

NOVEMBER 2012

Baltimore-Washington Parkway Widening Feasibility Study



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Table of Contents

Executive Summary	1
Study Background.....	1
Study Participants.....	2
Study Focus	3
Study Area.....	3
Feasibility Criteria	3
Alternatives Definition.....	4
Traffic and Transportation	6
Existing Conditions	6
Impacts on Parkway Traffic Volumes	7
Forecasting Scenarios	8
Impacts on B-W Parkway Traffic Operations	8
Physical Constraints.....	9
Preliminary Capital Cost Estimates.....	10
Environmental Analysis and Effects.....	11
Public and Political Considerations.....	12
Facility Ownership and Management.....	13
Conclusions	14
1.0 Study Background.....	16
1.1 Summary of Study Purpose	16
1.2 Description of Legislative Language.....	16
1.3 Legislative Purposes and Significance of the Parkway.....	17
1.4 Agency Participants	19
2.0 Study Purpose	20
2.1 Study Area	20
2.2 Facility Management and Ownership.....	24
2.3 Feasibility Criteria	24
2.3.1 Definition of Feasibility.....	24

2.3.2 Criteria Overview	25
2.3 Limiting Conditions	26
3.0 Alternatives Definition	27
3.1 Methodology	27
3.1.1 Background Information	27
3.1.2 Potential Safety Issues and Roadway Deficiencies	27
3.1.3 Stakeholder Input.....	28
3.2 Parkway Alternatives	29
3.2.1 Screening Criteria.....	30
3.2.2 Results of Preliminary Screening	30
3.3.3 Alternatives Selected for Further Study and Analysis.....	32
3.2 Widening Options	33
3.2.1 Outside Widening	34
3.2.2 Inside Widening	35
4.0 Public Involvement	37
4.1 Overview of the Context-Sensitive Solutions (CSS) Approach to the Feasibility Study	37
4.2 Technical Advisory Committee (TAC).....	37
4.2.1 TAC Member Agencies	37
4.2.2 TAC Meetings.....	38
4.3 Public Meetings	39
4.3.1 Overview of Public Meetings.....	39
4.4 Stakeholder Interviews	41
4.5 Public Access to Study Information	41
4.5.1 Mailing List and Email Contacts	41
4.5.2 Newsletters.....	42
4.5.3 Public Meeting Advertisements.....	42
4.5.4 Webpage on the FHWA Web site	42
4.6 Major Issues or Concerns Emerging from Public Involvement.....	42
5.0 Traffic and Transportation Impacts	43
5.1 Definition and Purpose	43

5.2 Methodology	43
5.2.1 Limitations of the Transportation Analysis.....	43
5.2.2 Travel Demand Modeling	44
5.2.3 Constrained Long Range Plan Projects.....	44
5.3 Alternatives Analysis.....	45
5.3.1 Existing Conditions Scenario.....	45
5.3.2 2040 No-Build Scenario	46
5.3.3 2040 Partial-Build Scenario	46
5.3.4 2040 Full-Build Scenario.....	47
5.4 Analysis Results.....	47
5.4.1 Traffic Volumes	47
5.4.2 Operations	49
6.0 Physical Constraints.....	54
6.1 Approaches to Widening.....	54
6.2 Potential Impacts.....	54
6.3 Preliminary Costs.....	57
6.3.1 Capital Costs	57
6.3.2 Right of Way Costs	59
6.3.3 Operations and Maintenance Costs.....	59
6.3.4 Construction Costs for Park Aesthetics	59
7.0 Environmental Effects.....	60
7.1 Environmental Resources.....	60
7.1.2 Land Uses.....	60
7.1.3 Forest Areas.....	61
7.1.4 Natural Environmental Resources	61
7.1.5 Cultural and Historic Resources.....	62
7.1.6 Communities and Community Features.....	63
7.1.7 Wetlands	63
7.2 Impacts.....	63
7.2.1. Parklands and Recreation Areas Impacts	64

7.2.2 Wetlands and Water Resources Impacts	64
7.2.3 Known Cultural Resources Effects	65
7.2.4 Forests and Ecology Effects	66
7.2.5 Potential Property Impacts.....	67
7.3 Quality of Life Effects	67
8.0 Ownership and Management.....	69
8.1 Potential Transfer of Ownership	69
8.2 Impairment.....	69
9.0 Conclusions	72
9.1 Feasibility Criteria #1 - Physical Constraints.....	72
9.2 Feasibility Criteria #2 - Environmental Analysis and Effects	72
9.3 Feasibility Criteria #3 - Traffic and Transportation	72
9.4 Feasibility Criteria #4 - Preliminary Capital Cost Estimates.....	73
9.5 Feasibility Criteria #5 – Public and Political Considerations.....	73
9.6 Feasibility Criteria #6 – Ownership and Management.....	73
9.7 Additional Considerations	74
Technical Appendices	75

Executive Summary

Study Background

House Report 110-238 which accompanied the Transportation, Housing and Urban Development, and Related Agencies Appropriations Act, 2008, directed the Federal Highway Administration (FHWA) Office of Federal Lands Highways to work with the National Park Service (NPS) and the Maryland State Highway Administration (SHA) to examine the feasibility of “adding a third



northbound and a third southbound travel lane for Maryland Route 295/Baltimore Washington Parkway from the intersection with Interstate 695 to New York Avenue in the District of Columbia.” The FY 2008 House Report also directed that the study “include an assessment of the impact of the Base Realignment and Closure process on traffic throughout the Maryland Route 295 corridor between Baltimore, Maryland and Washington, D.C.” Funding for the conduct of this feasibility study was identified in House Report 111-366, which accompanied the Consolidated Appropriations Act, 2010 (Public Law 111-117) which included the Transportation, Housing and Urban Development, and Related Agencies Appropriations Act, 2010.

Opened in 1954, the Baltimore-Washington (B-W) Parkway is a 29-mile scenic highway that connects Baltimore, Maryland, with Washington, DC. Within the study area, the B-W Parkway is divided into two distinct sections. The NPS owns and operates a 19-mile section to the south between MD 175 and the New York Avenue/U.S. Route 50 split at the Prince George’s County/District of Columbia border. The Maryland SHA owns and operates a 10-mile section of the B-W Parkway between I-695 and MD 175.

The B-W Parkway was legislated by Congress in 1950 as an extension of the park system of the District of Columbia, to be managed by the NPS. Additionally, this protected parkway was to link key regional defense facilities including Fort George G. Meade. In 1991, in recognition of its historical importance and cultural significance as an element of the Parkways of the National Capital Region, the B-W Parkway was designated as an Historic District and listed on the National Register of Historic Places (NRHP).



Study Participants

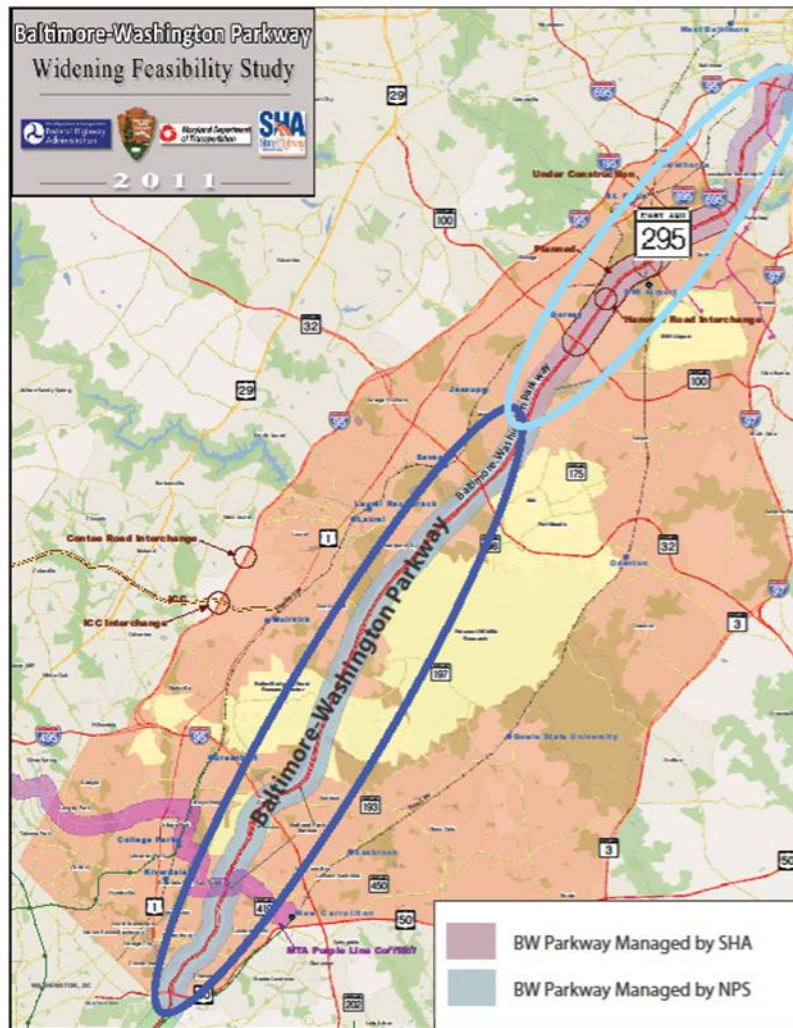
This study was completed as a partnership between the FHWA's Eastern Federal Lands Highway Division (EFLHD), the NPS, and the Maryland SHA. Additional agencies and institutional stakeholders provided guidance to the study team as members of a *Technical Advisory Committee (TAC)* which included the following agencies:

- Amtrak
- Anne Arundel County Office of Planning and Zoning
- Baltimore County Office of Planning
- Baltimore Metropolitan Council's Baltimore Regional Transportation Board
- Beltsville Agricultural Research Center, U.S. Department of Agriculture
- District of Columbia Department of Transportation
- Federal Highway Administration, Delaware-Maryland Federal-aid Division
- Federal Highway Administration, District of Columbia Federal-aid Division
- Federal Highway Administration, Eastern Federal Lands Highway Division
- Fort George G. Meade, U.S. Army
- Howard County Department of Planning and Zoning
- Maryland Aviation Administration
- Maryland State Highway Administration
- Maryland Transit Administration
- Maryland-National Capital Park and Planning Commission - Prince George's County Planning Department
- Metropolitan Washington Council of Governments - Transportation Planning Board
- National Aeronautics and Space Administration
- National Capital Planning Commission
- National Park Service - Greenbelt Park (A unit of National Capital Parks - East)
- National Park Service - National Capital Parks - East
- National Park Service - National Capital Region
- National Security Agency
- Patuxent Research Refuge, U.S. Fish and Wildlife Service
- United States House of Representatives, Office of Congressman Dutch Ruppersberger
- U.S. Park Police
- Washington Metropolitan Area Transit Authority



A public involvement process provided additional input from residents, municipalities, and community organizations along the Corridor.

Study Focus



Study Area

The study area was defined in the legislation - the portion of the B-W Parkway that falls between I-695 in Anne Arundel County, Maryland, to the District of Columbia boundary with the State of Maryland at New York Avenue.

Management and ownership of the B-W Parkway is divided and displayed graphically in the project map on this page. The Maryland SHA owns and operates the northern 10-mile section of the B-W Parkway between I-695 and MD 175. This section is designated as *Maryland 295*. The NPS owns and operates the southern 19-mile stretch of the Parkway between MD 175 and the boundary with the District of Columbia at New York Avenue/U.S. Route 50. It is designated as the *Baltimore-Washington Parkway*.

Feasibility Criteria

To help determine the feasibility of widening the Parkway, the following factors were assessed: traffic and transportation, physical constraints, preliminary capital cost estimates, environmental analysis and effects, public and political considerations, and facility ownership and management. Additionally, the study considered the potential impairment of the B-W Parkway, as impairment of the Parkway could change the ownership and management of the facility.

FEASIBILITY CRITERIA

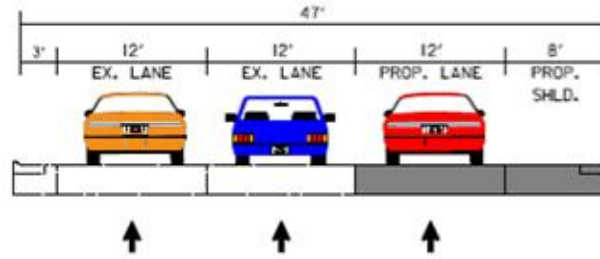
- Traffic and Transportation – the potential benefits to traffic flow and mobility that can be derived from the additional capacity provided by widening the B-W Parkway.
- Physical Constraints – the physical limitations for widening the B-W Parkway by a third lane in either direction including the availability of land and impacts to existing infrastructure, particularly the bridges and interchanges along the Parkway.
- Preliminary Capital Cost Estimates – the potential capital costs of widening the B-W Parkway by widening option.
- Environmental Analysis and Effects – the potential for impacts to natural resources, communities, and quality-of-life in areas such as noise or aesthetics.
- Public and Political Considerations – the willingness of the public to see a project of this magnitude move forward.
- Facility Ownership and Management – widening the B-W Parkway could impair the Parkway's character and function sufficiently to drive a shift in ownership and management from the NPS to the Maryland SHA.

Alternatives Definition

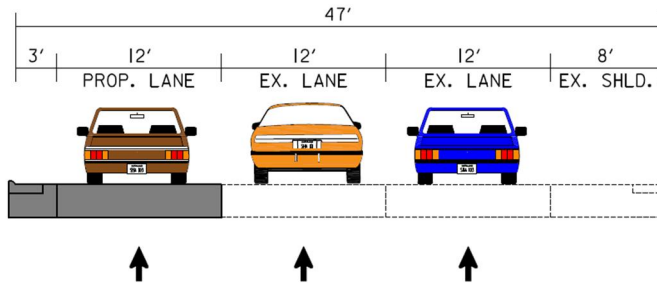
Two conceptual highway improvement alternatives were identified for the study: widening of the existing B-W Parkway facility to the inside median area and widening of the facility to the outside right-of-way. Additionally, two separate design options were examined for each of the widening alternatives based on the different design standards and guidelines used by the NPS and the Maryland SHA for highway facilities of this nature.

The NPS uses design standards and guidelines as noted in its *Park Road Standards*, published in 1984. The NPS standard for the widened road specifies a new 12-foot lane added to the inside or outside edge of pavement, an 8-foot outside paved shoulder with curb and gutter, and a 3-foot inside shoulder with curb and gutter for a total width of 47 feet. The use of these standards helps to preserve the nature and characteristics of a Parkway facility. The [NPS Outside Widening Option](#) replaces the existing right shoulder and curb with a new 12-foot lane and an 8-foot shoulder to the face of curb and gutter, while the [NPS Inside Widening Option](#) replaces the existing left shoulder and curb with a new 12-foot lane and a 3-foot shoulder with curb and gutter.

NPS Outside
Widening Option



Drawings not
to scale



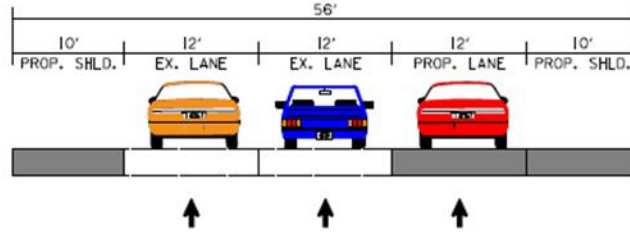
NPS Inside
Widening Option

LEGEND

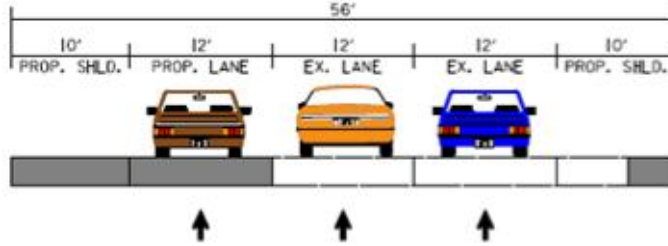
EXISTING PAVEMENT	
PROPOSED PAVEMENT	
EXISTING CURB	
PROPOSED CURB	

The Maryland SHA uses the design standards and guidelines as adopted by the American Association of State Highway and Transportation Officials (AASHTO) and as published in the *AASHTO Green Book - A Policy on Geometric Design of Highways and Streets, 6th Edition*. The AASHTO/SHA standard specifies a new 12-foot lane added to the inside or outside edge of pavement with a 10-foot outside paved shoulder and a 10-foot paved inside shoulder for a total width of 56 feet. The [AASHTO/SHA Outside Widening Option](#) replaces the existing B-W Parkway's narrow right shoulder and curb with a new 12-foot lane and a 10-foot shoulder with no curb. The [AASHTO/SHA Inside Widening Option](#) replaces the existing parkway's narrow left shoulder and curb with a new 12-foot lane and a 10-foot shoulder with no curb.

AASHTO/SHA
Outside
Widening Option



*Drawings not
to scale*



AASHTO/SHA
Inside Widening
Option

LEGEND

EXISTING PAVEMENT 
PROPOSED PAVEMENT 

Traffic and Transportation

Existing Conditions

Growth along the corridor has occurred over time with the increased interdependence of the Baltimore and Washington, DC, economies and the ease of transportation between the two cities provided by facilities such as the B-W Parkway. Development – residential, commercial, and industrial – adds more trips to the B-W Parkway and thus contributes to congestion, particularly at peak travel hours.

Today the B-W Parkway is a limited-access, divided highway consisting primarily of two general-use travel lanes in each direction from the interchange with I-695 in Anne Arundel County, Maryland, to New York Avenue/U.S. Route 50 and the boundary with the District of Columbia. Specifically, three locations along the existing roadway – U.S. Route 50 to MD 450, I-495/I-95 to MD 193 and MD 175 to MD 100 already provide *three* lanes in each direction. The table below presents the recently observed average daily traffic volumes at representative locations along the Parkway between U.S. Route 50 and the I-695 interchanges.

Traffic Volumes along the B-W Parkway

Location	2010	2009	2008
MD 295/I-695	89,963	89,422	89,421
MD 295/MD 100	96,470	88,600	87,810
B-W Parkway/MD 32	85,053	84,542	84,541
B-W Parkway/I-95/I-495	110,542	109,881	109,880
B-W Parkway/U.S. Route 50	104,492	103,871	103,870

Source: Maryland State Highway Administration

Impacts on Parkway Traffic Volumes

Existing and forecasted future traffic volumes estimates were compiled using the Metropolitan Washington Council of Governments' (MWCOCG) regional travel demand forecasting model. The model includes data that estimates future conditions, such as growth in population, jobs, and households anticipated from general economic development as well as the BRAC process. The model also includes consideration of all transportation improvement projects planned for development by 2040, the project's future timeframe horizon. These projects are found in the currently adopted, fiscally constrained Baltimore and Washington, DC, regional long-range transportation plans. They include the completion of all sections of the InterCounty Connector highway between Prince George's and Montgomery counties, the Purple Line light rail project in operation, and all projects identified to support BRAC development in the Fort Meade area. As shown in the table below, projections reveal a growth rate of 38 percent in population and 47 percent in employment between 2005 and 2040.

Projected Growth in the Baltimore-Washington Metropolitan Region

	2005	2040	Growth
Population	6,262,508	8,613,982	38%
Employment	3,700,075	5,457,004	47%

Sources: Metropolitan Washington Council of Governments and the Baltimore Metropolitan Council

The model output indicates that, from 2005 to 2040, the number of north-south trips in the study corridor between Baltimore, Maryland, and Washington, DC, is projected to increase by about 34 percent.

