attempt to access the Ocean City peninsula during construction activities, however that impacts will be temporary, and would be offset by a maintenance of traffic plan developed prior to construction. Because the proposed bridge would be located several hundred feet north of the existing bridge, it is expected that the existing bridge could remain open throughout the majority of construction activities, thus minimizing impacts to the adjacent communities.

Alternative 5: South Parallel Bridge

Alternative 5 would primarily affect the two blocks south of the existing bridge, resulting in the displacement of 10 buildings (8 residential and 2 commercial). This alternative would impact both residential and commercial properties. Residential impacts would occur primarily along Caroline Street, south of the existing bridge, and include 7 single-unit structures (207 Caroline Street, 209 Caroline Street, 301 Caroline Street, 303 Caroline Street, 304 Talbot Street, 101 St. Louis Avenue, and 102 St. Louis Avenue), and the Vincent Family Apartments located at 211 Caroline Street (with approximately 2 to 4 units). The commercial impacts include the Captain Bill Bunting Angler Restaurant located at the bayside waterfront on Talbot Street and the Shell Service Station located at North Division Street and Philadelphia Avenue.

Alternative 5 would not change traffic patterns or property access routes, as it ties back into North Division Street. The parking at the base of the existing bridge would be impacted, including the spot designated for the bridge keeper, but new parking along the new bridge may

be possible based on the final design of the bridge. Two pay-to-park lots near the intersection of Philadelphia Avenue and Caroline Street would also be partially impacted, resulting in the loss of approximately 250 spaces. This estimate is based on preliminary design layouts, and will likely be revised as the project advances.

Alternative 5 would have very little effect to the West Ocean City community. Although no residential or commercial displacements are expected, the proposed bridge would block access to the adjacent marina for all but the smallest boats. The anticipated clearance under the bridge into this marina is approximately 10-15 feet. This would potentially translate into a loss of future income for the marina owner.

Alternative 5A: North Parallel Bridge

Alternative 5A would primarily affect the two blocks north of the existing bridge, resulting in the displacement of 8 buildings (6 residential and 2 commercial). This alternative would impact both residential and commercial properties. The residential impacts would occur to the Bay Mist Apartments, located on North Division Street (3 buildings with a total of approximately 8 to 10 units), the Bridgeview Apartments, located at 206 North Division Street (approximately 10 units), an unnamed condominium building located at 210 North Division Street (6 units), and an unnamed apartment building located at 3 St. Louis Avenue (approximately 2 to 4 units). Approximately 26 to 30 residential units would be displaced by Alternative 5A. The commercial impacts include the Buoy Motel located at 2 St. Louis Avenue and the Shell Gasoline Service Station located at N. Division Street and Philadelphia Avenue.

The remaining homes would not be isolated between the new and existing bridge and traffic patterns and property access routes would be similar to the existing condition.

The parking at the base of the existing bridge would be impacted, but new parking along the new bridge may be possible based on the final design of the bridge. Two pay-to-park lots near the intersection of Philadelphia Avenue and Caroline Street would also be partially impacted, resulting in the loss of approximately 25 spaces. A separate lot north of the existing bridge, near the intersection of North Division Street and St. Louis Avenue would also be impacted, resulting in the loss of approximately 10-15 spaces. This estimate is based on preliminary design layouts, and will likely be revised as the project advances. Loss of parking spaces would translate to loss of future income to the owners of the pay-to-park lots.

Alternative 5A would have very little effect to the West Ocean City community, requiring only minor property impacts north of the existing bridge, and not requiring any residential or commercial displacements.

e. Effects on Community Facilities and Services

Effects on local community facilities are measured by direct impacts (acquisition of property) and indirect impacts (changes in proximity, usage or access). Noise impacts are not considered as part of this analysis. A separate noise study (see *Noise Quality Technical Report – Noise Measurements Section*) has been completed to determine noise impacts.

Several community facilities and services will not be impacted. The Ocean City Elementary School would not be impacted by any of the build alternatives currently under consideration. No direct impacts to any religious institutions are anticipated from any of the alternatives currently under consideration. None of the alternatives would impact the U.S. Coast Guard Station that is within the study area. It is anticipated that Alternative 4 Modified would eliminate the need for draw bridge openings, and allow unimpeded boat travel beyond the US 50 bridge crossing. Coordination with the U.S. Coast Guard is ongoing, and will be considered in the ultimate selection of a preferred alternative. No direct impacts to the healthcare facilities within the study area are anticipated with any of the build alternatives currently under consideration. No direct or indirect impacts to the Ocean City Library, located on 10th Street outside the project study area, are expected from any of the alternatives currently under consideration. No direct or indirect impacts to Ocean City's City Hall or the U.S. Post Office are expected from any of the alternatives currently under consideration.

Public Parks, Recreational Facilities, and Museums

No direct or temporary impacts to any public parks, recreation facilities, or museums are anticipated by the build alternatives. The current US 50 bridge will retain its function as a pedestrian crossing and recreational facility (fishing pier) during the construction of the build alternatives. Indirect impacts to the visibility and access to Entry Park may result from Alternative 4 Modified as US 50 would dispense on to First Street, therefore altering the access route from the US 50 bridge to the park. Access to Entry Park will not be impacted and will be maintained during the construction of Alternative 4 Modified. Currently, the Marlin sculpture and fountain within Entry Park are visible from the foot of the existing bridge, and serve as a welcome monument to the Town of Ocean City.

Emergency Services

Emergency services (fire, police, and emergency medical services (EMS)) were contacted in June 2007. They were provided the details of the alternatives retained for detailed study and were asked for feedback on the effects that each alternative would have on their routes and emergency response times. To date, only the Ocean City Police Department (OCPD) has responded and provided feedback (**Section V**). The OCPD expressed concern in regard to the proposed permanent closures and restricted traffic flow on the US 50 Bridge, which is a primary hurricane evacuation route. They have requested that SHA develop a traffic management plan that addresses how the US 50 Bridge is a critical evacuation route. The OCPD has also requested that SHA coordinate with them before the project goes to construction. SHA will continue to coordinate with the Ocean City Police Department and all other emergency services within and adjacent to the study area.

The No-Build Alternative is not expected to affect emergency services. Alternative 2 would temporarily affect emergency services (i.e police and fire for the mainland and hospital service for Ocean City) during the rehabilitation/construction period if access across the bridge is required. The rehabilitation of the bridge would likely require the closure of the bridge during some phases of construction. At a minimum, lane closures will be required for a significant

duration during construction, which potentially affects the emergency response time for emergency vehicles (fire, police, etc.) that must respond to calls across the bay. During times of bridge closure during construction, emergency response time would increase substantially since the MD 90 crossing would need to be used as the detour to respond to calls across the bay. If the bridge is not part of the emergency services response route, then Alternative 2 should not affect emergency service response time.

Alternatives 4 Modified, 5, and 5A have the potential of facilitating travel between the mainland and the Ocean City peninsula for any emergency vehicles that must respond to calls across the bay. The existing bridge would remain open during the construction of the new bridge, thereby eliminating the need for a significant detour. In addition, the new bridge alternatives may facilitate evacuation time, especially if the existing bridge is opened to vehicular traffic during emergency situations.

Public Transportation

It is expected that Alternatives 2, 4 Modified, 5, and 5A would benefit the public transportation system, allowing more reliable connections between Ocean City and the western portion of the study area by improving the functionality of the US 50 crossing and possibly reducing or eliminating the number of roadway closures associated with draw bridge openings. The existing bridge can remain in service during construction for Alternatives 4 Modified, 5, and 5A. For these alternatives, temporary road closures are not anticipated, allowing continuous public transportation service throughout the duration of construction. Temporary closures are anticipated if Alternative 2 is implemented, as the rehabilitation efforts are likely to require closing the bridge to complete certain portions of the work. The temporary closures could cause some of the bus routes to be temporarily altered or shut down while the work is completed on the bridge.

Each of the build alternatives would affect public parking in the downtown area of Ocean City, particularly Alternative 4 Modified, which would impact the Ocean City Municipal Parking Lot located at First Street and St. Louis Avenue.

2. Economic Effects

a. Regional Employment Effects

Ocean City is one of the most important economic engines within the State of Maryland, providing year round resort, conference, and entertainment destinations. Ocean City's attractions draw visitors from many areas located along the eastern coast of the United States and places beyond. Because of the popularity of this destination, many unique employment opportunities are created, particularly in the peak summer months, which attract workforces from throughout the region. Implementation of the proposed project is unlikely to affect these regional employment characteristics. The project proposes changes to an existing bridge that connects the Ocean City peninsula to the mainland. The economic characteristics of these areas are well established and are unlikely to change due to implementation of the project.

b. Local Effects

The No-Build Alternative and Alternative 2 are not expected to result in impacts to the local economy. However, because the Town of Ocean City is heavily dependent on tourists and others traveling from the mainland, structural inadequacies of the existing bridge could result in traffic concerns on the bridge associated with bridge repair activities and draw bridge openings. Repeated traffic concerns on the bridge from repair activities and draw bridge openings could increase commute times to work. This would reduce drive-by business, affecting businesses in this area.

The new bridge alternatives would each result varying numbers of commercial displacements, which could affect employment options. Because Ocean City is approaching build-out conditions, relocation of these businesses in Ocean City could be difficult. Any altered traffic patterns could affect businesses by relocating the primary traffic patterns away from where they are currently located. Certain businesses would benefit from the relocation of the US 50 entrance into Ocean City by gaining increased visibility and drive-by traffic, while other businesses located at the existing US 50 entrance into Ocean City would lose visibility and drive-by business, and access to these properties would become more circuitous.

c. Tax Base and Property Values Effects

The No-Build Alternative and Alternative 2 would have a negligible affect on the local tax base and local property values. Since there would be no property acquisitions, the tax base and property values would not be directly affected.

Alternatives 4 Modified, 5, and 5A would involve displacements of both residential and commercial buildings and ROW acquisition. The displacements would reduce the tax base through converting commercial or residential land to transportation uses. ROW acquisitions would reduce the value of the original parcel by reducing the size and decreasing adjacent property values. The reduction in revenue caused by the displacements and ROW acquisitions would be minimal in comparison to total tax revenue for Ocean City and Worcester County.

3. Land Use Effects

a. Existing and Future Land Use Effects

The No-Build Alternative and Alternative 2 would not result in any direct change in land use within the study area, as neither requires any displacements or ROW acquisitions.

Alternatives 4 Modified, 5, and 5A would result in the change of commercial land use (which includes some residences) to transportation land use because of the new access required for the proposed new bridges in each alternative. Alternative 4 Modified would convert approximately 5 acres of commercial land use to transportation land use and Alternatives 5 and 5A would convert approximately 3 acres of commercial land use to transportation land use. Because Ocean City has nearly reached build-out, this type of conversion would be required for almost any

transportation improvement that must occur outside the existing transportation corridors. The build alternatives are consistent with local land use plans.

b. Compliance with Smart Growth Initiatives

The Smart Growth Initiative requires state direct funding for highways and economic development to areas that are designated as Priority Funding Areas (PFAs). The project limits are entirely within the Ocean City PFA. Therefore, the project is in compliance with Smart Growth initiatives, regardless of the alternative that is selected.

B. CULTURAL RESOURCES

The requirements of the National Historic Preservation Act of 1966, as amended, are implemented by 36 CFR Part 800. The National Historic Preservation Act regulates the Advisory Council on Historic Preservation (ACHP) and establishes the procedures for compliance with Section 106 of the National Historic Preservation Act. If historic properties listed in, or determined eligible for listing in, the National Register are identified (36 CFR §800.4), the sponsoring agency must assess how its project will affect them. Throughout this assessment, MD SHA and FHWA should work with the MD SHPO and consider the views of others, such as representatives of local governments, property owners, members of the public, and the ACHP. The assessment should use the criteria found in the ACHP's regulations and guidance (36 CFR §800.5).

