BRAC Base Realignment and Closure

Traffic and Intersection Improvement Studies for Base Realignment and Closure

Fort George G. Meade

Anne Arundel County, Maryland

Summary Report

January 2009

MARYLAND

SHA State Highway Administration

SHA • A Century of Progress 100 years 1908 • 2008

Martin O'Malley
Governor

Anthony G. Brown
Lt. Governor

John D. Porcari
Secretary

Neil J. Pedersen
Administrator

Maryland Department of Transportation
State Highway Administration

Regional and Intermodal Planning Division

BRAC

Fort George G. Meade

Table of Contents

Executive Summary 1
Introduction 4
Identification of the Study Area 6
Traffic Study 9
Travel Forecasting 9
Traffic Operational Analysis 10
Short-Term (2011) Intersection Concept Development 11
Methodology 14
Description of Short-Term Intersection Concepts 14
Implementation of Short-Term (2011) Intersection Improvements 24
Summary and Conclusions 26
Appendix A: Recommended Short-Term (2011) Intersection Improvements ..... CD Included
Appendix B: Short-Term (2011) Intersection CLV Sheets ..... CD Included

List of Figures

Figure 1: Study Area Map 8
Figure 2: Level of Service (LOS) 10
Figure 3: Intersections Expected to Fail in 2011 13

List of Tables

Table 1: Summary of Intersection Priorities 3
Table 2: Intersections Included in the Study 6
Table 3: Intersections from the MD 175 Project Planning Study 7
Table 4: Intersections Forwarded for Detailed Study 11
Table 5: LOS and V/C for Intersections Forecasted to Fail in 2011 12
Table 6: Summary of Short-Term Intersection Improvement Concepts 23
Table 7: Summary of Intersection Priorities 25

BRAC Executive Summary

Fort George G. Meade

Base Realignment and Closure (BRAC) is the congressionally authorized process that the U.S. Department of Defense has used to reorganize and consolidate its base structure to support the military more efficiently and effectively. In November 2005, Congress voted to approve the final recommendations of the BRAC Commission and Maryland benefited by gaining additional military and civilian positions. An estimated 40,000 to 60,000 direct and indirect jobs will be coming to Maryland over the next six to ten years. Fort George G. Meade (FGGM) in Anne Arundel County, Aberdeen Proving Ground (APG) in Harford County, and the National Naval Medical Center at Bethesda (NNMC) in Montgomery County are three of the five locations that will be gaining most of these positions. For FGGM, 7,500 additional on-base BRAC-related jobs and 10,000 Enhanced Use Leasing (EUL)-related jobs are expected by 2011. In addition, the National Security Agency (NSA) is expected to add approximately 4,000 jobs at FGGM.

While not directly a BRAC-related action, FGGM has also embarked on an EUL program to lease out portions of federal land for private base-related developments. Because significant impacts on the transportation system could result if the form, placement and sequencing of new development are not well coordinated with transportation investments, BRAC, EUL, and NSA effects were considered during the course of this study.

In preparation for the increase in personnel at FGGM, the Maryland State Highway Administration (SHA) initiated a study of the short-term highway transportation needs associated with BRAC at this installation.

The study process involved three components:

- Identifying the study area and conducting traffic studies
- Developing short-term (2011) intersection improvement concepts and determining the costs and impacts associated with each concept
- Selecting priority short-term intersection improvements for inclusion in the Maryland Department of Transportation's Consolidated Transportation Program (CTP)

The focus of the study was on state roads or intersections with state roads. The effects of freeway interchanges on these roadways and intersections are within the scope of this study, so the interchanges are included, but the freeways themselves are not.

Additionally, in 2006, SHA began a Project Planning Study of MD 175 from MD 295 (Baltimore Washington Parkway) to MD 170 (Telegraph Road) in Anne Arundel County. A Draft Environmental Assessment/Section 4(f) Evaluation was published on June 3, 2008 and a Location/Design Public Hearing was held on June 26, 2008. The purpose of the Project Planning Study is to improve the capacity, traffic operations, intermodal connectivity, and vehicular and pedestrian safety of MD 175, while supporting existing and planned development in the area. All of the intersections along MD 175 within the Project Planning Study limits are likely to

be affected by the projected BRAC/EUL/NSA growth. Therefore, these intersections have also been included in the analysis and development of short-term (2011) intersection improvements.

SHA is also conducting a Project Planning Study of MD 198 from MD 295 (Baltimore Washington Parkway) to MD 32 in Anne Arundel County, started in 2006. The purpose of the Project Planning Study is to improve existing capacity and traffic operations, enhance access to FGGM, and increase vehicular, bicycle, and pedestrian safety along MD 198, while supporting existing and planned development in the area. An Alternates Public Workshop was held on June 24, 2008 and the study team is currently preparing the Alternatives Retained for Detailed Study package for the project.

In addition to these SHA projects, Anne Arundel County, in partnership with Howard County, the City of Laurel, and the SHA, is conducting the FGGM BRAC Near-Term Highway Corridor Study, funded by the Office of Economic Adjustment (OEA). The purpose of this study is to perform an investigation of spot improvements at key intersections or other conflict points along several major corridors in the vicinity of FGGM. The study will include travel demand forecasting and traffic analyses, recommendations for improvements to key failing intersections, and 30 percent plans and estimates to forward to the SHA for programming as funding becomes available.

The results of SHA's BRAC traffic studies indicate that the existing roadway capacity will be significantly affected by the influx of new traffic due to the BRAC/EUL/NSA action at FGGM. Under existing conditions, four intersections are currently operating at a level of service (LOS) F during one or both peak periods. MD 713 (Arundel Mills Boulevard) at MD 100 and MD 175 at Brock Bridge Road are operating at LOS F during the PM peak period and MD 175 at Sellner Road/Race Road and MD 175 at Max Blobs Park Road/Clark Road are operating at LOS F during the AM and PM peak periods. Capacity analyses using projected volumes from travel forecasts show that a total of 19 intersections (out of 35 analyzed) are projected to operate at LOS F for either the AM or PM peak period in 2011. This total includes 12 intersections that are part of the MD 175 Project Planning Study.

Based on these studies, SHA has determined that the 19 failing intersections are recommended for improvement. However, the level of available State funding is not sufficient to program all of the needed short-term improvements identified in this study. Therefore, SHA, in coordination with Anne Arundel County and the FGGM Garrison Commander, developed a list of priority intersections where improvements are desired to be implemented, should funding become available. The improvement priorities are based on proximity to the FGGM main gate located at the intersection of MD 175 and MD 174/Reece Road and the 2011 LOS and volume to capacity (v/c) ratio.

The 19 failing intersections are listed below, with the priority intersections highlighted in bold. The six priority intersections are currently in the design phase.

- Intersection 4: MD 198 EB (Gorman Avenue) at US 1 NB (2nd Street)
- Intersection 5: MD 198 WB (Fort Meade Road) at US 1 NB (2nd Street)
- Intersection 6: MD 198 WB (Talbott Avenue) at US 1 SB (Washington Boulevard)
- Intersection 12: MD 713 (Arundel Mills Boulevard) at MD 100 WB Off Ramp
- Intersection 13: MD 713 (Ridge Road)/Arundel Way at MD 713 (Arundel Mills Boulevard)
- Intersection 14: MD 713 (Ridge Road) at Severn Road/Ridgewood Road
- **Intersection 15: MD 174 (Reece Road) at Severn Road**
- Intersection 22: MD 175 at Brock Bridge Road
- Intersection 23: MD 175 at Sellner Road/Race Road
- Intersection 24: MD 175 at MD 295 (Baltimore Washington Parkway)
- **Intersection 25: MD 175 at Max Blobs Park Road/Clark Road**
- **Intersection 26: MD 175 at MD 713 (Ridge Road)/Rockenbach Road**
- **Intersection 27: MD 175 at Disney Road/26th Street**
- **Intersection 28: MD 175 at MD 174/Reece Road**

Table 1: Summary of Intersection Priorities

Priority	Intersection		Estimated Improvement Cost (range in $ million)
	No.	Name	
P1	15	MD 174 (Reece Road) at Severn Road	$4.5 - $8.5
P1	25	MD 175 at Max Blobs Park Road/Clark Road	$0 *
P1	26	MD 175 at MD 713 (Ridge Road)/Rockenbach Road	$18.5 - $21.5
P1	27	MD 175 at Disney Road/26th Street	$10 - $12
P1	28	MD 175 at MD 174/Reece Road	$19 - $24
P1	29	MD 175 at Mapes Road/Charter Oaks Boulevard	$16.5 - $21.5
		Subtotal	**$68.5 - $87.5**
P2	4	MD 198 EB (Gorman Avenue) at US 1 NB (2nd Street)	$2 - $4
P2	5	MD 198 WB (Fort Meade Road) at US 1 NB (2nd Street)	$6 - $11
P2	6	MD 198 WB (Talbott Avenue) at US 1 SB (Washington Boulevard)	$1.5 - $3.5
P2	12	MD 713 (Arundel Mills Boulevard) at MD 100	$5.5 - $10.5
P2	13	MD 713 (Ridge Road)/Arundel Way at MD 713 (Arundel Mills Boulevard)	$3.5 - $6.5
P2	14	MD 713 (Ridge Road) at Severn Road/Ridgewood Road	$6 - $11
P2	22	MD 175 at Brock Bridge Road	$6 - $11
P2	23	MD 175 at Sellner Road/Race Road	$3.5 - $6.5
P2	24	MD 175 at MD 295 (Baltimore Washington Parkway)	$5 - $10
P2	30	MD 175 at Llewellyn Avenue/Blue Water Boulevard	$1 - $3
P2	33	MD 175 at Morgan Road/Town Center Boulevard	$10.5 - $15.5
P2	34	MD 175 at Winmeyer Avenue	$6 - $11
P2	35	MD 175 at MD 170 (Telegraph Road)/Piney Orchard Parkway	$5.5 - $10.5
		Subtotal	**$62 - $114**
		Total	**$130.5 - $201.5**

* Developer-funded project

- **Intersection 29: MD 175 at Mapes Road/ Charter Oaks Boulevard**
- Intersection 30: MD 175 at Llewellyn Avenue/ Blue Water Boulevard
- Intersection 33: MD 175 at Morgan Road/Town Center Boulevard
- Intersection 34: MD 175 at Winmeyer Avenue
- Intersection 35: MD 175 at MD 170 (Telegraph Road)/Piney Orchard Parkway