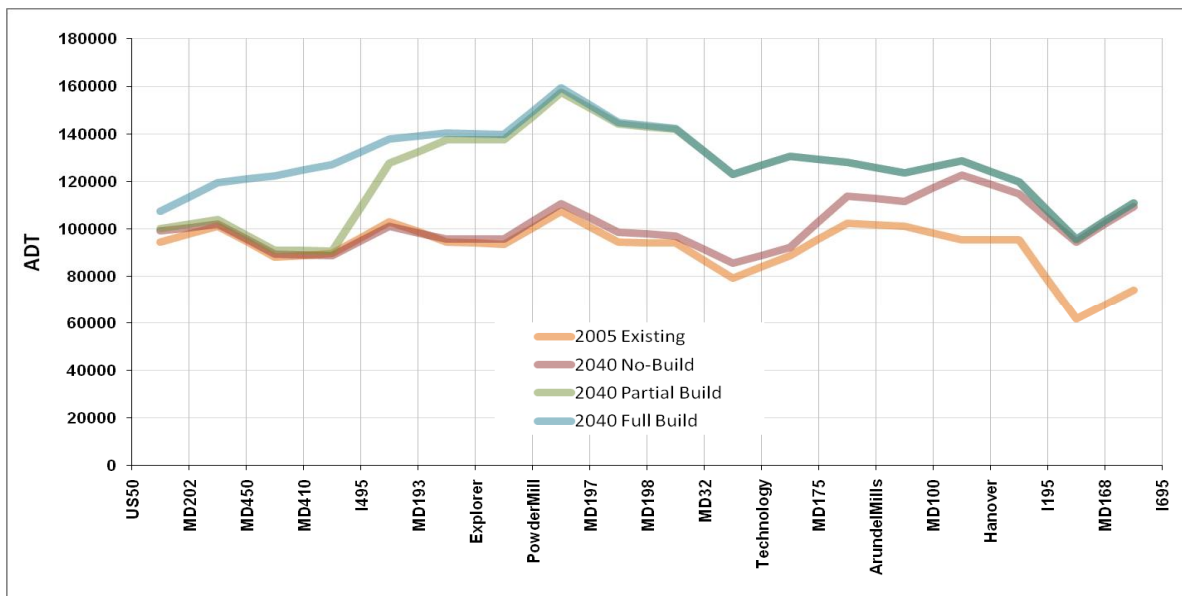
Forecasting Scenarios

For the feasibility study’s travel demand modeling effort, four potential scenarios were assessed:

- Existing: current conditions in the base year of 2005.
- Future No-Build: no change occurs to the existing roadway conditions on the B-W Parkway beyond those recently constructed or currently planned by the Maryland SHA.
- Future Partial Build: the B-W Parkway is widened to three lanes in each direction only from the Capital Beltway (I-495/I-95) to the Baltimore Beltway (I-695).
- Future Full Build: the B-W Parkway is widened to three lanes in each direction for the entire length of the study corridor from U.S. Route 50 to I-695.

Comparison of average daily traffic on specific segments of the B-W Parkway, as shown below, indicates that traffic volumes are projected to increase in the areas where widening is planned; specifically, those areas south of MD 450 toward U.S. Route 50 and those areas north of the planned Hanover Road Hanover/Parkway interchange to I-695. This would reflect the tendency for motorists to choose to use the widened Parkway who otherwise might not choose to use it today.

Average Daily Traffic on the B-W Parkway



Impacts on B-W Parkway Traffic Operations

Based on the results of the traffic operations analysis, the time it takes to travel between points along the Parkway and peak-period congestion levels will be similar in 2040 to what is being experienced today with any of the options studied. The overall facility performance is slightly better with the fully widened option from U.S. Route 50 to I-695 as opposed to a partially built option from the Capital

Expected Infrastructure Impacts per Widening Option

Interchange Reconstruction				Bridge Widening				Bridge Reconstruction			
NPS		AASHTO/SHA		NPS		AASHTO/SHA		NPS		AASHTO/SHA	
Outside	Inside	Outside	Inside	Outside	Inside	Outside	Inside	Outside	Inside	Outside	Inside
11	2	11	2	7	6	7	6	7	4	7	5

Preliminary Capital Cost Estimates

Preliminary capital cost estimates for each widening option were developed for major elements of highway construction based on conceptual engineering designs for the widening, including earthwork, paving, shoulders (curb, traffic barrier, guardrail, etc.) and structures (bridge widening, new construction, and demolition). Other categories of cost estimates included the service costs involved in project development and design. Lastly, an estimate of administrative costs for construction were added to yield a total estimated capital cost, as summarized in the table below.

Estimated Capital Costs for Each Widening Option (\$ Millions)*

Cost Elements	AASHTO/SHA		NPS	
	Inside	Outside	Inside	Outside
Construction Costs	\$ 326	\$ 450	\$ 274	\$ 427
Preliminary Engineering	\$ 33	\$ 45	\$ 27	\$ 43
Construction Administration	\$ 51	\$ 70	\$ 42	\$ 66
Total Costs	\$ 410	\$ 565	\$ 343	\$ 536

*2011 Dollars

Although this feasibility study indicated that the potential exists for some minor encroachments onto property beyond the existing B-W Parkway right-of-way, it is assumed that through more detailed design, these impacts could be mitigated and the acquisition of little, if any, additional land would be required for any of the four options studied. Therefore, cost estimates do not include the costs of land.

Environmental Analysis and Effects

The B-W Parkway Corridor is rich and diverse in natural and cultural resources, community features, and open space. The parkway itself is a legislatively-defined unit of the NPS and is listed on the NRHP. This presents unique challenges to the planning of transportation infrastructure expansion or improvements to the parkway. Large government properties within proximity to the corridor include the USDA's Beltsville Agricultural Research Center (BARC), the NASA Goddard Space Flight Center, headquarters of the NSA, Fort George G. Meade, Patuxent Research Refuge, Anacostia Park, and Greenbelt Park. These properties possess significant natural and cultural resources that contribute to the overall experience and aesthetic features of the Parkway.



Photo by Tom Fuchs, February 18, 2006

Other eligible historic resources such as the Greenbelt National Register Historic District lie within the corridor. Growing and vibrant communities lie adjacent to and within the viewshed of the B-W Parkway, typically near the Parkway's interchanges with MD 197, MD 198, and MD 175.

Potential Environmental and Cultural Impacts

	AASHTO/SHA		NPS	
	Outside	Inside	Outside	Inside
Widening Options				
Forest Impacts, Inside Existing ROW (Percent of total acres)	35%	26%	25%	9%
Wetland Area Crossings (Each)	18	6	18	0
Stream/Rivers/Floodplain Areas (Each)	6	6	6	6
Sensitive Species Areas (Each)	5	5	5	5
Potential Historic Properties (Each)	4	2	4	2
Potential Park Properties (Each)	2	1	2	1

The possible highway expansion options were examined with respect to the possible effects (positive and negative) on the known environmental resources and communities. Analyzed at a conceptual level using available information, a range of unavoidable direct impacts are anticipated with parkway widening. Should the study progress into an actual project planning and design process, the magnitude of these impacts would be measured using acceptable methods and procedures.

Any of the studied widening options would impact forests, streams, rivers, and sensitive species review areas. The magnitude of the possible direct impact is estimated to be the greatest for the AASHTO/SHA outside widening and least for the NPS inside widening option. The NPS inside widening option would not affect known wetlands, while the two outside widening options would affect 18 wetlands areas.

Direct impacts to communities could include noise, visual and viewshed changes, and loss or reduction in tree buffer areas located adjacent to the B-W Parkway. The outside widening options would also potentially require the use of additional property from abutting residential, commercial, and institutional properties.

Any of the four build options would result in physical changes to the B-W Parkway – a designated Historic District with distinct landscape, topographical, and design features – with lane and shoulder additions, interchange and ramp modifications, impacts to mature trees and landscaping, alterations to vistas, and overall change in visitor and traveler experience. In addition to the effects on the B-W Parkway, there are expected impacts to Greenbelt Park.

Public and Political Considerations

Public and stakeholder engagement was used to define the context in which the B-W Parkway operates – as a neighbor, a park, and a transportation facility – and to test public reaction to, and acceptance of, a proposed widening from its largely four-lane design to a six-lane divided highway from Washington, DC, to Baltimore, Maryland.

Three levels of public and stakeholder engagement were used to engage affected agencies, business interests, community groups, B-W Parkway users, and residents in the feasibility planning process:

- *Stakeholder Leadership Interviews* engaged about a dozen leaders representing stakeholders and stakeholder groups in a conversation with representatives of the study team. The leaders were asked to identify specific concerns and interests related to the use, location, design, and character of the B-W Parkway as well as their reactions to a proposed widening of the facility.

Public and Stakeholder Perspectives

Stakeholders provided dozens of comments to the study team. A sample of the comments received is provided below.

- Economic development and growth could further constrain the corridor.
- Further congestion could constrain economic development opportunities.
- Safety implications of existing traffic.
- North/south alternatives are limited and should be evaluated for implications.
- The environment is an important component but should not be an overriding element.
- Multimodal options and a wider study are needed.
- Park (tree) buffer for communities is an important quality-of-life element.

- A *Technical Advisory Committee* representing a range of local government, State transportation agencies, Federal Government agencies, and institutional and business organizations located along or with jurisdiction over the B-W Parkway. This group provided technical guidance on the methods used in conducting the feasibility study, provided access to data and information, and oversight of the results presented by the study team.
- Interactive *Public Meetings* provided a platform for the general public to interact with the study team regarding potential benefits and costs of a widened B-W Parkway as well as the specific options that were studied.

Public interests and concerns about the B-W Parkway varied considerably. Stakeholders representing business interests, economic development, and transportation agencies were concerned about congestion and the limited benefits of the narrowly defined potential project of a six-lane divided highway. Residents of communities abutting the Parkway were concerned about impacts to their communities and quality of life, particularly the potential for additional noise, bifurcation of their communities, impacts to trees and waterways, as well as the potential for a visually intrusive highway. Lastly, some groups and individuals expressed concerns about preserving the character and functions of the B-W Parkway as a national park, a distinctive transportation facility designed to enhance the traveler experience, not just provide a means to get from “Point A to Point B.”

Facility Ownership and Management

Management and ownership of the B-W Parkway is divided between the NPS and the Maryland SHA. Maryland SHA owns and operates the northern 10-mile section between I-695 and MD 175. The NPS owns and operates the southern 19-mile section between MD 175 and New York Avenue/U.S. Route 50 and the boundary with the District of Columbia. If it is determined that the B-W Parkway can be widened to three lanes in each direction along the entire corridor, would ownership and management continue to be divided between NPS and Maryland SHA? Or should one agency assume ownership and management of the entire facility?

According to the *National Park Service Directors Order-12 (DO-12)* and its *Management Policies of 2006*, the issue of impairment would arise. According to Section 1.4.5 of the *Management Policies of 2006*, impairment is described as being “an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values.” The NPS would need to make a determination if the potential widening of the B-W Parkway would impair the park’s resources and values.

According to the 2006 Policies, the park resources and values that are subject to the determination of impairment would include some of the following:

- “the park’s scenery, natural and historic objects, and wildlife and the processes and conditions that sustain them, including to the extent present in the park: the ecological, biological, and physical processes that created the park and continue to act upon it; scenic features; natural visibility, natural landscapes; natural soundscapes and smells; water and air resources; soils; geological resources; archaeological resources; cultural landscapes; historic and prehistoric sites, structures, and objects; and native plants and animals;”
- “the park’s role in contributing to the national dignity, the high public value and integrity, and the superlative environmental quality of the national park system, and the benefit and inspiration provided to the American people by the national park system.”

Any impact would not necessarily be considered impairment. As such, an official determination must be made. The 2006 policies state that the determination of impairment must be made by the responsible NPS park manager. The NPS is required to complete this non-impairment determination for any action selected prior to the signing of a Finding of No Significant Impact (FONSI) or Record of Decision (ROD) associated with the appropriate environmental document.

Thus, for the feasibility of widening of the B-W Parkway, a determination of impairment cannot be made at this time. However, if this feasibility study progresses and an environmental document according to the National Environmental Policy Act (NEPA) is prepared, then the NPS is required to complete a determination of non-impairment prior to the signing of a FONSI or a ROD. If, under such assessment, a determination of impairment is made, this determination, which will be appended to the FONSI or ROD, could result in the B-W Parkway being removed from the NRHP and reverse the enabling legislation. Thus, the B-W Parkway could no longer be under the jurisdiction of the NPS. The possibility that the entire parkway could come under the management and ownership of the Maryland SHA might then have to be considered.

Conclusions

Congress directed the FHWA, NPS and Maryland SHA to undertake a study with a very narrow study focus: to determine the feasibility of widening the B-W Parkway to a consistent six-lane divided facility from Washington, DC, to Baltimore, Maryland.

Some of the principal conclusions identified during the conduct of this study were as follows:

- While a widened B-W Parkway will accommodate greater traffic volumes, the magnitude of increased travel demand on the facility generated by continuing anticipated regional population and employment growth will likely result in levels of traffic congestion similar to those experienced today.

- The estimated capital costs of adding a third northbound lane and a third southbound lane to the B-W Parkway range from approximately \$343 million for the least expensive inside widening option to approximately \$565 million for the most expensive outside widening option.
- No general public consensus was identified on either the need or the desirability of undertaking any potential widening option, with views regularly being expressed to both retain the existing facility as a true Parkway and to advance the widening concept.
- The potential magnitude of physical change associated with the widening of the B-W Parkway mainline would require that a determination of potential impairment of the facility be made by the NPS. This assessment would have to be undertaken in association with any future NEPA evaluation.

Moreover, several other issues were identified that will merit closer attention if funding is identified for the more comprehensive studies that would be required prior to the initiation of any formal design or actual construction activities. These issues include, but are not limited to, the following:

- Consideration of the traffic needs of the B-W Parkway within the context of the existing and future network of transportation facilities and services in the entire Baltimore to Washington, DC, travel corridor. How the Parkway interacts with traffic from these other facilities is important to fully understand the best way to accommodate these expected future demands.
- Consideration of a wider array of options for addressing traffic and transportation needs on the B-W Parkway itself and within the larger study corridor, including examining additional widening options for the Parkway and other highway facilities, traffic management options, and options for the use of multiple travel modes such as high occupancy vehicle lanes, bus-only lanes or bus rapid transit, fixed guideway transit facilities, and managed lanes.
- Examination in much greater detail of the effects of all options on the natural, socioeconomic, cultural, and built environments. A proactive public and agency process will ensure proper identification of critical resources as well as strategies for minimizing, avoiding, and mitigating potential impacts.
- Incorporation of designs that will address the need for reconstruction or replacement of the many bridges and interchanges along the corridor in a context-sensitive manner, respectful of the B-W Parkway's documented history and established character.
- A careful examination of the implications of impairment on the status of the B-W Parkway as one of the region's premier NPS resources.

This initial feasibility study makes no definitive recommendations for any further examination of the potential widening of the B-W Parkway. Rather, it identifies the major factors that would need to be examined in substantially more detail if the decision were made to pursue any such changes to the existing facility at some future date.

1.0 Study Background

1.1 Summary of Study Purpose

Opened in 1954, the B-W Parkway is a 29-mile scenic highway that connects Baltimore, Maryland, with Washington, DC. The Parkway is divided into two distinct sections. The NPS owns and operates a 19-mile section to the south between Maryland Route (MD) 175 and the New York Avenue/U.S. Route 50 split at the Prince George's County/District of Columbia border. This section of the Parkway is located within Prince George's and Anne Arundel Counties and is designated as the B-W Parkway. The Maryland SHA owns and operates a 14-mile section of the Parkway beginning at MD 175 and continuing north of I-695 through sections of Anne Arundel and Baltimore Counties and the city of Baltimore until reaching its termination at the I-95 Interchange approaching downtown Baltimore. This section is designated as Maryland 295.



With direction contained in the House Report 110-238 which accompanied the Transportation, Housing and Urban Development, and Related Agencies Appropriations Act, 2008, the FHWA, along with the NPS and the Maryland SHA, assessed the feasibility of adding a third northbound and a third southbound lane to the B-W Parkway from the interchange with I-695 to New York Avenue/U.S. Route 50 and the boundary with the District of Columbia. The objective of this study is to assess the feasibility of increasing the B-W Parkway's vehicular carrying capacity within the Parkway's historic and legislative context. The legislation also requests that "...the feasibility study shall include an assessment of the impact of the Base Realignment and Closure process on traffic throughout the Maryland Route 295 corridor between Baltimore, Maryland, and Washington, DC." Funding for the conduct of this feasibility study was identified in House Report 111-366 that accompanied the Consolidated Appropriations Act, 2010 (Public Law 111-117) which included the Transportation, Housing and Urban Development, and Related Agencies Appropriations Act, 2010.

1.2 Description of Legislative Language

This study is the result of language contained in House Report 110-238 and contains background regarding its intended purpose.

Baltimore Washington Parkway feasibility study.-The Committee directs the FHWA's Office of Federal Lands Highways to work with the National Park Service and the

Maryland State Highway Administration to determine the feasibility of adding a third northbound and a third southbound lane for Maryland Route 295/Baltimore Washington Parkway from the intersection with Interstate 695 to New York Avenue in the District of Columbia. The FHWA shall prepare a report which must be submitted to the House and Senate Committees on Appropriations, not later than one year after the date of enactment of this Act, on the feasibility of such a widening. The feasibility study shall include an assessment of the impact of the Base Realignment and Closure process on traffic throughout the Maryland Route 295 corridor between Baltimore, MD and Washington, DC.

1.3 Legislative Purposes and Significance of the Parkway

The B-W Parkway is part of a system of four parkways that welcomes visitors and integrates a context-sensitive design to convey to citizens the importance of Washington, DC. There is the George Washington Memorial Parkway (GWMP) in Virginia running along the Potomac River shoreline from the Capital Beltway into Alexandria to George Washington's home at Mount Vernon. There is the GWMP's parallel companion Parkway, the Clara Barton Parkway, which runs along the Potomac River in Maryland from the MacArthur Boulevard to Chain Bridge. There is also the Suitland Parkway, extending from the eastern boundary of the District of Columbia to Andrews Air Force Base. Lastly, there is the Rock Creek and Potomac Parkway in the District of Columbia itself that runs from the Lincoln Memorial to just south of the National Zoo.

The concept of the B-W Parkway was first proposed as an element of a planned regional system of parkways providing access to the core of the National Capital Region in 1935, when the NPS issued the *Regulations and Procedures to Govern the Acquisition of Rights-of-way for Parkways* on February 8, 1935, by the Secretary of the Interior¹. This was the first document to define a parkway characterized by the type of roadway as one that limits access only to non-commercial and recreational traffic.

Unfortunately, due to various reasons, including economic and political, the plans for the B-W Parkway stalled until the early 1940s. Over the previous decades, travel on U.S. Route 1 between Baltimore, Maryland, and Washington, DC, grew dramatically resulting in a very crowded, unsafe, and undesirable travel experience. Pressures to relieve the traffic conditions on U.S. Route 1 pushed the Maryland State Road Commission to release an initial plan in 1941 for a toll road between Baltimore, and Washington, DC, which conflicted with the proposed parkway plans². However, the plans for a State toll road lost support with time, mainly due to Federal restrictions on tolling roads that go through federally owned lands, but the renewed interest in the B-W Parkway stressed the importance of planning a facility with a vehicular as well as aesthetic and recreational value.

¹ United States Department of the Interior, National Park Service, National Register of Historic Places Multiple Property Documentation Form, Section E - Statement of Historic Context, p2

² Historic American Engineering Record, Baltimore-Washington Parkway, HAER No. MD-129, p 50

The 1940s brought an emphasis on roadway projects important to national defense, leading to the Federal Defense Highway Act of 1941, which provided funds for infrastructures that addressed primarily national defense needs. The Department of Commerce's Federal Works Agency (the agency that oversaw the Bureau of Public Roads, which would later become the FHWA), restricted approval to road projects that were considered essential to national defense. Under these circumstances, the characteristics described by a typical parkway provided for a more functional defense roadway system connecting to Fort George G. Meade, one of the largest military bases in the United States, than the typical freeway or highway because the B-W Parkway would be impermeable to an air attack due to its context-sensitive design, and the parkway would have limited access which permitted easy closure to non-military traffic in times of emergency³.



