



**US Army Corps  
of Engineers®**

# **Transportation Management Plan for**

**BRAC 133 at Mark Center**



**PREPARED FOR:  
Washington Headquarters Services**

**IN ASSOCIATION WITH:  
Department of the Army  
U.S. Army Corps of Engineers,  
New York District**

**October 2010**

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# **TRANSPORTATION MANAGEMENT PLAN FOR BRAC 133 AT MARK CENTER**

## **Prepared for:**

Washington Headquarters Services

## **In Association with:**

Department of the Army  
U.S. Army Corps of Engineers, New York District  
Jacob K. Javits Federal Building  
26 Federal Plaza, Room 2109  
New York, NY 10278

## **Prepared by:**

The Benham Companies, LLC, a Subsidiary of SAIC  
9400 N. Broadway  
Oklahoma City, OK 73114

and

Science Applications International Corporation (SAIC)  
8301 Greensboro Drive  
McLean, VA 22102

## **With Special Thanks to:**

Pentagon Force Protection Agency

City of Alexandria, Virginia

Duke Realty Corporation / Clark Construction

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## List of Acronyms

ACP	Access Control Point	MWCOG	Metropolitan Washington Council of Governments
ACT	Association for Commuter Transportation	NCPC	National Planning Commission
ADA	Americans with Disabilities Act	NCR	National Capital Region
ADDT	Average Annual Daily Traffic	NETSIM	Network Simulation
AM	Morning Peak Hour	PFPA	Pentagon Force Protection Agency
AVB	Active Vehicle Barrier	PMB	Parking Management Branch
AVO	Average Vehicle Occupancy	POC	Point of Contact
AVR	Average Vehicle Ridership	PRTC	Potomac Rappahannock Transportation Commission
BRAC	Base Realignment and Closure Act	PVB	Passive Vehicle Barrier
CNA	Center for Naval Analyses	RDF	Remote Delivery Facility
CNG	Compressed Natural Gas	RIF	Remote Inspection Facility
CORSIM	Corridor Simulation Traffic Model	SOV	Single Occupant Vehicle
CWW	Compressed Work Week	TAZ	Transportation Analysis Zones
DASH	City of Alexandria Transit Company	TDM	Travel Demand Management
DC	District of Columbia	TDY	Temporary Duty Assignment
DoD	Department of Defense	TIMP	Transportation Improvement and Management Plan
DOT	Department of Transportation	TIS	Traffic Impact Study
ETC	Employee Transportation Coordinator	TMP	Transportation Management Plan
FHWA	Federal Highway Administration	TMPC	Transportation Management Plan Coordinator
FRESIM	Freeway Simulation	TOP	Traffic or Transit Operations Plan
FWW	Flexible Work Week	US	United States
GP	General Purpose	USACE	US Army Corps of Engineers
GRH	Guaranteed Ride Home	USDOT	US Department of Transportation
GSA	General Services Administration	VCC	Visitor Control Center
HCM	Highway Capacity Manual	VDOT	Virginia Department of Transportation
HCS	Highway Capacity Software	VISSIM	Visual Simulation Traffic Model
HOT	High Occupancy Toll	VMT	Vehicle Miles of Travel
HOV	High Occupancy Vehicle	vph	vehicles per hour
I-	Interstate -	vpmpl	vehicles per mile per lane
ID	Identification	VRE	Virginia Rail Express
IDA	Institute for Defense Analysis	VT	Vehicle Trip
IJR	Interchange Justification Report	WHS	Washington Headquarters Services
ITE	Institute of Transportation Engineers	WMATA	Washington Metropolitan Area Transit Authority
LNG	Liquid Natural Gas	ZEV	Zero Emission Vehicle
LOS	Level of Service		
MARC	Maryland Area Regional Commuter Rail		
MOE	Measure of Effectiveness		
MTBP	Mass Transit Benefit Program		
MUTCD	Manual on Uniform Traffic Control Devices		

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## Executive Summary

To mitigate the administration and operations of the Armed Forces and to achieve cost efficiency, numerous realignment and closure actions for domestic military installations and Department of Defense (DoD) organizations were recommended by the Base Realignment and Closure (BRAC) Commission. The recommendations became law after presidential concurrence, and must be implemented by September 15, 2011. Recommendation No. 133 calls for relocation and consolidation of various defense agency personnel and activities from leased space within the National Capital Region (NCR) to Fort Belvoir. It was determined that a portion of this relocation would be established at a site in the Mark Center development in Alexandria, Virginia. The site, termed "BRAC 133," is located adjacent to Interstate 395 (I-395), and is bounded by Seminary Road to the east and North Beauregard Street to the north. The United States Army Corps of Engineers (USACE) is responsible for construction of the BRAC 133 facility; upon completion of the building, ownership will be transferred to the Army and the site will become part of Fort Belvoir. The move is being managed by Washington Headquarters Services (WHS), who will manage the building when it is operational. The Pentagon Force Protection Agency Parking Management Branch (PFPA PMB) will manage parking at the building.

To minimize impacts on the neighboring community and to facilitate tenant mobility to the site, it is critical that an executable Transportation Management Plan (TMP) be developed for the facility. This document outlines such a plan. USACE led the effort of developing the TMP while working in close coordination with WHS, who will be responsible for executing the plan as the property manager.

### ***Transportation Management Plan Goals:***

- *Achieve 40 percent or more non-SOV person-trips to the site in order to minimize traffic impacts on the neighboring community*
- *Facilitate tenant mobility to the site by providing a viable transportation program in order to help employees choose appropriate commute methods for getting to Mark Center*

In developing this TMP, USACE and WHS considered guidance from the National Capital Planning Commission's (NCPC) document *Implementing a Successful TMP* and USACE and WHS have aligned the BRAC 133 TMP with the format and specifications of the City of Alexandria's TMP. It should be noted that at the date of publication of this document, draft language further limiting parking at BRAC 133 was incorporated into the Fiscal Year 2011 Defense Authorization Bill. Should such language in the legislation be passed by Congress, WHS will supplement the TMP accordingly.

The document identifies and discusses a series of Travel Demand Management (TDM) strategies that will be employed to influence travel behavior and mode choice of employees, thus reducing single occupancy vehicle (SOV) trips to the site. These strategies include designating a Transportation Coordinator and conducting a variety of outreach to employees both before and after relocation. A key

component of the plan is a robust DoD shuttle program that will provide connections to five key Metrorail stations from BRAC 133. The proposed plan provides frequent service during peak hours to the Pentagon Transit Center, as well as the King Street, Ballston, West Falls Church, and Franconia-Springfield Metrorail Stations. It also provides off-peak service to the Pentagon and Franconia-Springfield. Other non-SOV modes of access that will be encouraged include carpooling and vanpooling, slugging (via the Pentagon), local public transit (both public and private), walking, and bicycling. Another key component of the plan is the severe limitation on parking at the site, which will serve to significantly reduce SOV trips.

The document presents projected mode splits for the site along with a discussion of the rationale for the projections that takes into account where employees live and what modes of access they utilize today, along with the modes of access available at BRAC 133 and the planned TDM strategies, as well as regional commute patterns. Given an expected 57 percent SOV mode share, the Mark Center site with the addition of BRAC 133 and development expected at the nearby IDA facility is expected to generate a total of 1,964 trips in the morning peak hour and 1,855 trips in the evening peak hour.

The document also presents the results of a traffic operational analysis that was conducted using micro simulation modeling tools. The analysis presents a comparison of two scenarios: (1) the roadway network in 2011 without the BRAC development, and (2) the roadway network in 2011 with the projected traffic demand associated with BRAC 133 and IDA developments. The second scenario included interim site improvements that are scheduled for completion before September 15, 2011. The 2011 models were developed from the existing (2009) morning and evening peak hour models that were verified to match existing site conditions with regards to volume throughputs and traffic queues.

Upon review of the 2011 analysis results, all intersections in the study area that operate at acceptable levels of service continue to do so with the projected BRAC and IDA trips. There are two intersections in the study area that operate at failing levels of service and these intersections continue to do so with the addition of the BRAC and IDA trips:

- Seminary Road rotary interchange southeast ramp intersection
- North Beauregard Street and Seminary Road intersection

Based on the findings of the traffic analysis the TMP proposes various short and long-term suggestions to improve traffic operations and LEVELS OF SERVICE. In addition to the interim recommendations that are being implemented by the DoD to accommodate BRAC growth, the Virginia Department of Transportation (VDOT) and the City of Alexandria are currently evaluating the feasibility of a number of short term improvements as well as the possibility of a direct HOV access ramp plan from I-395 to Seminary Road.

The TMP also includes a Monitoring and Evaluation Plan to aid the Transportation Coordinator in evaluating the effectiveness of the various transportation programs and strategies over time. An annual survey will assess vehicle ridership, parking utilization, and employee mode choices based on the BRAC 133 Transportation Management Program. The TMP will be amended as necessary to effectively and efficiently serve BRAC 133 commuters and surrounding community needs.

## 1.0 Introduction

### 1.1 History of the Project

To mitigate the administration and operations of the Armed Forces and to achieve cost efficiency, numerous realignment and closure actions for domestic military installations and Department of Defense (DoD) organizations were recommended by the Base Realignment and Closure (BRAC) Commission. The recommendations became law after presidential concurrence, and must be implemented. One such recommendation involved the relocation of various defense agency personnel and activities, including Washington Headquarters Services (WHS) from leased space within the National Capital Region (NCR) to Fort Belvoir, Virginia. The proposed relocation demanded about 1.75 million square feet of existing or newly-constructed office space and 1.3 million square feet of associated parking facilities. Due to land use, environmental considerations, and transportation limitations within Fort Belvoir to accommodate the proposed demand, alternative sites throughout Northern Virginia were evaluated during 2007-2008 for implementing the proposed relocation<sup>1</sup>. The Mark Center development in Alexandria, Virginia was chosen as the site for a portion of the relocation, termed BRAC 133, after careful consideration of project timelines, transportation management, available space requirements, site adaptability, mission coordination requirements, proximity to Pentagon, contractor support relationships, quality of life, and change of residency or school requirements for employees. The site is an established mixed-use business park that had already been allocated by the City of Alexandria for redevelopment into office space and structured parking. A Transportation Management Plan (TMP) for the previous site was approved by the City in 2003<sup>2</sup>. The site will be owned by the Department of the Army (the Army) as an extension of Fort Belvoir and will accommodate 24 DoD organizations.

As shown in Figure 1-1, the BRAC 133 site is located adjacent to Interstate 395 (I-395), and is bounded by Seminary Road to the east and North Beauregard Street to the north. The new complex will consist of two multi-story office towers – a 15-story building and a 17-story building – as well as two parking garages and a publicly-accessible Transportation Center. A total of 6,409<sup>3</sup> DoD personnel, comprised of both federal employees and contractor staff, will be relocated to BRAC 133. As mandated by the 2005 BRAC legislation, the move will occur by September 15, 2011.

The United States Army Corps of Engineers (USACE) is responsible for construction of the BRAC 133 facility, and in this role, has taken responsibility for developing this TMP; upon completion of the building, ownership will be transferred to the Army. The move is being managed by WHS, who will also manage the building after opening day. The Pentagon Force Protection Agency Parking Management Branch (PFPA PMB) will manage parking at the building.

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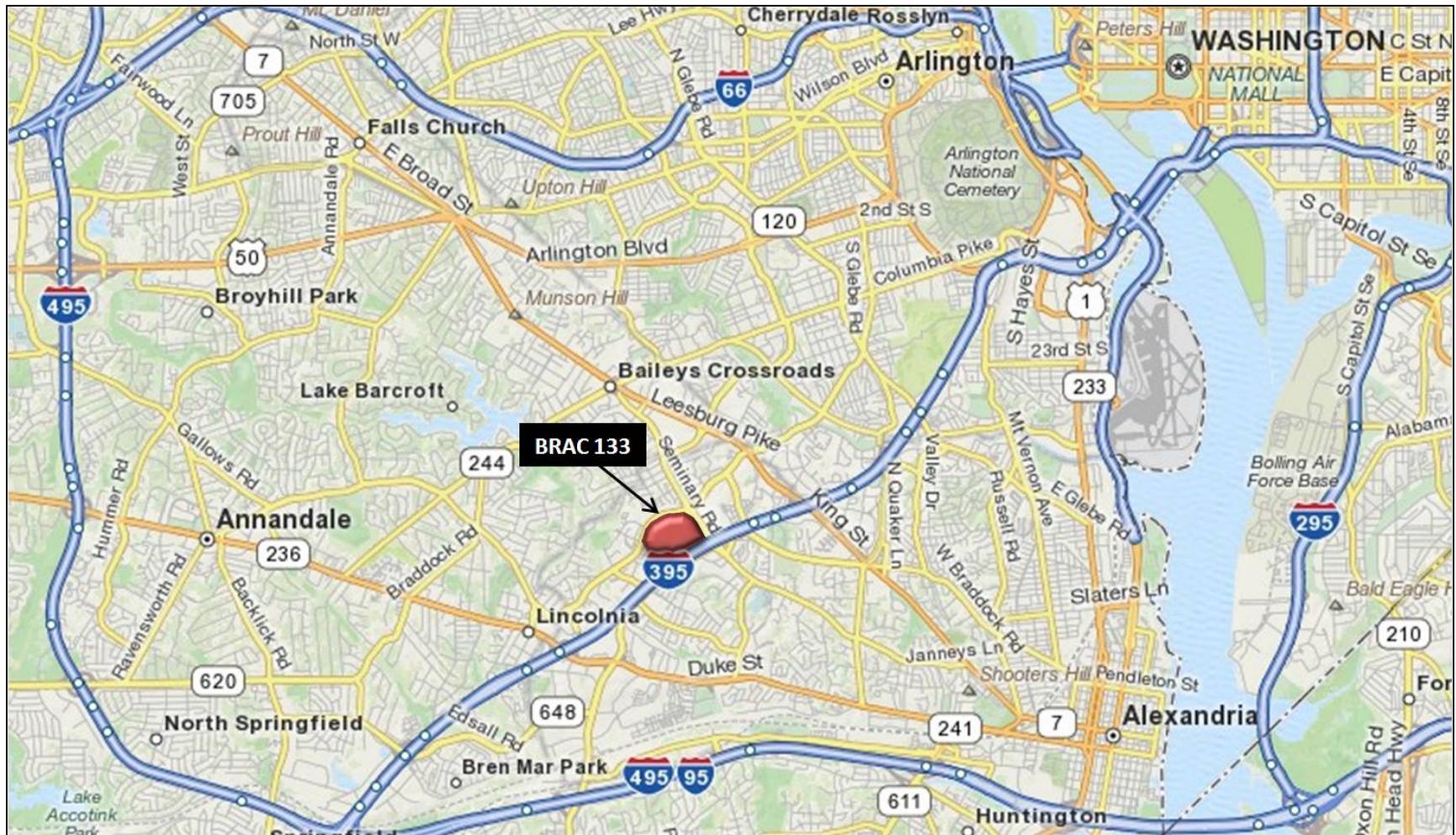
<sup>1</sup> Belvoir New Vision, DoD BRAC 133 Project at Mark Center, available online at

[http://www.belvoirnewvision.com/files/FINAL\\_BRAC133\\_Website\\_Collateral%5B1%5D.pdf](http://www.belvoirnewvision.com/files/FINAL_BRAC133_Website_Collateral%5B1%5D.pdf)

<sup>2</sup> *Mark Center Parcel 1A and 1B Traffic Impact Study and Transportation Management Plan*, Wells & Associates, LLC for The Mark Winkler Company, March 31, 2003.

<sup>3</sup> In addition to the 6,409 BRAC employees, there will be 150 other federal and non-federal employees at BRAC-133 providing a range of support functions, including security, IT, building management, and other service functions.

Figure 1-1: Regional Location of the BRAC 133 Site



Source: ©2010 MapQuest, Inc.

## 1.2 Community Outreach and Coordination

USACE and DoD have been coordinating closely with the existing community at Mark Center. This coordination has included regular meetings with Duke Realty Corporation, the property owner for the majority of the commercial properties at Mark Center, as well as extensive communication with area residents through the BRAC Advisory Group. The group was established by the City of Alexandria to serve as a forum for developing ideas and recommendations related to transportation improvements and other issues associated with the BRAC relocation to Mark Center<sup>4</sup>. USACE has attended and actively participated in the monthly BRAC Advisory Group meetings since the group's inception in early 2009 and has invited comments from both the Group and the general public on the June 2010 draft of this TMP. These comments have been addressed and are included in Appendix A. Additionally, an ad hoc committee was formed in June of 2010 as an extension of the BRAC Advisory Group to promote critical ongoing planning and communication with area residents as DoD occupies the site and becomes part of the Mark Center community. The BRAC 133 Ad Hoc Committee includes representatives from DoD, the City of Alexandria, and the public. The committee is making progress on the operational aspects of the TMP, with a specific focus on shuttle routing and service providers. The committee will continue meeting in order to ensure that the TMP is successfully executed prior to occupation of the building in 2011.

## 1.3 Purpose of the Transportation Management Plan

The purpose of a TMP is to establish a plan to promote more efficient employee commuting patterns by minimizing single occupancy vehicle (SOV) trips to a work location. This is accomplished through identification of a series of travel demand management (TDM) strategies and policies that can influence travel behavior. A TMP identifies these strategies and policies, and documents how they will be applied.

Guidelines available from the collaboration of General Services Administration (GSA), the Metropolitan Washington Council of Governments (MWCOC), and the National Capital Planning Commission (NCPC) suggest that a TMP include goals for single occupant vehicle (SOV) trip reduction, transportation mode split, and vehicle occupancy, strategies to minimize SOV work trips and to discourage SOV travel during peak and off-peak hours, measures to monitor achievement of goals and to adjust SOV trip reduction strategies, as needed, as well as a description of existing and projected peak hour traffic by mode<sup>5</sup>.

In developing this TMP, USACE and WHS have considered guidance from the National Capital Planning Commission (NCPC), both through discussions and through information available in their document, *Implementing a Successful TMP*. USACE and WHS have also had multiple discussions with the City of Alexandria concerning their TMP Ordinance, which is part of the *City of Alexandria Zoning Ordinance, Article XI, Division B, Development Approvals, Section 11-700 – Transportation Management Special Use Permits*. The DoD has aligned the BRAC 133 TMP with the format and specifications of the City ordinance to ensure proper alignment with future development plans in this area. The DoD has also

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<sup>4</sup> City of Alexandria, "Planning & Zoning: Base Realignment & Closure (BRAC-133)" web page, <http://alexandriava.gov/BRAC> (last accessed May 5, 2010).

<sup>5</sup> *Implementing a Successful TMP*, GSA / MWCOC / NCPC, May 2008.

programmed funding to fully support TDM strategies, including funding for the robust shuttle system described in Section 3.5.2.

It should be noted that at the date of publication of this document, draft language further limiting parking at BRAC 133 was incorporated into the Fiscal Year 2011 Defense Authorization Bill. Should such language in the legislation be passed by Congress, WHS will supplement the TMP accordingly.

### 1.4 Transportation Management Plan Goals and Objectives

The goals of the TMP are two-fold:

1. To achieve 40 percent or more non-SOV person-trips to the site in order to minimize traffic impacts on the neighboring community.
2. To facilitate tenant mobility to the site by providing a viable transportation program in order to help employees choose appropriate commute methods for getting to Mark Center.

As BRAC 133 employees have not made final decisions in viable transportation mode choice, specific objectives for target mode shares have not been determined. However, within 6 months of operations, WHS will establish baseline mode splits for BRAC 133 employees through an employee commute survey. Upon review of these baseline mode splits, WHS will establish specific annual mode-share goals. More details on this are explained in the monitoring and evaluation plan in Section 6 of this document.

Since parking at the site is restricted to only 3,747 spaces, SOV trips to the site will be severely limited. As a result, the goals and objectives of the TMP will be achieved primarily through execution of a parking management program, implementation of a comprehensive DoD shuttle program, and implementation of an aggressive employee commute program geared toward promoting other modes of travel (aside from driving alone). Current plans for the shuttle program are presented in Section 3.5 and the employee education program and the parking program are presented in Section 5. In order to determine whether the goals established in the TMP are being achieved, this document also lays out a monitoring and evaluation plan, in Section 6, that WHS will use to monitor progress over time.

The TMP also serves to provide an analysis of the impacts of the site on traffic operations at surrounding roadways and intersections. Although a number of previous studies have examined traffic operations (including a *Transportation Improvement Management Plan* prepared for the site in July 2008<sup>6</sup>, an *Internal Roadway Network Traffic Analysis* conducted for the site in August 2009<sup>7</sup>, and independent studies conducted by the Virginia Department of Transportation (VDOT)<sup>8</sup> and the City of Alexandria<sup>9</sup> in 2009), this study revisits these analyses with additional detail, including information on employee home

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<sup>6</sup> *Washington Headquarters Services at Mark Center Alexandria, Virginia BRAC 133 Build to Suit Transportation Improvement Management Plan*, Wells and Associates, July 30, 2008.

