III. EXISTING ENVIRONMENT AND IMPACT ANALYSIS

This section describes the existing conditions in the study area and the potential impacts of the proposed improvements to Section 200. The categories presented affect relevant environmental disciplines identified in the Federal Highway Administration (FHWA) 23 Code of Federal Regulations (CFR) Part 771, "Environmental Impact and Related Procedures," and all other appropriate Federal, State, and local laws.

To compare impacts to the resources identified in this section for each Build Alternative, each Build Alternative will include the interchange option with the most impacts at each location. This provides the largest footprint possible for each of the Build Alternatives, to identify a worst-case scenario. The MD 152 Option 4, MD 24 Option 2, MD 543 Option 1, and MD 22 Option 1 were included with the General Purpose Lanes Alternative in calculating impacts. The MD 152 Option 4A, MD 24 Option 2A, MD 543 Option 7A, and MD 22 Option 2 were included with the Express Toll Lanes Alternative. In some cases the impacts for all of the interchange options have been calculated and have been included in the discussion when appropriate. All impacts calculated for the interchange options for the I-95/MD 152 and I-95/MD 24 Interchanges include impacts for the proposed park and ride facilities.

A. Socioeconomic Resources and Land Use

A socioeconomic inventory was conducted for the Section 200 study area as part of the planning process, and is summarized in the following narrative. For additional details, refer to the *Section 200 Socioeconomic and Land Use Technical Report*.

The information documented in the *Section 200 Socioeconomic and Land Use Technical Report* identifies communities, community facilities, and commercial and industrial facilities within the study area. In addition, data regarding population, ethnicity, economics, and other demographics were compiled and evaluated.

1. Population

Table III-1 shows the population statistics for the State of Maryland, Baltimore and Harford Counties, and the study area. Approximately 11.5% of the population in the study area is over the age of 65. This is approximately the same as the counties and state percentages. The percentage of the study area population that is white (86.1%) is similar in to Harford County (86.8%), but is slightly higher compared to Baltimore County (74%) and the State of Maryland (64%).

Table III-1: Current Population Characteristics

Characteristic		Maryland	Baltimore County	Harford County	Study Area
Total Population		5,296,486	754,292	218,590	41,384
Projected Population for the Year 2030[1]		6,703,800	846,800	290,500	--
% Male/% Female		48%/52%	47%/53%	49%/51%	49%/51%
% Population 65 Years and Older		11%	14.6%	10.1%	11.5%
Racial Distribution	White	64%	74%	86.8%	86.1%
	African-American	28%	19%	9.3%	9.4%
	American Indian/Alaskan Native	<1%	<1%	<1%	<1%
	Asian/Pacific Islander	4%	3%	1.5%	1.8%
	Other	2%	<1%	<1%	<1%
	Two or More Races	2%	1%	1.5%	1.6%
% Population of Hispanic Origin[2]		4%	2%	1.9%	2.1%

Source: Census 2000
[1] Population projections provided by the Maryland Department of Planning State Data Center, October 2002
[2] Population of Hispanic Origin can be of any race.

2. Environmental Justice

Executive Order 12898: *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* issued on February 11, 1994, requires federal agencies to identify and address as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations, and to provide opportunity for participation in the public involvement process.

Executive Order 12898 defines minority persons as:

- Black (a person having origins in any of the black racial groups of Africa);
- Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture origin, regardless of race);
- Asian American (a person having origins in any of the original peoples of the Far East, South East Asia, the Indian subcontinent, or the Pacific Islands);
- American Indian and Alaskan Native (a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition).

Low-income is defined as a person whose median household income is at or below the Department of Health and Human Services (DHHS) poverty guidelines. The poverty guidelines issued by the DHHS are derived from the poverty thresholds updated each year by the United States Census Bureau. DHHS poverty guidelines for 2007 are $10,210 for the first person and $3,480 for each additional person ($20,650 for a family of four).

a. Methodology

Baseline demographic information at the census block group level was obtained from the 2000 U.S. Census to identify potential locations of minority and low-income populations. The block group data was compared to overall project area totals to identify concentrations of minority and low-income populations. In addition, local planning officials were consulted to identify the location of other potential minority and low-income populations within the study area.

Table III-2: Population Statistics

Block Group	White (%)	Black (%)	Alaskan Native/ American Indian (%)	Asian/ Pacific Islander (%)	Hispanic (%)	Total Minority[1] (%)	Median Household Income	Population Below Poverty (%)
Baltimore County	***74.4***	***20.1***	***0.3***	***3.3***	***1.8***	***25.5***	***$50,667***	***6.3***
Harford County	***86.8***	***9.3***	***0.2***	***1.6***	***1.9***	***13.0***	***$57,234***	***4.9***
Study Area	***83.1***	***9.4***	***0.2***	***1.8***	***2.1***	***13.5***	***$57,358***	***4.1***
411102 BG 1	97.2	0.8	0.1	0.6	0.9	2.4	$60,625	4.0
411102 BG 2	97.5	2.1	0.0	0.3	0.7	3.1	$65,882	0.0
411102 BG 3	96.8	0.4	0.2	0.2	1.0	1.8	$84,252	1.6
411302 BG 1	94.0	3.9	0.5	0.5	0.8	5.7	$53,438	**5.9**
411304 BG 2	95.9	1.8	0.0	2.1	1.2	5.1	$75,712	1.0
411304 BG 3	97.6	1.6	0.2	0.2	0.5	2.5	$56,607	1.4
411304 BG 4	94.7	2.8	0.1	1.8	1.2	5.9	$71,875	**4.7**
301102 BG 2	97.7	0.8	0.2	0.0	1.1	2.1	$50,741	1.8
301102 BG 3	91.5	5.0	0.0	2.0	0.7	7.7	$69,286	0.0
301104 BG 1	86.9	7.2	0.2	3.3	1.3	12.0	$88,730	0.0
301104 BG 2	80.2	10.2	0.3	4.4	5.0	**19.9**	$38,377	**6.4**
301201 BG 1	95.7	1.8	0.0	0.5	0.9	3.2	$45,417	0.7
301201 BG 2	95.4	2.8	0.5	0.4	0.8	4.5	$67,292	1.3
301203 BG 1	87.2	7.2	0.3	2.9	2.3	12.7	$62,500	3.1
301301 BG 1	95.6	1.7	0.2	0.8	0.5	3.2	$37,717	**8.9**
301301 BG 2	88.0	8.5	0.1	0.6	1.3	10.5	$47,847	**5.8**
301701 BG 1	88.1	7.4	0.1	1.6	2.4	11.5	$69,044	2.4
301701 BG 2	87.6	10.0	0.2	1.0	0.9	12.1	$65,347	3.9
301701	79.2	15.8	0.3	1.6	3.3	**21.0**	$59,826	1.9

Table III-2: Population Statistics

Block Group	White (%)	Black (%)	Alaskan Native/ American Indian (%)	Asian/ Pacific Islander (%)	Hispanic (%)	Total Minority[1] (%)	Median Household Income	Population Below Poverty (%)
BG 3								
301702 BG 1	80.7	14.0	0.5	1.6	3.1	**19.2**	$54,840	**5.9**
302200 BG 1	91.2	6.5	0.4	0.8	0.4	8.1	$58,281	4.5
302200 BG 2	96.2	3.3	0.5	0.0	0.5	4.3	$56,875	0.0
302400 BG 1	86.6	7.1	0.8	3.0	2.5	13.4	$40,625	**7.1**
302801 BG 2	85.7	9.1	0.2	4.2	2.4	**15.9**	$54,500	1.5
302802 BG 1	84.4	11.6	0.0	1.9	1.9	**15.4**	$35,865	**4.2**
302802 BG 3	52.9	37.6	0.1	2.1	5.5	**45.3**	$31,875	**13.6**
303700 BG 2	95.6	2.4	0.0	0.6	1.0	4.0	$45,278	2.6

Source: U.S. Census 2000

b. Findings

According to the criteria above, minority populations made up 13.5 percent (5,586 persons) of the study area according to the 2000 Census (**Table III-2**). The Baltimore County portion of the study area consisted of 4.9 percent minority populations, while the Harford County portion was approximately 19 percent minority. Six block groups contained a higher percentage of minority populations than the study area as a whole. All six of these block groups are located in the Harford County portion of the study area, primarily in the Abingdon/Edgewood and Aberdeen areas of the County. The largest concentration of minority populations occurred in Census Tract 302802, Block Group 3, where approximately 52.3 percent of the total population was minority. This block group is located in the western portion of Aberdeen, near the I-95 interchange with MD 22.

Coordination with the Baltimore County Office of Planning identified three African-American communities located along I-95, within the Baltimore County portion of the study

area: Bradshaw, Loreley, and Lloyd. Although there may be low-income individuals within these communities, Baltimore County does not characterize them as low-income communities. The Harford County Department of Community Services identified an area with a high percentage of minority population in census tract 302903, but the area is just outside of the study area.

U.S. Census 2000 data reports that the median household income for the study area was $57,358, which is well over the DHHS poverty threshold of $20,650 for a family of four. Baltimore County and Harford County, in comparison, have median household incomes of $50,667 and $57,234 respectively **(Table III-2)**.

As of 2000, approximately 1,702 persons, or 4.1 percent of the study area reported income in 1999 below the poverty level. Nine block groups have a higher percentage of individuals in poverty than the study area as a whole. Two of these block groups are located in Baltimore County, while the remaining seven are located in Harford County.

The Harford County Department of Planning and Zoning, and the Harford County Department of Community Services also identified specific areas within the county where high percentages of low-income populations are known to reside. Harford County defines low-to-moderate income areas as census tracts where more than 41.8 percent of the households report an income that is less than 80 percent of the median household income for the county (which was $45,787 in 2000). Census Tracts 301301 (53.2 percent of households under $45,787), 302400 (59.3 percent of households under $45,787), and 302802 (57.7 percent of households under $45,787) are located completely or partially in the study area.

c. Impacts

No-Build Alternative

The No-Build Alternative would not have a direct effect on minority or low-income populations. However, all populations, including minority and low-income, would be affected as increased congestion along I-95 and its radial routes results, in increased congestion around the region.

Build Alternatives

The Build Alternatives would result in the acquisition of portions of residential and business properties for highway ROW. The majority of ROW impacts would be minor, and only one business is required as a result of the Alternatives.

There will be some ROW required from Census Tract 301301, Block Group 1 which was identified as high minority. These impacts would occur in the vicinity of the I-95/ MD 152 interchange, where a new high capacity loop ramp is proposed at the connection of northbound MD 152 with northbound I-95. This new ramp would impact a currently undeveloped portion of ROW, but would benefit the adjacent communities by providing improved traffic operations of the existing interchange. There are some ROW impacts where cul-de-sacs will be constructed on Old Mountain Road, eliminating access through the I-95/ MD 152 interchange area. This would change access and mobility patterns in the vicinity of this road, but new access points would be provided at MD 152 to provide full access to and from these properties.

Of the potential environmental justice communities identified by Baltimore County, only the Bradshaw community would be directly impacted by the Build Alternatives. The impact would be to property only, and would not impact any homes or other buildings.

Based on these findings, none of the Alternatives are expected to result in disproportionately high or adverse impacts to minority or low-income populations. Potential property impacts occur throughout the project corridor, and occur almost equally to areas that do contain potential for minority or low-income populations and those areas that do not.

Aside from property impacts, there is a perception that the inclusion of toll lanes on I-95 would benefit only the wealthy, who can afford to use the lanes on a regular basis. While drivers would incur a fee to use the Express Toll Lanes, the fee would be priced fairly, so as not to preclude usage by lower income drivers. Also, the general purpose lanes would remain free of charge at all times. A benefit of Express Toll Lanes is that they would draw

some traffic away from the general purpose lanes, and help decrease congestion on the toll-free general purpose lanes. While the most direct advantage of congestion-free toll lanes would likely be experienced by those who pay to use them, the indirect effect to traffic on I-95 would be beneficial to all travelers, whether in the Express Toll Lanes or general purpose lanes.

None of the alternatives currently under consideration are expected to result in a negative impact to elderly or handicapped individuals. Access to the senior centers and assisted living facilities in the study area vicinity would not be affected by the Build Alternatives.

Title VI Statement

It is the policy of the MdTA 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, religion, or physical or mental handicap in all projects. The MdTA will not discriminate in highway planning, highway design, highway construction, right-of-way acquisitions, or provision of relocation advisory assistance. This policy has been incorporated in all levels of the highway planning process in order 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 and Diversity Division of the MdTA, to the attention of Mr. Louis Jones, Chief, Equal Opportunity and Diversity Division, 2310 Broening Highway, Suite 150, Baltimore, Maryland 21224.

3. Neighborhoods/Communities

Communities and neighborhoods exist in a variety of different scales in and surrounding the study area. These include incorporated cities and towns (such as the City of Aberdeen), large unincorporated areas that are several square miles in size (such as Abingdon), large mixed developments (such as Box Hill), and smaller neighborhoods and subdivisions, which are common throughout the study area.

The study area consists of 7 community areas (**Table III-3**). The community areas are based on Baltimore County and Harford County planning areas.

Table III-3: Community Areas

Community Areas	
Baltimore County	Perry Hall/White Marsh
	Kingsville
Harford County	Joppa/Joppatowne
	Edgewood
	Abingdon/Riverside/Emmorton
	Churchville/Creswell
	Greater Aberdeen/Greater Havre de Grace

Source: Baltimore County Master Plan 2010, Harford County 2004 Master Plan and Land Use Element Plan

While not all neighborhoods and developments can be accurately associated with a particular community, for planning purposes, individual neighborhoods and subdivisions within the study area have been grouped into these larger community areas.

Within the seven communities, numerous subdivisions, and other residential areas (neighborhoods) are present, with several proposed developments still pending. A total of 97 individual neighborhoods were identified, and are distributed throughout the Section 200 corridor along both the east and west sides of I-95 (see **Table III-4)**. These neighborhoods consist of various types of residences including apartments, condominiums, townhomes and single-family homes. The locations of the communities and neighborhoods are depicted on **Figure III-1**.

Table III-4: Communities Located within Study Area

Map Id	Subdivisions	Street Name	Housing Type
Perry Hall-White Marsh Community Area			
1	Overlook at Perry Hall	Overlook Court	Single Family
2	Equestrian Acres	Apperson Road	Single Family
3	Honeygo Ridge	Honeygo Ridge Court	Single Family
4	Loreley	Station Road	Single Family
5	Brittany Manor	Philadelphia Road	Single Family

Table III-4: Communities Located within Study Area

Map Id	Subdivisions	Street Name	Housing Type
6	Sylvania Mobile Home Park	Lloyd Avenue	Mobile Homes
7	Forge Acres	Winkler Street	Single Family
8	Forge Heights	Forge Road	Single Family
9	Darryl Gardens	Carrington Drive	Single Family
Kingsville Community Area			
10	Gunpowder (B. Co.)	Jones Road	Single Family
11	Days Wood Manor	Days Wood Court	Single Family
16	Walnut Hills Estates	Chapman Road	Single Family
17	Franklinville	Franklinville Road	Single Family
Joppa-Joppatowne Community Area			
12	Oaklyn Manor	Gunpowder Drive	Single Family
13	Gunpowder Pointe	Enfield Road	Single Family
14	The Estates at Goose Pond	Old Joppa Road	Single Family
15	Gunpowder (H. Co.)	Gunpowder Ridge Road	Single Family
18	Clear Acres	Joppa Road	Single Family
19	Shannon Heath	Woods End Drive	Single Family
20	Joppa Acres	Franklinville Road	Single Family
21	Woodlea	Woodlea Drive	Single Family
22	Clayton	Mountain Road	Single Family
23	Happy Acres	Jaycee Drive	Single Family
25	Annes Delight	Pine Road	Single Family
31	Clayton Manor	Holly Drive	Single Family
32	Green Acres	Clayton Road	Single Family
Edgewood Community Area			
24	Forest View Condominiums	Philadelphia Road	Condominiums (over 55)
26	Woodbridge Center	Woodbridge Court	Condominiums
27	Watergate	Brookside Drive	Townhomes
28	Johnson Manor	Philadelphia Road	Single Family
29	Brightwood	Philadelphia Road	Single Family
30	Clayton Vista (planned)	Clayton Road	Single Family
38	Van Bibber	Van Bibber Drive	Single Family
39	Holman Manor	Holman Drive	Single Family

Table III-4: Communities Located within Study Area

Map Id	Subdivisions	Street Name	Housing Type
Abingdon-Riverside-Emmorton Community Area			
33	The Pointe	Tollgate Road	Townhomes
34	Oaks of Harford	Woodsdale Road	Single Family
35	Woodsdale	Waldon Road	Apartments
36	Woodsdale Meadows	Woodsdale Road	Townhomes
37	Woodsdale Senior Housing	Memory Lane	Condominiums (over 55)
40	Autumn Run	Philadelphia Road	Townhomes
41	Chokesbury Manor	Tewkesbury Road	Single Family
42	Smiths Landing	Smiths Road	Single Family
43	Pomeroy Manor	Pomeroy Road	Single Family
44	Abingdon Estates	Philadelphia Road	Single Family
45	Hidden Stream	Hidden Stream Drive	Single Family
46	Abingdon Reserve	Wilson Road	Single Family
47	The Woodlands at Box Hill South	Deer Creek Drive	Single Family
48	Park View at Box Hill	Box Hill South Parkway	Condominiums (over 55)
49	Forsythia Court Apartments	Box Hill South Parkway	Apartments
50	Box Hill South	Box Hill South Parkway	Townhomes
51	Woodland Run	Peverly Run Road	Single Family
52	The Woodlands	Hookers Mill Road	Single Family
53	Tiffany Woods	Tiffany Court	Single Family
54	Timberwood	Clarkson Drive	Single Family
55	Village of Bynum Run	Clarkson Drive	Single Family
56	Bynum Hills	Bynum Hills Road	Single Family
57	Bynum Overlook	Bynum Overlook Drive	Single Family
58	Philadelphia Station	Valley Forge Way	Single Family
59	Harford Town	Harford Town Drive	Townhomes
62	Arborview at Riverside	Church Creek Road	Condominiums
63	Arborview Apartments	Church Creek Road	Apartments
64	Riverside	Church Creek Road	Mixed
65	Wexford	Ashford Circle	Single Family
66	Bristol Forest	Bristol Forest Court	Townhomes

Table III-4: Communities Located within Study Area

Map Id	Subdivisions	Street Name	Housing Type
67	Seven Trails	Seven Trails Drive	Single Family
68	Holly Woods	Holly Oak Circle	Townhomes
94	Hidden Stream North	Crystal Ridge Court	Single Family
95	Village of Grays Run (planned)	Creekside Drive	Unknown
96	Hidden Ridge at Box Hill South	Stone Drive	Single Family
97	Beechwood Mobile Home Park	Peaker Lane	Mobile Homes
Churchville-Creswell Community Area			
60	Pembrook	Goat Hill Road	Single Family
61	Henly Park	Henly Drive	Single Family
69	Stoney Forest Estates	Nova Scotia Road	Single Family
70	Happy Knoll	Tower Road	Single Family
71	Carsin Vale	Carvale Drive	Single Family
Greater Aberdeen-Greater Havre de Grace Community Area			
72	Carsonwood	Carsonwood Court	Single Family
73	Carsins Run Estates	Lynn Lee Drive	Single Family
74	Park Ridge Estates	Patricia Lane	Single Family
75	The Villages at Carsins Run	Long Drive	Condominiums
76	The Residences at Fieldstone Village	Long Drive	Condominiums
77	Catholic Charities Senior Housing	Barnette Lane	Condominiums (over 55)
78	Warwick Apartments	Warwick Road	Apartments
79	Cranberry Run Apartments	Stevens Circle	Apartments
80	Hillside Terrace Apartments	Beards Hill Road	Apartments
81	Alton Homes	Grant Street	Single Family
82	Fairbrooke Senior Housing	Bel Air Avenue	Condominiums (over 55)
83	Chapel Glen	Hiobs Lane	Single Family
84	Woodland Green	Woodland Green Way	Single Family
85	Aberdeen Hills	Beards Hill Road	Single Family
86	Hillcrest Manor	Hillcrest Drive	Single Family
87	North Hills	Penrith Way	Single Family
88	Burns Corner	Windsong Drive	Single Family
89	Windmere Estates	Windmere Drive	Single Family
90	Ramsgate Estates	Maxa Road	Single Family
91	Twin Oaks	Cronin Drive	Single Family

Table III-4: Communities Located within Study Area

Map Id	Subdivisions	Street Name	Housing Type
92	Maxa Woods	Everist Drive	Single Family
93	Adams Heights	Gilbert Road	Single Family

The following is a discussion of the possible community disruption and right-of-way (ROW) impacts associated with each alternative and associated interchange option. For more detailed information about the communities in the study area, please refer to the *Section 200 Socioeconomic and Land Use Technical Report.*

For the purposes of this Environmental Assessment, the ROW impacts include the acquisition of new ROW for highway use and the displacement of existing structures. A potential displacement is identified when the project limits of disturbance (LOD) are 30 feet or less from a building on a property. The LOD is defined as 25 feet from the limit of grading. A partial ROW acquisition would occur when the LOD encroaches onto a portion of property but is more than 30 feet from the nearest building on that property, and no displacement is required.

Table III-5 summarizes the property impacts for each alternative and interchange option. The ultimate number of displacements and amount of ROW required for each of the Build Alternatives may vary slightly from what is presented in this report as a result of revisions and/ or refinements to the design that may occur during the detailed engineering phase of this project.

Legend

- Project Limits
- Study Limits
- Communities (see Table II-4)
- Community Areas

N

ABINGDON/ RIVERSIDE/ EMMORTON

CHURCHVILLE/ CRESWELL

GREATOR ABERDEEN/ HAVRE DE GRACE

JOPPA/ JOPPATOWNE

KINGSVILLE

EDGEWOOD

PERRY HALL/ WHITE MARSH

95 Section 200

Figure III-1
Communities and Neighborhoods

1 inch equals 1 mile

Table III-5: Summary of ROW Impacts and Displacements

Alternative	Total ROW (acres)	Displacements		
		Residential	Commercial	Outbuildings
No-Build Alternative	0	0	0	0
General Purpose Lanes Alternative (Total)	32.7	0	1	0
General Purpose Lanes Alternative (mainline only)	10.2	0	0	0
General Purpose Lanes Alternative - Interchange Options				
MD 152 Option 1	9.7	0	0	0
MD 152 Option 4	13.6	0	0	0
MD 24 Option 2	8.9	0	1	0
MD 543 Option 1	0	0	0	0
MD 543 Option 7	0	0	0	0
MD 22 Option 1	0	0	0	0
Express Toll Lanes Alternative (Total)	52.6	0	1	0
Express Toll Lanes Alternative (mainline only)	17.1	0	0	0
Express Toll Lanes Alternative - Interchange Options				
MD 152 Option 1A	16.5	0	0	0
MD 152 Option 4A	20.3	0	0	0
MD 24 Option 2	13.2	0	1	0
MD 543 Option 7	2	0	0	0
MD 22 Option 1	0	0	0	0

*Based on limits of disturbance

No-Build Alternative

The No-Build Alternative retains the existing I-95 highway in its present configuration while allowing for routine maintenance and safety improvements. The No-Build Alternative would not require the acquisition of additional ROW, resulting in no physical impacts to residential, commercial, or other structures. There will be no impact to community cohesion, or changes to community access and mobility. However, as traffic volumes increase in the future, local

communities could experience indirect impacts resulting from increases in traffic due to motorists traveling to and from I-95, and those seeking to avoid congestion and delays on I-95 by diverting to local roadways.

General Purpose Lanes Alternative (mainline)

This alternative's mainline would require the acquisition of approximately 10.2 acres of new ROW from multiple areas along the Section 200 corridor. In general, the areas where ROW would be required are linear strips of land located adjacent to the Authority's existing ROW, with larger linear or polygonal sections for stormwater management (SWM) needed to address the increase in impervious areas associated with the roadway widening. Most individual ROW impacts would be small slivers of either undeveloped land or woodlands. The largest of the ROW impacts will occur at properties surrounding the existing interchanges. As such, ROW impacts resulting from each interchange option are described below:

No substantial community impacts are expected to occur as a result of General Purpose Lanes Alternative. Right of way acquisitions would result in community impacts, particularly to the Edgewood and Abingdon/Riverside/Emmorton communities due to modifications to the existing MD 152 and MD 24 interchanges, including the proposed park and rides. Because the majority of community impacts would result from interchange modifications, community impacts to cohesion, access, mobility, and quality of life have been broken down by each interchange.

General Purpose Lanes Alternative - Interchange Options

MD 152 Options 1 and 4 (Appendix A, Plates 8A-10A, 8-10, and 9P&R))

Option 1 is a simple diamond interchange design that has a similar footprint as that of the existing interchange, most of the proposed improvements for this option occur in the Authority's ROW. There are 9.7 acres of additional ROW required for this option. Most of the additional ROW is due to the proposed park and ride (10.6 acres). Option 4 would require 13.6 acres of additional ROW. A majority of the ROW is needed for a proposed loop ramp in

the northeast quadrant of this interchange option and the proposed park and ride. Most of the ROW required for Option 4 is forested. As a result of either interchange option, the existing park and ride lot will be removed and relocated off-site.

Both options call for the removal of the existing bridge carrying Old Mountain Road over I-95, and the construction of cul-de-sacs on Old Mountain Road. This would result in community cohesion impacts to the Joppa/Joppatowne community area, by changing local traffic patterns in the community where this portion of the I-95/MD 152 interchange is located. Local residents would no longer have direct access across I-95, and would be required to access MD 152 via MD 7 to make that movement. While this may inconvenience residents who currently utilize this road, it could benefit the community by eliminating cut-through traffic and by improving safety.

Option 4 would impact the Edgewood community from the construction of a loop ramp connecting northbound I-95 with northbound MD 152, replacing the current signalized intersection that provides that movement. This loop ramp would require the relocation of the existing ramp connection from MD 152 northbound to I-95 northbound, pushing it closer to the new Forest View Condominiums and a vacant commercial property located within the Edgewood community. The overall effect to the community is expected to be minor, as the new interchange configuration would not affect community cohesion, access, or mobility within the Edgewood community. There is the potential that the new ramps would increase visual impacts to adjacent neighborhoods, but this impact would be minor given the current location of these properties to the vicinity of the I-95 and MD 152 interchange, where existing views of the highway are present.

Both options would require the relocation of the existing park and ride lot currently located within the interchange ramp area. The new park and ride lot will have more available parking spaces, which will allow for more residents of the surrounding communities to use the new park and rides for rideshare and/or transit opportunities. The location of the new lot is described on page II-36 in this report.

MD 24 Option 2 (Appendix A, Plates 12-16)

There would be 8.9 acres of additional ROW required for this option. The majority of the improvements would occur within existing Authority ROW. The largest ROW requirement as part of the improvements to this interchange would occur along the ramps from southbound MD 24/MD 924/Tollgate Road to southbound I-95, ramps from northbound I-95 to northbound MD 24/ MD 924, and the proposed park and ride. This would impact open property associated with the Constant Friendship Business Park, and a commercial property located along MD 24 that would likely be displaced by this option. The displacement is currently a Sportsman Club (shooting range).

Overall, the proposed improvements would result in property, visual, and potential noise impacts. These represent potential quality of life impacts, which could be offset somewhat by improved access, increased transit use, mobility, and safety created by the enhanced interchange operations and a new park and ride lot. The proposed improvements to the I-95/MD 24 interchange and new park and ride lot are not expected to impact community cohesion as only one displacement is likely, and no neighborhoods or communities would be physically separated from others in the area.

MD 543 Options 1 and 7 (Appendix A, Plates 21A-24A and 21-24)

The proposed improvements for both options at the MD 543 interchange are entirely within existing ROW. The proposed interchange configurations utilize existing ramps where possible, and accommodate all new and realigned ramps within the existing ROW. There are no displacements associated with these options.

The proposed interchange configuration with Option 1 would minimize the overall footprint of the interchange by tightening the ramp layout, which would provide greater distance between the ramps and hotels located on Handler Road (Spring Hill Suites and Country Inn and Suites). This new configuration would improve the existing weaving condition along MD 543 by creating greater distance between the I-95 signal and the MD 7 intersection. The proposed improvements would also include dual left turn lanes from southbound MD 543 to

northbound MD 7, providing better access to the community's retail and business areas. The overall effect to the surrounding communities would be beneficial, as separation between the highway ramps and potential receptors would be increased, and safety and mobility through this area would be enhanced.

Option 7 would be similar to that of Option 1; however it would introduce a loop ramp in the northwest quadrant of the intersection. This new ramp would expand the footprint of the interchange and push the new ramps closer to existing residential and commercial receptors. In the Churchville/Creswell portion of the interchange area, these impacts would be relatively minor, and would be accomplished within existing ROW. The northbound MD 543 to southbound I-95 loop would push the ramp carrying southbound I-95 to northbound MD 543 further towards residential receptors, and would require the relocation of a service road providing access to the Maryland Transportation Authority Maintenance One facility. Despite the expansion of the interchange, portions of a forested buffer between the access road and residential properties would be preserved, reducing the impacts to the adjacent community.