This focus on national defense led to a plan for the B-W Parkway that merged the functionality of modern freeways with the scenic parkway characteristics that addressed the aesthetic value and national defense needs. In 1945, the plans were finalized, which significantly differed from the initial plans. The northern section of the corridor between Fort Meade and the city of Baltimore was designated under the jurisdiction of the State of Maryland, and the typical public highway design standards of the time were applied. Additionally, as a State-owned roadway, it was built to accommodate commercial vehicles. The southern portion of the planned parkway remained under federal jurisdiction as much of the land was owned by Fort Meade and other Federal agencies. A decision was made to abide by the parkway standards of the NPS, which was granted ownership and maintenance responsibilities for this portion of the corridor. This portion of the corridor would also enact a prohibition on commercial vehicles. Construction began in 1946 on the 12-mile section of the northern portion of the corridor between Baltimore and MD 175, and the parkway was opened in 1952. The construction of the 19-mile segment between MD 175 and New York Avenue/U.S. Route 50 and the boundary with the District of Columbia began in 1950 and was opened in 1954.

To ensure that the parkway maintained its primary purpose, congressional legislation was approved in 1950 for the B-W Parkway⁴. The legislation states that it "... shall be regarded as an extension of the park system of the District of Columbia and its environs..." and "...that it shall be constructed, developed, administered, and maintained by the Secretary of the Interior, through the National Park Service..." in accordance with the National Park Service 1916 mission which protects natural and

³ United States Department of the Interior, National Park Service, National Register of Historic Places Multiple Property Documentation Form, Section E - Statement of Historic Context, p17

⁴ Public Law 643 – 81st Congress, Chapter 525 – 2D Session, H.R. 5990

nationally significant historic resources by such means as will leave them unimpaired for the enjoyment of future generations. Further, it states that “[T]he Parkway shall be constructed, developed, operated and administered as a limited access road primarily to provide a protected, safe, and suitable approach for passenger-vehicle traffic to the National Capital and for an additional means of access between the several Federal establishments adjacent thereto and the seat of government in the District of Columbia.” As one of the National Capital Parks, the B-W Parkway is also subject to additional legislation that gives direction to preserving the forests and natural scenery in and about Washington, DC.

To avoid impairment of the above purposes of the B-W Parkway, the legislation specifically states that the Secretary of the Interior, in concurrence with the Secretary of Commerce, shall control the location, limit the number of access points, and regulate the use of the parkway by various classes or types of vehicles or traffic.

The Federal-Aid Highway Act of 1970 authorized \$65 million for upgrading the parkway to six lanes in compliance with Interstate standards. Implementation was contingent on completion of an agreement with the State of Maryland to accept the upgraded parkway as part of its Federal-aid primary highway system. When agreement with the State could not be reached, the Surface Transportation Assistance Act of 1978 amended the law to maintain the existing four lanes and preserve the parkway characteristics as agreed upon by the U.S. Department of Transportation Secretary and the Maryland Secretary of Transportation.

In 1991, in recognition of its historical importance and cultural significance as an element of the Parkways of the National Capital Region, the B-W Parkway was certified as a Historic District and listed on the NRHP in the category of Transportation and noted for its landscape architecture.

1.4 Agency Participants

The legislative language in the Fiscal Year 2008 Appropriations mandated the FHWA to work with the Federal and State agencies to determine the feasibility of widening. As a result, the FHWA-EFLHD partnered with the National Capital Region Office of the NPS and the Maryland SHA to administer this study. The FHWA-EFLHD was designated as the study lead and was responsible for the technical direction of this study. The NPS and Maryland SHA provided technical guidance and support throughout the duration of the study.

2.0 Study Purpose

This section of the report provides a description of the study area, and the existing management and operations of the B-W Parkway. A definition of feasibility for the purposes of this study is given along with a description of the feasibility criteria which were used.

2.1 Study Area

For the purposes of this discussion, the general boundaries of the study area for this effort are defined as follows:

- On the north: the interchange of the B-W Parkway with the Baltimore Beltway (I-695) in Anne Arundel County, Maryland.
- On the south: the interchange of the B-W Parkway with New York Avenue/U.S. Route 50 at the District of Columbia/Prince George's County, Maryland, boundary line.
- On the west: along the alignment of Interstate Route 95 between its interchanges with the Capital Beltway (I-495) and the Baltimore Beltway (I-695).
- On the east: along the alignment of Robert Crain Highway (MD Route 3) from the interchange of MD Route 3 with U.S. Route 50 in Prince George's County north to the MD Route 3 interchange with MD Route 32 and I-97 in Anne Arundel County, then along the alignment of I-97 north to its interchange with the Baltimore Beltway (I-695) in Anne Arundel County.

The portion of the B-W Parkway which is the subject of this feasibility study extends 29 miles between the I-695 Beltway interchange on the north and New York Avenue/U.S. Route 50 and the boundary with the District of Columbia on the south. The existing B-W Parkway mainline is typically two general-use travel lanes in each direction. Three-lane mainline roadways currently exist in each direction along the following sections of the Parkway: from U.S. Route 50 to MD Route 450, from the Capital Beltway to MD Route 193, and from MD Route 175 to MD Route 100.

The Maryland SHA is presently engaged in two roadway improvement projects along its portion of the corridor. Construction is currently underway on a project to widen the MD 295 mainline from four to six lanes between the I-695 interchange and the I-195 interchange. Maryland SHA is currently planning to widen the MD 295 mainline from four to six lanes from the MD 100 interchange to the I-195 interchange. This project planning study also includes the construction of a new interchange at MD 295 and Hanover Road.

Interstate 95 forms the northwest boundary of the study area. It is a major interstate highway and runs northeast to southwest parallel to the Parkway. This is one of the most heavily travelled routes in the Baltimore and Washington metropolitan areas. Over the portion of its length between I-695 and the Capital Beltway, the I-95 mainline has four general use travel lanes in each direction. U.S. Route 1 and the B-W Parkway run parallel to I-95 and serve as alternative routes connecting the Baltimore and

Washington, D.C., urban cores. Over the majority of its length through the defined study area, U.S. Route 1 is a four-lane divided or five-lane cross section arterial roadway.

Interstate 97 and MD 3 run north to south forming the eastern boundary of the study area. Interstate 97 typically has a four-lane freeway cross section through the study area, while MD 3 typically has a four-lane major arterial or expressway cross section.

Interstate 695, I-195, I-895, MD 100, MD 175, MD 32, MD 198, I-495, MD 410, and U.S. Route 50 are the other major routes in the study area. The Interstate highway routes are typically four- to six-lane freeway facilities, with other principal routes such as U.S. Route 50, MD 32, and MD 100 also being four-lane freeways. The other MD routes in the study area are typically multilane arterial highways with at-grade intersections.

The study area covers approximately 247 square miles or 157,982 acres. Figure 2.1 shows the generally defined study area boundaries of I-695 to the north; New York Avenue/U.S. Route 50 to the south; MD Route 3 and I-97 to the east; and I-95 to the west.

Land uses in the study area include a combination of residential, commercial, and institutional areas. There is a concentration of residential areas located south of MD 193 in the communities of Greenbelt, Cheverly and East Riverdale. North of MD 193 there are clusters of residential areas located near the interchanges of MD 197, MD 198 and MD 175 in the communities of Laurel, Maryland City, Columbia and Fort Meade.

The study area includes a diverse mix of large Federal and State-owned properties. The USDA Beltsville Agricultural Research Center property covers approximately 10-square miles, while the Patuxent Research Refuge of the U.S. Fish and Wildlife Service covers approximately 20-square miles. Also included are NASA's Goddard Space Flight Center, Fort George G. Meade, and the headquarters of the NSA. Major State-owned properties in the study area include the University of Maryland at College Park, Bowie State University, and the Jessup Correctional Institution.

There are several forest areas located throughout the corridor including the B-W Parkway itself, Greenbelt Park, and the Anacostia River Park, all of which are owned and administered by the NPS. Additionally, the BARC, the Patuxent Research Refuge, and Goddard Space Flight Center are designated as forest areas.

The study area is considered an environmentally sensitive area. There are three major river crossings identified along the Corridor: the Patuxent River, Little Patuxent River, and Patapsco River. Plus, there is an abundance of unnamed streams and related floodplains associated with the watersheds of these principal rivers. The study area also includes five defined Sensitive Species Areas and 14 wetlands.

The B-W Parkway and the Greenbelt National Register Historic District are both listed on the NRHP. A total of six sites within the defined study area have been identified as being eligible for listing on the NRHP. These sites are:

- Fort Lincoln Cemetery
- Beltsville Agricultural Research Center, USDA
- Beltsville Agricultural Research Center, Building #510, USDA
- D.C. Children's Center – Forest Haven District
- Clark/Vogel House
- Sachs Residence

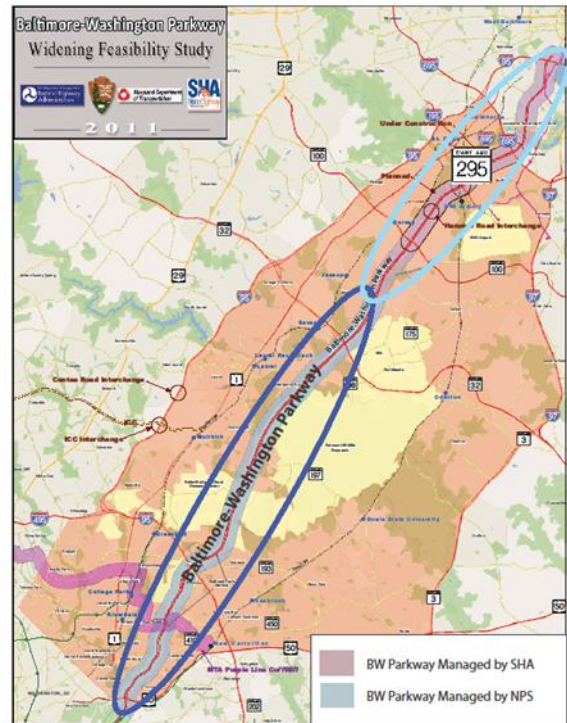
The following properties are listed in the Maryland Inventory of Historic Places (MIHP):

- D.C. Boundary Marker NE #8
- Cheverly Historic Community
- Crawford's Adventure Spring
- Cronmiller Outbuilding
- Jessup Survey District
- M. Bannon House
- Race Road House
- Matthias Harman House
- Andrew Harman Cemetery
- Patapsco State Park
- Summerfield Benson House

Within the study area, there are 151 public and private schools; 34 fire stations, and 20 police stations, as well as 17 libraries that serve the various communities. In addition, there are 131 parks and recreational facilities in the study area.

2.2 Facility Management and Ownership

Within the study area, the B-W Parkway is divided into two distinct sections. The NPS owns and operates a 19-mile section to the south between MD 175 and New York Avenue/U.S. Route 50 and the boundary with the District of Columbia. This section is located within Prince George's and Anne Arundel Counties and is designated as the B-W Parkway. The NPS is responsible for maintaining this portion of the Parkway, including roadway and bridge maintenance, landscaping, trash removal, and snow/ice removal. The United States Park Police patrol the B-W Parkway and enforce traffic laws. Along this section of the parkway, commercial vehicles such as trucks are prohibited; however, buses and limousines are allowed. This section of the Parkway was named in honor of Gladys Noon Spellman, a congresswoman who represented Maryland's 5th congressional district from 1975 to 1981.



The Maryland SHA owns and operates a 10-mile section of the Parkway between I-695 and MD 175. This section is located within Anne Arundel County and is designated as Maryland 295. Outside the study area, the B-W Parkway continues north of I-695 approximately four miles, through sections of Anne Arundel and Baltimore Counties and the city of Baltimore until reaching its termination at the I-95 Interchange approaching downtown Baltimore. The Maryland SHA is responsible for maintaining this portion of the Parkway, including roadway and bridge maintenance, landscaping, trash removal, and snow/ice removal. Commercial vehicles are allowed in this section of the B-W Parkway.

2.3 Feasibility Criteria

To help determine the feasibility of widening the B-W Parkway, the word feasibility needed to be defined for the context of the study. In addition, specific factors related to the feasibility of widening the Parkway needed to be determined and assessed. The following presents these items as relating to this study.

2.3.1 Definition of Feasibility

According to FHWA's procedural guidelines for highway feasibility studies, the definition of "feasibility" as given by Webster's Third International Dictionary (1966) provides the basis for determining the

definition of “feasibility” for a highway study. Within the context of FHWA’s guidelines, the meaning of “feasibility” has the following parts⁵:

- The degree to which a given alternative mode, management strategy, design, or location is economically justified.
- The degree to which such an alternative is considered preferable from an environmental or social perspective.
- The degree to which eventual construction and operation of such an alternative can be financed and managed.

For the purposes of the Baltimore-Washington Parkway Widening Feasibility Study, the feasibility of widening the Parkway would involve an assessment of costs, environmental impacts, social responsibilities, and overall operations and management. Several aspects would need to be evaluated in order to determine the true feasibility of widening the Parkway beyond its current capacity.

2.3.2 Criteria Overview

The study focused on five aspects of feasibility: traffic and transportation, physical constraints, environmental analysis and effects, preliminary capital cost estimates, public and political considerations and facility ownership and management. A description of each of these aspects is discussed below.

2.3.2.1 Traffic and Transportation

This aspect evaluates the influence of additional lane capacity on mainline traffic operations. The potential benefits to the traffic flow and mobility that might potentially be derived from the additional capacity provided by widening the B-W Parkway to three lanes in each direction for the full length of the corridor were assessed. This was done by a review of the historical traffic volumes, an evaluation of the future traffic forecasts, and an analysis of future traffic operations.

2.3.2.2 Physical Constraints

This aspect evaluates the physical limitations for widening the B-W Parkway by a third lane in either direction. This includes the availability of land for the widening, the impacts to NPS-designated land, impacts to privately held land, and impacts to existing infrastructure, particularly the bridges and interchanges along the Parkway. This was performed by assigning design standards of both the Maryland SHA and the NPS to the parkway widening and determining the results.

⁵ <http://www.fhwa.dot.gov/planning/corbor/feastudy.html#top>

2.3.2.3 Environmental Analysis and Effects

This aspect examines the potential for direct impacts to natural resources and communities as well as more indirect impacts to quality-of-life in areas such as noise or aesthetics for area residents and the communities that align the Parkway facility. The environmental resources contained in the study area were inventoried and their impacts were assessed both quantitatively and qualitatively as appropriate given the availability of quantitative data on a given resource. Resources were identified as considerations that would have to be dealt with in a future NEPA process should this study move forward.

2.3.2.4 Preliminary Capital Cost Estimates

This aspect looks at the potential capital costs of widening the B-W Parkway, including operation and maintenance costs, as the costs of such a widening must be justified.

2.3.2.5 Public and Political Considerations

This aspect examines the willingness of the public to see a study of this magnitude move forward in the region. In particular, this criterion assesses the input of the public as well as the perspectives of several major stakeholders of the study including elected officials, regional and local government agencies, economic development groups, business representatives, and others.

2.3.2.6 Ownership and Management

This aspect assesses the impacts of ownership and management of the Parkway and the implications of a potential widening on these factors. The widening of the B-W Parkway could be determined to impair the Parkway's character and function sufficiently to warrant consideration of whether or not the facility could still be classified as a unit of the NPS.

2.3 Limiting Conditions

Sticking closely to the language of the congressional legislation, this study would be limited to the analysis of adding general purpose vehicular travel lanes. Not under consideration as part of this feasibility study are any analyses of the potential for high occupancy vehicle lanes, bus-only lanes or bus rapid transit lanes, electronic toll lanes or high occupancy toll lanes, or other fixed guideway transit options. This feasibility study is not a part of the NEPA process, so a full range of multimodal improvements are not included in this study.

Avoidance alternatives are those that entirely avoid the use of Section 4(f) properties. Section 4(f) prohibits the U.S. Department of Transportation from using land from publicly owned parks, wildlife and waterfowl refuges, or public and private historical sites for a federally funded project unless there is no feasible and prudent alternative to use of the land and all possible planning to minimize harm to the property has been included in the project. The identification and evaluation of avoidance alternatives is not included in this feasibility study. The use of any NPS-owned properties, such as the B-W Parkway itself, may require the conduct of a formal Section 4(f) evaluation.

3.0 Alternatives Definition

The alternatives development process is a critical step in the feasibility study. It involved an interactive and interdisciplinary approach for identifying, screening and evaluating alternatives for the potential widening of the B-W Parkway. This section describes the processes used during the initial identification and preliminary screening of the widening alternatives.

3.1 Methodology

The alternatives development process consisted of the following steps:

1. Review of background Information.
2. Determination of roadway deficiencies; existing and projected traffic operational performance; and environmental, transportation, land-use, demographics and community features.
3. Identification of a reasonable range of alternatives from stakeholder input.
4. Preliminary screening of highway alternatives based on criteria that addresses environmental, transportation, and physical design factors.
5. Selection of widening options for further development.

Using this methodology, a reasonable range of highway-oriented physical and operational improvement widening alternatives for the B-W Parkway corridor was developed. Options were selected based on their ability to address the study's goals and objectives for both current and future year conditions.

3.1.1 Background Information

Background information was taken from existing pertinent legislation, reports, plans, studies, maps, and other available information pertaining to transportation, land use, and environmental conditions in the study area from the study's stakeholders, including the NPS, Maryland SHA, the District of Columbia Department of Transportation, the MWCOC, the Baltimore Metropolitan Council (BMC), the Maryland-National Capital Park and Planning Commission, Prince George's County, Maryland, and other sources as necessary. This data was inventoried and documented in the *Existing Conditions Technical Report*, which is included as an appendix to this document.

3.1.2 Potential Safety Issues and Roadway Deficiencies

The scope of this feasibility study did not include a detailed safety analysis or interchange operational analysis. However, through a review of as-built roadway plans, stakeholder comments, aerial photography, photos, and field observations of the study area, the team has identified some potential concerns that would require further study if this work advances further in the project development process.

In general, the B-W Parkway corridor meets applicable geometric standards and guidelines for limited access highways. The following areas of concern have been identified as potential topics for additional examination.

- Tight radii on loop ramps will present challenges for outside widening.
- Southbound B-W Parkway on-ramp at MD 197 acceleration area was identified as a concern during public meetings. However, the acceleration lane meets current roadway design standards and this area may need further operational analysis in future studies.
- Northbound B-W Parkway off-ramp at MD 197 was identified at the public meeting as an area where the queuing backs onto the parkway. This issue will require further operational analysis of the intersection in future studies.
- Northbound B-W Parkway off-ramp at Riverdale Road was identified at the public meeting as an area where the queuing backs onto the parkway. This issue will require further operational analysis of the intersection in future studies.
- Ramps at I-495 are in close proximity to the MD 193 interchange

A 3-year accident history (2008-2010) obtained from the section of the Parkway under Maryland SHA's jurisdiction, revealed that crashes are clustered primarily in the vicinity of interchanges. The top three are I-695, MD 100 and MD 175. This is generally consistent with traffic conditions one might expect in the vicinity of interchanges where the influence of ramp traffic can result in sudden slowing of vehicles, a higher incidence of lane-changing, and an increased demand on driver attention. The same conditions are likely along sections on the Parkway in the vicinity of interchanges.

3.1.3 Stakeholder Input

The methodology used to develop the alternatives involved the collection of input from key stakeholders who live, work, travel, and visit in the B-W Parkway corridor. Key stakeholders include:

- Members of the general public.
- Community groups and local residents.
- Daily commuters.
- Businesses and employees.
- Technical Advisory Committee members.
- Maryland State Highway Administration.
- National Park Service.
- Interagency group members.

During Public Meeting #1 in July 2011, participants were asked to assemble into small groups with aerial mapping, tracing paper, and markers and "sketch out" ideas for possible solutions. The results from the meeting were a list of ideas for consideration that were carried forth in the alternatives development. These ideas included, but were not limited to, the following:

- Public transportation is a better alternative.
- Make MD 295 look more like a parkway.
- Consider all multimodal options (high occupancy vehicle, bus rapid transit, public transportation).

- Minimize impacts on other Federal properties.
- Consider not only vehicle but also person-throughput on the corridor.
- Maintain limited access nature of the Parkway

Public input that was used as consideration in the alternatives development included the following:

- Widen to the inside versus the outside as outside widening has the potential to impact homes and more trees.
- MD 410/Riverdale Road: improvements at the interchange including longer access lanes.
- I-495: better merge and exit lanes.
- MD 197: more highway width and improve traffic flow at the interchange, mainly in the southbound direction.

