

**Section 100: I-95, I-895(N) Split to North of MD 43  
Baltimore City and Baltimore County, Maryland**

**Alternate 3: Managed Lanes**

**The Authority's Selected Alternate and Conceptual Mitigation  
Package**

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## **INTRODUCTION**

The study area for Section 100: Interstate-95 (hereinafter referred to as “I-95”), I-895(N) Split to North of MD 43 (hereinafter referred to as Section 100), is approximately nine miles long, extending north along I-95 from just south of the I-895(N) split on the northeast side of Baltimore City, to the New Forge Road overpass in Baltimore County, approximately three miles north of the MD 43 Interchange (*Figures 1 and 2*).

The Federal Highway Administration (FHWA) and the Maryland Transportation Authority are the lead federal and state agencies, respectively, in the National Environmental Policy Act (NEPA) study for the Section 100 project. The Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (EPA) participated as cooperating agencies in this NEPA Study. The FHWA and the Authority (the Authority) have followed “Maryland’s Streamlined Environmental and Regulatory Process” for guidance to achieve the timely and efficient identification, evaluation and resolution of environmental and regulatory issues related to the Section 100 project.

On May 24, 2004, FHWA and the Authority released the Environmental Assessment (EA) document for Section 100. On June 29, 2004, a Public Hearing was held to present the findings in the EA and to receive public comment. On September 21, 2004, the Authority selected the Managed Lanes Alternate (Alternate 3) as its Selected Alternate, which is analyzed in this document. The Maryland Streamlined Environmental and Regulatory Process establishes three major milestones in the NEPA process: determination of purpose and need; selection of alternates carried forward for detailed study; and selection of a preferred alternate and conceptual mitigation. At each point, the lead agencies provide information to the other agencies participating in the NEPA process and seek concurrence from agencies with permitting authority over the project and comment from other agencies. This report is being prepared at the third and final milestone.

The primary purpose of this document is to explain the Authority’s rationale for choosing the Managed Lanes Alternate and to present the Authority’s proposed conceptual minimization and mitigation measures for affected resources. To provide context for those issues, this document also includes a summary of the purpose and need for the project; describes the alternates carried forward for detailed study; and summarizes the impacts of the Authority’s Selected Alternate.

## **PURPOSE AND NEED**

### **Identification in I-95 Master Plan**

I-95 in Maryland extends 110 miles from the Woodrow Wilson Bridge at the Virginia State line to the Delaware State line. It provides continuity for regional traffic from Florida to Maine and operates as an important backbone for commuter traffic within Maryland. As the “East Coast’s Main Street,” I-95 serves high volumes of regional commercial/business and recreational traffic. The Authority owns, operates, and maintains a 50-mile portion of I-95 in Maryland, beginning north of Baltimore City and

extending to the Delaware State line, known as the John F. Kennedy Memorial Highway (JFK).

The Authority, in cooperation with the FHWA and the Maryland Department of Transportation (MDOT), developed the *I-95 Master Plan, I-895 Split(N) to the Delaware State Line* (hereinafter referred to as the I-95 Master Plan) study to comprehensively identify long-range transportation needs that establish clear goals for system maintenance, preservation and enhancement, and ensure the development of environmentally sensitive and intermodal-friendly solutions for the JFK.

The Authority adopted the I-95 Master Plan in April 2003. The I-95 Master Plan identified four independent projects, including:

- Section 100: I-95, I-895 (N) Split to North of MD 43
- Section 200: North of MD 43 to North of MD 22
- Section 300: North of MD 22 to North of MD 222
- Section 400: North of MD 222 to the Delaware State Line

Throughout the I-95 Master Plan process, the Authority coordinated with local, State, and Federal regulatory and resource agencies. This coordination resulted in agencies' concurrence in the determination that Sections 100 through 400 should be advanced for NEPA study as four independent projects. The agencies also concurred on the termini and the concepts to be considered in the alternates analysis for each project. In addition to FHWA, the concurring agencies included the USEPA, USACE, National Marine Fisheries Service (NMFS), Maryland Department of the Environment (MDE), and Maryland Department of Natural Resources (DNR). Section 100 is the first independent project identified in the I-95 Master Plan to be advanced for NEPA study.

### **Purpose of the Project**

The purpose of the proposed action is to address capacity and safety needs on Section 100 and thereby improve access, mobility, and safety for local, regional, and inter-regional traffic, including passenger, freight, and transit vehicles.

### **Need For the Project**

The proposed action is intended to address the following capacity and safety needs on Section 100:

#### Capacity

Section 100 is the most congested section of I-95 in Maryland north of Baltimore City. Currently, Section 100 south of MD 43 operates at LOS F during the morning and evening rush hours. If capacity needs are not addressed, congestion is expected to increase by the design year of 2025. By 2025, Section 100 south of MD 43 is also expected to operate at LOS E and F during weekend peak periods. Unchecked, increased congestion levels would extend the existing peak hour into a peak period of several hours

in duration and increase the level of diversion to alternate routes, such as the community-oriented arterials of US 1, US 40, and MD 7.

### Safety

The accident rate on Section 100 is currently lower than the statewide average for comparable urban interstates within Maryland. However, the total number of accidents on Section 100 is increasing, especially in the vicinity of the urban I-895, I-695, and MD 43 Interchanges, where large volumes of merging, diverging, and weaving movements occur. At some locations, left-hand exit and entrance treatments, limited auxiliary lane lengths, and restricted sight distances may increase the potential for accidents to occur. The majority of the reported accidents in Section 100 are of the types normally identified as congestion-related, such as rear-end and sideswipe. If the anticipated congestion levels in Section 100 are not addressed, an increase in the number and severity of congestion-related accidents would likely occur.

### **Conclusion**

The Section 100 Project focuses on safety and service improvements to reduce congestion on I-95 from south of the I-895(N) split to just north of the MD 43 Interchange. Improvements examined include efforts to improve access, mobility, and safety, while helping to concentrate growth within the PFA. This includes efforts to increase safety at the I-895, I-695, and MD 43 Interchanges, as well as the I-95 mainline within the study area.

### **ALTERNATES RETAINED FOR DETAILED STUDY**

Based upon the analyses used to evaluate the alternates and the input gathered from the Focus Groups and the November 18, 2003 Public Workshop, three alternates were recommended for detailed study in the EA. The following summarizes each of the Alternates Retained for Detailed Study (ARDS).

#### **Alternate 1: No-Build**

The No-Build Alternate would be restricted to normal maintenance and safety improvements. There would be no increase in roadway capacity, and I-95 would remain four lanes in each direction throughout the study corridor. As a result, LOS would continue to degrade, and there would be no reduction in the accident rate. This alternate was carried as a baseline for comparison.

**Figure 1**

**Figure 2**

## **Alternate 2: General Purpose Lanes**

The General Purpose Lanes Alternate would include additional general purpose lanes to accommodate the projected traffic demand. In order to reach a peak hour/peak direction LOS E through the design year, this alternate would consist of the following lane configurations:

- Four lanes in each direction on I-95 from approximately ¼ mile south of the I-895 Interchange to the point where I-95 merges with I-895;
- Six lanes in each direction between the I-895(N) split and MD 43;
- North of MD 43, the roadway would transition from six lanes in each direction to the existing four lanes in each direction.

In addition to improvements to the mainline, the alternate would improve the configuration of three interchanges:

*I-95/I-895 Interchange:* The existing I-95/I-895 Interchange would be modified by relocating the southbound roadway of I-95 and the northbound roadway of I-895 to make I-95 the through movement.

*I-95/I-695 Interchange:* For the I-95/I-695 Interchange, all braided mainline roadways for both I-95 and I-695 would be removed and replaced with parallel mainline roadway alignments. This would allow all the left-handed entrances and exits to be replaced with conventional right-handed exits and entrances.

*I-95/MD 43 Interchange:* The I-95/MD 43 Interchange weaving movements would also be minimized with the addition of signals on MD 43 at the spur ramps. The interchange would have a semi-directional configuration.

## **Alternate 3: Managed Lanes**

The Managed Lanes Alternate would include two managed lanes in each direction from I-895 to north of MD 43, plus additional general purpose lanes. The managed lanes would be separated from the general purpose lanes by a physical barrier from the I-95/I-695 Interchange to north of MD 43. South of the I-95/I-695 Interchange, the managed lanes would be separated from the general purpose lanes by a four-foot buffer area. Vehicles would access the managed lanes directly through dedicated managed lanes on-ramps and off-ramps. This alternate includes the following improvements:

- Four general purpose lanes in each direction of I-95 from approximately ¼ mile south of the I-895 Interchange to the point where I-95 merges with I-895;
- Two managed lanes and four general purpose lanes in each direction between the I-895(N) split and MD 43;
- North of MD 43, the roadway would transition from the six-lane section (two-lane managed and four-lane general purpose) in each direction into the existing four lanes in each direction).

In addition to improvements to the mainline, this alternate would improve the configuration of three interchanges:

*I-95/I-895 Interchange:* At the I-95/ I-895 Interchange, the northbound roadway of I-895 and the southbound roadway of I-95 would be relocated to make I-95 the through movement in the interchange. The managed lanes for both I-895 and I-95 would be located within the medians.