The proposed improvements to the I-95/MD 543 interchange are not expected to impact community cohesion as no displacements are likely, and no neighborhoods or communities would be physically separated from others in the area.

MD 22 Interchange Option 1 (Appendix A, Plates 30 and 31)

The proposed improvements at MD 22 occur entirely within existing ROW, with no outside widening or modification of existing ramps required. There are no displacements associated with this option.

No outside widening or modifications to the existing ramps or bridges would be required with this alternative; therefore no community impacts are expected. If anything, the improvements to the I-95/MD 22 interchange would have a positive effect on the

surrounding communities as the increased capacity on I-95 would help alleviate existing traffic congestion, resulting in decreased travel times.

Express Toll Lanes Alternative (mainline)

Although a majority of the improvements associated with the Express Toll Lanes Alternative would be located within the Authority's existing ROW, 17.1 acres of new ROW acquisition would be required for the mainline section. In general, the areas where ROW would be required are linear strips of land located adjacent to the Authority's existing ROW, with larger linear or polygonal sections for SWM needed to address the increase in impervious areas associated with the roadway widening. These SWM areas would be scattered throughout the study area on both sides of I-95, generally located in low-lying areas, near existing drainage systems. Most individual impacts would be small slivers of either undeveloped land or woodlands. The largest of the ROW impacts will occur at properties surrounding the four interchanges. As such, ROW impacts resulting from each interchange option are described below:

The Express Toll Lanes Alternative would require the most additional ROW, and would therefore result in the most impacts to the surrounding communities. Nevertheless, no substantial community impacts are expected to occur as a result of this alternative. Because this alternative would involve the construction of barrier separated ETLs, the configuration of existing interchanges would need to be modified in some areas to provide ramp connections to and from the ETLs. Because the majority of community impacts would result from interchange modifications, community impacts to cohesion, access, mobility, and quality of life have been broken down by each interchange.

Express Toll Lanes Alternative – Interchange Options

MD 152 Options 1A and 4A (Appendix B, Plates 39A-43A, 39-43, and 41 P&R)

The Option 1A improvements would require an additional 16.5 acres of ROW. The majority of these impacts occur in the northwest quadrant of the interchange, where ROW would be

needed for the ramp from I-95 southbound to MD 152, the relocation of Jaycee Road, and the proposed park and ride.

Option 4A improvements will require 20.3 acres of additional ROW. The ROW requirements are similar to Option 1A except in the northeast quadrant of the interchange where a new loop ramp would connect the I-95 northbound GPLs to northbound MD 152. This would require the acquisition of additional ROW in the vicinity of this ramp. Both Options 1A and 4A would require the relocation of the existing park and ride.

Just like the two interchange options for the General Purpose Lanes Alternative, both options would impact the Joppa/Joppatowne community primarily from the closure of the existing bridge carrying Old Mountain Road over I-95. Both options propose the removal of this bridge, and the construction of cul-de-sacs on Old Mountain Road. This would result in community cohesion impacts, by changing local traffic patterns in the community where this portion of the I-95/MD 152 interchange is located. Local residents would no longer have direct access across I-95, and would be required to access MD 152 via MD 7 to make that movement. While this may inconvenience residents who currently utilize this road, it could also benefit the community by eliminating cut-through traffic, and improving safety.

Both options would require the relocation of the existing park and ride lot currently located within the interchange ramp area. The new park and ride lot will have more available parking spaces, which will allow for more residents of the surrounding communities to use the new park and rides for rideshare and/or transit opportunities. The location of the new lot is described on page II-36 in this report.

Both options propose a ramp connecting southbound I-95 to northbound MD 152 that would require the relocation of the existing access road (Jaycee Drive) to homes in the Happy Acres neighborhood.

There are also some minor impacts to the Edgewood Community by both options. Option 4A proposes a loop ramp that would require the relocation of the existing ramp connection from MD 152 northbound to I-95 northbound, pushing it closer to the new Forest View Condominiums and a vacant commercial property. Option 1A also proposes a ramp from northbound MD 152 to northbound I-95 that is much closer to the new Forest View Condominiums and a vacant commercial property compared to the existing interchange configuration. The overall effect on the community for both options is expected to be minor, as the new interchange configurations would not affect community cohesion, access, or mobility within the Edgewood community. There is the potential that the new ramps would increase visual impacts to adjacent neighborhoods, but this impact would be minor given the current location of these properties in the vicinity of the I-95/MD 152 Interchange, where existing views of the highway are present.

MD 24 Option 2 (Appendix B, Plates 44-49 and 47 P&R)

The majority of the improvements would occur within existing Authority ROW, however there would be 13.2 acres of additional ROW required for this option. The largest ROW requirement as part of the improvements to this interchange would occur along the ramps from southbound MD 24/MD 924/Tollgate Road to southbound I-95, ramps from northbound I-95 to northbound MD 24/ MD 924/Tollgate Road, and the proposed park and ride. These ramps would impact open property associated with the Constant Friendship Business Park, and a commercial property located along MD 24 that would likely be displaced by this option. The displacement is currently a Sportsman Club (shooting range).

This new ramp configuration replaces the loop ramp that currently connects I-95 and MD 24. Because the ramp would provide access to both MD 24 and MD 924/Tollgate Road, the alignment extends outside of the current ramp, bringing the ramp closer to the Woodsdale neighborhood, and other homes along Woodsdale Road. This would reduce the forested buffer between these homes and the interchange ramp, resulting in increased proximity impacts to the neighborhood. The height of the new ramp, which will carry traffic over the I-95 lanes, would also make the ramp more visible to the surrounding neighborhoods.

The loop ramp connecting northbound MD 24 to southbound I-95 would also be removed, and replaced by a signalized dual lane left turn ramp. This would not impact adjacent communities because the proposed turn ramp would be within the existing footprint of the interchange, and would actually move this traffic further from adjacent residential areas.

In addition to the interchange improvements, a new park and ride lot is proposed along MD 24 west of the I-95/MD 24 Interchange. The park and ride is located just north of the Woodsdale community. There are no impacts expected to the community from the park and ride because there will be a significant buffer between the lot and the community. The new lot is required due to an increased need from commuters in the area that either rideshare or use public transit.

Overall, the proposed improvements would result in property, visual, and potential noise impacts. These represent potential quality of life impacts, which could be offset somewhat by improved access, increased transit use, mobility, and safety created by the enhanced interchange operations and a new park and ride lot. The proposed improvements to the I-95/MD 24 interchange and new park and ride lot are not expected to impact community cohesion as only one displacement is likely, and no neighborhoods or communities would be physically separated from others in the area.

MD 543 Option 7 (Appendix B, Plate 54-57)

The proposed improvements at MD 543 occur almost entirely within existing ROW. There will be an additional 2 acres of ROW required for this option. The majority of the ROW required would be in the form of small strip takes. There are no displacements associated with this option.

Impacts from the proposed I-95/MD 543 interchange would occur primarily to the Churchville/ Creswell community area, located north and west of the existing highway. The MD 543 intersection marks the northernmost extent of the ETLs. To accommodate the ETLs, a third signalized intersection would be added to the MD 543 bridge, which would

allow access to and from the ETLs via median ramps. The connection ramps in the median reduce the ROW requirements along the approaches to the interchange.

The new interchange configuration would provide a loop ramp movement between northbound MD 543 and southbound I-95. This would replace the existing signalized intersection that currently provides this traffic movement resulting in less congestion, and an ease to drivers attempting this movement. However, this new loop ramp would expand the overall footprint of the interchange. The northbound MD 543 to southbound I-95 loop ramp would push the ramp carrying southbound I-95 to northbound MD 543 further towards residential receptors, and would require the relocation of a service road providing access to the Maryland Transportation Authority's Maintenance One facility. Despite the expansion of the interchange, portions of a forested buffer between the access road and residential properties would be preserved, reducing the impacts to the adjacent community.

The proposed improvements to the I-95/MD 543 interchange are not expected to impact community cohesion as no displacements are likely, and no neighborhoods or communities would be physically separated from others in the area.

MD 22 Option 1 (Appendix B, Plate 63 and 64)

The proposed improvements at MD 22 occur entirely within existing ROW, with no outside widening or modification of existing ramps required. There are no displacements associated with this option.

No outside widening or modifications to the existing ramps or bridges would be required with this alternative; therefore no community impacts are expected. If anything, the improvements to the I-95/MD 22 interchange would have a positive effect on the surrounding communities as the increased capacity on I-95 would help alleviate existing traffic congestion, resulting in decreased travel times.

Mitigation

Fair market value would be provided to all property owners as compensation for land acquisition. Relocation of any individuals, families, or businesses displaced by this project would be accomplished in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended by the Surface Transportation and Uniform Relocation Assistance Act of 1987. In the event that comparable replacement housing is not available for displaced persons or that available replacement housing is beyond their financial means, replacement housing as a last resort will be utilized to accomplish the rehousing.

4. Effects on Aesthetics and Visual Quality

The I-95 corridor, from the project limit at New Forge Road to the MD 24 interchange is an eight-lane divided highway, with characteristics similar to much of the nation's highway system. North of MD 24 through the northern project limit at Maxa Road, the lanes drop from eight to six, but the highway characteristics remain fairly consistent. The existing views from the road are predominantly forested and agricultural, with areas of residential and commercial uses also visible. Noise barriers or retaining walls obscure portions of the view to and from I-95, particularly in the areas of high density of residential properties.

No Build Alternative

Under the No Build Alternative, the general aesthetics from the roadway would appear similar to what it is today. The highway would not be widened and no new structures would be built. The interchanges would not be improved, maintaining the current configuration. In most cases, the existing roadside and median landscaping would be preserved as they are today.

Build Alternatives

The Build Alternatives would affect visual quality by introducing additional pavement and structural elements along the I-95 Section 200 corridor. This would include expanded travel

lanes, reduced median width, and the addition of new structures such as retaining walls, sound barriers and bridges.

The added width of the Build Alternatives would reduce existing green space in the median and extend into the roadsides in some locations. Some existing trees and roadside landscaping would be removed, reducing or eliminating wooded buffers between the highway and adjacent homes. There is the potential that some existing sound barriers would also need to be relocated under both alternatives.

New highway structures at the MD 152 and MD 24 interchanges would be visible along the corridor. Other visual impacts would occur from the proposed park and ride lots along MD 24 and MD 152. It is expected that landscaping of the new lots to reduce visual effects would be incorporated into the final design of the lot. It is unknown at this time the extent lighting fixtures that will be included with the lot designs; however, it is not expected to be significantly more intense than the existing light at the lot, roadway, highway, and interchange ramps.

Other structures along the corridor would include sound barriers and retaining walls. New sound barriers will be considered as part of the separate noise study, and would be constructed in areas along the corridor where they meet the feasibility and cost effectiveness criteria. These new barriers would help to visually screen the highway from the community as well as attenuate noise. Other possible locations for new structures may include bridge abutments and retaining walls along roadsides where cut and fill slopes would need to be minimized.

When located in visible areas, these retaining walls and sound barriers could receive aesthetic treatments such as patterning and staining to create a more context-sensitive finish. Additionally, plantings could be added along sound barriers and retaining walls to help soften their appearance. The finish should be coordinated throughout the corridor and with other structural elements to maintain visual continuity.

Although the visual environment of the Section 200 corridor would be affected by the Build Alternatives, the overall aesthetic environment would not necessarily be incompatible with the overall character or visual quality of the I-95 corridor as it currently exists. While individual views may be altered slightly, the overall appearance and setting of I-95 under the Build Alternatives would be similar and consistent with the existing condition.

5. Community Facilities and Services

Community facilities and services located within or serving the study area include schools, places of worship, cemeteries, post offices, libraries, police, fire, hospitals and health care facilities, senior housing, transportation facilities, and parks and recreational facilities. **Figure III-2** shows the locations of the community facilities within and near the study area.

a. Schools

There are eight schools located within or immediately adjacent to the Section 200 study area. Six of these schools are public elementary schools, one is a public high school, and one, the Higher Education and Applied Technology (HEAT) Center, provides classroom space for several colleges and universities. The following is a list of schools in or adjacent to the study area:

- Chapel Hill Elementary School
- Abingdon Elementary School
- William S. James Elementary School
- William Paca Elementary School
- Old Post Road Elementary School
- Church Creek Elementary School
- Aberdeen High School
- HEAT Center

The No-Build Alternative would not directly impact any schools or school facilities. However, this alternative would ultimately have a negative effect on schools as traffic

volumes and congestion increase throughout the area, resulting in increased travel time to and from each facility.

Neither of the Build Alternatives would result in any direct impacts to schools or school facilities. Improvements to I-95 and associated roadways will not affect any of the ingress or egress points at any of the school facilities, however temporary detours or delays may occur to school bus routes as a result of construction activities.

It is expected that upon completion, the improvements proposed under each of the Build Alternatives will have a positive affect on local schools by providing safer and more efficient travel to and from each school facility.

b. Places of Worship

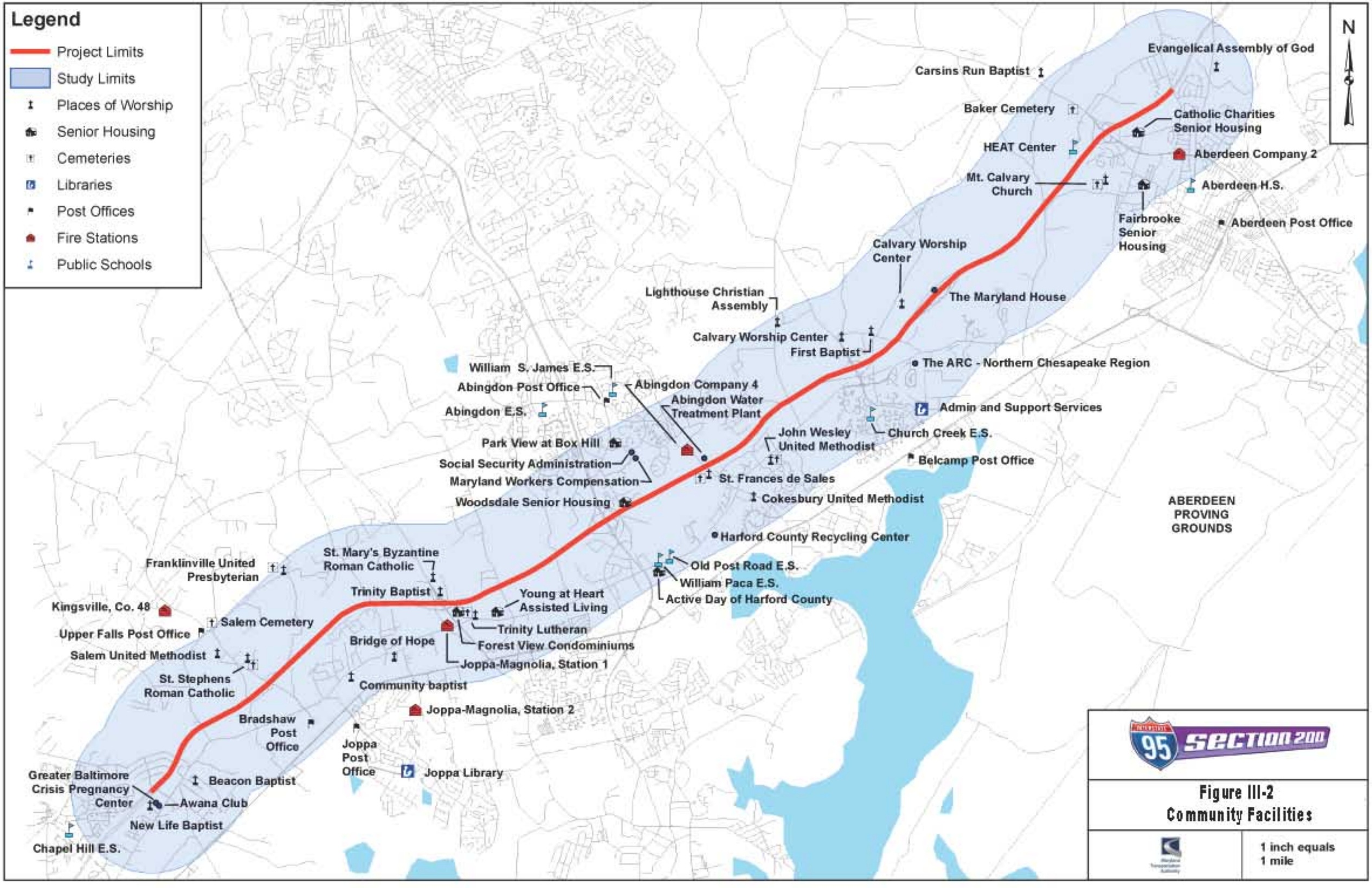
Twenty churches or other places of worship are located within or immediately adjacent to the Section 200 study area. Places of worship include:

- New Life Baptist Church
- Beacon Baptist Church
- Salem United Methodist Church (and cemetery)
- St. Stephens Roman Catholic Church (and cemetery)
- Franklinville United Presbyterian Church (and cemetery)
- Community Baptist Church
- Bridge of Hope Church
- St. Mary's Byzantine Catholic Church
- Trinity Reformed Baptist Church
- Trinity Evangelical Lutheran Church (and cemetery)
- St. Francis de Sales Roman Catholic Church (and cemetery)
- Cokesbury Memorial Methodist Church
- Jon Wesley United Methodist Church (and cemetery)
- Lighthouse Christian Academy

- Calvary Worship Center
- Calvary Worship Center (2)
- First Baptist Church
- Carsins Run Baptist Church
- Mt. Calvary Church (and cemetery)
- Evangelical Assembly of God

The No-Build Alternative would not directly impact any churches or other places of worship. However, this alternative would ultimately have a negative effect on all places of worship in the study area as traffic volumes and congestion increase throughout the area, resulting in increased travel time to and from each location.

The proposed park and ride lot at MD 152 for each of the Build Alternatives would directly impact the Trinity Baptist Church. Although a portion of the church property is required for the park and ride lot, it will not impact the church nor affect any activities that are conducted at the church. Trinity Baptist Church feels that the new park and ride may benefit the church because it will offer overflow parking during weekend events. In addition to Trinity Baptist Church, it is expected that upon completion, the improvements proposed under each of the Build Alternatives will have a positive affect on local places of worship, by providing safer and more efficient travel to and from each location and a signalized intersection that will help people get in and out of the parking lot at the church.


Legend
Project Limits
Study Limits
Places of Worship
Senior Housing
Cemeteries
Libraries
Post Offices
Fire Stations
Public Schools
N
Evangelical Assembly of God
Carsins Run Baptist
Baker Cemetery
Catholic Charities Senior Housing
HEAT Center
Aberdeen Company 2
Mt. Calvary Church
Aberdeen H.S.
Fairbrooke Senior Housing
Aberdeen Post Office
Calvary Worship Center
Lighthouse Christian Assembly
The Maryland House
Calvary Worship Center
First Baptist
The ARC - Northern Chesapeake Region
William S. James E.S.
Abingdon Post Office
Abingdon Company 4
Abingdon Water Treatment Plant
Abingdon E.S.
Admin and Support Services
John Wesley United Methodist
Church Creek E.S.
Park View at Box Hill
Social Security Administration
Maryland Workers Compensation
Woodsdale Senior Housing
St. Frances de Sales
Belcamp Post Office
Cokesbury United Methodist
ABERDEEN PROVING GROUNDS
Harford County Recycling Center
Old Post Road E.S.
William Paca E.S.
Active Day of Harford County
St. Mary's Byzantine Roman Catholic
Franklinville United Presbyterian
Trinity Baptist
Young at Heart Assisted Living
Kingsville, Co. 48
Salem Cemetery
Trinity Lutheran
Upper Falls Post Office
Bridge of Hope
Forest View Condominiums
Salem United Methodist
Joppa-Magnolia, Station 1
St. Stephens Roman Catholic
Community baptist
Joppa-Magnolia, Station 2
Bradshaw Post Office
Joppa Post Office
Joppa Library
Greater Baltimore Crisis Pregnancy Center
Beacon Baptist
Awana Club
New Life Baptist
Chapel Hill E.S.
95 Section 200
Figure III-2
Community Facilities
1 inch equals 1 mile

c. Cemeteries

In addition to the cemeteries identified above, the Baker Cemetery is located within the study limits, near the intersection of MD 22 with Technology Drive. The Baker Cemetery is owned by the Grace United Methodist Church, which is located outside the study limits in Aberdeen.

The Salem United Methodist Church also owns an off-site cemetery, in addition to a cemetery adjacent to the actual church. The off-site cemetery is located off of Franklinville Road, near the intersection of Chapman Road. Both the church and the off-site cemetery are located within the Section 200 study limits.

The No-Build Alternative would not directly impact any cemeteries. However, this alternative would ultimately have a negative effect on cemeteries and cemetery visitors as traffic volumes and congestion increase throughout the area, resulting in increased travel time to and from each location.

The Build Alternatives would not directly impact any cemeteries. It is expected that upon completion, the improvements proposed under each of the Build Alternatives will have a positive affect on local cemeteries, by providing safer and more efficient travel to and from each location.

d. Hospitals and Other Health Care Facilities

Franklin Square Hospital Center, located approximately 5 miles south of the study area near the intersection of I-95 and Rossville Road, and Harford Memorial Hospital, located approximately 6 miles north of the study area in Havre de Grace, are the two closest hospitals to the study area. Other medical facilities within (or near) the study area include numerous medical practices within the Box Hill Corporate Center in Abingdon, the Johns Hopkins Community Physicians at the Riverside Shopping Center, and other medical and dental practices scattered throughout the study area.

The No-Build Alternative would not directly impact any hospitals or health care facilities. However, this alternative would ultimately have a negative effect on hospitals and other health care facilities, as traffic volumes and congestion increase throughout the area, resulting in increased travel time to and from these facilities.

Neither of the Build Alternatives would result in any direct impacts to hospitals or other health care facilities. Improvements to I-95 and associated roadways will not affect any of the access points at any of these health care facilities.

It is expected that upon completion, the improvements proposed under each of the Build Alternatives will have a positive affect on health care facilities by providing safer and more efficient travel times throughout the area. The Build Alternatives would also provide improved emergency response time to and from the Franklin Square Hospital Center and Harford Memorial Hospital by reducing congestion in the area, and providing alternative travel lanes with the Express Toll Lanes Alternative.

e. Post Offices

Two post offices are located within the Section 200 study area: Upper Falls and Bradshaw, both of which are located in Baltimore County. The Upper Falls Post Office is located at the intersection of Raphel Road and Bradshaw Road. The Bradshaw Post Office is located on Bradshaw Road. Four Post Offices are located just outside the study area in Harford County: Joppa, Abingdon, Belcamp, and Aberdeen.

The No-Build Alternative would not directly impact any post offices or other postal related facilities. However, this alternative would ultimately have a negative effect on post offices as traffic volumes and congestion increase throughout the area, resulting in increased travel time to and from these facilities, and along mail delivery routes.

Neither of the Build Alternatives would result in any direct impacts to post office facilities. Improvements to I-95 and associated roadways will not affect any of the ingress or egress

points at any of the postal facilities, however temporary detours or delays may occur to mail delivery routes as a result of construction activities.

It is expected that upon completion, the improvements proposed under each of the Build Alternatives will have a positive affect on postal facilities by providing safer and more efficient travel to and from each facility, and along mail delivery routes.

f. Libraries

There are no libraries located within the Section 200 study area. The closest libraries to the study area are operated by Harford County, and include the Aberdeen Branch off of Franklin Street, the Edgewood Branch off of Edgewood Road, the Joppa Branch off of Towne Center Drive, and the Harford County Public Library Administrative Office located on Brass Mill Road. The closest library in Baltimore County is the Perry Hall Branch located off of Belair Road.

The No-Build Alternative would not directly impact any library facilities. However, this alternative would ultimately have a negative effect on libraries, as traffic volumes and congestion increase throughout the area, resulting in increased travel time to and from these facilities.

Neither of the Build Alternatives would result in any direct impacts to library facilities. Improvements to I-95 and associated roadways will not affect any of the ingress or egress points at any of the library facilities.

It is expected that upon completion, the improvements proposed under each of the Build Alternatives will have a positive affect on library facilities by providing safer and more efficient travel to and from each facility.

g. Police, Fire, and Rescue

The I-95 corridor is patrolled by the Maryland State Police detachment assigned to the JFK Memorial Highway (Barrack M). The majority of the study area within Baltimore County is

also served by the White Marsh Precinct #9, and the Maryland State Police Barrack R–Golden Ring. In the Harford County portion of the project, the area is served primarily by the Harford County Sheriff Southern Precinct, the Maryland State Police Barrack D–Bel Air, and the Aberdeen Police Department. None of these police stations are located within the study area.

The Baltimore County portion of the study area is serviced by the Kingsville Company 48 Station off of Bradshaw Road, and the Cowenton Company 20 Station off of Cowenton Avenue, both of which are located outside of the study area.

Three fire stations are located within the study limits in Harford County. These include the Joppa-Magnolia Company 8 (Station 1), the Abingdon Company 4 (Station 1), and Aberdeen Company 2 (Station 3).

The No-Build Alternative would not directly impact any police, fire, or rescue facilities. However, this alternative would ultimately have a negative effect on emergency services, as traffic volumes and congestion increase throughout the area, resulting in increased response times.

It is expected that upon completion, the improvements proposed under each of the Build Alternatives will have a positive affect on emergency services by providing safer and more efficient response times throughout the area. In particular, the Express Toll Lanes Alternative would provide emergency response vehicles with the additional flexibility of travel in the congestion free express toll lanes.

h. Transportation Facilities

There are several park and ride lots within the study area, including two lots at I-95 and MD 152 (~300 total spaces), a lot at I-95 and MD 24 (53 spaces), a lot at I-95 and MD 543 (133 spaces), and a lot at I-95 and MD 22 (64 spaces).

The Maryland Transit Administration (MTA) provides local and commuter bus service throughout Baltimore and Harford Counties. In addition, the Harford County public bus service (Harford Transit) operates seven routes throughout the county. Three of the routes use I-95, three routes cross I-95, and one route remains in Bel Air.

The No-Build Alternative would not directly impact any transportation facilities. However, this alternative would ultimately have a negative effect on the existing transportation facilities in the study area. Traffic volumes and congestion would decrease the access to the transportation facilities, and reduce the overall reliability of the existing transportation system within the I-95 corridor.

Both of the Build Alternatives would impact the park and ride facility located at the I-95/MD 152 interchange. The location of the new lot is described on page II-36 in this report. There is also a new park and ride proposed just west of the I-95/MD 24 Interchange. The new lot will be added due to the demand of the commuters in this area.

Both of the Build Alternatives and park and ride lots would be expected to have a positive effect on local and commuter bus services throughout the study area as a result of improved traffic flow and increased park and ride lot capacity. With the availability of ETLs in the Express Toll Lanes Alternative, public transportation would likely be a more attractive option to travelers, as it would provide a cost effective and reliable means of transportation.

i. Parks and Recreation Facilities

Eleven public parks are located within the study area, including: Gunpowder Falls State Park, Stoney Run Forest Demonstration Area, Loreley Community Center, Clayton Road Conservation Area, Winters Run Greenway Walking Trail, Winters Run Conservation Area, Box Hill South Park, Bynum Run Conservation Area, Bush Declaration Natural Resource Management Area, Hollywoods Park Area, and A.D. Demarco Memorial Park.

In addition to public parks, there are several recreation areas scattered throughout the study area, including the Loreley Community Center, other community and church playgrounds and athletic fields, equestrian riding centers, miniature golf courses, driving range facilities, and four golf courses (Gunpowder Falls, Bren-Mar Park, Beechtree, and Wetlands). Also within the study area, is the expansive Ripken Stadium Complex located in Aberdeen, which hosts both amateur and professional baseball games, camps, and other recreational activities.

The No-Build Alternative would not directly impact any parks or recreation facilities. However, this alternative would ultimately have a negative effect on parks and recreation facilities as traffic volumes and congestion increase throughout the area, resulting in increased travel time to and from these facilities.

Neither of the Build Alternatives would result in any direct impacts to park or recreation facilities. Improvements to I-95 and associated roadways will not affect access points at any of the park or recreation facility locations.

Because I-95 is an access-controlled facility, no bicycle and pedestrian facilities are being incorporated into the design. However adequate bicycle and pedestrian accommodations are being incorporated into the design of each interchange option and overpass structure to facilitate connectivity with the new design and existing facilities.

It is expected that upon completion, the improvements proposed under each of the Build Alternatives will have a positive affect on park and recreation facilities by providing safer and more efficient travel to and from each facility.

B. Economic Environment

The following is a discussion about the economic environment within and adjacent to the Section 200 study area. For more detailed information please refer to the *Section 200 Socioeconomic and Land Use Technical Report***.**

1. Employment Characteristics

Table III-6 shows median household, median family, and per capita income data for Baltimore County, Harford County and the Section 200 study area. Within the study area, the median household and median family incomes ($57,358 and $62,514, respectively) are both greater than Baltimore County, and are consistent with the income levels of Harford County. The per capita income within the study area is greater than that of Harford County as a whole, but less than that of Baltimore County.