3.2 Parkway Alternatives

As a result of the stakeholder input, a total of five potential parkway improvement conceptual alternatives were identified. The descriptions of each potential widening concept are as follows.

1. No-Build: No widening of the Parkway.
2. Build 1: Widening of the mainline to the inside right-of-way.
3. Build 2: Widening of mainline to the outside right-of-way.
4. Build 3: Combination of inside and outside mainline widening.
5. Build 4: Use of existing shoulders for the third lane.

The No-Build Alternative represents those multimodal transportation system improvements included in the currently adopted Baltimore and Washington Metropolitan Area Consolidated Long Range Plans of regional significance in the study area. These transportation improvements include completion of widening along the Maryland SHA-owned portion of the B-W Parkway to create a six-lane cross section, the Purple Line fixed guideway transit facility between Bethesda and New Carrollton, and the Inter-County Connector toll-road between the I-270 and I-95 corridors.

Two separate design options were also identified for each of the widening alternatives based on the different design standards used by NPS and Maryland SHA. These standards were assessed in consideration of the analysis of potential impairment to the NPS-owned and managed B-W Parkway facility. The purposes of a Parkway are not the same as a traditional freeway. Efforts are made to minimize impacts to the environment, follow the natural topography of the landscape, and retain the historic integrity and aesthetic qualities and infrastructure of the B-W Parkway facility, which is itself a National Park unit. Should a determination of sufficient impairment to those basic qualities and purposes be made as a result of a widening of the Parkway, the question would then be whether or not the Parkway facility should remain under the ownership of the NPS. Both sets of design standards are considered as options.

The NPS uses design standards as noted in their *Park Road Standards*, published in 1984. The NPS standard for the widened section specifies a new 12-foot travel lane added to the inside or outside edge of the existing pavement. However, it includes an 8-foot outside paved shoulder with curb and gutter and a 3-foot inside shoulder with curb and gutter for a total width of 47 feet face-of-curb to face-of-curb.

The Maryland SHA uses design standards provided by AASHTO published in the *AASHTO Green Book - A Policy on Geometric Design of Highways and Streets, 6th Edition*. The AASHTO/SHA standard specifies a new 12-foot travel lane added to the inside or outside edge of pavement with a 10-foot outside paved shoulder and a 10-foot paved inside shoulder for a total width of 56 feet edge to edge of pavement.

Since the NPS-owned portion of the B-W Parkway already has a cross section with six lanes - three lanes in each direction - between the Maryland/District of Columbia boundary line and MD 450, and the Maryland SHA-owned section between MD 175 and MD 100 is already six lanes, with six lanes either planned or recently completed between MD 100 and I-695, the limit of potential widening associated with this feasibility study is between the MD 450 and MD 175 interchanges.

3.2.1 Screening Criteria

The preliminary screening of widening alternatives was conducted to determine if any of the initially identified parkway improvement alternatives were deemed not feasible from a socioeconomic, environmental, transportation service or physical design standpoint. Screening criteria were developed using input from Technical Advisory Committee (TAC) members and public meeting participants on these key aspects of feasibility, which are as follows:

- Preserves the aesthetic, historic, and natural characteristics of the B-W Parkway.
- Minimizes community and environmental impacts.
- Follows a consistent approach for roadway widening.
- Increases capacity in the corridor.
- Relieves congestion in the corridor.
- Improves safe and efficient vehicular operations.

3.2.2 Results of Preliminary Screening

Alternative 1: No-Build Alternative

The future No-Build alternative for the study includes the assumed completion of all of the capacity expansion, system preservation and maintenance improvements contained in the September 14, 2011, Draft of the Fiscally Constrained Long-Range Transportation Plan for the Baltimore Region and the currently adopted Fiscally Constrained Long-Range Transportation Plan for the National Capital Region. The No-Build alternative, inclusive of the currently adopted regional long-range transportation plan improvements listed below, will, by definition, remain viable alternative concepts beyond this initial screening.

Alternative 2: Widening of Mainline to the Inside Right-of-Way

This alternative consists of the addition of a third general use travel lane adjacent to the “inside” edge (left side or driver’s side) of the existing pavement by using available space in the existing Parkway median. In those areas where there is insufficient space for inside widening, then narrower shoulders may be proposed with an understanding that a design exception would be required if the study advances further into the formal project development process.

Some of the potential advantages associated with this option include increasing vehicular capacity of the B-W Parkway, and possibly relieving congestion on the secondary roadway system with the NPS and AASHTO/SHA widening options. In addition, the use of such an inside widening concept would likely reduce the number and/or scale of potential direct impacts to adjacent properties, communities and environmental resources. These reductions would be more anticipated with the NPS option. However, minimal impacts are anticipated with the AASHTO/SHA option based on the need for addition of an outside shoulder to the proposed cross section.

Some members of the TAC viewed this alternative as modifying the park-like characteristics of the B-W Parkway with the narrowing or elimination of the median as a result of the third lane.

It was decided that this alternative would be carried forward to the next phase of the feasibility study, since it could benefit the region by increasing vehicular carrying capacity, thus possibly reducing congestion on the secondary roadway system.

Alternative 3: Widening of Mainline to the Outside Right-of-Way

This alternative consists of the addition of a third general use travel lane adjacent to the outside edge (right side or passenger side) of the existing pavement. Advantages include increasing vehicular capacity with the NPS and AASHTO/SHA options as noted in the above alternative and avoiding impacts to the Parkway’s existing median, particularly with the NPS design standards alternative. However, disadvantages include potential larger-scale impacts to adjacent properties, environmental resources, and sensitive species areas with the NPS or AASHTO/SHA design option. In addition, some impacts are anticipated in the parkway median area since a new inside shoulder would need to be added to the roadway cross-section with the AASHTO/SHA option.

It was decided that this alternative would be carried forward to the next phase of the feasibility study since it could benefit the region by increasing vehicular carrying capacity, thus possibly reducing congestion on the secondary roadway system. A number of public agency and citizen comments expressed concern with consideration of this option, both with respect to possible direct and indirect impacts on adjacent communities, as well as the potential for a dramatic change in the overall character and feel of the existing Parkway.

Alternative 4: Combination of Inside and Outside Widening of the Mainline

This alternative was initially identified to address concerns about insufficient room for widening to the inside or outside, particularly at bridge overpasses and along those sections of the B-W Parkway with narrow medians or the absence of medians. The thought was to shift the alignment to the inside or outside to best fit the existing total Parkway cross section creating a hybrid alternative.

After some discussion, it was agreed that narrow shoulders might be allowed at locations where the AASHTO/SHA options discussed above would not fit in lieu of shifting the alignment to either side. This would, however, require obtaining a design exception which is routinely granted for this type of condition.

The team identified a limited number of areas where there is no existing median space due to the presence of a barrier wall or bridge abutment. In these cases, any roadway widening would have to be to the outside, thus eliminating the need to evaluate a combined inside and outside widening alternative. This generic alternative concept was thus eliminated from further consideration during the feasibility study.

Alternative 5: Use of Existing Inside and Outside Shoulders for the Third Lane

This option would convert the existing 8-foot outside shoulder in the NPS-owned portion of the Parkway into the third travel lane. The idea is to only add enough pavement to provide a total of three appropriately sized travel lanes in each direction. This concept would create a curb-to-curb width of 40 feet. This would only be about 5 feet wider than the existing NPS cross section.

The key concern with this alternative was the elimination of shoulders. The team felt that removal of shoulders could become a potential safety hazard on a high-speed facility such as the B-W Parkway, with varying degrees of curvature. Therefore, this concept was dropped from further consideration during the feasibility study.

3.3.3 Alternatives Selected for Further Study and Analysis

In summary, two alternative widening concepts were carried forward for further analysis and evaluation. They are, respectively, widening of the B-W Parkway mainline to the inside right-of-way and widening of the B-W Parkway mainline to the outside right-of-way.

For the purposes of this feasibility study, all-new pavement was assumed to be full-depth asphalt pavement to facilitate constructability and accommodate maintenance of traffic during construction as well as minimize long term maintenance issues that have been observed in other similar facilities that have thinner pavement sections in the shoulders. Existing shoulder pavement is assumed to be thinner than the existing travel lanes and will be removed and reconstructed with full-depth pavement when adjacent to areas of pavement widening. Additional assumptions are:

- In some cases, additional pavement width beyond that shown in the typical sections was added for acceleration, deceleration, or auxiliary lanes. The cross slopes of the existing travel lanes will be maintained and extended to set the finished grade of the adjacent new lane.
- For purposes of setting conservative limits of disturbance widened roadside ditch sections were graded on each side of the existing Parkway, and where possible, an additional 25 feet was added to account for stormwater management, using environmental site design, to meet the new Maryland Department of the Environment (MDE) guidelines on erosion and sediment control. Figures 3.1 and 3.2 illustrate the general dimensions of the resulting stormwater management/MDE designs for a typical cut or fill section of mainline roadway.

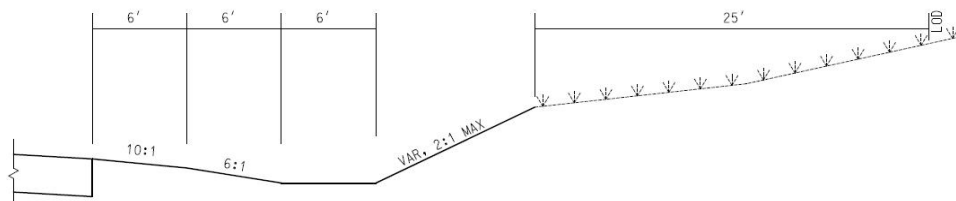


Figure 3.1. Roadside Grading Typical Section (Cut Slope with Ditch)

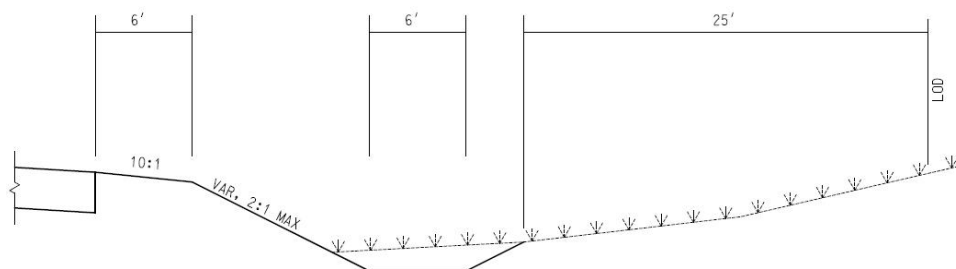


Figure 3.2. Roadside Grading Typical Section (Fill Slope with Ditch)

3.2 Widening Options

The following options were developed from the two widening alternatives evaluated:

- NPS Outside Widening Option.
- AASHTO/SHA Outside Widening Option.
- NPS Inside Widening Option.
- AASHTO/SHA Inside Widening Option.

3.2.1 Outside Widening

3.2.1.1 NPS Outside Widening Option

The NPS Outside Widening Option replaces the existing right shoulder and curb with a new 12-foot lane and an 8-foot shoulder to the face-of-curb and gutter. The existing 3-foot left shoulder with curb and gutter is not modified. The resulting configuration is an existing curb and 3-foot shoulder on the left with three 12-foot-wide travel lanes and an 8-foot-wide shoulder, including curb and gutter on the right for both the northbound and southbound parkway that meets NPS design guidelines. The resulting total roadway width would be 47 feet from face-of-curb to face-of-curb.

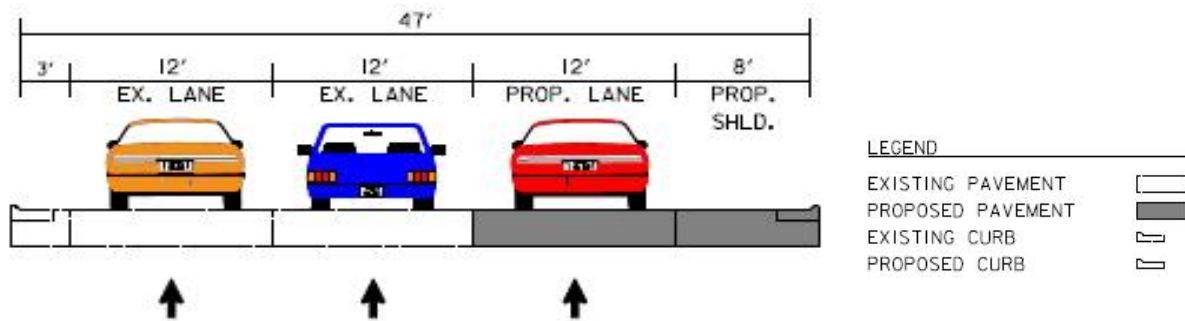


Figure 3.3. NPS Outside Widening

3.2.1.2 AASHTO/SHA Outside Widening Option

The AASHTO/SHA Outside Widening Option replaces the existing right shoulder and curb with a new 12-foot lane and a 10-foot shoulder with no curb. Additionally, the existing left shoulder and curb is replaced with a 10-foot-wide paved shoulder. The resulting configuration is a 10-foot-wide shoulder on the left with three 12-foot-wide travel lanes and a 10-foot-wide shoulder on the right for both the northbound and southbound parkway that meets AASHTO/SHA design guidelines. The resulting total roadway width would be 56 feet from edge of pavement to edge of pavement.

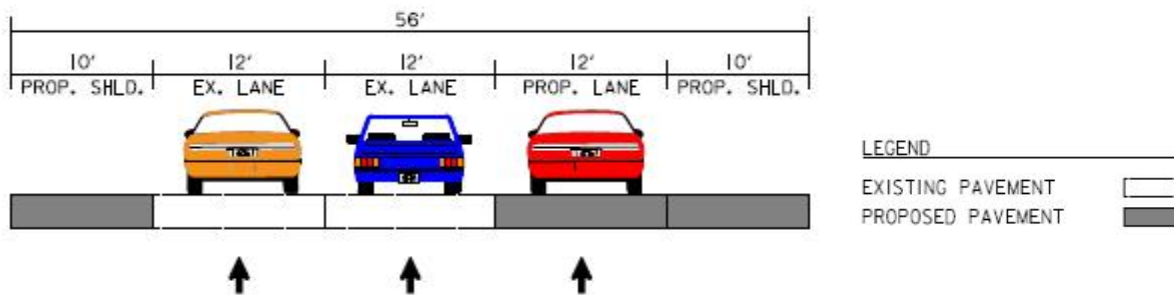


Figure 3.4. AASHTO/SHA Outside Widening

3.2.2 Inside Widening

3.2.2.1 NPS Inside Widening Option

The NPS Inside Widening Option replaces the existing left shoulder and curb with a new 12-foot lane and a 3-foot shoulder with curb and gutter. The existing right shoulder and curb is not modified. The resulting configuration is a 3-foot-wide shoulder including curb and gutter on the left, with three 12-foot-wide travel lanes and an existing 8-foot-wide right shoulder, including curb and gutter for both the northbound and southbound parkway that meets NPS design guidelines. The resulting total roadway width would be 47 feet from face-of-curb to face-of-curb.

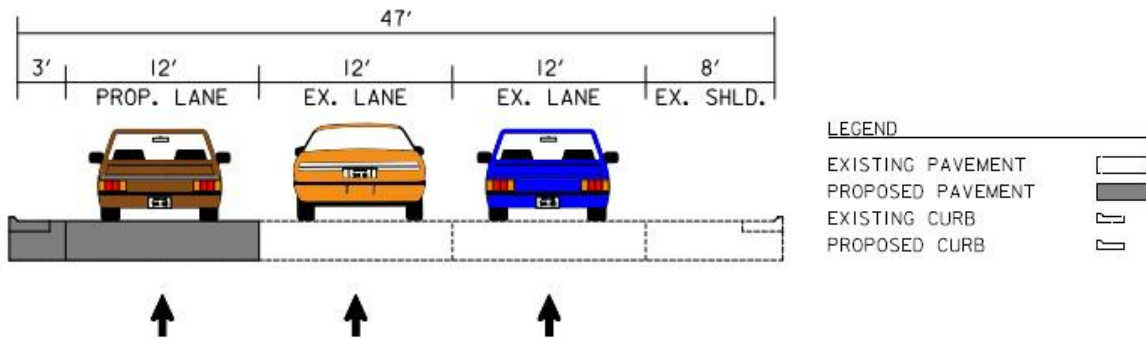


Figure 3.5. NPS Inside Widening

3.2.2.2 AASHTO/SHA Inside Widening Option

The AASHTO/SHA Inside Widening Option replaces the existing left shoulder and curb with a new 12-foot lane and a 10-foot shoulder with no curb. Additionally, the existing right shoulder and curb is replaced with a 10-foot-wide shoulder. The resulting configuration is a 10-foot-wide shoulder on the left with three 12-foot-wide travel lanes and a 10-foot-wide shoulder on the right for both the northbound and southbound parkway that meets AASHTO/SHA design guidelines. The resulting total roadway width would be 56 feet from edge of pavement to edge of pavement.

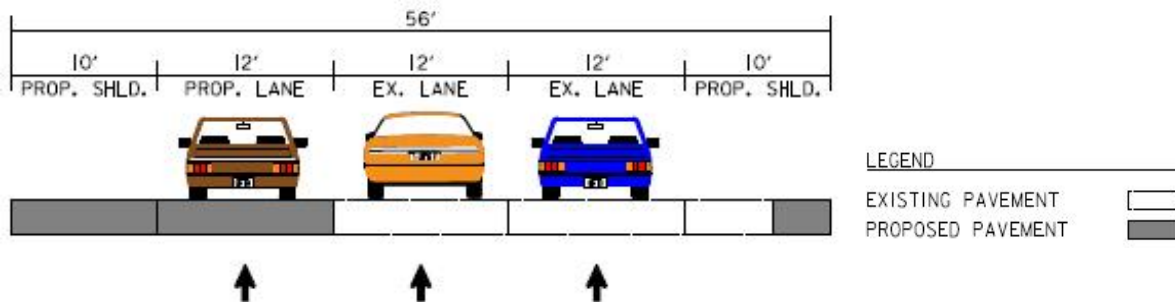


Figure 3.6. AASHTO / SHA Inside Widening

A conceptual-level visual representation of the potential effects of implementing either an outside or an inside widening of the existing B-W Parkway to provide a third lane in each direction is presented in the figures below. The photo perspective in both the “before” and “after” views is that of a driver in the left or passing lane of the existing four-lane parkway. Figure 3.7 illustrates the implications of adding the third lane to the outside pavement edge (i.e., to the far right side) of the existing B-W Parkway using the typical cross section illustrated on Figure 3.4. In addition to one more travel lane and a widened shoulder area, a noticeable amount of existing vegetation would have to be removed to provide the necessary stormwater management site design facilities.



Before *After*
Figure 3.7. AASHTO/SHA Outside Widening Option

Figure 3.8 illustrates the implications of adding the third lane to the inside pavement edge (i.e., to the far left side) of the existing Parkway using the typical cross section illustrated on Figure 3.5. As was the case with Figure 3.7, the photo perspective in both the “before” and “after” views for Figure 3.8 is that of a driver in the left or passing lane of the existing four-lane Parkway. In addition to one more travel lane being provided to the left side of the pavement, a noticeable amount of the existing parkway median area would have to be removed to provide the necessary space for the third travel lane and its associated shoulder and stormwater management site design facilities.



Before *After*
Figure 3.8. NPS Inside Widening Option

4.0 Public Involvement

4.1 Overview of the Context-Sensitive Solutions (CSS) Approach to the Feasibility Study

As is often the case with major infrastructure projects, the original planning and construction of the existing B-W Parkway created great anxieties in several of the communities along the corridor. Ultimately, the B-W Parkway divided several neighborhoods that still harbor that anxiety today.

It is clear that any study investigating the feasibility of widening such a symbolic corridor needs to assess not only environmental, economical, and engineering feasibility, but also the feasibility of community, and ultimately, political acceptance. Given the contentious history involving the B-W Parkway, it would be impossible to fully and fairly assess the feasibility of widening the facility without fully engaging the community and providing the opportunity to create and evaluate contextually sensitive alternatives. With this in mind, a CSS approach to public involvement was implemented. The CSS process is a strategy that seeks proactive engagement of project stakeholders in the identification of the issues and priorities related to a proposed project that informs the evaluation of analysis and options. This meant approaching communities with an open mind, listening, and continually gaining feedback as the work leads to more plausible outcomes for the study.