<sup>7</sup> *WHS Internal Roadway Network Traffic Analysis*, Wells and Associates, August 20, 2009.

<sup>8</sup> *Mark Center (BRAC) Transportation Study, Technical Memorandum*, Parsons Brinkerhoff, April, 2009.

<sup>9</sup> *Mark Center (BRAC 133) Transportation Study*, Vanasse Hangen Brustlin, Inc., November 2, 2009.

zip codes as well as information about current and expected commute patterns. The results of the traffic impact analysis are presented in Section 4 of this document.

### 1.5 Roadmap to the TMP

The remainder of this document is organized as follows:

**Section 2** provides background on the current and expected travel characteristics of the employees who will be moving to BRAC 133.

**Section 3** presents information about site conditions, including building location, roadway access, and pedestrian access to the site. It also presents information about existing and potential future transit (both public and private) serving the site, discusses expected slugging to the site, and presents the DoD shuttle program. This section also describes how parking will be managed at BRAC 133.

**Section 4** presents the findings of a traffic impact analysis and an assessment of the traffic operations of the study area roadway network under the projected traffic demand conditions.

**Section 5** presents the BRAC 133 TDM plan, which includes information about how the program will be managed, presents plans for educating employees about alternate modes of travel, and outlines about how parking will be managed to reduce SOV trips to the site.

**Section 6** presents a monitoring and evaluation plan that WHS will use to monitor their progress over time.

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## 2.0 Employee Relocation & Travel Characteristics

### 2.1 Tenant Organizations Relocation

A total of 24 different DoD organizations will be relocated to Mark Center. These organizations are currently located at various leased spaces throughout Arlington and Alexandria, at locations that are accessible via Metrorail. As the BRAC 133 site is not located near a Metrorail station, employees will need to adjust to a different commute pattern than which they are accustomed. Nearly 60 percent of the employees currently work in the Crystal City area with 45 percent working in Crystal City and 14 percent working in Pentagon City. An additional 31 percent currently work along the Rosslyn-Ballston corridor and a total of 8 percent work in Alexandria today, with 5 percent in Old Town Alexandria and another 3 percent at Mark Center.

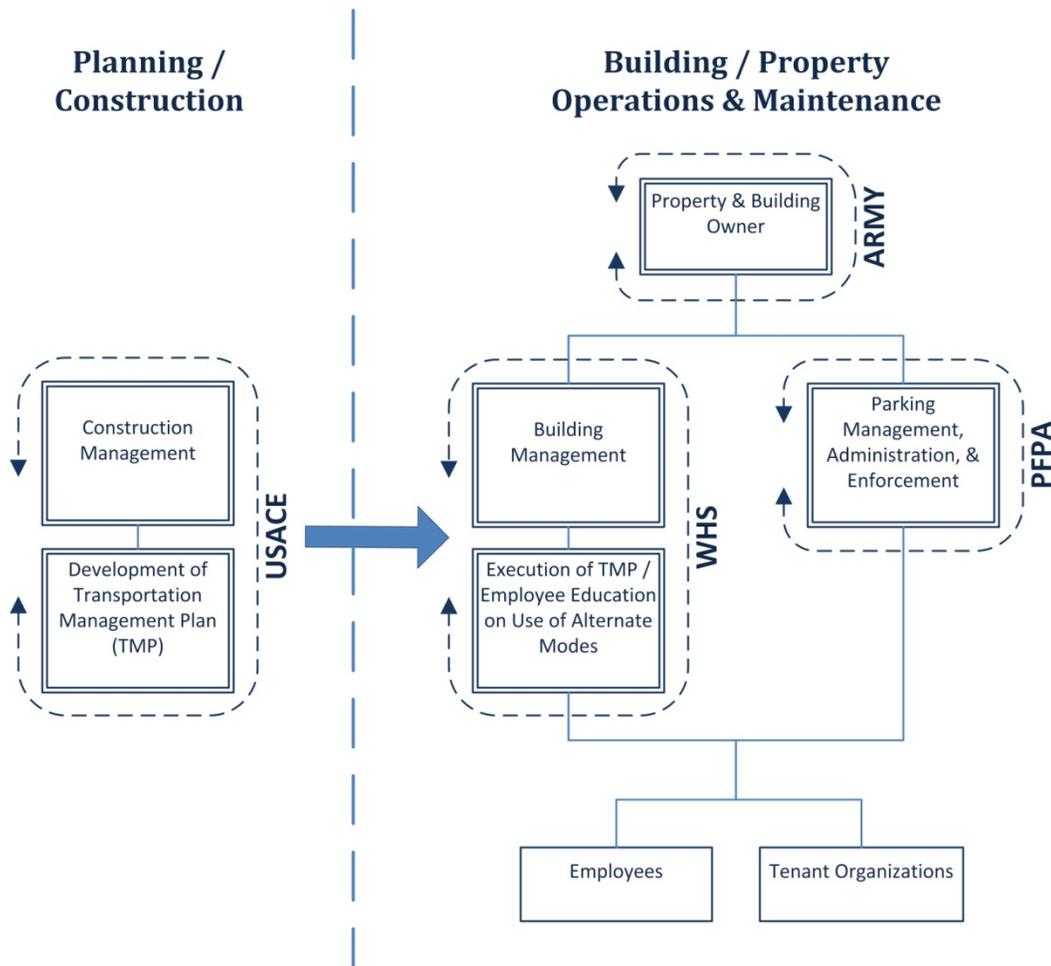
Managing a move with so many different tenant organizations requires extensive coordination. As the property manager, WHS has taken responsibility for this effort and is serving as the primary interface to the 24 tenant organizations before, during, and after relocation. Since September 2009, WHS has been meeting monthly with representatives from each tenant organization to keep them informed and to heed any concerns tenants may have about the relocation. WHS is responsible for implementing the TMP and for monitoring the progress of TMP activities over time. As part of this responsibility, WHS will provide active outreach to tenants and employees to educate them about the various modes of travel available to the site (both in advance of the move as well as on a continuing basis after the building is open). WHS will also be responsible for establishing and maintaining an onsite presence through the WHS Transportation Management Program Office, as is described in Section 5.2.

Other involved organizations include the following:

- **USACE** has responsibility for managing the construction of the building. As part of this responsibility, USACE led the development of the TMP in close coordinating with WHS.
- **The Army**, as property owner, will have responsibility for facilitating communication with the neighboring community.
- **PFPA** uniformed officers will perform traffic control, safety, and enforcement activities at BRAC 133.
- **PFPA PMB** will be responsible for managing parking at BRAC 133. PFPA PMB will manage parking permitting, monitor parking utilization, and enforce parking rules and regulations.

The organizational structure defining the relationships between these organizations is shown in Figure 2-1.

Figure 2-1: Roles and Responsibilities of Organizations Involved in BRAC 133 Development Process

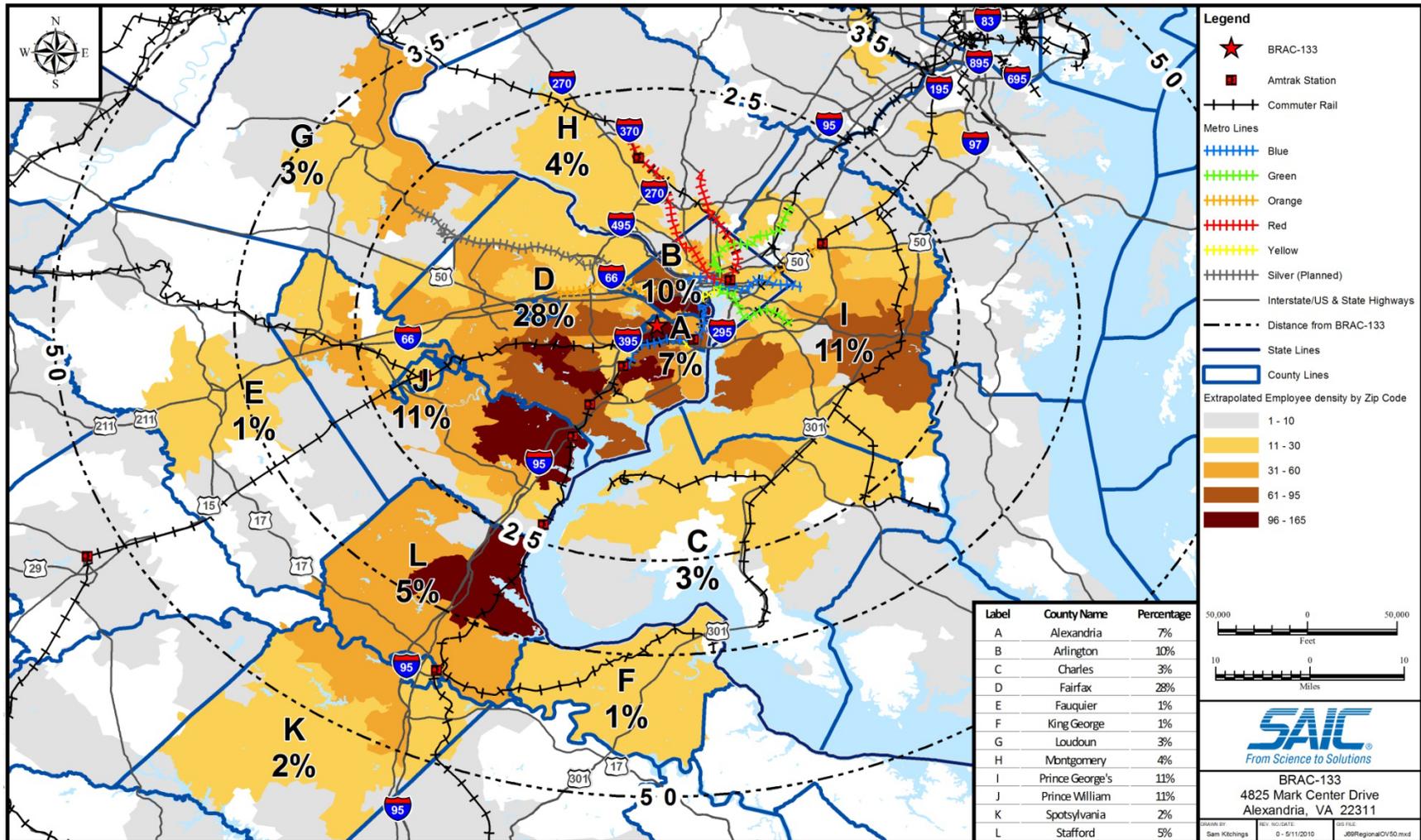


## 2.2 Employee Attitudes toward Alternative Commute Modes

WHS obtained employee home zip codes from human resources records for all federal employees who will be relocating to BRAC 133, accounting for 69 percent of the total employees. This sample size is large enough to be considered statistically representative of the population<sup>10</sup>. The data shows that while employees are distributed quite broadly throughout the Washington DC metropolitan region, the large majority of employees (71 percent) commute from within Virginia (see Figure 2-2). As seen in the figure, the areas of highest density are in Fairfax County as well as along the I-95/I-395 corridor near the Virginia Railway Express (VRE) commuter rail line and Metrorail’s Blue Line. Approximately one-quarter of the employees (23 percent) live in Maryland, and 6 percent live in the District of Columbia. Details of the number of employees in each zip code are provided in Appendix B, along with density maps for each of the major jurisdictions.

<sup>10</sup> Zip codes were obtained for all federal employees. The missing 31 percent of zip codes represents contractor staff who will be working at BRAC 133. As the response rate was statistically significant, characteristics of the federal employees can be applied to the survey population, including contractor staff.

Figure 2-2: BRAC 133 Employee Population Densities



Source: WHS 2009 Commuter Survey; DoD Human Resources Department; ESRI

NOTE: The 14 percent of employees not represented in summary table of this graphic are from other jurisdictions (i.e., City of Fairfax, District of Columbia, and outlying Counties).

To predict future mode choice, it is also important to consider what modes of travel employees are using today. While current employee mode share is attributed in some part to where employees work today, looking at current mode share can provide some sense of employee attitudes toward various modes. In August 2009 WHS conducted a survey of all employees (both federal and non-federal) who will be relocating to BRAC 133. WHS received responses from 2,815 employees, representing 44 percent of the employee population, a response rate that can be considered representative of the population. On the survey, employees were asked about their current commute patterns including what mode(s) of transportation they typically use in traveling to work. Respondents were asked to “check all modes that apply” for the benefit of employees who take different modes on different days and for employees who use multiple modes during their typical commute (e.g., an employee may drive to a park-and-ride lot and then take Metrorail, or another employee may typically slug to work, but will take a bus home on days when they need to work late).

The survey findings indicate that a large number of employees use transit – including Metrorail, bus, and/or VRE – for at least some part of their commute today. Eighteen percent use transit as their only mode of travel and an additional 27 percent use transit along with other modes (i.e., transit is one of multiple modes that employees use on a daily basis for their commute, or they use transit on a regular basis, but not every day). This statistic is valid, given that the majority of employees work near a Metrorail station today.

As shown in Table 2-1, nearly one-third of employees ride Metrorail with 9 percent using rail as their primary mode and an additional 21 percent using rail along with other modes. Over one-fifth of employees utilize bus transit, with 5 percent using bus transit as their primary mode, and an additional 16 percent using bus transit along with other modes. Fewer employees use VRE commuter rail, with 3 percent indicating that they use VRE as their primary mode of travel and 3.5 percent indicating that VRE is one of multiple modes that they use.

**Table 2-1: Current Commute Modes for Employees**

Mode	Percentage of Employees		
	Using this Mode Only	Using this Mode along with Other Modes	Total Using this Mode
Drive Alone	40.78%	14.27%	55.05%
Metrorail	9.35%	21.18%	30.53%
Bus	5.11%	16.18%	21.29%
Carpool/Vanpool	6.22%	4.28%	10.50%
Slug	2.95%	5.68%	8.63%
Walk	1.65%	5.04%	6.69%
VRE	3.16%	3.49%	6.65%
Bike	0.11%	1.40%	1.51%

*Note: Values do not total to 100 as respondents were given the option of selecting more than one mode of travel.*

The percentages presented in Table 2-1 are helpful in gauging the openness of employee attitudes toward taking transit. It is expected that many of the employees who are already using transit (in particular those coming from Maryland and DC) will remain on transit and use the DoD shuttle to transfer to Mark Center, as extensive shuttle service between BRAC 133 and multiple Metrorail stations will be provided (described in Section 3.5.2). Educating employees about transit options will be a major focus of WHS in managing the employee commute program for BRAC 133, as over 58 percent of employees use some form of transit today and as many indicated that they *think* they will use transit to get to BRAC 133.

The survey also revealed that a large number of employees (41 percent) drive alone today as their primary mode (i.e., this was the only mode of travel that these employees selected on the survey), but it also revealed that many employees are accustomed to ridesharing, in particular those originating from south of BRAC 133. Nearly one-third of employees who live in Northern Virginia (29 percent) rideshare today, and the large majority of these employees live in areas to the south along I-395 in Prince William and Stafford Counties. This is a valid statistic given that many commuters from these counties make use of the HOV lanes on I-395 between Fredericksburg and the Pentagon. Overall, 9 percent of employees use ridesharing as their primary mode today while an additional 10 percent use ridesharing along with other modes (again, ridesharing is either one of multiple modes used on a daily basis for their commute, or the mode used on a regular basis, but not every day). With nearly one-fifth of employees accustomed to ridesharing today, continuing to encourage this practice will also be a major focus for WHS.

A very small percentage of employees (two percent) currently walk or bike as their only mode of travel. However, over four percent of employees indicated that they *anticipate* walking or bicycling to work at the new site. WHS will make walking and biking a focus since a large number of employees (over 500, or 11 percent of the building population) live within 2 miles of Mark Center, with over 100 of these employees (2 percent) living within just 1 mile of the site.

In light of restricted parking at BRAC 133, the biggest challenge that most commuters will face is the distance of the site from a Metrorail station. To address this, WHS will be establishing a shuttle system (described in more detail in Section 3.5.2) providing employees frequent access to five Metrorail stations throughout Northern Virginia, including the Pentagon, King Street, Ballston, West Falls Church, and Franconia-Springfield. As a result of the DoD shuttle service, many commuters already on transit – and in particular those coming from DC and Maryland – will be able to continue their current commute patterns in combination with the DoD shuttle. For those who do not perceive transit as a viable option, rideshare and telework programs can be considered as alternative mode choices. For those who live near the site, there are local transit options, walking, bicycling, and finally the DoD shuttle which may serve as the primary mode of transportation for some employees. Plans for promoting these various mode choices are discussed in detail in the Travel Demand Management Plan in Section 5.

### 2.3 Employee Trip Generation

#### 2.3.1 Previous Studies

A comparison of the existing traffic studies was conducted to examine the trip generation methodology adopted in those reports and to identify the future site-generated trips for the proposed BRAC 133 and Institute for Defense Analyses (IDA) building developments. For all previous studies, the estimates for new trips generated by BRAC 133 were calculated only for SOV trips, shuttle buses, and trucks, and did not explicitly include rideshare vehicle trips (i.e., carpool, vanpool, and slug). Previous studies assumed that 10 percent to 25 percent of employees would be absent on any given day due to travel, vacation, illness, flexible work schedule, and telecommuting, and then applied a 40 percent TMP reduction to this total number of employees to determine SOV trips generated during a typical day. The total number of typical day SOV trips was then compared against available parking spaces to determine parking adequacy and potential overflow. Table 2-2 shows a comparison of the various factors that were utilized in the TMP trip generation process from all prior Mark Center traffic studies. The discussions below provide further details on the methodology that was adopted in determining the projected mode splits for the BRAC 133 site.

Table 2-2: Comparisons of Projected Mode Splits and Site Generated Peak Hour Trips from Prior Mark Center Studies

Report / Study	Employees present on a Typical Day Shift		Visitors per day	Opening Year Employee Trip Modal Split	Single Occupant Vehicle (SOV) Trips (Employee + Visitor)	Rideshare (Carpool/Vanpool/Slug) Trips	Peak Hour Shuttle Bus & Truck Trips	Total Number of Parking Spaces
	Percent %	Total Number of Employees						
Mark Center Traffic Impact Study (TIS) - Wells & Associates, March 2003	n/a (Note 1)	n/a (Note 1)	n/a (See Note 1)	10% Transportation Management Plan Trip Reduction assumed	WHS: • AM Peak - 1,801 trips • PM Peak - 1,872 trips IDA: • AM Peak - 481 trips • PM Peak - 449 trips	Not considered	Included as part of SOV trips	4,839 spaces (inclusive of government vehicle and visitor parking spaces)
Final Environmental Assessment (FEIS) BRAC 133, Fort Belvoir - USACE/Tetra Tech, July 2008	90%	5,768	500 visitors	• SOV - 58% • Rideshare - 21% • Walk/Bike/Other - 1% • Metrorail - 20%	WHS/BRAC 133: • AM Peak - 1,091 trips • PM Peak - 1,091 trips	WHS/BRAC 133: • AM Peak - 395 trips • PM Peak - 395 trips	WHS/BRAC 133: • AM Peak - 31 trips • PM Peak - 31 trips	3,845 spaces (inclusive of government vehicle and visitor parking spaces)
BRAC 133 Transportation Improvement & Management Plan (TIMP) - Wells & Associates, July 2008	75%	4,807	239 visitors (5% of employees present during day shift)	• SOV - 60% • Rideshare - 12% • Bus Transit - 5% • Walk/Bike/Other - 3% • Metrorail - 20%	WHS: • AM Peak - 1,240 trips • PM Peak - 1,309 trips IDA: • AM Peak - 470 trips • PM Peak - 433 trips	Not considered	• AM Peak - 34 trips • PM Peak - 34 trips	3,904 spaces (inclusive of government vehicle and visitor parking spaces)
VDOT Mark Center (BRAC) Transportation Study	88%	5,618	239 visitors (5% of employees present during day shift)	• SOV - 60% • Rideshare - 12% • Bus Transit - 5% • Walk/Bike/Other - 3% • Metrorail - 15% • Re-adjusted SOV - 80%	WHS: • AM Peak - 1,240 + 332 trips • PM Peak - 1,309 + 332 trips IDA: • AM Peak - 470 trips • PM Peak - 433 trips	Not considered	• AM Peak - 34 trips • PM Peak - 34 trips	3,846 spaces (inclusive of government vehicle and visitor parking spaces)
Mark Center (BRAC 133) Transportation Study - City of Alexandria/VHB, November 2009	89%	5,721	239 visitors (5% of employees present during day shift)	• SOV - 60% • Rideshare - 12% • Bus Transit - 5% • Walk/Bike/Other - 3% • Metrorail - 20%	WHS: • AM Peak - 1,240 + 110 trips • PM Peak - 1,309 + 110 trips IDA: • AM Peak - 470 trips • PM Peak - 433 trips	Not considered	• AM Peak - 34 trips • PM Peak - 34 trips	3,900 spaces (95% occupancy considered full; inclusive of government vehicle and visitor parking spaces)
Mark Center (BRAC 133) Access Study Operational Analysis Report / IJR - VDOT, January 2010	75%	4,807	239 visitors (5% of employees present during day shift)	• SOV - 60% • Rideshare - 12% • Bus Transit - 5% • Walk/Bike/Other - 3% • Metrorail - 20%	WHS: • AM Peak - 1,254 trips • PM Peak - 1,323 trips IDA: • AM Peak - 470 trips • PM Peak - 433 trips	Not considered	• AM Peak - 34 trips • PM Peak - 34 trips	3,904 spaces (inclusive of government vehicle and visitor parking spaces)
USACE Transportation Management Plan (TMP) - Benham/SAIC, July 2010	90%	5,768	500 visitors	• SOV - 57% • Carpool - 5% • Vanpool - 3% • Slug - 3% • Bus Transit - 5% • Walk - 2% • Bike - 2% • Metrorail - 23%	WHS: • AM Peak - 1,345 trips • PM Peak - 1,277 trips IDA: • AM Peak - 470 trips • PM Peak - 433 trips	WHS: • AM Peak - 81 trips • PM Peak - 77 trips	WHS: • AM Peak - 68 trips • PM Peak - 68 trips	3,747 spaces (inclusive of 150 government vehicle and 67 visitor parking spaces)

NOTE: 1. Institute of Transportation Engineers (ITE) Trip Generation rates to generate peak hour trips.