Table III-6: Income Characteristics

Characteristic	Baltimore County	Harford County	Study Area
Median Household Income (1999)[1]	$50,667	$57,234	$57,358[2]
Median Family Income (1999)[1]	$59,998	$63,868	$62,514[2]
Per Capita Income	$26,167	$24,232	$24,667

Source: Census 2000

[1] A household is a defined by the U.S. Census as a place (structure) where one or more persons reside on a regular basis. A family is defined as two or more persons related by birth, marriage, or legal adoption that occupy a place on a regular basis.

[2] Figures shown were determined by calculating the average of the Median Household Income or Median Family Income values for each census tract in the study area.

Approximately 66.6 percent of the population in Baltimore County belonged to the labor force, while 71.3 percent of the population in Harford County belonged to the labor force in 2000. Based upon the Census 2000 data, approximately 84 percent of the Baltimore County population that is 25 years of age and older, and 87 percent of the Harford County population that is 25 years of age and older at a minimum have a high school education. The top industries in Baltimore and Harford Counties include education, health, and social services.

Approximately 69 percent of the population 16 years of age and older in the study area were employed in 2000. Approximately 85.1 percent of the study area population 25 years of age and older have at a minimum a high school education. The top industries in the study area include education, health, and social services, retail trade, and manufacturing.

a. Base Realignment and Closure

The Base Realignment and Closure (BRAC) process will have a major effect on the regional employment characteristics of the study area. BRAC is the process by which the U.S. Department of Defense (DOD) reorganizes installation infrastructure to more efficiently/effectively stage forces, increase operational readiness, and facilitate new ways of doing business. As a result of BRAC, the Aberdeen Proving Ground within the study area is slated to receive 6,176 new federal jobs, 3,000 direct contractor support jobs, and 12,352 ancillary contractors, for a net of 21,528 new jobs by 2011. Other non-BRAC related developments could push the total new jobs within the study area to approximately 26,828 within the next ten years.

2. Effects on Local and Regional Employment Characteristics

No-Build Alternative

The No-Build Alternative would not directly impact any of the businesses located within the study area. However, increased traffic congestion and delays associated with projected increases in traffic volumes along I-95 could indirectly affect local businesses. Congested roadway conditions could inhibit access to local businesses as well as delay the delivery of goods and services to and from these businesses.

The No-Build Alternative would not have direct effects on regional business activity; however, the failure to address increasing traffic congestion would ultimately have a negative effect on the regional economy. Increasing traffic congestion on I-95 would lead to longer travel times for residents and businesses that rely on I-95 to travel throughout the Baltimore Metropolitan region, and points beyond. Traffic volume increases would also result in longer peak traffic periods on I-95 and adjacent roads. Because I-95 is a critical component of the regional transportation system, congestion-related delays could inhibit the productivity of many businesses, especially those that are highly dependent on the transportation system or timely delivery of goods and services. Decreased mobility along I-95 would not support planned economic growth in the region. This would also affect existing businesses as increased traffic and congestion would inconvenience potential customers, limiting the

geographic base of a particular business. Congestion expected under the no-build alternative would also make product delivery and supply less predictable.

General Purpose Lanes Alternative

The General Purpose Lanes Alternative would result in only minimal impacts to local businesses, with only one commercial displacement required for the I-95/MD 24 Interchange Option 2. Since this alternative would involve the widening of an existing access-controlled highway and would not add or remove any interchanges, access to local businesses would not be affected. In addition, by improving traffic operations along I-95 through this corridor and providing commuters expanded park and ride facilities, thus reducing traffic congestion, access to local businesses would be slightly improved.

The General Purpose Lanes Alternative would have the least overall effect on regional business activity. By providing additional roadway capacity along Section 200, the transportation system would be capable of accommodating projected increases in traffic that are expected to occur in the region. As previously discussed, the addition of general purpose lanes would result in very little direct impacts to businesses in the region; therefore, no major commercial areas would be substantially affected. This alternative does not propose the addition, removal or relocation of any access points on Section 200. Therefore, no commercial trip patterns would be affected. By improving travel conditions along Section 200 and increased access to transit due to the proposed park and ride lots, access to future residential and commercial areas would be enhanced.

Although this alternative would provide better overall traffic operations for both weekday and weekend peak periods, the number of accessible travel lanes would make it difficult to implement a travel demand management program. Over time, the General Purpose Lanes Alternative would experience increasing congestion levels on all lanes of travel. Additionally, there would be limited incentive for transit or carpooling.

This alternative would be consistent with the expected increase in regional employment opportunities and development resulting from BRAC.

General Purpose Alternative - Interchange Options

MD 152 Options 1 and 4

The largest commercial area located at the I-95/MD 152 interchange is along the northeast quadrant of the interchange. This will not be impacted by Option 1 but the loop ramp in Option 4 would impact the undeveloped property in the vicinity of a vacant commercial building.

MD 24 Option 2

For Option 2, a small strip of ROW would be required from the Constant Friendship Business Park, where a new ramp would be constructed to provide access to southbound I-95 from southbound MD 24 and MD 924. This will occur in an undeveloped portion of the property, and would not affect any existing or planned facilities. Option 2 will displace one business (Sportsman Club). The proposed park and ride will not directly impact any businesses in the area. The park and ride may benefit the businesses west of the interchange because it will attract more commuters to this area.

MD 543 Options 1 and 7

The I-95/MD 543 interchange improvements would not impact any commercial properties, as all improvements will occur within the existing ramp configuration.

MD 22 Option 1

The I-95/MD 22 interchange improvements would not impact any commercial properties, as all improvements will occur within the existing ramp configuration.

Express Toll Lanes Alternative

Because this alternative would involve the widening of an existing access-controlled highway corridor and would not add or remove any interchanges, access to local businesses

would not be altered, aside from the reconfiguration of various ramps and connections to accommodate the ETLs. In addition, by improving traffic operations along I-95 through this corridor and providing commuters expanded park and ride lots, thus reducing traffic congestion, access to local businesses would be slightly improved.

The Express Toll Lanes Alternative is similar to the General Purpose Lanes Alternative in that it would provide additional roadway capacity along Section 200 capable of accommodating projected increases in traffic. However, this alternative would result in more direct impacts to businesses in the region because additional ramps connecting the ETLs to intersecting roadways would be required. These additional ramps require slightly more ROW, but would not include any displacements. Although access points along Section 200 would not be removed, the addition of ETLs would result in a reconfiguration of the existing access points. This could have a slight impact on travel associated with regional business activity.

This alternative is anticipated to result in improved traffic operations in the ETLs, thereby allowing at least two relatively congestion free lanes. Predictable travel times create advantages for transport fleets with schedules to meet such as those engaged in transit services or commercial express freight delivery services. This alternative would also support planned commercial and industrial development in the vicinity of Section 200, thereby supporting employment growth in this area.

This alternative would be consistent with the expected increase in regional employment opportunities and development resulting from BRAC.

Express Toll Lanes Alternative – Interchange Options

MD 152 Options 1A and 4A

The largest commercial area located at the I-95/MD 152 interchange is along the northeast quadrant of the interchange. This will not be impacted by Option 1A but the loop ramp in

Option 4A would impact the undeveloped property in the vicinity of a vacant commercial building.

MD 24 Option 2

For Option 2, a small strip of ROW would be required from the Constant Friendship Business Park, where a new ramp would be constructed to provide access to southbound I-95 from southbound MD 24 and MD 924. This will occur in an undeveloped portion of the property, and would not affect any existing or planned facilities. Option 2 will displace one business (Sportsman Club). The proposed park and ride would not directly impact any businesses in the area. The park and ride may benefit the businesses west of the interchange because it will attract more commuters to this area.

MD 543 Option 7

The proposed improvements under this option would occur within existing ROW. Therefore, this option would not affect the operation of any businesses or commercial properties.

MD 22 Option 1

The I-95/MD 22 interchange improvements will not impact any commercial properties, as all improvements will occur within the existing ramp configuration.

C. Land Use

1. Existing and Future Land Use

The Section 200 study area is dominated by forested, residential, and agricultural land uses, with large concentrated areas of commercial development near many of the interchanges. The following is a summary of the land use types and their general locations, as depicted on **Figure III-3.**

Forested land is the most abundant land use in the study area. Large tracts of forested area are present between the interchanges, particularly in the vicinity of Gunpowder Falls State Park (south of MD 152), the Bush Declaration Natural Resources Management Area (south of MD

543), and the areas both north and south of I-95 between the MD 543 and MD 22 interchanges. Residential land use is the second most common land use within the Section 200 study area. The majority of the residential land use is located on the east and west side of I-95 between MD 24 and MD 543. Agricultural lands are the third most abundant land use within the study area. Large parcels of agricultural land are present throughout the study area, particularly in the areas north of I-95 in Harford County. The majority of commercial land use within the study area is located at the interchanges of I-95 with MD 24, MD 543, and MD 22.

The Baltimore County *Master Plan 2010* and the Harford County *2004 Master Plan and Land Use Element Plan* were reviewed to determine future land uses within the study area (**Figure III-4)**. The Baltimore County's *Master Plan 2010* (Baltimore County Council, 2000) incorporates the designation of two land management areas – the urban area and the rural area. The boundary separating these two land management areas is called the Urban Rural Demarcation Line (URDL). Growth management, land use policies, and proposed roadway improvements in the *Master Plan 2010* are designed to focus growth within the urban side of URDL. The Baltimore County portion of the Section 200 study areas falls within both the urban and rural portions of the county.

Within the urban portion of the county, the *Master Plan 2010* designates two growth areas. One of these designated growth areas is the Perry Hall – White Marsh Growth Area. This growth area is designed to provide a self-sustaining, planned community, including housing, employment, and full commercial and public services.

Planning within the rural portions of the county focuses on agricultural and environmental resource preservation, and land use management to prevent urban sprawl. With the advanced planning provided in *Master Plan 2010*, future land uses outside of the designated growth areas are anticipated to remain relatively unchanged, as development is focused toward the urban areas of the county.

The Harford County *2004 Master Plan and Land Use Element Plan* continues to focus future development within the Development Envelope. The Development Envelope defines a geographic area for planned development, which allows the county to direct more intense growth into a specific area, roughly defined by the I-95 and US 40 corridors, and the MD 24 corridor north to Bel Air. At the core of the Master Plan is the Land Use Element Plan. The Land Use Element Plan identifies several Designated Growth Areas (DGA), including the Development Envelope, municipalities, designated rural villages, areas designated for economic development, as well as the HEAT Center and Harford Community College. These areas are locations where the state and Harford County will target their efforts to encourage and support economic development, new growth, and redevelopment.

BRAC will have a noticeable effect on future land use pressures within the study area. Current projections indicate that in ten years, the total regional impact of BRAC is expected to yield 26,828 net new jobs, and an increase in population of 72,973 persons. As a result of this growth, the demand for commercial lands, office space, and housing needs are expected to increase throughout the region. It is anticipated, however, that existing redevelopment, revitalization, and expansion of under utilized areas will sufficiently accommodate any BRAC related growth. BRAC is not expected to require conversion of previously undeveloped sites, or sites that are not currently planned for growth.

The 1997 smart growth legislation provides exceptions for project funding that does not occur in designated PFAs. Such cases include projects that are *necessary to protect public health or safety, or are related to commercial or industrial activity* that can not be accommodated in an already developed area. Because the Section 200 project is being designed to address both capacity and safety needs along I-95, it is therefore in compliance with Smart Growth initiatives. Furthermore, although the Section 200 study area is not located entirely within the State-certified PFA, I-95 is an existing transportation facility that connects existing PFAs and is, therefore, consistent with the Smart Growth initiatives. The proposed project will not change land use designations, and will not directly result in additional development outside of designated PFAs.

2. Effects on Land Use

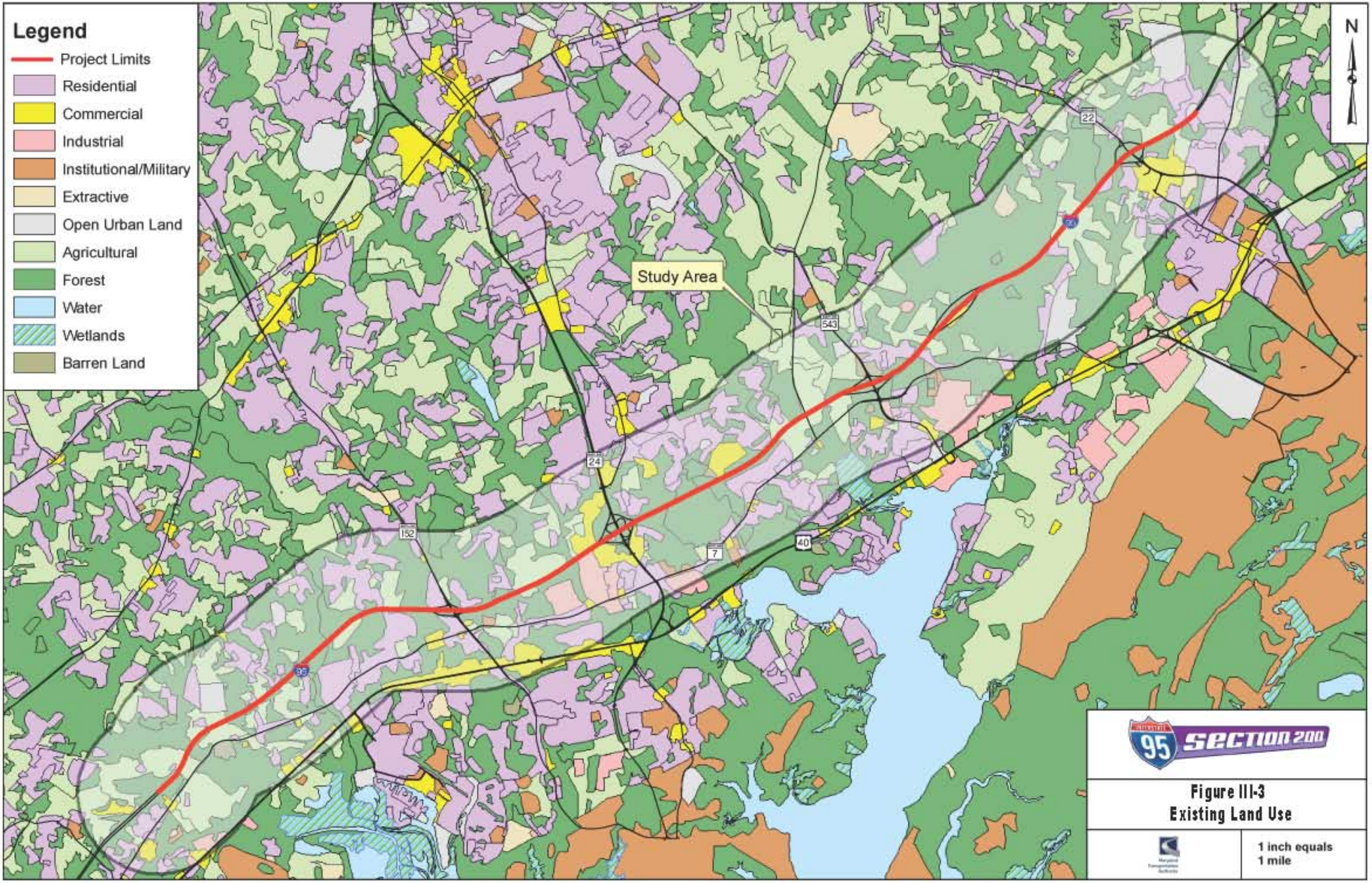
No-Build Alternative

The No-Build Alternative would not result in any affects on land use within the study area. This alternative would not involve the direct conversion of any of the various land use types identified in the study area to transportation use. It would also have no affect on local development patterns.

Build Alternatives

The General Purpose Lanes and Express Toll Lanes Alternatives would result in the conversion of minor amounts of residential, commercial, forested, and undeveloped land to transportation use. These minor land use impacts would be located throughout the I-95 corridor, adjacent to the existing highway. However, the overall land use in the study area would not be substantially affected because all changes in land use that would result from these alternatives would occur within an already existing transportation corridor. In addition, the Build Alternatives would not indirectly affect local development patterns because they would not result in new access within the corridor. I-95 within the study area is currently, and would remain a fully access-controlled highway. The Build Alternatives will support planned growth and redevelopment within the corridor, by accommodating projected traffic volume increases and providing additional parking for the growing number of commuters utilizing the park and ride lots.

While the Section 200 study area is not located entirely within a State-certified PFA, it does connect two distinct PFA areas, and is therefore consistent with the Smart Growth initiatives. Section 200 improvements assist in the goal to "develop long-term solutions to the complicated issues of economic growth, community revitalization, and resource conservation to achieve the best "public return on State investments" in accordance with Executive Order 01.01.2003.33, Maryland's Priority Places Strategy.



95 SECTION 200

Figure III-3
Existing Land Use

1 inch equals
1 mile

Legend

- Project Limits
- Agriculture/Open Space
- Forest
- Industrial
- Institutions
- Mixed Use Commercial
- Multifamily
- Office
- Park/Recreation
- Regional Commercial
- Right of Way
- Single Family Attached
- Single Family Detached
- Single Family Detached, Rural

N

BEL AIR

HEAT

ABERDEEN

STONEY FOREST

Study Area

ABERDEEN PROVING GROUND (U.S. ARMY)

BUSH RIVER

Source: Harford County 2004
Land Use Element Plan
Baltimore County 2010 Master Plan

I-95 Section 200

Figure III-4
Future Land Use

1 inch equals
1 mile

D. Cultural Resources

Cultural resources include historic and archaeological properties protected under Section 106 of the National Historic Preservation Act of 1966, as amended. Section 106 requires that, prior to approval of a project by a federal agency, the agency involved must consider the project's effects on any district, site, building, structure or object that is included or eligible for inclusion in the National Register of Historic Places (NRHP), and give the Advisory Council on Historic Properties an opportunity to comment with regard to the project. Properties of national, state, or local significance may be determined eligible for the NRHP. Archaeological sites that meet certain criteria may also be included on the NRHP.

Pursuant to Section 106, resources listed, eligible or potentially eligible for the NRHP that are within the Area of Potential Effect (APE) of a project have been evaluated for potential effects due to the project. Measures to minimize or mitigate adverse effects must be developed in consultation with the State Historic Preservation Officer (SHPO) and other interested parties and may be memorialized in a Memorandum of Agreement (MOA).

Cultural resource surveys were conducted in accordance with relevant State and Federal regulations, including: the National Historic Preservation Act of 1966, as amended; 36 Code of Federal Regulations (CFR) Part 800 – Protection of Historic Properties; EO 11593; and the Maryland Historical Trust (MHT) Act of 1985 (Article 83B, §§ 5-607, 5-617 to 5-619, and 5-623 of the Annotated Code of Maryland). All work was conducted in accordance with relevant guidelines from the MHT (viz. Maryland Historical Trust 2000; Shaffer and Cole 1994), as well as relevant Federal guidelines (viz. National Park Service, 1983).

1. Historic Structures

The historic architectural survey included the identification of all resources more than 50 years of age in the APE, the assessment of the significance of these resources, the completion of appropriate survey forms for these resources, and the evaluation of impacts that the project may have on significant historic resources. Archival and cartographic research was conducted to help determine the age and significance of identified resources.

The historic architecture APE for this project, as concurred upon by the SHPO on July 28, 2006 (**Appendix C**), consists of a broad corridor along Section 200, approximately 1,000 feet in width (500 feet on either side of the existing centerline of I-95). The APE also extends 500 feet from the centerline of all interchanges where improvements are proposed.

A total of 79 resources more than 50 years old were identified within the APE. Of these, 63 resources were documented on Short Forms for Ineligible Properties, 11 were documented on Determination of Eligibility (DOE) forms, three properties were inaccessible, and two were no longer extant. Prior to the Section 200 survey, no determinations of eligibility had been conducted for any of the properties within the APE.

The resources evaluated were primarily single-family houses dating from the first half of the twentieth century. Common building types within the study area include modified I-houses and vernacular forms as well as Minimal-Traditional and Cape-Cod cottages dating from the World-War-I and World-War-II era. Almost all of these residences have undergone various degrees of alteration, most commonly the application of siding and the replacement of original windows.

Within the historic structures APE, two previously identified resources were determined eligible for listing in the NRHP. The Onion-Rawl House (BA-360) located at 11314 Reynolds Road in Baltimore County, exemplifies the Georgian style and retains a remarkably high level of integrity sufficient to deem the dwelling individually eligible under Criterion C. The St. Francis de Sales Church (HA-1312), located at 1450 Abingdon Road in Harford County, is eligible under Criterion Consideration A for its significance as the first Catholic Church in Abingdon, Maryland.

As a result of the investigation, two newly identified resources were determined eligible for listing in the NRHP. The Bush Farm (HA-2174), located at 1416 Calvary Road in Harford County, is eligible for listing under Criterion A as a good example of an early twentieth-century farm complex. The Miller House (BA-3209), located at 8232 Bradshaw Road in Baltimore County, is eligible under Criterion C as a local residential resource.

These resources are identified and documented in further detail in the *Section 200 Historic Structures Survey and Determination of Eligibility Report* (Authority, 2007) prepared for this project. On July 23, 2007, MHT concurred with the formal eligibility determination (documented in **Appendix C)**.

No-Build and Build Alternatives

There will be no impacts to any of the historic structures associated with the No-Build Alternative or Build Alternatives, including the associated interchange options.

2. Archaeological Resources

A Phase IA Archeological Assessment was conducted by the Authority in 2006 to review previous archeological surveys, and identify previously recorded archeological sites. The Area of Potential Effect (APE) during the Phase IA Assessment was defined as being within the existing right-of-way (ROW) fences and slightly outside (100 feet beyond the ROW fences). The study area lies near the transition between three archeological research units as defined by the Maryland Historical Trust: Unit 6 (Bush, Susquehanna and eastern drainages) on the Coastal Plain Province, Unit 7 (Gunpowder and more southern drainages) on the Coastal Plain Province, and Unit 15 (Gunpowder-Bush Drainages) in the Piedmont Province.

Results of the Phase IA Assessment indicated that 83 previously identified archeological sites are present within the APE. Due to the likelihood that additional archeological resources are present within the Section 200 corridor and through coordination with MHT on June 13, 2007 (**Appendix C**), a Phase IB Archeological Assessment is currently being conducted. Preliminary results from the Phase IB study indicate that all of the sites, except for possibly one, have been found to have no resources. The MdTA is in communication with MHT to determine if a Phase II study is warranted for the one site.

E. Natural Environment

1. Soils

A review of *The Soil Survey of Baltimore County* (SCS, 1976) and *The Soil Survey of Harford County* (SCS, 1975) indicated that there are 26 soil series, 80 soil mapping units and

an additional 5 land types (alluvial land, cut and fill land, loamy and clayey land, sand gravel pits and stony land) identified within the study area. Actual soil types throughout the study area could vary from the type identified in the *Soil Survey* as some parts have been re-disturbed from grading, filling, pavement, and/or removal since publication of the *Soil Survey*. This is especially notable within the I-95/MD 152, I-95/MD 24, I-95/MD 543, and I-95/MD 22 interchanges.

a. Erosion and Sedimentation

No-Build Alternative

This alternative would not cause significant erosion and sedimentation beyond by the existing roadway condition.

General Purpose Lanes Alternative

This alternative proposes improvements to the interchanges, and widening the I-95 mainline. The proposed improvements for each interchange option would increase the amount of exposed areas which would lead to increased erosion and sedimentation during and after construction. This alternative will have a larger footprint than the No-Build Alternative, therefore increasing impacts from erosion and sedimentation to the study area.

Express Toll Lanes Alternative

Because the interchange options and the proposed mainline for this alternative has a larger footprint than those proposed for the General Purpose Lanes Alternative, this alternative is expected to have greater erosion and sedimentation impacts both during and after construction.

b. Prime Farmland Soils/Soils of Statewide Importance

There are 12 soil series and 20 mapping units classified as Prime Farmland Soils within the study area. Additionally, there are 17 soil series and 29 mapping units classified as Soils of Statewide Importance within the study area. In addition to being characterized by one or

more of the soil series, a land needs to be available for farming activities or can be treated to economically produce high yields of crops in order for the land to be classified as a Prime Farmland or of Statewide Importance.

No-Build Alternative

The No-Build Alternative would not impact any Prime Farmland Soils or Soils of Statewide Importance.

Build Alternatives

The Build Alternatives would impact these soils due to the proposed widening and interchange improvements, which includes the proposed park and ride lots at the I-95/MD 152 and I-95/MD 24 Interchanges. **Table III-7** lists the acreage of Prime Farmland Soils and Soils of Statewide Importance that will be impacted by each of the alternatives. For the impacts calculations for the Build Alternatives, the MD 152 Option 4, MD 24 Option 2, MD 543 Option 1, and MD 22 Option 1 interchange options were used for the General Purpose Lanes Alternative and the MD 152 Option 4A, MD 24 Option 2A, MD 543 Option 7, and MD 22 Option 1 interchange options were used for the Express Toll Lanes Alternative. Because of the similar footprints for the interchange options, the impacts for the options were negligible and were not assessed for this resource.

Table III-7. Impacts to Prime Farmland Soils and Soils of Statewide Importance

Alternative	Impacted Prime Farmland Soils (Acres)	Impacted Soils of Statewide Importance (Acres)
No-Build	**0**	**0**
General Purpose Lanes	**48.3**	**66**
Express Toll Lanes	**68.1**	**133.4**

Avoidance and Minimization Measures

For both of the Build Alternatives, keeping erosion and sedimentation to a minimum will be a priority. Several methods could be used to decrease erosion effects, including structural, vegetative and operational methods during construction. These control measures may include:

- Seeding, sodding, and stabilizing slopes as soon as possible to minimize the exposed area during construction,
- Stabilizing ditches at the tops of cuts and at the bottoms of fill slopes before excavation and formation of embankments,
- The proper use of sediment traps, silt fences, slope drains, water holding areas and other control measures, and
- The use of diversion dikes, mulches, netting, energy dissipaters, and other physical erosion controls on slopes where vegetation cannot be supported.

A grading plan and erosion and sediment (E&S) control plan will be prepared and implemented in accordance with Maryland Department of the Environment (MDE) stormwater 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. Measures to prevent erosion in highly susceptible areas (i.e., steep slopes) will be included in the E&S control plans when necessary. All temporary and permanent controls will be reviewed and approved by MDE prior to initiation of construction.

c. Topography and Geology

The study area lies within two physiographic provinces, the Atlantic Coastal Plain and the Piedmont Plateau. The Atlantic Coastal Plain is underlain by a wedge of unconsolidated sediments comprised of late Jurassic and Cretaceous clay, sand, and gravel that were stripped from the Appalachian mountains, carried eastward by rivers and deposited in deltas in the newly formed Atlantic Ocean basin. The Piedmont Plateau is represented by rolling upland areas of fertile valleys and low rolling hills that rise gradually westward containing a variety of hard, crystalline igneous and metamorphic rocks. The Piedmont Plateau extends from the Coastal Plain westward to the eastern boundary of the Blue Ridge Province.

The No-Build Alternative will have no anticipated impacts to topography or geology within the study area. It is anticipated that impacts will be associated with the Build Alternatives due to the proposed widening of the roadway and interchange improvements. The use of 2:1

slopes and/or retaining walls along the roadway embankments will minimize the footprints of the Build Alternatives, thereby minimizing impacts to the existing topography and geology of the study area. **Table III-8** shows the estimated cut/fill amounts for each of the alternatives. For the impacts calculations for the Build Alternatives, the MD 152 Option 4, MD 24 Option 2, MD 543 Option 1, and MD 22 Option 1 interchange options were used for the General Purpose Lanes Alternative and the MD 152 Option 4A, MD 24 Option 2, MD 543 Option 7, and MD 22 Option 1 interchange options were used for the Express Toll Lanes Alternative.

Table III-8. Estimated Cut/Fill Amounts

Alternative	Estimated Cut/Fill (cubic yards)		
	Cut	Fill	Net Fill
No-Build Alternative	0	0	0
General Purpose Lanes Alternative	1,741,000	834,000	-907,000
Express Toll Lanes Alternative	2,609,000	1,334,000	-1,275,000

No-Build Alternative

This alternative would have no impact on existing topography and geology.

General Purpose Lanes Alternative

This alternative would require a large amount of cut/fill due to road widening, new access ramps, and interchange improvements. The differences in the amount of cut/fill for the interchange options were negligible.

Express Toll Lanes Alternative

This alternative would involve cutting and/or filling for roadway widening and to achieve grade separation of the access ramps at the I-95/MD 152, I-95/MD 24, and I-95/MD 543 interchanges for the ETLs. This alternative would require a greater amount of cut/fill than the General Purpose Lanes Alternative because of the larger footprint of the mainline and interchange options. The differences in the amount of cut/fill for the interchange options were negligible.

2. Aquatic Resources

a. Surface Water

All of the waterways identified within the study area are classified as Use I (general water contact and recreation) or Use III (natural trout waters) surface waters by the Maryland Department of Natural Resources (Appendix C). In-stream work is restricted during the period of March 1st through June 15th for Use I waters and October 1st through April 30th for Use III waters, during any year.

b. Waters of the United States (WUS) Including Wetlands

1. WUS

To accurately compare impacts to perennial and intermittent streams (from herein referred to as WUS), as well as ephemeral channels for each Build Alternative; each mainline alternative will include the option with the most impacts for each interchange. The impacts for the other interchange options have been calculated and included in the discussion. **Appendix G** contains a table with detailed descriptions of each stream system that was identified within the study area.