The CSS public involvement approach was multipronged, including community residents and employees in the corridor, business and political leaders, and representatives of various governmental agencies. The residents and employees were reached through newsletters and involved in public meetings. Business and political leaders were reached through a set of stakeholder interviews, and local, State, and Federal Governmental agencies comprised a Technical Advisory Committee.

4.2 Technical Advisory Committee (TAC)

The TAC was comprised of the Federal agency partners, local and State agency officials and other governmental partners representing the predominant interests in the B-W Parkway corridor. The three meetings they attended served as forums for discussions of the issues surrounding the corridor and strategies for addressing them through the study options. They also served as sounding boards for materials to be presented to, and inputs received from, the public meetings, and advised on the public presentations to ensure the material was easily understandable to the public. A total of three sessions were spent presenting to and receiving very valuable and insightful advice from the TAC.

4.2.1 TAC Member Agencies

The TAC included the following agencies:

- Amtrak
- Anne Arundel County Office of Planning and Zoning
- Baltimore County Office of Planning
- Baltimore Metropolitan Council's Baltimore Regional Transportation Board

- Beltsville Agricultural Research Center, U.S. Department of Agriculture
- District of Columbia Department of Transportation
- Federal Highway Administration, Delaware-Maryland Federal-aid Division
- Federal Highway Administration, District of Columbia Federal-aid Division
- Federal Highway Administration, Eastern Federal Lands Highway Division
- Fort George G. Meade, U.S. Army
- Howard County Department of Planning and Zoning
- Maryland Aviation Administration
- Maryland State Highway Administration
- Maryland Transit Administration
- Maryland-National Capital Park and Planning Commission - - Prince George's County Planning Department
- Metropolitan Washington Council of Governments - Transportation Planning Board
- National Aeronautics and Space Administration
- National Capital Planning Commission
- National Park Service - Greenbelt Park (A Unit of National Capital Parks – East)
- National Park Service - National Capital Parks - East
- National Park Service - National Capital Region
- National Security Agency
- Patuxent Research Refuge, U.S. Fish and Wildlife Service
- United States House of Representatives, Office of Congressman Dutch Ruppersberger
- U.S. Park Police
- Washington Metropolitan Area Transit Authority

A list of the full TAC membership is included the appendix material.

4.2.2 TAC Meetings

TAC Meeting #1 was held on June 22, 2011, at the Greenbelt Park Ranger Station in Greenbelt, Maryland. The agenda included a discussion of the purpose of the study, the approach and timeline as well as an initial discussion of the existing condition. The meeting



ended with a facilitated participatory session. Participants individually answered several rounds of questions designed to inform the study team on concerns and issues on the study from the viewpoint of the various agencies represented on the TAC. There was no debating or discussion of individual statements as the purpose was to gain all input and not to determine whose position or opinion was more valid.

TAC Meeting #2 was held on October 14, 2011, at the Auditorium of the Maryland SHA District 3 Office in Greenbelt, Maryland. The agenda included a detailed presentation on the existing conditions, traffic projections, and AASHTO versus NPS roadway design standards and the application of those standards to the four widening options. A very valuable outcome of this meeting was the strong direction of the TAC to simplify the complex engineering information so the public would have a better understanding of the physical implications of the various widening options being examined.

TAC Meeting #3 was held on January 19, 2012, at the Auditorium of the Maryland SHA District 3 Offices in Greenbelt, Maryland. A detailed discussion of the cost estimates for the four options and a review of the content of the Report to Congress comprised this agenda.

4.3 Public Meetings

The residents and employees with an interest in the outcome of the feasibility study were invited to participate in a set of three CSS-based public work sessions. A total of three of these public meetings were held during the feasibility study. Each meeting began with an overview of the purpose of the study, presented a brief summary and the updated status of the study, and engaged the public in an interactive process designed to gain balanced input. The team implemented the following set of public meetings as the means to involve the public, gaining trust, as well as gauging the feasibility and level of community support should this effort go beyond a feasibility study.

4.3.1 Overview of Public Meetings

Three public meetings were held throughout the study. A summary of each public meeting is provided below. Details are provided in Appendix H of this report.

4.3.1.1 Public Meeting #1 – July 20, 2011

This meeting was held on July 20, 2011, at Meade Middle School and was set up as a listening session. The purpose of the meeting was to gain information on concerns, issues, and ideas related to the addition of a northbound and southbound lane to the B-W Parkway. It was deliberately held before any engineering analysis was conducted to begin developing trust and setting the stage for open communication throughout the process. The meeting began with an overview of the study purpose followed by a breakout session. A set of questions were asked at the breakout tables; each participant was allowed time to answer. Debate or discussions of the various comments and/or another person's position were not encouraged as everyone's input is as valuable as the next. A summary of the major comment themes include:



- Preservation of the aesthetic, historic, and natural values of the B-W Parkway.
- Community and environmental impacts of a potential widening.
- Direct connectivity needed between Washington, DC, and Baltimore.
- Congestion clogs the corridor today.
- Maintain the two-lanes to preserve the B-W Parkway's character.
- Alternative mobility options should be considered along the corridor.
- The B-W Parkway is viewed as a barrier to the environment and community connectivity along the corridor.

4.3.1.2 Public Meeting #2 – November 17, 2011



Public Meeting #2 was held on November 17, 2011, at the Greenbelt Community Center in Greenbelt, Maryland. The purpose of the meeting was to affirm that the team understood the comments received during and after Public Meeting #1, and to demonstrate how their comments informed the approach of the study. In addition, this public meeting was used to present the four potential parkway widening options that were going to be evaluated. Breakout sessions were organized to receive comments and feedback on each of the options. Major themes from the second public meeting included:

- Widening the B-W Parkway, regardless of the use of the additional lane, does not provide a long-term solution to congestion.
- The addition of an extra lane will only increase demand and promote greater environmental impacts.
- Alternative mobility options along the corridor (e.g. extend the Metrorail Green Line alignment) need consideration.
- Widening may have negative safety implications (e.g. possible degradation in safety due to extra lane and limited gap/clearance between opposite lanes).
- Widening will have negative community impacts (e.g. noise, aggravate barrier within divided communities).
- The aesthetic, historic, and natural values of the B-W Parkway need to be preserved.
- Concern for natural and environmental impacts caused by widening (e.g. impacts on wildlife, trees, air quality, light pollution, heat island effect).

4.3.1.3 Public Meeting #3 – February 16, 2012

Public Meeting #3 was held on February 16, 2012, at the Greenbelt Community Center in Greenbelt, Maryland. The purpose of this third public meeting was to present and discuss the final findings of the study, including conceptual cost estimates, the draft Report to Congress, and answer any questions or concerns related to the report prior to finalizing it.

In addition, the meeting informed the public on when and how they will have access to the final report of the feasibility study and provided recommendations on the requirements that will need to be further evaluated if the study is to move forward.

Over 30 participants were present in the meeting providing comments and concerns that reflected the same themes of those inputs received in the past Public Meetings and throughout the study.

4.4 Stakeholder Interviews

In order to engage the political leaders that could be affected by a potential widening of the B-W Parkway, the team arranged a series of stakeholder interviews between May 2011 and September 2011. These interviews involved local- and State-level elected officials, as well as business and community leaders. The following themes were extracted from the comments and inputs received during these interviews:

- Economic development and growth could further constrain the corridor.
- Further congestion could constrain economic development opportunities.
- Safety implications of existing traffic.
- North/south alternatives are limited and should be evaluated for implications.
- The environment is an important component but should not be an overriding element.
- Multimodal options and a wider study are needed.
- Park (tree) buffer for communities is an important quality-of-life element.
- An open mind to the study is needed by all.

4.5 Public Access to Study Information

The public was informed of the study through several means including a mailing list, newsletters, and a Webpage on the FHWA Web site.

4.5.1 Mailing List and Email Contacts

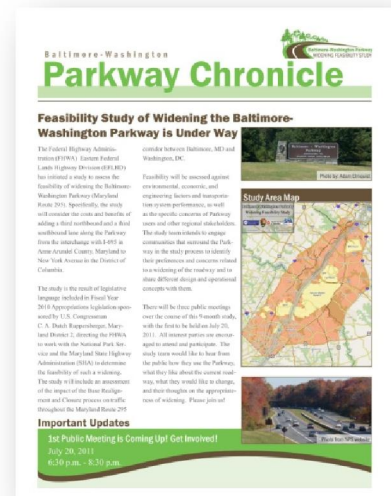
A mailing list of over 45,000 residents, employers, governmental agencies and political leaders in the study area was developed and maintained throughout the study. This list was used for invitations to the public meetings and for distributing newsletters. Meeting reminder blasts were also sent through email to those on the mailing list.

4.5.2 Newsletters

Three newsletters were developed and distributed by email and standard mail delivery to the TAC and those on the mailing list. The first newsletter described the purpose of the study, the second reported on the status of the study as well as provided a history of the B-W Parkway, and the third discussed the options and the feasibility of each. Each newsletter included a notice of an upcoming public meeting.

4.5.3 Public Meeting Advertisements

Paid media advertising was placed in several prominent newspapers in the corridor including the *Washington Post* and the local Gazette newspapers to make the public aware of the study and to invite participation in the public meetings.



4.5.4 Webpage on the FHWA Web site

The study process as it progressed comprised the content of the Webpage on the FHWA-EFLHD public access Web site at <http://www.efl.fhwa.dot.gov/>. Materials presented to the public were uploaded, as well as summaries of the public meetings.

4.6 Major Issues or Concerns Emerging from Public Involvement

From the interaction of the public, the input of the stakeholders and the TAC, it is clear that there are strong concerns over congestion on the B-W Parkway. Equally important is the concern that the character of the Parkway be maintained for the historic, aesthetic, and natural values embodied in the Parkway. The limited focus of the feasibility study was very troubling to public and TAC participants alike. Widening without considering other modal options or managed lanes seems to result in feasible options that handle more traffic but do little to relieve congestion. That feeds into the concern that widening, at such a significant cost, seems to result more in negative impacts to safety, environment, noise level, and aesthetics, than to the purpose of moving more people in a more efficient fashion. Should this feasibility study move forward to another phase, it will be much more acceptable if the options include considerations for transit, managed lanes, and other alternatives, as well as expand the study area to include the potential of capacity enhancements to I-95 and other corridors near the current study area.

5.0 Traffic and Transportation Impacts

Because the objective of this study is to assess the feasibility of increasing vehicular carrying capacity and reducing travel time for users of the B-W Parkway facility within its historic and legislative context, a discussion of the transportation operation impacts resulting from widening is necessary.

5.1 Definition and Purpose

For the purposes of this feasibility study, traffic and transportation impacts were determined by performing an operations analysis of the future traffic conditions of the Parkway. Future traffic volume forecasts of the Parkway were used to determine the traffic demand throughout the corridor. The operational analysis results were used to assess the potential benefits in terms of reduced congestion or improved travel time associated with capacity improvement. The future traffic volume forecasts included growth related to BRAC activities within and around Fort George G. Meade on the Parkway so that any resulting impacts could also be assessed.

5.2 Methodology

The methodology used in this feasibility study to assess the transportation impacts of the widening options on the B-W Parkway consisted of the application of the following data sources, assumptions, tools, and methods:

- Existing (2005) and future (2040) forecasted traffic volumes estimates were obtained from the Metropolitan Washington Council of Governments regional travel demand model. Estimates of AM and PM peak period demands were converted to estimates of AM and PM peak 1-hour volumes.
- An operational analysis was performed using the Freeway Module of the Highway Capacity Software (HCS) 2010 version. This module was used to calculate operational attributes for the B-W Parkway given mainline traffic volumes and number of lanes.
- An HCS analysis was performed to obtain level-of-service for each mainline segment (i.e. interchange-to-interchange) along the Parkway for the AM and PM peak hours.

5.2.1 Limitations of the Transportation Analysis

In harmony with the language mandated in the congressional legislation for this study, the transportation analysis included a basic review of the mainline traffic volumes for the B-W Parkway. The analysis did not include the following:

- A review of interchange geometry including auxiliary lanes, acceleration and deceleration lanes, ramps, and cross street typical sections.
- A review of traffic operations at existing interchanges and ramps.
- A review of the queuing effects from downstream traffic bottlenecks.

- Traffic management strategies such as high occupancy toll or congestion pricing, bus-only lanes or bus rapid transit lanes, managed lanes, or other alternative travel means.
- Consideration of improvements to parallel highway and transit facilities serving north-south travel demand between the Washington, DC, and Baltimore metropolitan areas.
- Changes to future land use or employment beyond what is assumed in the long-range plan.

5.2.2 Travel Demand Modeling

The B-W Parkway corridor overlaps the boundaries of the regional forecasting areas developed by two different entities: the Metropolitan Washington Council of Governments' (MWCOG) Transportation Planning Board and the Baltimore Metropolitan Council's Baltimore Regional Transportation Board. Both the MWCOG/Transportation Planning Board (TPB)-developed regional model and the BMC/Baltimore Regional Transportation Board (BRTB)-developed regional model estimates travel on major facilities within and between the Maryland counties of Montgomery, Prince George's, Howard and Anne Arundel. But each model does not estimate travel patterns along a number of important secondary facilities within these counties. For example, the regional model developed by the MWCOG/TPB does not estimate travel on secondary facilities in Howard and Anne Arundel Counties, and the regional model developed by BMC/BRTB does not estimate travel on secondary facilities in Montgomery and Prince Georges' Counties. Although various studies have been initiated to combine the models of these two entities, a final combined model for project-level use has yet to be developed.

For the Baltimore-Washington Parkway Widening Feasibility Study, it was decided that the MWCOG/TPB travel demand forecasting model would be the base, with selective enhancements to more accurately reflect the structure of the BMC/BRTB model. The merger of these two travel demand forecasting models would allow for more detailed travel estimates to be prepared over the entire length of the B-W Parkway, and facilitate a better understanding of the travel demands generated by the planned improvements, including the Base Realignment and Closure activities at Fort Meade, on the overall operations of the corridor. The MWCOG staff agreed to develop and calibrate their regional travel demand forecasting model for the purposes of this study to provide base year and future year traffic volume estimates.

For this study, the MWCOG staff used the MWCOG Version 2.2 regional travel demand model based on the 2010 Constrained Long Range Plan and Round 8.0 Cooperative Land use Forecasts. These forecasts reflect the latest planning assumptions adopted by the MWCOG/TPB Board for Air Quality Conformity Determination in November 2010.

5.2.3 Constrained Long Range Plan Projects

The following is a list of the transportation improvements projects listed in the current regional long-range transportation plans that were assumed as completed projects in the modeling analysis.

Transportation Improvement Projects in Current Long Range Transportation Plans

Draft Long-Range Transportation Plan Baltimore Region (September 14, 2011)	Long-Range Transportation Plan National Capital Region
<ul style="list-style-type: none"> • MD 295, I-195 to MD 100 • I-695 (Baltimore Beltway), Inner Loop bridge over Benson Avenue and Leeds Boulevard/Southwest Boulevard • I-95, Interchange at MD 175 • MD 100, Howard County Line to I-97 • MD 175, MD 295 to MD 170 • MD 198, MD 295 to MD 32 • MD 3, St. Stephens Church Rd. to MD 32 • MD 713 (Ridge Road), MD 175 to MD 176 • MD 32, MD 26 to Howard County Line 	<ul style="list-style-type: none"> • Baltimore Washington Parkway, intersection at MD 193 • MD 197, U.S. Route 50 to MD 450 • MD 3, U.S. Route 50 to MD 450 • MD 450, MD 704 to MD 424 • U.S. 1, I-95 to MD 410 • U.S. Route 50, westbound ramp to Columbia Park Road

5.3 Alternatives Analysis

The traffic and transportation analysis considered an existing base year of 2005 and a future forecast year of 2040. Both the No-Build and Build conditions were evaluated. The following future scenarios are discussed below:

- Existing Conditions Scenario.
- 2040 No-Build Scenario.
- 2040 Partial-Build Scenario.
- 2040 Full-Build Scenario.

5.3.1 Existing Conditions Scenario

The existing conditions scenario represents the current lane configuration of the B-W Parkway. The existing B-W Parkway mainline is typically two general-use travel lanes in each direction. The existing three-lane mainline sections in each direction are along the following sections of the parkway: from U.S. Route 50 to MD Route 450, from the Capital Beltway to MD Route 193, and from MD Route 175 to MD Route 100.

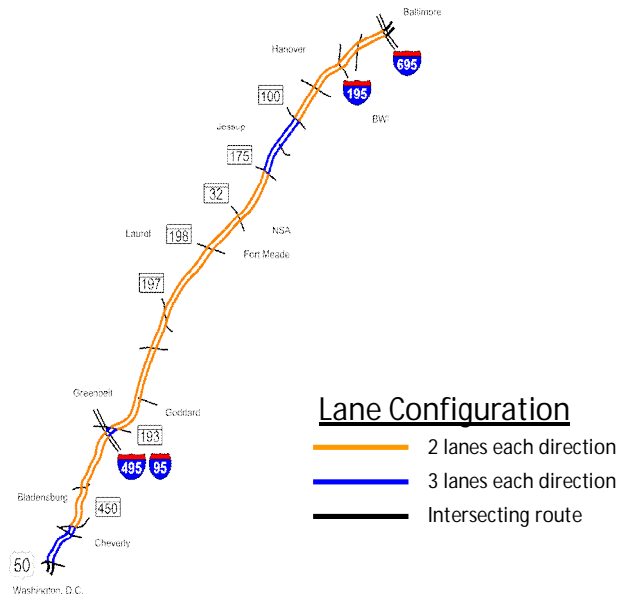


Figure 5.1. Existing Conditions Scenario Lane Configuration

5.3.2 2040 No-Build Scenario

The No-Build Scenario represents the 2040 roadway network, transportation facilities, and traffic forecasts consistent with the currently adopted 2010 Consolidated Long Range Plans for both the Baltimore, Maryland, and Washington, DC, metropolitan areas. This scenario accounts for the planned completion of widening along the Maryland SHA-owned portion of the B-W Parkway, which will result in a continuous section of three lanes in each direction from the MD 175 interchange to the Baltimore Beltway (I-695). This option assumes no other physical or operational changes to the existing B-W Parkway between New York Avenue and the Baltimore Beltway.

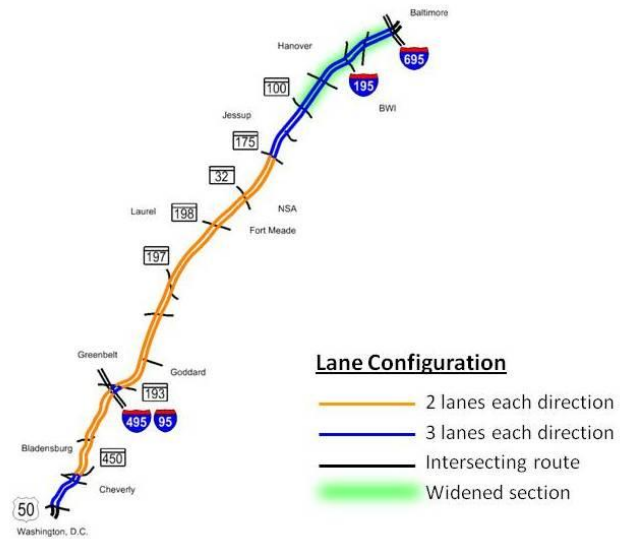


Figure 5.2. No-Build Scenario Lane Configuration

5.3.3 2040 Partial-Build Scenario

The Partial-Build Scenario assumes additional widening of the Parkway, relative to the 2040 No-Build scenario, to provide three general use travel lanes in each direction from the Capital Beltway (I-495/I-95) to MD 175. This assumption does not affect the Parkway segment between the Capital Beltway and MD 193, on which auxiliary lanes provide three lanes in each direction under existing conditions. This scenario, therefore, provides three lanes in each direction only between the Capital Beltway and the Baltimore Beltway. This option assumes no physical or operational changes to the existing NPS-owned portion of the B-W Parkway between New York Avenue and the Capital Beltway.