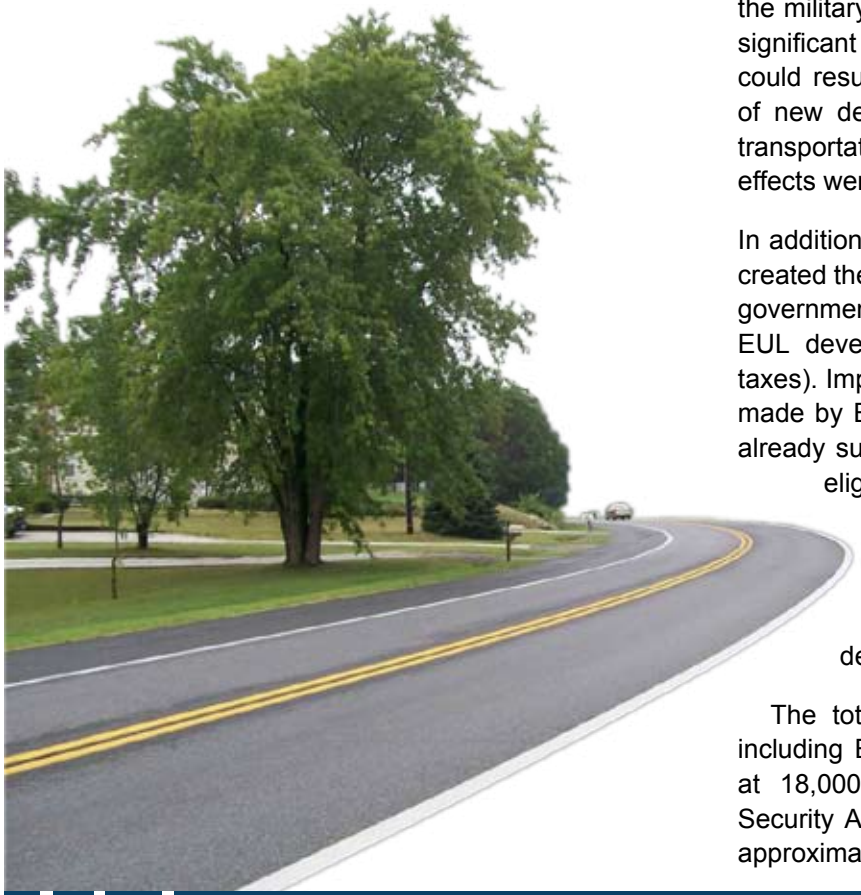
Table 1 denotes the priority; the intersections indicated with a "P1" are the top priorities and those with a "P2" are secondary priorities.

It should be noted that this report and supporting studies, based on 2011 traffic forecasts, are for the purpose of identifying the magnitude of improvements needed to provide satisfactory operations and prioritizing those improvements, near-term. Traffic forecasts and analyses will be further updated beyond what is presented in this report to fine-tune the design of the high priority BRAC intersections. Forecasts and studies will also be updated for the MD 175 Project Planning Study for planning beyond BRAC to 2030.

BRAC Introduction

Fort George G. Meade

Base Realignment and Closure (BRAC) is the congressionally authorized process that the U.S. Department of Defense has used to reorganize and consolidate its base structure to support the military more efficiently and effectively. In November 2005, Congress voted to approve the final recommendations of the BRAC Commission and Maryland benefited by gaining additional military and civilian positions. An estimated 40,000 to 60,000 direct and indirect jobs will be coming to Maryland over the next six to ten years. Fort George G. Meade (FGGM) in Anne Arundel County, Aberdeen Proving Ground (APG) in Harford County, and the National Naval Medical Center at Bethesda (NNMC) in Montgomery County are three of the five locations that will be gaining most of these positions. For FGGM, 7,500 additional on-base BRAC-related jobs and 10,000 Enhanced Use Leasing (EUL)-related jobs are expected by 2011. In addition, the National Security Agency (NSA) is expected to add approximately 4,000 jobs at FGGM.



While not directly a BRAC-related action, FGGM has also embarked on an EUL program to lease out significant portions of federal land for private developments. The EUL program helps to improve utilization of Department of Defense-owned property and reduces base operating costs while stimulating the local job market and fostering cooperation between the military services and the private sector. Because significant impacts on the transportation system could result if the form, placement and sequencing of new development are not well-coordinated with transportation investments, BRAC, EUL, and NSA effects were considered during this study.

In addition, Maryland Senate Bill 206/House Bill 366 created the authority for local jurisdictions and county governments to enter into agreements with private EUL developers for PILOTs (payments in lieu of taxes). Improvements (i.e. office buildings, labs, etc.) made by EUL developers on Federal properties are already subject to property taxes, and are therefore eligible under the legislation to be the subject of these PILOTs. This legislation provides a mechanism to fund off-base infrastructure improvements needed to accommodate the EUL, as well as BRAC, development.

The total number of additional jobs at FGGM, including BRAC and full EUL buildout, is estimated at 18,000. Concurrent with BRAC, the National Security Agency (NSA) is anticipated to expand by approximately 1,500 positions annually over a three

to five year period. The combination of BRAC, EUL, and NSA growth is anticipated to impact Baltimore County, Howard County, Anne Arundel County, and Prince George's County. Projected population statistics estimate that over 22,000 military personnel, dependents, civilian personnel, and contractors will be added. In preparation for this increase, the Maryland State Highway Administration (SHA) initiated a study of the highway transportation needs associated with BRAC at FGGM.

The SHA's Regional and Intermodal Planning Division (RIPD) is coordinating the transportation needs assessments associated with the five major military installations affected by the BRAC initiative in Maryland. RIPD created an Action Plan that outlines the steps for developing improvement concepts for intersections or short roadway segments that are projected to have a failing level of service (LOS) in the most immediate years of the BRAC planning process and can be improved with relatively low cost and minimal environmental impacts. As a first step, SHA determined which intersections were expected to be most affected by BRAC in 2011 (the year that Congress mandated the completion of BRAC in Maryland). Once the intersections were identified, SHA worked with decision-makers and local government officials to develop a list of priority intersections that could be funded in the Maryland Department of Transportation's Consolidated Transportation Program (CTP), based on available funding. The studies included analysis of the impacts to traffic operations that are anticipated based on the effects of BRAC/EUL/NSA growth on the roadway network that serves FGGM and recommendations for transportation system improvements that would allow operation at an acceptable LOS in 2011. The purpose of this report is to present the results of the travel forecasting, traffic, and short-term intersection studies at FGGM.

Additionally, in 2006, SHA began a Project Planning Study of MD 175 from MD 295 (Baltimore Washington Parkway) to MD 170 (Telegraph Road) in Anne Arundel County. A Draft Environmental Assessment/Section 4(f) Evaluation was published on June 3, 2008 and a Location/Design Public Hearing was held on June 26, 2008. The purpose of the Project Planning Study is to improve the capacity, traffic operations, intermodal connectivity, and vehicular and pedestrian safety of MD 175, while supporting existing and planned development in the area. All of the intersections along MD 175 within the Project Planning Study limits are likely to be affected by the projected BRAC/EUL/NSA growth. Therefore, these intersections have also been included in the analysis and development of short-term (2011) intersection improvements. The SHA is in the process of evaluating alternatives that best meet the project's Purpose and Need. The Project Planning Study is generally concerned with long term (2030) corridor-level improvements and shorter term Transportation System Management options, while the purpose of the BRAC study is to develop shorter-term, low impact spot improvements that can be implemented by 2011.

SHA is also conducting a Project Planning Study of MD 198 from MD 295 (Baltimore Washington Parkway) to MD 32 in Anne Arundel County, started in 2006. The purpose of the Project Planning Study is to improve existing capacity and traffic operations, enhance access to FGGM, and increase vehicular, bicycle, and pedestrian safety along MD 198, while supporting existing and planned development in the area. An Alternates Public Workshop was held on June 24, 2008 and the study team is currently preparing the Alternatives Retained for Detailed Study package for the project.

In addition to these SHA projects, Anne Arundel County, in partnership with Howard County, the City of Laurel, and the SHA, is conducting the FGGM BRAC Near-Term Highway Corridor Study, funded by the Office of Economic Adjustment (OEA). The purpose of this study is to perform an investigation of spot improvements at key intersections or other conflict points along several major corridors in the vicinity of FGGM. The study will include travel demand forecasting and traffic analyses, recommendations for improvements to key failing intersections, and 30 percent plans and estimates to forward to the SHA for programming as funding becomes available.

The current study process involved three components:

- Identifying the study area and conducting traffic studies
- Developing short-term (2011) intersection improvement concepts and determining the costs and impacts associated with each concept
- Selecting priority short term intersection improvements for inclusion in the Maryland Department of Transportation's Consolidated Transportation Program (CTP)

BRAC

Fort George G. Meade

Identification of the Study Area

The FGGM study area is located in portions of Anne Arundel, Prince George's, and Howard Counties, as shown in **Figure 1**, and includes the intersections that would likely be affected by the BRAC/EUL/NSA development at FGGM. The study area is comprised of the intersections along MD 175 that are being studied as part of SHA's MD 175 Project Planning Study as well as several other intersections

Table 2: Intersections Included in the Study

Intersection 1	MD 198 WB (Talbott Avenue) at 4th Street
Intersection 2	MD 198 EB (Gorman Avenue) at 4th Street
Intersection 3	MD 175 at US 1 (Washington Boulevard)
Intersection 4	MD 198 EB (Gorman Avenue) at US 1 NB (2nd Street)
Intersection 5	MD 198 WB (Fort Meade Road) at US 1 NB (2nd Street)
Intersection 6	MD 198 WB (Talbott Avenue) at US 1 SB (Washington Boulevard)
Intersection 7	MD 198 EB (Gorman Avenue) at US 1 SB (Washington Boulevard)
Intersection 8	MD 175 at Pocomoke Avenue
Intersection 9	MD 175 at Dorsey Run Road
Intersection 10	MD 175 at Wigley Avenue
Intersection 11	MD 713 (Arundel Mills Boulevard/New Ridge Road) at MD 176 (Dorsey Road)
Intersection 12	MD 713 (Arundel Mills Boulevard) at MD 100 WB Off Ramp
Intersection 13	MD 713 (Ridge Road)/Arundel Way at MD 713 (Arundel Mills Boulevard)
Intersection 14	MD 713 (Ridge Road) at Severn Road/Ridgewood Road
Intersection 15	MD 174 (Reece Road) at Severn Road
Intersection 16	MD 170 (Telegraph Road) at MD 100
Intersection 17	MD 170 (Telegraph Road) at MD 174 (Reece Road/Donaldson Avenue)
Intersection 18	MD 170 (Telegraph Road) at MD 32 EB Ramps
Intersection 19	MD 170 (Telegraph Road) at MD 32 WB Ramps
Intersection 20	Piney Orchard Parkway at Odenton Road
Intersection 21	MD 174 (Donaldson Avenue) at WB&A Road