No-Build Alternative

This alternative would have no anticipated impacts to WUS or ephemeral channels.

General Purpose Lanes Alternative

New bridges and spanned portions of roadway associated with this alternative occur at the I-95/MD152, I-95/MD 24, I-95/MD 543,and I-95/MD 22 interchanges, and the mainline widening of I-95 over Lower Gunpowder Falls, Little Gunpowder Falls, Lower Winters Run, Bynum Run, Swan Creek watersheds and some of their tributaries. Permanent impacts associated with these improvements include channel relocation, culvert extension, filling, piping between existing culverts, and more shading from longer and wider bridges.

Impacts to perennial and intermittent streams and ephemeral channels for each interchange option are listed in **Table III-9**. The General Purpose Lanes Alternative (including MD 152

Option 4, MD 24 Option 2, MD 543 Option 1, and MD 22 Option 1) would permanently impact ±9,580 linear feet (or ±66,520 square feet) of WUS and ±4,200 linear feet (or ±14,300 square feet) of ephemeral channels, and temporarily impact ±5,400 linear feet of WUS and ±4,300 linear feet of ephemeral channels. All temporary impacts are associated with the construction of the alternative, and were determined using a 25 foot buffer from the proposed LOD of this alternative. Please refer to **Appendix A**, Plates 1-32 for the locations of the perennial and intermittent streams and ephemeral channels in association with the General Purpose Lanes Alternative.

The following summarizes some of the impacts to perennial and intermittent streams and ephemeral channels associated with the General Purpose Lanes Alternative (For an all-inclusive impact summary refer to **Appendix G** for the I-95, Section 200 WUS Impact Matrix that identifies permanent and temporary impacts for all perennial, intermittent, and ephemeral systems identified within the study area):

- A permanent WUS impact involves the 676 linear feet of WUS 18A, which will be filled due to the widening of the roadway. WUS 18A is an intermittent tributary to Little Gunpowder Falls that runs parallel along northbound I-95. *(Appendix A, Plate 7)*
- Roadway widening would fill 1,301 linear feet of WUS-WL004, an intermittent tributary to Lower Winters Run that parallels northbound I-95. *(Appendix A, Plate 12)*
- Roadway widening will result in cutting and filling 1,923 linear feet of the WUS-WL001A. WUS-WL001A is an intermittent tributary to Lower Winters Run that parallels southbound I-95. *(Appendix A, Plate 12)*
- I-94/MD 24 Interchange improvements would permanently impact 564 linear feet of WUS-WL001, a perennial tributary to Winters Run. *(Appendix A, Plate 14)*
- WUS 21D is an intermittent tributary to the Bush River located within the southwest quadrant of the I-95/MD 543 interchange. A total of 109 linear feet of WUS 21D would be filled due to the proposed interchange improvements. *(Appendix A, Plates 22 - 23)*
- Improvements to the I-95/MD 543 interchange would also require all 300 linear feet of WUS 22D, an intermittent tributary to the Bush River, to be filled. WUS 22D is

located within the southeast quadrant of the interchange on the northbound side of I-95, south of the MD 543 bridge over I-95. *(Appendix A, Plate 22)*

- Permanent WUS impact occur from the filling of 737 linear feet of WUS 9E. This intermittent tributary to the Bush River parallels the northbound side of I-95. *(Appendix A, Plate 24).*

Table III-9. General Purpose Lanes Alternative – Interchange Options Estimated Impacts to WUS

Interchange Option	WUS IMPACTS (approximate)			
	Permanent (Feet)		Temporary (Feet)	
	Perennial and Intermittent	Ephemeral	Perennial and Intermittent	Ephemeral
MD 152				
Option 1	**728**	**964**	**426**	**362**
Option 4	**706**	**842**	**276**	**547**
MD 24				
Option 2	**5,654**	**934**	**1,213**	**316**
MD 543				
Option 1	**602**	**246**	**1,019**	**115**
Option 7	**412**	**229**	**844**	**66**
MD 22				
Option 1	**176**	**123**	**89**	**580**

For an all-inclusive impact summary refer to **Appendix G** for the I-95, Section 200 WUS Impact Matrix that identifies permanent and temporary impacts for all perennial, intermittent, and ephemeral systems identified within the study area.

Express Toll Lanes Alternative

Generally, this alternative has the same type of impacts on the same perennial and intermittent streams and ephemeral channels as the General Purpose Lanes Alternative, but in a greater magnitude. The difference between the impact amounts of the two Build

Alternatives is primarily due to the increased typical section to accommodate ETLs, including additional lane separation and more complex interchange improvements. This alternative (including MD 152 Option 4A, MD 24 Option 2, MD 543 Option 7, and MD 22 Option 1) would permanently impact ±16,290 linear feet (or ±100,100 square feet) of WUS and ±7,650 linear feet (or ±26,920 square feet) of ephemeral channels, and temporarily impact ±7,160 linear feet of WUS and ±3,630 linear feet of ephemeral channels. All temporary impacts are associated with the construction of the alternative. A 25-foot buffer was added from the proposed LOD. Please refer to **Appendix B**, Plates 33-65 for the locations of the WUS in association with the Express Toll Lanes Alternative. Impacts to WUS for each interchange option are listed in **Table III-10**.

The following summarizes some of the impacts to perennial and intermittent streams and ephemeral channels associated with the Express Toll Lanes Alternative:

- Permanent WUS impacts would result from filling 741 linear feet of WUS 18A due to the widening of the roadway. WUS 18A is an intermittent tributary to Little Gunpowder Falls that runs parallel along northbound I-95. *(Appendix B, Plate 39)*
- Permanent impacts to 502 linear feet of WUS 26A would occur due to the I-95/MD 152 Interchange upgrade. WUS 26A, an intermittent tributary to the Little Gunpowder Falls, parallels the off-ramp from I-95 northbound. *(Appendix B, Plate 41)*
- 867 linear feet of WUS 23B, a perennial tributary to Lower Winters Run that parallels southbound I-95 would be filled as a result of the reconfiguration of the I-95/MD 152 Interchange. *(Appendix B, Plates 41 and 42)*
- 2,180 linear feet of WUS-WL001A, a perennial tributary to Lower Winters Run that parallels southbound I-95 would be cut and filled as a result of proposed roadway widening. *(Appendix B, Plate 44)*
- The I-95/MD 24 Interchange reconfiguration would permanently fill 193 linear feet of WUS-WL 003, an intermittent tributary to Lower Winters Run. WL003 is located within the northwest quadrant of the interchange *(Appendix B, Plate 46).*

- A permanent WUS impact would involve the filling of 963 linear feet of WUS 16D, an intermittent tributary to James Run that parallels the northbound side of I-95 *(Appendix B, Plate 54).*
- Roadway widening and I-95/MD 543 Interchange reconfiguration would impact 796 linear feet of WUS 18D, an intermittent tributary to the James Run. WUS 18D parallels between I-95 southbound and the on-ramp from MD 543 *(Appendix B, Plate 54)*
- Permanent WUS impacts would occur from filling 737 linear feet of WUS 9E. This intermittent tributary to the Bush River parallels the northbound side of I-95. *(Appendix B, Plate 57)*

Table III-10. Express Toll Lanes Alternative – Interchange Options Estimated Impacts to WUS

Interchange Option	WUS IMPACTS (approximate)			
	Permanent (Feet)		Temporary (Feet)	
	Perennial and Intermittent	Ephemeral	Perennial and Intermittent	Ephemeral
MD 152				
Option 1A	**3,715**	**2,884**	**873**	**937**
Option 4A	**3,670**	**2,757**	**785**	**781**
MD 24				
Option 2	**6,722**	**1,494**	**724**	**40**
MD 543				
Option 7	**3,100**	**447**	**670**	**72**
MD 22				
Option 1	**176**	**123**	**89**	**580**

For an all-inclusive impact summary refer to **Appendix G** for the I-95, Section 200 WUS Impact Matrix that identifies permanent and temporary impacts for all perennial, intermittent, and ephemeral systems identified within the study area.

2. Wetlands

Wetland identification and delineation efforts were conducted from January to March 2006 in accordance with the Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1 (Department of the Army Waterways Experiment Station, 1987) and supplemental guidance papers. A separate wetland delineation report (Johnson, Mirmiran & Thompson, July 2006) details the findings of the WUS and wetlands located within the study area. The Authority is currently coordinating with the USACE and the Maryland Department of the Environment (MDE) to schedule a wetland Jurisdictional Determinations (JD). Detailed meeting minutes from the JD will be prepared and included in this report upon the completion of the JD process. It is anticipated that the JD will be completed during the Winter of 2007. The mapping included in **Appendices A and B** identifies all of the wetlands delineated within the study area. **Appendix G** contains a table with detailed descriptions including the Cowardin Classification of each wetland system that was identified within the study area.

In order to accurately compare impacts to wetlands for each Build Alternative, each mainline alternative will include the option with the most impacts for each interchange. The impacts for the other interchange options have been calculated and included in the discussion.

No-Build Alternative

The No-Build Alternative would not impact wetlands located within the study area.

General Purpose Lanes Alternative

The General Purpose Lanes Alternative (including MD 152 Option 4, MD 24 Option 2, MD 543 Option 1, and MD 22 Option 1) would permanently impact 0.55 acres of wetlands and temporarily impact 0.8 acres of wetlands. All temporary impacts are associated with the construction of the alternative and were determined using a 25 foot buffer from the proposed LOD for this alternative. Please refer to Appendix A, Plates 1-32 for the locations of the wetlands in association with the General Purpose Lanes Alternative. Impacts to wetlands for each interchange option are listed in **Table III-11**.

The following highlights wetland impacts for this alternative:

- WET-18A would be partially filled (0.013 acres) due to enhancements to the I-95 southbound onramp from MD 152 *(Appendix A, Plate 8).* Also, a small acreage of this wetland will have temporary construction related impacts (0.075 acres).
- Fill attributed to the I-95/MD 152 improvements would permanently impact 0.146 acres of wetlands WET- 31A through WET-38A. *(Appendix A, Plate 9)*
- Both WET-26B and WET-27B would be filled (0.015 acres) as a result of upgrades to the MD 152 exit ramp from I-95 southbound *(Appendix A, Plate 9).*
- Construction of interchange ramps would permanently impact wetlands within the immediate vicinity of the I-95/MD 24 Interchange. A total of 0.297 acres would be impacted within the following wetlands: WP024, WP001, WP002, WP003, WP004, WP004A, WP004B, and WET-25B. *(Appendix A, Plates 12-14)*
- Two wetlands, WP005 *(Appendix A, Plate 14)* and WET-9C *(Appendix A, Plate 13),* would be permanently impacted as a result of proposed I-95/MD 24 Interchange improvements. Impacts would total 0.063 acres at WP005 and 0.036 acres at WET-9C.
- A small area of WET7C (0.031 acres) would be permanently filled along with 0.060 acres of temporary construction related impacts. *(Appendix A, Plate 16-17)*
- A small portion (0.003 acres) of WET-10D would be temporarily impacted due to roadway widening *(Appendix A, Plate 21).* This impact is not expected to affect the sediment retention function of this wetland.
- Most of WET-18D would be temporarily impacted by construction activities associated with the widening of the I-95 southbound on-ramp from MD 543 *(Appendix A, Plate 21).*
- WET-5D, an isolated wetland, would be completely impacted as a result of the realignment of the I-95 northbound exit-ramp onto MD 543 *(Appendix A, Plate 21).*
- There would be permanent impacts to WET-7D of 0.006 acres and temporary construction related impacts of 0.069 acres. WET-7D is located within a stormwater

management retention area in the southwest quadrant of the I-95/MD 543 interchange *(Appendix A, Plate 21).*

- WET-26E and WET-27E would be filled as a result of the I-95/MD 543 Interchange enhancements. The fill would result in permanent impacts of 0.037 acres at WET-26E and 0.011 acres at WET-27E *(Appendix A, Plate 22).*
- The project would permanently impact 0.001 acres of WET-25E. However the impact would not influence the overall function of the wetland. Temporary construction related impacts to WET-25E would total 0.025 acres *(Appendix A, Plate 22).*
- A portion (0.023 acres) of WET-9E would be permanently impacted, while 0.068 acres of the wetland would be temporarily impacted by construction *(Appendix A, Plate 26).* These impacts would not influence the sediment retention function of this wetland.

Table III-11. General Purpose Lanes Alternative – Interchange Options Estimated Impacts to Wetlands

Interchange Option	Wetland Impacts (approximate)	
	Permanent (acres)	Temporary (acres)
MD 152		
Option 1	**0.29**	**0.12**
Option 4	**0.25**	**0.08**
MD 24		
Option 2	**0.16**	**0.25**
MD 543		
Option 1	**0.06**	**0.13**
Option 7	**0.04**	**0.05**
MD 22		
Option 1	**0**	**0**

For an all-inclusive impact summary refer to **Appendix G** for the I-95, Section 200 Wetland Impact Matrix that identifies permanent and temporary impacts for all wetland systems identified within the study area.

Express Toll Lanes Alternative

This alternative (including MD 152 Option 4A, MD 24 Option 2, MD 543 Option 7, and MD 22 Option 1) would permanently impact 1.3 acres of wetlands and temporarily impact 1 acre of wetlands. All temporary impacts are associated with the construction of the alternative, and were determined using a 25 foot buffer from the proposed LOD for this alternative. Please refer to Appendix B, Plates 33-65 for the locations of the wetlands in association with the Express Toll Lanes Alternative. Impacts to wetlands for each interchange option are listed in **Table III-12**.

The following summarizes some of the impacts to wetlands associated with the Express Toll Lanes Alternative:

- All 0.368 acres of wetlands within the current I-95/MD 152 Interchange would be filled due to the interchange enhancements *(Appendix B, Plate 41).*
- All WET-18B (0.068 acres) would be impacted as a result of upgrades to the MD 152 exit ramp from I-95 southbound *(Appendix B, Plate 42).*
- Construction of interchange ramps would permanently impact wetlands within the immediate vicinity of the I-95/MD 24 Interchange. A total of 0.072 acres would be impacted at the following wetlands: WP024, WP001, WP002, WP003, WP004, WP004A, WP004B, and WET-25B. *(Appendix B, Plates 44-46)*
- Roadway widening would necessitate all 0.177 acres of WET-6C to be filled *(Appendix B, Plate 50).*
- In addition to 0.042 acres of temporary construction impacts, WET-7C (0.030 acres) would be permanently impacted due to the roadway expansion *(Appendix B, Plate 50).*
- WET-3D and WET-4D would be impacted due to roadway widening. The impacts will total 0.053 acres *(Appendix B, Plates 53).* Also, both WET-5D and WET-18D

would be permanently impacted as a result of the I-95/MD 543 Interchange improvements *(Appendix B, Plate 54).*

- As a result of I-95/MD 543 Interchange enhancements, both WET-26E (.037 acres) and WET-27E (0.011 acres) would be completely filled *(Appendix B, Plate 55).*

Table III-12. Express Toll Lanes Alternative – Interchange Options Estimated Impacts to Wetlands

Interchange Option	Wetland Impacts (approximate)	
	Permanent (acres)	Temporary (acres)
MD 152		
Option 1A	**0.59**	**0.26**
Option 4A	**0.59**	**0.23**
MD 24		
Option 2	**0.30**	**0.26**
MD 543		
Option 7	**0.16**	**0.03**
MD 22		
Option 1	**0**	**0**

For an all-inclusive impact summary refer to **Appendix G** for the I-95, Section 200 Wetland Impact Matrix that identifies permanent and temporary impacts for all wetland systems identified within the study area.

Avoidance and Minimization Measures for WUS including Wetlands

A detailed assessment of the project impacts to WUS and wetlands has been conducted throughout the planning study in an effort to avoid and minimize impacts to nontidal waterways and wetlands within the project study area. Some of the preliminary alternatives were dropped from consideration due to excessive impacts to streams and wetlands associated with the disturbance required to widen the roadway to the outside. The addition of travel lanes to the inside effectively avoided and minimized impacts to waters and wetlands

since this area was altered during the original construction of I-95. Additional measures to minimize impacts to waters and wetlands, such as the use of 2:1 cut/fill slopes, retaining walls, reduced culvert lengths, and the use of bridges when possible instead of closed systems (i.e., culverts) have been incorporated into the preliminary design and will be will be further considered as the design progresses.

A grading plan, and sediment and erosion control plan will be prepared and implemented in accordance with the Maryland Department of the Environment's regulations and guidelines. The grading and sediment control plans will minimize the potential for impacts to water quality from erosion and sediments.

c. Wild and Scenic Rivers

There are no federally designated Wild and Scenic Rivers within the study area. Under the Maryland Scenic and Wild Rivers Act as amended in 1978, the following nine rivers have officially been designated "Scenic" by the Maryland General Assembly: Anacostia, Deer Creek, Monocacy, Patuxent, Pocomoke, Potomac (Frederick and Montgomery Counties), Severn, Wicomico-Zekiah, and Youghiogheny. The section of the Youghiogheny between Millers Run and the southern corporate limits of Friendsville has been officially designated a "Wild" river. While none of the designated rivers is located within the study area, the Authority will continue to coordinate with DNR to ensure full compliance with this Act.

d. Water Supply/Groundwater

The portion of the study area in Baltimore County is within the Metropolitan Public Water System. Water supply for this portion of Baltimore County is secured by three surface water bodies: the Gunpowder River, the North Branch of the Patapsco River and the Susquehanna River. The Susquehanna River is used only on an emergency basis. During such emergencies, the "Big Inch" (108 inch) waterline carries water from the Susquehanna River to Baltimore City. The "Big Inch" waterline runs parallel to southbound I-95 throughout the entire Section 200 study area. The water supply for the portion of the study area in Harford County is secured by a combination of surface water and groundwater sources. Harford

County obtains surface water directly from the Susquehanna River and the Susquehanna Aqueduct. The major groundwater resource for public water supply is concentrated around Perryman Well Field, near Aberdeen within the Atlantic Coastal Plain. These wells are capable of providing 25 percent of the potable water for the County's central water system.

The significance of groundwater impacts can vary with local differences in geology and soils. Groundwater contributions to streams are most significant in geologic settings that allow rapid exchange between ground and surface water. However, most aquifers within the study area are artesian (i.e., confined) aquifers. A confined aquifer is separated from other aquifers and the land surface by a confining layer. The confining layer inhibits the vertical movement of water into or out of the aquifer. Therefore, groundwater contamination associated with the Build Alternatives is expected to be minimal.

Because a majority of the study area's public water supply comes from the Susquehanna River and the Susquehanna Aqueduct, it is anticipated that the public drinking water supply would not be adversely affected by the Build Alternatives. There is a possibility that the "Big Inch" waterline, which carries emergency drinking water from the Susquehanna River to Baltimore City, may have to be realigned around some of the interchanges for the Build Alternatives. Further analysis will be completed by the project team and the results will be documented in the final decision document.

Although impacts to groundwater are expected to be minimal, any groundwater contamination from construction activities would be kept to a minimum by implementation of Best Management Practices (BMPs). Temporary BMPs that would be utilized during construction include silt fencing, re-vegetating disturbed areas, and designing grassed channels to control sediment and erosion from the work site. Some BMPs utilized during construction will be converted and added to a permanent stormwater management system, which will control runoff from the expanded highway and its interchanges. Permanent

BMPs would include stormwater management ponds and biofiltration systems, such as grassed medians and drainage swales.

e. Floodplains

The Federal Emergency Management Administration (FEMA) designated 100-year floodplains within the study area are located along Gunpowder Falls, Little Gunpowder Falls, Winters Run, Bynum Run, James and Gray Runs (tributaries of Bush River), and Carsins Run (a tributary of Swan Creek) **(Table III-13).**

Table III-13. Floodplains within the Study Area

Floodplain	Length/Crossing and Description
Unnamed tributary to Gunpowder Falls, just north of New Forge Road	This floodplain is 200 feet wide at the I-95 crossing and extends east and west outside of the study area. The land within this floodplain is forested.
Gunpowder Falls	This floodplain is 1150 feet wide at the I-95 bridge and extends east and west outside of the study area. The land within this floodplain is forested.
Little Gunpowder Falls	This floodplain is 1400 feet wide at the I-95 crossing and extends east and west outside of the study area. The land within this floodplain is forested.
Winters Run	This floodplain is 400 feet wide at the I-95 crossing and extends east and west outside of the study area. The land within this floodplain is forested.
Bynum Run	This floodplain is 180 feet wide at the I-95 crossing and extends east and west outside of the study area. The land within this floodplain is forested.
James Run	This floodplain is 450 feet wide at the I-95 crossing and extends east and west outside of the study area. The land within this floodplain is forested.
Grays Run	This floodplain is 400 feet wide at the I-95 crossing and extends east and west outside of the study area. The land within this floodplain is forested.
Carsins Run	This floodplain is 400 feet wide at the I-95 crossing and extends east and west outside of the study area. The land within this floodplain is forested.

The proposed project was evaluated with respect to potential impacts on regulated floodplains. Construction of new roadway embankments across drainage ways and in floodplains may create increases in floodplain elevation and size with potential for property damage and natural resource impacts. To ensure that floodwater impacts due to roadway construction are minimized, drainage structures are required to be designed to maintain the current flow regime and associated flooding (COMAR 26.17.04). Flooding risks will be minimized in all alternatives, since all culverts and bridges will be designed to limit the increase in the elevation of the regulatory flood so that structures will not be affected.

Existing culverts, culvert extensions and new culverts associated with these improvements will require hydraulic evaluations to identify potential impacts to flooding frequency and intensity. The natural and beneficial floodplain values of Little Gunpowder Falls, Gunpowder Falls, Winters Run, James Run (a tributary of Bush River), Bynum Run, Grays Run (a tributary of Bush River), and Carsins Run (a tributary of Swan Creek) will likely be impacted in locations where the Build Alternatives fill and/or narrow the floodway and 100-year floodplain. The area of 100-year floodplain impacted by each alternative is summarized in **Table III-14**. For comparison purposes for the Build Alternatives in **Table III-14**, the General Purpose Lanes Alternative includes MD 152 Option 4, MD 24 Option 2, MD 543 Option 1, and MD 22 Option 1 and the Express Toll Lanes Alternative includes MD 152 Option 4A, MD 24 Option 2, MD 543 Option 7, and MD 22 Option 1. The floodplain impacts for each interchange option were negligible. It should be noted that impacts as cited do not necessarily equate to a proposed "fill" activity; rather a "disturbance" which may include grading out abandoned road/ramp segments, pier placement or other activity in the floodplain.

The proposed project was evaluated with respect to potential impacts on regulated floodplains. The No-Build Alternative would not impact any floodplains within the study area. Both Build Alternatives and associated interchange options would encroach upon Little Gunpowder Falls, Gunpowder Falls, Winters Run, James Run, Bynum Run, Grays Run, and Carsins Run floodplains. A total of 3.9 acres of floodplains will be impacted by the General Purpose Lanes Alternative, these impacts include: a combined total of 0.5 acres within the Little Gunpowder Falls and Gunpowder Falls 100-year floodplains, 1 acre within Winters Run 100-year floodplain, a combined total of 1.6 acres within Bynum and James Run 100-year floodplains, 0.5 acres within Grays Run 100-year floodplain, and 0.3 acres within Carsins Run 100-year floodplain. Impacts to floodplains due to the Express Toll Lanes Alternative total 7.7 acres, these impacts include: a combined total of 1 acre within the Little Gunpowder Falls and Gunpowder Falls 100-year floodplains, 2.4 acres within the 100-year floodplain of Winters Run, a combined total of 3.2 acres within Bynum and James Run 100-

year floodplains, 0.8 acres within the 100-year floodplain of Grays Run, and 0.3 acres within the 100-year floodplain of Carsins Run.

Table III-14. Impacts to Floodplains

Floodplains	Floodplain Impacts (acres)		
	No-Build Alternative	**General Purpose Lanes Alternative**	**Express Toll Lanes Alternative**
Little Gunpowder Falls; Gunpowder Falls	0	0.5	1.0
Winters Run	0	1.0	2.4
Bynum Run; James Run	0	1.6	3.2
Grays Run	0	0.5	0.8
Carsins Run	0	0.3	0.3
Total	**0**	**3.9**	**7.7**

Avoidance and Minimization Measures

These encroachments would require detailed hydrologic and hydraulic analysis to assure minimal floodplain impacts. Avoidance and minimization efforts to impacted 100-year floodplains will continue throughout the planning and engineering process. These methods may include:

- Reduced encroachments by using 2:1 minimum slopes for roadways,
- Retaining walls, and
- Reduced impacts through alternative roadway alignments.

f. Waterways/Wetlands Compensatory Mitigation

Section 404 of the Clean Water Act requires mitigation for unavoidable impacts to wetlands and open waters, as does MDE's Wetlands regulations (Title 26 Part 4). A permit will be required by the U.S. Army Corps of Engineers (COE) and Maryland Department of the Environment for impacts to wetlands and waters of the U.S.

A mitigation site search has been initiated to identify and locate potential mitigation sites within the Lower Gunpowder Falls, Little Gunpowder Falls, Lower Winters Run, Bush

River, Bynum Run, and Swan Creek watersheds. Per the wetland regulations, areas of filled waters and wetlands must be replaced on at least a 1:1 basis.

It is anticipated that mitigation for impacts to non-vegetated waters will be required at a 1:1 ratio. A compensatory mitigation package will be prepared and included in the final decision document.

3. Vegetation and Wildlife Habitat

a. Forest/Woodland

Forest stands within the study area exist but have been altered directly or indirectly by agriculture, urbanization, timber harvesting activities, and/or natural factors such as disease and pests outbreaks. There are no virgin stands of forest identified within the study area. The largest blocks of continuous forests are located along the Gunpowder Falls and Little Gunpowder Falls, most of which is within public ownership. Forest land within the southern portion of the study area is primarily associated with stream buffers and preserved lands in urban areas. Conversely, forests within the northern portion of the study area are more dense and contiguous. These woodlands are also associated with stream buffers and are not as disturbed because there are not as many intersections with roadways and/or developments. A general transition from higher density to lower density urban land uses occurs from south to north within the Section 200 study area.

General effects to forests would involve the conversion of forested habitat to impervious road and associated infrastructure, and forest fragmentation where new roads would bisect existing habitat. **Table III-15** provides acreage of forest/woodland impacts for the sections identified in **Appendices A and B** for each of the Build Alternatives. Since the Build Alternatives mainly involve widening existing roadway alignments, the majority of these impacts will occur to the forest edge and/or to narrow rows of trees next to the I-95 roadway. For comparison purposes for the Build Alternatives in **Table III-15**, the General Purpose Lanes Alternative includes MD 152 Option 4, MD 24 Option 2, MD 543 Option 1, and MD 22 Option 1 and the Express Toll Lanes Alternative includes MD 152 Option 4A, MD 24

Option 2, MD 543 Option 7, and MD 22 Option 1. The impacts to woodlands for each interchange option were minimal.

Table III-15. Woodland Impacts

Woodland Impacts (acres)		
No-Build Alternative	**General Purpose Lanes Alternative**	**Express Toll Lanes Alternative**
0	**61.6**	**121.8**

No-Build Alternative

No woodlands would be impacted by this alternative.

Build Alternatives

The majority of woodland impacts would occur from improvements to the interchanges within the study area. To maintain traffic during construction and provide onsite staging areas and/or temporary roadways during different phases of construction, all of the woodlands within the immediate vicinity of the interchanges are expected to have permanent impacts. Pending further study and/ or final engineering design, impacts may be minimized. The proposed widening to the mainline lanes would push back the edge of the woodlands creating a shallower wooded buffer between I-95 and adjacent communities. Exact locations and acreage of woodland impacts will be better defined during final design. There are additional woodland impacts associated with the Express Toll Lanes Alternative (**Table III-15**) because of the additional width of the mainline.

Avoidance and Minimization Measures

Per Natural Resources Article 5-103, "Reforestation Law," adopted 1989, amended 1990 and 1991, the construction of a highway by a unit of the state:

1. May cut or clear only the minimum number of trees and other woody plants that are necessary and consistent with sound design practices, and

2. Shall make every reasonable effort to minimize the cutting or clearing of trees and other woody plants

The Maryland Reforestation Act requires the minimizing of forest clearing, replacement of removed wooded areas, or contributions to a reforestation fund if forested areas are taken. Any of the alternatives would comply with the Maryland Reforestation Act. Forest mitigation is required for any State or local government project that requires one or more acre of impact. Replacement is required on an acre-for-acre (1:1) basis and must be accomplished on public land.

b. Forest Interior Dwelling Species (FIDS)

The two main FIDS habitats within the study area are associated with the watersheds of Gray's Run and Haha Branch. The FIDS habitat associated with Gray's Run spans approximately 20,000 linear feet along the east and west side of I-95. The FIDS habitat associated with Haha Branch spans approximately 2,500 linear feet along the west side of I-95 and 9,500 linear feet along the east side of I-95. The other four FIDS habitats are associated with the stream buffers of Gunpowder Falls, Little Gunpowder Falls, Winters Run and Cranberry Run.