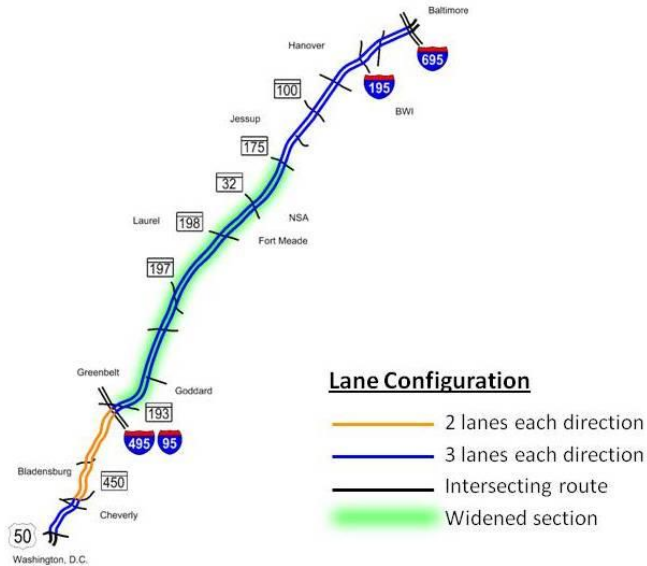


Figure 5.3. Partial Build Scenario Lane Configuration

5.3.4 2040 Full-Build Scenario

The Full-Build scenario assumes additional widening of the B-W Parkway, relative to the 2040 No-Build scenario, to provide three general-use travel lanes in each direction over the entire length of the Parkway from MD 450 to MD 175. With the existing three-lane section south of MD 450 and the completion of widening north of MD 175 by Maryland SHA provided in the No-Build scenario, the Full-Build scenario provides three general-use travel lanes in each direction through the full length of the study area from John Hanson Highway (U.S. Route 50) at the District of Columbia boundary to the Baltimore Beltway.

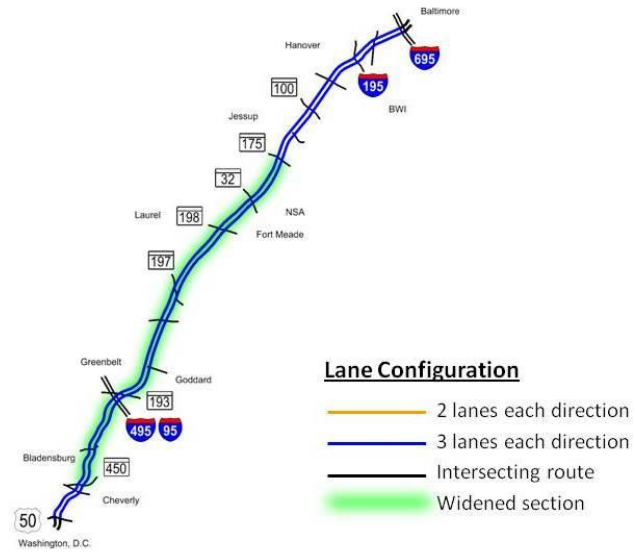


Figure 5.4. Full Build Scenario Lane Configuration

5.4 Analysis Results

This study identified the effect of the various future year widening options on traffic volumes and level-of-service on the mainline segments of the B-W Parkway.

5.4.1 Traffic Volumes

The MWCOG travel demand models incorporate anticipated regional growth in population, employment, and related activities across both the Baltimore, Maryland, and Washington, DC, metropolitan areas as shown in the table below.

Projected Growth in the Baltimore-Washington, DC Metropolitan Region

	2005	2040	Growth
Population	6,262,508	8,613,982	38%
Employment	3,700,075	5,457,004	47%

Sources: Metropolitan Washington Council of Governments and the Baltimore Metropolitan Council

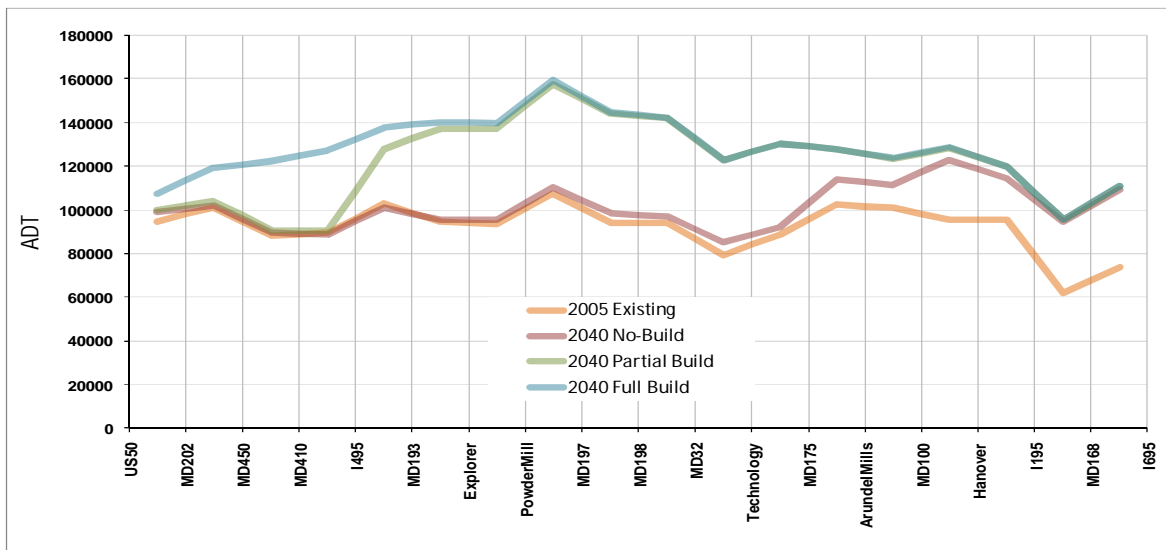
Reflective of these anticipated changes in population and employment across the Baltimore and Washington, DC, metropolitan areas, total travel demand is similarly expected to increase significantly over the next several decades in the corridor between the Baltimore and Washington urban cores. The

projected increases in Base Realignment and Closure-related employment at Fort Meade will also contribute to increased travel demand across the study area. The regional travel demand model forecasts indicate that from 2005 to 2040, the number of north-south oriented trips in the study corridor between Baltimore, Maryland, and Washington, DC, is projected to increase by about 34 percent.

A basic characteristic of both the Baltimore and Washington regional travel demand modeling processes is an effort to achieve a reasonable balance between the total estimated travel demand and the ability of the highway and transit systems in the two regions to accommodate these demands. Accordingly, the traffic volume forecasts along the Parkway corridor associated with each of the future year scenarios reflected the tendency for traffic to utilize the additional capacity created in areas where the Parkway was being proposed to be widened to three lanes in each direction. Figure 5.5 shows the average daily traffic forecasts for mainline segments along the B-W Parkway in 2040 associated with each of the widening options that were considered during the conduct of this initial feasibility study.

Comparing the forecast traffic volumes between scenarios, it is evident that there is little change on those Parkway segments which are assumed to remain two lanes in each direction, but a significant increase in volume on those segments which are proposed to be widened from two lanes in one scenario to three lanes in another. The projected travel demand across the study area seeks to use any available capacity that might be provided along segments of the B-W Parkway between the Baltimore Beltway (I-695) and New York Avenue/U.S. Route 50 and the boundary with the District of Columbia.

Figure 5.5. Mainline Average Daily Traffic Forecasts – All Scenarios



5.4.2 Operations

Results from the Highway Capacity Software (HCS) analysis were used to develop comparisons between the various scenarios to ascertain the impact of widening on individual users. With the intention of limiting this comparison to “significant” differences between the defined analysis scenarios, ignoring minor variations of operational characteristics that occur with small changes in traffic volumes, these comparisons focused on a segment-by-segment review of where the level-of-service letter-grade as reported by HCS changed between scenarios.

5.4.2.1 Existing Conditions

The results of this analysis show peak hour mainline segments generally operating at conditions between level-of-service “C” and “F” throughout the corridor. Traffic operations in the range of level-of-service “C” or “D” typically consist of travel at or near the free flow speed, with drivers increasingly constrained by surrounding vehicles. Level-of-service “E” or “F” conditions are indicative of operations at or near capacity and where congestion-related delays begin to have significant impacts on road users in the form of significantly reduced travel speeds; from 5 miles per hour or more below free-flow speeds down to stop-and-go traffic conditions. Several “hot spot” segments were identified where mainline segments were experiencing level-of-service “E” or “F” and are highlighted in Figure 5.6.

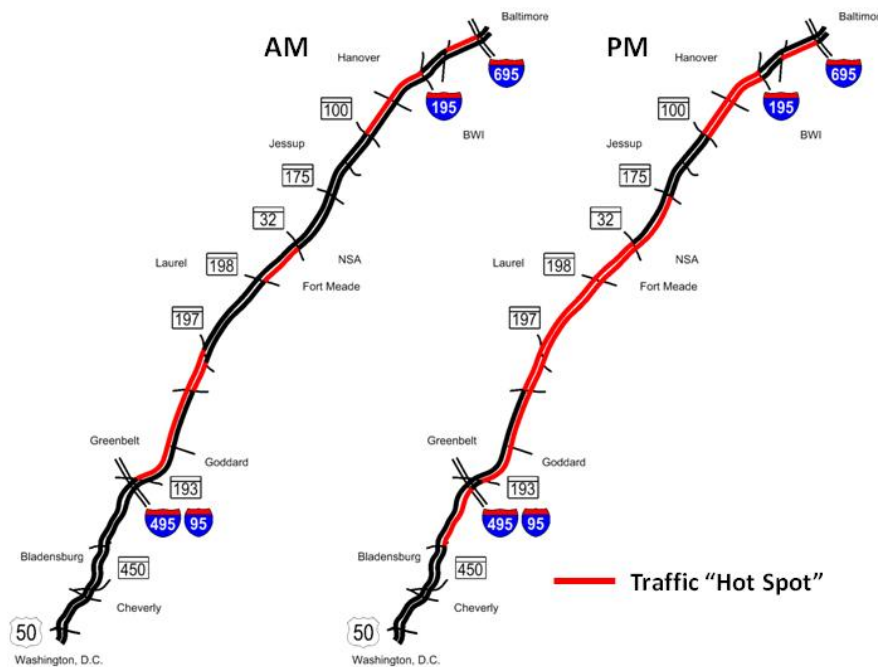


Figure 5.6. Parkway Segments Currently Operating at or Near Capacity
(Level-of-Service “E” or “F”)

5.4.2.2 Existing to 2040 No-Build

A comparison of the HCS results between those for the Existing and the 2040 No-Build scenarios is shown in Figure 5.7. Those mainline road segments highlighted in green represent segments where the level-of-service could be expected to improve in the 2040 No-Build scenario relative to the Existing Conditions scenario. Those B-W Parkway segments highlighted in red represent segments that are expected to experience a decline in the AM or PM peak hour levels-of-service from 2005 to 2040. These results may be partially explained by the following:

- Improvement in level-of-service north of MD 100 coincides with the limits of the B-W Parkway widening work being undertaken by Maryland SHA which is part of the Constrained Long Range Plans for 2040.
- Decline in level-of-service between MD 197 and MD 32 may be related to the projected growth of Fort Meade related to Base Realignment and Closure.

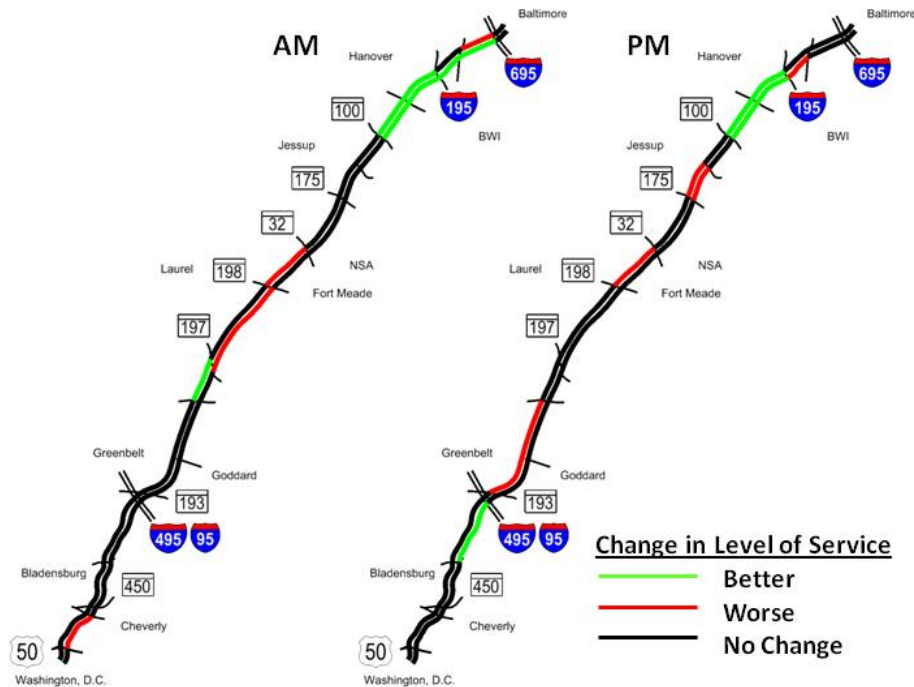


Figure 5.7. Change in Level-of-Service from Existing (2005 Base Year) to 2040 No-Build

The comparison of the 2040 No-Build scenario with the 2005 Existing Conditions scenario provided a basis for comparing future traffic conditions between the 2040 No-Build scenario and the 2040 Build scenarios.

5.4.2.3 - 2040 No-Build to 2040 Partial Build

Figure 5.8 documents the anticipated change in the AM and PM peak hour level-of-service for the 2040 Partial-Build scenario relative to the 2040 No-Build Scenario. Key observations associated with this comparison include the following:

- Level-of-service improves under the 2040 Partial-Build Scenario on widened segments south of MD 175, but degrades on the three-lane segments north of MD 175. This reflects additional traffic seeking the benefits of a widened north-south commuter link which has an adverse effect on operations for segments north of MD 175 where widening has already taken place under the 2040 No-Build scenario.
- A reduction in the projected peak-hour level-of-service is also noted for the B-W Parkway segment from the Capital Beltway to MD 193 on which the auxiliary lanes between the closely-spaced interchanges provide three lanes in each direction under existing conditions. This section of the Parkway is not anticipated to experience any widening under the 2040 Partial-Build scenario compared to either the 2005 Existing Conditions or 2040 No-Build Scenarios.
- The PM peak hour conditions on those Parkway segments south of the Capital Beltway are generally worse as these segments are assumed to remain two lanes in each direction under the 2040 Partial-Build scenario.

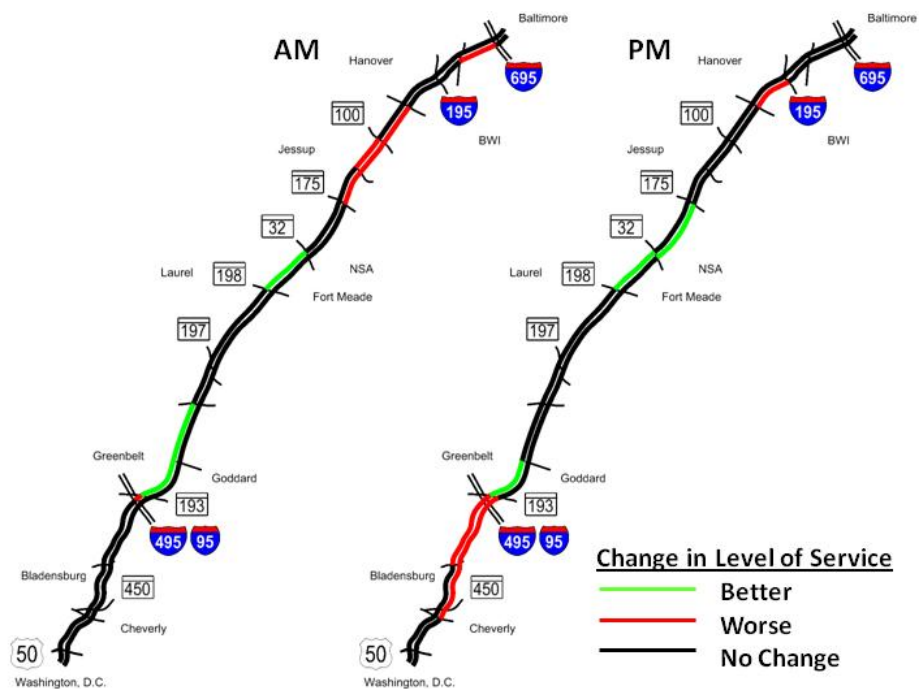


Figure 5.8. Change in Level-of-Service from 2040 No-Build to 2040 Partial Build

5.4.2.4 2040 No-Build to 2040 Full-Build

Figure 5.9 documents the projected change in the peak hour level-of-service from 2040 No-Build scenario to the 2040 Full-Build scenario. Key observations include the following:

- Results are similar to the comparison between the 2040 No-Build and 2040 Partial-Build north of the Capital Beltway. Thus, peak hour level-of-service is anticipated to improve under the 2040 Full-Build scenario on widened segments south of MD 175, but degrades on the three-lane segments north of MD 175. This reflects additional traffic seeking the benefits of a widened north-south commuter link which has an adverse effect on operations for segments north of MD 175 where widening has already taken place under the 2040 No-Build scenario.
- The PM peak hour level-of-service conditions south of the MD 450 interchange to U.S. Route 50 are generally worse as these segments are three lanes under existing conditions and will not experience any widening under the 2040 Full-Build scenario despite experiencing an increase in demand resulting from widening elsewhere along the Parkway. The AM peak hour level-of-service conditions are expected to remain essentially unchanged from those observed in the 2005 Existing Conditions and the 2040 No-Build and 2040 Partial-Build scenarios.

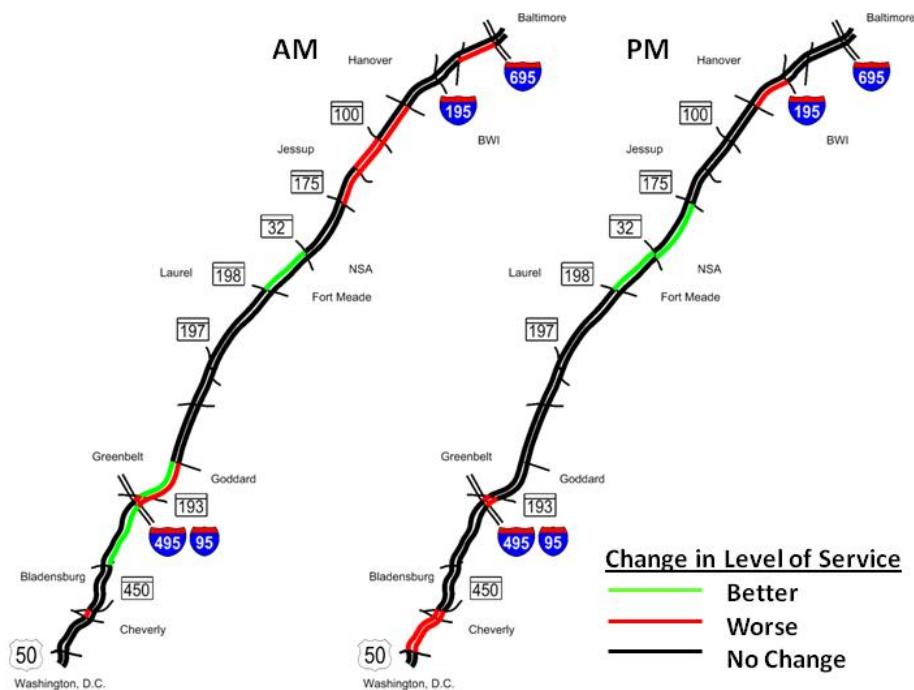


Figure 5.9. Change in Level-of-Service from 2040 No-Build to 2040 Full-Build

5.4.2.5 General Observations

Several general observations are derived from these results:

- Traffic conditions are generally worse in the PM peak hour than in the AM peak hour.
- The distribution of traffic “hot spots” in future years continues to be consistent with directional traffic distribution in the AM and PM peak periods.
- Widening selected sections of the B-W Parkway as proposed under the 2040 Partial-Build and 2040 Full-Build scenarios may provide some localized improvement to traffic operations, but regionally the level of traffic congestion changes little from the 2040 No-Build scenario as widened sections exhibit a sharp increase in traffic volumes to utilize the additional capacity that is provided. This is a result of the regional travel demand forecasting model’s efforts to balance projected traffic demand against available roadway capacity.
- Both Build scenarios have the effect of creating traffic bottlenecks at the point where newly widened sections join with previously widened sections on the Maryland SHA-owned area of the B-W Parkway, regardless of the number of lanes in the non-widened sections. This is due to additional traffic volumes accessing the widened sections of the facility in search of a more balanced level of congestion.