2.3.2 Mode Split Projections Rationale

The BRAC 133 employee origin zip code data obtained from WHS were examined for origin locations, zip code clusters, existing travel patterns, adjacent transit corridors, and ride sharing prospects. The data were also compared with information obtained on mode choice from the WHS commuter survey to determine travel characteristics of the relocating employees. Observations made from the above comparison were used to determine the likely future projected non-SOV mode splits to the BRAC 133 site, including carpool, vanpool, slug, walk, bike, bus transit, and rail transit<sup>11</sup>. Table 2-3 below shows the modes employees currently use to get to work (“current mode choice”) as well as the modes that employees believed they would use in the future (“anticipated mode choice”). It should be noted that at the time of the survey, employees were not yet familiar with the modes of access that would be available to them at BRAC 133, so the anticipated mode split percentages may not be entirely realistic.

Many employees checked multiple modes as employees were asked to “check modes all that apply” for the benefit of those who take different modes on different days and for those who use multiple modes during their typical commute (e.g., an employee may drive to a park-and-ride lot and then take Metrorail, or another employee may typically slug to work but may take the bus home on days when they need to work late). The first column (“Using this Mode Only”) represents the percentage of employees who selected *only* that mode, indicating that it is their primary, and possibly only, mode of travel. The second column (“Using this Mode along with Other Modes”) represents the percentage of employees who checked that mode along with other modes. The third column (“Anticipated Mode Choice after Relocating to BRAC 133”) represents the primary mode that employees believed they would use in the future.

Table 2-3: Current and Anticipated Mode Choice as Reported by Employees on 2009 WHS Survey

Primary Mode Choice	Current Mode Choice		Anticipated Mode Choice after Relocating to BRAC 133
	Using this Mode Only	Using this Mode along with Other Modes	
Rideshare	6.22%	10.50%	7.30%
Slug	2.95%	8.63%	4.47%
Bus Transit	5.11%	21.29%	14.40%
Walk	1.65%	6.69%	2.13%
Bike	0.11%	1.51%	1.95%
Metrorail	9.35%	30.53%	12.58%
VRE	3.16%	6.65%	3.16%

Source: WHS Employee Transportation Survey for Commuter Patterns, Fall 2009.

Projected primary mode splits were determined based on current and anticipated employee travel modes as shown in the above table, current employee origin zip codes (and hence, their feasible

<sup>11</sup> Note that rail users will be transported to the BRAC 133 site by DoD shuttles which will operate during the morning and evening peak periods at frequent headways from multiple Metrorail stations.

modes), and commuter patterns in the metropolitan Washington D.C. region obtained from various sources. The rationale that went into determining each mode split is explained below.

### ***Rideshare***

The WHS commuter survey reported that 6.2 percent of BRAC 133 employees exclusively use carpool or vanpool as their primary mode of transportation. It is projected that a higher percentage of employees (at least 8 percent) will rideshare at the new work location. There are several reasons that suggest that there will be greater opportunity for ridesharing. First, a significant number of BRAC 133 employees are already familiar with carpool/vanpool (although only 6.2 percent use ridesharing as their primary mode today, an additional 10.5 percent use it for some part of their commute), and there will be a greater incentive to rideshare at the new building given the fact that parking is so severely restricted, and that carpools and vanpools will be guaranteed a priority parking space. Employee comments from the WHS survey results requesting verification on a guaranteed parking space allotment for carpool/vanpool commuters suggest the same. Furthermore, based on an employee zip code review, it is understood that there is feasibility for more carpools and vanpools to form based on where employees live. The density maps generated from the zip code data (see Appendix B) show high densities of origin zip codes located within close proximity in southern suburbs along I-395 in Virginia, counties where ridesharing is traditionally very high. Finally, a 2007 Commuter Connections study showed that 7.6 percent of commuters in the region regularly utilize rideshare option, and that of commuters who have access to HOV lanes for their commute, 11 percent use vanpool/carpool to get to work<sup>12</sup>. Although, there is not currently direct HOV access at Seminary Road, it is expected that many employees will still take advantage of HOV lanes, riding to the Pentagon, and turn around to travel along I-395 SB general purpose (GP) lanes for the time savings as discussed in Section 3.4.

### ***Slug***

Based on the existing and anticipated travel modes, it is anticipated that a certain percent of employees at BRAC 133 are expected to commute by means of “slugging” or “casual carpooling.” An August 2009 report titled *Estimating the Energy Impact of Casual Carpooling* projected almost 9,700 commuters in the Washington D.C. region slugging every day<sup>13</sup>. Prince William County (56 percent), Fairfax County (22 percent), Stafford County (17 percent), and the City of Fredericksburg (5 percent) are home to the greatest number of “sluggers,” which also holds true for a significant portion of BRAC 133 employees<sup>14</sup>. More importantly, the Pentagon is the most popular slugging destination, representing 33 percent of slug trips made throughout the Washington D.C. region<sup>15</sup>. Similar to the rideshare options previously discussed, slugging is feasible for employees traveling to Mark Center because of its proximity to the I-

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<sup>12</sup> “2007 State of the Commute Survey Report from the Metropolitan Washington DC Region”, Commuter Connections, June 2008 webpage <http://www.mwcog.org/uploads/pub-documents/yldZWA20080903151902.pdf> (last accessed May 5, 2010)

<sup>13</sup> “Estimating the Energy Consumption Impact of Casual Carpooling”, Minett, P. and Pearce, J., August 2009 webpage <http://www.flexiblecarpooling.org/casualcarpoolingenergysaving.pdf> (last accessed May 5, 2010)

<sup>14</sup> “Dynamic Ridesharing (Slugging) Data”, Prepared for Virginia Department of Transport, Final Report”, Prepared by Vanasse Hangen Brustlin, Inc., June 15, 2006

<sup>15</sup> Ibid.

95/I-395 corridor, despite the lack of direct HOV access at Seminary Road. BRAC 133 employees with a parking permit can utilize the HOV lanes by picking up sluggers, dropping them off at the Pentagon, and then driving back to Mark Center. Although three miles may seem to be a significant distance to travel after the drop-off point at the Pentagon, many drivers are expected to consider this a feasible option. A December 2008 study titled *The Native Slugs of Northern Virginia* shows that 65 percent of sluggers travel to work anywhere from 10 minutes to greater than 30 minutes beyond the slugging drop-off point. This fact is also promising for employees who do not have access to parking. These employees can participate in casual carpooling by riding to the Pentagon with other sluggers and then taking the DoD shuttle from there to Mark Center. DoD will offer free shuttle service between BRAC 133 and the Pentagon every 10 minutes during peak hours (more details regarding the DoD shuttle plan are discussed in Section 3.5.2).

### **Local Bus Transit**

This mode share projection focuses only on employees who use local bus transit routes that directly serve Mark Center as their primary mode of transportation. The projected mode share was determined based on a comparison of the existing bus routes that serve Mark Center along with the origin zip codes retrieved from the employee survey data. Currently, a number of employees live near the existing bus routes that stop along Beauregard Street or at Southern Towers adjacent to Mark Center, within a walking distance of 0.25 - 0.5 miles. While the employee zip codes indicate that commuting via bus will require a significant walk to the bus stop for some commuters, 51 percent of regional commuters who use alternate modes travel up to a mile from their home to the alternate mode meeting point<sup>16</sup> (see Section 3.3 for more discussion on bus transit service). More details regarding bus transit routes serving the region are included in Appendix C.

### **Walk / Bicycling**

Based on the existing and anticipated travel modes, it is anticipated that a number of BRAC 133 employees will walk and/or bicycle as their primary mode of travel. Nearly four percent of Alexandria residents walk to work while slightly over half a percent bike to work<sup>17</sup>. The average commute for walkers is 1.42 miles while the average commute for bikers is 8.17 miles. Currently, over 100 employees live within 1 mile, and over 500 employees live within two miles of Mark Center. In addition, the BRAC 133 facility includes bicycle racks, shower facilities, and other amenities for commuters bicycling/walking to work. The *2007 State of the Commute Survey Report from the Metropolitan Washington DC Region*<sup>18</sup> showed that 12 percent of people who work for employers in Alexandria, Arlington County, and the District of Columbia that provide incentives/support services have used the bicycle/walk services at some point and that three percent report bicycling/walking as their *primary*

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<sup>16</sup> *2007 State of the Commute Survey Report from the Metropolitan Washington DC Region*, Commuter Connections, June 2008 webpage <http://www.mwcog.org/uploads/pub-documents/yldZWA20080903151902.pdf> (last accessed May 5, 2010)

<sup>17</sup> Bicycle and Pedestrian Plan for the National Capital Region. July 2006, webpage (last accessed May 5, 2010) <http://www.mwcog.org/uploads/committee-documents/v1ZfWI020070726155118.pdf>

<sup>18</sup> *2007 State of the Commute Survey Report from the Metropolitan Washington DC Region*. Commuter Connections. June 2008. <http://www.mwcog.org/uploads/pub-documents/yldZWA20080903151902.pdf>

*mode*. With a significant number of employees within walking/biking distance to Mark Center and their excessive interest in information regarding walk/bicycle amenities and employer incentives (as expressed in the WHS commuter survey comments), as well as the on-site amenities being provided at BRAC 133, a high percent of walking and bicycling trips are anticipated.

***Rail Transit (WMATA, VRE, MARC)***

A higher percent of Mark Center employees than that observed from the 2009 commuter survey are expected to take rail transit as their primary mode of travel. This assumption is justified based on the extensive DoD express shuttle service planned directly to serve Mark Center from nearby Metrorail stations (Blue/Yellow/Orange Lines and VRE) at frequent headways. Employees were not fully informed of the proposed DoD shuttle plan when the survey was conducted and were unable to make informed decisions about rail transit use. However, many employees, as noted from the WHS commuter survey, had requested for an extensive shuttle program to make transit an attractive mode choice, since parking is so severely limited at the BRAC 133 site. Additionally, with 10 percent to 30 percent of employees riding Metrorail today, it is implicit that employees are accustomed to transit.

**2.3.3 Proposed Primary Mode Splits and Trip Projections**

Based on a careful review and detailed analysis of all of the above data, future primary mode choice percentages were projected for BRAC 133 employees after relocation to Mark Center. It should be noted that these mode split percentages are not explicit goals, but rather they together achieve the overall goal of 40 percent or greater of non-SOV mode use. WHS will establish TDM strategies (as described in Section 5) to encourage non-SOV modes. The mode use of employees will be carefully and continuously monitored by WHS (as explained in Section 6, the Monitoring and Evaluation Plan), after opening day and used to establish set goals for each mode as per relocated employee travel patterns.

The primary mode split assumptions were determined based on the total number of available parking spaces, with the exception of government vehicle and visitor parking spaces, to determine the maximum number of SOV trips that would be accessing the site. The proposed plan for the BRAC 133 site provides parking in two parking structures. The proposed North Garage is an eight-level structure that will be used for both employee and visitor parking. The South Garage is a nine-level structure that will be exclusively used for employee parking. The North Garage provides a total of 2,032 parking spaces, of which 67 spaces will be allotted for visitor parking, and the South Garage provides 1,715 spaces. Together they provide for a total of 3,747 parking spaces. With 150 spaces being reserved for government vehicle parking, a total of 3,530 spaces will be allotted for employee parking. This was considered as the threshold value for determining the potential number of SOV trips that could be accommodated by the site.

The following is the projected primary mode split for the BRAC 133 employees relocating to Mark Center:

- SOV – 57%
- Carpool – 5%
- Vanpool – 3%
- Slug – 3%

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- Local Bus Transit – 5%
- Rail Transit / DoD Shuttle – 23%
- Walk – 2%
- Bike – 2%

To accurately determine the total number of vehicular trips associated with ridesharing employees, average occupancy rates were assumed for carpools, vanpools, and slug vehicles based on the HOV lane requirements of the regional roadway network. The I-395 HOV lanes require a minimum vehicle-occupancy of three or more passengers, while the I-66 HOV lanes require only two or more passengers. Based on BRAC 133 employee origin zip codes, employees will be using both of these roadways to access the site. Hence, it is estimated that some BRAC 133 carpools will have two occupants while others will have three or more. Therefore, an average carpool vehicle occupancy rate of 2.3 persons per vehicle (ppv) was used. This assumption is in line with assumptions made by WMATA in a previous study<sup>19</sup>. Vanpool programs nationwide typically carry anywhere from 7 to 15 passengers per vehicle. Hence, a conservative vanpool vehicle occupancy rate of 7.0 ppv was assumed for BRAC 133 vanpools<sup>20</sup>. With the consideration that all slug vehicles will have to meet the I-395 HOV lane occupancy requirements, it was assumed that each slug trip represents three employees.

It should be noted that the projected primary mode split assumes that only those employees riding Metrorail or VRE will utilize the DoD shuttle (these employees will use the shuttle to complete the last leg of their trip from the Metrorail stations to Mark Center). However, it is likely that some employees will make use of the shuttles in other ways. As discussed in Section 3, the DoD shuttles will provide employees access to five Metrorail stations in the region, namely, King Street, Pentagon, Ballston, West Falls Church, and Franconia-Springfield. Service will be available at 10- or 15-minute headways during peak periods and will also be available during off-peak periods with service to the Pentagon (15-minute headways) and Franconia-Springfield (30-minute headways). Possibilities for other employees to be served by the shuttle include the following: employees could drive and park at a Metrorail station that is served by the DoD shuttle (e.g., Franconia-Springfield or West Falls Church); employees could slug to the Pentagon and board the Pentagon DoD shuttle; or employees could walk or get dropped off at one of the Metrorail stations that is served by the DoD shuttle. Based on employee feedback from the 2009 WHS Commuter Survey, it is anticipated that this mode of travel will be popular among the BRAC 133 employees. WHS will continuously monitor employee travel patterns and DoD shuttle bus ridership, and amend the shuttle plan as appropriate. As employees adapt to using the Rail Transit/DoD Shuttle mode, a considerable reduction in SOV trips and the overall number of vehicular trips entering the site is anticipated, thus benefiting the adjacent roadway network and neighborhood communities.

Table 2-4 shows the projected primary mode splits and associated vehicular trip projections. The projected mode splits were applied toward the total number of employees expected to be present on a typical day (percent employee occupancy rate) to determine the number of employees accessing the site by various modes and to determine the overall site-generated vehicular trips. For traffic analysis purposes, the TMP has assumed that 90 percent of BRAC 133 employees will be present on a typical

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<sup>19</sup> *Technical Memorandum, Task 4.1: Analysis of Existing and Potential Transit Demand, WMATA, January 2010*

<sup>20</sup> United States Environmental Protection Agency (EPA) and Air and Radiation Transportation and Air Quality document titled *Vanpool Programs: Implementing Commuter Benefits under the Commuter Choice Leadership Initiative* webpage: [http://www.bestworkplaces.org/empkit/files/section3/vanpool\\_benefit\\_brief.pdf](http://www.bestworkplaces.org/empkit/files/section3/vanpool_benefit_brief.pdf) (last accessed July 20, 2010)

work day and will be commuting to the site. This assumption, though conservative when compared to many of the prior studies, represents the maximum number of vehicular trips generated by the BRAC 133 site and was used in performing the traffic operations and impact analysis included in Section 4. TDM strategies of telecommuting, flex time, and compressed work week (see Section 5) when successfully implemented by the tenant agencies, will decrease the total number of site-generated trips. WHS will carefully implement of all the TDM strategies included in the TMP and will monitor employee travel patterns over time, making changes to their plan as necessary to change mode split and generated trips. Detailed discussion of trip distribution of all the generated trips along the existing roadway network and opening day (2011) traffic volumes are included in Section 4.

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Table 2-4: Trip Projections of BRAC 133 Employees with Proposed Mode Split

		Percent of Total Employees Present on a Typical Weekday						
		100%	95%	93%	90%	85%	80%	75%
Number of Employees present on a Typical Day Shift		6409	6089	5928	<b>5768</b>	5448	5127	4807
57% Single Occupant Vehicle Trips		3653	3470	3379	<b>3288</b>	3105	2923	2740
Carpool	Number of Employees (5%)	320	304	296	<b>288</b>	272	256	240
	Vehicle Trips (2.3 ppv) <sup>1</sup>	139	132	129	<b>125</b>	118	111	104
Vanpool	Number of Employees (3%)	192	183	178	<b>173</b>	163	154	144
	Vehicle Trips (7 ppv) <sup>2</sup>	27	26	25	<b>25</b>	23	22	21
Number of Walking & Biking Employees (2% each)		256	244	237	<b>231</b>	218	205	192
Slug	Number of Employees (3%)	192	183	178	<b>173</b>	163	154	144
	Vehicle Trips (3 ppv)	64	61	59	<b>58</b>	54	51	48
Employees Riding Local Bus Transit serving Mark Center (WMATA/DASH) (5%)		320	304	296	<b>288</b>	272	256	240
Number of Employees Utilizing Rail Transit (and DoD Shuttle from Metro Stations to Mark Center) (23%)		1474	1400	1364	<b>1327</b>	1253	1179	1106
Total Incoming Employee Trips on a typical Weekday		3884	3690	3593	<b>3496</b>	3301	3107	2913

NOTE: (1) Technical Memorandum, Task 4.1: Analysis of Existing and Potential Transit Demand, WMATA, January 2010

(2) United States Environmental Protection Agency (EPA) and Air and Radiation Transportation and Air Quality document titled Vanpool Programs: Implementing Commuter Benefits under the Commuter Choice Leadership Initiative

Total Number of BRAC 133 Employees = 6,409

Total Number of Government Vehicle Parking Spaces = 150

Total Number of Visitor Parking Spaces = 67

Potential Rideshare Priority Parking Spaces = 320

Potential Alternate Fuel or Low Emission Vehicle Priority Parking Spaces = 192

Total Number of Parking Spaces = 3,747

Total Number of BRAC 133 Parking Spaces = 3,530

Total Number of ADA Spaces = 48

### 3.0 Site Conditions

#### 3.1 BRAC 133 Site Description and Land Use

Mark Center is a mixed-use business park located in Alexandria, Virginia at the southwest quadrant of the I-395 and Seminary Road interchange. The area currently includes 1.6 million square feet of office space, a Hilton hotel and conference center, numerous restaurants, two day care centers, and a shopping center. The site is located immediately adjacent to the 43-acre Winkler Botanical Preserve.

The BRAC 133 facility is a 16-acre site which was master-planned and approved in 2004 by the City of Alexandria<sup>21</sup>. The site plan shown in Figure 3-1 displays the 1.8 million square feet of office space in two BRAC 133 towers located on the southwest corner of the site. Parking structures are located to the south of the office buildings along I-395 (the South Parking Garage) and on the north side of the site (the North Parking Garage). The North Parking Garage will include a publicly-accessible community Transportation Center that will provide multiple transportation options for DoD employees as well as Mark Center commuters and visitors<sup>22</sup>.