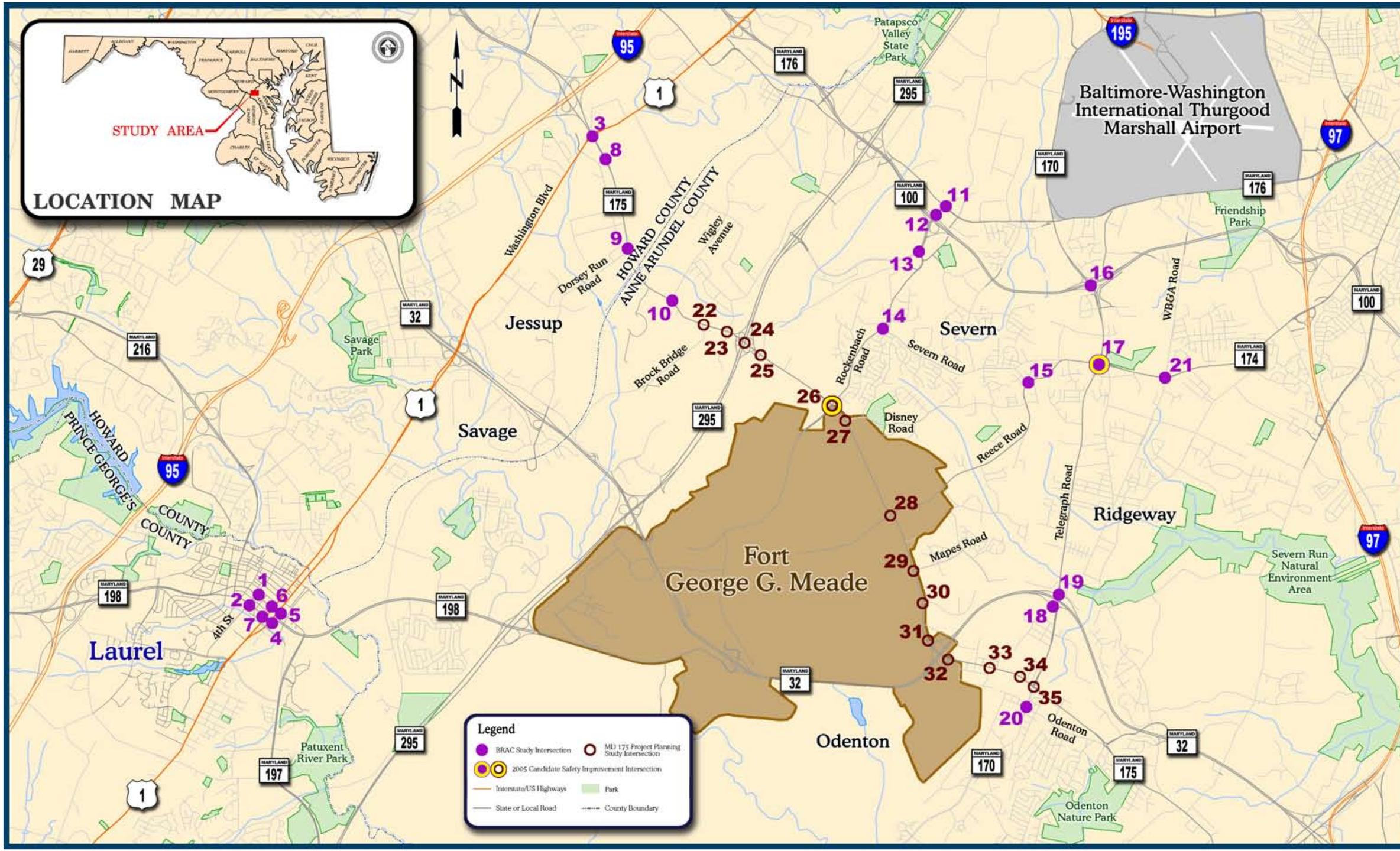
along the major routes that serve FGGM, such as MD 198, US 1, MD 100, MD 32, MD 713, MD 174, and MD 170.

Although the effects of freeway interchanges (i.e., MD 295, MD 100, and MD 32) on the surface roadways are accounted for in the traffic analyses, improvements to the freeways themselves are not included in this study. The resulting study area is comprised of 35 intersections, seven of which are interchange ramp termini that connect with State or local roads at a signalized intersection. The intersections listed in **Table 2** were included as a part of this study.

The 14 intersections that are part of the MD 175 Project Planning Study and also included in the 2011 analysis. These intersections are listed in **Table 3**.

Table 3: Intersections from the MD 175 Project Planning Study

Intersection 22	MD 175 at Brock Bridge Road
Intersection 23	MD 175 at Sellner Road/Race Road
Intersection 24	MD 175 at MD 295 (Baltimore Washington Parkway)
Intersection 25	MD 175 at Max Blobs Park Road/Clark Road
Intersection 26	MD 175 at MD 713 (Ridge Road)/Rockenbach Road
Intersection 27	MD 175 at Disney Road/26th Street
Intersection 28	MD 175 at MD 174/Reece Road
Intersection 29	MD 175 at Mapes Road/Charter Oaks Boulevard
Intersection 30	MD 175 at Llewellyn Avenue/Blue Water Boulevard
Intersection 31	MD 175 at MD 32 WB Ramps
Intersection 32	MD 175 at MD 32 EB Ramps
Intersection 33	MD 175 at Morgan Road/Town Center Boulevard
Intersection 34	MD 175 at Winmeyer Avenue
Intersection 35	MD 175 at MD 170 (Telegraph Road)/Piney Orchard Parkway


LOCATION MAP
STUDY AREA
Baltimore-Washington International Thurgood Marshall Airport
Patapsco Valley State Park
Friendship Park
Jessup
Savage
Savage Park
Severn
Ridgeway
Severn Run Natural Environment Area
Fort George G. Meade
Odenton
Odenton Nature Park
Laurel
Patuxent River Park
HOWARD COUNTY
ANNE ARUNDEL COUNTY
HOWARD COUNTY
PRINCE GEORGE'S COUNTY
Washington Blvd
Dorsey Run Road
Wigley Avenue
Brock Bridge Road
Rockenbach Road
Severn Road
Disney Road
Reece Road
Telegraph Road
Mapes Road
WBGA Road
Odenton Road
4th St
Legend
BRAC Study Intersection
MD 175 Project Planning Study Intersection
2005 Candidate Safety Improvement Intersection
Interstate/US Highways
Park
State or Local Road
County Boundary

Travel Forecasting

A comprehensive traffic study was conducted by SHA to evaluate two different future short-term scenarios: the 2011 With BRAC scenario (which also includes EUL and NSA growth) and the 2011 No-BRAC scenario. The purpose of the traffic study was to analyze the impacts to traffic operations that are anticipated based upon the effects of BRAC/EUL/NSA growth and to develop recommendations for transportation system improvements.

At the same time SHA was conducting a traffic study to assess the impacts of BRAC on intersections outside of FGGM, consultants working for FGGM were conducting a traffic study to assess the impacts of BRAC on intersections inside of FGGM. This included an assessment of intersections at the entrances to FGGM and a few additional intersections in close vicinity to FGGM. The consultants working for FGGM determined that an average annual growth rate of three percent would be appropriate to predict background growth for the intersections in their study area. The turning movement volumes resulting from application of the three percent annual growth rate to the existing turning movement volumes are the 2011 No-BRAC volumes. The FGGM study team then developed assumptions as to how much of the BRAC traffic forecasted to be in place by 2011 would use each gate, and distributed those volumes throughout the roadway network. The 2011 No-BRAC turning movement volumes plus the distributed BRAC/EUL/NSA traffic resulted in the turning movement volumes for the 2011 With BRAC condition.

In order to maintain consistency between the two studies, the SHA traffic study used the same No-BRAC and With BRAC turning movement volumes as the FGGM study where the two study areas overlapped. Further, the SHA traffic study applied the same three percent annual growth rate to the additional intersections that were included in the SHA study, but that were not included in the FGGM study, in order to develop a complete set of No-BRAC turning movement volumes. Once the No-BRAC forecasts were complete, the SHA study team continued the distribution of the BRAC traffic through the rest of the SHA study's study area, added the BRAC volumes to the No-BRAC volumes, and thereby developed the 2011 With BRAC turning movement volumes.

The forecasts for the two studies therefore match at their boundaries, as well as at each overlapping intersection.

The following scenarios were evaluated as part of the full comprehensive traffic study:

- Existing Conditions
- 2011 No-Build (with BRAC/EUL/NSA) Conditions
- 2011 Build (with BRAC/EUL/NSA) Conditions.