The following statements summarize the transportation results of this study, as it pertains to the feasibility of future widening:

- Widened sections will attract more traffic; traffic volumes are projected to increase.
- Widened sections will not necessarily be less congested than conditions being experienced today.
- From the perspective of the average driver, levels of congestion on a widened B-W Parkway in 2040 would be similar to what is being experienced today.

6.0 Physical Constraints

The physical constraints for widening the B-W Parkway by adding a third lane in either direction are discussed in this section. These constraints include the availability of land for the widening, the impacts to NPS-designated land, impacts to privately owned land, and impacts to existing infrastructure along the Parkway.

6.1 Approaches to Widening

Applying the typical sections for each of the four widening options along the existing B-W Parkway alignment revealed several types of impacts and limitations due to the existing conditions. Generally, if the Parkway passes over a cross-street, the existing bridges will need to be widened. If the Parkway passes under the cross-street, then the entire overpass bridge will typically need to be replaced. There are some locations where the generally defined limits of disturbance are anticipated to encroach close to, or to extend outside of, the existing B-W Parkway right-of-way.

If the study advances, the assumption is that through more detailed design at a later stage, potential impacts could be mitigated such that relatively modest amounts of additional right-of-way would likely be required for any of the four options. These mitigation methods could include, but not be limited to, such features as minor geometric alignment alterations, localized reduction of a stormwater management buffer area, steepening of fill slopes, or even the construction of short sections of retaining walls. The latter mitigation action has been employed on some areas of the GWMP, and its companion the Clara Barton Parkway.

6.2 Potential Impacts

The table below summarizes the levels of reconstruction anticipated for each widening option.

Expected Infrastructure Impacts Per Widening Option

Interchange Reconstruction				Bridge Widening				Bridge Reconstruction			
NPS		AASHTO/SHA		NPS		AASHTO/SHA		NPS		AASHTO/SHA	
Outside	Inside	Outside	Inside	Outside	Inside	Outside	Inside	Outside	Inside	Outside	Inside
11	2	11	2	7	6	7	6	7	4	7	5

With all four widening options, bridge widening would be required at Little Patuxent River, Patuxent River, MD 197, Powder Mill Road, Beaver Dam Road, Capital Beltway, and MD 410. Under both outside widening options, bridge reconstruction would be required at MD 175, MD 32, MD 198, Explorer Road, MD 193, Good Luck Road, and MD 450. Under the inside widening options, only the bridges at MD 32, Explorer Road, MD 193, Good Luck Road, and MD 450 would need total reconstruction. Partial



Under the NPS inside widening option, the MD 175 Bridge would require widening.

interchange reconstruction involving a readjustment of the ramp gore areas, under the outside widening options, would be required at MD 175, MD 32, MD 198, Powder Mill Road, MD 193, Capital Beltway, MD 410 and MD 450. Under the inside widening options, only the interchanges at MD 193 and MD 450 would require reconstruction.

Widening is constrained at several locations involving the existing ramp configurations. Widening to the outside Parkway right-of-way will impact several existing loop ramps, such as at MD 175, MD 32, MD 198, MD 197, Explorer Road, MD 193 Capital

Beltway, MD 410, and MD 450. So as not to impact the turn radii on the loop ramps, these ramps would need to be reconstructed if outside widening occurs.

The limits of disturbance for the outside widening option will encroach upon the existing B-W Parkway property rights-of-way on both the northbound and southbound directions at some locations between the Patuxent River and MD 198. The limits of disturbance encroaches upon the northbound right-of-way at the Patuxent Research Refuge just north of Powder Mill Road, and between Explorer Road and Beaver Dam Road. The limits of disturbance encroach upon the southbound right-of-way adjacent to BARC between Beaver Dam Road and Powder Mill Road. The limits of disturbance also encroach upon the right-of-way on both northbound and southbound sides between Greenbelt Road and Explorer Road. The limits of disturbance encroach upon Greenbelt Park between Good Luck Road and the Capital Beltway.



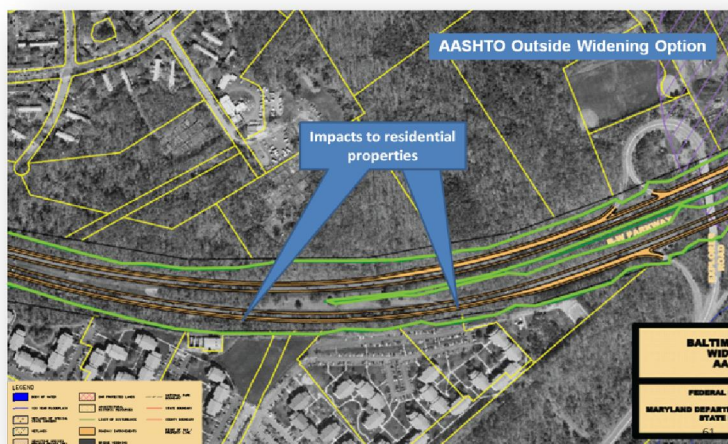
MD 450 Bridge would require reconstruction



MD 193 Bridge Would Require Reconstruction



Good Luck Road Bridge Would Require Reconstruction



Potential Property Impacts in Greenbelt, Maryland

6.3 Preliminary Costs

In order to address the feasibility of widening the B-W Parkway, the potential benefits need to be compared to the estimated capital costs. Below is a summary of the methodologies and assumptions that were used to develop the preliminary capital cost estimates for each of the four widening options presented in the feasibility study.

6.3.1 Capital Costs

Preliminary capital cost estimates for each widening option were developed using the Maryland Department of Transportation State Highway Administration 2011 Highway Construction Cost Estimating Manual. The recommended format for conceptual or feasibility study planning level project cost estimates is a *Major Quantities Estimate*. Overall, base costs were developed by applying current 2011 unit costs to measurable quantities of major item categories that included earthwork, paving, shoulders (curb, traffic barrier, guardrail, etc.) and structures (bridge widening, new construction, demolition). Other categories of costs were estimated by applying recommended percentages of the overall base cost of the major items. The percentages used were based primarily on the ranges suggested in the 2011 Highway Construction Cost Estimating Manual prepared by Maryland SHA. In some cases, where additional items within a category could be measured or estimated by lane-mile or length of project, they were included and the corresponding percentage adjusted.

The Maryland SHA 2011 Highway Construction Cost Estimating Manual breaks down the total project cost into eight separate cost categories, or groups of similar items. For the purposes of this initial cost calculation, only four of the categories (2, 4, 5 and 6) are considered major items and their combined category costs are included as the defined "major item costs." A brief description of the items considered and quantified within each category for this feasibility study or the applicable percentage of the major item costs are provided below:

- Category 1 Preliminary: mobilization, clearing and grubbing, engineer's office, and maintenance of traffic were considered to be 40 percent of the major item cost.
- Category 2 Earthwork: the earthwork volumes were estimated by average end method from cut-and-fill areas computed from preliminary cross sections and Geopak design software. The cross sections included a widened roadside ditch section to account for stormwater management, using environmental site design, to meet the new MDE guidelines.
- Category 3 Drainage: the drainage (storm drain pipes, inlets, etc.) was estimated as 30 percent of the major item cost. Stormwater management, using environmental site design, to meet the new MDE guidelines is accounted for in this percentage.
- Category 4 Structures: the areas of bridge removal, bridge widening, and new bridge construction were measured from the feasibility study plans.

- Category 5 Pavement: the areas of new pavement for the widening and the areas of existing pavement to be milled and overlaid were measured from the feasibility study plans. From these areas, quantities of aggregate base, base asphalt and surface asphalt were computed.
- Category 6 Shoulders: this category includes curb, gutter, traffic barriers, guardrail, and appurtenances. Though not designed or shown on the plans at a feasibility study level, quantities for these items were estimated using engineering judgment and the cross sections' dimensions.
- Category 7 Landscaping: this category includes an allowance for normal roadside landscape items estimated as 10 percent of the major item cost. It also includes the reforestation of the impacted forested areas measured within the limits of disturbance shown on the feasibility study plans. For purposes of this estimate, an acre of mitigation or replacement was assumed for every acre of impacted forest. This category also includes an estimate for anticipated noise walls. A length of noise walls along potential sensitive sound receptors (adjacent residential communities) was approximated and multiplied by an average height of 15 feet. The total cost of these three components comprises the landscaping category.
- Category 8 Traffic: pavement markings, markers, signs and guide signs were estimated based on project lane lengths. No lighting or traffic signal equipment are anticipated or included in this estimate for the widening as neither items exist on the current parkway.
- Category 9 Utilities: utility relocation was estimated as 8 percent of the major item cost.

Due to the preliminary nature of this estimate, a contingency cost of 40 percent was added to the sum of the above categories to provide an overall "Neat" cost. Preliminary engineering (10 percent) and construction overhead (15.5 percent) costs were also included in the overall capital cost estimate based on percentages of the total "Neat" cost. A summary of the capital cost estimate is illustrated below.

Preliminary Capital Cost Estimate (2011 Dollars)⁶
(in millions of dollars)

Cost Elements	AASHTO/SHA		NPS	
	Inside	Outside	Inside	Outside
Construction Costs	\$ 326	\$ 450	\$ 274	\$ 427
Preliminary Engineering	\$ 33	\$ 45	\$ 27	\$ 43
Construction Administration	\$ 51	\$ 70	\$ 42	\$ 66
Total Costs	\$ 410	\$ 565	\$ 343	\$ 536

⁶ For additional cost estimate details, see Appendix G

Based on the capital cost calculations, the outside widening options will cost more than the inside widening options. The AASHTO widening options will cost more than the NPS widening options. The difference in cost is due mostly to the wider shoulder impacts resulting from the use of the AASHTO design standards in comparison to the NPS standards. This impact would affect both northbound and southbound widening. It should also be noted that these costs exclude estimates of potential right-of-way acquisition or other cost factors previously noted.

6.3.2 Right of Way Costs

The potential right-of-way impacts identified were very narrow sliver encroachments adjacent to the B-W Parkway boundary. It is anticipated that if this study should advance to a more detailed design that these impacts could be avoided and therefore no costs for right-of-way acquisition are included in the study.

6.3.3 Operations and Maintenance Costs

The widening of the parkway will increase the pavement area by about 35 lane-miles and the surface area of associated bridge structures will be increased accordingly. As a result, the annual operations and maintenance cost budget for the Parkway would likely increase by about \$300,000 to \$400,000. This cost was estimated by applying the increased number of lane miles and structure areas to unit prices taken from the 2011 operations and maintenance budget, provided by the NPS. This cost includes labor and materials for typical parkway maintenance items such as mowing grass, applying road salt and annual bridge maintenance.

6.3.4 Construction Costs for Park Aesthetics

Given the context of the parkway, additional costs were included in the estimate for landscaping and aesthetic treatment of structures. For the NPS alternatives, the cost of roadside barriers was estimated to account for the decorative concrete/stone treatments. For bridges, an additional \$20 per square foot was added to the cost estimate to account for the aesthetic architectural treatments of piers and abutments. The estimated landscaping cost was increased to account for plantings indicative of a parkway.

7.0 Environmental Effects

The following presents the results of an initial, multidisciplinary environmental analysis for each of the widening options, including the No-Build scenario for the B-W Parkway corridor. The environmental analysis does not constitute a formal environmental evaluation according to NEPA, since there is no proposed Federal action at this time. This analysis, however, is a basic examination of the social, economic, environmental, historic, and cultural resources in the study area and the potential impacts on these resources that would be anticipated with implementation of each of the proposed widening options.

7.1 Environmental Resources

The following describes the environmental resources in the B-W Parkway study area. Potential environmental justice impacts are described, followed by a discussion of air quality and noise data. Distinctive habitats and the animals that reside in these areas are noted in this section. Readily available data regarding floodplains and wetlands along the B-W Parkway corridor is also noted.

7.1.2 Land Uses

The defined general study area is large, covering about 247-square miles. Land uses in the study area include a mixture of residential, commercial, and institutional areas. Alternatives were identified in consideration of these locations with the intent of providing access to them as well as avoiding or minimizing impacts to them. A summary of land uses within the general study area includes the following:

- Residential areas are located south of MD 193 in the communities of Greenbelt, Cheverly, and East Riverdale. North of MD 193 there are clusters of residential areas located near the interchanges of MD 197, MD 198 and MD 175 in the communities of Laurel, Maryland City, and Fort Meade.
- The study area also includes a diverse mix of large Federal and State-owned properties. Included are the USDA/BARC, the U.S. Fish and Wildlife Service's Patuxent Research Refuge, the NASA Goddard Space Flight Center, Fort George G. Meade, and the headquarters of the NSA. State-owned properties include two universities, the University of Maryland at College Park, Bowie State University, and the Jessup Correctional Institution.
- Development proposals and locally identified activity centers in the study area include Baltimore/Washington International Thurgood Marshall Airport (BWI Airport), Arundel Mills, Odenton Town Center, Greenbelt Station Town Center, and several development projects in College Park.

7.1.3 Forest Areas

The study area contains several forest resources. Patapsco Valley State Park is the most significant protected area of forest land in the vicinity of the study area. Patapsco Valley State Park extends along 32 miles of the Patapsco River, encompassing 16,043 acres and eight developed recreational areas. In Anne Arundel County, most of the woodlands areas are in the central or southern portions of the county along the Patuxent River, near Fort Meade, and the B-W Parkway itself. There are also significant forested areas along the Patuxent and Middle Patuxent watersheds. In the eastern part of Howard County, the forest cover is more limited due to development, but can be found along stream valleys, such as those surrounding the Patuxent reservoirs.

Within the study area there are significant forested areas associated with the Patuxent Wildlife Research Center and BARC, both under Federal protection. In addition, the Greenbelt Park under the ownership of the NPS also contains a significant concentration of protected forest land. The B-W Parkway is either adjacent to, or runs through, each of these protected areas. Also, the B-W Parkway itself, along with Anacostia River Park, USDA's BARC, and the Goddard Space Flight Center are all designated as forest areas.

7.1.4 Natural Environmental Resources

The B-W Parkway is located partially within the area of the BMC (Howard, Baltimore, and Anne Arundel Counties) and partially within the area of the MWCOG (Prince George's County) jurisdictions. For air quality, both of these multi-jurisdictional metropolitan areas are designated as non-attainment areas for ground-level ozone and PM 2.5 according to EPA's Clean Air Act standards.

Currently experienced noise levels along the B-W Parkway are typical of those associated with multi-lane suburban freeway/expressway type highways. The typically expected vehicle mix of private automobiles, buses, and commercial vehicles is observed in the northern portion of the study corridor which is owned and operated by the Maryland SHA. However, the NPS-maintained section prohibits use of the facility by large trucks, therefore reducing noise levels. Individual noise generators in the study area include industrial areas with heavy truck traffic and aircraft operations at BWI Airport and local airports such as Tipton Airfield.

The study area is considered an environmentally sensitive area. There are three major river crossings identified along the Corridor: the Patuxent River, Little Patuxent River, and Patapsco River. Plus, there is an abundance of unnamed streams and related floodplains associated with the watersheds of these principal rivers.

For the existing 100-year floodplain for the study area, the Patapsco River, forming the boundary between Baltimore County and Anne Arundel County, contains significant floodplain areas within the study area. Anne Arundel County contains 12 watersheds. Within the study area there are floodplains associated with the non-tidal Patapsco River watershed, the Severn River watershed, the Little Patuxent

River Watershed, the Upper Patuxent River watershed, and the Middle Patuxent River watershed. The B-W Parkway crosses all three branches of the Patuxent River in Anne Arundel County.

Howard County lies within the Patuxent and Patapsco watersheds, and numerous tributaries flow off of these streams which drain large areas of the County. There are floodplains in Howard County associated with the Patuxent River, the Middle Patuxent River, the Little Patuxent River, and Deep Run, a tributary of the Patapsco River. In Prince George's County, floodplains occur along the streams and tributaries that run throughout the county, including the floodplain of the Patuxent River and the upper reaches of tributaries to the Anacostia River.

7.1.5 Cultural and Historic Resources

Cultural resources involve physical assets of an architectural, historical, or archaeological nature that reveals the past. As noted below, readily available existing data on cultural resources from published sources, including the NPS, the Maryland State Historic Preservation Office, and local cultural resource agencies will be discussed.

The current study area encompasses a large area that contains approximately 1,350 previously identified and/or evaluated built resources more than 50 years of age according to Maryland Historical Trust (MHT, the Maryland State Historic Preservation Office) geographic information system (GIS) data and files. These built resources may include buildings, structures, sites, objects, and districts. The preliminary archeological assessment is based on a review of the GIS archeological database maintained by the MHT.



Of particular note, the B-W Parkway is listed in the NRHP for its historic associations with transportation and landscape architecture. This historic property designation encompasses the area from the Washington, DC, border to just south of MD 175 and includes the historic right-of-way. Within this area are numerous contributing elements such as bridges, culverts, and landscape architecture components that are recognized as the character-defining features of the parkway.

Also listed in the NRHP is the city of Greenbelt National Register Historic District. The eligible properties for the NRHP include the following:

- Fort Lincoln Cemetery
- Beltsville Agricultural Research Center, USDA
- Beltsville Agricultural Research Center, Building #510, USDA
- D.C. Children's Center – Forest Haven District
- Clark/Vogel House
- Sachs Residence

The following properties are listed in the Maryland Inventory of Historic Places:

- D.C. Boundary Marker NE #8
- Cheverly Historic Community
- Crawford's Adventure Spring
- Cronmiller Outbuilding
- Jessup Survey District
- M. Bannon House
- Race Road House
- Matthias Harman House
- Andrew Harman Cemetery
- Patapsco State Park
- Summerfield Benson House

A total of 35 previously identified archeological sites fall within the entire study corridor. Of these sites, a total of 29 are within Anne Arundel County. The floodplain of the Patapsco River is considered to have an elevated potential for prehistoric sites, particularly in the area between I-195 and MD 100 where portions of the Patapsco Valley State Park lie directly north and east of the Parkway. There are no records of a systematic archeological survey in Baltimore or Howard Counties and no previously identified archeological sites have been recorded. Historic development along the Prince George's portion of the B-W Parkway alignment includes sparse scatterings of individual farms or residences along the eventual intersection of the B-W Parkway and MD 197 (Laurel-Bowie Road). Additional areas of historic archeological potential could be associated with historic communities of Greenbelt (north of MD 193) and Cheverly (south of MD 202).

7.1.6 Communities and Community Features

There are 151 schools (K-12, public and private), 20 police stations, 34 fire stations, 17 libraries, 131 parks and recreational facilities, 33 post offices, six heliports, and five airports in the study area. The general locations of these community facilities are in the appendices. Socioeconomic and community features are categorized by county in the following sections. A complete listing of each community feature is provided in the Existing Conditions Report for this study, located in the appendices.

7.1.7 Wetlands

The B-W Parkway crosses five Sensitive Species Project Review Areas, and 14 Wetland Clusters, including Wetlands of Special State Concern. Within the study area, there are wetlands in the Patapsco River watershed, including stream valleys and tributaries. Wetlands existing along the Patuxent and Middle Patuxent stream valleys and tributaries in Anne Arundel County are in the closest proximity of the B-W Parkway.