According to the current guidance, "An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative."

In addition, according to the current guidance, examples of adverse effects on historic properties include, but are not limited to:

(i) Physical destruction of or damage to all or part of the property;
(ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines;
(iii) Removal of the property from its historic location;
(iv) Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
(v) Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features;

(vi) Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and

(vii) Transfer, lease, or sale of property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

In considering the potential effects of the project on the identified resources, the agency may make one of the following three determinations:

- No historic properties affected;
- No historic properties adversely affected; or
- Historic properties adversely affected.

In consultation with the MD SHPO, the FHWA and MD SHA have identified eight cultural resources, all of which are historic standing structures that are eligible for the NRHP and lie within the US 50 Crossing Study APE. The MD SHPO's concurred with the SHA determination of adverse effects on historic properties on December 18, 2007 (**Section V)**.

1. Historic Standing Structures

a. St. Paul's by the Sea Episcopal Church (MIHP No. WO-326)

The St. Paul's by the Sea Episcopal Church is located on the northeast corner of North Baltimore Avenue and Third Street. The MD SHA has determined that none of the project alternatives will impact this property or result in adverse effects. The top of the higher fixed span bridge proposed by Alternative 4 Modified may be partially visible from the St. Paul's by the Sea Episcopal Church, but at a distance of 7 blocks with intervening commercial and residential buildings to screen the view. As such, Alternative 4 Modified will have no adverse effect.

b. Taylor House (MIHP No. WO-331)

The Taylor House is located at the northwest corner of Baltimore Avenue and Talbot Street. None of the project alternatives will impact this property or result in adverse effects due to the distance between the proposed project and this property. In addition, the intervening residential and commercial buildings, as well as the distance, prevent physical, audible, atmospheric or visual impacts to the Taylor House.

c. Edwin L. Purnell Store (MIHP No. WO-336)

The Edwin L. Purnell Store is located on the east side of Baltimore Avenue, north of Dorcester Street. None of the project alternatives will impact this property or result in adverse effects due to the distance between the proposed project and this property. In addition, the intervening residential and commercial buildings, as well as the distance, prevent physical, audible, atmospheric or visual impacts to this property.

d. Town Market (MIHP No. WO-337)

The Town Market is located on the east side of Baltimore Avenue, north of Dorcester Street. None of the project alternatives will impact this property or result in adverse effects due to the distance between the proposed project and this property. In addition, the intervening residential and commercial buildings, as well as the distance, prevent physical, audible, atmospheric or visual impacts to the Town Market.

e. City Hall (MIHP No. WO-341)

The MD SHA has determined that none of the project alternatives will impact this property or result in adverse effects. The top of the higher fixed span bridge proposed by Alternative 4 Modified may be partially visible from City Hall, but at a distance of 7 blocks with intervening commercial and residential buildings to screen the view. As such, Alternative 4 Modified will have no adverse effect.

f. MD SHA Bridge No. 2300700 (MIHP No. WO-461)

The No-Build Alternative involves general maintenance and repair to MD SHA Bridge No. 2300700 and is not an undertaking as defined by 36 CFR Part 800. Alternative 2, Rehabilitation, will cause no adverse effect because the work will be completed in accordance with the Secretary of Interior's Standards for Treatment of Historic Properties (36 CFR Part 68), while the proposed fishing pier, wider sidewalks, and aesthetic treatments are all reversible. Alternative 5 and Alternative 5A will have no adverse effect to the existing bridge. Under both of these alternatives, the new bridge and new road connecting the bridge to Philadelphia Road and US 50 will introduce limited new visual impacts. The proposed bridges for Alternatives 5 and 5A are approximately 45 feet from MD SHA Bridge No. 2300700 and will be built at the same height of the existing bridge. This will not alter any characteristic that qualifies MD SHA Bridge No. 2300700 for the NRHP.

Visual impacts from Alternative 4 Modified will accrue to MD SHA Bridge No. 2300700 due to the proximate location (varies from 10 to 300 feet) to the Alternative 4 Modified bridge. The new bridge would tower 30-feet over the current 15-foot high bridge, and would alter the viewshed of MD SHA Bridge No. 2300700, resulting in adverse effects to the historic structure.

g. Emery-Hartman House (MIHP No. WO-553)

The No-Build Alternative and Alternative 2 will have no impact to the Emery-Hartman House. This determination was made because neither of these alternatives will require right-of-way or permanent easements from the property. Under Alternatives 5 and 5A, the new bridge and new road connecting the bridge to Philadelphia Road and US 50 will introduce limited new visual impacts, but these will not alter any characteristic that qualifies the Emery-Hartman House for the NRHP. Therefore, the MD SHA has determined that these alternatives will have no adverse impact to the Emery-Hartman House.

Visual impacts from Alternative 4 Modified will accrue to the Emery-Hartman House due to the proximate location (approximately 750 feet) to the Alternative 4 Modified bridge. The new bridge would tower 30-feet over the current 15-foot high bridge, and would alter the viewshed of the Emery-Hartman House, resulting in adverse impacts to this historic structure.

h. Francis Scott Key Motel (MIHP No. WO-555)

None of the project alternatives will impact the Francis Scott Key Motel or result in adverse effects due to the distance between the proposed project and this property. In addition, the intervening residential and commercial buildings, as well as the distance, prevent physical, audible, atmospheric or visual impacts to the Town Market.

2. Archeology

No archeological resources eligible for the NRHP would be impacted by the build alternatives for the US 50 Crossing.

i. Conclusion

Eight properties within the APE are listed, or eligible for listing, in the NRHP. Based on the analyses conducted, 2 of these NRHP eligible structures will be adversely impacted by Alternative 4 Modified. Both the MD SHA Bridge No. 2300700 and the Emery-Hartman House will be adversely impacted by Alternative 4 Modified due to the proximate location to the new bridge and the altered viewshed. None of the other historic standing structures will be adversely impacted by any of the Alternatives.

Pursuant to 36 CFR §800.6, FHWA and MD SHA have coordinated with the MD SHPO and other consulting parties throughout the NEPA process to identify and consider options that could avoid, minimize, or mitigate any adverse effects on historic properties. If Alternative 4 Modified is chosen as the Selected Alternative, a Section 106 Memorandum of Agreement (MOA) between the MD SHPO, FHWA, and MD SHA will be completed to address the effects of the project.

C. Natural Resources

The following describes the impacts to natural resources as a result of the build alternatives. The No-Build Alternative would have no impacts on climate, soils, agricultural areas, groundwater, surface water quality, waters of the U.S., floodplains, terrestrial habitat and wildlife, aquatic habitat and wildlife, rare, threatened and endangered species, and impervious areas.

1. Climate

There would be no impacts to the climate as a result of any of the alternatives.

2. Topography, Geology and Soils

a. Impacts

Topography and Geology

Alternatives 4 Modified, 5 and 5A all involve cutting and/or filling due to the proposed roadway realignment at the bridge termini and any necessary ramps on the Ocean City side. The study area topography presents no limitations to the project as there are no steep slopes within the study area.

Soils

The majority of the soils within the study area have a low erosion potential. Mattapex fine sandy loam, which accounts for less than 1 percent of the study area, is considered to have a high erosion potential but is located outside of the proposed area of disturbance for any of the alternatives. Soil disturbances would occur predominantly where land grading is necessary to construct the new roadway approach at the western terminus and to construct the ramps into Ocean City.

The majority of the area of disturbance is urban land and existing impervious surfaces. No hydric soils will be disturbed as part of this project. Best Management Practices (BMP's) will be implemented to decrease erosion effects during and after construction, including structural, vegetative and operational methods.

Alternative 2 (Rehabilitation) would increase impervious areas by approximately 1 percent (0.5 acres) due to the addition of the dedicated fishing pier. Alternative 4 Modified (Fixed Span Bridge), Alternative 5 (South Parallel Bridge) and Alternative 5A (North Parallel Bridge) will increase impervious surface by 10 percent (5.6 acres), 9 percent (5.2 acres) and 9 percent (5.3 acres) respectively.

Prime Farmland Soils

There will be no impacts to Prime Farmland Soils or agricultural land as a result of the project.

3. Water Quality Impacts

a. Groundwater Impacts

Potential impacts to groundwater resulting from the proposed project are expected to be minimal. Potential sources of contaminants to groundwater include point sources and non-point sources. Point sources include landfills, underground storage tanks, surface impoundments, injection wells, spills, storage area and similar facilities. This project will include the construction of stormwater quality control facilities, but it is not anticipated that these types of facilities will contribute to groundwater contamination.

Non-point sources include facilities such as animal lots, onsite sewage facilities, agricultural land (fertilizer and pesticide runoff), and urban runoff. Alternatives 4 Modified, 5 and 5A include the conversion of pervious surfaces to impervious surfaces. The increase in impervious surface is expected to range from 9 to 10 percent, most of which is associated with the bridge deck. The minimal conversion to impervious surface on land is expected to have little to no affect on groundwater recharge rates.

b. Surface Water Impacts

The purpose of the proposed project is to provide a transportation solution for the US 50 crossing of the Sinepuxent Bay. Alternatives 4 Modified, 5 and 5A propose a new crossing in the vicinity of the existing US 50 bridge. No other stream crossings are required for any of the alternatives under consideration.

The Isle of Wight Bay and Sinepuxent Bay are classified as Use II (Shellfish Harvesting Waters) surface waters by the Maryland Department of Natural Resources (DNR). However, the DNR recommends that the Use I instream work time restriction may be more appropriate to protect anadromous fish species known to occur in Sinepuxent Bay, such as herring, shad, striped bass and perch. The Use I in-stream work restriction period is March 1 through June 15, inclusive, during any year. A Section 10/404 permit from the COE and a Tidal Wetlands License from the State of Maryland will be required for any construction in open waters.

c. Avoidance and Minimization

The MDE requires stormwater management for highway development projects and the Critical Area Commission (CAC) requires a net reduction in pollutant loadings for any development or redevelopment within the Intensely Developed Area (IDA) of the Critical Area.
The Critical Area 10% Rule Guidance Manual (CAC, 2003) will be used to determine the amount and types of stormwater management facilities needed to meet the requirements of the Critical Area Act. The criteria set forth in the Critical Area Act require that any development within the IDA be designed with appropriate Best Management Practices (BMPs) to achieve at least a 10 percent reduction of pre-development pollutant (phosphorous) loadings. The additional runoff from the proposed bridges associated with the build alternatives will be factored into the BMPs to ensure all runoff is treated properly by appropriate stormwater facilities.

Best Management Practices (BMPs), as found in the *2003 Critical Area 10% Rule Guidance Manual*, will be used throughout the project to reduce the effects of erosion, sedimentation and pollutant loading on groundwater and the Coastal Bays. These practices could include stormwater management ponds, stormwater wetlands, infiltration, stormwater filtering systems (e.g. bioretention and sand filters), and vegetated open channel systems.

Short-term, localized impacts to water quality would be expected from construction activities associated with the build alternatives. Bridge construction activities would be expected to produce temporary increases in turbidity levels and potential release of nutrients into the water column. In accordance with MDE and the U.S. Environmental Protection Agency (EPA)

regulations, a National Pollutant Discharge Elimination System (NPDES) stormwater permit for construction activities will be required for the proposed bridge construction project.

A grading plan and erosion and sediment (E&S) control plan will be prepared and implemented in accordance with MDE regulations. The grading and E&S control plans will minimize the potential for impacts to water quality from erosion and sedimentation that would occur before, during, and after construction.

4. Jurisdictional Wetlands and Other Waters of the United States

a. Impacts

Impacts to wetlands are expected to be minor. The alternatives on the north side of the existing bridge (Alternative 4 Modified and Alternative 5A) would result in less than 0.04 acre of impact to emergent tidal wetlands located along the north side of US 50 on the western shoreline of Sinepuxent Bay. Alternative 5 would not impact wetlands (**Table IV-2**).