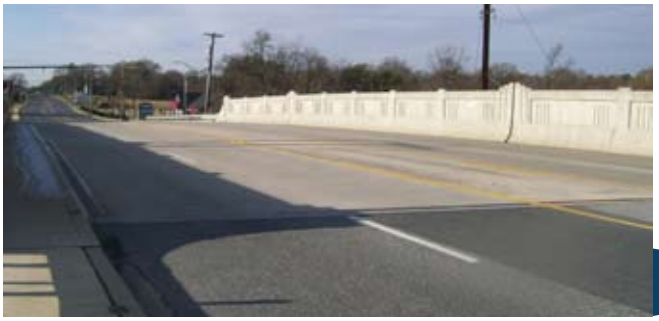
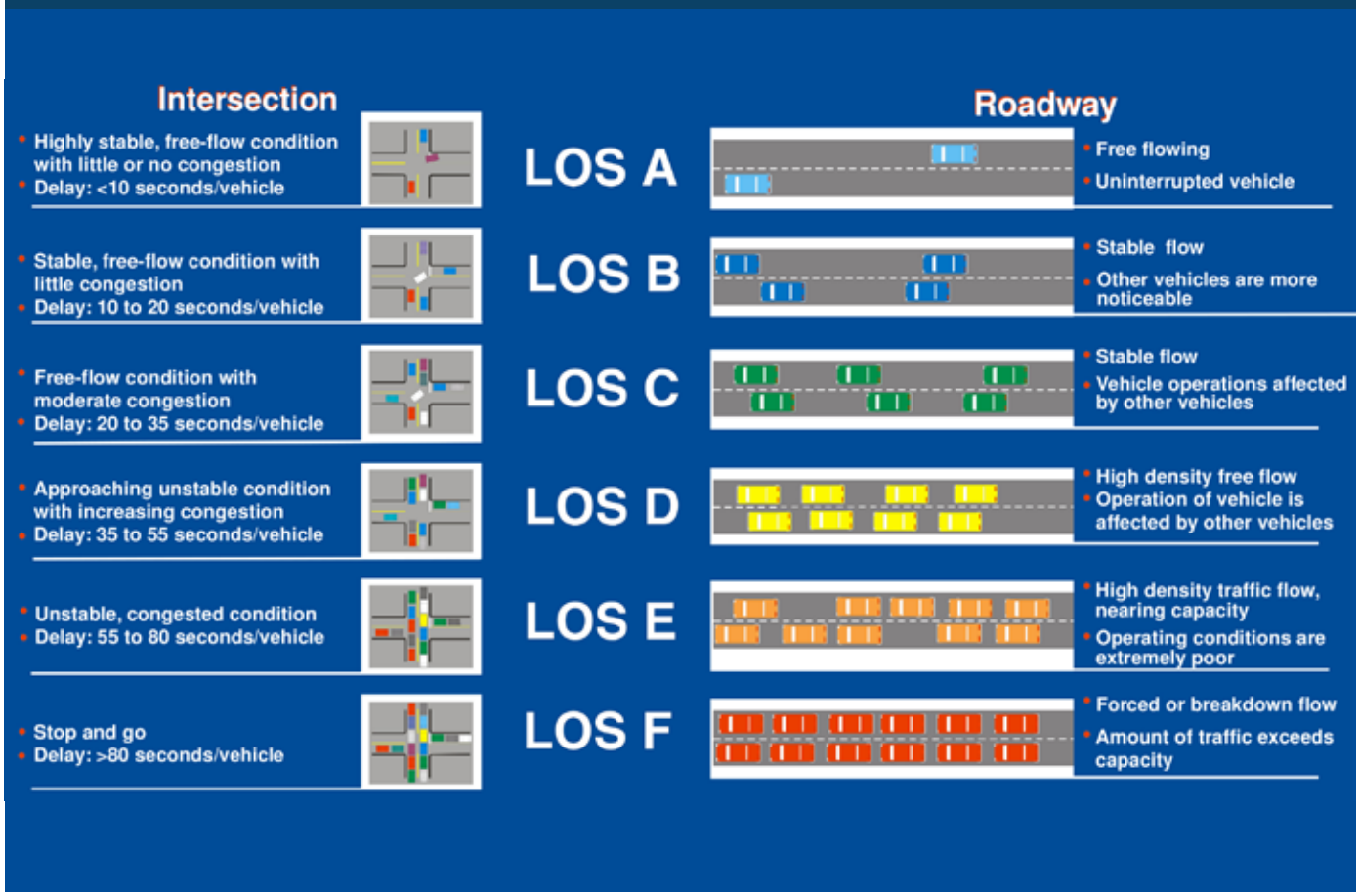


Figure 2: Level of Service (LOS)



Traffic Operational Analysis

To understand the operations at the key intersections and interchanges in the study area, a capacity analysis was conducted to determine the v/c ratio and LOS at these intersections and interchanges for both the existing and future (2011) conditions. The LOS is a quantitative measure of traffic operations. On most arterials with signalized intersections, LOS is also a measure of the intersection delays. Intersection operations are quantified by applying an LOS letter grade as shown in **Figure 2**.

Traffic distribution analysis is based on the morning peak period and the evening peak period of the day with the highest hourly traffic volumes, commonly known as the AM and PM peak periods. Roadways must be designed to adequately serve the peak period traffic volume in the peak direction of flow. Since traffic going one way during the morning peak is typically going the opposite way during the evening peak, both sides of a facility must generally be designed to accommodate the peak directional flow during the peak period.

Critical Lane Volume (CLV) analysis is the standard SHA tool for the preliminary analysis of intersection improvements, and is used to determine the v/c ratio of an intersection. CLV analyses were performed on the 35 intersections included in this study. If an intersection had functioned at LOS F during a particular peak period, then the improvements were designed to allow the intersection to function at a minimum of LOS E during that peak period.

BRAC
Fort George G. Meade

Short-Term Intersection Concept Development

In analyzing the 35 study area intersections, the SHA focused on the short-term, immediate effects on traffic operations due to the BRAC initiative through 2011. Traffic forecasts and analyses will be further updated beyond what is presented in this report to fine-tune the design of the high priority BRAC intersections. Forecasts and studies will also be updated for the MD 175 Project Planning Study for planning beyond BRAC to 2030. The 19 intersections listed in **Table 4** were forwarded for more detailed study because they were projected to operate at LOS F for either the AM or PM peak period in 2011.

Table 5 shows the intersections that are expected to fail in 2011, as well as the LOS and v/c for each intersection under Existing, 2011 No-Build (with BRAC/EUL/NSA), and 2011 Build (with BRAC/EUL/NSA) conditions. An aerial map showing these intersections can be found in **Figure 3**.

Table 4: Intersections Forwarded for Detailed Study

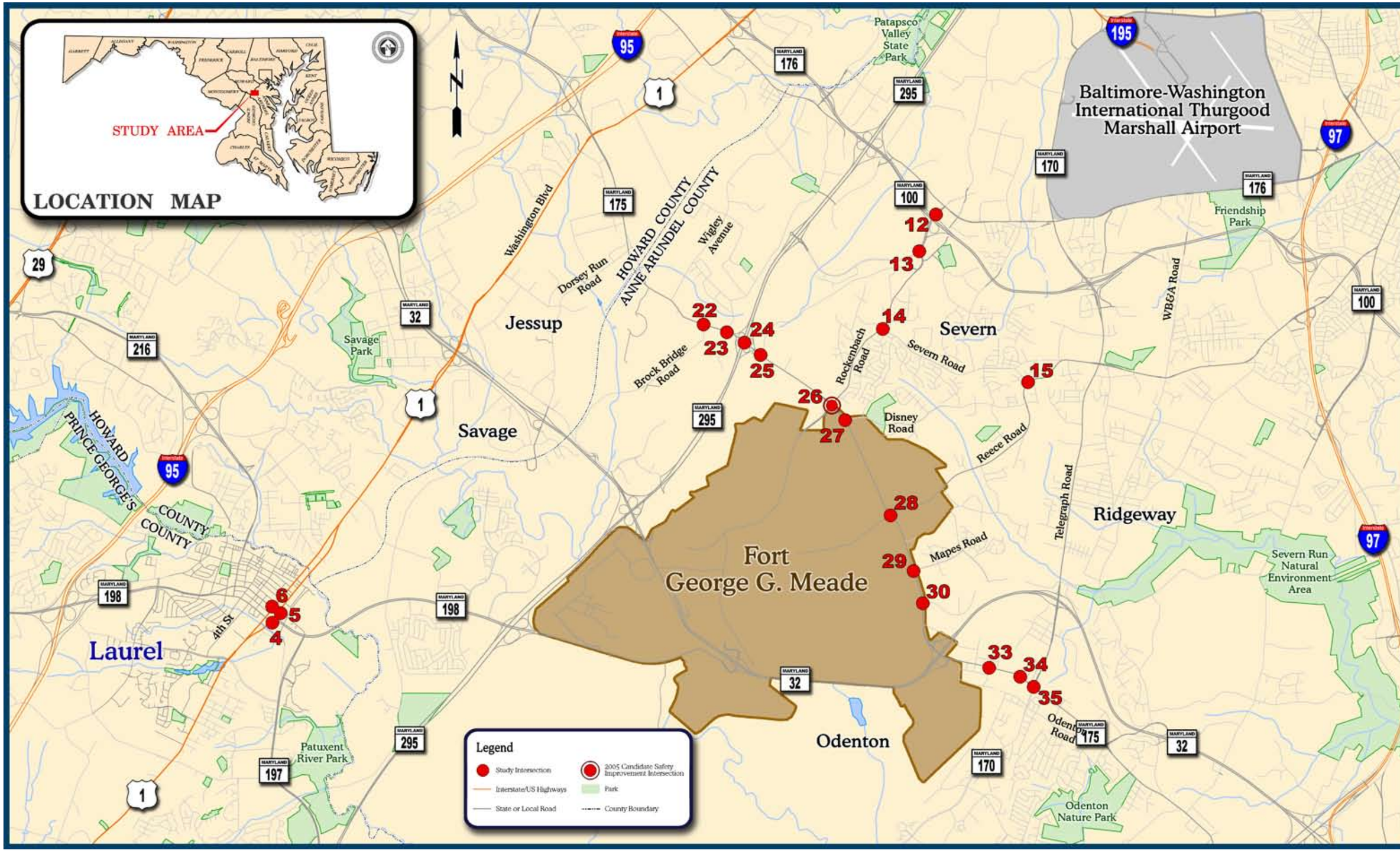
Intersection 4	MD 198 EB (Gorman Avenue) at US 1 NB (2nd Street)
Intersection 5	MD 198 WB (Fort Meade Road) at US 1 NB (2nd Street)
Intersection 6	MD 198 WB (Talbott Avenue) at US 1 SB (Washington Boulevard)
Intersection 12	MD 713 (Arundel Mills Boulevard) at MD 100 WB Off Ramp
Intersection 13	MD 713 (Ridge Road)/Arundel Way at MD 713 (Arundel Mills Boulevard)
Intersection 14	MD 713 (Ridge Road) at Severn Road/Ridgewood Road
Intersection 15	MD 174 (Reece Road) at Severn Road
Intersection 22	MD 175 at Brock Bridge Road
Intersection 23	MD 175 at Sellner Road/Race Road
Intersection 24	MD 175 at MD 295 (Baltimore Washington Parkway)
Intersection 25	MD 175 at Max Blobs Park Road/Clark Road
Intersection 26	MD 175 at MD 713 (Ridge Road)/Rockenbach Road
Intersection 27	MD 175 at Disney Road/26th Street
Intersection 28	MD 175 at MD 174/Reece Road
Intersection 29	MD 175 at Mapes Road/Charter Oaks Boulevard
Intersection 30	MD 175 at Llewellyn Avenue/Blue Water Boulevard
Intersection 33	MD 175 at Morgan Road/Town Center Boulevard
Intersection 34	MD 175 at Winmeyer Avenue
Intersection 35	MD 175 at MD 170 (Telegraph Road)/Piney Orchard Parkway