The office complex is being designed and constructed to achieve a LEED “Gold” rating<sup>23</sup>, a national standard set by the U.S. Green Building Council to foster sustainable building design and construction. Cutting-edge strategies in environmentally sustainable construction and site development are being employed to ensure water savings, energy efficiency, and indoor environmental quality. When completed, the two towers will use 30 percent less energy and 45 percent less water than comparable office buildings. Figure 3-2 shows the scorecard for the building, demonstrating each of the elements that together aim for a LEED Gold rating.

The building will also contain a number of retail facilities and amenities for employees including a fitness center, a cafeteria, an office supply store, a snack/coffee shop, a health clinic, and a credit union. These on-site amenities will help to reduce mid-day trips.

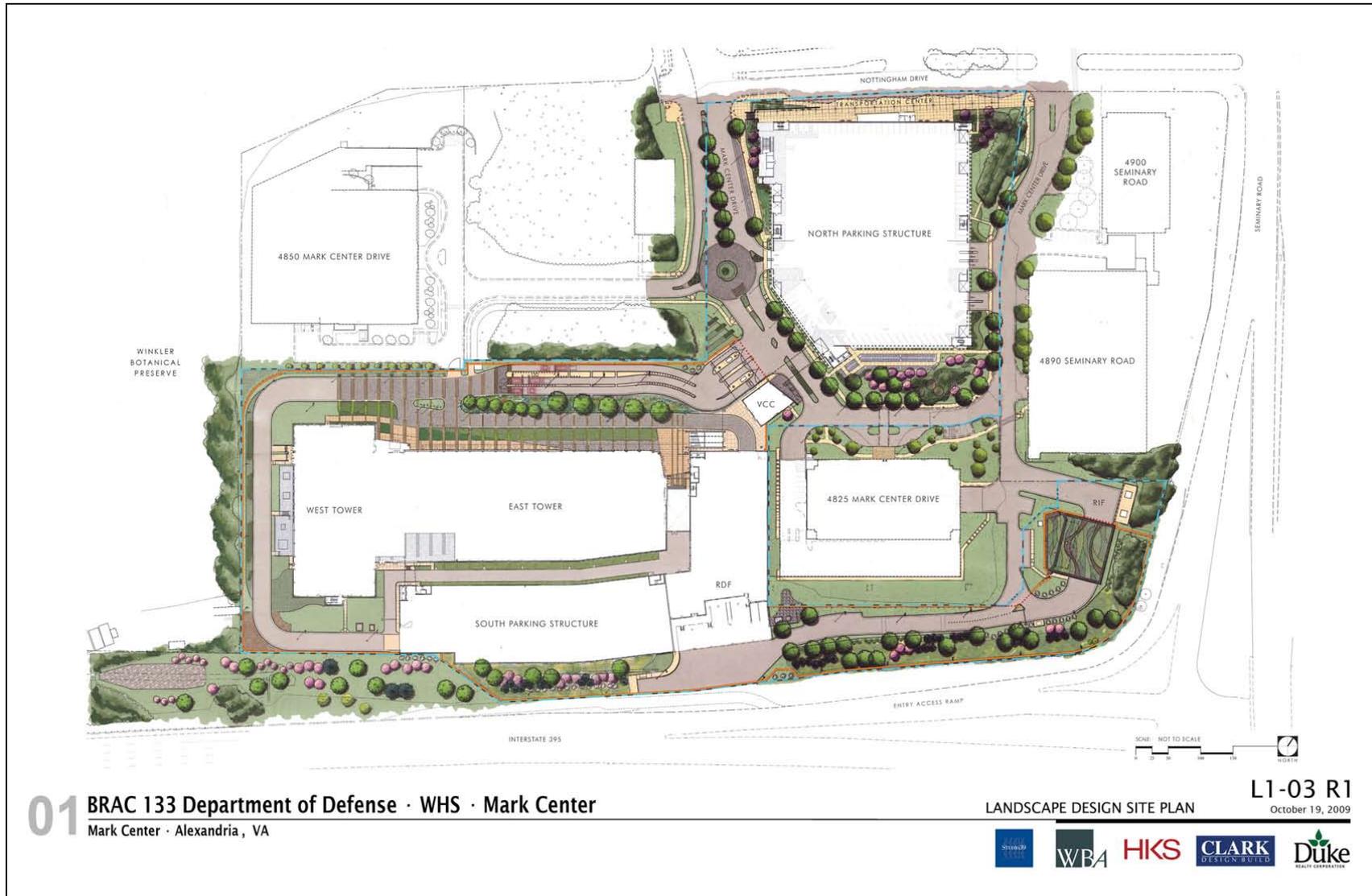
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<sup>21</sup> Special Use Permit Certificate issued to the Mark Winkler Company, February 17, 2004.

<sup>22</sup> Belvoir New Vision - DoD BRAC 133 Project at Mark Center web page, [http://www.belvoirnewvision.com/files/FINAL\\_BRAC133\\_Website\\_Collateral%5B1%5D.pdf](http://www.belvoirnewvision.com/files/FINAL_BRAC133_Website_Collateral%5B1%5D.pdf) (last accessed April 12, 2010).

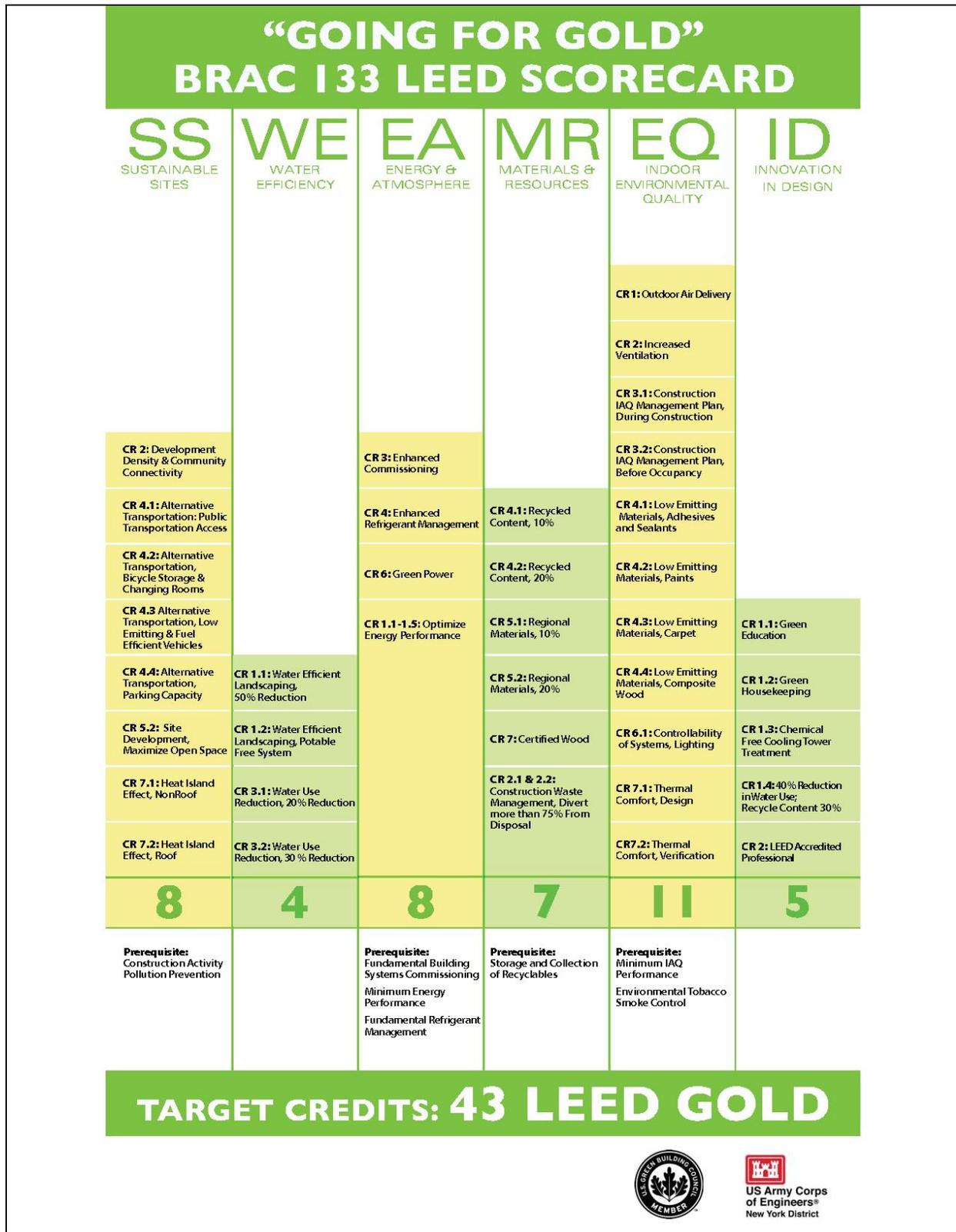
<sup>23</sup> U.S Green Building Council “What LEED is” web page, <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1988> (last accessed May 5, 2010).

Figure 3-1: Site Plan for the BRAC 133 Development



Source: USACE

Figure 3-2: LEED Scorecard for the BRAC 133 Development



Source: USACE

### 3.2 Site Access

#### 3.2.1 Existing Roadway Access

The study area is served by an extensive roadway system that includes an interstate freeway, a principal arterial, and collector streets. The BRAC 133 site is bounded by I-395 to the east, Seminary Road to the north, North Beauregard Street and Mark Center Drive to the west, and the Winkler Botanical Preserve to the south. The existing site can be accessed via:

1. The intersection of North Beauregard Street and Mark Center Drive to the west of the site.
2. The intersection of Seminary Road and Mark Center Drive to the northwest of the site.

The existing site traffic from the I-395 northbound and southbound ramps accesses the site via the intersection of Seminary Road and Mark Center Drive and has inadequate weave lengths to make the necessary lane changes.

#### ***I-395/Henry G. Shirley Memorial Highway***

I-395/Henry G. Shirley Memorial Highway is a north-south interstate freeway in the vicinity of the study area connecting Springfield and Washington DC. The interstate freeway is a six-lane GP facility with a barrier-separated two-lane HOV facility in the median. The freeway mainline section through the study area offers three GP lanes along the northbound and southbound movements, with a full southbound auxiliary lane between the adjacent interchanges of King Street and Duke Street. This auxiliary lane merges to the left just before the Duke Street interchange exit and entrance ramps. The GP lanes operate at 55 mph and the HOV lanes at 65 mph. The HOV lanes are reversible in nature serving the peak direction of travel during the morning and evening peak hours, and are restricted to motor vehicles with three or more occupants. The HOV lanes are open from 6:00 AM through 9:00 AM during the morning peak hours and 3:30 PM through 6:00 PM during the evening peak hours on weekdays. The HOV lanes are open to all during the off-peak periods except during the hours closed for lane reversals.

The I-395 interchange at Seminary Road is the primary access point for traffic traveling from the northern and southern regions to the Mark Center site. The interchange is a three-level, full-service interchange with Seminary Road at the third level, the Seminary Road ramp intersections in a rotary arrangement at the second level, and the I-395 mainline in the first level. The interstate also provides access to the City of Alexandria via the King Street and Duke Street interchanges to the north and south of the Seminary Road interchange. Both King and Duke Streets intersect with the North Beauregard Street corridor, approximately 0.75 and 2.0 miles north and south of Seminary Road, respectively. It should be noted that there is no direct HOV access from I-395 northbound to Seminary Road; however, a ramp does provide access from Seminary Road to the northbound I-395 HOV lanes during the morning peak period as well as access from the southbound I-395 HOV lanes to Seminary Road during the evening peak period. This HOV access will not benefit the BRAC 133 traffic accessing the Mark Center site from either the north or south directions. The closest I-395 HOV exits to access the Mark Center site in the morning peak hour are the Springfield exit south of the site and the Pentagon exit north of the site. Drivers exiting the HOV lanes at these locations will have to travel along the northbound and southbound I-395 GP lanes, respectively, to access the site. The HOV lane entry points for vehicles

exiting the Mark Center site in the evening peak hour are the Pentagon entrance to the north of the site and the Duke or Springfield entrances to the south of the site. Drivers entering the HOV lanes at these locations will have to exit the site and travel along the northbound and southbound I-395 GP lanes, respectively, to access the HOV lanes.

### ***Seminary Road***

Seminary Road is an east-west arterial that provides direct access to the site from I-395. The arterial intersects at-grade with Library Lane, Mark Center Drive, and North Beauregard Street, and is controlled by traffic signals. Seminary Road is a six-lane divided arterial between Library Lane and North Beauregard Street, except for the I-395 overpass, which is a four-lane section. Seminary Road operates at a posted speed limit of 35 mph between Library Lane and North Beauregard Street. The arterial provides access to office complexes and developments along the corridor and offers exclusive turn lanes at intersections.

### ***North Beauregard Street***

North Beauregard Street is a north-south four-lane divided arterial operating at a posted speed limit of 35 mph. The intersection with Mark Center Drive is another primary access point to the site. This intersection will also serve as the only access to the site for vehicles approaching the site from the I-395 ramps. The corridor also provides access to developments along the corridor.

### ***Mark Center Drive***

Mark Center Drive is a two-lane loop road providing local access to the developments within Mark Center and connects with both Seminary Road and North Beauregard Street. Currently, IDA and Mark Center Express shuttle buses circulate Mark Center Drive to provide access to existing office complexes in the study area.

The existing Mark Center traffic exiting from the I-395 north and southbound movements at the Seminary Road interchange is prevented from accessing Mark Center Drive at the Seminary Road intersection by a white solid dividing stripe. Only the westbound Seminary Road traffic can legally execute left turns at the Mark Center Drive intersection. I-395 traffic accessing Mark Center is required to travel along Seminary Road and execute left turns at the Seminary Road and North Beauregard Street intersection and then access the site via the North Beauregard Street and Mark Center Drive intersection. This is required due to the limited weaving distance available between the exit ramp merge point at Seminary Road and the beginning of the left turn lane taper at Mark Center Drive. Although there is a solid white stripe prohibiting I-395 traffic from making a left at Mark Center Drive, most of the I-395 exit ramp traffic accessing Mark Center today violates the marking. Drivers weave over multiple lanes within a 100 foot distance in order to execute an illegal left turn. This weaving maneuver has resulted in multiple vehicular crashes and safety concerns.

### 3.2.2 Planned Roadway Access

Many adjacent roadway improvements are being implemented and are considered as part of BRAC 133 development mitigation measures to improve traffic operations along the adjacent roadway network and access points to the BRAC 133 facility. For this TMP development process, only the interim improvements that are currently under construction and scheduled for completion before September 15, 2011 have been considered as part of future roadway geometry.

The overall site-generated vehicular trips including the SOV, rideshare, and shuttle bus trips that will access the site via Mark Center Drive / Seminary Road and Mark Center Drive / North Beauregard Street intersections. It was noted that the projected traffic demand at these intersections under build-out conditions will require additional left turn lane capacity to maintain acceptable levels of service. In addition, the existing Nottingham Drive / Mark Center Drive (future Mark Center Drive / Mark Center Drive) will be improved to serve as a major internal roadway facilitating access and circulation within the site. This necessitated traffic control improvements along Mark Center Drive intersections. The 2003 *Mark Center Parcel 1A and 1B Traffic Impact Study (TIS) and Transportation Management Plan (TMP)*<sup>24</sup> identified these capacity and traffic control improvements as being necessary to maintain acceptable traffic operations under full build-out conditions.

In addition to the capacity and traffic control improvements identified in the 2003 Mark Center TIS, a fourth offsite roadway improvement was recommended to minimize traffic weaving from the I-395 exit ramps accessing Seminary Road and promote traffic safety along Seminary Road. The proposed offsite roadway improvement will include a physical barrier to prevent I-395 traffic from executing the short-distance weaving maneuver to turn left at the Mark Center Drive intersection.

Interim (2011) roadway improvements that are currently under construction and scheduled for completion before September 15, 2011 include:

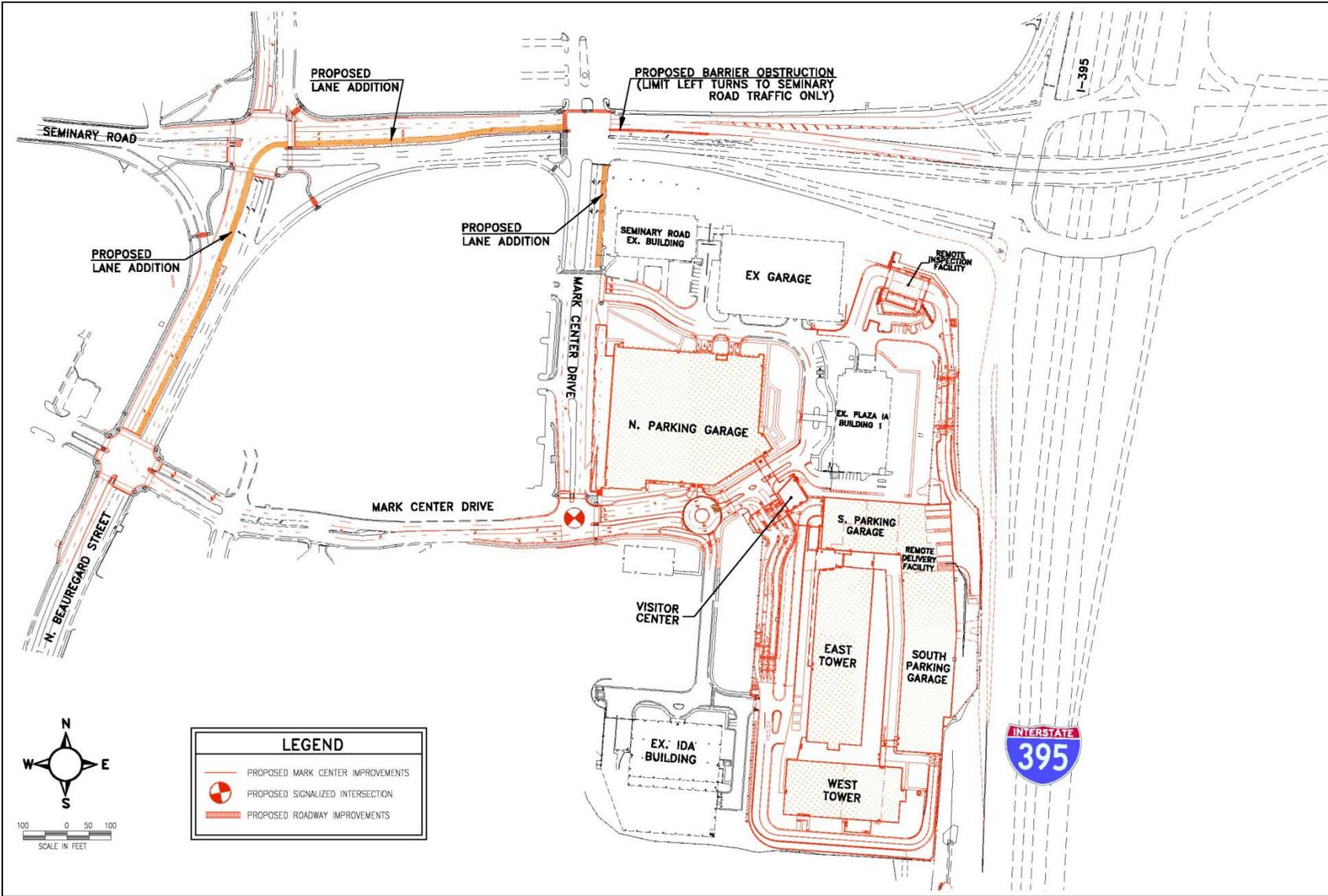
1. Construction of a third left turn lane from westbound Seminary Road to southbound North Beauregard Street.
2. Construction of a second southbound-to-eastbound left-turn lane at the North Beauregard Street and Mark Center Drive intersection.
3. Installation of a new traffic signal at the Mark Center Drive and IDA Driver on-site intersection.
4. Installation of a physical barrier to prevent I-395 ramp traffic from accessing Mark center via the intersection of Seminary Road and Mark Center Drive. Traffic approaching the site from Seminary Road or from Southern Towers will still be able to access the site from this location.

Figure 3-3 highlights the proposed internal and external roadway improvements that will be in-place to serve the opening day traffic demand.

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<sup>24</sup> *Mark Center Parcel 1A and 1B Traffic Impact Study and Transportation Management Plan*, Wells & Associates, March 31, 2003.

Figure 3-3: BRAC 133 Internal and External Roadway Improvements



Source: "Overall Site with Improvements" AutoCAD Drawing, USACE, March 01, 201

Besides these short-term improvements, other additional short-term and long-term improvements including roadway widening and traffic control improvements, and a direct HOV access ramp from I-395 South to Seminary Road<sup>25</sup> are currently being considered and evaluated<sup>26</sup>.