*I-95/I-695 Interchange:* At the I-95/I-695 Interchange, the existing braiding on both I-95 and I-695 would be removed. For the general purpose lanes, the left-hand entrances and exits on I-95 would be replaced with right-hand entrances and exits. The currently approved 2001 Baltimore Regional Transportation Plan recommends improvements to I-695 that incorporates the addition of two High Occupancy Vehicle (HOV) lanes between I-95 north and I-95 south in 2010. Therefore, the left-handed exits and entrances on I-95 for the proposed managed lanes would eventually tie in with the left hand exits and entrances for the planned improvements on I-695. There would only be left hand exits and entrances between the I-95 managed lanes and the I-695 westbound lanes. There are no recommendations for HOV lanes or ETLs east I-95/I-695 Interchange.

*I-95/MD 43 Interchange:* At the I-95/MD 43 Interchange, all weaving would be eliminated and replaced with a single exit point on each approach with direct connections provided for all interchange improvements. The single lane ramps for the managed lanes would connect directly to MD 43 at a signalized intersection.

The Managed Lanes Alternate would allow the Authority the flexibility to use varying types of management strategies to meet its transportation goals. The managed lanes could operate under a single management strategy 24 hours per day, or on a “time-share basis” with different restrictions at different times of day. Management strategies could also be modified over time to maximize person-moving capacity, optimize vehicle carrying capacity, and achieve transportation and community goals. Management strategies could include restrictions at access locations (ramps), restrictions by time of day (peak/off-peak), restrictions by vehicle-type (trucks/buses), restrictions by type of use (commercial/transit), or management by price (variable or fixed tolls). The managed lane strategies considered for the Section 100 project in the EA, for purposes of traffic modeling, included priced lanes (i.e., toll lanes), truck-only lanes, and transit-only lanes. A detailed traffic analysis for each management strategy for the Managed Lanes Alternate will be included in the Finding of No Significant Impact (FONSI) document.

If the Managed Lanes Alternate is approved by FHWA, the Authority would be responsible for determining a particular management strategy. This decision would be made by the Authority following completion of the NEPA process and could be modified by the Authority over time, in the Authority’s role as owner and operator of the facility, based upon factors such as operational efficiency, safety, congestion management, and revenue generation.

It is possible that priced lanes, specifically, Express Toll Lanes (ETLs) will be used as the initial management strategy. Using ETLs as the specific management strategy for the Section 100 project would involve placing toll collection gantries above the managed lanes, which would collect tolls electronically, without the use of toll booths.

## **PUBLIC INVOLVEMENT**

To gather input from and inform citizens within the project area, in a manner consistent with the requirements of NEPA, the Authority conducted and participated in a variety of public involvement activities.

### **Alternates Public Workshop**

The Authority held an Alternates Public Workshop on November 18, 2003, at the Perry Hall Middle School. The purpose of the workshop was to acquaint the public with the need for the project and present the status of the Section 100 Project as of that date. At the workshop, the preliminary alternates were introduced. These alternates included the No-Build Alternate, the General Purpose Lanes Alternate, and the Managed Lanes Alternate. A preliminary assessment of environmental impacts associated with each of these alternates was also presented.

The public input generated as a result of the public hearing was reviewed by the project team and, where appropriate, incorporated into the development of the Alternates Retained for Detailed Study (ARDS).

### **Focus Groups**

A fifteen-member Focus Group, comprised of local residents, community leaders, and business owners, was formed in Fall 2003 to provide an opportunity for the public to provide input and comments on a variety of issues related to the Section 100 project, including purpose and need, alternates under consideration, and potential environmental impacts.

Six Focus Group Meetings were held during the development and refinement of alternates.

- September 11, 2003 - Background information on the I-95 Master Plan was presented, the Section 100 Project was introduced, and possible options for the project were discussed.
- September 30, 2003 - The project team presented their initial designs for both the General Purpose Lanes and Managed Lanes Alternates.
- October 27, 2003 - The project team proposed the elimination of the collector-distributor (C-D) lanes based on results of additional traffic and engineering analyses. The Focus Group agreed that the C-D lanes should be eliminated from

further analysis, as they would not improve the alternates' ability to meet the project needs, would not provide the originally intended function, and would increase natural environmental, cultural, and socioeconomic impacts.

- February 24, 2004 - During this meeting, the General Purpose Lanes and Managed Lanes Alternates (without C-D lanes) were presented, along with the preferred interchange options. The presentation included examples of computer-generated three-dimensional (3D) images that could be used to graphically display the alternates at the Summer 2004 Public Hearing.
- April 27, 2004 - A fifth Focus Group Meeting was held to present the results of the additional detailed engineering and environmental studies, and gather additional input on the upcoming Public Hearing.
- June 8, 2004 - A sixth Focus Group Meeting was held to present and gather input and feedback on the displays to be viewed at the Public Hearing.

### **Public Hearing**

The Authority held a Public Hearing on June 29, 2004 at the Perry Hall Middle School. The purpose of the Public Hearing was to allow all interested persons the opportunity to present their views regarding the proposed location and general design of the project alternates, as well as the associated social, economic and natural environmental effects. Approximately 100 people attended, with three providing public testimony, two providing private testimony which was recorded by a court reporter and 44 submitting comments after the Public Hearing. This includes comment cards received at the hearing or sent in to the Authority, letters and emails sent to the Authority, and phone calls made to the Authority. The main issues raised by the comments included:

- Noise issues along the entire portion of Section 100;
- Noted support for new transit initiatives within the study area;
- Concerns that the improvements would decrease safety of the roadway;
- Support for Alternate 1: No-Build;
- Support for the Alternate 3: Managed Lanes.

### **Public Outreach**

In addition to the Alternate Public Workshop and Public Hearing, the Authority participated in other public involvement activities. On June 23 and 27, 2004, the Authority staff handed out fliers and answered questions at White Marsh Mall to invite input and answer questions about the Public Hearing on June 29, 2004. On July 31, 2004 and October 2, 2004, Authority staff attended the Garden Village Community Festival and the Baltimore County Community Waterfront Festival, respectively, to answer questions concerning the Section 100 project.

## **MDTA'S SELECTED ALTERNATE**

*[NOTE: Maryland's streamlining procedures refer to "SHA's Selected Alternate," which is identified by SHA as the third concurrence point in the NEPA-404 process. The wording of this document is modeled on those streamlining procedures.]*

As noted above, FHWA and the Authority carried three alternates forward for detailed study: Alternate 1 – No Build; Alternate 2 – General Purpose Lanes; and Alternate 3 – Managed Lanes. After performing detailed engineering and environmental analysis for each of these alternates and considering public and agency input, the Authority selected Alternate 3 – Managed Lanes as its Preferred Alternate. FHWA has not yet selected or approved the Managed Lanes Alternate; FHWA's decision-making will occur at the conclusion of the NEPA process.

Alternate 1 (No Build) was not selected because it does not satisfy the purpose and need of the project. Minor improvements for normal traffic maintenance and safety operations proposed under Alternate 1 would not improve the safety or capacity along Section 100.

Having eliminated the No Build Alternate, the Authority compared the General Purpose Lanes Alternate and the Managed Lanes Alternate based upon the following evaluation criteria: (i) ability to meet Purpose and Need, (ii) environmental impacts, (iii) operational efficiency, (iv) cost, and (v) consistency with State transportation policy. The overall results of this comparison demonstrate that the Managed Lanes Alternate would more effectively meet these criteria, as explained below.

### **1. Ability to Meet Purpose and Need**

#### **a. Congestion**

Both the General Purpose Lanes Alternate and the Managed Lanes Alternate would provide congestion relief compared to the No Build condition, because both of the build alternates would provide substantial new capacity. However, the Managed Lanes Alternate would provide one important congestion relief benefit that is not available under the General Purpose Lanes Alternate: the ability to provide a consistently congestion-free travel option, which continues to be available even as traffic volumes increase over time.

Under the General Purpose Lanes Alternate, even with the addition of two general purpose lanes, the general purpose lanes will operate at a weekday peak of LOS E or worse. General purpose lanes provide only limited opportunities for travel demand management programs because the lanes cannot be altered. Thus, no management strategies could be implemented to alter the operation of the lanes to keep traffic flowing or provide flexibility for the lanes to be open to more or different user groups.

By contrast, the Managed Lanes Alternate provides the opportunity to implement a travel demand management system that would in turn provide superior service for motorists that

use the managed lanes. While the LOS for the managed lanes would vary depending upon the strategy utilized, the managed lanes are anticipated to operate at or above LOS D during weekday peak periods. These management strategies may be combined and modified to achieve changing regional transportation goals. Maximum flexibility of a managed lane system would best meet changing needs for the safe and efficient movement of people and goods across all transportation modes. One of the keys to the success of the managed lanes concept is the ability to alter the operation of the lanes in ways that keep traffic flowing and provides flexibility for the lanes to be open to more or different user groups, during day-to-day operations of the lanes or in situations where isolated incidents such as major accidents or other events block the movement of traffic.

Under the Managed Lanes Alternate, the operation of the managed lanes would affect the LOS for the general purpose lanes by affecting the number of trips, the number of trips made during a non-peak period of travel and/or a change in travel modes. By 2025, the general purpose lanes of the Managed Lanes Alternate would operate at a LOS E or worse during AM peak periods along southbound I-95 and PM peak periods along northbound I-95 (*Table 1*). The general purpose lanes would be somewhat more congested under the Managed Lanes Alternate than they would be under the General Purpose Lanes Alternate. However, under the Managed Lanes Alternate, the users of the general purpose lanes would have the option of using the less congested managed lanes for time-sensitive trips.