Impacts to open tidal waters are similar for each of the new bridge alternatives (Alternatives 4 Modified, 5 and 5A) and are all around 0.7 acre (**Table IV-2**). These impact estimates are based on the following assumptions: a pier will be located approximately every 100 feet along the entire length of the proposed bridge; each pier will be as long as the proposed roadway (87 feet) and will be 15 feet wide. The waters of the United States (WUS) impact assessment also includes the area of WUS filled to construct the roadway and bridge abutments. The bridge itself was not calculated as an impact to WUS since the height of the proposed bridge does not effectively cover the water surface. Disturbance to WUS during construction for Alternatives 2, 4 Modified, 5 and 5A would likely be within 100 feet of the existing bridge and would be considered a temporary impact. The temporary impact to WUS includes the bottom excavation necessary to set the new footings and any potential dredging needed to mobilize construction equipment.

Table IV-2: Estimated Impacts to Waters of the United States

Alternative	Wetland Impacts		Other WUS Impacts	
	Permanent (Acres)	Temporary (Acres)	Permanent (Acres)	Temporary (Acres)
1: No-Build	0	0	0	0
2: Rehabilitation	0	0	0	0
4 Modified: Fixed Span Bridge	0.03	0.04	0.75	4.6
5: South Parallel Bridge	0	0	0.72	4.6
5A: North Parallel Bridge	0.01	0.02	0.73	4.6

Avoidance and Minimization Efforts

A detailed assessment of the project impacts to wetlands and other WUS has been conducted throughout the planning study in an effort to avoid and minimize impacts to tidal wetlands along Isle of Wight and Sinepuxent Bay. Several of the preliminary alternatives were dropped from

consideration due to excessive impacts to the expansive tidal wetlands north and south of US 50. The alignments of the Alternatives Retained for Detailed Study reflect the efforts taken to minimize impacts to tidal wetlands. The shoreline adjacent to US 50 is predominantly developed and supports only one small tidal wetland near Hooper's Restaurant. Additional measures to minimize impacts to this wetland, such as steep fill slopes, retaining walls, and lengthening the bridge will be considered as the design progresses.

Impacts to open waters of Sinepuxent Bay have been minimized by locating the bridge abutments landward of the mean high tide line. Further minimization efforts will include minimizing the number and size of piers necessary for the bridge construction and utilizing construction techniques to minimize temporary construction impacts to open waters.

b. Wetland/Waterways Mitigation/Permits

Section 404 of the Clean Water Act requires mitigation for unavoidable impacts to wetlands and open waters, as does MDE's Tidal Wetlands regulations (Title 26, Subtitle 24). A permit, or Tidal Wetland License, will be required by the U.S. Army Corps of Engineers (COE) and Maryland Board of Public Works (in coordination with the Maryland Department of the Environment) for impacts to wetlands and tidal waters of the U.S.

A mitigation site search has been initiated to identify and locate potential mitigation sites within the Isle of Wight and Sinepuxent Bay watersheds. Per the wetland regulations, areas of filled open waters and wetlands must be replaced.

It is anticipated that open water mitigation will be required at a 1:1 ratio and that wetland mitigation will be required at a 2:1 ratio. As such, a total of 0.75 acre of open water/wetland mitigation is anticipated. A compensatory mitigation package will be prepared and included in the Final Environmental Impact Statement once a preferred alternative has been identified.

5. Floodplains

The majority of the study area is within the 100-year floodplain of Sinepuxent Bay. Floodplain impacts have been calculated for all of the alternatives (**Table IV-3**). The 100-year floodplain has been delineated using the Federal Emergency Management Administration (FEMA) Flood Insurance Rate Maps. The floodplain within the study area is tidal. The placement of fill in tidal floodplains at the bridge abutments and approaches will not result in increased floodplain elevation or frequency. The anticipated impacts to floodplains range from 1.1 acres to 4.3 acres.

Tidal floodplains are not regulated by the MDE as waters of the State. SHA will continue to coordinate with the COE on the permit required for impacts or disturbance to tidal floodplains.

Table IV-3: Estimated Impacts to Floodplains

Alternative	Acres
1: No-Build	0
2: Rehabilitation	0
4 Modified: Fixed Span Bridge	4.3
5: South Parallel Bridge	1.1
5A: North Parallel Bridge	1.6

6. Chesapeake and Atlantic Coastal Bays Critical Area

Alternatives 4 Modified, 5 and 5A would have impacts on the Critical Area - Intensely Developed Area (IDA) and the 100-foot buffer on both the west and east ends of the bridge. The anticipated impacts from disturbance include removal of vegetation, placement of fill, and increased impervious area. The impacts are associated with the tie-in of the bridge to existing US 50 on the west end and to city streets on the east end.

The No-Build Alternative and Alternative 2 would result in no impacts within the Critical Area. Alternative 4 Modified would result in disturbance of 5.8 acres within the IDA and 1.2 acres of the 100-foot Critical Area buffer. Alternative 5 would result in disturbance to 2.2 acres within the IDA and 1.0 acre of the 100-foot buffer. Alternative 5A would result in disturbance to 2.5 acres within the IDA and to 1.2 acres of the 100-foot buffer.

Mitigation in the form of reforestation will be required for disturbance within the Critical Area (1:1) and its 100-foot buffer (3:1).

7. Terrestrial and Aquatic Habitat and Wildlife

a. Terrestrial Habitat and Wildlife Impacts

Forest & Significant Tree Impacts

There are no forests located within the study area. Therefore, no forest would be impacted by any of the alternatives. There are no large or significant trees located within the study area. Therefore, no large or significant trees would be impacted by any of the alternatives.

FIDS Impacts

There is no forest interior dwelling species (FIDS) habitat located within the study area. Therefore, no FIDS habitat would be affected by any of the alternatives.

Terrestrial Wildlife Impacts

Since the new bridge alternatives would only provide tie-ins from the proposed bridge back to existing US 50 on the west end and city streets on the east end, and Alternatives 1 and 2 affect

only the bridge structure itself, minimal to no impact on wildlife communities and habitat is anticipated. None of the alternatives would affect the passage of wildlife into or out of any habitat areas.

b. Aquatic Habitat and Wildlife / Fisheries Impacts

Alternative 2 would have few, if any, impacts to the waterway. If dredging is required for construction access for Alternative 2, it would constitute a temporary impact to the bay bottom.

Alternatives 4 Modified, 5 and 5A would have short-term and long-term impacts to finfish in the project area. Construction activities associated with a new bridge would likely cause short-term direct in-water disturbances, such as suspension of sediment. Increased turbidity would likely result in decreased fish utilization while the turbidity persists. Because the coastal bay sediments in the project area are relatively free of contaminants, no toxic releases are expected. Some increases of nutrient levels may occur locally due to sediment disturbance, but this is expected to dissipate quickly due to the strong currents in the area.

Dredging may need to occur to mobilize construction equipment on site and bottom excavation would need to occur in order to set the new bridge footings. Short-term suspension of sediment from dredging and/or excavation activities may result in direct impacts to feeding ability of fish and suffocation of fish eggs and larvae, while the dredging activity itself may result in entrainment of some fish eggs and larvae. This disturbance is not expected to be significant because the coastal bays in the vicinity of the inlet are high energy, dynamic areas with very strong tidal currents. Species living in these habitats are largely adapted to these conditions and the displaced species should rapidly re-populate the area after construction has ceased.

The footings would permanently impact approximately 31,320 sq. ft of the bay bottom, while excavation for the footing placement would have short-term impacts to approximately 200,000 sq. ft. of the bay bottom. In addition, the excavation may result in long-term impacts including loss of habitat utilized by fish for foraging and nursery area. Construction would also involve activities such as pile driving that would create short-term noise and pressure wave disturbances in the waterway that would cease when construction is complete.

The build alternatives would result in increased shading of some of the waterway, which is not expected to adversely impact fish utilization. The increase of hard structure of the footings would eventually colonize with epibenthic fauna (species living on the bay bottom) and serve as habitat for structure-oriented fish species (e.g. striped bass).

No Submerged Aquatic Vegetation (SAV) occurs in the project area (potential footprints of Alternatives 4 Modified, 5, or 5A) and recent surveys have indicated that the natural low water clarity makes the area poor SAV habitat (Koch 2007). As such, the slight deepening of the waterway that is likely to occur due to excavation and construction would not impact this resource or affect the fish species that rely upon it as critical habitat. A summary of the relative risk to each life stage, prey, and habitat of each Essential Fish Habitat (EFH) species that may be found in the project area can be found in **Table IV-4**.

The habitat impacts caused by the proposed bridge construction project would not reduce the carrying capacity of the coastal bays for finfish. Consequently, the proposed project complies with the provisions of the Magnuson-Stevens Act, as amended. The Magnuson-Stevens Act is the primary law governing marine fisheries management in United States federal waters. The Federal Highway Administration received comments and recommendations from National Oceanic and Atmospheric Administration – National Marine Fisheries Service (NOAA – Fisheries) on this determination on December 17, 2007.

c. Avoidance and Minimization

The protection of aquatic habitat and the fish species within the study area is of utmost importance. The impacts to fish are most likely to occur during construction. BMPs, such as turbidity curtains, may be employed to avoid and minimize the potential for re-suspended sediment movement and transport away from the construction site. In addition, pile driving of hollow steel piles greater than 4-feet in diameter can cause an oscillation that is lethal to fish. Studies indicated that six pounds per square inch (psi) is the mortality threshold for pressure and that a lower value of four psi is appropriate to account for variations in equipment, driving energy, and the environment. If steel pilings over 4 feet in diameter are required for bridge construction, mitigation (sound dampening techniques) would be required. The driving of piles will be conducted during the appropriate time of year to minimize the effects on fish. Bubble curtains may be used to minimize the shock wave effects of driving piles. Pressure waves below four psi would need to be maintained during pile driving in order to be protective of fish (Colligan 2003). Power-driving of large diameter hollow steel piles will be conducted during the appropriate time of year (e.g., winter months) to minimize the effects on fish. Bubble curtains contained within a "can" (i.e., a large diameter piling surrounding the steel pile being power-driven) may be used to minimize the shock wave effects of the pile driving action. Consultation with the DNR, US Fish and Wildlife Service (USFWS) and NOAA - Fisheries is ongoing and will continue throughout the planning, design and construction process in an effort to avoid, or minimize, impacts to fish and other important aquatic wildlife.