Various access ramp alternatives serving the BRAC 133 site directly from I-395 South were considered and evaluated by VDOT. Two alternatives have been narrowed down for further study and are being evaluated for operations, access, and other impacts. VDOT, the City of Alexandria, and DoD are currently pursuing options to analyze the feasibility of these alternatives and to identify potential funding sources.

These long-term improvements would enhance the traffic flow and operations of this site as well as the regional traffic, but it should be noted that it will take many years to fund, design, and construct any such improvements.

### 3.2.3 Internal Site Access

The existing Mark Center Drive that runs in an east-west direction will be widened to four lanes and will serve as a loop road providing access to both the North and South Parking Garages, the visitor parking area, and the IDA buildings. A two-lane roundabout is proposed at the intersection of WHS Circle/IDA Drive and the North Parking Garage to slow down internal traffic and circulate them efficiently without stopping the through movements. A three-legged “T-intersection” is proposed at the South Parking Garage access from WHS Circle<sup>27</sup>.

The BRAC 133 developments can be divided into the North Campus, South Campus and the Remote Inspection Facility (RIF)<sup>28</sup>. The North Campus includes the North Parking Garage and the Transportation Center. The South Campus is the largest area of the site and includes the South Parking Garage, the east and west towers, the Visitor Center, and the Remote Delivery Facility (RDF). The main access control point to the site is located at the South Campus. The North Parking garage has two access points, one via the WHS Circle and one via the internal loop road. The access point along the internal loop road has two inbound lanes and one outbound lane. The access point along WHS Circle offers one inbound lane and one outbound lane. The visitor parking area is located within the North Parking Garage but has a separate entrance from the general parking area. The visitor parking area has one inbound lane and one outbound lane.

The South Parking Garage has one inbound lane and one outbound lane along with one reversible lane to meet morning peak hour entry and evening peak hour exit demand. A proposed pedestrian bridge will connect the North Campus to the South Campus which accommodates the access control point to the site allowing employees and visitors to enter from the same location. Access to the WHS towers is

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<sup>25</sup> Virginia Department of Transportation Mega Projects web page, <http://www.vamegaprojects.com/faqsdocuments/mark-center-documents/> (last accessed April 5, 2010).

<sup>26</sup> City of Alexandria, “Planning & Zoning: Base Realignment & Closure (BRAC-133)” web page, <http://alexandriava.gov/BRAC> (last accessed May 5, 2010).

<sup>27</sup> *WHS Internal Roadway Network Traffic Analysis*, Wells and Associates, August 20, 2009.

<sup>28</sup> Fort Belvoir BRAC 133 Project, Mark Center Development, Department of Army Staff Recommendation to NCPD, December 30, 2009.

secured through guarded access control points with employee identity verification booths at the South Campus. The location of the main access control point at the South Campus prevents the possibility of spillback from traffic queues waiting at the access control gates. This will prevent traffic queues from affecting the adjacent major roadway network operations.

The visitor traffic entering the site will be strictly controlled and managed by the PFFA PMB. Every visitor will be required to register in advance and receive approval from PFFA, at least 1 day prior to visiting the site. When arriving at the site, the visitor's credentials will be verified by the PFFA before they are permitted to enter the visitor parking area. This advance verification process will minimize the traffic queues at the visitor parking entry point, promote regulation of arrival times of visitor vehicles and limit the number of daily visitors entering the site.

The RDF will be located adjacent to the South Parking Garage. All trucks accessing the RDF will first be screened at the RIF. The RIF will be located in a secure area along the northeast corner of the site adjacent to the existing Center for Naval Analyses (CNA) building and the parking garage at 4890 Seminary Road. Trucks accessing the RIF will circulate around the North Parking Garage via an access road paralleling I-395 and enter the facility for vehicle inspection. Any vehicles that fail the scan will be forced to exit the site. The RIF will be located partially below grade and will incorporate screening along Seminary Road and green roofing to blend in with the surrounding landscape and to minimize visibility from adjacent roadways. The site is expected to receive approximately 35 deliveries each weekday.

### 3.2.4 Pedestrian Access & Facilities

Existing site conditions indicate a continuous walkway system along Seminary Road, North Beauregard Street and Mark Center Drive providing access to Southern Towers and existing Mark Center buildings. Sidewalks exist along both sides of Seminary Road between the North Beauregard Street and Mark Center Drive intersections, and along both sides of North Beauregard Street from the Sanger to Seminary Road intersections, with Americans with Disabilities Act (ADA)-standard ramps and high visibility markings at pedestrian crossing locations. Marked pedestrian crosswalks exist only along the north and west crossing legs of the Seminary Road and Mark Center Drive intersection forcing pedestrians to cross only at these locations. Pedestrian signal heads with push buttons exist along some pedestrian signal crossing locations.

However, the existing pedestrian walkway system adjacent to the Mark Center site is in poor condition with substandard effective sidewalk widths (4 feet or less) and pavement conditions, discouraging pedestrian mode of travel and posing a threat to pedestrian safety, especially to the disabled pedestrians. The signage for pedestrian travel is also inconsistent through the region. The existing Seminary Road and North Beauregard Street intersection does not offer pedestrian signal heads at crossing locations making it unsafe for the pedestrians crossing this heavily traveled intersection. Discontinuous sidewalks exist along the east side of North Beauregard Street between Mark Center Drive and Seminary Road intersections. The existing pedestrian push buttons at the signalized crossing locations do not meet the ADA standards<sup>29</sup>.

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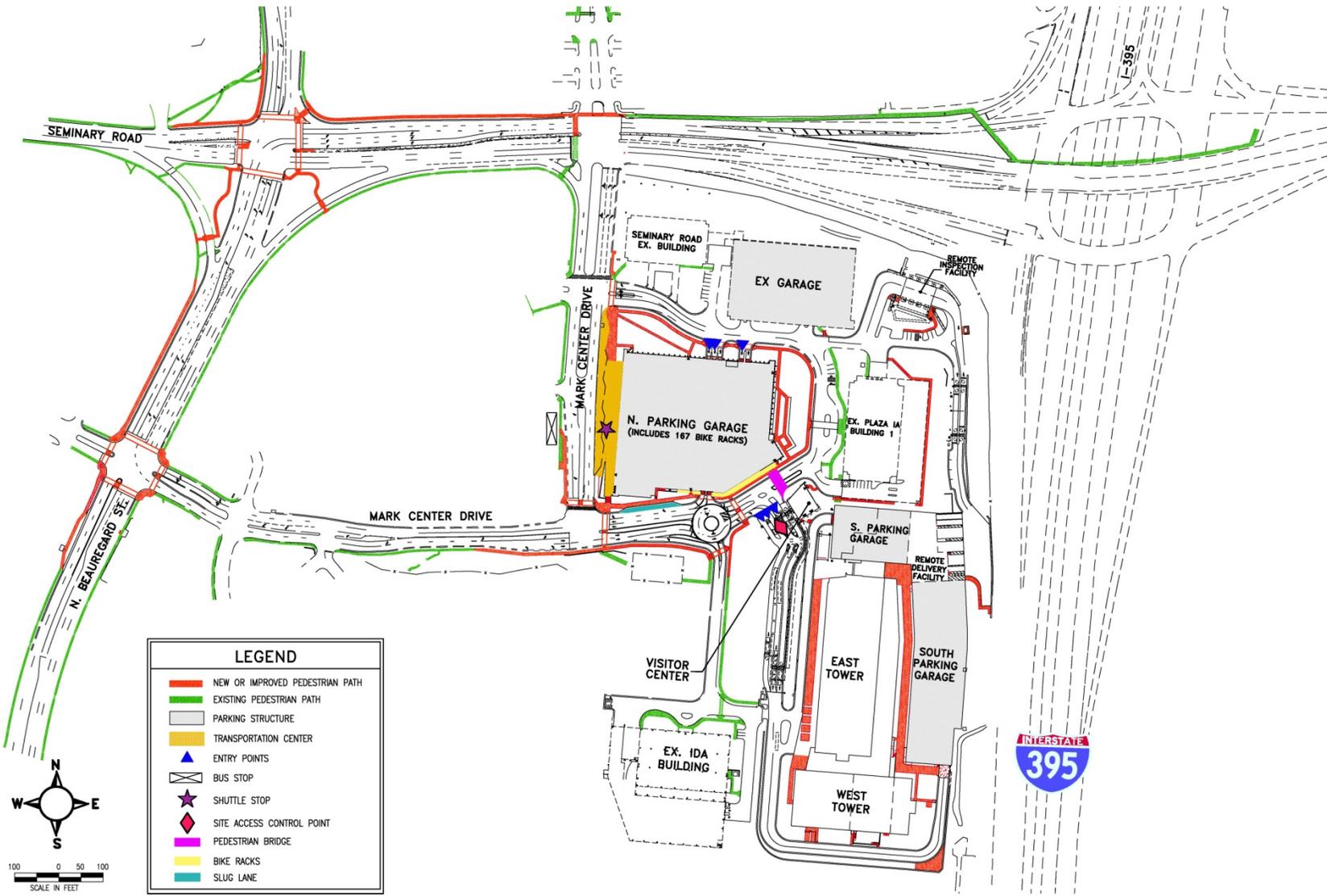
<sup>29</sup> *Seminary Road/Beauregard Street Corridor(s) Traffic Study*, Wilbur Smith Associates, January 19, 2007.

The proposed sidewalk and crosswalk plan as part of the BRAC 133 development promotes connectivity by integrating the existing sidewalks and pathways to the boundary roadways that provide access to the BRAC 133 facility and the internal circulating system. The proposed plan includes improvement of the existing walkways and addition of new sidewalks throughout the site to promote continuity. The proposed improvements includes wider sidewalks and crosswalks (6 feet or more) throughout the study area, highly visible pavement markings, pedestrian refuge areas closer to high pedestrian traffic generators and activity centers, lateral separation between traffic and pedestrians, planting and landscape, and lighting. All intersection crosswalks will meet the accessibility guidelines set by the Americans with Disabilities Act (ADA) by including gentle grades and cross slopes and ADA ramps at crossing locations. These improvements will promote safe and enjoyable pedestrian travel throughout the study area. The proposed plan will also allow pedestrian crossing opportunities at all major intersections by providing optimized signal timing for pedestrian crossings, thus minimizing any potential conflict with vehicular traffic. Figure 3-4 shows the pedestrian circulation plan highlighting the existing and proposed or improved walkways along with the major pedestrian activity centers.

No pedestrian movement will be allowed at the ground level area between the North and South Parking Garages to prevent any potential conflict with vehicular traffic. Shuttle buses, the Transportation Center, and slug lines will be connected to primary pedestrian paths to provide convenient access to BRAC 133 commuters. A pedestrian bridge will connect the North Campus to the South Campus. Visitors entering the site from the North Parking garage will be able to access the Visitor Control Center (VCC) located in the main building using the pedestrian bridge. The access control point to the site is located at the South Campus. Employees and visitors can access the towers from this location after being verified.

Crosswalks and pedestrian signal timing allocation for pedestrians crossing at the Seminary Road and Mark Center Drive intersection will be provided only along the north side of Mark Center Drive and the west side of Seminary Road to maximize intersection operations by providing adequate green time for the critical intersection movements. The signal timing at the Seminary Road and North Beauregard Street intersection will need to be modified to allow pedestrian crossing along the westbound Seminary Road and southbound North Beauregard Street approaches of the intersection. Secondary paths throughout the site will be enhanced by providing landscaping and lighting to provide an attractive, amenable, and comfortable environment for visitors and employees.

Figure 3-4: Proposed Pedestrian Circulation Plan and Major Activity Centers



Source: "Overall Site with Improvements" AutoCAD Drawing, USACE, March 01, 2010

### 3.2.5 Access Control Facilities

The proposed access control security features at the BRAC 133 site are in compliance with the Army required Access Control Point (ACP) standards<sup>30</sup>. The South Campus will serve as the main ACP to the site. The visitors and employees from the North Parking Garage will access the South Campus via the pedestrian bridge for verification and identification before entering the facility. The ACP at the Campus implements the vehicle presence detection safety method for entry control. The proposed access control includes Active Vehicle Barrier (AVB) and Passive Vehicle Barrier (PVB) systems that work sequentially to provide security to the site and the ACP users. The entry vehicles will be checked and authorized by the guards at the entry guard booth. Authorized vehicles will be guided through the PVB consisting of chicanes and traffic bollards to arrive at a stop and go signal control at the AVB location. Any unauthorized vehicles identified at the guard booth will be forced to a turn-around path adjacent to the guard booth.

The ACP at the South Parking Garage includes two inbound ID lanes with guard booths and a third ID lane reserved for overflow capacity. Under normal processing conditions, each proposed ID check point will process 350 vehicles per hour, a maximum of 700 vehicles during the highest peak hour demand. Two inbound lanes proceeding from the ID check points will also process vehicles at the rate of 350 vehicles per hour per lane, serving a maximum of 700 vehicles during the highest peak hour demand<sup>31</sup>. The projected trips generated by the site indicate an hourly demand of only 550 vehicles entering the South Parking Garage during the highest peak hour. This allows adequate gaps between entering vehicles at the ACP and prevents any possible queue build-up. The two lanes proceeding from the AVBs merge to a single lane before entering the South Parking Garage. The third reserved ID lane can be used for all vehicles, based on demand. Detailed discussion on the projected trips, future traffic operations and traffic queues are included in Section 4.

## 3.3 Transit

### 3.3.1 Existing Bus Transit Service

The Mark Center area is currently served by a number of public bus routes provided by the Alexandria Transit Company (DASH) and the Washington Metropolitan Area Transit Authority (WMATA), as well as one private bus route provided by Quick's Bus Company. Public bus stops are located at the Southern Towers apartment complex, one quarter mile away from the BRAC 133 site, and on Mark Center Drive just across from the proposed Transportation Center. While Mark Center is not served by a Metrorail station, most of the bus routes serving the area lead to a Metrorail destination, in addition to other major destinations.

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<sup>30</sup> *WHS Internal Roadway Network Traffic Analysis*, Wells and Associates, August 20, 2009.

<sup>31</sup> Main Vehicle Access Control Point (ACP) Active Vehicle Barrier (AVB) Traffic Issue Memorandum, Department of the Army, August 26, 2009.

***DASH Service***

Alexandria Transit Company currently operates two DASH bus routes that serve Southern Towers apartment complex and Mark Center along North Beauregard Street approaching Mark Center Drive. These routes provide access to and from four Metrorail stations, including Eisenhower Avenue, Braddock Road, Van Dorn Street, and King Street Metrorail stations. Route maps for DASH routes AT1 and AT2 are provided in Appendix C.

The AT1 route provides service to the Eisenhower Avenue and Van Dorn Metrorail stations. This route operates seven runs to and from Mark Center during the 6:00 AM to 9:00 AM peak period and seven runs to and from Mark Center during the 3:00 PM to 6:00 PM peak period. This line operates from 5:09 AM to 11:11 PM on weekdays and operates a total of 32 runs to and from Mark Center during operating hours. The AT1 operates on 25 to 30 minute headways during peak periods.

The AT2 route provides service to the King Street and Braddock Road Metrorail stations. This route operates nine runs to and from Mark Center during the 6:00 AM to 9:00 AM peak period and seven runs to and from Mark Center during the 3:00 PM to 6:00 PM peak period. This line operates from 5:40 AM to 11:26 PM on weekdays and operates a total of 35 runs to and from Mark Center during operating hours. The AT2 operates on headways ranging from 17 to 30 minute headways during peak periods.

***Metrobus Service***

WMATA currently operates 10 bus routes that serve the Southern Towers apartment complex and Mark Center at along North Beauregard Street approaching Mark Center Drive and along Mark Center Drive approaching Seminary Road. The various WMATA routes provide access to and from five Metrorail stations, including the Pentagon, Ballston, Van Dorn Street, West Falls Church, and King Street Metrorail stations. Route maps for Metrobus routes 7, 25B, 28A, and 28G are provided in Appendix C.

Route 7 (Lincolnia-North Fairlington Line) operates frequent service through Mark Center via routes A,F,W, and X as well as Southern Towers via routes A,B,D,E,F, W, and X. The 7 route operates 46 runs through Mark Center and Southern Towers during the 6:00 AM to 9:00 AM peak period and 9 runs during the 3:00 PM to 6:00 PM peak period in the northbound direction, as well as 10 runs during the 6:00 AM to 9:00 AM peak period and 29 runs during the 3:00 PM to 6:00 PM peak period in the southbound direction. This line operates from 5:05 AM to 3:54 AM during weekdays and conducts 172 runs through the area during operating hours.

Route 25B (Landmark-Ballston Line) also operates service in close proximity to BRAC 133 via Southern Towers. During the 6:00 AM to 9:00 AM peak period, Route 25B operates six runs through Southern Towers and six runs during the 3:00 PM to 6:00 PM peak period in the northbound direction, as well as six runs during the 6:00 AM to 9:00 AM peak period and six runs during the 3:00 PM to 6:00 PM peak period in the southbound direction. This line operates from 6:04 AM to 10:07 PM and conducts 45 runs through Southern Towers during operating hours.

Route 28A (Alexandria-Tysons Corner Line) operates service to in close proximity to BRAC 133 via Southern Towers, with six runs operating during the 6:00 AM to 9:00 AM peak period and six runs during the 3:00 PM to 6:00 PM peak period in the eastbound direction, as well as six runs during the 6:00 AM

to 9:00 AM peak period and six runs during the 3:00 PM to 6:00 PM peak period in the westbound direction. This line operates from 5:30 AM to 12:59 AM and conducts 72 runs through Southern Towers during operating hours.

Route 28G (Skyline City Line) operates limited service to Southern Towers, with eight runs operating during the 6:00 AM to 9:00 AM peak period in the northbound direction, as well as eight runs during the 3:00 PM to 6:00 PM peak period in the southbound direction. This line operates from 5:50 AM to 7:18 PM and conducts 18 runs through Southern Towers during operating hours.

Figure 3-5 illustrates existing public transit service within one-half mile of the BRAC 133 site. A summary of operating routes and services is provided in Table 3-1 and these routes and services are discussed in more detail below. The routes summarized in Table 3-1 are routes that stop within walking distance (less than one-half mile) from the BRAC 133 site.

### ***Quick's Bus Service***

Quick's Bus Company is a private company operating commuter bus service from Fredericksburg, Virginia. The company currently operates one bus route that provides direct service to Mark Center from Fredericksburg and Stafford. The route conveniently serves Mark Center with stops at two buildings immediately adjacent to BRAC 133 (buildings 4900 and 4850). Quick's Bus Run #9 operates only once during the AM and PM peak periods, arriving at Mark Center at 6:00 AM, and leaving Mark Center at 3:20 PM. It is important to note that Quick's Bus, like many other private commuter bus companies, is equipped to accept federal transit vouchers through the DoD NCR Mass Transit Benefit Program (MTBP).

### ***Public Feeder Service to Metrorail and VRE Stations***

Given that the building population is distributed throughout the region and that the DoD will be establishing extensive shuttle service between BRAC 133 and key Metrorail and VRE stations, public bus transit service bringing commuters from the closest home bus stop to rail transit stations (otherwise known as public feeder service) will be critical to serve as the first leg of commuter trips. There are currently public feeder service options in place from nearly every jurisdiction around the region. Appendix C provides information on available public feeder services throughout the region that serve Metrorail and VRE stations.

### ***Paratransit Service***

Paratransit services are available for individuals with disabilities through WMATA's MetroAccess<sup>32</sup> as well as through the City of Alexandria's DOT Paratransit Program<sup>33</sup>.