**Table 1. Project Weekday 2025 LOS Summary**

Alternate	ROADWAY SECTION		AM Peak Period		PM Peak Period	
			NB	SB	NB	SB
No-Build	I-895 to I-695		D	F	F	D
	I-695 to MD 43		D	F	F	E
General Purpose Lanes	I-895 to I-695		B	E	E	C
	I-695 to MD 43		C	E	E	C
Managed Lanes <sup>(1)</sup>	I-895 to I-695	ML	A	A-D	A-D	A
	I-895 to I-695	GP	C	E-F	E-F	C
	I-695 to MD 43	ML	A	A-C	A-D	A
	I-695 to MD 43	GP	C	E-F	E-F	D

(1) Varying management strategies for the Managed Lanes Alternate will influence the anticipated level of service.

**b. Safety**

Roadway safety is influenced by the number of contiguous lanes on a facility. If a facility contains too many lanes, drivers may be forced to traverse an increased number of lanes to enter and exit the roadway. This results in unsafe weaving on the roadway. In addition, the driver of a disabled vehicle will have more lanes to cross to reach the roadway shoulder. It is not necessarily unsafe for a roadway to have six contiguous lanes of traffic, but, as a general rule, it is preferable from a safety standpoint to have fewer contiguous lanes of traffic, which minimizes the risks associated with weaving traffic.

The Managed Lanes Alternate would have fewer contiguous lanes than the General Purpose Lanes Alternate. The Managed Lanes Alternate would have four contiguous general purpose lanes and two contiguous managed lanes. The General Purpose Lanes Alternate would have six contiguous lanes. With fewer contiguous lanes, the Managed Lanes Alternate would decrease the number of lanes that a driver would have to traverse and limit the amount of weaving when exiting and entering the roadway. The additional contiguous lanes provided by the General Purpose Lanes would increase the distance a driver must traverse to exit the roadway. Also, the distance a disabled vehicle would have to travel to the shoulder would increase. Therefore, it is expected that the number of accidents related to these types of movements would be less with the Managed Lanes Alternate as compared to the General Purpose Lanes Alternate.

## **2. Environmental Impacts.**

### **a. Natural and Human Environment**

The General Purpose Lanes Alternate has a slightly smaller footprint than the Managed Lanes Alternate, and thus would have a proportionally smaller direct impact on the natural and human environment. Notwithstanding this slight difference in footprint, the Managed Lanes Alternate could provide environmental benefits that would not be provided by the General Purpose Lanes Alternate. A long-term benefit of the Managed Lanes Alternate is that appropriate management of the managed lanes could cause motorists to modify travel behavior, thus reducing the need for future highway widening and its associated environmental impacts. The Managed Lanes Alternate would cause short-term environmental benefits as well, such as reducing vehicle emissions by creating a transportation facility that maintains stable travel speeds.

### **b. Land Use Impacts**

The Maryland Department of Planning (MDP) employed a land use analysis methodology in 2004 to estimate the impact of the General Purpose Lanes Alternate and the Managed Lanes Alternate on household location in 2025. This pilot methodology, which was specifically developed for the Section 100 project, provides a preliminary analysis of potential residential development rates for the study area.

The findings of MDP's transportation and land use analysis indicate that both the General Purpose Lanes and Managed Lanes Alternates would contribute to land use/residential development rates in Harford County and eastern Baltimore County. As compared to the General Purpose Lanes Alternate, the Managed Lanes Alternate would generally have a slower rate of residential development in both counties.

By 2025, the General Purpose Lanes Alternate would result in more residential development in areas outside of Priority Funding Areas along the I-95, MD 543, and MD 152 corridors than the Managed Lanes Alternate. The General Purpose Lanes Alternate would also result in a faster rate of development in rural areas of northern and eastern Harford County. It is anticipated that the Managed Lanes Alternate would produce a

lower rate of residential development in non-Priority Funding Areas of Baltimore and Harford Counties than the General Purpose Lanes Alternate through 2025, without changing the currently designated geographical pattern of residential development in the region.

The modeled differences in development rates can be attributed to the fact that as the apparent cost and time of travel increase, demand for residential development decreases. Compared to the General Purpose Lane Alternate, the Managed Lane Alternate would generate an added cost of tolls or/and a slightly higher congestion delay in the general purpose lanes, resulting in impedance to travelers and decreased residential development pressure.

### **3. Operational Efficiency**

#### **a. Incident Management**

The Managed Lanes Alternate offers a greater benefit than the General Purpose Lanes Alternate for incident management. First, physical separation of the general purpose and managed lanes of the Managed Lanes Alternate would provide adjacent detour routing and/or access for emergency services during traffic-related and other incidents. In addition, the managed lanes would provide emergency responders with unimpeded access throughout Section 100, since the managed lanes would operate at LOS D or better. Furthermore, by having a maximum of four contiguous lanes (general purpose) and additional shoulders associated with the managed lanes, additional areas would be available for crews to work and safely access necessary sites. The General Purpose Lanes Alternate would not provide these incident-management benefits.

#### **b. Facility Maintenance**

The Managed Lanes Alternate is preferable to the General Purpose Lanes Alternate in terms of facility maintenance. With the Managed Lanes Alternate, most maintenance activities can be accomplished by diverting traffic (during non-peak hours) to either the managed lanes or to the general purpose lanes, which are separated by a barrier or other buffer. Because the General Purpose Lanes Alternate does not include such separation, it would not be possible to divert traffic to a separated roadway for maintenance activities. The Managed Lanes Alternate provides the additional benefits of only requiring minimal efforts and materials to redirect traffic, and enhancing worker safety due to the concrete barrier that would separate workers from the traffic. (Note: The managed lanes and general purpose lanes would be barrier-separated to the north of the I-695 interchange. To the south of the I-695 interchange, the managed lanes and general purpose lanes would be separated by a four-foot buffer, not a barrier.)

#### **c. Intermodal Access**

Section 100 provides access to the Port of Baltimore, Baltimore Washington International (BWI), and Martin State Airports, Amtrak rail service, and the local transit system. In

order to provide dependable intermodal connectivity, it is important that highway travel times remain fairly consistent, and that those times be perceived as reasonable by users. Based upon the flexibility afforded by the Managed Lanes Alternate, a facility operator has the ability to consistently manage traffic volumes to provide travel speed and travel time with a high degree of certainty. It is anticipated that the managed lanes would operate at LOS D or better, thereby providing faster, more consistent travel conditions as compared to the General Purpose Lanes Alternate, which would operate at LOS E during weekday peak periods and which do not include any mechanisms to assure consistent travel times – and would thus provide a much lower level of predictability and reliability for freight shippers and transit providers. The more predictable travel times associated with the Managed Lanes Alternate would create advantages for transport fleets with schedules to meet, such as those engaged in transit services or commercial “just in time” freight delivery services.

#### **d. Facilitation of Transit Service**

While the General Purpose Lanes Alternate would involve the addition of lanes to accommodate projected traffic volumes, this alternate would only have a moderate effect on bus transit in the Section 100 corridor. This is because all travelers, including transit services, would experience decreasing benefits as traffic volumes grow over time. The General Purpose Lanes Alternate would not provide a way for transit vehicles to avoid increasing congestion. Thus, transit vehicles would experience the same increase in level of traffic congestion as general traffic, and there would likely be no incentives for bus usage due to a lack of variation in travel time from autos.

Bus transit could benefit from the implementation of managed lanes. Managed lane strategies preserve a portion of the highway capacity for priority needs by providing opportunities for eligible vehicles, such as buses, to maintain generally free-flow travel speeds on designated lanes. By utilizing the managed lanes, buses could benefit from the higher level of service that could be provided in these managed lanes. This could have the result of improving the attractiveness of transit services by providing reliable and predictable transit service times. Therefore, by implementing managed lanes, bus ridership would likely increase. Preliminary indications are that a 6% increase in ridership would be expected.

#### **4. Cost**

Both the General Purpose Lanes Alternate and the Managed Lanes Alternate would be funded by the Authority from toll revenues, which are drawn from I-95 and other facilities owned by the Authority. Sufficient funds have been budgeted by the Authority to cover the cost of construction for either of these build alternates.

The preliminary cost estimate for the General Purpose Lanes Alternate is approximately \$558.5M, while the preliminary cost estimate for the Managed Lanes Alternate is approximately \$824.6M. These preliminary costs do not include right-of-way (ROW) or mitigation costs. The estimated cost for the General Purpose Lanes Alternate’s additional

ROW (i.e. seven displacements and 140 parcels) and mitigation is approximately \$12M. The estimated cost for the Managed Lanes Alternate's additional ROW (i.e. seven displacements and 210 parcels) and mitigation is approximately \$22M.

While the Managed Lanes Alternate has a higher cost, it also has the potential to provide an additional revenue source – the tolls collected from the managed lanes if the managed lane strategy that is employed includes priced lanes (i.e. tolls). The revenues from such priced lanes would help offset the cost to construct and manage the facility.