Table IV-4: Relative Risk to EFH Species as a Result of the Proposed Project

Species	Life stages				Habitat	Prey
	Eggs	Larvae/ Neonate	Juveniles/ Subadult	Adults		
Red Hake	none [1,2]	none [1,2]	low [3,5]	N/A	none / low	temporary, minor
Winter Flounder	N/A	N/A	moderate [3]	low	low [4]	temporary, minor
Windowpane Flounder	none [1]	none [1]	low [3,5]	low [3,5]	low [4]	temporary, minor
Atlantic Sea Herring	N/A	N/A	low [5]	low [5]	none	none
Bluefish	N/A	N/A	low [3,5]	N/A	low [4]	temporary, minor
Atlantic Butterfish	none [2]	N/A	low [3,5]	low [3,5]	none	temporary, minor
Summer Flounder	N/A	high [3,6]	low [3,5]	low [3,5]	low	temporary, minor
Scup	N/A	N/A	low [3,6]	low [2,5]	low [4]	temporary, minor
Black Sea Bass	N/A	N/A	moderate [3]	low [2,5]	low [4]	temporary, minor

Species	Life Stages				Habitat	Prey
	Eggs	Larvae/ Neonate	Juveniles/ Subadult	Adults		
Surf Clam	N/A	N/A	none [2]	N/A	none	none
King Mackerel	low [1,2]	low [1,2]	low [3,5,7]	low [3,5,7]	none	none
Spanish Mackerel	low [1,2]	low [1,2]	low [3,5,7]	low [3,5,7]	low [4]	none
Cobia	none [2]	none [2]	low [3,5]	low [3,5]	low [4]	low
Red Drum	low [2]	low [2]	low [2,5]	low [2,5]	none	low
Sand Tiger Shark	N/A	N/A	low [5]	none [2,5]	temporary, low [8]	temporary, minor
Atlantic Angel Shark	N/A	low [5]	low [5]	low [5]	temporary, low [8]	temporary, minor
Dusky Shark	N/A	low [5]	low [5]	N/A	temporary, low [8]	temporary, minor
Sandbar Shark	N/A	low [5]	low [5]	none [2,5]	temporary, low [8]	temporary, minor

Key:
1 – spawning occurs offshore, very early life stages not found in coastal bays
2 – life stage rare/non-existent in project area
3 – life stage known to occur in project area
4 – minor, short-term habitat impacts during construction
5 – highly mobile species/life stage; species able to avoid project area during construction
6 – immobile life stage; life stage unable to avoid project area during construction
7 – low abundance of this species/life stages
8 – inshore habitat usage poorly understood

NOAA - Fisheries will require a time-of-year restriction on specific construction activities (e.g., dredging, by any method, power-driving of hollow steel piles exceeding 4' in diameter, installation and removal of cofferdams) April 1-June 30, during the period of maximum abundance of early juvenile summer flounder in the coastal bays. In addition, if power-driving of large diameter (> 48 inches) hollow steel piles is required for this project, shock wave levels should be monitored immediately outside the "can" or sheath encasing the a pile during power-driving, to ascertain that underwater sound oscillations do not exceed the 4 pounds per square inch (psi) threshold identified in the assessment. If oscillations continually exceed 4 psi during power-driving activity, and/or fish mortality is observed in the vicinity of the activity, corrective measures should be taken immediately. These measures may include: 1) decreasing the diameter of the "can" to better consolidate the air bubble curtain; 2) increasing the intensity of the air bubble curtain within the "can". Power driving activity will be suspended until oscillations are reduced to or below the 4 psi threshold.

8. Rare, Threatened and Endangered Species

a. Impacts

Colonial Nesting Waterbirds

Skimmer Island, located north of the existing US 50 bridge, provides nesting habitat for the State-listed endangered royal tern (*Sterna maxima*) and black skimmer (*Rhynchops niger*) and several other colonial nesting waterbird species of conservation interest. There are no anticipated direct impacts to Skimmer Island, or to the rare, threatened and endangered (RT&E) species or their nesting habitat from any of the alternatives. However, potential indirect impacts may include increased potential for conflicts between traffic and birds in flight; the potential migration of Skimmer Island to the south which would place Skimmer Island closer to the existing and/or new bridges; the potential erosion of Skimmer Island due to changes in the Bay's hydraulics; and disturbance to the colonial nesting waterbirds during construction.

Skimmer Island and similar landforms may be steadily migrating to the south, leading to concerns that Skimmer Island may eventually move underneath or south of the existing US 50 bridge. MD SHA recognizes our responsibility to consider the project's future actions under the provisions of Title 08 in COMAR regarding the potential to "jeopardize the continued existence" of the colonial nesting bird species utilizing Skimmer Island and protected by Natural Resources Article 10-2A.

DNR has expressed concern that the existing bridge and past scour protection measures have already affected the hydrodynamics of Sinepuxent Bay and may be causing the erosion and possible migration of Skimmer Island to the south. Therefore, the MD SHA conducted a detailed study of the sand migration and hydraulic patterns in the Bay. The Sand Migration/Hydrodynamic Model CMS-M2D Version 3.2 predicted the effect of each alternative (including the No-Build and Rehabilitation Alternative (Alternative 2)) on the sand migration patterns of Skimmer Island and shoals in the Bay. The model also examined the impacts of bridge changes on Skimmer Island and the flood shoals/channels. For the build alternatives, the model assumed the piers for the proposed bridges were spaced at 150 feet.

The model includes information that Skimmer Island formed at, and partially underneath, the U.S. 50 bridge and has migrated to the north from 1952 until the bridge was armored (for scour protection) in the late 1980's. This movement and evolution was primarily due to the effects of the Ocean City inlet and effects of the bridge. Further review of the evolution of Skimmer Island indicates that it is now getting smaller, but increasing in elevation, allowing Skimmer Island to become vegetated. The data suggests that Skimmer Island is now migrating to the south, and may migrate to the bridge in 20-25 years. The affects of the build alternatives on the migration of Skimmer Island is discussed in **Table IV-5**.

Please refer to **Table IV-5** for a summary of anticipated impacts determined by the model for all of the alternatives.

Table IV-5. Anticipated Impacts Determined by the Sand Migration Modeling

Alternative	Sedimentation	Hydraulics	Shorelines	Navigation
Alternative 1 (No-Build) and Alternative 2 (Rehabilitation	Skimmer Island slowly migrating west southwest, deposition west of the west channel, east channel widens, flood shoal accumulations south of bridge will be driven north by ocean swells, and deposition in channels south of bridge.	High velocity flows continue east of channel. During flood tide, high velocity flows also occur in the central flood shoal, diverging at the existing scour protection rock beneath the bridge.	Slow sediment deposition along western shoreline. East channel deepens along bulkhead. Continued entry and reflection of ocean swell south of bridge.	Continued high flows in east channel and difficulties under draw span. Deposition in west channels south of bridge.
Alternative 4 Modified	Same as the No-Build Alternative, except this alternative slightly reduces sediment driven north of bridge by ocean swell.	Slightly lowered currents south of existing bridge and in the east and west channels. Increased current south and east of Skimmer Island, in the main channel beneath the draw span, and between the new bridge supports.	Same as the No-Build Alternative	Same as the No-Build Alternative
Alternative 5	Same as Alternative 4 Modified, except this alternative further reduces sediment driven north of bridge by ocean swell and may reduce migration rate of Skimmer Island to the west and southwest.	Same as Alternative 4 Modified, except that current south and east of Skimmer Island does not appear to increase.	Same as the No-Build Alternative	Same as the No-Build Alternative
Alternative 5A	Same as Alternative 4 Modified	Same as Alternative 4 Modified	Same as the No-Build Alternative	Same as the No-Build Alternative

The conclusion of the modeling is that the existing rock scour protection of the existing bridge provides a primary control over the hydraulics and sedimentation processes in the area. The existing bridge pilings also play a significant role in controlling hydraulic and sedimentation. The build alternatives would affect the hydraulics and sedimentation in a very local vicinity

(1,500 feet from new construction) of the proposed new bridges, but the far-field conditions will continue and evolve in a manner similar to the No-Build Alternative.

Continued coordination with DNR will be conducted to ensure that the alternatives design and ultimate construction will not adversely affect the State-listed endangered species or their habitat. If adverse impacts are unavoidable, MD SHA will coordinate with DNR to ensure that the appropriate mitigation is used.

Marine Turtles

The No-Build Alternative would have no impacts to marine turtle individuals, habitat, or prey. There are only impacts associated with Alternative 2 if dredging is required. Impacts associated with the other build alternatives would be the same and are described in the following sections.

Impacts to Individuals

Sea turtles are generally only found in the coastal bays during warmer months and are generally incidental, summer transients. Of the five Federally threatened and endangered sea turtle species of concern (green, hawksbill, Kemp's ridley, leatherback, and loggerhead turtles), loggerheads are most likely to be found in the coastal bays based on stranding data (Kimmel 2004). From 1991 to 2003, 161 loggerhead sea turtles were stranded along Maryland's Atlantic Coast and nine of these individuals were stranded within the Sinepuxent or Isle of Wight Bays (Kimmel 2004). Only 11 sea turtle strandings, comprised of loggerhead, Kemp's ridley, and green, have been recorded in the Sinepuxent and Isle of Wight Bays from 1991 to 2003 (Kimmel 2004).

Construction activities associated with the build alternatives would likely dissuade sea turtles from utilizing the area during construction. However, increased number of boats and vessel traffic during the construction period may result in increased collisions between sea turtles and boats or equipment. Based on consultations with NOAA Fisheries staff, driving large diameter (> 48-inch) steel piles is unlikely to have a lethal effect on sea turtles but would likely cause them to avoid the construction area (Crocker 2007). These impacts are expected to be negligible since sea turtles are more commonly found along the ocean coast of Maryland than within the Coastal Bays. Stranding data indicates that a substantially higher number of individuals were found along the ocean coasts than were found within the coastal bays over the 13 year study period (Kimmel 2004).

Impacts to Habitat

Since there is no designated critical habitat within the project area, no impacts to sea turtle critical habitat are anticipated. No nesting for sea turtles is known to occur in Maryland waters or along the Maryland coastline (NOAA - Fisheries and USFWS 1991a, 1991b, 1992, 1993; USFWS and NOAA - Fisheries 1992). Hawksbill turtles are found only rarely north of Florida and are unlikely to be using the project area; therefore, no impacts to hawksbill habitat are anticipated. However, the coastal bays may be used as developmental and foraging habitat by other species of sea turtles in the summer months. A Biological Assessment, in accordance with Section 7 consultation, has been completed to determine the presence of, and potential impact to,

marine turtles within the Coastal Bays. The NOAA - Fisheries is currently in the process of preparing a formal response, which will be included in the FEIS.

Aquatic Species

The only State of Maryland listed aquatic species known to exist in the Maryland coastal bays is the spotfin killifish, *Fundulus luciae*. The current status of the spotfin killifish is rare, and it is actively tracked by the DNR Wildlife Heritage Service. The build alternatives are expected to have minimal, if any, direct impacts to spotfin killifish since their preferred habitat is intertidal marshes. Temporary impacts to water quality (increased turbidity) temporarily reduce the local abundance of prey species including phytoplankton, zooplankton, and small benthic organisms. Destruction of near shore habitat including tidal wetlands may reduce habitat and foraging areas for spotfin killifish.

b. Avoidance and Minimization

As part of the development of the build alternatives, several measures have been introduced in order to avoid or minimize the impacts to the natural environment. Avoidance and minimization efforts include, but are not limited to, lengthening the bridge structure, using steeper fill slopes and retaining walls, minimizing the proposed bridge width, utilizing the existing historic bridge for pedestrian and fishing, minimizing the approach roadway improvements, and modeling the hydrodynamic characteristics to ensure minimum affects to the flow dynamics of the Bay.

Colonial Nesting Waterbirds

The sand migration model will be used to modify the pier placement locations and/or adjust the pier spacing in an effort to direct the flows in such a way that Skimmer Island and other shoal systems are not affected by the project. Other options under consideration to reverse the possible migration and degradation of Skimmer Island may include the removal of some of the scour protection under the existing bridge to reduce the "weir" effect and provide increased sand availability to Skimmer Island. These design efforts may result in increased habitat for the colonial nesting bird species of concern and the stabilization of Skimmer Island (i.e. halting the southern migration). MD SHA will continue to refine the bridge pier spacing/size options and scour protection options in an effort to avoid and minimize impacts to Skimmer Island.

Marine Turtles

Construction activities are only a short-term disturbance that would affect an area of approximately 200,000 square feet. Potential impacts to sea turtles as a result of construction could be minimized by avoiding in-water construction, to the maximum extent practicable, from April 1st to November 30th. Sea turtles are typically found in the coastal bays during warmer months and are incidental, summer transients. The permanent bridge in-water structures are not anticipated to have an impact on sea turtles.

Impacts to sea turtles could be minimized by conducting in-water construction activities outside the known window of sea turtle occurrences in Maryland (April 1st through November 30th). Construction mitigation such as sound dampening techniques may reduce the effects of pile driving which can cause the marine turtles to leave the area. Also, only a mechanical clamshell or hydraulic cutterhead pipeline dredge will be used for dredging. This is much safer dreging equipment around marine turtle habitat.