Table 5: LOS and V/C for Intersections Forecasted to Fail in 2011

No.	Intersection	Existing Conditions				2011 No-Build (with BRAC/EUL/NSA) Conditions				2011 Build (with BRAC/EUL/NSA) Conditions			
		AM		PM		AM		PM		AM		PM	
		LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c
4	MD 198 EB (Gorman Avenue) at US 1 NB (2nd Street)	A	0.39	D	0.91	A	0.54	F	1.10	A	0.54	E	0.99
5	MD 198 WB (Fort Meade Road) at US 1 NB (2nd Street)	A	0.59	D	0.87	B	0.71	F	1.17	A	0.59	E	0.99
6	MD 198 WB (Talbott Avenue) at US 1 SB (Washington Blvd)	B	0.71	C	0.81	D	0.86	F	1.10	C	0.74	D	0.85
12	MD 713 (Arundel Mills Boulevard) at MD 100 WB Off Ramp	A	0.59	D	0.90	C	0.73	F	1.08	B	0.65	C	0.81
13	MD 713 (Ridge Road)/Arundel Way at MD 713 (Arundel Mills Boulevard)	A	0.56	E	0.93	C	0.79	F	1.20	C	0.74	E	0.98
14	MD 713 (Ridge Road) at Severn Road/Ridgewood Road	A	0.50	B	0.70	F	1.11	F	1.13	D	0.84	C	0.79
15	MD 174 (Reece Road) at Severn Road	A	0.62	C	0.78	F	1.41	F	1.63	E	0.94	D	0.83
22	MD 175 at Brock Bridge Road *	D	0.86	F	1.14	F	1.05	E	0.99	A	0.62	D	0.88
23	MD 175 at Sellner Road/Race Road	F	1.04	F	1.23	F	1.28	F	1.51	C	0.73	D	0.85
24A	MD 175 at MD 295 (Baltimore Washington Parkway) East-bound Weave/Western Intersection	C	-	F	-	F	-	F	-	B	-	D	-
24B	MD 175 at MD 295 (Baltimore Washington Parkway) Westbound Weave/Eastern Intersection	E	-	B	-	F	-	E	-	C	-	A	-
25	MD 175 at Max Blobs Park Road/Clark Road *	F	1.16	F	1.01	F	1.46	F	1.60	D	0.84	D	0.88
26	MD 175 at MD 713 (Ridge Road)/ Rockenbach Road *	C	0.81	D	0.89	F	1.26	F	1.11	D	0.90	E	0.98
27	MD 175 at Disney Road/26th Street	A	0.54	C	0.72	F	1.08	F	1.26	E	0.99	E	0.92
28	MD 175 at MD 174/Reece Road	B	0.68	C	0.81	F	1.41	F	1.58	C	0.77	E	0.93
29	MD 175 at Mapes Road/Charter Oaks Boulevard	C	0.78	D	0.90	F	1.36	F	1.43	D	0.89	E	0.97
30	MD 175 at Llewellyn Avenue/Blue Water Boulevard	B	0.66	B	0.70	F	1.03	E	0.95	E	0.98	C	0.79
33	MD 175 at Morgan Road/Town Center Boulevard	A	0.47	C	0.79	B	0.68	F	1.16	B	0.66	D	0.83
34	MD 175 at Winmeyer Avenue	A	0.53	B	0.70	C	0.74	F	1.03	C	0.74	C	0.77
35	MD 175 at MD 170 (Telegraph Rd)/Piney Orchard Parkway	B	0.66	D	0.85	D	0.88	F	1.29	D	0.88	D	0.88

* Developer improvement(s) included in "2011 BRAC Existing Lane Configurations"

Note: At interchanges, LOS is a function of the traffic delays on the ramps and merge/diverge points, and is evaluated using Highway Capacity Software (HCS), not CLV analysis.


LOCATION MAP
STUDY AREA
N
Baltimore-Washington International Thurgood Marshall Airport
Patapsco Valley State Park
Friendship Park
Jessup
Savage
Severn
Ridgeway
Fort George G. Meade
Odenton
Laurel
Savage Park
Patuxent River Park
Severn Run Natural Environment Area
Odenton Nature Park
HOWARD COUNTY
ANNE ARUNDEL COUNTY
HOWARD COUNTY
PRINCE GEORGE'S COUNTY
Washington Blvd
Dorsey Run Road
Wigley Avenue
Brock Bridge Road
Rockenbach Road
Severn Road
Disney Road
Reece Road
Mapes Road
Telegraph Road
WBGA Road
Odenton Road
4th St
12
13
14
15
22
23
24
25
26
27
28
29
30
33
34
35
4
5
6
Legend
Study Intersection
2005 Candidate Safety Improvement Intersection
Interstate/US Highways
Park
State or Local Road
County Boundary

Methodology

Once it was determined which intersections were recommended for improvement, field reviews were conducted to gather additional data. SHA took photos and documented information about the topography and environmental features found at each location, and noted anything unusual that could influence the intersection design process. Photographs were also used to verify the features shown on aerial mapping of the study area, and traffic operations were observed during the field reviews to help confirm the results of the CLV analyses.

Information collected during field reviews was used in conjunction with aerial photography to develop sketch-level intersection improvement design concepts. Improvement concepts were developed using AASHTO 2001 and SHA design standards, assuming twelve-foot lanes.

Once the initial concepts were created using aerial photography as a base map, the limits of disturbance were determined for each location. Using aerial photography and GIS data, the SHA calculated the area of impact within the limits of disturbance for wetlands, streams, floodplains, parks and forests, as well as right-of-way impacts and displacements to residential and commercial properties. At this stage of the study, no detailed planning or engineering was completed.

Cost estimates for each intersection improvement concept were developed using COST-EST, SHA's Excel-based spreadsheet. For cost estimating purposes, the pavement overlay was assumed to be a two-inch hot mix asphalt (HMA) surface, and full depth pavement was assumed to consist of a two-inch HMA surface, six-inch HMA base, and eight-inch graded aggregate base. Sidewalks were assumed to be five inches thick and five to eight feet wide. For reconstruction and/or widening, it was assumed that existing traffic signals would be entirely replaced. Quantities were estimated using design concept drawings, information from field reviews and aerial photography. SHA's 2007 Highway Construction Cost Estimating Manual was used to obtain unit costs.

For intersection concepts that initially had an unusually high cost or a large number of right-of-way or environmental impacts, the SHA sought, where possible, other less impactive ways to improve the intersection's LOS, while still achieving a LOS E or better. Below is a summary of the recommended improvements, cost estimates, and environmental impacts associated with each intersection.

Description of Short-Term Intersection Concepts

The 19 intersection concepts are described below, and **Table 6** at the end of this section summarizes the traffic data, cost estimates, and impacts for each intersection concept. Additionally, the intersection concepts are depicted on aerial mapping, which can be found in **Appendix A**. It should be noted that these concepts are preliminary and subject to modification as they are refined during detailed design.

Intersection 4: MD 198 EB (Gorman Avenue) at US 1 NB (2nd Street)

This intersection currently operates at LOS A during the AM peak period with a v/c ratio of 0.39, and LOS D during the PM peak period with a v/c ratio of 0.91. In 2011 with BRAC traffic and without improvements, this intersection is forecasted to operate at LOS A during the AM peak period, with a v/c ratio of 0.54,

Intersection 4

and at LOS F during the PM peak period, with a v/c ratio of 1.10. Making the recommended improvement will allow the intersection to function at LOS A during the AM peak period in 2011, with a v/c ratio of 0.54, and LOS E during the PM peak period, with a v/c ratio of 0.99. The proposed improvement is to add one right turn lane to northbound US 1.

The proposed improvement would impact three properties, totaling 0.13 acres, and result in no displacements. No environmental features are expected to be impacted. The total cost is estimated at approximately $2.0 to $4.0 million.

Intersection 5: MD 198 WB (Fort Meade Road) at US 1 NB (2nd Street)

This intersection currently operates at LOS A during the AM peak period with a v/c ratio of 0.59, and LOS D during the PM peak period with a v/c ratio of 0.87. In 2011 with BRAC traffic and without improvements, this intersection is forecasted to operate at LOS B during the AM peak period, with a v/c ratio of 0.71, and at LOS F during the PM peak period, with a v/c ratio of 1.17. Making the recommended improvement will allow the intersection to function at LOS A during the AM peak period in 2011, with a v/c ratio of 0.59, and LOS E during the PM peak period, with a v/c ratio of 0.99. The proposed improvement is to add one through lane to westbound MD 198.

Intersection 5

The proposed improvement would impact one property, totaling 0.11 acres, and result in no displacements. No environmental features are expected to be impacted. The total cost is estimated at approximately $6.0 to $11.0 million.

Intersection 6: MD 198 WB (Talbott Avenue) at US 1 SB (Washington Boulevard)

This intersection currently operates at LOS B during the AM peak period with a v/c ratio of 0.71, and LOS C during the PM peak period with a v/c ratio of 0.81. In 2011 with BRAC traffic and without improvements, this intersection is forecasted to operate at LOS D during the AM peak period, with a v/c ratio of 0.86, and at LOS F during the PM peak period, with a v/c ratio of 1.10. Making the recommended improvement will allow the intersection to function at LOS C during the AM peak period in 2011, with a v/c ratio of 0.74, and LOS D during the PM peak period, with a v/c ratio of 0.85. The proposed improvement is to convert the shared through/left turn lane to one through and one left turn lane on westbound MD 198.

Intersection 6

The proposed improvement would impact one property, totaling 0.01 acres, and result in no displacements. No environmental features are expected to be impacted. The total cost is estimated at approximately $1.5 to $3.5 million.

Intersection 12: MD 713 (Arundel Mills Boulevard) at MD 100 WB Off Ramp

This intersection currently operates at LOS A during the AM peak period with a v/c ratio of 0.59, and LOS D during the PM peak period with a v/c ratio of 0.90. In 2011 with BRAC traffic and without improvements, this intersection is forecasted to operate at LOS C during the AM peak period, with a v/c ratio of 0.73, and at LOS F during the PM peak period, with a v/c ratio of 1.08. Making the recommended improvement will allow the intersection to function at LOS B during the AM peak period, with a v/c ratio of 0.65, and LOS C during the PM peak period, with a v/c ratio of 0.81. The proposed improvement is to convert the right turn lane from southbound MD 713 to the westbound MD 100 On Ramp into a free right turn lane.