## **5. Consistency with State Transportation Policy**

On May 4, 2004, the Maryland Secretary of Transportation announced an Express Toll Lanes (ETL) initiative. Under this initiative, the Secretary has directed the Maryland Department of Transportation and Maryland Transportation Authority to consider implementing ETLs on several existing facilities in Maryland, including I-95. The ETL concept, as outlined in this initiative, involves the construction of new tolled lanes adjacent to existing free lanes. Tolls would be collected electronically, without the use of toll booths, and would vary by time of day and demand.

The Managed Lanes Alternate, as defined in the EA, would allow for a wide range of management strategies to be implemented, including the Express Toll Lanes concept. The General Purpose Lanes Alternate would not allow for tolling and thus is not compatible with the Secretary's policy favoring the establishment of Express Toll Lanes.

## **SUMMARY OF ENVIRONMENTAL IMPACTS**

A detailed analysis of the Managed Lanes Alternate was conducted to determine potential effects to socioeconomic, cultural and natural environmental resources (*Table 2*). The following is a summary of impacts associated with the Managed Lanes Alternate.

### **Socioeconomic Resources**

Existing land use along the Section 100 study area is dominated by residential land from the I-95/I-895(N) split to the I-695 Interchange. North of the I-695 Interchange, the study area is dominated by a mix of forested, residential, and commercial land, with some sparsely scattered areas of open space and industrial land.

The Managed Lanes Alternate would result in the direct conversion of only minor amounts of residential, commercial, forested, and open space land to transportation use. These minor land use impacts would be located throughout the Section 100 corridor, adjacent to the existing highway. As previously stated, the purpose of Section 100 is to address capacity and safety needs on Section 100 and thereby improve access, mobility, and safety for local, regional and inter-regional traffic, including passenger, freight, and transit vehicles. Although the project needs include capacity and safety, the State and county land development policies will determine the extent, pace, and location of development growth along I-95. Section 100 would accommodate future planned growth

within the study area; however, future growth is not dependent on proposed improvements to Section 100. The alternate would affect local residential development rates. Section 100 is currently, and would remain, a fully access-controlled highway under the Managed Lanes Alternate.

**Table 2. Summary of Impacts**

<b>RESOURCE CATEGORY</b>	<b>The Managed Lanes Alternate</b>
<b>Residential (acres)</b>	29.0
<b>Commercial (acres)</b>	19.1
<b>Other (acres)</b>	49.6
<b>TOTAL ROW (acres)</b>	97.7
<b>Residential Displacements (number)</b>	7 residences 12 outbuildings
<b>Commercial Property Structural Displacements (number)</b>	1
<b>Wetlands (acres)</b>	4.87
<b>Stream Impacts (linear feet)</b>	14,211
<b>Stream Impacts (square feet)</b>	182,731
<b>Floodplain (acres)</b>	44.9
<b>Woodland (acres)</b>	210.6
<b>Threatened/Endangered Species Impacts (species)</b>	0
<b>NR/NRE Historic Sites Impacted (number)</b>	0
<b>NR/NRE Archaeological Sites Impacted (number)</b>	0
<b>Noise Impacts (number)</b>	17 NSAs
<b>Air Quality Impacts (sites exceeding CO S/NAAQS)</b>	0
<b>Section 4(f) Resource Impacts (number)</b>	0

The majority of the improvements associated with the Managed Lanes Alternate would be located within the Authority's existing ROW; however, approximately 97.7 acres of new ROW would be required. Seven residences and twelve residential outbuildings would be displaced.

Five residences and five residential outbuildings displaced within the vicinity of the I-95/I-695 Interchange could not be avoided except by shifting the roadway to the east, which would result in greater impact to local communities. (**Plates 33 and 37**). Two residences and two residential outbuildings would be displaced along East Avenue south of the I-95/I-695 Interchange. One residence and one residential outbuilding displacement occurring along eastbound I-695 are within 30 feet of the proposed roadway footprint (**Plate 36**). The Authority determined that any building within 30 feet from the roadway would be considered a displacement. Two residences and two residential

outbuildings are anticipated displacements along the northeast quadrant of the I-95/I-695 Interchange (**Plate 40**).

The sixth and seventh residential displacements and four residential outbuildings would be displaced along the east side of I-95 north and south of Cowenton Avenue (**Plate 49**).

Three outbuilding structures that would be displaced are located on the Community College of Baltimore County – Essex Campus (**Plate 40**). All of these buildings are used for storage associated with the maintenance facility. The Authority has coordinated with the College and anticipates that all three outbuildings may be relocated within the existing campus.

The Managed Lanes Alternate would result in the displacement of one agricultural business located just north of Cowenton Avenue. Because this alternate involves the widening of an existing access-controlled highway corridor and would not add or remove any interchanges, access to local businesses would not be substantially altered. In addition, by improving traffic operation along I-95 through this corridor and, therefore, reducing traffic congestion, access to local businesses would be improved.

An analysis of affected persons in the study area indicates that no disproportionate adverse impacts would occur to minority or low-income populations as a result of the Managed Lanes Alternate.

Bus transit would benefit from the implementation of managed lanes under the Managed Lanes Alternate. By utilizing the managed lanes, buses would benefit from the reduced congestion and travel times that would be provided in these managed lanes. The travel demand modeling completed as part of the Section 100 study projects a nine minute travel time savings on the Section 100 portion of I-95 in the managed lanes versus using the four general purpose lanes. The modeling effort calculates a 6% increase in transit ridership in the corridor due to this time savings in the forecast year 2025. The estimates for the I-95 study are consistent with national experience in transit. Elasticities from documentation such as Traveler Response to Transportation System Changes indicate that a nine minute travel time savings on a 32 minute trip (present travel time from White Marsh to Downtown Baltimore) coupled with an increase in service to accommodate demand would yield a projected ridership increase between 3 to 11 percent.

It is anticipated that access to and from the managed lanes at the interchanges would be convenient for buses as direct access ramps are included in the design of the Managed Lanes Alternate. This includes buses entering at the MD 43 Interchange, as well as buses continuing on I-95 from Harford County.

Effects on visual quality for the Authority's completed Recommended Alternate would include expanded travel lanes, reduced median width, and new structures along the corridor. There would be less vegetation along the highway in medians and along roadsides. The roadway width would change from eight lanes to twelve lanes plus additional shoulders for the managed lanes, making the highway approximately 64 feet

wider than the existing roadway. The added lanes and shoulders would remove all existing green space in the median and extend into the roadsides. New highway structures would be highly visible along the corridor. The I-95/I-695 interchange configuration has been revised since the EA. The new interchange configuration at I-695 would contain four levels. The first level would be used for I-695 eastbound and westbound traffic, the second and third levels would be designated for on- and off-ramps between I-95 and I-695, and the upper-most level would carry traffic for I-95 southbound and northbound general purpose and managed lanes. The proposed structure would increase the current structure height by approximately 63 feet (33 feet lower than the configuration presented in the EA). The I-95 general purpose and managed lanes would be more visible than the existing interchange at a distance by motorists approaching the interchange on both I-95 and I-695 and by the surrounding communities. However, despite these changes, the overall visual appearance would still be consistent with the visual character of the interstate highway system as it currently exists.

The Managed Lanes Alternate would have a positive effect on emergency services throughout the project area. Traffic congestion along I-95 would be reduced, thereby improving emergency response times and access to existing facilities. In addition, the Authority is working closely with emergency response providers to improve safety and access to median crossovers.

## **Cultural Resources**

The State Historic Preservation Officer (SHPO) has determined that one site that is eligible for listing in the National Register of Historic Places (NRHP) is located within the Area of Potential Effect (APE). This site is a residence located at 11204 Lilac Lane. Currently, it has been determined through the National Historic Preservation Act Section 106 process that the Managed Lanes Alternate would have “no adverse effect” on the 11204 Lilac Lane residence. In addition, the project will not result in a Section 4(f) use of the property.

Studies were performed to identify archaeological resources and the potential effects on these resources. Phase I testing within the APE identified one potentially significant archeological resource – the Smith Site (18BA516). After further coordination with the Maryland Historic Trust (MHT), the Smith Site was determined ineligible for the NRHP.

## **Natural Environment**

### *Farmlands*

Because the area surrounding Section 100 is designated for urban development, Prime Farmland Soils and Soils of Statewide Importance located within the study area are exempt from Farmland Protection Policy Act of 1981 (FPPA) coordination. There are no active agricultural lands affected by this project.

### *Waters of the US*

Several stream crossings would be required for the Managed Lanes Alternate, thereby resulting in stream impacts. There would be approximately 14,211 linear feet of stream

affected by the project: 7,169 linear feet of perennial stream, 3,854 linear feet of intermittent stream, and 3,188 of ephemeral drainage (*Table 3 and Appendix A*). The impacts would include culvert extensions, channel relocations, filling of waters, or piping of waters between existing culverts. Stream impact numbers have been reduced since publication of the Environmental Assessment because of refinements to the jurisdictional status of waters.

Streams within the Section 100 study area are within either Use I or Use IV stream classifications, as defined by the Code of Maryland Regulations (COMAR) 26.08.02.03. The majority of stream impacts would occur within Use I waters. Use I water quality standards are the least stringent of the four classifications, meaning that these waters typically do not provide pristine aquatic habitat as compared to the other use classifications. Use I waters are mainly protected for the purposes of maintaining water contact recreation and protection of aquatic life. The following streams in the project area are classified as Use I waters: Moores Run, Redhouse Creek, Stemmers Run (northwest of I-95), Bird River, and Gunpowder tributary. In-stream work is prohibited during the period between March 1 and June 15 during any year for Use I waters.