General effects to FIDS would involve the conversion of forested habitat to impervious road and associated infrastructure, and forest fragmentation where new roads would bisect existing habitat. **Table III-16** provides acreage of FIDS impacts for the sections identified in **Appendices A and B** for each of the Build Alternatives. Since the Build Alternatives mainly involve widening existing roadway alignments, the majority of these impacts will occur to the forest edge and/or to narrow rows of trees next to the I-95 roadway. For comparison purposes for the Build Alternatives in Table III-8, the General Purpose Lanes Alternative includes MD 152 Option 4, MD 24 Option 2, MD 543 Option 1, and MD 22 Option 1 and the Express Toll Lanes Alternative includes MD 152 Option 4A, MD 24 Option 2, MD 543 Option 7A, and MD 22 Option 1.

No-Build Alternative

The No-Build Alternative would not impact any FIDS habitat within the study area.

General Purpose Lanes Alternative

The General Purpose Lanes Alternative would impact approximately 10.5 acres of FIDS habitat within the study area. All the impacts to FIDS habitat are associated with the proposed roadway widening. The differences in the amount of impacts to FIDS habitat for the interchange options were negligible.

Express Toll Lanes Alternative

The Express Toll Lanes Alternative would impact approximately 16.3 acres of FIDS habitat within the study area. Additional impacts related to this alternative can be attributed to the wider mainline typical section. The differences in the amount of impacts to FIDS habitat for the interchange options were negligible.

Table III-16. Impacts to FIDS Habitat

Alternative	Impacts to FIDS habitat (acres)
No-Build Alternative	0
General Purpose Lanes Alternative	10.5
Express Toll Lanes Alternative	16.3

Avoidance and Minimization Measures

The Authority will make every possible effort to avoid/minimize project impacts to FIDS habitat and other native forest plants and wildlife. Minimization measures could include the following:

- Avoid placement of new roads or related construction in the forest interior. If forest loss or disturbance is absolutely unavoidable, restrict development to the perimeter of the forest (i.e., within 300 feet of the existing forest edge), and avoid road placement in areas of high quality FIDS habitat (e.g., old-growth forest). Maximize the amount of remaining contiguous forested habitat.

- Do not remove or disturb forest habitat during May-August, the breeding season for most FIDS. This seasonal restriction may be expanded to February-August if certain early nesting FIDS (e.g., Barred Owl) are present.

- Maintain forest habitat as close as possible to the road, and maintain canopy closure where possible.

- Maintain grass height at least 10" during the breeding season (May-August).

c. Large and Significant Trees

There were 356 specimen trees identified throughout the study area. Locations of large and significant trees within the study area can be found in **Appendices A and B**.

Impacts to large and significant trees were determined by calculating the percent of critical root zone affected by each proposed alternative. When more than 30 percent of the critical root zone (CRZ) was disturbed the tree was considered a total removal. A summary of impacts for each alternative and associated interchange options to large and significant trees (LST) is shown in **Table III-17**. For comparison purposes for the Build Alternatives, the General Purpose Lanes Alternative includes MD 152 Option 4, MD 24 Option 2, MD 543 Option 1, and MD 22 Option 1 and the Express Toll Lanes Alternative includes MD 152 Option 4A, MD 24 Option 2, MD 543 Option 7, and MD 22 Option 1.

No-Build Alternative

The No-Build Alternative would not impact any LSTs within the study area.

General Purpose Lanes Alternative

The General Purpose Lanes Alternative would impact 20 LST and remove 14 LSTs. The LSTs are impacted by the roadway widening and interchange improvements. The differences in the amount of impacts to LSTs for the interchange options were negligible.

Express Toll Lanes Alternative

The Express Toll Lanes Alternative would impact approximately 47 LSTs and remove 25 LSTs. Similar to the General Purpose Lanes Alternative, the LSTs are impacted due to roadway widening and interchange improvements. The Express Toll Lanes Alternative

impacts more LSTs due to its larger typical section and additional ramps required at some of the interchanges. The differences in the amount of impacts to LSTs for the interchange options were negligible.

Table III-17. Alternative Impacts to Large and Significant Trees

Tree #	Tree Species		Percentage of Critical Root Zone (CRZ) Impacted				
	Common Name	Scientific Name	No Build Alternative	General Purpose Lanes Alternative	Removal or Impact	Express Toll Lanes Alternative	Removal or Impact
1	southern red oak	*Quercus falcata*	0	0	N/A	19	Impacted
12	white oak	*Quercus alba*	0	0	N/A	2	Impacted
16	tulip poplar	*Liriodendron tulipifera*	0	0	N/A	15	Impacted
25	tulip poplar	*Liriodendron tulipifera*	0	11	Impacted	71	Removal
28	white oak	*Quercus alba*	0	100	Removal	100	Removal
29	white oak	*Quercus alba*	0	94	Removal	96	Removal
30	white oak	*Quercus alba*	0	50	Removal	53	Removal
59	white oak	*Quercus alba*	0	0	N/A	14	Impacted
60	tulip poplar	*Liriodendron tulipifera*	0	40	Removal	77	Removal
62	tulip poplar	*Liriodendron tulipifera*	0	0	N/A	2	Impacted
79	tulip poplar	*Liriodendron tulipifera*	0	0	N/A	46	Removal
81	tulip poplar	*Liriodendron tulipifera*	0	0	N/A	4	Removal
83	tulip poplar	*Liriodendron tulipifera*	0	0	N/A	3	Removal
91	tulip poplar	*Liriodendron tulipifera*	0	0	N/A	14	Impacted
96	red maple	*Acer rubrum*	0	46	Removal	26	Impacted
101	American beech	*Fagus grandifolia*	0	0	N/A	47	Removal
103	white oak	*Quercus alba*	0	17	Impacted	83	Removal
104	American beech	*Fagus grandifolia*	0	0	N/A	9	Impacted
105	tulip poplar	*Liriodendron tulipifera*	0	0	N/A	37	Removal
108	northern red oak	*Quercus rubra*	0	90	Removal	90	Removal

Table III-17. Alternative Impacts to Large and Significant Trees

Tree #	Tree Species		Percentage of Critical Root Zone (CRZ) Impacted				
	Common Name	Scientific Name	No Build Alternative	General Purpose Lanes Alternative	Removal or Impact	Express Toll Lanes Alternative	Removal or Impact
109	northern red oak	*Quercus rubra*	0	13	Impacted	14	Impacted
111	pin oak	*Quercus palustris*	0	16	Impacted	55	Removal
112	Sycamore	*Platanus occidentalis*	0	2	Impacted	2	Impacted
114	Sycamore	*Platanus occidentalis*	0	0	N/A	15	Impacted
115	northern red oak	*Quercus rubra*	0	83	Removal	100	Removal
117	American beech	*Fagus grandifolia*	0	100	Removal	80	Removal
118	white oak	*Quercus alba*	0	100	Removal	3	Impacted
119	black oak	*Quercus velutina*	0	100	Removal	25	Removal
120	American beech	*Fagus grandifolia*	0	100	Removal	43	Impacted
123	American beech	*Fagus grandifolia*	0	18	Impacted	25	Impacted
124	white oak	*Quercus alba*	0	0	N/A	29	Impacted
125	American beech	*Fagus grandifolia*	0	0	N/A	5	Impacted
127	white oak	*Quercus alba*	0	4	Impacted	71	Removal
128	Oak	*Quercus spp.*	0	0	N/A	10	Impacted
131	American beech	*Fagus grandifolia*	0	0	N/A	24	Impacted
132	white oak	*Quercus alba*	0	0	N/A	14	Impacted
133	American beech	*Fagus grandifolia*	0	100	Removal	87	Removal
136	American beech	*Fagus grandifolia*	0	0	N/A	29	Impacted
161	American beech	*Fagus grandifolia*	0	0	N/A	13	Impacted
162	tulip poplar	*Liriodendron tulipifera*	0	0	N/A	24	Impacted
164	white oak	*Quercus alba*	0	0	N/A	1	Impacted
165	white oak	*Quercus alba*	0	0	N/A	100	Removal
166	white oak	*Quercus alba*	0	0	N/A	100	Removal
169	American beech	*Fagus grandifolia*	0	0	N/A	1	Impacted
176	northern red oak	*Quercus rubra*	0	0	N/A	89	Removal
177	northern red oak	*Quercus rubra*	0	0	N/A	19	Impacted
182	white oak	*Quercus alba*	0	6	Impacted	7	Impacted
183	white oak	*Quercus alba*	0	3	Impacted	3	Impacted
190	tulip poplar	*Liriodendron tulipifera*	0	0	N/A	1	Impacted

Table III-17. Alternative Impacts to Large and Significant Trees

Tree #	Tree Species		Percentage of Critical Root Zone (CRZ) Impacted				
	Common Name	Scientific Name	No Build Alternative	General Purpose Lanes Alternative	Removal or Impact	Express Toll Lanes Alternative	Removal or Impact
192	tulip poplar	*Liriodendron tulipifera*	0	11	Impacted	12	Impacted
199	tulip poplar	*Liriodendron tulipifera*	0	18	Impacted	19	Impacted
200	white oak	*Quercus alba*	0	0	N/A	2	Impacted
206	northern red oak	*Quercus rubra*	0	9	Impacted	9	Impacted
235	black oak	*Quercus velutina*	0	0	N/A	6	Impacted
238	tulip poplar	*Liriodendron tulipifera*	0	0	N/A	5	Impacted
239	white oak	*Quercus alba*	0	27	Impacted	27	Impacted
256	northern red oak	*Quercus rubra*	0	0	N/A	1	Impacted
262	white oak	*Quercus alba*	0	0	N/A	4	Impacted
267	white oak	*Quercus alba*	0	22	Impacted	34	Removal
283	tulip poplar	*Liriodendron tulipifera*	0	18	Impacted	18	Impacted
284	white oak	*Quercus alba*	0	0	N/A	8	Removal
302	tulip poplar	*Liriodendron tulipifera*	0	0	N/A	2	Impacted
305	northern red oak	*Quercus rubra*	0	0	N/A	2	Impacted
327	tulip poplar	*Liriodendron tulipifera*	0	69	Removal	31	Removal
328	tulip poplar	*Liriodendron tulipifera*	0	4	Impacted	4	Impacted
329	tulip poplar	*Liriodendron tulipifera*	0	1	Impacted	1	Impacted
331	northern red oak	*Quercus rubra*	0	11	Impacted	11	Impacted
332	black oak	*Quercus velutina*	0	20	Impacted	20	Impacted
343	American beech	*Fagus grandifolia*	0	60	Removal	60	Removal
357	northern red oak	*Quercus rubra*	0	27	Impacted	27	Impacted
361	tulip poplar	*Liriodendron tulipifera*	0	0	N/A	9	Impacted

Table III-17. Alternative Impacts to Large and Significant Trees

Tree #	Tree Species		Percentage of Critical Root Zone (CRZ) Impacted				
	Common Name	Scientific Name	No Build Alternative	General Purpose Lanes Alternative	Removal or Impact	Express Toll Lanes Alternative	Removal or Impact
363	tulip poplar	*Liriodendron tulipifera*	0	0	N/A	11	Impacted

As the project progresses into design and construction phases, impacts to large and significant trees may change. Some trees may no longer remain suitable for retention at the LOD boundary due to effects from soil and root compaction, root injury, limb or trunk injury, and/or altered hydrology.

d. Terrestrial Wildlife

Wildlife was observed throughout the study area, primarily in naturally forested areas, fields, wetlands and wildlife corridors occurring along floodplains and greenways. Mammal signs observed in the study area indicate the presence of white-tailed deer (*Odocoileus virginianus*), raccoon *(Pyrocon lotor*), beaver *(Castor canadensis),* opossum *(Didelphis marsupialis*), eastern chipmunk (*Tamias striatus*), gray squirrel *(Sciurus carolinensis*), woodchuck *(Marmota monax*), red fox (*Vulpes fulva*), and eastern cottontail (*Sylvilagus floridanus).* Herptiles present within the study area include green frog (*Rana clamitanc*), spring peeper (*Psuedacris crucifer*), gray tree frog (*Hyla versicolor*), garter snake (*Thamnophis sirtalis*), American toad (*Bufo americanus*), wood frog (*Rana sylvatica*), black ratsnake (*Elaphe obsoleta*) and snapping turtle (*Chelydra serpentina*). Observed signs of mammals and herptiles included actual sighting, observed tracks and scat, road-kill, dwellings and breeding calls.

In addition, during field investigation any bird species sighting by sight, song, or call were recorded. Habitats varied and were categorized from residential, industrial, agricultural, commercial, marshland, forested, and open space.

The No-Build Alternative would have no impact on terrestrial habitat and therefore no affect on wildlife within the study area. Since the Build Alternatives would only expand the existing roadway, minimal impact on the wildlife communities within the study area is anticipated. Generally, road widening pushes back existing roadside edge area. Roadside edge habitat is broadly defined as the area influenced by roadway drainage, slope limits, sun light penetration or maintenance activity. However, road widening is of special concern when improvements impair the passage of wildlife between areas of adjacent habitat. The Build Alternatives would not affect the passage of wildlife in or out of the good habitat areas.

4. Rare, Threatened, and Endangered Species

There will be no impacts to any Rare, Threatened and Endangered (RT&E) species within the study area from the No-Build Alternative or proposed Build Alternatives. On April 13, 2006, the DNR indicated the possible occurrence of the state rare Ostrich Fern (*Matteucia struthiopteris*) within the vicinity of the study area (**Appendix C**). The Authority conducted an RT&E survey in September 2006 for the Ostrich Fern. The survey did not identify any occurrence of Ostrich Fern within the study area. The DNR is currently reviewing the results of the survey. The Authority will continue coordination with DNR.

5. Unique and Sensitive Areas

The Chesapeake Bay Critical Area (CBCA) will not be impacted by either the No-Build Alternative or the Build Alternatives (Appendix A, Plates 20-21 and Appendix B, Plates 53-54).

6. Air Quality

The Clean Air Act regulates emissions of six criteria pollutants that pose a danger to human health and the environment. The six criteria pollutants are: lead, carbon dioxide, particulate matter, sulfur dioxide, nitrogen dioxide, and ozone. Under the Act, a system of health-based national ambient air quality standards, called “NAAQS” has been established. Each NAAQS represents the amount of a particular pollutant that can be emitted into the ambient air, i.e., the air we breathe, without causing adverse health effects. Air quality control regions across

the country are each given one of three designations: attainment, nonattainment, or maintenance.

The Section 200 study area is located within the Metropolitan Baltimore Intrastate Air Quality Control Region. The region is not designated as a non-attainment area for the following pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (Pb), and particulate matter (PM_{10}). It is however designated as a non-attainment area for ozone (O_3) and fine particulate matter ($PM_{2.5}$). Because of this non-attainment designation for ozone, the region is subject to the implementation of reasonably available control measures, such as the Vehicle Emissions Inspection Program (VEIP).

In addition, projects in maintenance and non-attainment areas are subject to the transportation conformity provisions of the Clean Air Act. Transportation conformity is the link between transportation planning and decision-making and the emissions budget. Conformity requires that transportation plans, programs, and projects in nonattainment and maintenance areas be demonstrated to "conform" to the mobile source emissions budgets in the SIP. Conformity is demonstrated based on the metropolitan constrained long-range plan (CLRP) and Transportation Improvement Program (TIP). In addition, projects located in CO maintenance or non-attainment areas are subject to micro-scale or "hot-spot" air quality analyses. FHWA cannot grant approvals or award funding for a project that has not been found to conform.

The Section 200 study is listed as a Regionally Significant and Non-Federally Funded project in the 2007-2011 TIP for the Baltimore Region. Therefore, this project has been included and considered in assessments of regional conformity with the Maryland SIP.

a. CO Analysis

A CO micro-scale analysis was undertaken as a supplement to the regional conformity work performed by the Baltimore Metropolitan Council (BMC), which is the Metropolitan Planning Organization with jurisdiction over the project area. This was done to ensure that no localized air quality impacts would occur as a result of the proposed transportation

improvements, EPA's MOBILE 6.2 emissions model and CAL3QHC dispersion model were used to predict CO concentrations for air quality-sensitive receptors through the project corridor. Both free flow (along the I-95 mainline sections) and "hot-spot" (at the three worst-case project intersections) analyses were performed at a variety of representative air quality receptor sites. The models predicted CO vehicular emissions at each receptor location in the existing year as well as the design year for the No-Build Alternative, the General Purpose Lanes Alternative and the Express Toll Lanes Alternative and all associated interchange options. Background CO concentrations were added to the modeled 1-hour and 8-hour average CO concentrations for comparison to the Sate and National Ambient Air Quality Standards.

The location of air quality sensitive receptors and the intersection analysis receptors (hot spots) used to assess each of the Build Alternatives is shown in Appendices A and B**.**

No CO concentrations were predicted to be in violation of the NAAQS under either of the study years for any of the receptor locations for the alternatives and associated interchange options evaluated.

b. $PM_{2.5}$ Analysis

Transportation conformity is required under Section 176(c) of the Clean Air Act (CAA) and the EPA's transportation conformity rule. These rules require that federally supported transportation plans, programs, and projects conform to the intent of the SIP in "non-attainment" areas. On January 5, 2005, the EPA designated the Baltimore Region (including Baltimore and Harford counties) as a "non-attainment" area for fine particulate matter (PM2.5). This designation became effective on April 5, 2005 following the EPA's notification in the Federal Register. Transportation conformity for the PM2.5 standards applied as of April 5, 2006 following the one-year grace period, as provided for within the CAA. After that time, federally supported projects in PM2.5 nonattainment areas are required to be part of a conforming long range plan and transportation improvement program (TIP). In addition, for PM2.5 areas, projects considered to be "of air quality concern," as described in 40 CFR 93.123, must also complete a hotspot analysis to assess possible

localized emissions impacts. Projects not deemed to be of air quality concern do not require a hotspot analysis as part of the project-level conformity determination. For more information on transportation conformity, visit:
http://www.epa.gov/otaq/stateresources/transconf/index.htm.

PM2.5 Regional Conformity Determination

Baltimore and Harford counties are both part of the Baltimore, MD "nonattainment" areas for PM2.5. The Baltimore Regional Transportation Board approved the 2007-2011 TIP and the 2004 Baltimore Regional Plan on August 22, 2006, and have concluded that the Region's transportation plan and program are in conformity with the SIP relative to air quality goals. The U.S. Department of Transportation made a conformity determination on the 2004 Plan and 2007-2011 TIP on November 8, 2006. I-95 Section 200 is listed as a Regionally Significant and Non-Federally Funded Transportation Improvement in the 2007-2011 TIP. Therefore, the I-95 Section 200 Project has been included in a conforming plan and program in accordance with 40 CFR 93.115. The current conformity determination is consistent with the final conformity rule found in 40 CFR Parts 51 and 93.

Project-level Evaluation

Based on review and analysis of the proposed I-95 Section 200 Alternatives, it has been determined that the project has not been found to be a project of air quality concern as defined under 40 CFR 93.123(b)(1). We have reached this determination based on the following elements of the proposed project:

- The truck traffic associated with the "build" condition versus the "no-build" condition indicates a difference in overall truck volumes of less than 1%. Associated affects to air quality from the truck component would be present regardless of the proposed project and therefore are not considered to be "project-induced".

- The difference in diesel truck percentages between the "build" and "no-build" would be further diminished as diesel trucks represent only a portion of the overall trucks

using this facility. Diesel trucks are the primary contributor of transportation-induced PM 2.5 emissions.

- The implementation of the EPA's "2007 Highway Rule" is projected to remove diesel engine emissions from the equivalent of 90 percent of the total truck fleet, or about 13 million trucks and buses, by the year 2030.

The project's traffic engineering data does not suggest that there will be an increase in the percentage of diesel vehicles utilizing the corridor, future truck percentages are assumed to be slightly less (0.56%) than the existing truck percentages for the purpose of this analysis. Current and future build and no build traffic data are listed in the table below.

Table III-18. AADT and Diesel Truck Traffic

	Current	2030 Build	2030 No build	Change between Build and No Build
AADT	89,000 to 165,000	131,000 to 231,000	129,000 to 229,000	2,000
Truck Percentage	11.51%	10.95%	10.96%	0.01%
Truck Volume	12,000 to 19,000	17,100 to 25,300	16,900 to 25,100	200

* The high end traffic numbers (south of MD 152) for the AADT and truck volumes were use d to calculate the truck percentages.

EPA's 2007 "Highway Rule" was finalized in January 2001. A variety of approaches have been considered in developing the qualitative assessment for this project relative to $PM_{2.5}$ conformity. Considering the multitude of factors and trends that will affect the particulate emissions of diesel vehicles, the most critical element is the incorporation of the EPA's "2007 Highway Rule", finalized in January 2001.

According to the EPA's *Program Update: Introduction of Cleaner-burning Diesel Fuel Enables Advanced Pollution Control for Cars, Trucks and Buses* (EPA420-F-06-064, October 2006) the EPA's Clean Air Highway Diesel final rule "requires a 97 percent

reduction in the sulfur content of highway diesel fuel, from its current level of 500 ppm to 15 ppm. As of October 15, 2006, Ultra-Low Sulfur Diesel (ULSD) is available at retail stations. Cars, trucks and buses with advanced pollution control have been available since the autumn of 2006.

By addressing diesel fuel and engines together as a single system, this program will provide annual emission reductions equivalent to removing the pollution from more than 90 percent of today's trucks and buses, or about 13 million trucks and buses, when the current heavy-duty vehicle fleet has been completely replaced in 2030. This is the greatest reduction in harmful emissions of soot, or particulate matter (PM), ever achieved from cars and trucks."

Therefore, this project will not lead to a significant increase in diesel vehicles and does not meet any other criteria in 40 CFR 93.123(b) for a project of air quality concern. The I-95 Section 200 project is not anticipated to cause or contribute to a new violation of the PM2.5 NAAQS, or increase the frequency or severity of a violation. The PM 2.5 analysis completed for Section 200 has been concurred upon by Maryland Department of the Environment (MDE) and EPA.

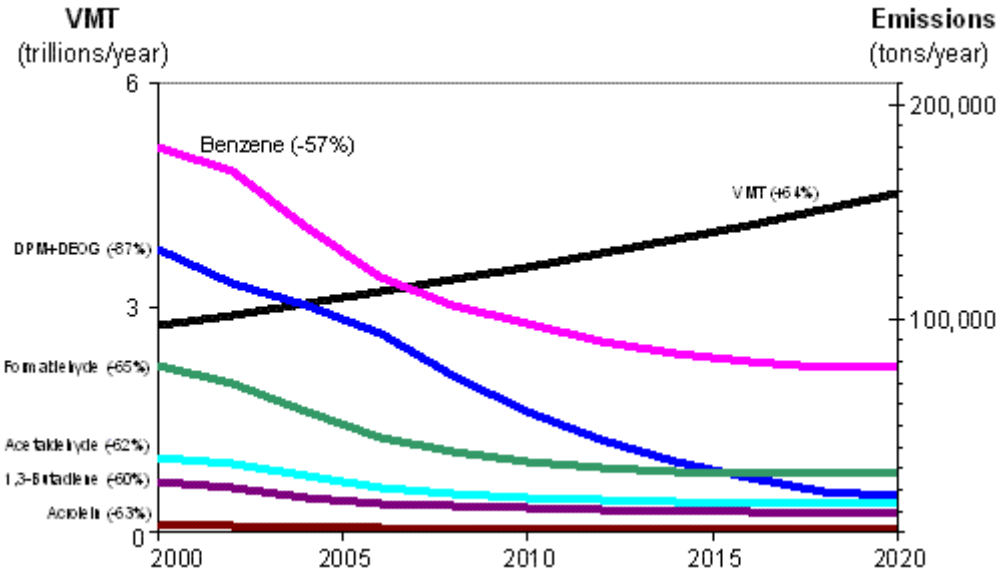
c. Mobile Source Air Toxics (MSATs) Analysis Background

In addition to the criteria air pollutants for which there are National Ambient Air Quality Standards (NAAQSs), the EPA also regulates air toxics. Most air toxics originate from human-made sources including on-road mobile sources, non-road mobile sources (e.g. airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries).

Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the CAA. The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

The EPA is the lead Federal Agency for administering the CAA and has certain responsibilities regarding the health effects of MSATs. The EPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources, 66 FR 17229 (March 29, 2001). This rule was issued under the authority in Section 202 of the CAA. In its rule EPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline (RFG) program, its national low emission vehicle (NLEV) standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Between 2000 and 2020, the FHWA has determined that even with a 64 percent increase in VMT (vehicle miles traveled), these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadine, and acetaldehyde by 57 percent to 65 percent, and will reduce on-highway diesel PM emissions by 87 percent, as shown in the following graph:

Figure III-5. U.S. Annual Vehicle Miles Traveled (VMT) vs. Mobile Source Air Toxics Emissions, 2000-2020



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

EPA adopted its second MSAT Rule in February 2007 which regulates emissions further by setting more restrictive engine emission standards for new vehicles. These new standards will cause increased emission reductions in addition to those already forecasted in Figure V-1.

Project Level Assessment

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. The I-95 Section 200 project has AADT values greater than 150,000 by the Design Year 2030 (see ***Appendix C***), and also has the potential to significantly increase the capacity of the mainline roadway due to the addition of travel lanes. Although the volume exceeds FHWA's recommended volume for performing a qualitative analysis, it is believed that a qualitative analysis is warranted for this project. The projected AADT will not exceed the FHWA guidance until 2030. Over the next 20 years, significant additional reductions in vehicle emitted pollutants are anticipated as noted in the Figure V-1 presented in Section A. These additional reductions will come as a result of technology changes occurring now, such as hybrid vehicles, and through regulations such as EPA's new MSAT2 Rule adopted February 2007. The additional reductions ***are not accounted*** for in Figure V-1

If mitigation were to be considered for this project, there are several strategies that could potentially be employed in an attempt to minimize the long-term MSATs emissions (as outlined in the FHWA's Interim Guidance on Air Toxic Analysis in NEPA Documents, February 2006). Operational strategies that focus on speed limit enforcement or traffic management policies may help reduce MSAT emissions even beyond the benefits of fleet turnover. Well-traveled highways with high proportions of heavy-duty diesel truck activity may benefit from active Intelligent Transportation System programs, such as traffic management centers or incident management systems.

Planners also may want to consider the benefits of establishing buffer zones between new or expanded highway alignments and areas of vulnerable populations. Modifications of local

zoning or the development of guidelines that are more protective also may be useful in separating emissions and receptors. The initial decision to pursue MSATs emissions mitigation should be the result of interagency consultation.

In this document, MdTA has been provided with a qualitative analysis of MSATs emissions relative to the various alternatives, and has acknowledged that the project alternatives may result in increased exposure to MSAT emissions in certain locations, although the concentrations and duration of exposures are uncertain. Because of this uncertainty, the health effects from these emissions cannot be estimated.

Unavailable Information for Project Specific MSAT Impact Analysis: This Air Quality Report includes 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 alternatives in this Technical Air Quality Report. Due to these limitations, the following discussion is included in accordance with CEQ regulations (40 CFR 1502.22(b)) regarding incomplete or unavailable information:

Information that is Unavailable or Incomplete: 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 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.

1. **Emissions:** The EPA tools to estimate MSAT emissions from motor vehicles are not sensitive to key variables determining emissions of MSATs in the context of highway projects. While MOBILE 6.2 is used to predict emissions at a regional level, it has limited applicability at the project level. MOBILE 6.2 is a trip-based model - emission factors are projected based on a typical trip of 7.5 miles, and on average speeds for this typical trip. This means that MOBILE 6.2 does not have the ability to predict

emission factors for a specific vehicle operating condition at a specific location at a specific time. Because of this limitation, MOBILE 6.2 can only approximate the operating speeds and levels of congestion likely to be present on the largest-scale projects, and cannot adequately capture emissions effects of smaller projects. For particulate matter, the model results are not sensitive to average trip speed, although the other MSAT emission rates do change with changes in trip speed. Also, the emissions rates used in MOBILE 6.2 for both particulate matter and MSATs are based on a limited number of tests of mostly older-technology vehicles. Lastly, in its discussions of PM under the conformity rule, EPA has identified problems with MOBILE 6.2 as an obstacle to quantitative analysis. These deficiencies compromise the capability of MOBILE 6.2 to estimate MSAT emissions. MOBILE 6.2 is an adequate tool for projecting emissions trends, and performing relative analyses between alternatives for very large projects, but it is not sensitive enough to capture the effects of travel changes tied to smaller projects or to predict emissions near specific roadside locations.

2. **Dispersion:** The tools to predict how MSATs disperse are also limited. The EPA's current regulatory models, CALINE3 and CAL3QHC, were developed and validated more than a decade ago for the purpose of predicting episodic concentrations of carbon monoxide to determine compliance with the NAAQS. The performance of dispersion models is more accurate for predicting maximum concentrations that can occur at some time at some location within a geographic area. This limitation makes it difficult to predict accurate exposure patterns at specific times at specific highway project locations across an urban area to assess potential health risk. The NCHRP is conducting research on best practices in applying models and other technical methods in the analysis of MSATs. This work also will focus on identifying appropriate methods of documenting and communicating MSAT impacts in the NEPA process and to the general public. Along with these general limitations of dispersion models, FHWA is also faced with a lack of monitoring data in most areas for use in establishing project-specific MSAT background concentrations.