Aquatic Species

The protection of aquatic habitat and the fish species within the study area is of utmost importance. The impacts to fish are most likely to occur during construction. Pile driving of hollow steel piles greater than 4 feet in diameter can cause an oscillation that is lethal to fish. If larger sized piles are required, construction mitigation (sound dampening techniques) would be required. BMPs, such as turbidity curtains, may be employed to minimize re-suspended sediment movement and transport away from the construction site. In addition, dredging, power-driving of large hollow steel piles (exceeding 4' in diameter), and cofferdam installation and removal will be restricted from April 1 – June 30, during the period of maximum abundance of early juvenile summer flounder in the coastal bays. Bubble curtains contained by a "can" may be used to minimize the shock wave effects of power driving large diameter hollow steel piles. Consultation with the DNR, US Fish and Wildlife Service and NOAA - National Marine Fisheries Service is ongoing and will continue throughout the planning, design and construction process in an effort to avoid, or minimize, impacts to fish and other important aquatic wildlife.

D. HAZARDOUS MATERIALS/WASTE IMPACTS

1. Potential Hazardous Materials Site Impacts

Several inventoried hazardous materials sites have the potential to be impacted by the project alternatives: 4 Modified, 5, and 5A (**Table IV-6**). Depending on the design and depth of required grading, subsurface water pipes, foundations, Underground Storage Tanks (USTs), and associated soil and groundwater could be impacted. Further investigation into the specific location of reported permanently out-of-use USTs in relation to the proposed US 50 bridge construction activities is recommended before property is purchased and construction is initiated.

Sites that may be potentially impacted by one of the build alternatives are identified below in **Table IV-6**. For more information and observations on each site refer to **Table III-14** in **Section III.D.3.** The following site locations are shown on **Figure III-11**.

Table IV-6. Impacts to Hazardous Wastes Sites

Site # (Parcel #) & Location	Risk Ranking	Impact Type	Alternative
Site 1 (**Parcel # 3968**) is located on the northeast side of the US 50 Bridge, and is bordered to the west by the	High	Displacement	Alternative 4 Modified

Table IV-6. Impacts to Hazardous Wastes Sites

Site # (Parcel #) & Location	Risk Ranking	Impact Type	Alternative
Sinepuxent Bay and to the north by 1st Street.			
Site 2 (**Parcel #'s 4004, 4005, and 4006**) is is made up of three parcels and is located along the west side of Philadelphia Avenue, between North Division Street and 1st Street, which is northeast of the US 50 Bridge.	High	Displacement	Alternative 4 Modified
Site 3 (**Parcel # 2466**) is located at the northwest corner of the intersection of St. Louis Avenue and Talbot Street, which is southeast of the US 50 Bridge.	Low	No impact	No impact
Site 4 (**Parcels # 2570 and 2571**) is located on Philadelphia Avenue, south of North Division Street and east of the US 50 Bridge.	High	No impact	No impact
Site 5 (**Parcel # 2458**) is located on Talbot Street, south of the US 50 Bridge. The building on this parcel consists of a restaurant and an office.	High	Displacement	Alternative 5
Site 6 (**Parcel #227**) is located on the southwest side of the US 50 Bridge on Marina View Lane.	High	Displacement	Alternative 5
Site 7 (**Parcel #0569**) is located on the northwest side of the US 50 Bridge on US 50 (Ocean Gateway Highway).	Low / Medium	Minimal property impacts	Alternative 4 Modified & Alternative 5A
Site 8 (**Parcel #4035**) is located at the corner of 2nd Street and Philadelphia Avenue.	High	Displacement	Alternative 4 Modified
Site 9 (**Parcel #4036**) is located at 108 Philadelphia Ave next to parcel #4035.	High	Displacement	Alternative 4 Modified
Site 10 (**Parcel #3967**) is located at the northeast section of the St. Louis	High	Displacement	Alternative 4 Modified

Table IV-6. Impacts to Hazardous Wastes Sites

Site # (Parcel #) & Location	Risk Ranking	Impact Type	Alternative
Avenue/1st Street intersection.			
Site 11 (**Parcel #3969**) is located at 17 – 27 St. Louis Avenue.	High	Displacement	Alternative 4 Modified
Site 12 (**Parcel #3948-1**) is located at 203 Philadelphia Avenue. The parcel is currently occupied by Western Auto automobile parts sales facility.	High	Displacement	Alternative 4 Modified

E. AIR QUALITY

1. Methodology

To determine if the US 50 Crossing Study – Ocean City project meets the requirements of the federal Clean Air Act (CAA), an air quality impact assessment was conducted. The complete analysis is documented in the *Air Quality Technical Report*, published separately and was submitted to the Air and Radiation Management Administration of the MDE and the EPA.

Air Quality Receptor Sites for this project were selected to ensure adequate coverage of the project area. Both free-flow and queuing analysis sites were used to predict existing and future air quality indicator pollutant levels. Free-flow receptor sites were generally placed adjacent to portions of the roadway that experience steady-state traffic flow and represent areas of potential human use within the project area. The Queuing Analysis receptor sites were selected to represent a modeling array in close proximity to the three worst-case intersections in the project area anticipated to experience future LOS of class "D" or lower.

The queuing analysis sites are uniform for the majority of the alternatives; Alternative 4 Modified required analysis of discrete receptors due to the re-design of multiple intersections.

2. Predicted Results of Micro-scale Analysis

Carbon Monoxide (CO)

None of the receptor sites in the project area yielded worst-case CO emissions in excess of the 1-hour National Ambient Air Quality Standards (NAAQS) of 35 parts per million (ppm) or 8-hour NAAQS of 9.0 ppm. Predicted CO concentrations were consistent through all cases, with the highest future concentrations found (as anticipated) near intersections at the queuing analysis receptors.

The 8-hour concentration levels were derived from the computer modeled 1-hour concentrations. Following the computation of the 1-hour concentration levels (using the MOBILE 6.2 and CAL3QHC models); a persistence factor is applied to the CO emission levels.

This persistence factor accounts for atmospheric dispersion over time, and is represented as a 0.7 multiplier in accordance with EPA modeling guidelines. The maximum calculated 1-hour and 8-hour CO concentrations are as follows:

- 6.7 ppm (1 hour) / 4.7 ppm (8 hour) for the existing facility (2004);
- 5.4 ppm (1 hour) / 3.8 ppm (8 hour) for Alternative 1 No-Build (2030);
- 5.7 ppm (1 hour) / 4.0 ppm (8 hour) for Alternative 4 Modified;
- 5.4 ppm (1 hour) / 3.8 ppm (8 hour) for Alternative 5; and
- 5.4 ppm (1 hour) / 3.8 ppm (8 hour) for Alternative 5A.

Table IV-7 shows the individual 1-hour and 8-hour queue analysis CO concentration levels at each receptor site for the build alternatives.

Table IV-7. Modeled Queuing Analysis CO Emissions in ppm

Receptor ID	Existing (2004)			No-Build (2030)			Alternative 4 Modified (2030)			Alternative 5 (2030)			Alternative 5A (2030)	
	1-hour	8-hour		1-hour	8-hour		1-hour	8-hour		1-hour	8-hour		1-hour	8-hour
US 50/Route 611														
1	5.2	3.6		4.6	3.2		4.6	3.2		4.6	3.2		4.6	3.2
2	4.8	3.4		4.3	3.0		4.3	3.0		4.3	3.0		4.3	3.0
3	4.7	3.3		4.0	2.8		4.0	2.8		4.0	2.8		4.0	2.8
4	4.8	3.4		4.4	3.1		4.4	3.1		4.4	3.1		4.4	3.1
5	4.4	3.1		4.4	3.1		4.4	3.1		4.4	3.1		4.4	3.1
6	**5.7**	**4.0**		**5.2**	**3.6**		**5.2**	**3.6**		**5.2**	**3.6**		**5.2**	**3.6**
7	5.1	3.6		4.4	3.1		4.4	3.1		4.4	3.1		4.4	3.1
8	5.6	3.9		4.5	3.2		4.5	3.2		4.5	3.2		4.5	3.2
9	5.3	3.7		4.8	3.4		4.8	3.4		4.8	3.4		4.8	3.4
10	4.9	3.4		4.6	3.2		4.6	3.2		4.6	3.2		4.6	3.2
11	4.8	3.4		4.4	3.1		4.4	3.1		4.4	3.1		4.4	3.1
12	4.7	3.3		4.3	3.0		4.3	3.0		4.3	3.0		4.3	3.0
13	4.5	3.2		4.2	2.9		4.2	2.9		4.2	2.9		4.2	2.9
14	4.7	3.3		4.4	3.1		4.4	3.1		4.4	3.1		4.4	3.1
15	4.6	3.2		4.3	3.0		4.3	3.0		4.3	3.0		4.3	3.0
16	5	3.5		4.4	3.1		4.4	3.1		4.4	3.1		4.4	3.1
17	4.6	3.2		4.2	2.9		4.2	2.9		4.2	2.9		4.2	2.9
18	4.4	3.1		4	2.8		4	2.8		4	2.8		4	2.8
19	5	3.5		4.4	3.1		4.4	3.1		4.4	3.1		4.4	3.1
20	4.8	3.4		4.4	3.1		4.4	3.1		4.4	3.1		4.4	3.1
US 50/Golf Course Road														
1	6.3	4.4		4.7	3.3		4.7	3.3		4.7	3.3		4.7	3.3
2	5.7	4.0		4.3	3.0		4.3	3.0		4.3	3.0		4.3	3.0
3	5.4	3.8		4	2.8		4	2.8		4	2.8		4	2.8

Table IV-7. Modeled Queuing Analysis CO Emissions in ppm

Receptor ID	Existing (2004)		No-Build (2030)		Alternative 4 Modified (2030)		Alternative 5 (2030)		Alternative 5A (2030)	
4	5.9	4.1	4.4	3.1	4.4	3.1	4.4	3.1	4.4	3.1
5	5.7	4.0	4.4	3.1	4.4	3.1	4.4	3.1	4.4	3.1
6	**6.7**	**4.7**	**5.2**	**3.6**	**5.2**	**3.6**	**5.2**	**3.6**	**5.2**	**3.6**
7	6.2	4.3	4.8	3.4	4.8	3.4	4.8	3.4	4.8	3.4
8	6.5	4.6	4.5	3.2	4.5	3.2	4.5	3.2	4.5	3.2
9	6.7	4.7	4.8	3.4	4.8	3.4	4.8	3.4	4.8	3.4
10	6.5	4.6	4.6	3.2	4.6	3.2	4.6	3.2	4.6	3.2
11	6.1	4.3	4.5	3.2	4.5	3.2	4.5	3.2	4.5	3.2
12	6	4.2	4.3	3.0	4.3	3.0	4.3	3.0	4.3	3.0
13	5.5	3.9	4.1	2.9	4.1	2.9	4.1	2.9	4.1	2.9
14	6.2	4.3	4.4	3.1	4.4	3.1	4.4	3.1	4.4	3.1
15	6.1	4.3	4.3	3.0	4.3	3.0	4.3	3.0	4.3	3.0
16	6.2	4.3	4.5	3.2	4.5	3.2	4.5	3.2	4.5	3.2
17	5.6	3.9	4.3	3.0	4.3	3.0	4.3	3.0	4.3	3.0
18	5.3	3.7	4.1	2.9	4.1	2.9	4.1	2.9	4.1	2.9
19	6.2	4.3	4.5	3.2	4.5	3.2	4.5	3.2	4.5	3.2
20	6	4.2	4.5	3.2	4.5	3.2	4.5	3.2	4.5	3.2

Table IV-7. Modeled Queuing Analysis CO Emissions in ppm (continued)