This project would also impact Use IV waters, which are classified as “Recreation Trout Waters” and typically considered higher quality waters according to the COMAR 26.08.02.03. Stemmers Run (southeast of I-95), South Fork, and White Marsh Run are considered Use IV waters. In-stream work is prohibited during the period between March 1 and May 31 during any year for Use IV waters.

**Table 3. Stream Impacts from the Managed Lanes Alternate**

<b>Watershed</b>	<b>Herring Run</b>	<b>Redhouse Creek</b>	<b>Stemmers Run</b>	<b>White Marsh Run</b>	<b>Bird River</b>	<b>Gunpowder River</b>	<b>Total</b>
<i>Impacts in Linear Feet*</i>							
Perennial	174	347	2,577	1,832	566	1,673	7,169
Intermittent	122	773	2,155	370	307	127	3,854
Ephemeral	0	0	0	3,188	0	0	3,188
<b>Total (lf)</b>	<b>296</b>	<b>1,120</b>	<b>4,732</b>	<b>5,390</b>	<b>873</b>	<b>1,800</b>	<b>14,211</b>
<i>Impacts in Square Feet*</i>							
Perennial	4,909	10,164	54,089	29,114	4,993	8,275	111,544
Intermittent	244	6,455	21,047	5,218	1,995	127	35,086
Ephemeral	0	0	0	36,101	0	0	36,101
<b>Total (sf)</b>	<b>5,153</b>	<b>16,619</b>	<b>75,136</b>	<b>70,433</b>	<b>6,988</b>	<b>8,402</b>	<b>182,731</b>

\*All stream impacts are permanent.

### Soils

The Managed Lanes Alternate would expose soils during the construction phase, thereby potentially resulting in soil erosion and subsequent sedimentation. Erosion and sedimentation would primarily be caused by removal of existing vegetation and placement of fill, leading to increased exposure of soils to weather and runoff potential. Eroded soils could be washed into nearby streams and wetlands, resulting in sedimentation. The areas with the highest potential for erosion and sedimentation would

be the I-95/I-695 Interchange and I-95/MD 43 Interchange. These two areas would require relatively large amounts of earthwork to accommodate the proposed interchange improvements, thereby exposing the greatest amount of soil.

The Managed Lanes Alternate would increase the amount of impervious surface in the study area. This 62% increase in impervious area would increase the amount of stormwater runoff. With stormwater runoff amounts increasing, increased erosion and sedimentation will occur in areas exposed during local construction. This would eventually increase the sediment load in local waterways. The impervious area for each alternate is listed in *Table 4*.

Wetlands

The majority of effects to wetlands caused by the Managed Lanes Alternate would occur from widening the mainline of I-95, and improvements to the I-95/I-695 Interchange (*Table 5 and Appendix A*). The most extensive impact to wetlands would occur in the median of I-95 north of Joppa Road, where systems BRBR-WET5, GPJR-WET6, 7, and 8 would be filled. Impacts to wetlands within the Herring Run, Redhouse Creek, Stemmers Run (outside of the I-95/I-695 Interchange), White Marsh Run (except WMHG-WET3), and Bird River 3<sup>rd</sup> Order Watersheds would occur along the I-95 and I-695 mainline widening, where wetland systems that have hydrology linked to existing roadway drainage would be filled. The primary function of all of these wetlands is sediment retention, sequestration of nutrients, and toxicant retention. Total wetland impacts for the Managed Lanes Alternate would be approximately 4.87 acres. Wetland impact numbers have been reduced since publication of the Environmental Assessment because of refinements to system Jurisdictional status.

**Table 4. Estimated Proposed Impervious Area**

<b>3<sup>rd</sup> Order Watershed</b>	<b>Existing Impervious Area (acres)</b>	<b>Proposed New Impervious Area (acres)</b>	<b>Percent Increase Over Existing</b>
Moores Run	33	49	50%
Redhouse Creek	31	41	33%
Stemmers Run	63	114	80%
White Marsh Run	92	156	69%
Bird River	14	22	60%
Gunpowder River	14	18	30%
<b>Total</b>	<b>247</b>	<b>400</b>	<b>62%</b>

Floodplains

The Managed Lanes Alternate would affect approximately 45 acres of floodplains in the study area. This would include approximately 1.5 acres of impacts in the Redhouse Creek 3<sup>rd</sup> Order Watershed, approximately 36.2 acres of impacts within the I-695 Interchange Stemmers Run 3<sup>rd</sup> Order Watershed, and approximately 5 acres of additional transverse impacts within the White Marsh 3<sup>rd</sup> Order Watershed. Floodplain impacts for the Managed Lanes Alternate are described in *Table 6* and shown on corresponding plates in *Appendix A*.

**Table 5. Wetland Impacts from the Managed Lanes Alternate \***

Watershed	Herring Run	Redhouse Creek	Stemmers Run	White Marsh Run	Bird River	Gunpowder River	Total
POW	0.0	0.0	0.0	0.8	0.0	0.0	0.8
PEM	0.0	0.14	1.41	1.17	0.0	0.39	3.11
PSS	0.0	0.0	0.42	0.0	0.0	0.0	0.42
PFO	0.0	0.0	0.09	0.05	0.05	0.35	0.54
<b>Total (acres)</b>	<b>0.0</b>	<b>0.14</b>	<b>1.92</b>	<b>2.02</b>	<b>0.05</b>	<b>0.74</b>	<b>4.87</b>

\*All wetland impacts are permanent.

**Table 6. Impacts to Floodplains from the Managed Lanes Alternate**

3 <sup>rd</sup> Order Watershed	Floodplain	Managed Lanes Alternate	Plate No.
Redhouse Creek	Moore's Run	0.64	27-29
	Redhouse Creek	0.92	32
Stemmers Run	Stemmers Run	36.16	34-39
White Marsh	White Marsh Run	5.44	44, 45, 47
	Honeygo Run	1.75	48
Lower Gunpowder	Gunpowder	0	52
<b>Total</b>		<b>44.91</b>	

Forests

Widening I-95 would affect existing forest edge and create new forest edge, thereby potentially reducing or eliminating a shallow wooded buffer between I-95 and some adjacent communities. In addition, the proposed I-895 northbound span over Moore's Run and I-95 would affect a forested area east of the existing interchange. **Table 7** shows the amount of forested area that would be impacted by the Managed Lanes Alternate.

FIDS

The Managed Lanes Alternate would impact approximately 6.31 acres of Forest Interior Dwelling Species (FIDS) habitat within the study area due to the placement of SWM facilities and roadway widening. The results will be moving the forest edge to the interior. These facilities would be located adjacent to the roadway embankment within several wooded areas of the Bird River 3<sup>rd</sup> Order Watershed (**Plates 49 and 50**).

Large and Significant Trees

The Managed Lanes Alternate would impact eleven large and significant trees (**Table 8**). Ten of the eleven large and significant trees affected by the Managed Lanes Alternate would be removed.

Threatened and Endangered Species

The U.S. Fish and Wildlife Service (FWS) indicated that “except for occasional transient individuals, no federally proposed or listed endangered or threatened species are known to exist within the study area.” Correspondence concerning State-listed threatened or endangered species with the Maryland Department of Natural Resources (DNR) indicated the presence and location of a Least Tern (*Sterna antillarum*) and the potential presence of four plant species of concern within the study area. Field habitat surveys conducted during the Summer of 2003 identified no State species of concern within the study area. It has been determined that there will be no State- or Federal-listed threatened or endangered species impacted by the Managed Lanes Alternate.

**Table 7. Woodland Impacts by Sub-Watershed**

Sub-Watershed	Woodland Impact (acres)
Moores Run	18.23
Redhouse Creek	12.32
Stemmers Run	80.75
White Marsh Run	80.81
Bird River	13.21
Gunpowder River	5.28
<b>Total</b>	<b>210.6</b>

**Table 8. Impacts to Large and Significant Trees from the Managed Lanes Alternate**

Tree #	Plate #	Tree Species		Impact to Critical Root Zone (Percent)	
		Common Name	Scientific Name	Percent	Removed or Impacted
50	32	Southern red oak	<i>Quercus falcata</i>	60	Removed
49	32	Chestnut oak	<i>Quercus prinus</i>	60	Removed
53	38	Red oak	<i>Quercus rubra</i>	30	Removed
57	36	White oak	<i>Quercus alba</i>	60	Removed
59	36	Southern red oak	<i>Quercus falcata</i>	30	Removed
60	40	Southern red oak	<i>Quercus falcata</i>	50	Removed
61	41	Black willow	<i>Salix nigra</i>	5	Impacted
62	41	Black willow	<i>Salix nigra</i>	40	Removed
63	41	Silver maple	<i>Acer saccharinum</i>	100	Removed
77	35	Yellow poplar	<i>Liriodendron tulipifera</i>	5	Removed
78	35	Yellow poplar	<i>Liriodendron tulipifera</i>	15	Removed

Noise

Noise Abatement Criteria (NAC) for various land uses have been established by the FHWA in Title 23 of the Code of Federal Regulations, Part 772 (23 CFR, Part 772) Procedures for Abatement of Highway Traffic Noise and Construction Noise and the Maryland State Highway Administration (SHA) Sound Barrier Policy (SHA, 1998).