3. **Exposure Levels and Health Effects:** Finally, even if emission levels and concentrations of MSATs could be accurately predicted, shortcomings in current techniques for exposure assessment and risk analysis preclude us from reaching meaningful conclusions about project-specific health impacts. Exposure assessments are difficult because it is difficult to accurately calculate annual concentrations of MSATs near roadways, and to determine the portion of a year that people are actually exposed to those concentrations at a specific location. These difficulties are magnified for 70-year cancer assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over a 70-year period. There are also considerable uncertainties associated with the existing estimates of toxicity of the various MSATs, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population. Because of these shortcomings, any calculated difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with calculating the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against other project impacts that are better suited for quantitative analysis.

Summary of Existing Credible Scientific Evidence Relevant to Evaluating the Impacts of MSATs: 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.

Exposure to toxics has been a focus of a number of EPA efforts. Most notably, the agency conducted the National Air Toxics Assessment (NATA) in 1996 to evaluate modeled estimates of human exposure applicable to the county level. While not intended for use as a

measure of or benchmark for local exposure, the modeled estimates in the NATA database best illustrate the levels of various toxics when aggregated to a national or State level.

The EPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The EPA Integrated Risk Information System (IRIS) is a database of human health effects that may result from exposure to various substances found in the environment. The IRIS database is located at http://www.epa.gov/iris. The following toxicity information for the six prioritized MSATs was taken from the IRIS database *Weight of Evidence Characterization* summaries. This information is taken verbatim from EPA's IRIS database and represents the Agency's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

- **Benzene** is characterized as a known human carcinogen.
- **Formaldehyde** is a probable human carcinogen, based on limited evidence in humans, and sufficient evidence in animals.
- **1,3-butadiene** is characterized as carcinogenic to humans by inhalation.
- **Acetaldehyde** is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure.
- **Diesel exhaust** (DE) is likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust as reviewed in this document is the combination of diesel particulate matter and diesel exhaust organic gases.
- **Diesel exhaust** also represents chronic respiratory effects, possibly the primary noncancer hazard from MSATs. Prolonged exposures may impair pulmonary function and could produce symptoms, such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.

There have been other studies that address MSAT health impacts in proximity to roadways. The Health Effects Institute, a non-profit organization funded by EPA, FHWA, and industry, has undertaken a major series of studies to research near-roadway MSAT hot spots, the health implications of the entire mix of mobile source pollutants, and other topics. The final summary of the series is not expected for several years.

Some recent studies have reported that proximity to roadways is related to adverse health outcomes -- particularly respiratory problems. Much of this research is not specific to MSATs, instead surveying the full spectrum of both criteria and other pollutants. The FHWA

cannot evaluate the validity of these studies, but more importantly, they do not provide information that would be useful to alleviate the uncertainties listed above and enable us to perform a more comprehensive evaluation of the health impacts specific to this project.

Relevance of Unavailable or Incomplete Information to Evaluating Reasonably Foreseeable Significant Adverse Impacts on the Environment, and Evaluation of impacts based upon theoretical approaches or research methods generally accepted in the scientific community: Because of the uncertainties outlined above, a quantitative assessment of the effects of air toxic emissions impacts on human health cannot be made at the project level. While available tools do allow us to reasonably predict relative emissions changes between alternatives for larger projects, the amount of MSAT emissions from each of the project alternatives and MSAT concentrations or exposures created by each of the project alternatives cannot be predicted with enough accuracy to be useful in estimating health impacts. (As noted above, the current emissions model is not capable of serving as a meaningful emissions analysis tool for smaller projects.) Therefore, the relevance of the unavailable or incomplete information is that it is not possible to make a determination of whether any of the alternatives would have "significant adverse impacts on the human environment."

7. Noise Analysis

There are currently no noise barriers along the I-95 corridor with the Section 200 study area. For more detailed information about the Noise Analysis refer to the Section 200 Noise Quality Report

Noise Sensitive Area Description

There have been 29 Noise Sensitive Areas (NSAs) identified in the study area. Individual noise receptor locations were selected to represent each of the noise sensitive communities potentially affected by project improvements. A total of 228 receptors were identified within the 29 NSAs. Individual noise receptor and NSA locations are illustrated in Appendices A and B**.** The following is a list and description of each NSA in the study area. Additional

details regarding the NSAs can be found in the *Section 200 Noise Quality Technical Report* (Authority, 2007) prepared for this project.

NSA 01 consists of single family residences of the Forge Acres and Forge Heights neighborhoods. The receptors are 180 feet from the edge of the southbound I-95 shoulder. The area is between Gunpowder Falls and New Forge Road.

NSA 02 consists of single family residences of the Darryl Gardens neighborhood. The receptors are 170 feet to 550 feet from the edge of the northbound I-95 shoulder. The area is between Gunpowder Falls and New Forge Road.

NSA 03 consists of single family residences of the Darryl Gardens neighborhood, and Saint Stephens Catholic Church. The receptors are 223 feet to 610 feet from the edge of the southbound I-95 shoulder. The area is located approximately 1,300' to the east and 2,600' to the west of Bradshaw Road.

NSA 04 consists of single family residences in the neighborhood north and south of the Bradshaw overpass. The receptors are 110 feet to 760 feet from the edge of the northbound I-95 shoulder. The area is approximately 1,680' to the east and 3,700' to the west of Bradshaw Road

NSA 05 consists of single family residences of the Gunpowder neighborhood. The receptors are 120 feet to 540 feet from the edge of the northbound I-95 shoulder. The area is located between Little Gunpowder Falls and Joppa Road.

NSA 06 consists of single family residences of the Gunpowder neighborhood. The receptors are 130 feet to 630 feet from the edge of the southbound I-95 shoulder. The area is located between Old Joppa Road and 350 feet east of Dugan Drive.

NSA 07 consists of single family homes within Clear Acres and Joppa Acres neighborhoods. The receptors are 100 feet to 450 feet from the edge of the southbound I-95 shoulder. The area is located 730' west and 1550' east of Old Joppa Road.

NSA 08 consists of single family residences in the Woodlea neighborhood. The receptors are 130 feet to 400 feet from the edge of the southbound I-95 shoulder. The area is between Old Mountain Road and 1350' southwest of Old Mountain Road.

NSA 09 consists of single family residences of the Hilbert Heights neighborhood. The receptors are 30 feet to 320 feet from the edge of the northbound I-95 shoulder. The area is located 675' east and 803' west of Old Mountain Road.

NSA 10 consists of single family homes in the Happy Acres neighborhood. The receptors are 180 feet to 450 feet from the edge of the northbound I-95 shoulder. The area is located between Jaycee Road and the end of Jaycee Drive.

NSA 11 consists of townhouses and single family residences in the Clayton Vista neighborhood. The receptors are 200 feet to 620 feet from the edge of the northbound I-95 shoulder. The area is located 700' to the west and 680' to the east of Clayton Road on the northbound side of I-95.

NSA 12 consists of single family homes in the Clayton Manor neighborhood. The receptors are 250 feet to 690 feet from the edge of the northbound I-95 shoulder. The area is located 1500' west and 265' east of Clayton Road.

NSA 13 consists of single family residences in the Woodsdale neighborhood. The receptors are 170 feet to 340 feet from the edge of the northbound I-95 shoulder. The area is located 800' west and 1570' east of Woodsdale Rd.

NSA 14 contains single family residences in Woodsdale Meadows Neighborhood and apartment buildings located in Woodsdale Senior Housing and Woodsdale Apartments. The receptors are 110 feet to 730 feet from the edge of the southbound I-95 shoulder. The area is between Emmorton Road and 530' east of Red Maple Drive.

NSA 15 consists of single family homes in the Woodlands at Boxhill South neighborhood. The receptors are 140 feet to 850 feet from the edge of the northbound I-95 shoulder. The area is located at Abingdon Road and approximately 3300' west of Abingdon Road.

NSA 16 consists of single family residences in the Hidden Stream North and Philadelphia Station neighborhoods. The receptors are 200 feet to 490 feet from the edge of the southbound I-95 shoulder. The area is located between Abingdon Road and My Ladys Drive.

NSA 17 consists of the Village of Bynum Run and the Bynum Overlook neighborhood. The receptors are 100 feet to 560 feet from the edge of the southbound I-95 shoulder. The area is located between Hookers Mill Road and Pouska Road.

NSA 18 consists of single family residences in the Henley Park Neighborhood. The receptors are 120 feet to 670 feet from the edge of the southbound I-95 shoulder. The area is located between Riverside Parkway and 800 feet east of Creswell Road.

NSA 19 consists of single family residences north of the Bristol Forest and the Riverside Shopping center. The receptors are 640 feet to 830 feet from the edge of the northbound I-95 shoulder. The area is located between Belcamp Road and the eastern end of Old Philadelphia Road.

NSA 20 consists of single family residences of the Wexford neighborhood. The receptors are 120 feet to 610 feet from the edge of the northbound I-95 shoulder. The area is located at Creswell Road and 440' from the eastern end of Kimby Lane.

NSA 21 (represented by Receptors M-21-01 thru M-21-03) consists of single family residencies in the neighborhood north and south of the Stepney Road overpass. The receptors are 110 feet (Receptor M-21-01) to 580 feet (Receptor M-21-02) from the edge of the southbound I-95 shoulder. The area located 400' west and 1680' east of Stepney Road.

NSA 22 consists of single family residencies in the neighborhood north and south of the Stepney Road overpass. The receptors are 160 feet to 690 feet from the edge of the northbound I-95 shoulder. The area is located 1370' east of Bush Chapel Road and 1850' west of Stepney Road.

NSA 23 consists of single family residences in the Woodbrook neighborhood and Cranbrook Run Apartment buildings. The receptors are 100 feet to 410 feet from the edge of the southbound I-95 shoulder. The area is located 470' west of Churchville Road and the western end of Northeast Road.

NSA 24 consists of the single family residencies located in the Parkridge Estates neighborhood. The receptors are 30 feet to 190 feet from the northbound edge of Churchville Road. The area is located approximately 700' north of I-95 and 140' feet of Churchville Road.

NSA 25 consists of single family residences in the Maxa Heights neighborhood. The receptors are 120 feet to 380 feet from the edge of the southbound I-95 shoulder. The area is located between Maxa Road and the western end of Randolph Drive.

NSA 26 consists of single family residences in the Ramsgate Estates neighborhood. The receptor is 320 feet from the edge of the northbound I-95 shoulder. The area is located at Maxa Road and goes approximately 500' westward.

NSA 27 consists of single family homes in the Beards Hill neighborhood. The receptors are 530 feet to 900 feet from the edge of the northbound I-95 shoulder. The area is located approximately 550' north of MD 22 and 3600' south of Maxa Road.

NSA 28 consists of multi-story condo buildings in the Forest View neighborhood. The receptors are 260 feet to 460 feet from the edge of the northbound I-95 shoulder. The area is located between approximately 700' and 1200' north of MD 152.

NSA 29 (represented by Receptor M-26-01) consists of a pending development site (that is presently farm land). The receptors are 400 feet (Receptor M-29-03) to 800 feet (Receptor M-29-01) from the edge of the southbound I-95 (or ramp) shoulder. The area is southwest of the I-95/MD 543 interchange.

b. Existing Noise Conditions

Noise monitoring for this study was conducted on Tuesdays, Wednesdays, and Thursdays to ensure that peak periods were accurately evaluated. Field measurements of ambient noise levels were performed to determine existing (2006) noise levels and to calibrate FHWA's Traffic Noise Model (TNM) Version 2.5. Noise measurements were performed during worst-case noise hours using Metrosonics dB 308 and dB 3080 Noise Monitors.

Table III-19 summarizes when and where the four twenty-four hour noise-monitoring sessions were taken in the study area.

The purpose of the twenty-four hour measurements was to determine the diurnal characteristics of the traffic noise in the study area, and to identify peak noise hours. Based on the twenty-four hour analysis, it was determined that short term measurements taken

between the hours of 6:00 AM and 6:00 PM would best represent the peak noise conditions for Section 200.

Table III-19. 24-Hour Noise Measurement Summary

Receptor Number	Residence Address or Property Description	Start Date & Time	Peak Hour Noise[1]	Peak Noise Hour Leq, dB(A)[2]
M-24HR-1	NSA 01 5426 Forge Road	04/20/06, 1200	0600 - 0700	77
M-24HR-2	NSA 05 244 Powdersby Road	04/20/06, 1400	0600 - 0700	73
M-24HR-3	NSA 25 3511 Ashley Court	06/21/06, 1000	0900 - 1000	73
M-24HR-4	NSA 16 3726 Federal Lane	06/21/06, 1100	0900 - 1100	67

1. *The peak hour noise is the hour at which the highest hourly equivalent sound levels occur. The peak hour noise may not be at the peak traffic hour bout instead, may occur when traffic volumes are lower but the truck mix or vehicle speeds are higher. The peak hour noise range may last for several hours and may occur more than once during a given day.*
2. *All noise levels are shown as hourly equivalent sound levels (Leq[h]) with units in A-weighted decibels (dB[A]). The level is rounded to the nearest whole decibel in accordance with SHA guidelines.*

There were 126 short term measurements (20-minute duration) were taken at the 196 noise receptors within the 26 NSAs (**Table III-20**). These measurements were taken between June 7 and June 20, 2006 to measure the current noise conditions. Six (6) additional short term measurements were taken August 9, 2007, for NSA 27 and NSA 28, and 5 more short term measurements were taken October 17, 2007 for NSA 29

Table III-20. Short-term Noise Measurement Summary

NSA	Receptor Number	Residence Address or Property Description		Date	Time	Measured Noise Level Leq dB(A)	Peak Hour Adjustment Factor	Adjusted Peak Hour Noise Level Leq dB(A)
01	M-01-01	5305	Palomino Road	6/7/2006	1120-1140	62	0	62
	M-01-02	5309	Palomino Road	6/7/2006	1120-1140	67	0	67
	M-01-03	5312	Palomino Road	6/7/2006	1120-1140	58	0	58

Table III-20. Short-term Noise Measurement Summary

NSA	Receptor Number	Residence Address or Property Description		Date	Time	Measured Noise Level Leq dB(A)	Peak Hour Adjustment Factor	Adjusted Peak Hour Noise Level Leq dB(A)
	M-01-04	5407	Bush Street	6/7/2006	1040-1100	71	0	71
	M-01-05	5408	Bush Street	6/7/2006	1120-1140	59	0	59
	M-01-06	5410	Bush Street	6/7/2006	1040-1100	64	0	64
	M-01-07	5417	Bangert Street	6/7/2006	1040-1100	58	0	58
	M-01-08	9708	Gaylord Street	6/7/2006	1040-1100	65	0	65
	M-01-09	5417	Forge Road	6/7/2006	1000-1020	62	1	63
	M-01-10	5426	Forge Road	6/7/2006	1000-1020	67	1	68
02	M-02-01	5515	Bush Street	6/7/2006	1120-1140	64	1	65
	M-02-02	5600	Bush Street	6/7/2006	1040-1100	60	0	60
	M-02-03	5600	Bangert Street	6/7/2006	1000-1020	61	0	61
	M-02-04	5513	Forge Road	6/7/2006	1000-1020	61	0	61
	M-02-05	5504	Forge Road	6/7/2006	1000-1020	69	0	69
03	M-03-01	11010	Pfeffers Road	6/7/2006	1320-1340	67	3	70
	M-03-02	11018	Pfeffers Road	6/7/2006	1320-1340	56	3	59
	M-03-03	8201	Bradshaw Road	6/7/2006	1240-1300	64	3	67
	M-03-04	8206	Bradshaw Road	6/7/2006	1240-1300	64	3	67
	M-03-05	11124	Reynolds Road	6/7/2006	1240-1300	57	3	60
04	M-04-01	12013	Old Long Calm Road	6/7/2006	1240-1300	64	1	65
	M-04-02	10852	Pfeffers Road	6/7/2006	1240-1300	68	1	69
	M-04-03	10865	Pfeffers Road	6/7/2006	1320-1340	66	0	66

Table III-20. Short-term Noise Measurement Summary

NSA	Receptor Number	Residence Address or Property Description		Date	Time	Measured Noise Level Leq dB(A)	Peak Hour Adjustment Factor	Adjusted Peak Hour Noise Level Leq dB(A)
	M-04-04	8232	Bradshaw Road	6/7/2006	1320-1340	64	0	64
	M-04-05	12456	Wolbert Way	6/7/2006	1320-1340	72	0	72
05	M-05-01	218	Powdersby Road	6/8/2006	1400-1420	67	0	67
	M-05-02	211	Powdersby Road	6/8/2006	1400-1420	59	0	59
	M-05-03	228	Powdersby Road	6/8/2006	1400-1420	65	0	65
	M-05-04	237	Powdersby Road	6/8/2006	1400-1420	60	0	60
	M-05-05	246	Powdersby Road	6/8/2006	1400-1420	71	0	71
	M-05-06	249	Powdersby Road	6/8/2006	1320-1340	60	0	60
	M-05-07	302	Powdersby Road	6/8/2006	1320-1340	65	0	65
	M-05-08	315	Powdersby Road	6/8/2006	1320-1340	60	0	60
	M-05-09	324	Powdersby Road	6/8/2006	1320-1340	73	0	73
	M-05-10	323	Powdersby Road	6/8/2006	1320-1340	59	0	59
	M-05-11	342	Spry Island Road	6/8/2006	1240-1300	69	1	70
	M-05-12	1615	Bridgewells Court	6/8/2006	1240-1300	61	1	62
	M-05-13	406	Spry Island Road	6/8/2006	1240-1300	68	1	69
	M-05-14	417	Spry Island Road	6/8/2006	1240-1300	61	1	62
	M-05-15	414	Spry Island Road	6/8/2006	1240-1300	68	1	69
06	M-06-01	1621	Old Joppa Road	6/8/2006	1200-1220	62	1	63
	M-06-02	1618	Dugan Drive	6/8/2006	1200-1220	60	1	61
	M-06-03	1621	Dugan Drive	6/8/2006	1200-1220	71	1	72

Table III-20. Short-term Noise Measurement Summary

NSA	Receptor Number	Residence Address or Property Description		Date	Time	Measured Noise Level Leq dB(A)	Peak Hour Adjustment Factor	Adjusted Peak Hour Noise Level Leq dB(A)
07	M-07-01	2912	Old Joppa Road	6/8/2006	1200-1220	68	3	71
	M-07-02	2903	Old Joppa Road	6/8/2006	1200-1220	67	3	70
08	M-08-01	2407	Woodlea Drive	6/8/2006	1000-1020	63	1	64
	M-08-02	3004	Old Mountain Road	6/8/2006	1000-1020	66	1	67
	M-08-03	3003	Old Mountain Road	6/8/2006	1000-1020	61	1	62
09	M-09-01	1508	Old Mountain Road	6/8/2006	1040-1100	60	0	60
	M-09-02	1502	Old Mountain Road	6/8/2006	1040-1100	57	0	57
	M-09-03	1503	Old Mountain Road	6/8/2006	1040-1100	62	0	62
10	M-10-01	2214	Jaycee Road	6/8/2006	1000-1020	70	1	71
	M-10-02	2104	Jaycee Road	6/8/2006	1000-1020	70	1	71
11	M-11-01	1516	Clayton Road	6/20/2006	1340-1400	60	0	60
	M-11-02	1606	Clayton Road	6/20/2006	1340-1400	64	0	64
12	M-12-01	3716	Hilltop Drive	6/20/2006	1340-1400	62	3	65
	M-12-02	3713	Clayton Road	6/20/2006	1340-1400	64	3	67
13	M-13-01	3728	Torey Lane	6/13/2006	1400-1420	57	1	58
	M-13-02	3712	Woodsdale Road	6/13/2006	1440-1500	56	1	57
	M-13-03	3809	Memory Lane	6/13/2006	1400-1420	66	1	67
	M-13-04	3819	Memory Lane	6/13/2006	1400-1420	69	1	70
	M-13-05	3835	Memory Lane	6/13/2006	1440-1500	63	1	64
	M-13-06	3861	Memory Lane	6/13/2006	1440-1500	63	1	64

Table III-20. Short-term Noise Measurement Summary

NSA	Receptor Number	Residence Address or Property Description		Date	Time	Measured Noise Level Leq dB(A)	Peak Hour Adjustment Factor	Adjusted Peak Hour Noise Level Leq dB(A)
14	M-14-01	1905	Van Bibber Road	6/13/2006	1440-1500	53	1	54
	M-14-02	2500	Red Maple Drive	6/13/2006	1440-1500	63	1	64
	M-14-03	2502	Red Maple Drive	6/13/2006	1400-1420	63	2	65
	M-14-04	2506	Red Maple Drive	6/13/2006	1400-1420	59	2	61
15	M-15-01	3252	Meadow Valley Road	6/13/2006	1040-1100	54	1	55
	M-15-02	3257	Meadow Valley Road	6/13/2006	1040-1100	52	1	53
	M-15-03	3260	Meadow Valley Road	6/13/2006	1040-1100	54	1	55
	M-15-04	3270	Meadow Valley Road	6/13/2006	1040-1100	45	1	46
	M-15-05	3337	Abingdon Road	6/13/2006	1040-1100	69	1	70
16	M-16-01	1418	Emily Court West	6/13/2006	1120-1140	63	1	64
	M-16-02	1413	Emily Court West	6/13/2006	1120-1140	55	1	56
	M-16-03	1419	McComas Way West	6/13/2006	1120-1140	69	1	70
	M-16-04	3716	Federal Lane	6/13/2006	1120-1140	63	1	64
	M-16-05	3722	Federal Lane	6/13/2006	1120-1140	66	1	67
	M-16-06	3725	Federal Lane	6/13/2006	1200-1220	57	1	58
	M-16-07	3732	Federal Lane	6/13/2006	1200-1220	63	1	64
	M-16-08	3742	Federal Lane	6/13/2006	1200-1220	63	1	64
	M-16-09	3741	Federal Lane	6/13/2006	1200-1220	57	1	58
	M-16-10	1428	Valley Forge Way	6/13/2006	1200-1220	55	1	56
	M-16-11	1429	Valley Forge Way	6/13/2006	1240-1300	53	1	54

Table III-20. Short-term Noise Measurement Summary

NSA	Receptor Number	Residence Address or Property Description		Date	Time	Measured Noise Level Leq dB(A)	Peak Hour Adjustment Factor	Adjusted Peak Hour Noise Level Leq dB(A)
	M-16-12	1444	Valley Forge Way	6/13/2006	1240-1300	59	1	60
	M-16-13	1454	Valley Forge Way	6/13/2006	1240-1300	62	1	63
	M-16-14	1453	Valley Forge Way	6/13/2006	1240-1300	62	1	63
	M-16-15	1464	Valley Forge Way	6/13/2006	1240-1300	63	1	64
17	M-17-01	3309	Pouska Road	6/13/2006	1000-1020	52	1	53
	M-17-02	3317	Pouska Road	6/13/2006	1000-1020	66	1	67
	M-17-03	3324	Pouska Road	6/13/2006	1000-1020	59	1	60
	M-17-04	3331	Pouska Road	6/13/2006	1000-1020	63	1	64
	M-17-05	1113	Hookers Mill Road	6/13/2006	1000-1020	71	1	72
18	M-18-01	2829	Henley Drive	6/20/2006	1020-1040	55	1	56
	M-18-02	2818	Henley Drive	6/20/2006	1020-1040	58	1	59
	M-18-03	2822	Belcamp Road	6/20/2006	1020-1040	63	1	64
	M-18-04	2815	Belcamp Road	6/20/2006	1100-1120	58	1	59
	M-18-05	3018	Creswell Road	6/20/2006	1100-1120	67	1	68
	M-18-06	3023	Creswell Road	6/20/2006	1100-1120	66	1	67
19	M-19-01	4409	Old Philadelphia Road	6/20/2006	1020-1040	57	0	57
	M-19-02	4415	Old Philadelphia Road	6/20/2006	1020-1040	56	0	56
20	M-20-01	1439	Creswell Road	6/20/2006	1100-1120	70	0	70
	M-20-02	1425	Creswell Road	6/20/2006	1100-1120	60	0	60
21	M-21-01	3601	Kalmacher Road	6/20/2006	1240-1300	65	2	67

Table III-20. Short-term Noise Measurement Summary

NSA	Receptor Number	Residence Address or Property Description		Date	Time	Measured Noise Level Leq dB(A)	Peak Hour Adjustment Factor	Adjusted Peak Hour Noise Level Leq dB(A)
	M-21-02	1536	Stepney Road	6/20/2006	1240-1300	55	2	57
	M-21-03	1527	Stepney Road	6/20/2006	1200-1220	59	2	61
22	M-22-01	1002-A	Stepney Road	6/20/2006	1200-1220	63	1	64
	M-22-02	1002-B	Stepney Road	6/20/2006	1200-1220	61	1	62
	M-22-03	1007-B	Stepney Road	6/20/2006	1240-1300	57	1	58
	M-22-04	1011	Stepney Road	6/20/2006	1240-1300	61	1	62
	M-22-05	503	Bush Chapel Road	6/20/2006	1240-1300	67	1	68
	M-22-06	418	Bush Chapel Road	6/20/2006	1200-1220	63	1	64
	M-22-07	416	Bush Chapel Road	6/20/2006	1200-1220	62	1	63
23	M-23-01	320	Northeast Road	6/15/2006	1000-1020	66	0	66
	M-23-02	324	Northeast Road	6/15/2006	1000-1020	66	0	66
	M-23-03	304	Northeast Road	6/15/2006	1000-1020	66	0	66
	M-23-04		Warwick Drive	6/15/2006	1000-1020	68	0	68
	M-23-05		Warwick Drive	6/15/2006	1000-1020	69	0	69
24	M-24-01	3714	Churchville Road	6/15/2006	1040-1100	54	1	55
	M-24-02	3706	Churchville Road	6/15/2006	1040-1100	60	1	61
	M-24-03	3700	Churchville Road	6/15/2006	1040-1100	58	1	59
25	M-25-01	842	Randolph Road	6/15/2006	1200-1220	63	2	65
	M-25-02	841	Randolph Road	6/15/2006	1200-1220	72	2	74
	M-25-03	3511	Ashley Court	6/15/2006	1200-1220	68	2	70

Table III-20. Short-term Noise Measurement Summary

NSA	Receptor Number	Residence Address or Property Description		Date	Time	Measured Noise Level Leq dB(A)	Peak Hour Adjustment Factor	Adjusted Peak Hour Noise Level Leq dB(A)
	M-25-04	3510	Ashley Court	6/15/2006	1200-1220	61	2	63
	M-25-05	840	Maxa Road	6/15/2006	1200-1220	60	2	62
26	M-26-01	706	Maxa Road	6/15/2006	1240-1300	60	1	61
27	M-27-01	923	Barnette Lane	8/09/2007	1100-1120	58	0	58
	M-27-02	916	Barnette Lane	8/09/2007	1100-1120	56	0	56
	M-27-03	913	Barnette Lane	8/09/2007	1100-1120	53	0	53
28	M-28-01	1406	Joppa Forest Drive	8/09/2007	1000-1020	69	0	59
	M-28-02	1402	Joppa Forest Drive	8/09/2007	1000-1020	70	0	70
	M-28-03	1403	Joppa Forest Drive	8/09/2007	1000-1020	60	0	60
29	M-29-01		Carter property	10/17/07	120-140	53	2	55
	M-29-02		Carter property	10/17/07	120-140	55	2	57
	M-29-03		Carter property	10/17/07	120-140	53	2	55
	M-29-04		Carter property	10/17/07	120-140	58	2	60
	M-29-05		Carter property	10/17/07	120-140	59	---	59

Short-term noise levels were adjusted by determining the difference between the 24-hour peak hour noise level and the 24-hour short-term measurement period noise level, and adding this value to the measured short-term noise level to approximate peak hour noise levels. The resultant adjusted peak hour noise levels are presented in column seven of **Table III-20.** Measured noise levels ranged from 45 dBA to 73 dBA. Variations in noise levels are attributable to three factors:

- Traffic flow conditions (volume, speed, and percentage of trucks) during the measurement period,
- Distance from receptor to noise source, and
- Shielding effects from intervening terrain, structures, and vegetation.

Noise Abatement Criteria

SHA Sound Barrier Policy/ MdTA Guidelines

Noise evaluations were performed in accordance with the Federal Highway Administration's guidelines presented in Title 23, United States Code of Federal Regulations, Part 772, (23 CFR 772), entitled *Procedures for Abatement of Highway Traffic Noise and Construction Noise* and the *Highway Traffic Noise Analysis and Abatement Policy and Guidance Manual*, issued by FHWA in June 1995. These guidelines were established in order to protect the public, provide noise abatement criteria and establish requirements for information to be supplied to local highway agencies for use in planning and design of highways. They identify different land use categories and establish criteria for their abatement. The criteria are shown in Table III-20.

The project study corridor was screened to determine the type of land use present, such as residences, playgrounds and schools. The land use in the study corridor is residential. We have therefore identified the Land Use as Activity Category B in the Noise Abatement Criteria Table for all 29 NSA's. Criteria for this category are based on exterior, not interior noise impacts. A traffic noise impact is considered to occur when the predicted levels approach or exceed the noise abatement criteria. As shown in Table **III-21**, the governing noise abatement criterion for Activity Category B is 67 dBA.