Receptor ID	Existing (2004)		No-Build (2030)		Alternative 4 Modified (2030)		Alternative 5 (2030)		Alternative 5A (2030)	
	1-hour	8-hour	1-hour	8-hour	1-hour	8-hour	1-hour	8-hour	1-hour	8-hour
US 50/ Philadelphia Ave (MD 528)										
1	4.4	3.1	4.2	2.9	N/A		4.2	2.9	4.2	2.9
2	4.3	3.0	4.1	2.9	N/A		4.1	2.9	4.1	2.9
3	4	2.8	3.8	2.7	N/A		3.8	2.7	3.8	2.7
4	4.2	2.9	4	2.8	N/A		4	2.8	4	2.8
5	4	2.8	3.9	2.7	N/A		3.9	2.7	3.9	2.7
6	5.4	3.8	5.1	3.6	N/A		5.1	3.6	5.1	3.6
7	5.3	3.7	5.1	3.6	N/A		5.1	3.6	5.1	3.6
8	5.1	3.6	4.9	3.4	N/A		4.9	3.4	4.9	3.4
9	5.1	3.6	4.6	3.2	N/A		4.6	3.2	4.6	3.2
10	4.9	3.4	4.5	3.2	N/A		4.5	3.2	4.5	3.2
11	5	3.5	4.6	3.2	N/A		4.6	3.2	4.6	3.2
12	4.4	3.1	4.2	2.9	N/A		4.2	2.9	4.2	2.9
13	4.1	2.9	4	2.8	N/A		4	2.8	4	2.8
14	5.3	3.7	4.9	3.4	N/A		4.9	3.4	4.9	3.4
15	5.5	3.9	5.2	3.6	N/A		5.2	3.6	5.2	3.6
16	**5.9**	**4.1**	5.2	3.6	N/A		5.2	3.6	5.2	3.6
17	5.4	3.8	4.9	3.4	N/A		4.9	3.4	4.9	3.4
18	5.1	3.6	4.6	3.2	N/A		4.6	3.2	4.6	3.2
19	5.8	4.1	**5.4**	**3.8**	N/A		**5.4**	**3.8**	**5.4**	**3.8**
20	5.1	3.6	4.9	3.4	N/A		4.9	3.4	4.9	3.4

Receptor ID	Existing (2004)		No-Build (2030)		Alternative 4 Modified (2030)		Alternative 5 (2030)		Alternative 5A (2030)
Baltimore Ave (MD 378) and 3rd St									
1	N/A		N/A		**4.8**	**3.4**	N/A		N/A
2	N/A		N/A		4.3	3.0	N/A		N/A
3	N/A		N/A		4.2	2.9	N/A		N/A
4	N/A		N/A		4.2	2.9	N/A		N/A
5	N/A		N/A		4.2	2.9	N/A		N/A
6	N/A		N/A		4.6	3.2	N/A		N/A
7	N/A		N/A		4.6	3.2	N/A		N/A
8	N/A		N/A		4.6	3.2	N/A		N/A
9	N/A		N/A		4.2	2.9	N/A		N/A
10	N/A		N/A		4.1	2.9	N/A		N/A
11	N/A		N/A		4.1	2.9	N/A		N/A
12	N/A		N/A		3.9	2.7	N/A		N/A
13	N/A		N/A		4.1	2.9	N/A		N/A
14	N/A		N/A		4	2.8	N/A		N/A
15	N/A		N/A		3.8	2.7	N/A		N/A
16	N/A		N/A		4.3	3.0	N/A		N/A
17	N/A		N/A		4.5	3.2	N/A		N/A
18	N/A		N/A		4.4	3.1	N/A		N/A
19	N/A		N/A		4	2.8	N/A		N/A
20	N/A		N/A		3.9	2.7	N/A		N/A

Table IV-7. Modeled Queuing Analysis CO Emissions in ppm (continued)

Receptor ID	Existing (2004)			No-Build (2030)			Alternative 4 Modified (2030)			Alternative 5 (2030)			Alternative 5A (2030)	
	1-hour	8-hour		1-hour	8-hour		1-hour	8-hour		1-hour	8-hour		1-hour	8-hour
Philadelphia Ave(MD 528)/ Talbot Ave														
1	N/A			N/A			5.1	3.6		N/A			N/A	
2	N/A			N/A			4.8	3.4		N/A			N/A	
3	N/A			N/A			4.5	3.2		N/A			N/A	
4	N/A			N/A			4.6	3.2		N/A			N/A	
5	N/A			N/A			4.4	3.1		N/A			N/A	
6	N/A			N/A			4.8	3.4		N/A			N/A	
7	N/A			N/A			4.8	3.4		N/A			N/A	
8	N/A			N/A			4.8	3.4		N/A			N/A	
9	N/A			N/A			4.5	3.2		N/A			N/A	
10	N/A			N/A			4.4	3.1		N/A			N/A	
11	N/A			N/A			**5.7**	**4.0**		N/A			N/A	
12	N/A			N/A			5.1	3.6		N/A			N/A	
13	N/A			N/A			4.7	3.3		N/A			N/A	
14	N/A			N/A			5.1	3.6		N/A			N/A	
15	N/A			N/A			4.8	3.4		N/A			N/A	
16	N/A			N/A			5.4	3.8		N/A			N/A	
17	N/A			N/A			5	3.5		N/A			N/A	
18	N/A			N/A			4.8	3.4		N/A			N/A	

Receptor ID	Existing (2004)		No-Build (2030)		Alternative 4 Modified (2030)			Alternative 5 (2030)		Alternative 5A (2030)
19	N/A		N/A		5.2	3.6		N/A		N/A
20	N/A		N/A		4.9	3.4		N/A		N/A

The NAAQS Primary Standards for Carbon Monoxide: **1 hr** : 35 ppm and **8 hr** : 9ppm

Worcester County has been designated as not in "non-attainment" of the NAAQS for $PM_{2.5}$. Therefore, this project is exempt from regional or micro-scale $PM_{2.5}$ analysis.

$PM_{2.5}$ Conformity Determination

The EPA issued amendments to the Transportation Conformity Rule in March 2006 to address localized impacts of $PM_{2.5}$. These rules require the assessment of localized impacts of federally-funded transportation projects in $PM_{2.5}$ non-attainment areas for projects considered to be "projects of air quality concern."

Worcester County has been designated as not in "non-attainment" of the NAAQS for $PM_{2.5}$. Therefore, this project is exempt from regional or micro-scale $PM_{2.5}$ analysis.

Mobile Source Air Toxics (MSAT) Analysis

FHWA *Guidance on Air Toxic Analysis in NEPA Documents* requires analysis of Mobile Source Air Toxics (MSAT) under specific conditions. The EPA has designated six prioritized MSATs, which are known or probable carcinogens or can cause chronic respirator effects. The six prioritized MSATs are: Benzene; Acrolein; Formaldehyde; 1, 3-Butadiene, Acetaldehyde; and Diesel Exhaust (Diesel Exhaust Gases and Diesel Particulate Matter). The US 50 Project, which has a maximum design year (2030) ADT of 55,300 (Summer Traffic Peak; Average Traffic Peak AADT is predicted to be 35,200), would be considered in the category: *"Projects with Low Potential MSAT Effects",* as described in the referenced guidance. An example of this type of project is a minor widening project, where design year traffic (AADT) is not projected to exceed 150,000. Projects in this category may require a qualitative MSAT analysis.

The US 50 Project will not result in any meaningful changes in traffic volumes, vehicle mix, or any other factor that would cause an increase in emissions impacts. As such, FHWA has determined that this project will generate minimal air quality impacts for the Clean Air Act criteria pollutants and has not been linked with any special MSAT concerns. However, based on existing FHWA guidance a qualitative MSAT analysis is necessary.

Included herein is a basic analysis of the likely MSAT emission impacts of this project. However, available technical tools do not enable us to predict the project-specific health impacts of the emission changes associated with the various alternatives. Due to these limitations, the following discussion is included in accordance with CEQ regulations (40 CFR 1502.22(b)) regarding incomplete or unavailable information.

For each alternative, the amount of MSATs emitted would be proportional to the vehicle miles traveled, or VMT. Although the traffic data provided by the Maryland State Highway Administration (MD SHA) does not indicate a difference between the build traffic volumes and

truck percentages and the No-Build or rehabilitation traffic volumes and truck percentages, the Vehicle Miles Traveled (VMT) within the entire study area for Alternatives 4 Modified, 5, and 5A may be slightly greater because these alternatives will marginally reduce congestion and increase efficiency of the roadway, and may potentially attract additional trips from elsewhere in the transportation network. This slight increase in VMT may lead to slightly higher MSAT emissions along the US 50 Project corridor. The emissions increase due to increased VMT is offset by lower MSAT emission rates due to increased speeds, since according to EPA's MOBILE6 emissions model, emissions of all of the priority MSATs, except for diesel particulate matter decrease as speed increases. The extent to which these speed-related emissions decreases will offset VMT-related emissions increases cannot be reliably projected due to the inherent deficiencies of technical models.

A new US 50 bridge crossing as proposed under Alternatives 4 Modified, 5, and 5A will have the effect of moving some traffic closer to nearby homes and businesses; therefore, there may be localized areas where ambient concentrations of MSATs could be higher than the No-Build and Rehabilitation alternatives. The localized increases in MSAT concentrations would likely be most pronounced along the edge of the proposed facility where the travel lanes shift towards the residences and businesses. However, as discussed above, the magnitude and the duration of these potential increases compared to the No-Build Alternative cannot be accurately quantified due to the inherent deficiencies of current models.

In sum, when a highway moves closer to receptors, the localized level of MSAT emissions could be higher relative to the No-Build Alternative and Alternative 2, but this could be offset by increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSATs will be lower in other locations when traffic shifts away from them. Furthermore, at the project location and regionally, MSAT concentrations will decrease in future years due to EPA's vehicle emission and fuel regulations. Please refer to **Table IV-8** for a graphical representation of this emissions trend over time.

Evaluating the environmental and health impacts from MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling in order to estimate ambient concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure. Each of these steps is encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSAT health impacts of this project.

The EPA tools to estimate MSAT emissions from motor vehicles are not sensitive to key variable determining emissions of MSATs in the context of highway projects. The tools to predict how MSATs disperse are also limited. Even if emission levels and concentrations of MSATs could be accurately predicted, shortcomings in current techniques for exposure assessment and risk analysis preclude reaching meaningful conclusions about project-specific health impacts. Research into the health impacts of MSATs is ongoing. For different emission types, there are a variety of studies that show that some either are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings) or that animals demonstrate adverse health outcomes when

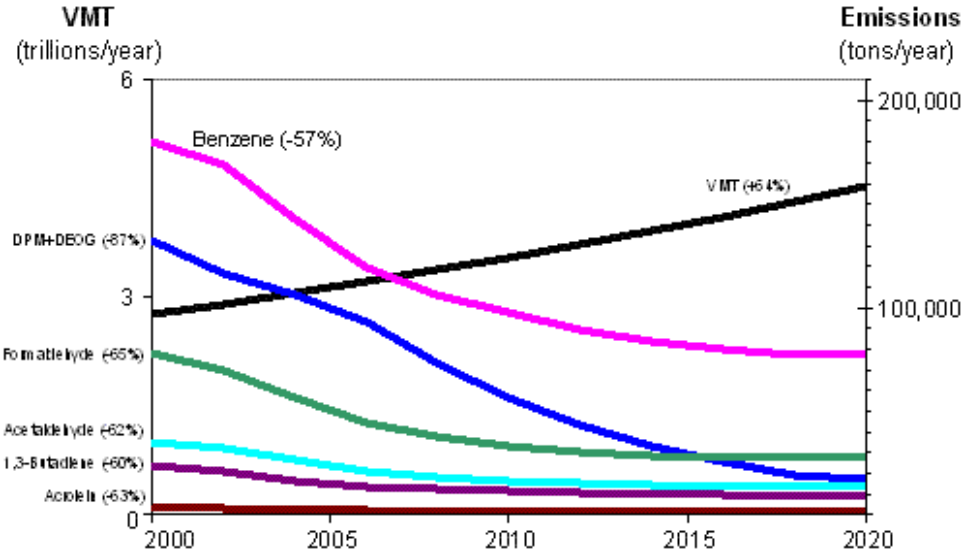
exposed to large doses. The EPA is in the process of assessing the risks of various kinds of exposures to these pollutants.