These categories and criteria are presented in **Table 9**. The noise abatement criterion for most land uses occurring in the project study area (Category B) is 67 dBA Leq. However, Receptor 12-1 falls under Category C, which has a criterion of 75 dBA Leq.

According to the procedures described in 23 CFR, Part 772, noise impacts occur when predicted traffic noise levels for the design year approach or exceed the NAC prescribed for a particular land use category, or when the predicted noise levels are substantially higher than the existing ambient noise levels. The SHA *Sound Barrier Policy* defines the term “approaches” as 66 dBA for Category B and as 74 dBA for Category C, and defines a 10 dBA increase above existing noise levels as a substantial increase.

Seventy-one (71) receptor sites within 23 Noise Sensitive Areas (NSA) were selected to represent the overall noise environment and to determine locations where residences may be impacted by traffic noise associated with the Managed Lanes Alternate. Of the 23 NSA’s, the Federal Noise Abatement Criteria were exceeded at 17, and noise mitigation was evaluated at each of these areas. The use of earth berms are generally not appropriate for urban areas, such as Section 100 because of the right-of-way constraints. Therefore, sound barriers were evaluated for each impacted area. Any existing noise abatement measures that are affected by the Section 100 project, including berms and noise walls, would be replaced with new measures. Both NSA 1 and 3 have existing noise walls currently in place. The existing wall at NSA 1 would need to be modified near Receptor 1-1 (north end of the barrier) from 17-foot to 23-foot high noise barrier, for approximately 1,251 feet paralleling northbound I-95. In NSA 3, 725 feet of the north end of the existing barrier would need to be rebuilt west of the existing barrier.

**Table 9. Noise Abatement Criteria (NAC), 23 CFR, Part 772: Hourly A-Weighted Sound Level in Decibels (dBA) \***

Activity Category	L <sub>eq</sub> (h)	L <sub>10</sub> (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, libraries, and hospitals.
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.

\* Either L<sub>eq</sub>(h) or L<sub>10</sub>(h) (but not both) may be used on a project.

*Note:* These sound levels are only to be used to determine impact. These are the absolute levels where abatement must be considered. Noise abatement should be designed to achieve a substantial noise reduction - not the noise abatement criteria.

### Air

The Section 100 study area is located within the Metropolitan Baltimore Intrastate Air Quality Control Region. Within this region, Baltimore County and Baltimore City are designated as “severe” non-attainment for the 1-hour Ozone Standard and as “moderate” non-attainment for the 8-hour Ozone Standard. Because of this non-attainment designation for ozone, all federally assisted projects within this region must conform to the applicable State Implementation Plan (SIP) for achieving the 1-hour and 8-hour ozone air quality standards. Because this project requires approvals from FHWA for changes to Interstate access, this project is subject to the air quality conformity requirement.

Under the federal air quality conformity regulations, conformity determinations for transportation projects are based on a regional analysis of all projects included in the metropolitan long-range transportation plan. Accordingly, the conformity determination for the Section 100 project will be based on the inclusion of this project in a conforming plan for the Baltimore region.

Section 100 is currently included in the 2001 Baltimore Regional Transportation Plan as an “illustrative” project, which means that it was not considered in making the conformity determination for that plan. It is anticipated that the Section 100 project will be included in the new long-range plan, Transportation 2030, which is scheduled for federal approvals in February 2005. The conformity status of the long-range plan will be determined concurrently with the conformity for the Baltimore TIP.

The Authority is currently coordinating with the Baltimore Metropolitan Council (BMC) regarding inclusion of the Section 100 project into the new cycle for the Baltimore Region Transportation Improvement Program (TIP) for 2005-2009. Conformity determination for the 2005-2009 TIP is scheduled for July 2004.

In addition to regional analysis for compliance with the ozone standard, modeling also has been conducted using the EPA’s CAL3QHC model to determine whether the project would cause any carbon monoxide (CO) “hotspots.” Model runs were completed for AM peak hour, PM peak hour, and eight-hour average traffic volumes for both the build year (2010) and the design year (2025). CAL3QHC models did not predict any concentrations that would exceed the State and National Ambient Air Quality Standards (S/NAAQS) of 35 parts per million (ppm) for the one-hour concentration or nine ppm for the eight-hour concentration for CO. [This project does not fall within the Baltimore City Maintenance Zone for carbon monoxide.](#)

The construction phase of the proposed project has the potential to impact the local ambient air quality by generating fugitive dust through activities such as demolition and materials handling. SHA has established *Specifications for Construction and Materials*, which describe procedures to be followed by contractors involved in site work. The Authority adheres to these specifications to minimize construction-related impacts. The Maryland Air and Radiation Management Administration (ARMA) was consulted, and

determined that these specifications would satisfy the requirements of the *Regulations Governing the Control of Air Pollution in the State of Maryland*.

### **Publicly Owned Parks and Recreation Areas**

There would be no impacts to publicly owned public parks and/or recreation areas or other properties protected under Section 4(f) within the study area as a direct result of the Section 100 project. A potential stream enhancement project involving Stemmers Run in Linover Park may occur as part of mitigation for this project. This mitigation would have a beneficial effect on the Linover Park property, and would be closely coordinated with the Baltimore County Department of Recreation and Parks. This improvement would not constitute the “use” of a Section 4(f) resource. Additional details on the potential stream enhancement are described later in this document.

### **MINIMIZATION MEASURES**

This section describes the minimization and avoidance efforts the Authority has incorporated into the Managed Lanes Alternate. **Appendix A** contains all the plates showing locations of the minimization and avoidance efforts made to date. Minimization and avoidance efforts would continue throughout the roadway design phase.

Avoidance and minimization efforts were analyzed for the entire length of the project area. In general, socioeconomic and natural resources constraints prohibit major shifts in the existing Section 100 alignment. Shifting the roadway to one side to avoid resources would impact additional resources on the opposite side of I-95.

To minimize the effects to all resources, 2:1 fill slopes, rather than standard 4:1 fill slopes, were used throughout the project area to reduce the amount of fill area required for the project and reduce the amount of additional ROW required. In addition, structures such as retaining walls and extended bridge spans were used to avoid and/or minimize impacts to specific socioeconomic and natural resources.

### **Socioeconomic**

#### *Communities / Community Facilities and Services*

Impacts to the Garden Village community, located north of the I-95/I-895 split, were avoided by adding a retaining wall between Stations 138 and 144 along southbound I-95. The Chesaco Heights community, located south of the Chesaco Avenue overpass, was avoided with the addition of a retaining wall between Stations 160 and 168 along southbound I-95 (**Plates 29 and 30**).

The placement of the I-95/I-695 Interchange and associated approaches was selected to avoid extensive impact to the Willow Hill community and the majority of residences along East Avenue (**Plates 33 and 37**).

Impacts to Brushfield Road were avoided with the addition of a retaining wall along I-695 westbound, just west of the I-95/I-695 Interchange (**Plate 36**).

To avoid the Crystal Spring community, a retaining wall is proposed along the ramp from I-695 eastbound to I-95 southbound (**Plate 37**). The Pentecostal Holiness Church, located adjacent to the northwest quadrant of the I-95/I-695 Interchange, would be avoided through the addition of a retaining wall along the ramp from I-95 southbound to I-695 westbound (**Plate 37**).

The “Big Inch” water line, which is located in the northwest quadrant of the I-95/MD 43 Interchange and runs north along the west side of I-95 until it crosses I-95 at Station 507, would be avoided using a retaining wall from Station 458 to Station 507 (**Plates 46, 48, and 49**).

## **Natural Environment**

This section describes the efforts made to avoid and minimize impacts to the natural resources found throughout the project area.

### Soils

Several methods would be used in combination during construction to decrease erosion effects, including structural, vegetative, and operational methods. These control measures could include:

- Seeding, sodding, and stabilizing slopes as soon as possible to minimize the exposed area,
- Stabilizing ditches at the tops of cuts and at the bottoms of fill slopes before excavation and formation of embankments,
- Proper use of sediment traps, silt fences, slope drains, water holding areas, and other control measures, and
- 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 Sedimentation (E&S) plan would be prepared and implemented prior to (and during) construction, in accordance with Maryland Department of the Environment (MDE) regulations. The grading plan and E&S plan would minimize the potential for impacts to water quality from erosion during pre-construction and post-construction activities. Measures to prevent erosion in highly susceptible areas (i.e. steep slopes) would be included in the grading and E&S plans as necessary. In general, the topography of the study area is relatively gentle (average 0-5 percent); however, there are localized areas of steeper slopes that may equal or exceed 15 percent. Where these areas coincide with proposed improvements, appropriate engineering measures and sediment controls and would be employed to reduce erosion and sedimentation.

### Water Quality

The *2000 Maryland Stormwater Design Guidelines* would be used to determine the amount of SWM facilities necessary to properly control and treat stormwater runoff. Study points have been established at all locations where runoff or concentrated flow would leave the project site. Potential erosion from the increased runoff would be offset by SWM requirements. Best Management Practices (BMPs), as found in the *2000 Maryland SWM Design Manual* would be used throughout the project to reduce the impacts of erosion and sedimentation on wetlands and waterways.