Intersection 12

The proposed improvement would impact one property, totaling 1.10 acres, and result in no displacements. Additionally, 45 linear feet of streams, 0.1 acres of

floodplains, and 2.5 acres of forest are expected to be impacted. The total cost is estimated at approximately $5.5 to $10.5 million.

Intersection 13: MD 713 (Ridge Road)/Arundel Way at MD 713 (Arundel Mills Boulevard)

This intersection currently operates at LOS A during the AM peak period with a v/c ratio of 0.56, and LOS E during the PM peak period with a v/c ratio of 0.93. In 2011 with BRAC traffic and without improvements, this intersection is forecasted to operate at LOS C during the AM peak period, with a v/c ratio of 0.79, and at LOS F during the PM peak, with a v/c ratio

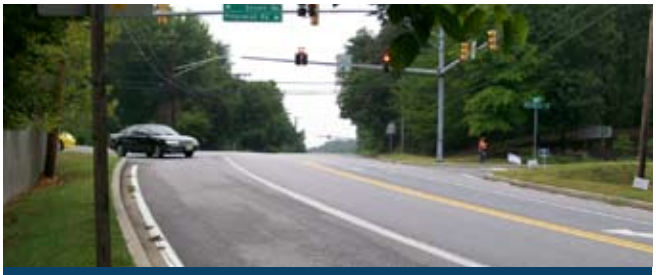
Intersection 13

of 1.20. Making the recommended improvements will allow the intersection to function at LOS C during the AM peak period in 2011, with a v/c ratio of 0.74, and LOS E during the PM peak period, with a v/c ratio of 0.98. The proposed improvements include adding one through lane and one left turn lane to MD 713 in the westbound direction.

These proposed improvements would impact three properties, totaling 0.56 acres, and result in no displacements. No environmental features are expected to be impacted. The total cost is estimated at approximately $3.5 to $6.5 million.

Intersection 14: MD 713 (Ridge Road) at Severn Road/Ridgewood Road

This intersection currently operates at LOS A during the AM peak period with a v/c ratio of 0.50, and LOS B during the PM peak period with a v/c ratio of 0.70. In 2011 with BRAC traffic and without improvements, this intersection is forecasted to operate at LOS F during both the AM and PM peak periods with a v/c ratio of 1.11 in the AM peak period and a v/c ratio of 1.13 in the PM peak period. Making the recommended



Intersection 14

improvements will allow the intersection to function at LOS D during the AM peak period in 2011, with a v/c ratio of 0.84, and LOS C during the PM peak period, with a v/c ratio of 0.79. The recommended improvements include adding one through lane to MD 713 in the southbound direction and adding one through lane to MD 713 in the northbound direction.

These proposed improvements would impact 10 properties, totaling 0.12 acres, and result in no displacements. Additionally, 1.5 acres of forest are expected to be impacted. The total cost is estimated at approximately $6.0 to $11.0 million.

Intersection 15: MD 174 (Reece Road) at Severn Road

This intersection currently operates at LOS A during the AM peak period with a v/c ratio of 0.62, and LOS C during the PM peak period with a v/c ratio of 0.78. In 2011 with BRAC traffic and without improvements, this intersection is forecasted to operate at LOS F during both the AM and PM peak periods with a v/c

Intersection 15

ratio of 1.41 in the AM peak period and a v/c ratio of 1.63 in the PM peak period. Making the recommended improvements will allow the intersection to function at LOS E during the AM peak period in 2011, with a v/c ratio of 0.94, and LOS D during the PM peak period, with a v/c ratio of 0.83.

The recommended improvements include:

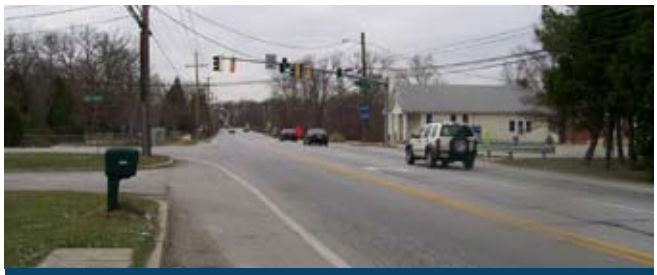
- Adding one through lane to southbound MD 174
- Converting the shared through/left turn lane to one through and one left turn lane on northbound MD 174.

These proposed improvements would impact four properties, totaling 0.31 acres, and result in no displacements. Additionally, 0.2 acres of forest are expected to be impacted. The total cost is estimated at approximately $4.5 to $8.5 million.

Intersection 22: MD 175 at Brock Bridge Road

This intersection currently operates at LOS D during the AM peak period with a v/c ratio of 0.86, and LOS F during the PM peak period with a v/c ratio of 1.14. By 2011 with BRAC traffic and the improvement that is being constructed by the developer, this intersection is forecasted to operate at LOS F during the AM peak period, with a v/c ratio of 1.05, and at LOS E during the PM peak period, with a v/c ratio of 0.99. The developer improvement includes one new through lane on eastbound MD 175.

Additional improvements above and beyond the developer improvements are required to accommodate BRAC traffic. Making the recommended improvements will allow the intersection to function at LOS A during the AM peak period, with a v/c ratio of 0.62, and LOS D during the PM peak period, with a v/c ratio of 0.88. The recommended improvements include:



Intersection 22

- Converting the shared through/right turn lane to one through lane and adding one right turn lane to eastbound MD 175
- Adding one through lane to westbound MD 175.

These proposed improvements would impact 17 properties, totaling 1.84 acres, and result in no displacements. No environmental features are expected to be impacted. The total cost is estimated at approximately $6.0 to $11.0 million.

Intersection 23: MD 175 at Sellner Road/ Race Road

This intersection currently operates at LOS F during both the AM and PM peak periods, with a v/c ratio of 1.04 in the AM peak period, and v/c ratio of 1.23 in the PM peak period. In 2011 with BRAC traffic and without improvements, this intersection is forecasted to operate at LOS F during both the AM and PM peak periods with a v/c ratio of 1.28 in the AM peak period and a v/c ratio of 1.51 in the PM peak period. Making the recommended improvements will allow the intersection to function at LOS C during the AM peak period, with a v/c ratio of 0.73, and LOS D

Intersection 23

during the PM peak period, with a v/c ratio of 0.85. The recommended improvements include:

- Converting the shared left turn/right turn/ through lane to a shared left turn/through lane and adding one shared through/right turn lane to eastbound MD 175
- Adding one through lane to westbound MD 175.

These proposed improvements would impact four properties, totaling 0.5 acres, and result in no displacements. No environmental features are expected to be impacted. The total cost is estimated at approximately $3.5 to $6.5 million.

Intersection 24: MD 175 at MD 295 (Baltimore Washington Parkway)

The eastbound weave movement of this interchange currently operates at LOS C during the AM peak

Intersection 24

period and LOS F during the PM peak period. The westbound weave movement of this interchange currently operates at LOS E during the AM peak period and LOS B during the PM peak period. In 2011 with BRAC traffic and without improvements, the eastbound weave movement of this interchange is forecasted to operate at LOS F during both the AM peak period and the PM peak period. The westbound weave movement of this interchange is forecasted to operate at LOS F during the AM peak period and LOS E during the PM peak period.

Making the recommended improvements will create two signalized intersections at this location. The western intersection (formerly the beginning of the eastbound weave movement) will operate at LOS B during the AM peak period and LOS D during the PM peak period. The eastern intersection (formerly the beginning of the westbound weave movement) will operate at LOS C during the AM peak period and LOS A during the PM peak period.

The recommended improvements include:

- Proposing two traffic signals at this interchange
- Adding one through lane on eastbound MD 175
- Adding one through lane on westbound MD 175
- Realigning the single lane cloverleaf ramp from southbound MD 295 to a two-lane approach that meets eastbound MD 175 at a signalized intersection
- Realigning the single lane cloverleaf ramp from northbound MD 295 to a two-lane approach that meets westbound MD 175 at a signalized intersection.

These proposed improvements would not impact or displace any properties. However, 0.9 acres of parks and 0.4 acres of forest are expected to be impacted. The total cost is estimated at approximately $5.0 to $10.0 million.

Intersection 25: MD 175 at Max Blobs Park Road/Clark Road

This intersection currently operates at LOS F during both the AM and PM peak periods with a v/c ratio of 1.16 in the AM peak period and a v/c ratio of 1.01 in the PM peak period. In 2011 with BRAC traffic and without improvements, this intersection is forecasted to operate at LOS F during both the AM and PM peak periods with a v/c ratio of 1.46 in the AM peak period and a v/c ratio of 1.60 in the PM peak period.

Intersection 25

By 2011, developer improvements are expected to be in-place. These improvements are as follows:

- Adding a traffic signal at this intersection
- Converting the right turn lane to a shared through/right turn lane, converting the shared through/left turn lane to a left turn lane, and adding one left turn lane to southbound Clark Road
- Adding one through lane and one left turn lane to eastbound MD 175
- Converting the shared through/right turn lane to one through lane, adding one through lane, and adding one right turn lane to westbound MD 175.

The developer improvements will allow the intersection to operate at LOS D during the AM and PM peak periods, with a v/c ratio of 0.84 in the AM peak period and a v/c ratio of 0.88 in the PM peak period. Therefore, no additional improvements are required to accommodate BRAC traffic.

These proposed improvements are not expected to impact or displace any properties or impact any environmental features. Because these improvements will be constructed or funded by a developer, there will be no net cost to SHA.

Intersection 26: MD 175 at MD 713 (Ridge Road)/Rockenbach Road

This intersection was identified in 2005 as a Candidate Safety Improvement Intersection, and currently operates at LOS C during the AM peak period, with a v/c ratio of 0.81, and LOS D during the PM peak period, with a v/c ratio of 0.89. By 2011 with BRAC traffic and the improvements that are being constructed by the developer, this intersection is forecasted to operate

Intersection 26

at LOS F during both the AM and PM peak periods, with a v/c ratio of 1.26 during the AM peak period and a v/c ratio of 1.11 during the PM peak period. The developer improvements include:

- Adding one left turn lane to southbound MD 713 (Ridge Road)
- Adding one left turn lane, converting the shared through/right turn lane to one through lane, and adding one right turn lane to northbound Rockenbach Road
- Adding one left turn lane to eastbound MD 175
- Adding one left turn lane, converting the shared through/right turn lane to one through lane, and adding one right turn lane to westbound MD 175.