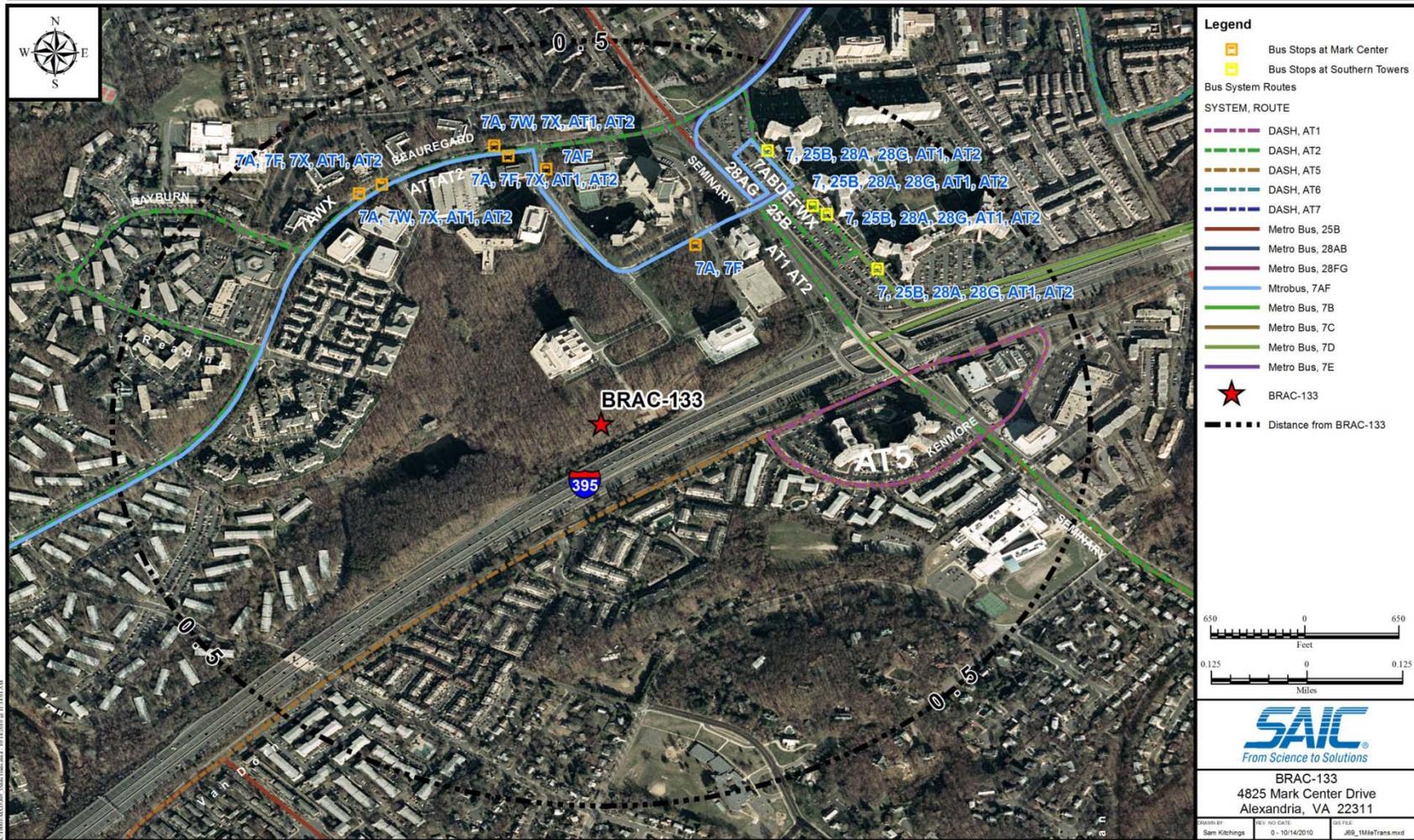
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<sup>32</sup> MetroAccess Paratransit, [http://www.wmata.com/accessibility/metroaccess\\_service](http://www.wmata.com/accessibility/metroaccess_service), last accessed October 8, 2010.

<sup>33</sup> DOT Paratransit Program, <http://alexandriava.gov/tes/info/default.aspx?id=6538>, last accessed October 8, 2010.

Figure 3-5: Existing Bus Routes and Bus Stops along Arterial Streets within One-Half Mile of BRAC-133 Facility

October 2010



Bus Routes and Stops along Arterial Streets within ½ mile of BRAC 133 Facility

Sources: ESRI, WMATA, DASH, Fairfax County Department of Transportation

SITE CONDITIONS

Table 3-1: Transit Routes Serving Mark Center within One-Half Mile of the BRAC 133 Site

Route #	Origin	Destination	Direction	Stop Near BRAC 133	Number of Weekday Trips			Weekday Headways		
					AM Peak	PM Peak	Off-Peak	AM Peak	PM Peak	Off-Peak
<b>Dash - Alexandria Transit Company</b>										
AT1	Eisenhower/Van Dorn Metro	Seminary Plaza	NB	Mark Center Southern Towers	7	7	18	25	25	30
	Seminary Plaza	Eisenhower/Van Dorn Metro	SB	Mark Center Southern Towers						
AT2	Lincolnia	Braddock Metro	EB	Mark Center Southern Towers	9	7	19	17	30	30
	Braddock Metro	Lincolnia	WB	Mark Center Southern Towers						
<b>Metrobus - WMATA</b>										
7 A,B,D,E,F,W,X	Lincolnia	Pentagon	NB	Mark Center (7A,F,W,X only) Southern Towers (7A,B,D,E,F,W,X)	46	9	28	30	30	30
	Pentagon	Lincolnia	SB	Mark Center (7A,F,W,X only) Southern Towers (7A,B,D,E,F,W,X)						
25B	Van Dorn Metro	Ballston Metro	NB	Southern Towers	6	6	11	30	30	60
	Ballston Metro	Van Dorn Metro	SB	Southern Towers	6	6	10	30	30	60
28A	Tysons Corner Center	King Street Metro	EB	Southern Towers	6	6	26	30	30	30
	King Street Metro	Tysons Corner Center	WB	Southern Towers	6	6	22	30	30	30
28G	Skyline City	Pentagon	NB	Southern Towers	8	0	0	25	---	---
	Pentagon	Skyline City	SB	Southern Towers	0	8	2	---	20	25
<b>Private - Quick's Bus Company</b>										
Run #9	Fredericksburg	Mark Center	NB	Mark Center (Bldgs 4850 & 4900)	1	0	0	---	---	---
	Mark Center	Fredericksburg	SB	Mark Center (Bldgs 4850 & 4900)						

Source: WMATA, DASH, Quick's Bus

NOTE: AM Peak = 6:00 AM - 9:00 PM; PM Peak = 3:00 PM - 6:00 PM

**3.3.2 Need for Modifications of Transit Routes**

As part of the TMP process, the Army has engaged in discussions with transit service providers in the region to determine if any providers with cross-jurisdictional service capabilities (i.e., PRTC/Omniride, Loudoun County Transit, and WMATA) are considering establishing new service or adjusting existing routes to serve the needs of the employees who will be relocated to BRAC 133. The Army also engaged in multiple discussions with WMATA and DASH to determine if any of the routes that currently stop near the BRAC 133 site could be modified to include a stop at the Mark Center Transportation Center. Discussions were also held with local transit providers (i.e., Arlington Transit, DASH, Fairfax Connector) to determine if there are any planned modifications to public feeder routes that service VRE and/or Metrorail stations, as public feeder service will be critical to serving the BRAC 133 population.

On March 10, 2010, the Army conducted a BRAC 133 Transit Round Table Discussion with public transit providers from across Northern Virginia, including WMATA, DASH, Fairfax Connector, ART, PRTC/Omniride, and Loudoun County Transit. The purpose of the discussion was to provide these agencies with information about the population of individuals who will be moving to BRAC 133 and to have a constructive discussion about potential service modifications that would best serve this population. During this meeting the Army presented information about where BRAC 133 trips will originate based on employee home zip codes, as well as information about the current and expected mode share of this population by jurisdiction. Transit agencies across the region have generally expressed an interest in expanding service to meet the new travel patterns and needs of BRAC 133 employees, and are exploring solutions to implement modifications to transit routes. WMATA staff and transit staff from the City of Alexandria have identified a number of possible transit improvements that could be implemented to serve the BRAC 133 population; however, final decisions on moving forward with solutions have not been made to date. The most promising possibilities include those shown in Table 3-2.

**Table 3-2: Possible Transit Improvements to serve the BRAC 133 Population**

Description of Transit Improvement	Details of Transit Improvement
Establishing Bus Service from the King Street Metrorail Station to BRAC 133	<p>Making adjustments to routes that currently serve nearby areas such as Southern Towers as well as the King Street Metrorail Station to directly serve BRAC 133. These include DASH’s AT2 bus route and WMATA’s 28A route.</p> <p>Making adjustments to routes that currently serve Southern Towers to directly serve BRAC 133. These include WMATA’s routes 7BDE, 25AD (which serve the Northern Virginia Community College), WMATA’s routes 25B, 28B, and 28F (which serve the Pentagon and Skyline City), and DASH’s AT1 route.</p> <p>Increasing the frequency of DASH’s AT2 route and adding a few runs each peak with limited-stop service from the King Street Metro station that coordinate with VRE arrivals at King Street.</p>
Improving Existing Bus Service serving the Ballston Metrorail Station and add a stop at BRAC 133	Increasing the frequency of WMATA’s 25B route which serves the Ballston Metrorail Station and adding a few runs each peak with limited-stop service with consideration of modifying the route using Van Dorn Street and Kenmore Avenue to access Seminary Road.
Establishing Bus Service between BRAC 133 and the Pentagon	Putting WMATA buses into service that are currently deadheading between the Pentagon and Mark Center on the 7 route.

*Sources: Presentation given by Wendy Jia, WMATA, at BRAC Coordinators Meeting on February 18, 2010; Discussions with WMATA staff on March 3, 2010; memo received from the City of Alexandria on May 3, 2010; WMATA Draft Report dated June 2010, “Transit Service Impacts of the Base Realignment and Closure Recommendations in the Metropolitan Washington Region.”*

WHS and the Army have engaged in discussions with WMATA and DASH to identify any potential modifications in bus stop locations, frequency, or routing that may be feasible in the future. Details are not finalized at this time but WHS will be continuing discussions with DASH and WMATA concerning possible route enhancements to support BRAC 133. In addition to this, DoD is evaluating the potential for local and regional service providers to provide part or all of the DoD Mark Center shuttle service. Decisions about service providers will be based on efficiency and cost effectiveness.

Another possibility for a mid-term modification is for private bus companies to establish direct service to Mark Center from areas to the south (e.g., Lorton/Quantico, Woodbridge, Fredericksburg, etc.). In March 2010, USACE and WHS met with two private commuter bus companies, Martz and Quick's Bus, to explore whether either would be interested in establishing direct commuter service to Mark Center. Although both companies saw the potential for significant ridership on this type of route, neither indicated definitive plans to establish new service, at least in the short term. However, both indicated that service in the future is a distinct possibility, particularly if either sees a decline in the number of riders to the Crystal City area, an area where many BRAC 133 employees currently work and a key market that both companies serve today.

These companies, and possibly others, will likely be assessing their routes in the months following the move, to determine if establishing new service is feasible. To facilitate this decision-making, within 6 months following the move, WHS will arrange a meeting with any private bus companies who have interest in providing bus service directly to Mark Center. The purpose of the meeting will be to share information about what is known about employee commute patterns at that point in time. The private bus companies may also elect to conduct an on-board survey of their existing riders to gauge interest in service to Mark Center.

### **3.3.3 Transportation Center**

As shown in Figure 3-6, the BRAC 133 site will include a publicly-accessible Transportation Center attached to the North Parking Garage. The Transportation Center is located on Mark Center Drive west of Seminary Road. It includes five bus bays that will be available for shared-use by any public or private transit providers who are interested in providing service to the Mark Center. Any public or private agencies interested in providing service to the Transportation Center may do so by coordinating with WHS. Additionally there is a bus stop located on the west side of Mark Center Drive, directly across from the Transportation Center. This stop will remain in place and available for use through coordination with the City of Alexandria.

**Figure 3-6: Mark Center Transportation Center**

Source: USACE.

The Transportation Center has been designed as an open-air facility with overhead protection to shield travelers from the elements. It will include a restroom for use by bus operators and benches for public use. It will also include an area for agencies to post transit schedules and route information as well as overhead electronic signage to announce bus arrivals.

### 3.4 Slug Lines

Slugging is a phenomenon that has been prominent in the DC region since HOV lanes were introduced on the Shirley Highway (I-395) in the 1970s. Initially the lanes were restricted to vehicles with four or more occupants, making it extremely difficult for commuters to establish reliable carpools. This led to the creation of what is commonly called “casual carpooling”, whereby individuals looking to take advantage of the uncongested HOV lanes meet at designated pick-up locations to share a ride. Slugging is an informal, unofficial, local custom which is not sponsored by the U.S. Government. Although the HOV designation has since been lowered to require only three passengers per vehicle, the slugging phenomenon has remained strong.

Slugging plays a particularly critical role in transportation at the Pentagon given the large number of people who work at the Pentagon and the fact that the Pentagon itself is a major transit hub. Although currently there is no direct access (on or off) of the HOV lanes at Seminary Road in peak-hour directions, it is still expected that many BRAC 133 employees will make slugging part of their regular commute. This can be accomplished in a number of ways. For example, employees who have a parking space may choose to save time by picking up slugs at one of the well-established pick-up locations throughout the southern suburbs (see Appendix D) and driving them to the Pentagon before turning around and returning to the site via the I-395 southbound GP lanes. These same drivers may then elect to pick up “slugs” at Mark Center on their way home from work to save time (although the southbound HOV lanes cannot be accessed directly from Seminary Road, commuters can access the HOV lanes via a slip ramp

located approximately 2.5 miles south of Seminary Road). As for slugs, they may elect to slug to the Pentagon in the morning where they can ride the DoD shuttle to Mark Center. In the evenings they may elect to do the reverse or they may instead slug with a driver leaving directly from Mark Center. Anecdotal evidence suggests that for long-distance commuters (from Fairfax County and areas south), HOV access to the Mark Center via the Pentagon provides significantly better travel time as compared to using the GP lanes for the entire trip.

To accommodate to the local custom, the BRAC 133 site includes a designated location for slug lines. The designated slug area is located along Mark Center Drive just to the west of the North Parking Garage. The area will include signage instructing slugs and drivers about appropriate places to queue safely. As usage of the slug area is difficult to predict at this time and will likely change over time, WHS will observe operations over time in and around the slug area, and may choose in the future to move the slug area to a different location. During mid-day hours the slug area will be available for taxis.

### 3.5 Shuttle Services

#### 3.5.1 Local Mark Center Express Shuttle

The Duke Realty Corporation and Mark Center tenants CNA and IDA provide private shuttle service to Mark Center tenants, employees, and residents. Duke Realty Corporation provides the free weekday Mark Center Express shuttle service for Mark Center tenants to and from the Pentagon City Metrorail station, as well as within Mark Center. Tenants must display a Mark Center Express shuttle card in order to board. The shuttle operates on 20 minute headways from 6:00 AM to 9:45 AM and 3:30 PM to 7:10 PM for service to Metrorail, as well as at 10 minute headways from 11:30 AM to 2:00 PM for lunchtime service to restaurants and shops. Figure 3-7 provides a map of the Mark Center Express shuttle route and stops for both the Metrorail and lunch time services.

Mark Center tenants CNA and IDA also provide private shuttle services to Metrorail stations; however, shuttle service is provided for CNA and IDA employees only with proper identification.

The Duke Realty Corporation, CNA, and IDA shuttles will not be available to BRAC 133 employees, as these services are private shuttles offered only for tenants and employees of the respective organizations. However, to accommodate to BRAC 133 employees, private DoD shuttle services are being provided for BRAC 133 employees, as described in the following section.

Figure 3-7: Mark Center Express Route Map



Source: Duke Realty Corporation

### 3.5.2 DoD Shuttles

As shown in Table 3-3, which presents the DoD shuttle plan, DoD shuttles will operate frequent service between BRAC 133 and five key Metrorail stations: Pentagon, King Street, Ballston, West Falls Church, and Franconia-Springfield.

Service will operate Monday through Friday from 5:30 AM to 7:30 PM. During peak hours (6:30 AM to 9:30 AM and 3:30 PM to 6:30 PM) all routes will operate on 10-minute headways with the exception of the West Falls Church route which will operate on 15-minute headways. During off-peak hours service will be provided between BRAC 133 and the Pentagon every 15 minutes and between BRAC 133 and Franconia-Springfield every 30 minutes. The service will be provided through a combination of vehicles depending on the route. The West Falls Church route will be served by 25-passenger vehicles, King Street route by 30-passenger vehicles, Ballston and Franconia-Springfield route by 35-passenger

## SITE CONDITIONS

vehicles, and the Pentagon route by 45-passenger vehicles. Preliminary proposed routing for these routes is shown in Figure 3-8. Overall, the shuttle plan provides capacity to serve 3,000 employees during peak periods, or 47 percent of the employee population. Regulations governing DoD bus transportation services allow the Secretary of Defense to authorize modified shuttle bus service for employees and contractors between transit centers and BRAC 133.

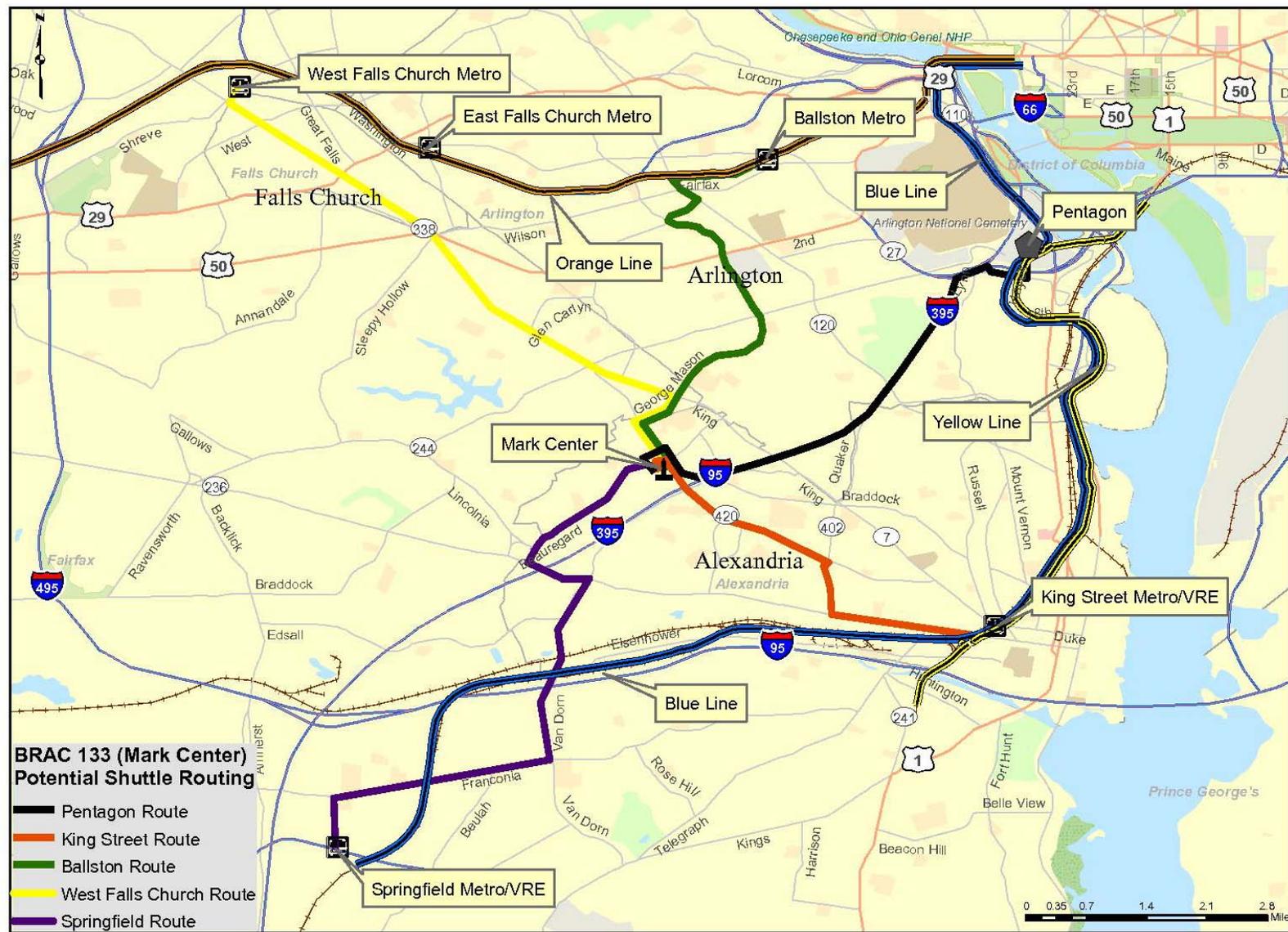
**Table 3-3: DoD Shuttle Plan**

Route	Number of Seats per Bus	Number of Runs per Hour		Capacity		
		Peak	Off-Peak	AM Peak	PM Peak	Off-Peak
King Street Route	30	6	0	540	540	-
Pentagon Route	45	6	4	810	810	1,440
Ballston Route	35	6	0	630	630	-
West Falls Church Route	25	4	0	450	450	-
Franconia-Springfield Route	35	6	2	630	630	560
<b>TOTAL</b>				<b>3,060</b>	<b>3,060</b>	<b>2,000</b>

Source: WHS

As the exact demand at each Metrorail station cannot be anticipated at this time, and as demand will change over time as employees move and/or as changes occur to local transit options, WHS will monitor the use of the shuttles on a periodic basis and make adjustments to reflect actual ridership and demand. This will be especially important during the first 6 months as employees adjust to their new commute. At the 3-month and 6-month mark WHS will conduct a detailed analysis of ridership trends to determine if adjustments are needed at that time, and annually thereafter. On-board passenger counters on each vehicle will facilitate ease and accuracy of data collection.