### Waters of the United States

Complete avoidance of stream systems by the Managed Lanes Alternate is not feasible because most systems lie perpendicular to existing I-95. Minimization efforts for Waters of the United States (WUS) includes the use of steeper (2:1) roadway embankments and retaining walls to minimize the footprint. As this project progresses into final design, avoidance and minimization measures would continue to be evaluated. Additional effects would be considered in the minimization design efforts include shading, loss of riparian vegetation, and potential changes to stream hydrology/hydraulics. Many streams in the study area currently have floodplain access; this would be retained wherever possible to preserve benefits such as velocity dissipation, storage, and sedimentation/stabilization. Retaining or adding riparian buffers, as well as fish passage through structures, would be considered during the project's design phase. Table 10 lists specific locations in which efforts were used to avoid or minimize impacts.

### Wetlands

Avoidance and minimization efforts were analyzed for the entire length of the project area. Avoidance of the wetlands located adjacent to existing I-95 was not achievable in several instances without an impractical alignment shift. Unavoidable impacts to wetlands would be minimized by using steeper cut and fill slopes or constructing retaining walls wherever possible and reasonable. South of the I-95/I-695 interchange, many of the wetlands to be impacted by the Managed Lanes Alternate are roadside ditches, which are of poor functional value. From the I-95/I-695 Interchange to the MD 43/I-95 Interchange, shifting the alternate to the west would impact South Fork Branch which runs parallel to I-95; the "Big Inch" waterline; and larger open-ended wetland systems. Shifting the alignment to the east would impact parkland and the Lilac Lane historic property. The section north of the MD 43/I-95 Interchange was specifically designed to impact the median and minimize impacts to the higher quality streams and wetlands to the west and east. Table 11 lists specific locations in which efforts were used to avoid or minimize impacts to wetlands.

### Floodplains

Any encroachment upon the 100-year floodplain would require detailed hydrology and hydraulics analysis to assure minimal floodplain impacts. Avoidance and minimization efforts include reducing encroachments by increasing the steepness of fill slopes and/or incorporating retaining walls. In addition, the proposed bridge span that carries the I-895 northbound general purpose lanes over the existing I-95 southbound and proposed I-95 northbound lanes will be lengthened to avoid Moore's Run and minimize floodplain

encroachment. Because of the increased height of the proposed bridge over the existing grade, the lengthening of the bridge span was a viable minimization option that could be implemented into the design. Table 12 lists additional locations in which efforts were used to avoid or minimize impacts to floodplains.

**Table 10. Locations of Avoidance and/or Minimization Efforts for Streams**

Minimization Effort	Location	Plate Number	Stream (s)
Retaining Wall	Station 174 to 187 right	Plate 31	HRRC-WUS 3 and HRRC-WUS 2
Retaining Wall	Station 203 to 210 right	Plate 32	HRRC-WUS 1
Retaining Wall	I-695 westbound north of the I-95/I-695 Interchange	Plate 34	SRSR-WUS 45 and SRSR-WUS 43
Retaining Wall/Headwalls	Station 317 right and Station 326 right	Plate 41	WMSF-WUS 1, WMSF-WUS 9, and WMSF-WUS 10
Retaining Wall	Station 477+50 to 485 left	Plate 48	WMHG-WUS 11 and WMHG-WUS 12

**Table 11. Locations of Avoidance and/or Minimization Efforts for Wetlands**

Minimization Effort	Location	Plate Number	Stream (s)
Retaining Wall	I-695 eastbound south of the I-95/I-695 Interchange	Plate 38	SRSR-WET 23 and SRSR-WET 25
Retaining Wall	Station 477+50 to 485 left	Plate 48	Wetland next to WMHG-WUS 10

**Table 12. Locations of Avoidance and/or Minimization Efforts for Floodplains**

Minimization Effort	Location	Plate Number	100-Year Floodplain
Retaining Wall	Southbound general purpose lanes at Moore's Run Park	Plate 27	Moore's Run
Retaining Wall	I-695 westbound off-ramp to I-95 northbound	Plate 37	Stemmer's Run
Retaining Wall	I-95 southbound off-ramp to I-695 eastbound	Plate 37	Stemmer's Run
Retaining Wall	I-695 westbound south of the I-95/I-695 Interchange	Plate 38	Stemmer's Run

Forest

Per the State of Maryland's Natural Resources Article 5-103, *Reforestation Law*, adopted 1989, amended 1990 and 1991, the construction of a highway by a unit of the State:

- May cut or clear only the minimum number of trees and other woody plants that are necessary and consistent with sound design practices, and
- 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. The Managed Lanes Alternate would comply with the Maryland Reforestation Act. All highway construction projects utilizing one dollar or more of State funding must perform mitigation for forest impacts. Forest mitigation is required for any State 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.

#### FIDS Habitat

The Authority would 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:

- Avoiding placement of new roads or related construction in the forest interior. If unavoidable, restrict construction of roads to the perimeter of the forest.
- Avoiding removal or disturbance of forest habitat from May through August, which is the breeding season for most FIDS. This seasonal restriction may be extended to February through August if certain early nesting FIDS (i.e., Barred Owl) are present.
- Maintain forest habitat as close as possible to the road, and
- Maintain grass height of at least ten inches during the breeding season (May-August).

#### Parks

A total of five parks can be found adjacent to the Managed Lanes Alternate. This section describes the efforts made to avoid impacts to the parks throughout the project area.

Moore's Run Park, located along I-895 southbound just south of the I-95/I-895 Interchange, was avoided by using a retaining wall along I-895 southbound at the Moore's Run stream crossing (**Plate 27**) and between Stations 130 and 135 (**Plate 29**).

Impacts to Garden Village Park would be avoided with the use of a retaining wall located along southbound I-95 between Stations 145 and 150 (**Plate 30**).

Linover Park, located along eastbound I-695, just west of the Lillian Holt Drive overpass, was avoided. A retaining wall would be used along eastbound I-695, approximately 100 feet west of the Lillian Holt Drive overpass (**Plate 34**).

Impacts to Nottingham Park were avoided by using a retaining wall along northbound I-95 from Station 337 to Station 354 (**Plates 41 and 42**).

Cowenton Avenue Park along I-95 southbound was avoided through the use of a retaining wall. The retaining wall is located along I-95 southbound between Stations 490 and 507 (**Plate 49**).

### Noise

Several procedures can be followed to assist in minimizing the temporary impacts of construction noise associated with the Managed Lanes Alternate, including, adjusting the equipment, building sound barriers earlier in the construction process, providing temporary noise barriers, varying the construction activity areas to redistribute noise events, and offering financial incentives to contractors to work faster and in a quieter manner. These minimization measures would be considered during final design to reduce public exposure to short-term noise impacts.

### Air

Maryland air quality regulations (COMAR 26.11.06.03) require that during the construction period, all appropriate measures be incorporated to minimize the impacts of construction on air quality. Specifically, applying water or appropriate liquids during demolition, land clearing, grading, and construction operations is recommended to minimize fugitive dust. Additionally, open-body trucks transporting materials should be covered at all times when in motion, and all excavated material should be removed promptly.

## MITIGATION

### **Socioeconomic**

Landscaping opportunities would be considered to lessen the visual intrusion where appropriate.

### **Noise**

Sound barriers were evaluated and found feasible and reasonable for 10 of the 17 impacted NSAs within the study area: 1, 3, 7, 8, 9, 11, 14, 16, 22, and 23 (**Table 13**). The locations of the NSAs are displayed in **Figures 3A, 3B, and 3C**. Thus, to mitigate noise impacts, the Authority would construct sound barriers.

**Table 13. Preliminary Noise Barrier Cost Analysis Summary**

NSA	Length (ft)	Height (ft)	Cost of Sound Barrier	Insertion Loss (first row residences)	Benefited Residences	Cost/Benefited Residence
1	1,251	23	\$488,641	6 (dBA)	18	\$27,147
3	725	21	\$249,123	7-11 (dBA)	30	\$8,304
7	3,871	20	\$1,280,527	8-15 (dBA)	35	\$36,586
8&9	4,279	30	\$2,123,240	5-8 (dBA)	193	\$11,001
11	2,033	14	\$470,761	8-12 (dBA)	14	\$33,626
14	1,250	20	\$413,500	8-11 (dBA)	36	\$11,486
16	2,380	18	\$708,574	5-12 (dBA)	24	\$29,524
22	2,636	19	\$812,042	7-10 (dBA)	17	\$47,767
23	2,300	20	\$760,840	5-10 (dBA)	28	\$27,173
Total Cost of Sound Barriers for the Managed Lanes Alternate = \$7,565,553						

## **Wetlands and Waters of the US**

In many circumstances, proposed roadway drainage would replace existing roadway drainages that would be affected by the Managed Lanes Alternate. For those systems which cannot be replaced in-kind, a wetland mitigation site search was conducted using GIS information and a review of aerial photography. The Authority coordinated with the Army Corps of Engineers (ACOE), Maryland Department of the Environment (MDE) and the Baltimore County Department of Environmental Protection and Resource Management (DEPRM) for existing opportunities and a field reconnaissance and assessment of all identified sites.