Additional improvements above and beyond the developer improvements are required to accommodate BRAC traffic. Making the recommended improvements will allow the intersection to function at LOS D during the AM peak period, with a v/c ratio of 0.90, and LOS E during the PM peak period, with a v/c ratio of 0.98. The recommended improvements include:

- Adding one through lane to southbound MD 713 (Ridge Road)
- Converting the shared through/right turn lane to one through lane and adding one right turn lane to eastbound MD 175
- Adding one through lane to westbound MD 175.

These proposed improvements would impact five properties, totaling 2.13 acres, and result in three commercial displacements – Shell Gas Station, Exxon Gas Station, and Lisa Cleaners. No environmental features are expected to be impacted. More detailed information about the construction and right-of-way costs of this intersection are currently being developed as part of the 30 percent design efforts. Based on the current level of design, the cost is estimated to range between $18.5 and $21.5 million.

If the improvement concept is revised so that one through lane is removed from southbound MD 713 and one through lane is removed from westboundMD 175, the cost could be reduced by approximately $6.0 million and right-of-way impacts could be reduced to approximately 0.88 acres, but the intersection would be forecasted to operate at LOS F during the AM and PM peak periods, with a v/c ratio of 1.23 in the AM peak period a v/c ratio of 1.11 in the PM peak period.

Intersection 27: MD 175 at Disney Road/ 26th Street

This intersection currently operates at LOS A during the AM peak period with a v/c ratio of 0.54, and LOS

Intersection 27

C during the PM peak period with a v/c ratio of 0.72. In 2011 with BRAC traffic and without improvements, this intersection is forecasted to operate at LOS F during both the AM and PM peak periods with a v/c

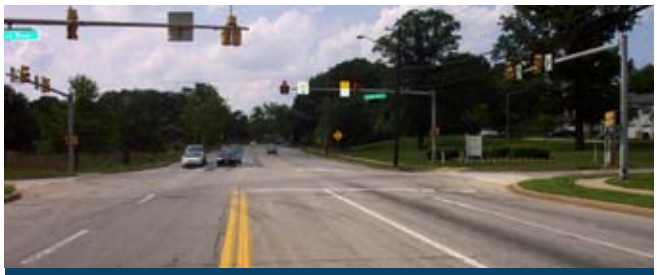
ratio of 1.08 in the AM peak period and a v/c ratio of 1.26 in the PM peak period. Making the recommended improvements will allow the intersection to function at LOS E during the AM peak period, with a v/c ratio of 0.99, and LOS E during the PM peak period, with a v/c ratio of 0.92. The recommended improvements include:

- Converting the shared through/left turn lane to one through lane and adding one left turn lane to southbound Disney Road
- Converting the shared through/right turn lane to one through lane and adding one right turn lane to eastbound MD 175
- Converting the shared through/right turn lane to one through lane, adding one through lane, and adding one right turn lane to westbound MD 175.

These proposed improvements would impact four properties, totaling 1.46 acres, and result in no displacements. Additionally, 0.1 acres of wetlands are expected to be impacted. More detailed information about the construction and right-of-way costs of this intersection are currently being developed as part of the 30 percent design efforts. Based on the current level of design, the cost is estimated to range between $10.0 and $12.0 million.

Intersection 28: MD 175 at MD 174/Reece Road

This intersection currently operates at LOS B during the AM peak period with a v/c ratio of 0.68, and LOS C during the PM peak period with a v/c ratio of 0.81. In 2011 with BRAC traffic and without improvements,



Intersection 28

this intersection is forecasted to operate at LOS F during both the AM and PM peak periods with a v/c ratio of 1.41 in the AM peak period and a v/c ratio of 1.58 in the PM peak period. Making the recommended improvements will allow the intersection to function at LOS C during the AM peak period, with a v/c ratio of 0.77, and LOS E during the PM peak period, with a v/c ratio of 0.93. The recommended improvements include:

- Converting the shared through/right turn lane to one through lane, adding one right turn lane, and adding one left turn lane to southbound MD 174
- Converting the shared through/right turn lane to one through lane, adding one through lane, adding one right turn lane, and adding one left turn lane to eastbound MD 175
- Converting the shared through/right turn lane to one through lane, adding one through lane, adding one right turn lane, and adding one left turn lane to westbound MD 175.

These proposed improvements would impact six properties, totaling 7.09 acres, and result in no displacements. Additionally, 0.08 acres of wetlands are expected to be impacted. The total cost is estimated at approximately $19.0 to $24.0 million.

If the improvement concept is revised so that one through lane is not added to westbound MD 175, the cost could be reduced by approximately $11.0 million and right-of-way impacts could be reduced to approximately 2.66 acres, but the intersection would be forecasted to operate at LOS D during the AM peak period, with a v/c ratio of 0.87, and LOS F during the PM peak period, with a v/c ratio of 1.05. If the concept is further revised so that one through lane is not added to eastbound MD 175, the cost could be reduced by approximately $13.0 million compared to the initial cost estimate and right-of-way impacts could be reduced to approximately 2.19 acres. Under these conditions, the intersection is also forecasted to operate at LOS D during the AM peak period, with a v/c ratio of 0.87, and LOS F during the PM peak period, with a v/c ratio of 1.05.

Intersection 29: MD 175 at Mapes Road/ Charter Oaks Boulevard

This intersection currently operates at LOS C during the AM peak period with a v/c ratio of 0.78, and LOS D during the PM peak period with a v/c ratio of 0.90. In 2011 with BRAC traffic and without improvements, this intersection is forecasted to operate at LOS F during both the AM and PM peak periods with a v/c

Intersection 29

ratio of 1.36 in the AM peak period and a v/c ratio of 1.43 in the PM peak period. Making the recommended improvements will allow the intersection to function at LOS D during the AM peak period, with a v/c ratio of 0.89, and LOS E during the PM peak period, with a v/c ratio of 0.97. The recommended improvements include:

- Converting the shared through/left turn/right turn lane to one shared through/left turn lane and adding one right turn lane to southbound Charter Oaks Boulevard
- Converting the shared through/left turn/right turn lane to one shared through/left turn lane and adding one right turn lane to northbound Mapes Road
- Converting the shared through/right turn lane to one through lane, adding one through lane, adding one right turn lane, and adding one left turn lane to eastbound MD 175
- Converting the shared through/ right turn lane to one through lane, adding one right turn lane, and adding one left turn lane to westbound MD 175.

These proposed improvements would impact five properties, totaling 2.48 acres, and result in no displacements. No environmental features are expected to be impacted. More detailed information about the construction and right-of-way costs of this intersection are currently being developed as part of the 30 percent design efforts. Based on the current level of design, the cost is estimated to range between $16.5 and $21.5 million.

If the improvement concept is revised so that one through lane is not added to eastbound MD 175, the cost could be reduced by approximately $2.5 million and right-of-way impacts could be reduced to approximately 1.77 acres, but the intersection would be forecasted to operate at LOS D during the AM peak period, with a v/c ratio of 0.89, and LOS F during the PM peak period, with a v/c ratio of 1.10.

Intersection 30: MD 175 at Llewellyn Avenue/ Blue Water Boulevard

This intersection currently operates at LOS B during the AM peak period with a v/c ratio of 0.66, and LOS B during the PM peak period with a v/c ratio of 0.70. In 2011 with BRAC traffic and without improvements, this intersection is forecasted to operate at LOS F during the AM peak period, with a v/c ratio of 1.03, and at LOS E during the PM peak period, with a v/c of 0.95. Making the recommended improvements will allow the intersection to function at LOS E during the AM peak period, with a v/c ratio of 0.98, and LOS C during the PM peak period, with a v/c ratio of 0.79. The recommended improvements are to convert the shared through/right turn lane to one through lane and add one right turn lane on westbound MD 175.

These proposed improvements would impact three properties, totaling 0.13 acres, and result in

Intersection 30

no displacements. No environmental features are expected to be impacted. The total cost is estimated at approximately $1.0 to $3.0 million.

Intersection 33: MD 175 at Morgan Road/ Town Center Boulevard

This intersection currently operates at LOS A during the AM peak period with a v/c ratio of 0.47, and LOS C during the PM peak period with a v/c ratio of 0.79. In 2011 with BRAC traffic and without improvements, this intersection is forecasted to operate at LOS B during the AM peak period, with a v/c ratio of 0.68, and at LOS F during the PM peak period, with a v/c ratio of 1.16. Making the recommended improvements will allow the intersection to function at LOS B during the AM peak period, with a v/c ratio of 0.66, and LOS

Intersection 33

D during the PM peak period, with a v/c ratio of 0.83. The recommended improvements include:

- Adding one through lane on eastbound MD 175
- Adding one left turn lane on northbound Morgan Road.

These proposed improvements would impact 11 properties, totaling 0.75 acres, and result in no displacements. No environmental features are expected to be impacted. The total cost is estimated at approximately $10.5 to $15.5 million.

Intersection 34: MD 175 at Winmeyer Avenue

This intersection currently operates at LOS A during the AM peak period with a v/c ratio of 0.53, and LOS B during the PM peak period with a v/c ratio of 0.70. In 2011 with BRAC traffic and without improvements, this intersection is forecasted to operate at LOS C

Intersection 34

during the AM peak period, with a v/c ratio of 0.74, and at LOS F during the PM peak period, with a v/c ratio of 1.03. Making the recommended improvement will allow the intersection to function at LOS C during the AM peak period, with a v/c ratio of 0.74, and LOS C during the PM peak period, with a v/c ratio of 0.77. The proposed improvement is to add a new through lane on eastbound MD 175.

This proposed improvement would impact two properties, totaling 1.63 acres, and result in one commercial displacement – Odenton Florist. Additionally, 0.4 acres of forest are expected to be impacted. The total cost is estimated at approximately $6.0 to $11.0 million.