Figure 3-8: Potential Shuttle Routing



Source: WHS

### 3.6 Parking

#### 3.6.1 BRAC 133 Parking

As was previously shown in the site plan in Figure 3-1, there are two parking garages, one of which is within the secure perimeter. The North Parking Garage (located outside of the secure perimeter), will contain 2,032 parking spaces while the South Parking Garage (located within the secure perimeter) will contain 1,715 spaces for a total of 3,747 parking spaces in total between the two garages. It should be noted, however, that a number of these parking spaces will be set aside for particular uses as described below:

- **Disabled Parking:** BRAC 133 will have 48 disabled parking spaces per ADA requirements<sup>34</sup>. These parking spaces will be located at the ground level in the South Parking Garage in order to be located within shortest walking distance to building entry. An additional three ADA parking spaces will be located in the visitor parking section of the North Parking Garage. It should be noted that in order to qualify for a disabled parking permit, employees must first apply for a permit and supply a physician's certification from a medical evaluation deeming the applicant as disabled.
- **Carpool/vanpool Parking:** There will be a large number of preferential parking spaces that are set aside for carpools/vanpools, as the building is being designed to meet LEED Gold standards and requirements for LEED Gold certification<sup>35</sup>. The North Parking Garage contains 320 parking spaces that will be reserved for carpools and vanpools. In the event there is a higher demand for carpool/vanpool parking than allocated, WHS will meet the demand. Carpool/vanpool parking will not be capped.
- **Alternative Fuel and Low/No Emission Vehicle Parking:** Also in line with LEED Gold certification requirements, a large number of parking spaces are set aside for alternative fuel vehicles, low/no emission and/or fuel-efficient vehicles. There are 192 spaces reserved for alternative fuel vehicles (including ultra low sulfur diesel, CNG, LNG, electric, fuel cell, E85, as well as an average B50 biodiesel in a standard diesel engine), low-emission vehicles, and fuel-efficient vehicles (ZEVs), located in the South Parking Garage.
- **Government Vehicles:** There will be a total of 150 parking spaces set aside for government vehicles.
- **Visitor Parking:** There are a total of 67 visitor parking spaces which are all located in the North Parking Garage, outside of the secure perimeter. This section of the garage is separate from the main garage, and access will be controlled manually by PFPA PMB staff working from the VCC. Visitor access was previously described in detail in Section 3.2.3, Internal Site Access.

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<sup>34</sup> Section 4.1.2 of ADA Accessibility Guidelines for Buildings and Facilities, <http://www.access-board.gov/adaag/html/adaag.htm#4.1> (last accessed May 10, 2010).

<sup>35</sup> "LEED-NC Application Guide for Multiple Buildings and On-Campus Building Projects", October 2005, <http://www.usgbc.org/ShowFile.aspx?DocumentID=1097> (last accessed May 10, 2010).

3.6.2 Park and Ride Lots

As the BRAC 133 commuter population is greatly dispersed throughout the region and mostly concentrated around transit corridors, and as over 40 percent of commuters will use alternative modes of transportation, including transit, slugging, and vanpooling, commuters may need to take advantage of park and ride lots that are available throughout the region. As shown in Figure 3-9, many park and rides are located in areas highly concentrated by BRAC 133 employees, making park and rides a convenient option for commuters who decide to utilize transit, carpooling, vanpooling, and/or slugging. Currently, many park and ride lots are underutilized and have excess capacity to accommodate much of the BRAC 133 commuting population. Table 3-3 illustrates the region’s overall park and ride lot capacity while Table 3-4 illustrates WMATA-operated park and ride capacities for select Metrorail stations in Northern Virginia. See Appendix E for details on regional park and ride lot capacities and select park and ride utilization rates.

Table 3-4: Regional Park & Ride Parking Capacity

Park and Ride Locations	Parking Capacity
Maryland or DC	61,273
Fairfax County	10,059
Other NoVA	13,087
Metro Rail Station	17,973
<b>Total</b>	<b>102,392</b>

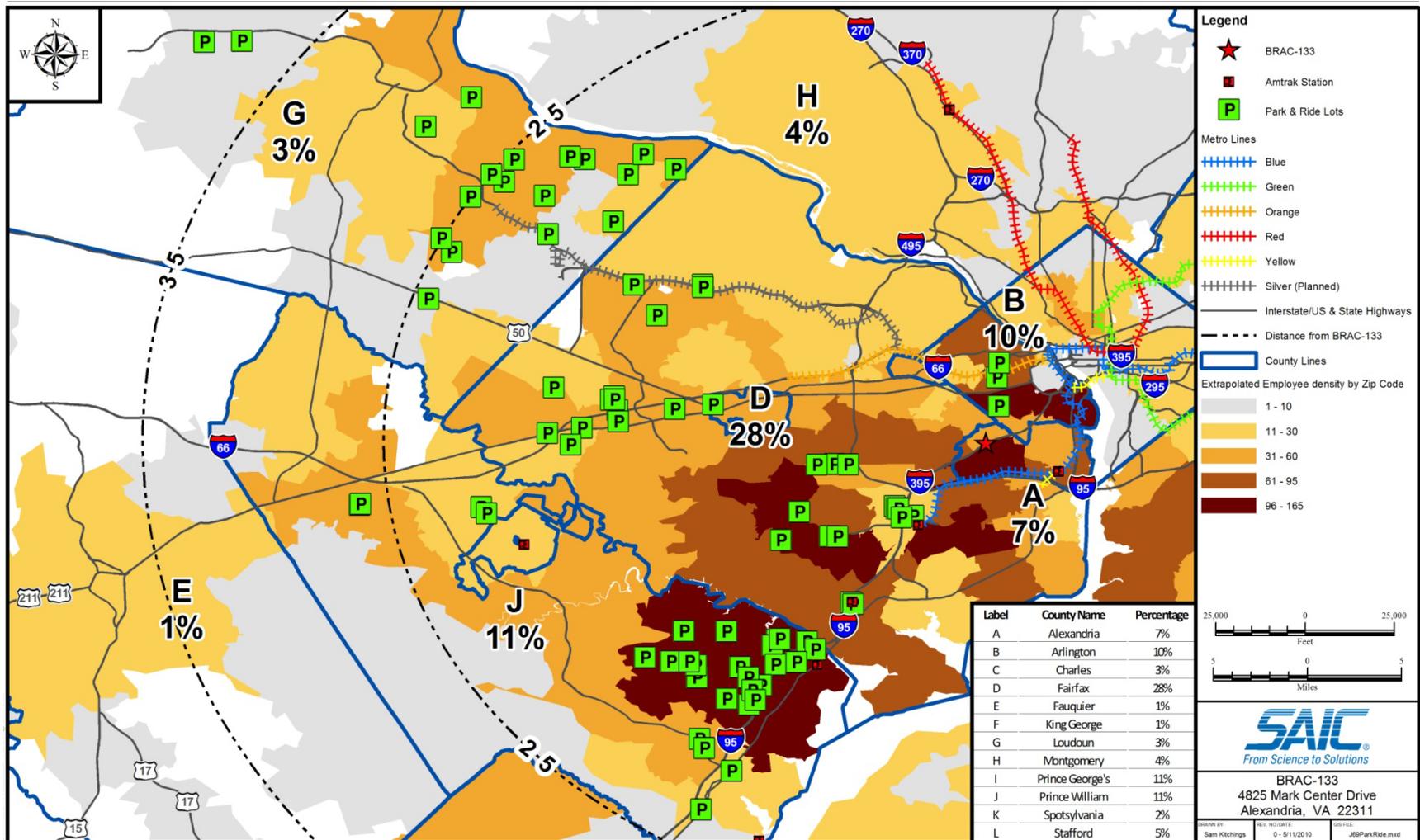
Sources: VDOT;  
 MWCOG Commuter Connections Website,  
<http://www.mwcog.org/commuter2/commuter/ridesharing/prlocations.html>, last  
 accessed May 1, 2010.  
 Arlington County Commuter Page, <http://www.commuterpage.com/parkandride.htm>,  
 last accessed May 1, 2010.

Table 3-5: Parking Capacity for Select Metrorail Stations in the Region

WMATA Metrorail Park & Rides	Parking Capacity
Huntington	3,617
West Falls Church	2,009
Dunn Loring	1,326
Vienna	5,169
Franconia-Springfield	5,069
Van Dorn	361
East Falls Church	422
<b>TOTAL</b>	<b>17,973</b>

Source: MWCOG Commuter Connections Website,  
<http://www.mwcog.org/commuter2/commuter/ridesharing/prlocations.html>  
 (last accessed May 1, 2010).

Figure 3-9: Park and Ride Lots in Northern Virginia Relative to BRAC 133 Employees



Source: ESRI, VDOT

## 4.0 Traffic Impact Analysis

### 4.1 Summaries of Previous Traffic Studies

#### 4.1.1 Mark Centre Parcel 1A and 1B Traffic Impact Study and Transportation Management Plan, Wells and Associates, March 31, 2003

##### ***Scope of Analysis***

The study was prepared for the Mark Winkler Company. The purpose of the study was to evaluate the traffic impacts from developing Parcels 1A and 1B, a total of 1,743, 116 square feet of office space by Mark Winkler Company previously approved by City of Alexandria. Traffic impacts from the generated trips on the adjacent roadway network were analyzed and roadway improvements along with TDM strategies were proposed to achieve mobility.

##### ***Methodology***

The TIS/TMP included the following tasks:

- Conducted traffic counts of adjacent roadway network
- Used ITE trip generation rates for Parcels 1A, 1B and IDA Building based on net square footage of the floor area for office land use; number of employees were not considered
- Projected future traffic without ambient growth adjustment
- Used 10 percent TMP reduction for mode choice
- Distributed trip distribution based on then existing traffic patterns
- Level of service analysis for the existing intersections with and without projected development trips
- Identified TDM strategies to reduce the proportion of single occupancy vehicle trips and to promote transit, shuttle bus, rideshare and flexible work schedules among employees

Based on the level of service analysis of the future traffic demand, the following roadway improvements were identified as necessary to maintain the existing LEVELS OF SERVICE at the signalized intersections,

- Third west bound-to-southbound left-turn lane along Seminary Road at North Beauregard Street
- Second southbound-to-eastbound left turn lane along North Beauregard Street at Mark Center Drive
- Installation of a new traffic signal at the Mark Center Drive/IDA Drive on-site intersection

##### ***Study Conclusions***

The report concluded that with the implementation of the proposed roadway improvements and 10 percent TMP trip reduction, all study intersections will operate at an acceptable level of service under full build-out and occupancy conditions.

### 4.1.2 Seminary Road / Beaugard Street Corridor Study, Wilbur Smith Associates, January 19, 2007

#### ***Scope of Analysis***

The study was completed for the City of Alexandria. The purpose of the study was to identify, analyze, and make short and long term recommendations to address operational and safety issues within the study corridor. The study area included the section of Beaugard Street between Seminary Road and Mark Center Drive.

#### ***Methodology***

The study utilized a series of neighborhood meetings to identify traffic issues and concerns along the corridor. Vehicle and pedestrian traffic counts were taken to establish baseline conditions. Future conditions assumed office development of Mark Center Parcels 1A and 1B. The traffic forecasts prepared by Wells and Associates, TIMP, March 2003 were used to develop future volumes. Several scenarios of road improvements were evaluated by the study which included widening of Seminary Road and Beaugard Street to allow additional turn lanes.

#### ***Study Conclusions***

The report concludes with a series of short term (within 2 years) and mid-term (5-10 years) recommendations to improve safety and mobility. Many of the recommendations are focused on improving access by pedestrians and transit users.

### 4.1.3 I-95/I-395 Transit/TDM Study, TDM Technical Committee, Virginia Department of Rail and Public Transportation, February 29, 2008

#### ***Scope of Analysis***

This study was made in conjunction with the I-95/ I-395 HOV/Bus/HOT lane project to specifically address transit needs and services within the corridor. The study provides a comprehensive examination of existing transit services within the corridor.

#### ***Methodology***

A set of alternatives were evaluated based upon a tiered level of investment. The Federal Highway Administration (FHWA) TDM model was used to predict changes in travelers' likelihood to use various modes of travel when offered particular TDM strategies. In other words the study could evaluate strategies to reduce single occupancy vehicles.

#### ***Study Conclusions***

The study includes an investment strategy to fund the recommended Refined Alternative and Park and Ride Analysis with estimates of anticipated available revenues.

#### 4.1.4 Transportation Improvement Management Plan (TIMP), Wells and Associates, July 30, 2008

##### ***Scope of Analysis***

Prepared for WHS and Duke Realty Corporation, the study updates and supersedes the March 31, 2003 Traffic Impact Study and Transportation Management Plan approved by the City of Alexandria. The revised TIMP is based on the specific BRAC-133 requirements of the proposed WHS development at the Mark Center site. The TIMP examines the existing intersection levels of service for seven off-site and two on-site intersections; projects future traffic volumes, with and without BRAC 133; estimates BRAC 133 auto-, shuttle bus-, and truck-trips; analyzes future intersection levels of service, with and without BRAC 133; and provides a queuing analysis.

##### ***Methodology***

The TIMP was based on the following assumptions:

- Traffic counts:
  - Used May 2002 data without ambient growth adjustment
  - Used ITE trip generation rates for IDA Building 5 with a 10 percent TMP reduction.
  - Trip distribution based on then existing traffic patterns
  - Trip generation for WHS facility based three work shifts per day with 83 percent of total employees scheduled for day shift. The trip generation rate is further adjusted 25 percent to discount employees not reporting to work due to illness, vacation or on flex time
  - Of employees reporting to work 60 percent are expected to drive automobile.
- Anticipated improvements for projected LEVELS OF SERVICE:
  - Third west bound-to-southbound left-turn lane along Seminary Road at North Beauregard Street
  - Second southbound-to-eastbound left turn lane along North Beauregard Street at Mark Center Drive
  - Installation of a new traffic signal at the Mark Center Drive/IDA Drive on-site intersection
  - Signal timing optimization

##### ***Study Conclusions***

- “All signalized intersections are forecasted to operate at LOS “D” or better during both the AM and PM peak hours, with the additional traffic generated by full build out and occupancy of WHS.”
- “Sufficient garage driveway capacity and multiple points of access will be provided to adequately accommodate peak hour traffic expected to be generated by build out and full occupancy of WHS.”

- Mark Center is currently serviced by several mass transit services that provide access to multiple Metrorail stations on three Metrorail lines (Orange, Blue, and Yellow).

### **4.1.5 I-95/I-395 HOV/Bus/HOT Lanes Interchange Justification Report (IJR), HNTB, January 7, 2009**

#### ***Scope of Analysis***

The IJR was prepared for VDOT for submission to the Federal Highway Administration for approval of a proposed interchange and access modifications to a 36-mile section of I-95/I-395 between Garrisonville Road (Route 610) in Stafford County and Boundary Channel Drive in Arlington County. The project proposes to add a third lane to the existing 28-miles of HOV lanes on I-95/I-395 from South Eads Street near the Pentagon in Arlington County, to their existing southern terminus Route 234 (Dumfries Road) near Dumfries in Prince William County and to convert these lanes to HOV/Bus/HOT lanes. In addition, the project proposes to improve modal interrelationships by adding new direct ramp access from the HOV/Bus/HOT lanes to the GP lanes at eleven (11) locations, one of which is at Seminary Road. The change will allow transit vehicles to use the HOV/Bus/HOT lanes toll free and implement TDM strategies that will improve the interrelationships between GP lanes, HOV/Bus/HOT lanes, mass transit, and ridesharing along the I-95/I-395 corridor.

#### ***Methodology***

The operational performance of I-95/I-395 was evaluated for three analysis years: existing conditions, opening year (2015) and design year (2030). Raw traffic forecast model data were post processed for future 2015 and 2030 Build and No-Build forecast scenarios on the mainline, HOV/Bus/HOT lanes, ramps, and interchanging crossroad intersections. The post processing of forecast mainline and ramp volumes were based on procedures detailed in *NCHRP 255, Highway Traffic Data for Urbanized Area Project Planning and Design*.

#### ***Study Conclusions***

The study concluded that the proposed project will relieve congestion at key locations within the improvement limits and meets the justification requirements specified by the FHWA.

### **4.1.6 Mark Center (BRAC) Transportation Study, Technical Memorandum, Parsons Brinkerhoff (PB), April, 2009**

#### ***Scope of Analysis***

This study was prepared for the Virginia Department of Transportation (VDOT). The purpose of the study was to evaluate the impact of BRAC development at the Mark Center on the surrounding arterials and the I-395 Interchange. The Technical Memorandum provides a critical review of the July 2008 TIMP and includes its own independent traffic analysis of the existing, opening year and 2030 traffic conditions.

***Methodology***

The PB report analyzed the same seven signalized intersections as the TIMP study. The number of trips generated by the WHS facility was adjusted upward to be consistent with the number of available parking spaces. A 0.5 percent annual growth rate was used for calculating 2030 traffic volumes.

Synchro files were obtained from the City of Alexandria and VDOT and field verified for the analysis.

***Study Conclusions***

The proposed off site road improvements identified in the TIMP will not be adequate to handle the additional site generated traffic and several of the intersections would operate at LOS E or F. The study suggested that direct access to Mark Center from I-395 is warranted to provide an alternative path and redistribute traffic.

**4.1.7 Memorandum - Mark Center Transit Center, Wells and Associates, April 17, 2009**

***Scope of Analysis***

The study reviewed the number of buses that might potentially serve the new Transportation Center on Mark Center Drive.

***Methodology***

The study examined existing bus routes serving Mark Center and anticipates diversion of WMATA and Dash buses from their present route through the Mark Transportation Center. In addition to public transit the analysis included existing Duke Shuttle trips and estimated WHS shuttle trips.

***Study Conclusions***

The analysis projected that the Mark Center Transportation Center could potentially be served by 69 buses including public transit vehicles and DoD shuttles during both the AM and PM peak hour.

**4.1.8 WHS Internal Roadway Network Traffic Analysis, Wells and Associates, August 20, 2009**

***Scope of Analysis***

This technical memorandum updates an earlier memorandum prepared for Duke Realty which analysis the internal road network serving the BRAC 133 site and the pending WHS building.

***Methodology***

The trip generation and distribution assumption used for the July 2008 TIMP were used for the internal analysis. Level of service and queue analyses based on the Highway Capacity Manual (HCM) intersection analysis methodology were completed on critical intersections. The analysis also includes an examination of the entry control facility with respect to traffic operations.

### ***Study Conclusions***

The study concluded that the proposed roadway network with three ID check stations at the Access Control Point will operate “generally well” during the AM and PM peak hours.

#### **4.1.9 Mark Center (BRAC 133) Transportation Study, Vanasse Hangen Brustlin, Inc. (VHB), November 2, 2009**

### ***Scope of Analysis***

This study was prepared for the City of Alexandria. It evaluated a series of conceptual alternatives to provide additional access to BRAC 133 site and the parking garage. The VHB study looked at direct access and egress from I-395 to BRAC 133 and the south parking structure in addition to the programmed improvements to the turn lanes on Seminary Road and North Beauregard Street.

### ***Methodology***

- Collected new traffic count data to assess weekday AM and PM peak hour traffic
- Alternatives were assessed based on 2013 estimated traffic volumes
- Based on the MWCOG Travel Demand Model an annual growth rate of 0.51 percent was assumed for 2013 traffic volume projections
- Baseline conditions for the trip generation included BRAC 133, IDA, and the 4661 Kenmore Avenue Medical Office Building
- Modeling based on HCM module in Synchro and VISSIM(Version 5.10)

### ***Conceptual Alternatives Evaluated Under Projected 2013 Conditions***

- New Ramp to South Parking Garage with and without turn lane improvements
- New Ramp to Mark Center Drive with and without turn lane improvements
- New Ramp to South Garage and Mark Center Drive with and without turn lane improvements
- Additional left turn lanes on westbound Seminary at North Beauregard Street (triple left) and on southbound North Beauregard Street at Mark Centre Drive (double left) without access ramps

### ***Study Conclusions***

The turn lane improvements will have little effect on improving the AM and PM peak hour operations. Given continued growth of the corridor, the area would benefit from direct access to the Mark Center Drive from I-395.

#### **4.1.10 Mark Center (BRAC 133) Access Study, Virginia Department of Transportation, December 2009**

### ***Scope of Analysis***

This study prepared under the direction of VDOT is an operational analysis of the I-395/Seminary Road interchange and surrounding local street network providing access to Mark Center. The study was initiated at the request of the City of Alexandria and the U.S. Army in order to document the impact of

the anticipated employment activity in the area primarily resulting from the relocation of 6,409 DoD personnel to BRAC 133 and to identify transportation solutions to mitigate such impacts.