As discussed above, technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of MSAT emissions and effects of this project. However, even though reliable methods do not exist to accurately estimate the health impacts of MSATs at the project level, it is possible to qualitatively assess the levels of future MSAT emissions under the project. Although a qualitative analysis cannot identify and measure health impacts from MSATs, it can give a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the build alternatives.

3. Construction Impacts

Temporary air quality impacts in the project area are possible due to construction activities. These short-term impacts can be minimized through adherence to accepted construction site air control measures in the handling of materials and as part of any potential demolition. Fugitive dust controls such as water spraying of access roads and stockpiles and the employment of dust covers on vehicles transporting dust-emitting materials has been shown to be effective in controlling emissions.

Table IV-8. U.S. Annual Vehicle Miles Traveled vs. MSAT Emissions, 2000-2020



Source: Memorandum - Interim Guidance on Air Toxic Analysis in NEPA Documents, US Department of Transportation, Federal Highway Administration, February 2006.

F. NOISE

1. Impact Analysis

An impact analysis was performed in compliance with FHWA and MD SHA methodologies. Noise abatement criteria (NAC) for various land uses have been established by FHWA in Title 23 of the Code of Federal Regulations, Part 772 (23 CFR 772) *Procedures for Abatement of Highway Traffic Noise and Construction Noise* and the MD SHA *Sound Barrier Policy (May 1998).* The noise abatement criteria for land uses occurring in the study area, (Category B: picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals) is 67 dBA Leq.

According to the procedures described in 23 CFR, Part 772, noise impacts occur when predicted traffic noise levels for the design year approach or exceed the NAC prescribed for a particular land use category, or when the predicted noise levels are substantially higher than the existing ambient noise levels. The MD SHA and FHWA defines approach as 66 decibels (dBA) for Category B, and uses a 10 dBA increase to define a substantial increase **(Table IV-9)**. This analysis was completed in accordance with Federal procedures and evaluated in accordance with MD SHA's Sound Barrier Policy.

Table IV-9. FHWA Noise Abatement Criteria

Activity Group	One Hour Equivalent Level (L_{eq}(h), dBA)	Description
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purposes.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	-	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

FHWA Noise Abatement Criteria (NAC), 23 CFR, Part 772
Hourly A-Weighted Sound Level in Decibels (dBA)

Prediction modeling was performed to assess projected 2030 design year noise levels and to assess noise abatement alternatives. All prediction modeling was performed using TNM v2.5. Predicted design year noise levels indicated that traffic noise impacts for the Future "Build" scenarios occurs in areas with a dominant local roadway contribution. The biggest contributor to

future traffic noise impacts is the traffic being placed on the local roadway network. The existing and proposed bridge structure provide screening that shields the majority of the community from direct line-of-sight to the highest traffic volumes. It should be noted that the existing bridge will be retained for recreational use, but restricted from vehicular traffic.

The predicted 2030 No-Build traffic noise levels range from a low of 49 dBA (Site 1-3) to a high of 69 dBA (Site 3-3).

The predicted year 2030 traffic noise levels for Alternative 4 Modified range from a low of 49 dBA (Site 1-3, 3-1, and 3-4) to a high of 64 dBA (Site 4-1).

The predicted year 2030 traffic noise levels for Alternative 5 range from a low of 50 dBA (Site 1-3) to a high of 68 dBA (Site 3-3).

The predicted year 2030 traffic noise levels for Alternative 5A range from a low of 50 dBA (Site 1-3) to a high of 68 dBA (Site 3-3).

Table IV-10 provides summary data of the traffic noise levels predicted in the project area.

Table IV-10. Traffic Noise Level Summary

Receptor Site	Dwelling Units	Existing Noise Level (dBA)	Future "No Build" Noise Level (dBA)	Alternative 4 Modified Noise Levels (dBA)	Alternative 5 Noise Levels (dBA)	Alternative 5A Noise Levels (dBA)
NSA 1						
1-1	6	57	58	54	58	56
1-2	6	52	53	52	54	53
1-3	6	48	49	49	50	50
1-4	10	62	63	57	60	59
1-5	10	65	66	60	64	64
NSA 2						
2-1	17	59	60	53	58	59
2-2	12	64	66	57	64	63
2-3	11	54	57	55	57	57
2-4	11	60	64	57	64	64
2-5	10	54	57	58	57	58
2-6	11	62	65	58	65	65
NSA 3						
3-1	4	58	59	49	displaced*	56
3-2	4	65	66	53	displaced*	60
3-3	4	67	69	61	68	68
3-4	6	49	52	49	54	52
3-5	4	50	53	51	55	54
3-6	6	54	60	59	61	61
NSA 4						
4-1	10	62	66	64	67	66

* *Receptors are displaced by Alternative 5.*
Shaded cells indicate noise levels exceeding FHWA/ MD SHA noise impact criteria.

A detailed description of each Noise Sensitive Areas (NSAs) is located in Section III. F.1. and the location of each NSA is identified on Figure III-12.

2. Feasibility and Reasonableness of Noise Control

Several factors for evaluating and determining the feasibility and reasonableness of noise abatement are defined in the MD SHA *Sound Barrier Policy*. The elements of MD SHA's sound barrier **feasibility** criteria address the following questions:

- Can a noise reduction of at least 3 dBA be achieved at the location(s) warranting abatement (impacted residences)?
- Can highway traffic noise at receptors with the highest noise levels (first row receptors) be reduced by 7 to 10 dBA as a result of the construction of a sound barrier?
- Will construction of a sound barrier restrict access to vehicular or pedestrian traffic?
- Will construction of a sound barrier cause safety or maintenance problems?
- Can a sound barrier be constructed given topography, drainage or utilities?
- Are there other non-highway noise sources in the area that would reduce or limit the effectiveness of a sound barrier?

Reasonableness is based on a number of factors, including:

- Do a minimum of 75 percent of the impacted residents approve the proposed sound barrier?
- If existing noise levels are expected to increase by 10 dBA or more, are they less than 57 dBA?
- Will design year "Build" noise levels be equal to or greater than 3 dBA over design year "No-Build" noise levels?
- Will the cumulative increase in design year noise levels as a result of prior improvements to the highway be equal to or greater than 3 dBA?
- Will design year noise levels equal or exceed 72 dBA?
- Will the sound barrier cost per benefited residence exceed $100,000?
- Will the relative size and appearance (aesthetics) of the proposed sound barrier have a negative visual impact?
- Will the construction of a sound barrier result in an impact to Section 4(f) resources?
- Are there local controls on noise sensitive development adjacent to state highways?
- Are there any special circumstances, such as historical significance and/or cultural barrier that would be affected negatively by the construction of a sound barrier?

Only sound barriers that are determined to be feasible and reasonable will be approved for consideration. If any of the feasibility and reasonableness criteria cannot be satisfied, a sound barrier may be considered not feasible and/or not reasonable.

Results

As build noise levels at NSAs 3 and 4 approached or exceeded the FHWA noise abatement criteria, the evaluation of the noise abatement measures was warranted for Alternatives 5 and 5A. The feasibility and reasonableness of noise abatement was investigated for both NSAs even though a barrier analysis was not performed.

Feasible mitigation for NSA 3 could not be developed due to maintenance of local vehicular and pedestrian access. Site 3-3 is located adjacent to the residential structure at the corner of US 50 and Philadelphia Avenue. Potential mitigation designed to protect this NSA would require a vertical barrier to be placed between the community and Philadelphia Avenue. The physical space available for potential barrier placement would displace the pedestrian walkway and encroach upon the Philadelphia Avenue travel lanes. It is also unclear if this adjacent parking lot could be considered as the area of frequent outdoor human activity for the adjacent residence. The other predicted noise levels in the NSA 3 community are sufficiently low to indicate that these impacts are localized to the northeastern corner of this NSA.

Feasible mitigation could not be developed for NSA 4 due to maintenance of local vehicular and pedestrian access. Site 4-1 represents the Ocean City Baptist Church along Division Street, which maintains direct access to Division Street. The local traffic on Division Street, Baltimore Avenue, and Philadelphia Avenue represent the dominant traffic noise source, not the elevated bridge structure carrying US 50 across Sinepuxent Bay. Potential mitigation designed to protect this NSA would require a vertical barrier to be placed between the church parking lot and Division Street, blocking the entrance to the parking lot. This would serve to block vehicular and pedestrian access to the church property.

Reasonableness criteria also not met given that predicted Future "Build" noise levels will not exceed Future "No-Build" noise levels by 3 dBA or more in any of the four NSAs, and in many cases are lower due to the shadow zone created by a higher bridge structure. Because there have been no capacity increases made to the bridge since the original construction, a cumulative effects analysis does not apply. Therefore, mitigation consideration does not meet MD SHA feasibility or reasonableness criteria.

It is recognized that the elevated structure associated with Alternative 4 Modified may generate increases in noise levels that are not capable of quantification through current accepted modeling practices (i.e. vibration noise from the bridge deck/vehicle interaction). Potential noise from structure-borne sources may be addressed through the consideration of alternative bridge component materials. Specifically, the areas underneath the viaduct along St. Louis Avenue both north and south of the proposed elevated structure are areas that would be potentially affected by this noise.

There are several other issues affecting the desirability of mitigation that should also be considered. The "scenic byway" designation of the US 50 corridor entering Ocean City raises issues of sound walls that would potentially block the view-shed entering the town. This is compounded by the desires of the town to maintain US 50 as a "Gateway" access point to Ocean

City, which would typically require a clear line-of-sight to maintain the scenic view entering Ocean City.

In summary, while there are traffic noise impacts associated with Alternatives 5 and 5A, mitigation consideration does not meet MD SHA feasibility or reasonableness criteria for either of the impacted NSAs. No traffic noise mitigation is currently proposed for this project.

3. Construction Noise

Land uses that would be sensitive to vehicular noise would also be sensitive to construction noise. Although highway and bridge construction is a short-term phenomenon, it can cause noise impacts. The extent and severity of the noise impact would depend upon the phase of construction and the noise characteristics of the construction equipment in use. Construction would have direct impact on receptors located close to the construction site, and an indirect impact on receptors located near roadways whose traffic flow characteristics are altered during construction.

G. VISUAL AND AESTHETIC QUALITY

US 50 is and would remain a four-lane highway within the project limits, with characteristics similar to many of the nation's urban highways. The bridge and approach roadway characteristics would remain relatively unchanged under Alternatives 1 and 2, while Alternatives 4 Modified, 5, and 5A would alter the visual landscape by constructing a new bridge. The proposed typical section of the new bridge would be 87 feet, 4 inches, an increase of approximately 22 feet over the existing structure.

The construction of a new bridge, as proposed under Alternatives 4 Modified, 5 and 5A, would change the visual characteristics of the surrounding community. Under Alternatives 5 and 5A, the new bridge will be the same height (30 feet) as the existing bridge and the new bridge for Alternative 4 Modified would be 15 feet higher than the existing bridge, making it a more dominant feature in the visual landscape. Although specific views would vary from property to property, the new bridge could alter or partially obstruct views of downtown Ocean City from the western portion of the study area.