Table III-21. Noise Abatement Criteria (NAC) Hourly A-Weighted Sound Level in Decibels (dB[A])[1]

Activity Category	Leq(h)	L_{10}(h)	*Description of Activity Category*
A	57 (Exterior)	60 (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 purpose.
B	67 (Exterior)	70 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches,
C	72 (Exterior)	75 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	--	Undeveloped lands.
E	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

1. Either Leq(h) or L_{10}(h) (but not both) may be used on a project. These sound levels are only to be used to determine impact. Noise abatement should be designed to achieve a substantial noise reduction - not the noise abatement criteria.

Feasibility and Reasonableness

According to the SHA *Sound Barrier Policy*, decisions concerning the provision of noise barriers will be made after evaluation of the feasibility and reasonableness criteria. Noise barrier feasibility is defined as the engineering and acoustical ability to provide effective noise reduction. The determination of the feasibility of a noise barrier is dependent upon the relationship of the highway to the adjacent community. The elevations of the highway and adjacent development must be such that a barrier of reasonable height can be constructed to provide a desirable noise reduction of 7 to 10 dB(A) at first row residences. Other factors such as available right-of-way, constructability, and safety are also considered in determining noise barrier feasibility. Reasonableness includes such factors as cost, desires of the affected community, the relationship of no-build to build noise levels, aesthetics, and environmental considerations.

An important aspect in the reasonableness of a noise barrier is the cost. For Type I projects, such as Section 200, the MdTA will look at both the cost per residence for individual NSAs and the average cost per residence for the entire project in determining reasonableness. NSAs with a cost per residence of less than $100,000 would be included in the project cost

averaging. If the average cost per residence for the project is less than $50,000, noise barriers will be considered reasonable.

Predicted Noise Level Results

Table III-22 compares the modeled worst case noise levels between the existing worst case (EWC), 2030 No Build, 2030 General Purpose Lanes Alternative, and 2030 Express Toll Lanes Alternative. PM peak traffic volume during EWC and 2030 No Build showed louder noise level comparing to AM peak traffic volume, therefore PM peak traffic volume were used in all of the TNM models.

Occasionally, the proposed changes in highway alignment or the terrain between the highway and receiver create an obstruction in the noise path. This can result in the 2030 Build level that is less than the 2030 No-Build level and negative values in the 'difference' column(s). This situation can also result from changes in the traffic distribution.

'Highlighted' cells in the modeled noise level indicate that the receptor is impacted. However, several of these measurement receptors do not correspond to a specific residential use. These receptors were only positioned at a suitable location to capture direct highway noise and to aid in model calibration. All noise levels are rounded to the nearest whole decibel. Please refer to **Appendices A and B** for receptor locations.

Table III-22 Predicted Noise Levels

Modeled Receptor Number[1]	EWC PM Modeled Noise Level	2030 No Build PM Modeled Noise Level	Difference (No Build - EWC)	2030 GPL PM Modeled Noise Level	Difference (GPL - No Build)	2030 ETL PM Modeled Noise Level	Difference (ETL - No Build)
NSA 01							
M-01-01	66	67	1	66	-1	65	-2
M-01-02	71	71	0	69	-2	69	-2
M-01-03	63	64	1	64	0	63	-1
M-01-04	**75**	**75**	0	**76**	1	**75**	0
M-01-05	64	65	1	66	1	65	0

Table III-22 Predicted Noise Levels

Modeled Receptor Number[1]	EWC PM Modeled Noise Level	2030 No Build PM Modeled Noise Level	Difference (No Build - EWC)	2030 GPL PM Modeled Noise Level	Difference (GPL - No Build)	2030 ETL PM Modeled Noise Level	Difference (ETL - No Build)
M-01-06	66	66	0	68	2	67	1
M-01-07	62	62	0	64	2	63	1
M-01-08	70	70	0	**72**	2	71	1
M-01-09	63	63	0	65	2	63	0
M-01-10	70	70	0	71	1	70	0
R-01-01	64	64	0	64	0	63	-1
R-01-02	64	64	0	65	1	64	0
R-01-03	65	65	0	66	1	64	-1
NSA 02							
M-02-01	66	66	0	68	2	70	4
M-02-02	64	65	1	66	1	66	1
M-02-03	64	64	0	67	3	65	1
M-02-04	64	64	0	65	1	64	0
M-02-05	**73**	**73**	0	**74**	1	**74**	1
R-02-01	61	62	1	63	1	63	1
R-02-02	64	64	0	64	0	63	-1
NSA 03							
M-03-01	71	71	0	71	0	71	0
M-03-02	64	65	1	66	1	65	0
M-03-03	68	68	0	70	2	69	1
M-03-04	69	69	0	71	2	**72**	3
M-03-05	65	65	0	67	2	66	1
R-03-01	68	68	0	70	2	69	1
R-03-02	68	68	0	69	1	69	1
R-03-03	61	61	0	63	2	62	1
R-03-04	59	60	1	61	1	61	1
R-03-05	59	60	1	61	1	60	0
NSA 04							
M-04-01	67	67	0	68	1	67	0
M-04-02	**73**	**73**	0	**75**	2	**73**	0
M-04-03	**72**	**72**	0	**72**	0	**72**	0
M-04-04	68	69	1	70	1	70	1
M-04-05	**73**	**73**	0	**74**	1	**74**	1
R-04-01	66	66	0	66	0	65	-1
R-04-02	70	70	0	70	0	69	-1
R-04-03	67	67	0	68	1	67	0
R-04-04	60	61	1	62	1	62	1

Table III-22 Predicted Noise Levels

Modeled Receptor Number[1]	EWC PM Modeled Noise Level	2030 No Build PM Modeled Noise Level	Difference (No Build - EWC)	2030 GPL PM Modeled Noise Level	Difference (GPL - No Build)	2030 ETL PM Modeled Noise Level	Difference (ETL - No Build)
R-04-05	62	63	1	64	1	63	0
NSA 05							
M-05-01	70	70	0	**72**	2	71	1
M-05-02	59	59	0	60	1	59	0
M-05-03	66	67	1	69	2	68	1
M-05-04	62	62	0	65	3	64	2
M-05-05	**74**	**74**	0	**76**	2	**75**	1
M-05-06	61	61	0	64	3	62	1
M-05-07	71	71	0	**73**	2	**72**	1
M-05-08	64	64	0	**66**	2	65	1
M-05-09	**75**	**75**	0	**76**	1	**74**	-1
M-05-10	60	60	0	61	1	61	1
M-05-11	**74**	**74**	0	**75**	1	**72**	-2
M-05-12	64	64	0	66	2	64	0
M-05-13	**74**	**74**	0	**76**	2	**75**	1
M-05-14	64	64	0	66	2	64	0
M-05-15	**74**	**74**	0	**76**	2	**75**	1
R-05-01	57	57	0	59	2	58	1
R-05-02	61	62	1	64	2	63	1
R-05-03	**74**	**74**	0	**77**	3	**75**	1
R-05-04	**76**	**76**	0	**78**	2	**77**	1
R-05-05	62	62	0	64	2	63	1
R-05-06	63	64	1	66	2	64	0
R-05-07	**72**	**72**	0	**74**	2	**73**	1
R-05-08	68	68	0	69	1	68	0
R-05-09	62	62	0	64	2	62	0
R-05-10	64	64	0	66	2	64	0
R-05-11	66	66	0	68	2	67	1
R-05-12	67	67	0	69	2	68	1
R-05-13	64	64	0	65	1	64	0
R-05-14	63	63	0	63	0	62	-1
NSA 06							
M-06-01	65	66	1	66	0	67	1
M-06-02	65	65	0	65	0	63	-2
M-06-03	**72**	**72**	0	**73**	1	**74**	2
R-06-01	70	70	0	**72**	2	**78**	8
R-06-02	64	64	0	65	1	63	-1

Table III-22 Predicted Noise Levels

Modeled Receptor Number[1]	EWC PM Modeled Noise Level	2030 No Build PM Modeled Noise Level	Difference (No Build - EWC)	2030 GPL PM Modeled Noise Level	Difference (GPL - No Build)	2030 ETL PM Modeled Noise Level	Difference (ETL - No Build)
R-06-03	**72**	**72**	0	**72**	0	71	-1
R-06-04	61	61	0	63	2	60	-1
NSA 07							
M-07-01	70	70	0	**72**	2	na [4]	na
M-07-02 [2]	**72**	**72**	0	**75**	3	na [4]	na
R-07-01	64	64	0	66	2	66	2
R-07-02	68	68	0	68	0	68	0
NSA 08							
M-08-01	67	68	1	68	0	60	-8 [5]
M-08-02	69	69	0	71	2	63	-6 [5]
M-08-03	67	67	0	68	1	66	-1 [5]
R-08-01	66	67	1	68	1	61	-6 [5]
R-08-02	65	66	1	66	0	64	-2 [5]
R-08-03	69	69	0	69	0	68	-1 [5]
R-08-04	65	66	1	67	1	64	-2 [5]
NSA 09							
M-09-01	65	66	1	64	-2	66	0
M-09-02	62	62	0	62	0	62	0
M-09-03	67	68	1	66	-2	67	-1 [5]
R-09-01	65	66	1	64	-2	63	-3 [5]
R-09-02	**72**	**73**	1	68	-5	71	-2 [5]
R-09-03	65	65	0	66	1	66	1
NSA 10							
M-10-01	**73**	**74**	1	**75**	1	63	-11 [5]
M-10-02	71	**72**	1	71	-1	60	-12 [5]
R-10-01	69	69	0	70	1	63	-6 [5]
R-10-02	69	70	1	70	0	65	-5 [5]
R-10-03	**72**	**72**	0	**73**	1	62	-10 [5]
NSA 11							
M-11-01	66	66	0	67	1	66	0
M-11-02	67	67	0	67	0	68	1
R-11-01	70	70	0	70	0	70	0
R-11-02	64	65	1	65	0	65	0
NSA 12							
M-12-01	67	68	1	68	0	66	-2

Table III-22 Predicted Noise Levels

Modeled Receptor Number[1]	EWC PM Modeled Noise Level	2030 No Build PM Modeled Noise Level	Difference (No Build - EWC)	2030 GPL PM Modeled Noise Level	Difference (GPL - No Build)	2030 ETL PM Modeled Noise Level	Difference (ETL - No Build)
M-12-02	66	67	1	68	1	69	2
R-12-01	66	66	0	67	1	65	-1
R-12-02	64	64	0	65	1	65	1
R-12-03	67	67	0	69	2	70	3
NSA 13							
M-13-01	63	na [6]	na [6]	63	na [6]	64	na [6]
M-13-02	61			64		63	
M-13-03	70			70		**72**	
M-13-04	**74**			**73**		**76**	
M-13-05	68			69		69	
M-13-06	67			69		69	
R-13-01	69			70		71	
R-13-02	67			68		69	
R-13-03	68			68		69	
R-13-04	64			65		65	
NSA 14							
M-14-01	60	na [6]	na [6]	62	na [6]	62	na [6]
M-14-02	68			**74**		70	
M-14-03	70			**73**		**72**	
M-14-04	64			64		65	
R-14-01	66			67		69	
R-14-02	62			63		64	
NSA 15							
M-15-01	62	62	0	63	1	63	1
M-15-02	59	60	1	60	0	60	0
M-15-03	61	61	0	62	1	62	1
M-15-04	57	58	1	58	0	58	0
M-15-05	**74**	**74**	0	**72**	-2	**73**	-1
R-15-01	71	**72**	1	70	-2	70	-2
R-15-02	62	64	2	64	0	64	0
NSA 16							
M-16-01	69	70	1	**73**	3	**72**	2
M-16-02	61	61	0	63	2	63	2
M-16-03	**73**	**73**	0	**75**	2	**74**	1
M-16-04	71	71	0	71	0	71	0
M-16-05	**72**	**72**	0	71	-1	71	-1

Table III-22 Predicted Noise Levels

Modeled Receptor Number[1]	EWC PM Modeled Noise Level	2030 No Build PM Modeled Noise Level	Difference (No Build - EWC)	2030 GPL PM Modeled Noise Level	Difference (GPL - No Build)	2030 ETL PM Modeled Noise Level	Difference (ETL - No Build)
M-16-06	63	63	0	64	1	64	1
M-16-07	69	69	0	69	0	69	0
M-16-08	68	68	0	69	1	69	1
M-16-09	60	60	0	62	2	61	1
M-16-10	60	61	1	63	2	62	1
M-16-11	58	58	0	60	2	60	2
M-16-12	59	60	1	62	2	61	1
M-16-13	68	68	0	70	2	70	2
M-16-14	65	65	0	66	1	66	1
M-16-15	68	68	0	69	1	68	0
R-16-01	68	68	0	70	2	69	1
R-16-02	67	67	0	68	1	67	0
R-16-03	67	67	0	68	1	67	0
R-16-04	64	64	0	66	2	66	2
R-16-05	61	61	0	64	3	63	2
R-16-06	59	59	0	61	2	60	1
NSA 17							
M-17-01	60	60	0	62	2	61	1
M-17-02	**72**	71	-1	**73**	2	**72**	1
M-17-03	66	66	0	68	2	67	1
M-17-04	69	69	0	69	0	69	0
M-17-05	**75**	**75**	0	**73**	-2	**74**	-1
R-17-01	71	71	0	**72**	1	71	0
R-17-02	63	63	0	65	2	64	1
R-17-03	**72**	**72**	0	**73**	1	**72**	0
R-17-04	63	63	0	64	1	63	0
R-17-05	69	69	0	68	-1	68	-1
R-17-06	71	71	0	70	-1	70	-1
NSA 18							
M-18-01	55	56	1	57	1	58	2
M-18-02	56	57	1	58	1	58	1
M-18-03	64	65	1	66	1	66	1
M-18-04	62	63	1	63	0	64	1
M-18-05	71	71	0	**72**	1	71	0
M-18-06	68	69	1	69	0	69	0
R-18-01	55	57	2	57	0	58	1
R-18-02	62	63	1	63	0	64	1

Table III-22 Predicted Noise Levels

Modeled Receptor Number[1]	EWC PM Modeled Noise Level	2030 No Build PM Modeled Noise Level	Difference (No Build - EWC)	2030 GPL PM Modeled Noise Level	Difference (GPL - No Build)	2030 ETL PM Modeled Noise Level	Difference (ETL - No Build)
R-18-03	**75**	**75**	0	**75**	0	**76**	1
R-18-04	65	65	0	66	1	66	1
R-18-05	68	69	1	69	0	69	0
R-18-06	68	68	0	69	1	69	1
R-18-07	63	63	0	64	1	65	2
NSA 19							
M-19-01	56	57	1	59	2	59	2
M-19-02	55	56	1	60	4	61	5
NSA 20							
M-20-01	**74**	**74**	0	**73**	-1	**74**	0
M-20-02	64	64	0	64	0	65	1
R-20-01	66	67	1	67	0	67	0
R-20-02	66	66	0	67	1	67	1
R-20-03	67	68	1	68	0	69	1
NSA 21 [7]							
M-21-01	67	67	0	71	4	71	4
M-21-02	58	62	4	62	0	62	0
M-21-03	62	63	1	64	1	64	1
NSA 22 [7]							
M-22-01	66	67	1	68	1	68	1
M-22-02	65	64	-1	63	-1	63	-1
M-22-03	55	57	2	57	0	57	0
M-22-04	64	65	1	65	0	65	0
M-22-05	66	67	1	68	1	68	1
M-22-06	66	67	1	66	-1	66	-1
M-22-07	64	65	1	65	0	65	0
R-22-01	62	63	1	63	0	63	0
R-22-02	69	69	0	68	-1	68	-1
NSA 23 [7]							
M-23-01	66	67	1	65	-2	65	-2
M-23-02	66	67	1	66	-1	66	-1
M-23-03	67	68	1	67	-1	67	-1
M-23-04 [2]	**72**	**73**	1	71	-2	71	-2
M-23-05 [2]	**72**	**73**	1	**72**	-1	**72**	-1
R-23-01	69	70	1	68	-2	68	-2
R-23-02	70	71	1	69	-2	69	-2

Table III-22 Predicted Noise Levels

Modeled Receptor Number[1]	EWC PM Modeled Noise Level	2030 No Build PM Modeled Noise Level	Difference (No Build - EWC)	2030 GPL PM Modeled Noise Level	Difference (GPL - No Build)	2030 ETL PM Modeled Noise Level	Difference (ETL - No Build)
R-23-03	64	66	2	65	-1	65	-1
R-23-04	58	59	1	59	0	59	0
NSA 24 [7]							
M-24-01	59	60	1	60	0	60	0
M-24-02	65	67	2	67	0	67	0
M-24-03	61	63	2	63	0	63	0
R-24-01	62	64	2	64	0	64	0
R-24-02	66	68	2	67	-1	67	-1
NSA 25 [7]							
M-25-01	66	67	1	66	-1	66	-1
M-25-02	**74**	**75**	1	**73**	-2	**73**	-2
M-25-03	**73**	**74**	1	**75**	1	**75**	1
M-25-04	63	64	1	64	0	64	0
M-25-05	64	65	1	66	1	66	1
R-25-01	**72**	**73**	1	71	-2	71	-2
R-25-02	69	70	1	70	0	70	0
R-25-03	68	69	1	70	1	70	1
NSA 26 [7]							
M-26-01	64	65	1	65	0	65	0
NSA 27 [7]							
M-27-01	62	63	1	63	0	63	0
M-27-02	59	61	2	59	-2	59	-2
M-27-03	59	60	1	59	-1	59	-1
NSA 28							
M-28-01	75	75	0	75	0	76	1
M-28-02	74	74	0	75	1	76	2
M-28-03	63	64	1	65	1	68	4
NSA 29[8]							
M-29-01	55	N/A	N/A	N/A	N/A	N/A	N/A
M-29-02	57	N/A	N/A	N/A	N/A	N/A	N/A
M-29-03	55	N/A	N/A	N/A	N/A	N/A	N/A
M-29-04	60	N/A	N/A	N/A	N/A	N/A	N/A
M-29-05	59	N/A	N/A	N/A	N/A	N/A	N/A

Table III-22 Predicted Noise Levels

Modeled Receptor Number[1]	EWC PM Modeled Noise Level	2030 No Build PM Modeled Noise Level	Difference (No Build - EWC)	2030 GPL PM Modeled Noise Level	Difference (GPL - No Build)	2030 ETL PM Modeled Noise Level	Difference (ETL - No Build)
LEGEND							
Impact [3]							

1. A Receptor Number beginning with "M" represents a measured and modeled location and a Receptor Number beginning with an "R" represents a modeled receptor only.
2. Receptor was placed and measured in the open area which is for 'common use' and not for individual residential use.
3. Impacted receptors are those where the Modeled Noise Level equals or exceeds 66 dB(A). Modeled Noise Levels shown in bold equals or exceed 72 dB(A).
4. The proposed improvement extends beyond the location of receptor toward the residences. Therefore the sound level results for these receptors are not valid.
5. Receptor shows decrease in noise level due to construction of elevated ramps on berms that act as a noise barrier between the highway and the residences.
6. For this NSA, the 2030 No Build condition is a pending interim SHA improvement. The TNM model has not been developed or compared for this condition.
7. For this NSA, noise levels for the ETL Alternative are identical to noise levels for the GPL Alternative. (The north end of the ETL lanes is MD 543.)
8. This NSA is currently undeveloped. No noise modeling has been done for this site. Noise levels presented are the measured existing noise levels.

Barrier Analysis Results

Generally, only critical sensitive receptors, or those defined as first-row, ground level sites where worst-case noise levels are found are used to govern the noise barrier design. Other receptors may gain benefit from a proposed barrier, but are not directly considered during the design process.

Total surface area for the noise barriers has been computed by adjusting the barrier surface area from TNM to account for 9 inches below ground to account for panel embedment and 6 inches above ground to account for panel steps above the acoustic line. Cost-effectiveness calculations are based on this adjusted surface area.

The overall alignments of the two Build Alternatives and associated interchange options were similar; therefore the noise impacts associated with each Build Alternative is comparable. Because the Build Alternatives' design similarities and the fact that the General Purpose Lanes

Alternative has a slightly smaller footprint, the General Purpose Lanes Alternative was used first for noise barrier modeling and analysis for each NSA. If the analysis for a NSA resulted in a cost less than $100,000 per benefited residence for the General Purpose Lanes Alternative, then a noise barrier design for the same NSA was also analyzed for the Express Toll Lanes Alternative. If the analysis results indicated a cost greater than $100,000 per benefited residence in a NSA for the General Purpose Lanes Alternative, then it was presumed that the noise barrier would be not cost effective for the same NSA for the Express Toll Lanes Alternative (**Tables III-23 and III-24**).

Table III-23. Summary of Noise Abatement for GPL Alternative

NSA	Total Cost	Number of Benefited Residences, total	Reasonableness Criteria			
			Cost per Benefited Residence	Noise Level equal to or greater than 66 dB(A) , increase equal to or greater than 3 dB(A)	Increase equal to or greater than 3 dB(A) with Cumulative Effects	Noise Level equal to or greater than 72 dB(A), increase equal to or greater than 1 dB(A)
01	$1,903,854	26	$73,225	No	na	Yes
02	$981,975	6	$163,663	Yes	na	Yes
03	$3,163,926	9	$351,537	No	na	No
04	$3,450,925	10	$345,093	No	na	Yes
05	$3,071,426	107	$28,705	Yes	na	Yes
06	Combined with NSA 05			Yes	na	Yes
07	$1,375,558	3	$458,519	Yes	na	Yes
08	$1,321,474	9	$146,830	No	na	No
09	$1,473,960	4	$368,490	No	na	No
10	$1,260,220	6	$210,037	No	na	Yes
11	$1,377,283	3	$459,094	No	na	No
12	$1,629,989	3	$543,330	No	na	No
13	$1,783,640	61	$29,240	No	No	No
14	$730,907	4	$182,727	No	na	Yes
15	$545,801	2	$272,900	No	na	No
16	$3,031,164	60	$50,519	No	na	Yes
17	$2,232,866	27	$82,698	No	na	Yes
18	$2,060,465	9	$228,941	No	Yes	Yes
19	No Impact					
20	$1,404,594	7	$200,656	No	na	No
21	$142,450	1	$142,450	Yes	na	No
22	$2,950,403	8	$368,800	No	na	No

Table III-23. Summary of Noise Abatement for GPL Alternative

NSA	Total Cost	Number of Benefited Residences, total	Reasonableness Criteria			
			Cost per Benefited Residence	Noise Level equal to or greater than 66 dB(A) , increase equal to or greater than 3 dB(A)	Increase equal to or greater than 3 dB(A) with Cumulative Effects	Noise Level equal to or greater than 72 dB(A), increase equal to or greater than 1 dB(A)
23	$1,614,397	160	$10,090	No	TBD	No
24	No Impact from Section 200					
25	$995,855	9	$110,651	No	na	Yes
26	No Impact					
27	No Impact					
28	$609,848	14	$43,560	No	na	Yes
29	No Impacts					

Table III-24. Summary of Noise Abatement for ETL Alternative

NSA	Total Cost	Number of Benefited Residences, total	Reasonableness Criteria			
			Cost per Benefited Residence	Noise Level equal to or greater than 66 dB(A) , increase equal to or greater than 3 dB(A)	Increase equal to or greater than 3 dB(A) with Cumulative Effects	Noise Level equal to or greater than 72 dB(A), increase equal to or greater than 1 dB(A)
01	$1,913,251	26	$73,587	No	na	No
02	$981,975	6	$163,663	Yes	na	Yes
03	$3,163,926	9	$351,537	Yes	na	Yes
04	$3,450,925	10	$345,093	No	na	Yes
05	$3,012,984	101	$29,832	No	na	Yes
06	Combined with NSA 05			Yes	na	Yes
07	$1,375,558	3	$458,519	Yes	na	Yes
08	$1,321,474	9	$146,830	No	na	No
09	$1,473,960	4	$368,490	No	na	No
10	$1,260,220	6	$210,037	No	na	No
11	$1,377,283	3	$459,094	No	na	No
12	$1,629,989	3	$543,330	Yes	na	No
13	$1,906,647	61	$31,256	No	na	Yes
14	$730,907	4	$182,727	Yes	na	Yes
15	$545,801	2	$272,900	No	na	No

Table III-24. Summary of Noise Abatement for ETL Alternative

NSA	Total Cost	Number of Benefited Residences, total	Reasonableness Criteria			
			Cost per Benefited Residence	Noise Level equal to or greater than 66 dB(A) , increase equal to or greater than 3 dB(A)	Increase equal to or greater than 3 dB(A) with Cumulative Effects	Noise Level equal to or greater than 72 dB(A), increase equal to or greater than 1 dB(A)
16	$3,225,118	58	$55,605	No	na	Yes
17	$2,447,462	26	$94,133	No	na	Yes
18	$2,060,465	9	$228,941	No	na	Yes
19	No Impact					
20	$1,404,594	7	$200,656	No	na	No
21	$142,450	1	$142,450	Yes	na	No
22	$2,950,403	8	$368,800	No	na	No
23	$1,614,397	160	$10,090	No	Yes	No
24	No Impact from Section 200					
25	$995,855	9	$110,651	No	na	Yes
26	No Impact					
27	No Impact					
28	$543,373	18	$29,687	Yes	na	Yes
29	No Impact					

Cost Averaging

Section 200 NSA's with costs less than $100,000 per benefited residence can be included in 'cost averaging'. The procedure for cost averaging is to 1) Identify all NSAs with cost per benefit less than $100,000; 2) Add together costs for NSAs with cost per benefit less than $100,000; 3) Add together benefited residences for NSAs with cost per benefit less than $100,000; and 4) Divide Total cost by Total benefits. The result is the 'cost averaged' project cost per benefit. Barrier cost and benefits for these NSA's are presented in **Table III-25**, along with the total barrier cost and benefits for Section 200.

Table III-25. Noise Barrier 'Cost Averaging' Calculations

	GPL Alternative			ETL Alternative	
	Cost	**Benefits**		**Cost**	**Benefits**
NSA 01	$1,903,854	26		$1,913,251	26
NSA 05/06	$3,071,426	107		$3,012,984	101
NSA 13	----------	--		$1,906,647	61
NSA 16	$3,031,164	60		$3,225,118	58
NSA 17	$2,232,866	27		$2,447,462	26
NSA 23	$1,614,397	160		$1,614,397	160
NSA 28	$609,848	14		$535,373	18
TOTAL	**$12,463,555**	**394**		**$14,655,232**	**450**

Based on the total cost and benefits, the Section 200 cost per benefited residence with 'cost averaging' is: $31,633 for the GPL Alternative and $32,567 for the ETL Alternative.

Noise Abatement

Refer to Appendix A and B for the locations of proposed noise barriers for the General Purpose Lanes Alternative and Express Toll Lanes Alternative, respectively.

NSA 01

The noise barrier investigated is located along southbound I-95, between Gunpowder Falls and New Forge Road. There are no significant differences in barrier alignment or topography between the General Purpose Lanes and Express Toll Lanes Alternatives at this NSA. The noise barrier for the General Purpose Lanes Alternative was analyzed first. The design that was selected for the General Purpose Lanes Alternative was then checked for the Express Toll Lanes Alternative. Unless otherwise stated, the details presented herein are based on the General Purpose Lanes Alternative analysis but apply to either Build Alternative.

The barrier consists of two sections. The ground-mounted section is 2,845 feet long and 32 feet high. The structure-mounted section is 523 feet long and ranges from 15 to 24 feet high. The total surface area of the noise barrier is 102,911 SF. Using a unit cost of $18.50/SF, the total cost of the barrier is $1,903,854, for the General Purpose Lanes

Alternative. For the Express Toll Lanes Alternative, there were insignificant alignment differences due to the barrier crossing the bridge. The total cost of the barrier is $1,913,251, for the Express Toll Lanes Alternative.

For noise barrier location, see Appendix A, Plates 1 and 2 for the General Purpose Lanes Alternative and Appendix B, Plates 33 and 34 for the Express Toll Lanes Alternative.

The noise barrier was optimized to meet a goal of 7-10 dB(A) insertion loss at the critical sensitive receivers. The barrier provides a minimum of 3 dB(A) benefit to all 18 impacted residences and provides a minimum of 5 dB(A) benefit to 8 non-impacted residences. The barrier benefits a total of 26 residences in the study area.

The cost per benefited residence is $75,225 for the General Purpose Lanes Alternative and $73,587 for the Express Toll Lanes Alternative. Because this is greater than the $50,000 cost per benefit criterion, this barrier is considered not cost effective when computed for NSA 01 alone. However, this barrier is considered cost effective when 'cost averaged', for both the General Purpose Lanes and Express Toll Lanes Alternatives.

A noise barrier for NSA 01 ***is considered feasible*** and ***is considered reasonable*** for the General Purpose Lanes and Express Toll Lanes Alternatives.

NSA 05 / NSA 06

NSA 05 and NSA 06 are adjacent to one another, but are separated by Old Joppa Road. Because noise barriers for these two NSA would benefit each other, it was determined that they be analyzed together. There are no significant differences in barrier alignment or topography between the General Purpose Lanes and Express Toll Lanes Alternatives at these NSAs. The noise was performed primarily for the General Purpose Lanes Alternative. The design that was selected for the General Purpose Lanes Alternative was then verified in the Express Toll Lanes Alternative.