Intersection 35: MD 175 at MD 170 (Telegraph Road)/Piney Orchard Parkway

This intersection currently operates at LOS B during

Intersection 35

the AM peak period with a v/c ratio of 0.66, and LOS D during the PM peak period with a v/c ratio of 0.85. In 2011 with BRAC traffic and without improvements, this intersection is forecasted to operate at LOS D during the AM peak period, with a v/c ratio of 0.88, and at LOS F during the PM peak period, with a v/c ratio of 1.29. Making the recommended improvements will allow the intersection to function at LOS D during the AM peak period, with a v/c ratio of 0.88, and LOS D during the PM peak period, with a v/c ratio of 0.88. The recommended improvements include:

- Adding one right turn lane to eastbound MD 175
- Converting the shared through/left turn lane to one through lane on southbound MD 170
- Converting the shared through/left turn lane to one left turn lane on northbound Piney Orchard Parkway.

These proposed improvements would impact six properties, totaling 0.18 acres, and result in no displacements. Additionally, 670 linear feet of streams, 1.1 acres of floodplains, and 1.1 acres of forest are expected to be impacted. The total cost is estimated at approximately $5.5 to $10.5 million.

Table 6: Summary of Short-Term Intersection Improvement Concepts

Intersection		2011 LOS (V/C)				Right-of-Way			Environmental Features					Total Costs (range in $ million)
		No-Build		Build										
Number	Name	AM	PM	AM	PM	Displace-ments	Properties Impacted	Total Right-of-Way (acres)	Wetlands (acres)	Streams (linear feet)	Flood-plains (acres)	Parks (acres)	Forests (acres)	
4	MD 198 EB (Gorman Avenue) at US 1 NB (2nd Street)	A (0.54)	F (1.10)	A (0.54)	E (0.99)	0	3	0.13	0	0	0	0	0	$2 -$4
5	MD 198 WB (Fort Meade Road) at US 1 NB (2nd Street)	B (0.71)	F (1.17)	A (0.59)	E (0.99)	0	1	0.11	0	0	0	0	0	$6 - $11
6	MD 198 WB (Talbott Avenue) at US 1 SB (Washington Boulevard)	D (0.86)	F (1.10)	C (0.74)	D (0.85)	0	1	0.01	0	0	0	0	0	$1.5 - $3.5
12	MD 713 (Arundel Mills Boulevard) at MD 100 WB Off Ramp	C (0.73)	F (1.08)	B (0.65)	C (0.81)	0	1	1.10	0	45	0.1	0	2.5	$5.5 - $10.5
13	MD 713 (Ridge Road)/Arundel Way at MD 713 (Arundel Mills Blvd)	C (0.79)	F (1.20)	C (0.74)	E (0.98)	0	3	0.56	0	0	0	0	0	$3.5 - $6.5
14	MD 713 (Ridge Road) at Severn Road/Ridgewood Road	F (1.11)	F (1.13)	D (0.84)	C (0.79)	0	10	0.12	0	0	0	0	1.5	$6 - $11
15	MD 174 (Reece Road) at Severn Road	F (1.41)	F(1.63)	E (0.94)	D (0.83)	0	4	0.31	0	0	0	0	0.2	$4.5 - $8.5
22	MD 175 at Brock Bridge Road	F (1.05)	E (0.99)	A (0.62)	D (0.88)	0	17	1.84	0	0	0	0	0	$6 - $11
23	MD 175 at Sellner Road/Race Road	F (1.28)	F (1.51)	C (0.73)	D (0.85)	0	4	0.50	0	0	0	0	0	$3.5 - $6.5
24	MD 175 at MD 295 (Baltimore Washington Parkway) Eastbound Weave/Western Intersection	F	F	B	D	0	0	0	0	0	0	0.9	0.4	$5 - $10
	MD 175 at MD 295 (Baltimore Washington Parkway) Westbound Weave/Eastern Intersection	F	E	C	A									
25	MD 175 at Max Blobs Park Road/Clark Road	F (1.46)	F (1.60)	D (0.84)	D (0.88)	0	0	0	0	0	0	0	0	$0
26	MD 175 at MD 713 (Ridge Road)/Rockenbach Road	F (1.26)	F (1.11)	D (0.90)	E (0.98)	3	5	2.13	0	0	0	0	0	$18.5 - $21.5
27	MD 175 at Disney Road/26th Street	F (1.08)	F(1.26)	E (0.99)	E (0.92)	0	4	1.46	0.1	0	0	0	0	$10 - $12
28	MD 175 at MD 174/Reece Road	F (1.41)	F (1.58)	C (0.77)	E (0.93)	0	6	7.09	0.08	0	0	0	0	$19 - $24
29	MD 175 at Mapes Road/Charter Oaks Boulevard	F (1.36)	F (1.43)	D (0.89)	E (0.97)	0	5	2.48	0	0	0	0	0	$16.5 - $21.5
30	MD 175 at Llewellyn Avenue/Blue Water Boulevard	F (1.03)	E (0.95)	E (0.98)	C (0.79)	0	3	0.13	0	0	0	0	0	$1 - $3
33	MD 175 at Morgan Road/Town Center Boulevard	B (0.68)	F (1.16)	B (0.66)	D (0.83)	0	11	0.75	0	0	0	0	0	$10.5 - $15.5
34	MD 175 at Winmeyer Avenue	C (0.74)	F (1.03)	C (0.74)	C (0.77)	1	2	1.63	0	0	0	0	0.4	$6 - $11
35	MD 175 at MD 170 (Telegraph Road)/Piney Orchard Parkway	D (0.88)	F (1.29)	D (0.88)	D (0.88)	0	6	0.18	0	670	1.1	0	1.1	$5.5 - $10.5

BRAC

Fort George G. Meade

Implementation of Short-Term Improvements

Once the SHA determined the full range of short-term needs and intersection improvements described in the previous section, the next step in the process was to determine the priority of intersection improvements to be implemented. Based on the cost estimates developed for all 19 intersections, the total cost of the short-term improvements at FGGM would be between $130.5 and $201.5 million, including the design, construction, and ROW acquisition phases. The level of available funding is not sufficient to program all of the needed improvements. As a result, SHA, in coordination with Anne Arundel County and the FGGM Garrison Commander, developed a list of priority intersections where improvements are desired to be implemented, should funding become available. The improvement priorities are based on proximity to the FGGM main gate located at the intersection of MD 175 and MD 174/Reece Road and the 2011 LOS and v/c ratio. **Table 7** denotes the priority; the intersections indicated with a "P1" are the top priorities and those with a "P2" are secondary priorities.

Table 7: Summary of Intersection Priorities

Priority	Intersection		Estimated Improvement Cost (range in $ million)
	No.	Name	
P1	15	MD 174 (Reece Road) at Severn Road	$4.5 - $8.5
P1	25	MD 175 at Max Blobs Park Road/Clark Road	$0 *
P1	26	MD 175 at MD 713 (Ridge Road)/Rockenbach Road	$18.5 - $21.5
P1	27	MD 175 at Disney Road/26th Street	$10 - $12
P1	28	MD 175 at MD 174/Reece Road	$19 - $24
P1	29	MD 175 at Mapes Road/Charter Oaks Boulevard	$16.5 - $21.5
		Subtotal	**$68.5 - $87.5**
P2	4	MD 198 EB (Gorman Avenue) at US 1 NB (2nd Street)	$2 - $4
P2	5	MD 198 WB (Fort Meade Road) at US 1 NB (2nd Street)	$6 - $11
P2	6	MD 198 WB (Talbott Avenue) at US 1 SB (Washington Boulevard)	$1.5 - $3.5
P2	12	MD 713 (Arundel Mills Boulevard) at MD 100	$5.5 - $10.5
P2	13	MD 713 (Ridge Road)/Arundel Way at MD 713 (Arundel Mills Boulevard)	$3.5 - $6.5
P2	14	MD 713 (Ridge Road) at Severn Road/Ridgewood Road	$6 - $11
P2	22	MD 175 at Brock Bridge Road	$6 - $11
P2	23	MD 175 at Sellner Road/Race Road	$3.5 - $6.5
P2	24	MD 175 at MD 295 (Baltimore Washington Parkway)	$5 - $10
P2	30	MD 175 at Llewellyn Avenue/Blue Water Boulevard	$1 - $3
P2	33	MD 175 at Morgan Road/Town Center Boulevard	$10.5 - $15.5
P2	34	MD 175 at Winmeyer Avenue	$6 - $11
P2	35	MD 175 at MD 170 (Telegraph Road)/Piney Orchard Parkway	$5.5 - $10.5
		Subtotal	**$62 - $114**
		Total	**$130.5 - $201.5**

* Developer-funded project

Summary & Conclusions

The results of SHA's BRAC traffic studies indicate that the existing roadway capacity will be significantly affected by the influx of new traffic due to the BRAC/EUL/NSA action at FGGM. Under existing conditions, four intersections are currently operating at LOS F during one or both peak periods. MD 713 (Arundel Mills Boulevard) at MD 100 and MD 175 at Brock Bridge Road are operating at LOS F during the PM peak period and MD 175 at Sellner Road/Race Road and MD 175 at Max Blobs Park Road/Clark Road are operating at LOS F during the AM and PM peak periods. Capacity analyses using projected volumes from travel forecasts show that a total of 19 intersections (out of 35 analyzed) are projected to operate at LOS F for either the AM or PM peak period in 2011. This total includes 12 intersections that are part of the MD 175 Project Planning Study.

Based on these studies, SHA has determined that the 19 failing intersections are recommended for improvement. However, the level of available State funding is not sufficient to program all of the needed short-term improvements identified in this study. Therefore, SHA, in coordination with Anne Arundel County and the FGGM Garrison Commander, developed a list of priority intersections where improvements are desired to be implemented, should funding become available. The improvement priorities are based on proximity to the FGGM main gate located at the intersection of MD 175 and MD 174/ Reece Road and the 2011 LOS and v/c ratio. These intersections include:

- MD 175 at MD 713 (Ridge Road)/ Rockenbach Road
- MD 175 at MD 174/Reece Road
- MD 175 at Mapes Road/Charter Oaks Boulevard
- MD 175 at Max Blobs Park Road/Clark Road
- MD 174 (Reece Road) at Severn Road
- MD 175 at Disney Road/26th Street

It should be noted that this report and supporting studies, based on 2011 traffic forecasts, are for the purpose of identifying the magnitude of improvements needed to provide satisfactory operations and prioritizing those improvements, near-term. Traffic forecasts and analyses will be further updated beyond what is presented in this report to fine-tune the design of the high priority BRAC intersections. Forecasts and studies will also be updated for the MD 175 Project Planning Study for planning beyond BRAC to 2030.

BRAC

Base Realignment and Closure