7.2 Impacts

In examining the four widening options and the No-Build, potential direct impacts were estimated for the subject areas that are likely to be of interest to decision makers, public stakeholders, and resource and regulatory agencies, should widening studies advance beyond the feasibility study level. These

included park impacts, private property impacts beyond the NPS property and/or Maryland SHA right-of-way, forest/tree buffer impacts, known wetland crossings, major stream/floodplain crossings, sensitive species areas, and known historic properties.

7.2.1. Parklands and Recreation Areas Impacts

Any of the four widening options would have direct effects on the NPS-owned B-W Parkway in the form of lane and shoulder additions, interchange and ramp modifications, mature tree and landscaping removal or alteration, alterations to vistas, and overall change in visitor and traveler experience. In addition to the effects on the Parkway, both AASHTO/SHA and NPS outside widening options would affect Greenbelt Park. The No-Build option would have no direct park property impacts. However, the B-W Parkway user experience is likely to be affected by worsening traffic conditions. Mitigation and minimization of park impacts of the NPS facilities would be a primary focus of any future studies and continuing coordination would be needed to determine the range of possibilities.

7.2.2 Wetlands and Water Resources Impacts

The environs in and around the B-W Parkway contains significant wetland resources mostly associated with Patuxent and Little Patuxent River crossings. Direct impacts to wetlands and their regulated buffers would be unavoidable under any of the widening options except for the NPS inside widening option as reflected in the table below. The wetland areas are exclusively to the outside of the existing Parkway pavement according to GIS data. The NPS inside option requires widening to the inside with no additional widening to the outside. However, the AASHTO/SHA inside widening option requires widening to the outside for additions of a standard width shoulder that would potentially affect six wetland resources.

Potential Wetland Impacts

Potential Effect	AASHTO/SHA		NPS	
	Outside	Inside	Outside	Inside
Known Wetland Area Crossings (each)	18	6	18	0
Rivers/Streams/Floodplains Crossings (each)	6	6	6	6

Any of the build options would require the same number of rivers, streams and floodplain crossings, although the magnitude of the possible direct impact would be greatest for the AASHTO/SHA outside widening and least for the NPS inside widening simply based on the size of their respective limit of disturbance. The No-Build would not directly affect any known wetlands or water resources.

In Maryland, stream and wetland mitigation are typically permit conditions related to MDE and/or U.S. Army Corps of Engineers authorizations or permits. Mitigation requirements will depend on the quality and quantity of impacts. The Compensatory Mitigation for Losses of Aquatic Resources Final Rule (40 CFR 230) governs compensatory mitigation for activities authorized by MDSPGP-3 or Corps Individual Permits (i.e., wetland and waterway impacts). The amount of mitigation required is determined by functional or condition assessment or a suitable metric (minimum 1:1 acreage or linear feet compensation) and should be commensurate with project impacts.

7.2.3 Known Cultural Resources Effects

Cultural resources in this planning context are characterized as historic structures, districts, landmarks and landscapes as well as archeological (subsurface) artifact sites. Section 106 of the National Historic Preservation Act of 1966 (as amended) requires that historic properties be considered while planning and executing an undertaking requiring Federal permits or funds. Generally, historic properties are those that are more than 50 years of age, and that are listed in or eligible for listing in the NRHP.

Potential direct effects to known historic properties would be unavoidable under any of the widening options. As reflected in the table below, the inside widening options encounter fewer known historic properties than the outside widening options.

Potential Cultural Resources Impacts

Potential Effect	AASHTO / SHA		NPS	
	Outside	Inside	Outside	Inside
Known Historic Properties (each)	4	2	4	2

Any of the four build options would have direct effects on the NRHP-listed B-W Parkway in the form of lane and shoulder additions, interchange and ramp modifications, mature tree and landscaping removal or alteration, alterations to vistas, and overall change in historic character. Similarly, any of the four build options could affect the National Register-eligible BARC. The two outside widening options could also directly affect the National Register-listed Greenbelt Historic District and the National Register-eligible D.C. Children's Center - Forest Haven District (facility closed).

Although a detailed evaluation of archeological potential is beyond the scope of this preliminary analysis, there are portions of the B-W Parkway alignment that can be identified as having higher potential for archeological sites, based on a variety of environmental and land-use factors. The original construction of the Parkway and intersecting roadway interchanges would have resulted in the disturbance of many of the landforms the alignment crosses. However, as the design was predicated on the preservation of natural topography and vegetation, the level of disturbance will be variable and

more intact landforms with well-preserved archeological resources may still exist along portions of the flanking wooded buffers and in wide sections of the median.

The No-Build option would not directly affect any known cultural resources. Mitigation of cultural resource impacts or effects can vary from preservation in place to resource recordation and is negotiated on a resource by resource basis with the Maryland Historical Trust.

7.2.4 Forests and Ecology Effects

The study corridor contains significant forest and ecological resources highlighted by the Patuxent Research Refuge, BARC, and Greenbelt Park. The table below presents the approximate acreage of forest that could be affected by any of the potential build options.

Potential Forest and Ecology Impacts

Potential Effect	AASHTO/SHA		NPS	
	Outside	Inside	Outside	Inside
Widening Options				
Forest Impacts-inside existing ROW (acres and %)	240 acres (35%)	175 acres (26%)	170 acres (25%)	58 acres (8.5%)
Sensitive Species Project Review Areas (each)	5	5	5	5

The total forest area within the existing B-W Parkway right-of-way is approximately 678 acres. As reflected in the table any of the build options would require some impacts to forest areas. However, the direct impact would be greatest for the AASHTO/SHA outside widening option and least for the NPS inside widening option simply based on the size of their respective limits of disturbance.

Compliance with the State of Maryland’s Forest Conservation Act is required for any activity requiring an application for a subdivision, grading permit or sediment control permit on areas 40,000 square feet or greater and will require a Forest Conservation Plan. The Forest Conservation Act is implemented at the County level, and each County may have different implementation guidelines regarding forest retention, reforestation and afforestation. In general, planting requirements under the Forest Conservation Act are not required if the total area of forest to be retained is at or above the breakeven point (amount of forest that must be retained so that no mitigation is required). The break-even point is determined based on Forest Conservation Act-required calculations considering net tract area, land use, and existing forest cover. Planting requirements (i.e., mitigation) are then based on required worksheet calculations outlined in the Forest Conservation Act, and may include areas of available reforestation, afforestation, or both.

Sensitive Species Project Review Areas are delineated by the Maryland Department of Natural Resources and are typically areas known to contain or provide critical habitat for protected plants or

animals or contain a habitat type unique or rare in Maryland such as a bog. All four build options would require traversing five Sensitive Species Project Review Areas; however, field specific work would be required to evaluate whether any species or feature of concern actually occurs within or near the area of possible disturbance. Mitigation requirements would be dependent on the specifics of the resource in question (e.g. protected plant or fish) and would be coordinated with the DNR and other stakeholders on a case by case basis.

The No-Build option would not directly affect any forests or ecologically sensitive resources.

7.2.5 Potential Property Impacts

Direct property impacts immediately adjacent to existing NPS property and Maryland SHA right-of-way limits occur primarily with the outside widening option, with little difference between the NPS and AASHTO/SHA typical section. Due to the requirement for an outside shoulder, the AASHTO/SHA inside widening option could directly affect up to three properties. The NPS inside widening option could be constructed without any additional property impacts on adjacent areas.

Potential Property Impacts

Potential Property Impacts	AASHTO/SHA		NPS	
	Outside	Inside	Outside	Inside
Widening Options				
Residential (each)	13-14	0-1	13-14	0
Commercial (each)	2	1	2	0
Institutional (each)	1-2	0-1	1-2	0

Direct property impacts associated with either of the outside widening options would most likely occur in the residential communities of East Riverdale, Greenbelt, and Laurel.

The No-Build option would not directly affect any adjacent properties.

7.3 Quality of Life Effects

During the public outreach process concerns were raised about indirect impacts to communities and other land uses abutting the B-W Parkway that could result from possible facility expansion, including loss of tree buffer to the existing facility, viewsheds, noise, and aesthetics. These subjects would undergo rigorous investigation should this study lead to the next step of planning. At this initial feasibility study stage, these quality-of-life effects are anticipated to be greatest with either of the two outside widening options. The AASHTO/SHA inside widening option also requires the construction of a wider outside shoulder so some loss of trees on the outside would be required. The NPS inside widening would likely result in the least amount of quality-of-life effects on neighboring communities but would require the removal of some vegetation in the existing median area, and a change in the

overall image of the facility. The No-Build scenario would have no direct park property impacts. However, B-W Parkway users would likely be affected by worsening traffic conditions over time.

The B-W Parkway provides a park setting to welcome visitors and locals alike to the Nation's capital, but no real opportunities for visitors to stop and experience the park. The B-W Parkway not only connects the two large tourist destinations of Washington, DC, and Baltimore, Maryland, the corridor also contains many attractions itself. The corridor is home to the Patapsco Valley State Park, Greenbelt Park, and environmental research facilities including BARC and the Patuxent Research Refuge. None of the four build options under consideration are expected to substantively change the transportation role of the B-W Parkway.

8.0 Ownership and Management

Management and ownership of the B-W Parkway is divided between the NPS and the Maryland SHA. The Maryland SHA owns and operates the northern 10-mile section of the Parkway between I-695 and MD 175. The NPS owns and operates the southern 19-mile stretch of the Parkway between MD 175 and New York Avenue/U.S. Route 50 and the boundary with the District of Columbia. If it is determined that the B-W Parkway can be widened to three lanes in each direction along the entire corridor, then a question of ownership and management of the parkway would arise. An issue of impairment would need to be determined by the NPS in order to establish resulting ownership and management.

8.1 Potential Transfer of Ownership

There are implications associated with adding a third lane in each direction to the B-W Parkway that may affect the ability of the NPS to operate and maintain the corridor within its current legislated mandate. According to the NPS legislation, critical resources must be conserved "...in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."⁷

The potential impact of such a major change in the physical and aesthetic characteristics, and historical, and cultural integrity of the B-W Parkway due to widening requires an impairments analysis to be conducted by the NPS. If a determination of impairment is made, this would prevent the NPS from implementing any widening proposals. If the National Park Service was directed to move forward, then a federally legislated transfer of ownership and management of the NPS section of the Parkway would need to be pursued. Currently, the NPS does not have an agreement in place with any State or Federal agency other than the District of Columbia that would dictate the process by which a transfer, or an exchange, of park land would be undertaken. There would thus be additional time needed for the development of such an agreement. Congressional oversight may not be needed for the actual transfer but may be needed to remove the B-W Parkway from the National Park System. As such, this effort would involve planning and development from the Director of the National Park Service and the Secretary of the Interior prior to any discussion of transfer or exchange of this magnitude. However, considering the short-term and long-term costs of widening the Parkway, the State of Maryland would need to appropriately assess their willingness to assume ownership and maintenance of the NPS section of the B-W Parkway.

8.2 Impairment

According to the NPS *Directors Order-12 (DO-12)* and their *Management Policies of 2006*, the issue of impairment would arise. The NPS would need to make a determination if the potential widening of the B-W Parkway would impair the park's resources and values. The Management Policies of 2006 provides the following definition of impairment.

⁷ Public Law 643 – 81st Congress, Chapter 525 – 2D Session, H.R. 5990

Section 1.4.5

An impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values.

An impact to any park resource or value may, but does not necessarily, constitute an impairment. An impact would be more likely to constitute impairment to the extent that it affects a resource or value whose conservation is:

- *Necessary to fulfill a specific purpose identified in the establishing legislation or proclamation of the park or*
- *Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park*
- *Identified in the park NPS Planning document as being of "significance".*

According to Section 1.4.5 of the *Management Policies of 2006*, a determination of impairment is based on the impacts to park resources and value. This determination is left to the professional judgment of the responsible NPS manager of the park unit, which in this case would be the Park Superintendent of the B-W Parkway.

According to Section 1.4.6 of the 2006 Policies, the park resources and values that are subject to the determination of impairment would include some of the following:

- "the park's scenery, natural and historic objects, and wildlife and the processes and conditions that sustain them, including to the extent present in the park: the ecological, biological, and physical processes that created the park and continue to act upon it; scenic features; natural visibility, both in daytime and in night; natural landscapes; natural soundscapes and smells; water and air resources; soils; geological resources; archaeological resources; cultural landscapes; paleontological resources; archaeological resources; cultural landscapes; ethnographic resources; historic and prehistoric sites, structures, and objects; museum collections; and native plants and animals;"
- "appropriate opportunities to experience enjoyment of the above resources, to the extent that can be done without impairing them;"
- "the park's role in contributing to the national dignity, the high public value and integrity, and the superlative environmental quality of the national park system, and the benefit and inspiration provided to the American people by the national park system;"
- "any additional attributes encompassed by the specific values and purposes for which the park was established."

Any impact would not necessarily be considered impairment. As such, an official determination must be made. The NPS is required to complete this non-impairment determination for any action selected prior to the signing of a FONSI or ROD associated with the appropriate NEPA document.

Thus, for the feasibility of widening of the B-W Parkway, a determination of impairment cannot be made at this time. However, if this feasibility study progresses and an environmental document according to NEPA is prepared, then the NPS is required to complete a determination of non-impairment prior to the signing of a FONSI or a ROD. If under such assessment, a determination of impairment is made, this determination, which will be appended to the FONSI or ROD, could result in the B-W Parkway being removed as a listed property from the NRHP and the enabling legislation granting the Parkway status can be reversed. Thus, the B-W Parkway would no longer be under the jurisdiction of the NPS. The possibility that the entire parkway could come under the management and ownership of the Maryland SHA will then have to be considered.

9.0 Conclusions

Congress provided the FHWA, NPS, and Maryland SHA with a very narrow study focus: to determine the feasibility of widening the B-W Parkway to a six-lane divided facility from Washington, DC, to Baltimore, Maryland. The following is a summary of the findings.

9.1 Feasibility Criteria #1 - Physical Constraints

In sections where widening might occur, new or re-constructed infrastructure will most likely be needed. In locations where the Parkway passes under a cross street, bridges will need to be replaced. In locations where the Parkway passes over a cross street, bridges will need to be widened. Most of the existing B-W Parkway interchanges will need to be modified or replaced.

There are some locations, such as in the Greenbelt area, where the limits of disturbance appear to encroach close to or outside of the existing Parkway right-of-way. There were also several sections noted where an inside widening concept is likely not feasible due to the lack of median width available for widening of the Parkway. Many locations may require design exceptions in order to avoid complete reconstruction given the physical constraints of the corridor.

9.2 Feasibility Criteria #2 - Environmental Analysis and Effects

Each of the four widening options would have direct effects on all evaluated environmental elements: parklands and recreation areas, including the B-W Parkway itself; wetlands and water resources; known cultural resources, including the B-W Parkway; forest and ecology; and residential, commercial, and institutional property impacts. Quality-of-life impacts such as view sheds, noise, and aesthetics are anticipated to be greatest with either of the two outside widening options that were considered.

The No-Build option would have no direct environmental impacts; however, the B-W Parkway user experience is likely to be affected by worsening traffic conditions as more travelers attempt to use the existing roadway.

9.3 Feasibility Criteria #3 - Traffic and Transportation

The traffic and transportation analysis results revealed the following major findings:

- Traffic conditions along most sections of the B-W Parkway are generally worse in the PM peak hour than in the AM peak hour, both today and in the future;
- The distribution of traffic “hot spots” in future years continues to be consistent with directional traffic distribution in the AM and PM peak periods.
- Widening of the B-W Parkway as proposed under the 2040 Partial-Build and 2040 Full-Build scenarios may provide some localized improvement to traffic operations, but regionally the level of traffic congestion is anticipated to change little from the 2040 No-Build conditions as widened sections exhibit a sharp increase in traffic volumes.

Thus, a widened B-W Parkway, whether inside or outside, will be able to carry more traffic but not necessarily be less congested. More vehicles can move through the corridor if it is widened, but will likely operate at similar levels of congestion as observed today.

9.4 Feasibility Criteria #4 - Preliminary Capital Cost Estimates

The preliminary capital cost estimate based on the Maryland SHA 2011 Highway Construction Cost Estimating Manual ranged from \$333 million to \$537 million exclusive of operations and maintenance costs. These cost estimates do not include any additional right-of-way acquisition costs. Based on these initial capital cost calculations, the outside widening options will cost more than the inside widening options. The AASHTO widening options will cost more than the NPS widening options. The difference in cost is due mostly to the wider shoulder impacts resulting from the AASHTO standards in comparison to the NPS standards. This impact would affect both northbound and southbound widening options.

9.5 Feasibility Criteria #5 – Public and Political Considerations

There were strong concerns voiced by the stakeholders regarding the congestion on the B-W Parkway. Also of major concern to the public was maintaining the character of the Parkway for the historic, aesthetic, and natural values embodied in the National Park. The limited focus of the feasibility study was very troubling to public and TAC participants alike. Widening without considering other modal options or managed lanes seems to result in feasible options that handle more traffic but do little to relieve congestion. That feeds into the concern that widening, at such a significant cost, seems to result more in negative impacts to safety, environment, noise level, and aesthetics than to the purpose of moving more people in a more efficient fashion.

9.6 Feasibility Criteria #6 – Ownership and Management

The implications associated with adding a third lane in each direction to the B-W Parkway may affect the ability of the NPS to operate and maintain the corridor within its current legislated mandate. Thus, an impairments analysis would need to be conducted by the NPS. If a determination of impairment is made, this would prevent the NPS from implementing any widening proposals. If the National Park Service was directed to move forward, then a federally legislated transfer of ownership and management of the NPS section of the Parkway would need to be pursued. Currently, the NPS does not have an agreement in place with any state or federal agency other than the District of Columbia that would dictate the process by which a transfer, or an exchange, of park land would be undertaken. There would thus be additional time needed for the development of such an agreement. Congressional oversight may not be needed for the actual transfer but may be needed to remove the B-W Parkway from the National Park System. As such, this effort would involve planning and development from the Director of the National Park Service and the Secretary of Interior prior to any discussion of transfer or exchange of this magnitude. However, considering the short-term and long-term costs of widening the

Parkway, the State of Maryland would need to appropriately assess their willingness to assume ownership and maintenance of the NPS section of the B-W Parkway.

9.7 Additional Considerations

This study demonstrates the potential feasibility of widening the B-W Parkway to a six-lane divided facility from a purely physical or engineering perspective. However, there are several other issues identified that would merit closer attention if funding is identified for the more comprehensive studies that would be required prior to the initiation of any formal design or actual construction activities.

These issues include, but are not limited to, the following:

- Consideration of the traffic needs of the B-W Parkway within the context of the existing and future network of transportation facilities and services in the entire Baltimore to Washington, DC, travel corridor. How the Parkway interacts with, feeds, and takes traffic from these other facilities is important to fully understanding the best way to accommodate these expected future demands.
- Consideration of a wider array of options for addressing traffic and transportation needs on the B-W Parkway itself and within the larger study corridor, including examining additional widening options for the Parkway and other highway facilities, traffic management options, and options for the use of multiple travel modes such as high occupancy vehicle lanes, bus-only lanes or bus rapid transit, fixed guideway transit facilities, and managed lanes.
- Examination in much greater details the effects of all options on the natural, socioeconomic, cultural, and built environments. A proactive public and agency process will ensure proper identification of critical resources, as well as strategies for minimizing, avoiding, and mitigating potential impacts.
- Incorporation of designs that will address the need for reconstruction or replacement of the many bridges and interchanges along the corridor in a context-sensitive manner, respectful of the B-W Parkway's documented history and established character.
- A careful examination of the implications of impairment on the status of the B-W Parkway as one of the region's premier NPS resources.

Technical Appendices

- A. Legislative Language
- B. Baltimore-Washington Parkway Legislation
- C. National Register Nomination
- D. Existing Conditions Report
- E. Traffic and Travel Demand Technical Report
- F. Alternatives Development Technical Report
- G. Alternatives Evaluation Technical Report
- H. Public Involvement Plan
- I. Official Comments to Baltimore-Washington Parkway Widening Feasibility Study
- J. Study Team

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