The noise barrier investigated is located along northbound I-95. The barrier for NSA 5 is located between Little Gunpowder Falls and Old Joppa Road. The barrier for NSA 6 is located between Old Joppa Road and Dugan Drive. (Appendix A, Plates 6-8 and Appendix B, Plates 38-40)

The barrier alignment at the south end of NSA 5 is on ground that slopes down to Little Gunpowder Falls. Potentially, the barrier noise reduction at the south end of the NSA could be improved if the barrier were realigned near the roadway and possibly onto the bridge.

General Purpose Lanes Alternative

The barrier for NSA 5 is 4,176 feet long and 28 feet high. The barrier for NSA 6 is 1500 feet long and 28 feet high. Combined, the total surface area of the noise barrier is 166,023 SF. Using a unit cost of $18.50/SF, the total cost of the noise barrier is $3,071,426.

The noise barrier was optimized to meet a goal of 7-10 dB(A) insertion loss at the critical sensitive receivers. The barrier provides a minimum of 3 dB(A) benefit to all 77 impacted residences and provides a minimum of 5 dB(A) benefit to 30 non-impacted residences. The barrier benefits a total of 107 residences in the study area.

The cost per benefited residence is $28,705. Because this is less than the $50,000 cost per benefit criterion, this noise barrier is considered cost effective.

A (combined) noise barrier for NSA 05 and NSA 06 ***is considered feasible*** and ***is considered reasonable*** for the General Purpose Lanes Alternative.

Express Toll Lanes Alternative

The barrier for NSA 05 is 4,168 feet long and 28 feet high. The barrier for NSA 06 is 1,400 feet long and 28 feet high. Combined, the total surface area of the noise barrier is

162,864 SF. Using a unit cost of $18.50/SF, the total cost of the noise barrier is $3,012,984.

The noise barrier was optimized to meet a goal of 7-10 dB(A) insertion loss at the critical sensitive receivers. The barrier provides a minimum of 3 dB(A) benefit to all 73 impacted residences and provides a minimum of 5 dB(A) benefit to 28 non-impacted residences. The barrier benefits a total of 101 residences in the study area.
The cost per benefited residence is $28,832. Because this is less than the $50,000 cost per benefit criterion, this noise barrier is considered cost effective.

A (combined) noise barrier for NSA 05 and NSA 06 ***is considered feasible*** and ***is considered reasonable*** for the Express Toll Lanes Alternative.

NSA 13
The noise barrier investigated is located along southbound I-95, between MD 24 and Ha Ha Branch. The residences in this NSA are multi-family buildings, plus several single-family homes.

Typically, the 2006 Existing Worst Case and the 2030 No Build models are identical with regard to roadway alignment, topography, and other geometric input. However, for NSA 13, there is a pending Maryland SHA improvement for MD 24, MD 924 and the (I-95) interchange that will change the roadway alignment and topography. Therefore the 2030 No Build condition will be the result of this pending improvement. This condition has not been modeled as part of this study.

General Purpose Lanes Alternative
The barrier is 2,900 feet long and 32 feet high. The total surface area of the noise barrier is 96,413 SF. Using a unit cost of $18.50/SF, the total cost of the noise barrier is $1,783,640.

The noise barrier was optimized to meet a goal of 7-10 dB(A) insertion loss at the critical sensitive receivers. The barrier provides a minimum of 3 dB(A) benefit to 61 impacted residences and provides a minimum of 5 dB(A) benefit to no non-impacted residences. The barrier benefits a total of 61 residences in the study area.

The cost per benefited residence is $ 29,240. Because this is less than the $50,000 cost per benefit criterion, this noise barrier is considered cost effective when computed for NSA 13 alone.

There are no receptors that have impact of 66 dB(A) or above with 3 dB(A) increase and/or 72 dB(A) with any increase, comparing 2030 Build to 2005 EWC conditions. According to Maryland Department of Assessments and Taxation's *Real Property Search Data Base* the impacted residences were constructed in 1991. There have been no improvements to this section of I-95 since that date. Therefore, there are no cumulative affects at NSA 13 as a result of prior improvements.

A noise barrier for NSA 13 ***is considered feasible*** and ***is considered not reasonable*** for the General Purpose Lanes Alternative due to insufficient increase in traffic noise level.

ETL Alternative

The barrier is 3,100 feet long and 32 feet high. The total surface area of the noise barrier is 103,062 SF. Using a unit cost of $18.50/SF, the total cost of the noise barrier is $1,906,647.

See Appendix B, Plates 46 and 49 for noise barrier location.

The noise barrier was optimized to meet a goal of 7-10 dB(A) insertion loss at the critical sensitive receivers. The barrier provides a minimum of 3 dB(A) benefit to 61 impacted residences and provides a minimum of 5 dB(A) benefit to no non-impacted residences. The barrier benefits a total of 61 residences in the study area.

The cost per benefited residence is $ 31,256. Because this is less than the $50,000 cost per benefit criterion, this noise barrier is considered cost effective when computed for NSA 13 alone.

A noise barrier for NSA 13 ***is considered feasible*** and ***is considered reasonable*** for the Express Toll Lanes Alternative.

NSA 16

The noise barrier investigated is located along northbound I-95, between Abington Road and Bynum Run. (Appendix A, Plates 18 and 19 and Appendix B, Plates 51 and 52)

General Purpose Lanes Alternative

The barrier is 5,243 feet long and 30 feet high. The total surface area of the noise barrier is 163,847 SF. Using a unit cost of $18.50/SF, the total cost of the noise barrier is $3,031,164.

The noise barrier was optimized to meet a goal of 7-10 dB(A) insertion loss at the critical sensitive receivers. The barrier provides a minimum of 3 dB(A) benefit to 58 impacted residences and provides a minimum of 5 dB(A) benefit to 2 non-impacted residences. The barrier benefits a total of 60 residences in the study area.

The cost per benefited residence is $50,519. Because this is greater than the $50,000 cost per benefit criterion, this noise barrier is considered not cost effective when computed for NSA 16 alone. However, this noise barrier is considered cost effective when 'cost averaged'.

A noise barrier for NSA 16 ***is considered feasible*** and ***is considered reasonable*** for General Purpose Lanes Alternative.

Express Toll Lanes Alternative

The barrier is 5,243 feet long and 32 feet high. The total surface area of the noise barrier is 174,331 SF. Using a unit cost of $18.50/SF, the total cost of the noise barrier is $3,225,118.

The noise barrier was optimized to meet a goal of 7-10 dB(A) insertion loss at the critical sensitive receivers. The barrier provides a minimum of 3 dB(A) benefit to 24 impacted residences and provides a minimum of 5 dB(A) benefit to 26 non-impacted residences. The barrier benefits a total of 58 residences in the study area.

The cost per benefited residence is $94,133. Because this is greater than the $50,000 cost per benefit criterion, this noise barrier is considered not cost effective when computed for NSA 16 alone. However, this noise barrier is considered cost effective when 'cost averaged'.

A noise barrier for NSA 16 ***is considered feasible*** and ***is considered reasonable*** for ETL Alternative.

NSA 17

The noise barrier investigated is located along southbound I-95, north of Abingdon Road, in the vicinity of Pouska Road and Hookers Mill Road. (Appendix A, Plate 18 – 19 and Appendix B, Plate 51 - 52)

General Purpose Lanes Alternative

The barrier is 4,126 feet long and 28 feet high. The total surface area of the noise barrier is 120,696 SF. Using a unit cost of $18.50/SF, the total cost of the noise barrier is $2,232,866.

The noise barrier was optimized to meet a goal of 7-10 dB(A) insertion loss at the critical sensitive receivers. The barrier provides a minimum of 3 dB(A) benefit to 25 impacted

residences and provides a minimum of 5 dB(A) benefit to 2 non-impacted residences. The barrier benefits a total of 27 residences in the study area.

The cost per benefited residence is $82,698. Because this is greater than the $50,000 cost per benefit criterion, this noise barrier is considered not cost effective when computed for NSA 17 alone. However, this noise barrier is considered cost effective when 'cost averaged'

A noise barrier for NSA 17 ***is considered feasible*** and ***is considered reasonable*** for General Purpose Lanes Alternative.

Express Toll Lanes Alternative

The barrier is 4,233 feet long and 30 feet high. The total surface area of the noise barrier is 132,295 SF. Using a unit cost of $18.50/SF, the total cost of the noise barrier is $2,447,462.

The noise barrier was optimized to meet a goal of 7-10 dB(A) insertion loss at the critical sensitive receivers. The barrier provides a minimum of 3 dB(A) benefit to 25 impacted residences and provides a minimum of 5 dB(A) benefit to 2 non-impacted residences. The barrier benefits a total of 27 residences in the study area.

The cost per benefited residence is $82,698. Because this is greater than the $50,000 cost per benefit criterion, this noise barrier is considered not cost effective when computed for NSA 17 alone. However, this noise barrier is considered cost effective when 'cost averaged'

A noise barrier for NSA 17 ***is considered feasible*** and ***is considered reasonable*** for Express Toll Lanes Alternatives.

NSA 23

The noise barrier investigated is located along northbound I-95, south of MD 22. (Appendix A, Plates 29 and 30 and Appendix B, Plates 62 and 63) Residences in this NSA consist of several single family houses at the south end and thirteen apartment buildings along or near the exit ramp to MD 22. The apartment community includes a swimming pool and two picnic pavilions along the ramp. The apartment buildings are each three story. It was assumed each building contains twelve units. It was also assumed that all apartment units have use of the outdoor amenities and would therefore benefit from noise mitigation.

The barrier is 2,983 feet long and 28 feet high. The total surface area of the noise barrier is 87,265 SF. Using a unit cost of $18.50/SF, the total cost of the noise barrier is $1,614,397.

The noise barrier was optimized to meet a goal of 7-10 dB(A) insertion loss at the critical sensitive receivers. The barrier provides a minimum of 3 dB(A) benefit to 4 impacted residences and provides a minimum of 5 dB(A) benefit to 156 non-impacted residences. The barrier benefits a total of 160 residences in the study area.

The cost per benefited residence is $10,090. Because this is less than the $50,000 cost per benefit criterion, this noise barrier is considered cost effective when computed for NSA 23 alone.

There are no receptors that have impact of 66 dB(A) or above with 3 dB(A) increase and/or 72 dB(A) with any increase, comparing 2030 Build to 2030 No-Build conditions. According to Maryland Department of Assessments and Taxation's *Real Property Search Data Base*, the impacted single family residences along northbound I-95 were constructed prior to the interstate, and the (Warwick) apartments along the off-ramp (to southbound MD 22) were constructed in 1968. This section of I-95 was widened from 2

to 3 lanes (each direction) in 1973. Therefore, there may be cumulative affects at NSA 23 as a result of prior improvements.

A noise barrier for NSA 23 ***is considered feasible*** and ***is considered reasonable*** for the General Purpose Lanes Alternative.

At NSA 23, ETL and GPL Alternatives are identical, since there will be only GPL lanes. The noise level results for the GPL and ETL Alternatives are also identical. Therefore:

A noise barrier for NSA 23 ***is considered feasible*** and ***is considered reasonable*** for the Express Toll Lanes Alternative.

NSA 28

The noise barrier investigated is located along northbound I-95, north of MD 152. (Appendix A, Plates ***9***, 9A, ***10, 10A*** and Appendix B, Plates ***41, 41A,*** 4***2, and 42A)***

General Purpose Lanes Alternative

The barrier is 910 feet long and 24 feet high. The total surface area of the noise barrier is 22,978 SF. Using a unit cost of $18.50/SF, the total cost of the noise barrier is $609,848.

The noise barrier was optimized to meet a goal of 7-10 dB(A) insertion loss at the critical sensitive receivers. The barrier provides a minimum of 3 dB(A) benefit to 4 impacted residences and provides a minimum of 5 dB(A) benefit to no non-impacted residences. Also, the barrier provides benefit to an outdoor community area, which is considered equivalent to 10 residences. The barrier benefits a total of 14 residences in the study area. The cost per benefited residence is $28,339. Because this is less than the $50,000 cost per benefit criterion, this noise barrier is considered cost effective when computed for NSA 28 alone.

A noise barrier for NSA 28 ***is considered feasible*** and ***is considered reasonable*** for General Purpose Lanes Alternative.

Express Toll Lanes Alternative

The barrier is 910 feet long and 22 feet high. The total surface area of the noise barrier is 32,965 SF. Using a unit cost of $18.50/SF, the total cost of the noise barrier is $535,373.

The noise barrier was optimized to meet a goal of 7-10 dB(A) insertion loss at the critical sensitive receivers. The barrier provides a minimum of 3 dB(A) benefit to 4 impacted residences and provides a minimum of 5 dB(A) benefit to no non-impacted residences. Also, the barrier provides benefit to an outdoor community area, which is considered equivalent to 10 residences. The barrier benefits a total of 14 residences in the study area.

The cost per benefited residence is $27,958. Because this is less than the $50,000 cost per benefit criterion, this noise barrier is considered cost effective when computed for NSA 28 alone.

A noise barrier for NSA 28 ***is considered feasible*** and ***is considered reasonable*** for Express Toll Lanes Alternative.

Potential Noise Sensitive Areas

In an effort to identify all NSAs within the study area, the Authority will continue to evaluate new and future residential developments along the I-95 corridor within the Section 200 study area.

The initial field testing for the 29 NSAs identified in this report occurred between June 7 and June 20, 2006, August 9, 2007, and October 17, 2007. The Authority will continue to coordinate with the Harford County Planning and Zoning and Baltimore County Department of Permits and Development Management regarding the status of residential development projects within the Section 200 study area. If a new development receives its building permit from Baltimore or Harford County between June 30, 2006 and the date of signature of the Section 200 decision document (anticipated final decision document signature-Fall 2008) and the development qualifies as a NSA by the criteria set forth in this report, a noise analysis

will be completed for the new NSA. Noise abatement as a result of any new development after the final decision document approval is the responsibility of the local jurisdictions and private developers.

8. Hazardous Materials

An *Initial Site Assessment* (ISA) Report (Authority, 2007) was prepared for the Section 200 Project. This report resulted in the identification of 41 properties with the potential for environmental concern within or adjacent to the study area. Background research, including a database search of State and/or Federal waste site inventories, a file review at the Maryland Department of the Environment (MDE), the Baltimore County Department of Environmental Protection and Resource Management (DEPRM), and the Harford County Health Department, was conducted for the study area.

Of these 41 properties, a total of 28 sites were listed on the environmental database. Review of the database revealed one NPL site, three RCRA, one CERCLIS, three state, eleven UST/AST facilities, and twenty-six LUST sites within or adjacent to the project area. Some of the sites were listed on one or more database. There are numerous sites that were listed on the environmental database but were not field verified and are not anticipated to be an environmental concern to the study area.

The properties of concern within the project area were given a potential contaminate value of high, medium, or low based on property operations, presence of USTs, and/or listing on the environmental database. The high value was assigned to those sites that were an open LUST case or had property operations that caused for concern. Those sites with the medium value are those sites that were listed on the environmental database as closed LUST cases, sites with current UST operations on the property, or USTs closed in place. Those sites with the low value were classified as such due to no listing on the environmental database, ASTs in good condition, and/or no reported releases. There are 4 sites within the project area classified as having a high potential contaminant value, 26 sites with a medium potential contaminant value, and 11 sites with a low potential contaminant value.

The No Build Alternative will not impact any of the sites. At this point only one site, the JFK Maintenance Facility #1 (rated medium for contamination potential), is expected to be impacted by either of the Build Alternatives. A Preliminary Site Assessment is currently being conducted for the JFK Maintenance Facility #1 to determine the extent of hazardous materials concerns.

9. Indirect and Cumulative Effects Analysis

An Indirect and Cumulative Effects Analysis (ICE) was performed in accordance with the guidelines established by the SHA, the National Environmental Policy Act (NEPA), and the Council on Environmental Quality (CEQ) regulations. Indirect and Cumulative Effects are defined as the following:

> *Indirect Effects:* "Effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects related to changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems." (40 CFR 1508.8(b))

> *Cumulative Impacts:* "Impacts on the environment that result from the incremental impact of the action when added to past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions." (40 CFR 1508.8(b))

In order to determine which environmental resources were considered in the ICE, the resources that would be directly impacted by the proposed alternatives were identified. The resources directly impacted by the project form the basis for the resources that were examined in the ICE. In addition to directly impacted resources, any resources that would potentially experience indirect effects were also considered in the ICE. **Table III-26** summarizes the resources that were analyzed in the ICE.

Table III-26: ICE Resources and Effects

Potential Effects	Incorporation into ICE	Rationale
Socioeconomic		
Communities/Businesses	Yes	Direct and/or Indirect Impacts
Active Agricultural Land	Yes	Direct and/or Indirect Impacts
Park and Recreation Facilities	Yes	Direct and/or Indirect Impacts
Cultural		
Historic Sites and Structures	Yes	Direct and/or Indirect Impacts
Archeological Resources	Yes	Direct and/or Indirect Impacts
Natural Environmental		
Floodplains	Yes	Direct and/or Indirect Impacts
Surface Water	Yes	Direct and/or Indirect Impacts
Wetlands	Yes	Direct and/or Indirect Impacts
Terrestrial Habitat (forests)	Yes	Direct and/or Indirect Impacts

Geographical Boundary

Using the environmental resources that would be affected by direct and indirect impacts of the project as a guide, multiple resource boundaries were reviewed to determine appropriate ICE sub-boundaries that would be joined to create a single ICE boundary in which all indirect and cumulative effects would be analyzed. The ICE boundary incorporates the following sub-boundaries: Lower Gunpowder Falls, Little Gunpowder Falls, Lower Winters Run, Bush River, Bynum Run, and Swan Creek sub-watersheds, ATI/TAZ, and census blocks (See **Figure III-6**). Because indirect and cumulative effects are farther removed from the project alternatives than direct impacts, the geographic limits for the analysis of indirect and cumulative effects extend well beyond the Section 200 project limits.

ICE Time Frames

Past and future ICE time frames were also established to determine the appropriate time frame in which to conduct the ICE analysis. Based on past events in the Section 200 study

area (the widening of I-95 from MD 43 to MD 24 in 1972, the construction of the I-95/MD 152 Interchange in 1973), a trend analysis developed from 1973 Land Use maps and 1971 aerial photography, and the fact that detailed natural and socioeconomic resource information prior to the passage of NEPA in 1969 is not readily available, the year 1970 has been selected as the past time frame limit. The future time frame for reasonably foreseeable future actions was determined primarily from the project's design year of 2030.

a. Indirect and Cumulative Effects

This section will discuss the potential indirect and cumulative effects for each alternative and associated interchange option. For more detailed information about the potential indirect and cumulative effects of the project, please refer to the *Section 200: Indirect and Cumulative Effects Analysis.*

Communities and Businesses

All of the Section 200 Build Alternatives would impact communities and businesses to some degree, both directly and indirectly.

Improvements associated with the Section 200 build alternatives would improve access and mobility throughout the ICE boundary, thereby improving the ease and availability of existing community services to the residents who use them. Improved access and traffic conditions would likely stimulate growth, thus boosting employment opportunities, resulting in an overall benefit to the economic environment within the study area.

As the demand for new business and residential properties increases, the resulting development pressures on remaining parcels of undeveloped land would also increase. However, this development pressure will be limited through the existing Smart Growth laws, and zoning regulations in place by Baltimore and Harford Counties, who will look to accommodate these demands through infill development and redevelopment of existing developed areas, rather than new development within previously undisturbed areas. Both the Baltimore and Harford County Master Plans have the identified goal of conserving and

enhancing the character of existing communities and neighborhoods, and all new developments must demonstrate compliance with this goal before being approved.

Community and business development within the ICE boundary has been increasing steadily since the 1970s. This trend is expected to continue through the future year of 2030 and beyond. None of the developments are dependent upon the Section 200 improvements, including the proposed interchange reconfigurations.

Other Transportation Projects

The improvements at the MD 24/MD 924 intersection and the Section 100 Express Toll Lanes construction project will experience cumulative effects from the Section 200 project. The Section 200 project will relieve congestion along the I-95 corridor in Baltimore and Harford Counties. This will increase the traffic along the Section 100 portion of I-95 because the relief in congestion will encourage travelers to use I-95 to reach destinations north in Baltimore, Harford, and Cecil Counties on a more regular basis. The MD 24/MD 924 intersection is an area that will experience the increase in traffic from I-95. The MD 24/ MD 924 intersection is located in a commercial area that contains many retail businesses that would benefit from the increase in vehicles in this area. Both of these projects have been designed to handle the increase in traffic flow anticipated from Section 200.

The additional park & ride facilities proposed at MD 152 and MD 24 as part of the proposed Section 200 improvements will provide more opportunities for commuters from Baltimore, Harford, and Cecil Counties to use transit or carpool. This will increase the ridership on the current transit services in the study area, as well as relieve some of the congestion along I-95 in Section 100 and 200.

N

22

95

543

24

152

7

40

95

Legend

Project Limits

ICE Boundary

95 SECTION 200

Figure III-6
ICE Boundary

1 inch equals
1.5 miles

Active Agricultural Land

Due to intense development, and construction of transportation facilities, the acreage of active agricultural land within the ICE boundary has been decreasing since the past timeframe of 1970. This decrease in agricultural lands is likely to continue as development pressures increase, particularly in areas within the Development Envelope, where isolated areas of agricultural land still exist. However, the rate of loss is expected to decrease as agricultural preservation programs continue to expand, and the respective counties continue to enforce rural and agricultural preservation in their planning efforts. Because the direct effect of the Section 200 project on active agricultural land would be minor, and because the programs currently in place at the state and county level to protect agricultural lands, any indirect or cumulative effects resulting from any of the build alternatives on active agricultural lands are expected to be minor.

Park and Recreation Facilities

Impacts to public parks/recreation facilities resulting from the Section 200 project are expected to be minor, and will be minimized to the extent practicable as part of the Section 4(f) Evaluation process. Likewise, the requirements of Section 4(f) will limit the likelihood and extent of impacts to public parks or recreational facilities resulting from any federally funded or authorized transportation improvement project. While there is potential for impacts to occur to public parks or recreation facilities as a result of future development in the ICE boundary, future impacts are expected to be minimal since it would be extremely unlikely that development would be permitted on public parkland or recreational property. As a result, any indirect or cumulative impacts resulting from any of the build alternatives on public parkland or recreational facilities are expected to be minor.

Historic Sites and Structures

Cumulative effects to historic sites and structures within the ICE boundary are possible as a result of the Section 200 project, in addition to other development that is pending or approved within the study area. However, impacts to properties that are eligible for the National Register are unlikely, considering the size and location of the parcels, and the fact

that they have remained unchanged for such a long period of time. Cumulative effects to historic sites and structures are expected to be minimal due to established laws and regulations designed to protect these resources, including:

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

However, these laws and regulations pertain to state or Federally funded projects. Individuals are not governed by these laws, and are free to improve, alter, or even remove any historic site or structure that they own.

Archeological Resources

Cumulative effects to archeological resources within the ICE boundary are possible as a result of the Section 200 project, in addition to other development that is pending or approved within the study area. Prehistoric archeological resources are often found within undisturbed areas, especially near streams, that may be affected by future land use. However, cumulative effects to archeological resources are expected to be minimal due to established laws and regulations designed to protect these resources, including:

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

Floodplains

It is anticipated that stormwater management practices and federal, state, and county regulations would minimize the effects to floodplains within the ICE boundary. Indirect and

cumulative impacts to floodplains would be minimized through COMAR regulations (COMAR 26.17.04) and FEMA CFR 44.01, which state that impacts within the floodplain should be mitigated to result in no decrease in flood storage.

COMAR regulations are designed to govern construction, reconstruction, repair, or alteration of a dam, reservoir, or waterway obstruction or any change of the course, current, or cross section of a stream or body of water within the State, including any changes to the 100-year frequency floodplain of free-flowing waters (COMAR 26.17.04). In order to minimize future floodplain impacts, the following considerations should be included in floodplain management:

- Avoiding long and short-term adverse impacts associated with the occupancy and modification of floodplains,
- Avoiding direct and indirect support of floodplain development wherever there is a practicable alternative,
- Reducing the risk of flood loss,
- Promoting the use of nonstructural flood protection methods to reduce the risk of flood loss,
- Minimizing the impact of floods on human health, safety, and welfare,
- Restoring and preserving the natural and beneficial values served by floodplains, and
- Adhering to the objectives of the Unified National Program for Floodplain Management

In both Baltimore and Harford Counties floodplain management programs aim to limit and control floodplain development, in order to protect persons and property from floodwaters. These programs emphasize the preservation of floodplains as undeveloped areas.

Furthermore, any construction within a designated 100-year floodplain in the State of Maryland requires a joint permit from the Maryland Department of the Environment (MDE) and United States Army Corps of Engineers (USACE). The permitting process serves to

ensure that avoidance and minimization measures are considered, and that resulting impacts are regulated, and mitigated for, in most cases.

Because of stringent federal, state, and local floodplain management laws, it is anticipated that any indirect or cumulative impacts to floodplains resulting from any of the build alternatives would be minor.

Surface Water/Aquatic Habitat

Based on existing data, there has been an overall improvement of water quality within the Section 200 drainage areas since the mid-1980s due largely to the reduction in point source nitrogen and phosphorus loads, which is in direct response to federal and state initiatives to improve water quality, including:

- The Clean Water Act, Section 404 (CFR 33.26.1344),
- The Clean Water Act, Section 401 (Water Quality Certification) (CFR 33.1341),
- The Maryland Waterway Construction Statute (COMAR 26.17.04),
- National Pollutant Discharge Elimination System (NPDES), and
- Local water quality, wetland, and Chesapeake Bay Critical Area legislation

With an expected increase in population and development density, surface water impacts would increase through the future time frame. Mitigation of these impacts would be required if water quality is to remain equal to or greater than current levels.

As part of the permitting process required by federal and state laws, mitigation would be required to offset the impact of all unavoidable stream impacts. Mitigation ratios for stream impacts can vary, but typically include stream channel improvements, buffer enhancements, or other similar activities. Mitigation requirements will be finalized as the project design advances.

The indirect and cumulative effects of all proposed and/or potential developments (highway and non-highway) to surface water/aquatic habitat of the watersheds within the ICE boundary would add additional stressors on water quality and watershed stability. Collectively, these developments would be expected to increase non-point source (NPS) pollutant loadings to surface waters within the ICE boundary. This would be expected to result in a negative overall impact to water quality, however measures identified by both Baltimore and Harford Counties, and mitigation requirements established by federal and state law will help to keep the detrimental effects of development activities on surface water quality and aquatic habitat to a minimum.

Wetlands

It is anticipated that percentages of future net wetland loss within the ICE boundary will continue to decline due to government regulatory programs that would minimize wetland destruction in the future, and require mitigation for impacts that cannot be avoided. Existing wetlands are now protected by state and federal laws, while in the past, reclamation of wetland areas was encouraged. Techniques and procedures for protecting Maryland's existing wetlands include: land use regulations, preservation and conservation easements, tax incentives, public education, and the efforts of private individuals and corporations.

Direct, indirect, and cumulative impacts to wetlands from the proposed build alternatives would occur despite avoidance and minimization measures that would be applied. These impacts would be regulated by federal and state review agencies, and mitigation would be provided as required by these permitting agencies. Typical mitigation ratios include a 1:1 replacement ratio for impacts to emergent wetlands, a 1.5:1 replacement ratio for scrub-shrub wetlands, and a 2:1 replacement ratio for forested wetland systems. Mitigation options may include restoring, enhancing, or creating and preserving wetlands, surface waters, or uplands. The Authority is currently in discussion with USACE regarding the mitigation sites for impacts associated with the Section 200 project. Indirect and cumulative effects within the ICE boundary are reasonably foreseeable; but it is expected that state and federal regulations

and incentives, as previously identified, would minimize future wetland impacts within the ICE boundary. The resulting impact is expected to be minor, if not beneficial.

Forests/Terrestrial Habitat

Due to intense development, and construction of transportation facilities, remaining forest cover is widely scattered in numerous forest fragments, with the exception of the previously mentioned large forest tracts. The significance of this distribution can be characterized by a decrease in the natural beneficial functions of forests, including wildlife habitat, recreation, air quality, water quality, and other benefits.

In general, development over time would convert forested areas and would continue to require mitigating practices. Private developers must comply with applicable state, and county regulations governing forest conservation. Indirect and cumulative effects to forests in the ICE boundary would be limited by these forest conservation regulations. These regulations will also help minimize effects to terrestrial wildlife species, such as forest interior dwelling species (FIDS), which are dependent upon large tracts of forest for habitat. Planning efforts and regulations from agencies such as the MDNR and Baltimore and Harford Counties will help to preserve forests, minimize the effects of forest fragmentation, and reduce impacts to terrestrial habitat. Because I-95 is a linear transportation facility, forest impacts resulting from the build alternatives would be regulated by the Maryland Reforestation Law, and mitigation would be required for all forest impacts. Because future forest impact is regulated by local and state law, with strict mitigation requirements, any indirect or cumulative impacts to forest or terrestrial habitat resulting from any of the build alternatives is expected to be minor.