Visual impacts would be most severe under Alternative 4 Modified, which includes the tallest structure (87 feet) of the alternatives, and grade-separated ramps connecting the new bridge to the existing road network. The combination of the tall bridge and ramps would require many new hardscape elements to be constructed along the existing roads and community. The placement of the bridge north of the existing structure would also create a tunnel effect for the remaining homes between the new and existing bridges, with retaining walls or bridge structures to either side, creating a visual impact to this community.

Despite the introduction of newer and larger visual elements associated with the proposed bridge alternatives, the modified views would not be inconsistent with the surrounding community,

considering the intensely developed landscape of apartments, hotels, resorts, and other features throughout the Town of Ocean City. Recent development trends have resulted in many larger and taller condominium and hotel buildings, creating a dynamic visual environment that seems to change with regularity. Tall buildings now dominate the Ocean City landscape, and are visible from the portions of the study area west of Sinepuxent Bay. It is expected that after construction of the new bridge, the structure would blend in with the exciting and diverse aesthetic environment of Ocean City, and would be used to create a gateway entrance to the resort town.

Aesthetic treatments will be considered once an alternative has been selected, and the detailed design work begins. If an alternative providing a new bridge structure is selected, aesthetic treatments could be incorporated into the ultimate design of the bridge to make it more visually pleasing to adjacent homes, businesses, and roadway commuters, and more consistent with the overall landscape of Ocean City.

H. INDIRECT AND CUMULATIVE EFFECTS ANALYSIS

An Indirect and Cumulative Effects (ICE) Analysis has been prepared for this project. The ICE was developed in compliance with the current MD SHA ICE guidelines specified for Environmental Assessments and Environmental Impact Statements, the National Environmental Policy Act (NEPA), and the Council on Environmental Quality (CEQ) regulation 40 CFR 1508.25(c). The resources evaluated for indirect and cumulative effects include socioeconomic, cultural, and natural resources.

Temporal and geographic boundaries were derived to encompass all resources that may be affected. The temporal boundary extends from 1970 to 2030. The temporal boundary was developed based upon information availability, population trends, and key events in the study area over the past 75 years. The year 1970 was selected as the past time frame limit based upon past events, such as the completion of the Chesapeake Bay Bridge in 1952 and the completion of the Chesapeake Bay tunnel in 1964, population changes (**Table IV-11**), and a limited availability of natural and socioeconomic resource information prior to the passage of NEPA in 1970. The future time frame was determined from the project's design year of 2030. Using the environmental resources (socioeconomic, natural, and cultural) that would be affected by direct and indirect impacts of the project as a guide, multiple resource boundaries were reviewed to determine the appropriate geographic sub-boundaries that would create the geographic boundary. The sub-boundaries included census tract boundaries, election districts, Priority Funding Area (PFA) boundaries, and watershed boundaries. The overall ICE boundary is shown in **Figure IV-4**. Based on readily available data from State and County sources, the resources were mapped using GIS mapping techniques and analyzed to determine the nature and extent of indirect and cumulative effects created by the proposed project.

Table IV-11. Study Area Population Size, 1940-2000

Area	1940	1950	1960	1970	1980	1990	2000
Worcester County	**21,245**	**23,148**	**23,733**	**24,442**	**30,889**	**35,028**	**46,543**
10-year increase	-	*8.9%*	*2.5%*	*3.0%*	*26.4%*	*13.4%*	*32.9%*
Ocean City, Election District 10	**2,037**	**2,508**	**2,712**	**3,510**	**7,354**	**7,936**	**11,684**
10-year increase	-	*23.1%*	*8.1%*	*29.4%*	*109.5%*	*7.9%*	*47.2%*

1. Summary of Potential Indirect and Cumulative Effects

Socio-economic Resources

Indirect and cumulative effects to the socio-economic resources within the ICE boundary are anticipated as a result of the US 50 bridge over Sinepuxent Bay project and other development projects within the area. However, these indirect and cumulative effects are anticipated to be minor due to the existing high level of development near the project location and the existing Smart Growth laws and land use plans and zoning regulations of Worcester County and Ocean City.

The greatest potential for cumulative effects to communities in the ICE boundary relate to the effects of the frequency of the number of draw span openings associated with each alternative. The No-Build Alternative and Alternative 2 are not designed for to have higher spans; therefore there will be an increase draw span openings as boat traffic increases in the area. The increased draw span openings could have the potential to decrease interest in Ocean City and the surrounding communities as a tourist destination and place to live. The build alternatives either provide an additional bridge for pedestrians, cyclists and fisherman or do not require as many draw span openings due to a higher span, therefore the build alternatives would have a positive effect on the attraction to Ocean City and the surrounding communities as a tourist destination or place to live. Also, the build alternatives could have indirect effects to the area partially isolated between the existing bridge and proposed bridge associated with these alternatives. The access to this area may be slightly altered and therefore may decrease the traffic flow in this area. This could have a slightly negative effect to the patronage of the businesses in this area.

The No-Build and Alternative 2 are not expected to contribute to indirect effects to communities and businesses in the ICE boundary, because they would not result in any displacements or impacts to community cohesion, access and mobility, aesthetics, or quality of life. The cumulative effects resulting from increased safety from the build alternatives would likely encourage some additional development and/or redevelopment in the area. However, future effects to communities and businesses will be limited through the existing Smart Growth laws and zoning regulations in place by Worcester County and Ocean City. No future development projects are dependent on or would benefit from the completion of the US 50 bridge project.

Cultural Resources

Alternatives 1, 2, 5, and 5A will have no indirect effects on cultural resources within the ICE boundary. Alternative 4 Modified proposes a change in traffic patterns in Ocean City which would change the routes used to access the MD SHA Bridge No. 2300700 and the Emery-Hartman House in Ocean City, which could result in minor cumulative effects associated with reduced user and/or proximity impacts to these properties.

A majority of the ICE Boundary has been built-out, meaning that few undeveloped areas remain and redevelopment will become increasingly important. Therefore, cultural resources within

these areas have a greater potential of being affected. However, cumulative effects to historic sites and structures associated with publicly-built impacts are expected to be minimal due to established laws and regulations designed to protect cultural resources. They include the following:

- The Department of Transportation Act of 1966
- The National Historic Preservation Act 1966, as amended; 36 CFR Part 800 – Protection of Historic Properties; Executive Order 11593
- The Maryland Historic Trust Act of 1990 (Article 83B, §§ 5-607, 5-617, to 5-619, and 5-623 of the Annotated Code of Maryland)

Cumulative effects to cultural resources associated with other planned development or transportation projects are expected to be minor due to existing laws and regulations protecting these resources.

Natural Resources

Based on Ocean City's Comprehensive Plan (Town of Ocean City, 2006), Worcester County's Comprehensive Development Plan (Worcester County, 2006), and the goals and objectives of the Maryland Coastal Bays Comprehensive Management Plan (Maryland Coastal Bays Program, 2000), local government officials are fully aware that the strengths of the regional economy (e.g., tourism, and agriculture) were built upon the richness of the area's natural resources. Moreover, the future viability of the economy will rely upon sustaining the quantity and quality of natural resources in the face of anticipated population growth.

Surface Waters

The No-Build Alternative is not expected to have an indirect impact on surface waters. Alternative 2 is expected to have a minor indirect impact to surface waters due to the 1% increase in impervious surface due to a slightly wider bridge and new fishing pier. Alternatives 4 Modified, 5, and 5A would have more indirect impacts to surface waters as a result of the additional runoff resulting from a 9%-10% increase in impervious surface. To minimize these impacts, stormwater management facilities will be constructed to treat runoff from the new structure if one of these alternatives is selected. Future planned development within the ICE boundary will result in cumulative effects to surface waters, however these effects are expected to be minor, as local, state, and federal laws continue to lessen the impacts of development activities through stormwater management, erosion and sediment control, and other best management practices.

Ground Water

Due to the lack of significant fresh water on the peninsula, Ocean City is dependent on 23 production wells divided between two aquifers (the Manokin and the Ocean City) for its water supply. No indirect impacts to groundwater are anticipated due to implementation of any of the

alternatives, as no future development plans are dependent upon the project and stormwater treatment facilities would compensate for project related impacts.

None of the project alternatives are expected to impact ground water resources, due to the implementation of best management practices and stormwater treatment requirements. However, future planned development within the ICE boundary will result in impacts to ground water, as new areas of development will require access to limited ground water supplies, and decrease the infiltration of ground water due to increases in impervious surfaces. Collectively, future development and transportation improvements would be expected to decrease the quality and availability of ground water within the ICE boundary. However, both Ocean City and Worcester County are aware of the potential impacts to ground water and are developing strategies to minimize the potential for impacts. Examples of such strategies include better well location and distribution plans, limiting surface containment risks, and controlling the amounts and locations of impervious surfaces.

Habitat

No indirect impacts to aquatic habitats are expected from the No-Build Alternative and Alternative 2. Alternatives 4 Modified, 5, and 5A each have the potential to change the hydrodynamics and pattern of sand migration in the bay due to the additional bridge piers and supports. These changes could indirectly impact aquatic habitats, fisheries, and the endangered waterbird colony on Skimmer Island.

The No-Build Alternative and Alternative 2 would not contribute to cumulative effects to terrestrial habitats, as neither would result in direct or indirect impacts to these resources. Alternatives 4 Modified, 5, and 5A would contribute (wetland impacts) to the cumulative effect to these resources, although it is expected to be minor. Future planned development within the ICE boundary would place additional stresses on the natural environment as new developments and transportation improvements are realized, however; these impacts are expected to be minor due to local, state, and federal regulations designed to protect environmental resources and habitat areas. Local, county and state regulations will help to protect the natural environment and habitats within the ICE boundary.

Conclusion

Because of the high level of residential and commercial development within the ICE study area and the existing Smart Growth laws, land use plans, and zoning regulations of Worcester County and Ocean City, it is anticipated that there will be only minor indirect and cumulative effects as a result of this project.

No transportation or other development projects are dependent upon the US 50 Crossing Study for completion, and the project will not open additional areas to development that are currently not accessible. Therefore, no growth inducing effects are anticipated as a result of this project. While development within this area of Worcester County and Ocean City is expected to continue throughout the future timeframe, this development would occur regardless of this project.

Figure IV-4: ICE Boundary

The indirect effects of this project would be limited to community impacts, proximity impacts to historic structures, and the hydraulic effect of introducing new bridge piers into the tidal Sinepuxent Bay system. Community effects would include impacts to community cohesion associated with the displacement of homes and businesses, and access changes associated with shifting traffic patterns. The indirect effects to historic structures would include visual impacts associated with the introduction of a new bridge structure. Indirect effects to natural resources would include a minor increase in runoff associated with construction of new impervious areas, potential impacts to sand migration and shoreline erosion by the placement of new bridge piers, and proximity impacts to rare bird and fish species present within the study area.

The cumulative effects of this project and other past, present, and reasonably foreseeable future actions would also affect communities, historic structures, and natural resources. The cumulative effect to historic structures would be minor, resulting only in visual impacts to the existing US 50 bridge, and the adjacent Emery-Hartman House. Cumulative effects to surface waters, aquatic habitats, wetlands, and RTEs would also be minor, giving the limited potential for direct impacts, and the regulatory requirements protecting these resources from future development actions.

Future transportation and development projects would be limited through the existing Maryland Smart Growth laws, zoning regulations in place by Worcester County and Ocean City, and regulatory requirements governing natural environmental resources. Efforts to avoid, minimize, and mitigate impacts caused by private development impacts within the ICE boundary are beyond the control and funding authority of MD SHA or FHWA, however the MD SHA and FHWA will continue to work with local jurisdictions to promote development controls, and suggest that local jurisdictions develop resource preservation plans where applicable. Worcester County and each municipality is ultimately responsible for monitoring and applying growth management techniques that result in development at a consistent pace with roadways and other necessary infrastructure.