Twelve sites were presented during an interagency field meeting in August 2003. Upon further coordination with the ACOE and MDE, 4 sites were selected for mitigation investigations and plan development (**Figures 4 and 4A-4D**). Three of the sites (Linover Park, King Avenue and I-95/I-695) are adjacent to and are at least partially within the proposed right-of-way of the Managed Lanes Alternate. The fourth site (White Marsh Run) is off site but is much larger and is located in the most impacted 3<sup>rd</sup> order watershed. Coordination efforts with the property owners of each of the mitigation sites have been initiated and all parties have indicated a willingness to negotiate with the Authority on use and/or acquisition of their property. All correspondence associated with land acquisition between the Authority and property owners will be sent to the USACE before the permit is issued. The following is a summary of each of the proposed site's characteristics, amount and type of mitigation available, and potential functions and values.

### White Marsh Run

The largest potential mitigation site identified for this project is along a lower portion of White Marsh Run from east of US 40 to Ebenezer Road. Approximately 6000 feet of stream and 4-10 acres of wetland are targeted for improvement/replacement based on a preliminary aerial photography estimate and site reconnaissance. The site is situated on an old gravel mine and its intended use as mitigation will be for wetlands replacement, enhancement and/or preservation and stream restoration. The floodplain areas have become partially forested and large sections of the some parts of the stream bank are unstable or have been poorly stabilized with gabion baskets, concrete, etc. There are also sections of the channel, which have disconnected floodplains, where renewed access would serve to both enhance floodplain wetland quality as well as reduce bank and bed stress and associated erosion. Part of this stream restoration would serve to both enhance floodplain wetland quality as well as reduce bank and bed stress and associated erosion. There are sections of split channel flows (approximately  $\frac{3}{4}$  mile downstream of US 40) where restoration efforts to reduce the frequency of flooding into the overflow channel (via grade controls) would assist in sediment transport in the main channel. This improved transport would reduce bed aggradation, improve instream habitat and reduce the potential for stresses on the adjacent banks in the main channel.

Near the approach to the MD 43 crossing, there are extended sections of gabion reinforced bank protection along the west bank, which have become undermined. Efforts here would include removal of the gabions and replacement with an earthen bank

stabilized with bioengineering and/or native plantings. Downstream of the gabion-lined banks, is the new crossing of White Marsh Run by MD 43 Extended. Restoration efforts here (if required) would include an evaluation of an improvement to the planform approach to the bridge as well as providing adequate floodplain access through the structure. Instream structures (e.g. cross-vanes) may be utilized to fix the channel low flow approach under the structure.

Additional efforts include the restoration of the anadromous fish passage at U.S. 40 by removing an existing Alaska Steep Passage Skeet fish ladder and , raising the streambed from several hundred feet downstream up to a passable elevation under U.S. 40. Approximately 6000 feet of stream and 4-10 acres of wetland are targeted for improvement/replacement based on a preliminary aerial photography estimate. This would not only improve the downstream reach conditions by reducing channel entrenchment, but will also open up the entire White Marsh system upstream of US 40 to anadromous fish; something that likely has not occurred for over 30 years.

Estimates from NWI mapping show 95 acres of wetland within this mitigation site. It is likely that many of these wetland systems have changed character and/or have lost wetland status due to channel incision or other land use alteration. Previous mining activity on this site has altered the historic amount and quality of wetlands. Wash pools left over from mining may now function as wetland and other, previously wetland areas, may have been drained or drainage systems may still occur and provide active drainage at present. Additional mitigation opportunities at this site include: wetland preservation, enhancement, creation, intermittent stream restoration or enhancement and upland terrestrial habitat improvements. This includes some large areas of potential enhancements, such as the existing large wash pond just north of the MD 43 crossing and east of US 40. This pond is very slowly filling with fine sediments and is mostly devoid of vegetation. Where sediment accretion is more rapid along the northern fringe/stream interface, scrub-shrub and emergent wetlands have established. Potential wetland enhancement efforts here may include both passive and active methods to increase wetland area. Active methods would include the potential filling and/or planting in relatively shallow areas. Passive techniques may include efforts to “roughen-up” the shallow surface areas using willow posts or other means to increase sedimentation and subsequent wetland vegetation recruitment. In addition to the wetland enhancement opportunities, the inlet and outlet to this pond may be retrofitted to reduce the occurrences of shad trapping in the pond. At high flows, Shad access the pond at the inlet in the northwest corner; then as the stage drops, they become trapped and often die. Frequent coordination efforts with MD DNR Fisheries and USFWS will be conducted in association with any proposed improvements to this condition affecting the shad migration.

More information on the type, quality and amounts of mitigation would become available after field assessments and preliminary design studies begin.

### I-95/I-695

The I-95/I-695 site is located directly over a portion of Stemmers Run. Stemmers Run, which runs through the middle of the interchange, was channelized during the original construction of the roadway. Before the construction of I-695, this area was a wide floodplain containing a meandering stream as evidenced by historical aerial photos from the 1940s. The existing stream flows through a concrete channel, where the bottom of the channel has been washed out, portions of the concrete bank have failed and several box culverts block fish passage. Approximately 2,400 feet of stream is targeted for restoration. Even though Stemmers Run through the new interchange will be inhibited by the placement of new piers and ramps, there are opportunities to greatly improve upon flood-prone area access, and energy dissipation. The improvements will be accommodated by removing the concrete flumes, increasing channel sinuosity and increasing the frequency of access to floodplains for smaller storm events. Additional restoration of floodplain and wetlands may be feasible depending on further studies and coordination between highway designers and the preliminary mitigation design teams. Wetlands restoration or enhancement at this location is considered an additional potential benefit associated with improved floodplain access. Wetland functions and values within this system will be primarily beneficial for water quality conditions versus wildlife habitat.

### Linover Park

The Linover Park site consists of property owned by Baltimore County, a private landowner, and State Highway Administration (SHA) right-of-way adjacent to the inner loop of I-695. Stemmers Run flows parallel to I-695 across a farm field before turning sharply into Linover Park. The farm field has rubble-reinforced earthen levies that straighten the channel and restrict access to the floodplain (farm field). Another part of the channel, just west of Linover Park, is a failed section of concrete trapezoidal channel. Channel restoration opportunities include channel stabilization, floodplain reconnection and wetland restoration. The improvements would lessen the erosive force of Stemmers Run within Linover Park and improve aquatic and terrestrial habitats. This site provides approximately 1000 feet of stream restoration along Stemmers Run. Floodplain and/or wetland restoration may be feasible pending further field investigations. Mitigation efforts here would focus on stabilizing the northern (I-695 side) streambank including structures such as rock vanes to direct flows away from the north bank and restoring access to the floodplain along the south bank.

### King Avenue

The King Avenue site is on an existing open field adjacent to both I-95 and King Avenue. This field is being actively farmed for corn, hay and contains a small vegetable garden. An intermittent channel (drainage ditch) was created to provide drainage for the farm field. A culvert draining portions of I-95 and Essex Community College drains into this site from beneath I-95. The combined flows of these two intermittent channels create a perennial channel, the South Fork of White Marsh Run, which flows along the toe of the existing I-95 roadway embankment in a concrete channel. Under the mitigation concept, the perennial portion of the stream would be relocated, due to fill from roadway widening, and set in a natural channel. The surrounding riparian area is targeted to be restored as forested wetland and forested upland buffer. The mitigation goals for this site are to re-establish a natural channel of approximately 800 feet of stream and one acre of forested wetland and to include some forested buffer in a headwater area of the South Fork of the White Marsh Run.

The potential replacement quantities for streams and wetlands at each site are summarized in *Table 14* and *Table 15*.

**Table 14: Stream Mitigation Replacement Quantities**

Mitigation Site	I-95/I-695 Interchange	Linover Park	King Avenue	White Marsh Run	Total
Intermittent	0	50	300	Unknown	350+
Perennial	2400	1000	500	6,000	9,900
<b>Total Streams (linear feet)</b>	<b>2,400</b>	<b>1,050</b>	<b>800</b>	<b>6,000+</b>	<b>10,250+</b>
Intermittent	Unknown*	400	900	Unknown*	1,300+
Perennial	120,000	45,000	4,000	105,000	274000
<b>Total Streams (Square feet)</b>	<b>120,000+</b>	<b>45,400</b>	<b>4,900</b>	<b>105,00+</b>	<b>275,300+</b>

**Table 15 Wetland Mitigation Replacement Quantities**

Mitigation Site	I-95/I-695 Interchange	Linover Park	King Avenue	White Marsh Run	Total
POW	0	0	0	Unknown*	0+
PEM	0-.5 acre	0	0	Unknown*	0-0.5
PSS	0	0	0	Unknown*	0+
PFO	0	0.0-1.0 acre	0.5-1.0 acre	Unknown*	0.5-2.0
<b>Total Wetlands (acres)</b>	<b>0-0.5 acre</b>	<b>0-1.0 acre</b>	<b>0.5-1.0 acre</b>	<b>4-10 acres**</b>	<b>4.5-12.5+</b>

\* Further field study is required to determine potential mitigation opportunities concerning this particular type of system.

\*\* NWI mapping shows up to 95 acres of wetlands of various types within this mitigation site of which it is estimated that 4-10 acres would be suitable as a combination of restoration, creation, enhancement and/or preservation upon incorporation of the final accepted mitigation package