### ***Methodology***

The study includes an operational analysis based on current conditions (2009) and as well as projected traffic volumes for 2015 and 2035. The analysis took into consideration programmed intersection improvements at Mark Center as well as the planned HOT lane project on I-395. In addition to the “No-Build” scenario, the study identified seven unique “Build” alternatives that would facilitate access from I-395 to Mark Center. A detailed traffic operations analysis of the no-build scenario and two of the build scenarios are included in the study. The operations analysis utilized both VISSIM and HCS modeling.

### ***Conceptual Alternatives Evaluated***

- No-Build Scenario which included programmed intersection improvements, HOT lane improvements, transportation system management improvements as well as TDM strategies incorporated herein
- Alternative A1 – Access to the South Parking Garage via a braided flyover along the existing I-395 southbound ramp
- Alternative D – Access to Mark Center Drive from the I-395 HOT lane via a one-lane, reversible ramp with a connection with a South Parking Garage exit lane

### ***Study Conclusions***

The study identified five areas of operational deficiencies under the 2035 No-Build peak traffic conditions. Three of the five involved unacceptable levels of service on the GP lanes on I-395; the fourth affected the signalized “rotary” at the second level of the I-395 and Seminary Road interchange; and the fifth area involved the arterial intersection in the vicinity of the BRAC 133 development. Alternative D was found to produce “better levels of service” for each of the five areas whereas Alternative A1 only improved deficiencies at the arterial intersections with either no improvement or worse levels of services on I-395 and the Seminary Road interchange<sup>36</sup>. VDOT is continuing to evaluate new alternatives to establish a direct ramp access from I-395 South to Mark Center.

#### **4.1.11 Technical Memorandum, Task 4.1: Analysis of Existing and Potential Transit Demand, WMATA, January 2010**

### ***Scope of Analysis***

The report was prepared under the direction of the WMATA in order to anticipate the effect of eight BRAC sites within the metropolitan Washington region on public transit. Estimates of public transit use at the eight sites were developed for the BRAC deadline year of 2011 and 2020.

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<sup>36</sup> *Mark Center (BRAC 133) Access Study, Virginia Department of Transportation, December 2009.*

### ***Methodology***

The study used MWCOG's Census Transportation Planning Package with data by Transportation Analysis Zones to estimate the distribution of residence locations by installation personnel and the share of personnel using public transit. When available employee surveys were compared to the TAZ data and adjustments made to the model as to reflect the survey data. At the time of the study no survey data was available and 2006 employee payroll data from the Fort Belvoir EIS was used to estimate the residential distribution of DoD/WHS employees relocating to Mark Center. High and low scenarios were developed based on the amount of employee parking that is planned for the center and assumption regarding the split between car / vanpooling and transit use.

### ***Study Conclusions***

The transit mode use is expected to range between 13 and 26 percent. The lower number is based on carpooling and van pooling to be more highly used and is the more likely scenario after the opening of the planned HOV off-ramp to Seminary Road.

### **4.1.12 Technical Memorandum, Task 4.2: Development of Transit Service Plan, WMATA, January 2010**

#### ***Scope of Analysis***

This report presents service planning concepts for the seven military installations that will gain employees as a result of the BRAC process in the metropolitan Washington region. The discussion of each site begins with a summary of the range of transit demand estimated in Task 4.1. The service planning takes into consideration not only existing service proposals but identifies additional service improvements that may be implemented to accommodate additional transit use as a result of the BRAC initiatives.

#### ***Methodology***

The study identifies existing transit services available to the gaining sites and describes transit improvements that are being proposed to support additional transit demands. The study did not examine vehicle loads or running times. Further studies will address crowding and reliability issues.

#### ***Study Conclusions***

A variety of modifications and improvements to the bus routes which would improve transit service for BRAC 133 employees are identified. However, the report concluded that shuttle bus service offered by DoD would provide the most effective connections to the rail network

## 4.2 Study Area

### 4.2.1 Streets and Intersections Examined

The traffic analysis study area along I-395 mainline extends north and south of the Seminary Road interchange, inclusive of Seminary Road entrance and exit ramps and ramp influence areas along Seminary Road from Library Lane on the east to North Beauregard Street to the west; and along North Beauregard Street from Seminary Road to Mark Center Drive intersections. Figure 4-1 shows the extents of the traffic analysis study area.

The following signalized and unsignalized intersections that are part of the adjacent roadway network within the study area were analyzed for optimum traffic operations:

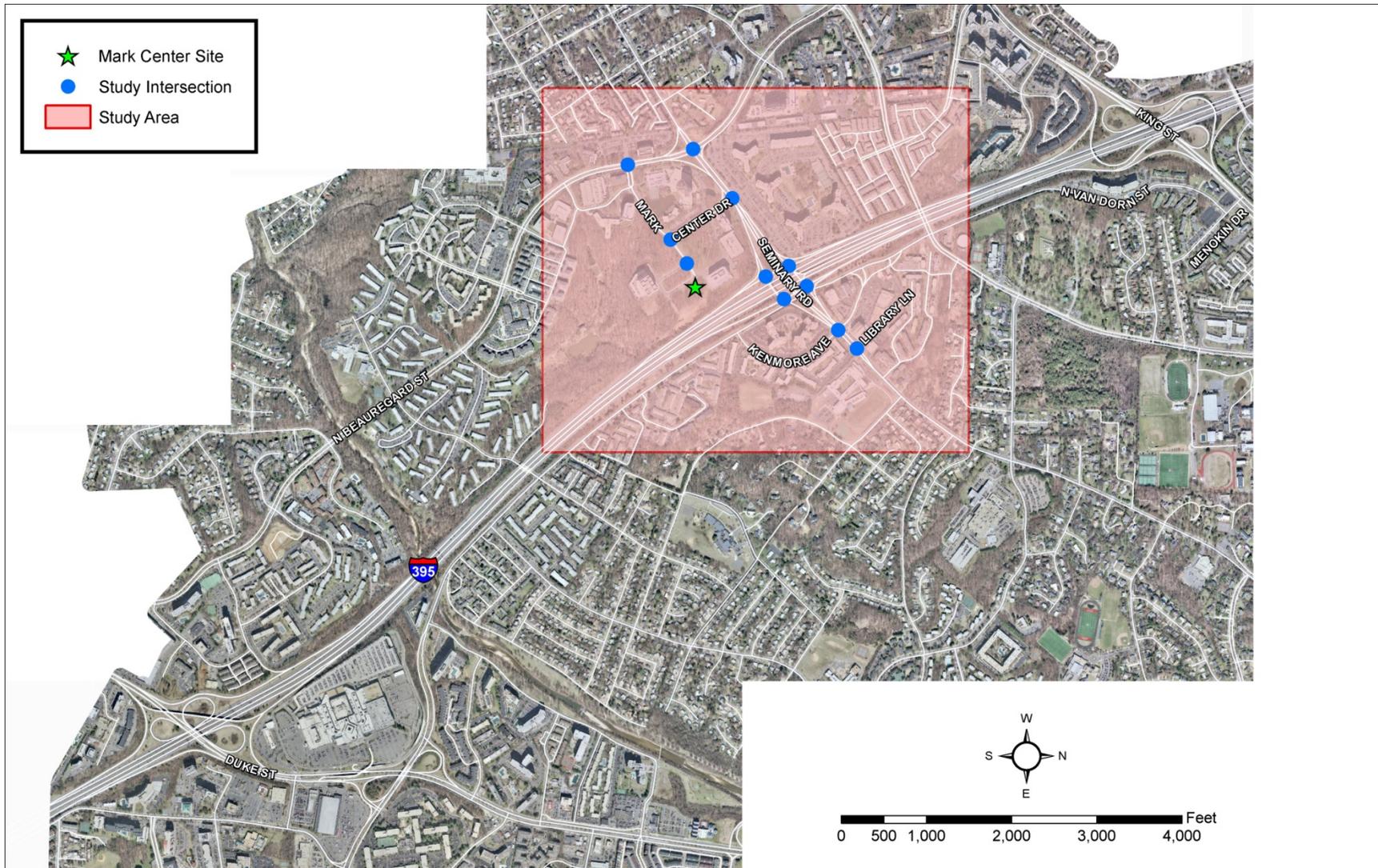
- Seminary Road / Library Lane
- Seminary Road / Kenmore Avenue
- I-395 Northbound Ramps / Seminary Road
- I-395 Southbound Ramps / Seminary Road
- Seminary Road / Mark Center Drive
- North Beauregard Street / Seminary Road
- North Beauregard Street / Mark Center Drive

In addition, the following signalized and non-signalized intersections that are part of the internal roadway network within the study area were also analyzed for optimum traffic operations:

- Mark Center Drive signalized intersection
- WHS Circle/IDA Drive - North Parking Garage roundabout

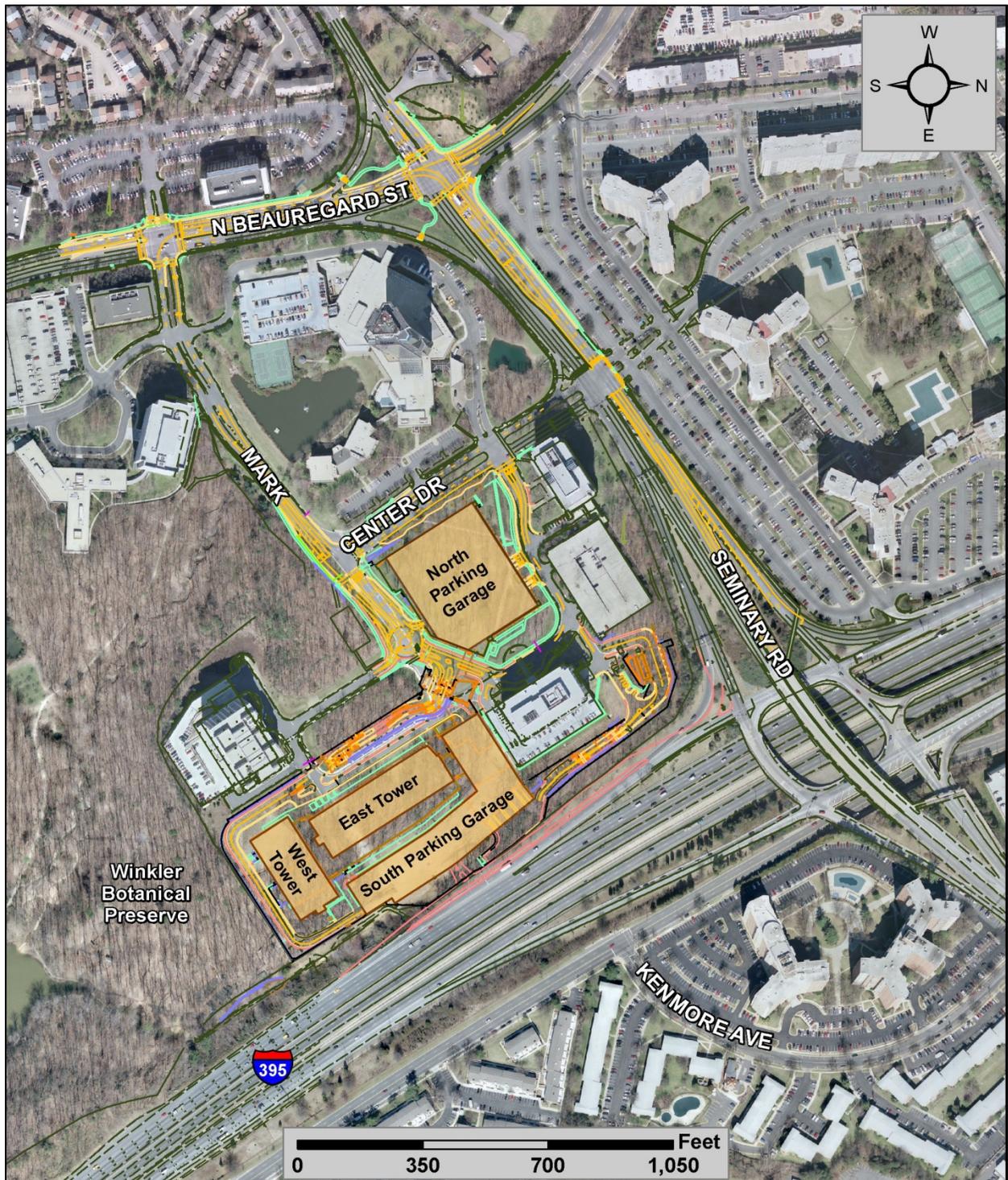
Figure 4-2 shows an overall site plan highlighting the proposed BRAC 133 development and the adjacent roadway network.

Figure 4-1: Traffic Analysis Study Area Extents



Source: ESRI

Figure 4-2: Overall Site Plan



Source: "City of Alexandria GIS DVD," "Overall Site with Improvements" AutoCAD Drawing, USACE, March 01, 2010.

### 4.2.2 Existing Roadway Conditions

The existing roadway geometry, lane configuration, roadway widths, storage bay lengths, intersection traffic control and signal timing parameters were inventoried and utilized to analyze the existing traffic operations. Figure 4-3 shows the existing lane geometry and traffic control for the study area along with the interim roadway improvements that are currently under construction and scheduled for completion before September 15, 2011<sup>37</sup>.

#### ***I-395 and Seminary Road Interchange:***

I-395 through the study area is a seven-lane GP facility along with two barrier-separated exclusive High Occupancy Vehicle (HOV) lanes to the left side of the GP lanes. The GP lanes are 12 feet wide, with 12-foot wide outside shoulders and 6-foot wide inside shoulders, providing three northbound and four southbound freeway lanes. A full service rotary interchange at Seminary Road allows access from the GP lanes. Existing ramp configurations at the Seminary Road merge and diverge locations are as follows:

- Single lane exit ramp from northbound I-395 GP lanes - 700 foot long deceleration lane
- Double lane entrance ramp to northbound I-395 GP lanes - full auxiliary lane to King Street and 650 foot long acceleration lane
- Double lane exit ramp from southbound I-395 GP lanes - full auxiliary lane from King Street and 100 foot long deceleration lane
- Single lane entrance ramp to southbound I-395 GP lanes - 200 foot long acceleration lane

The I-395 HOV lanes are reversible serving northbound directional traffic demand during the morning peak hour and southbound directional traffic demand during the evening peak hour. I-395 HOV lanes are restricted to motor vehicles with three or more occupants during the peak hour. Transit and shuttle buses serving federal employees are allowed to use the HOV lanes. There is no direct HOV access from I-395 northbound to Seminary Road; however, a single lane HOV ramp with a 450 foot long acceleration (or deceleration) lane allows direct access from Seminary Road to northbound I-395 HOV lanes during the morning peak period, and reversible access from southbound I-395 HOV lanes to Seminary Road during the evening peak period. This HOV access will not benefit the BRAC 133 traffic accessing the Mark Center site from either the north or south directions. The closest I-395 HOV exits to access the Mark Center site in the morning peak hour would be the Springfield exit south of the site and the Pentagon exit north of the site. Drivers exiting the HOV lanes at these locations will have to travel along the northbound and southbound I-395 GP lanes, respectively, to access the site. The HOV lane entry points for vehicles exiting the Mark Center site in the evening peak hour would be the Pentagon entrance to the north of the site and the Duke or Springfield entrances to the south of the site. Drivers entering the HOV lanes at these locations will have to exit the site and travel along the northbound and southbound I-395 GP lanes, respectively, to access the HOV lanes.

The ramp intersections are served by a rotary type interchange with four signalized intersections. These intersections can be coordinated with optimum cycle lengths to facilitate continued traffic flow within

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<sup>37</sup> *WHS Transportation Improvement and Management Plan, Wells and Associates, July 30, 2008.*

the rotary and reduce traffic queue buildup within the interchange and along the ramp approaches. The intersection approach lane configurations at the existing rotary interchange are shown in the above figure.

The existing geometry and traffic control features of the study area signalized intersections are shown below in Table 4-1<sup>38</sup>. Adequacy of the existing roadway capacity, lane configurations, storage bay lengths, and signal operations to serve the existing traffic demand are analyzed under existing traffic operations.

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<sup>38</sup> Aerial Image and Map Source: "City of Alexandria GIS DVD & Google Earth Imagery".

Figure 4-3: Existing and Proposed External Roadway Lane Geometry

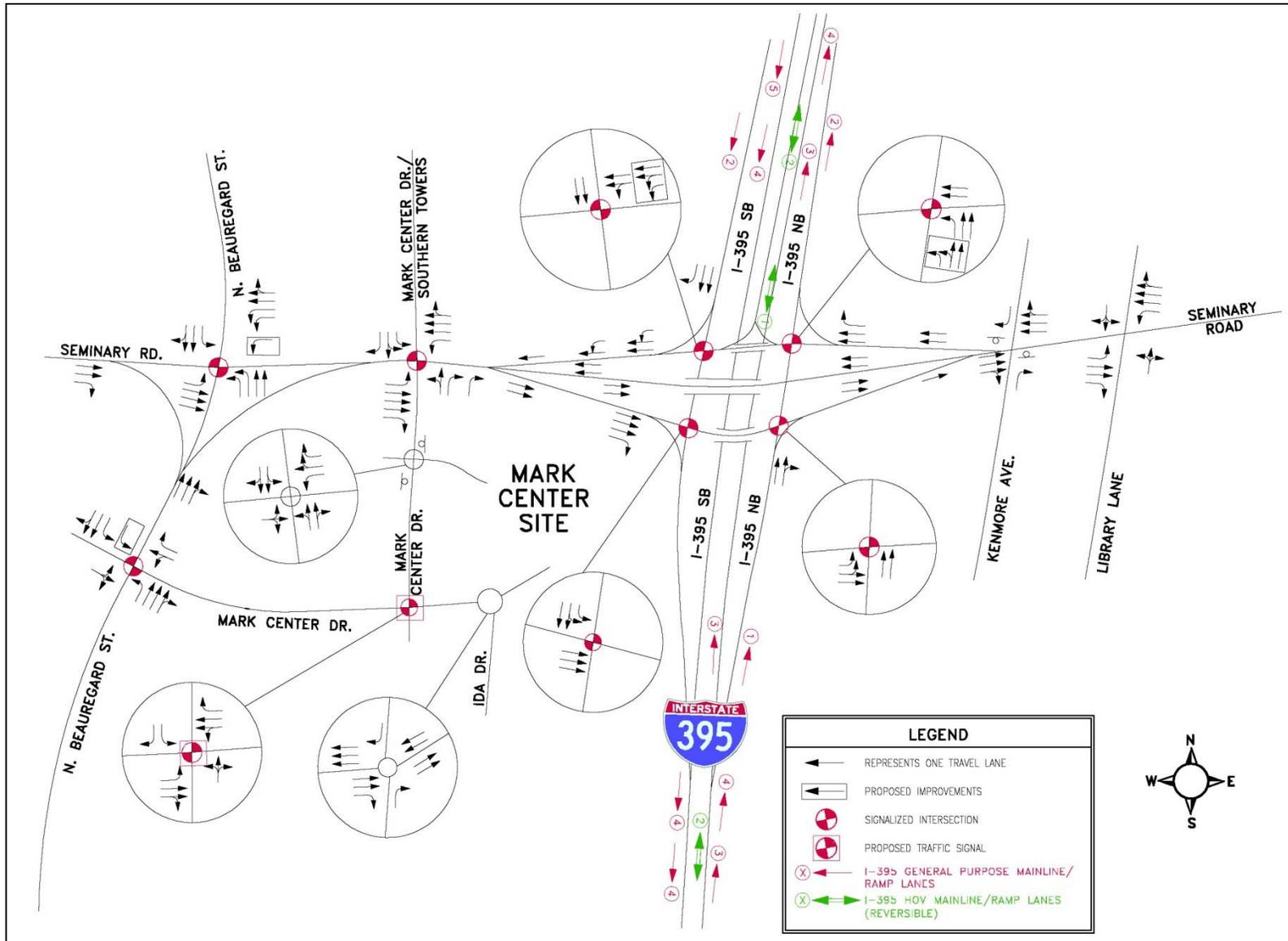


Table 4-1: Existing Roadway and Traffic Control Characteristics at Study Area Signalized Intersections

Intersection	Existing Approach Lane Configuration	Existing Traffic Control Characteristics
Seminary Road and Mark Center Drive	<p>12 ft wide travel lanes, unless otherwise noted</p> <p>Eastbound Approach - one 100 ft left turn bay, three exclusive through lanes, one exclusive free right turn lane from upstream Seminary Road and N. Beaugard Street</p> <p>Westbound Approach - one 120 ft left turn bay, two Seminary Road exclusive through lanes, one I-395 exit ramp movements shared through - right turn lane</p> <p>Northbound Approach - one shared left-through lane, two exclusive right turn lanes</p> <p>Southbound Approach - one exclusive left turn lane, one shared left-through lane and one exclusive right turn lane</p>	<ul style="list-style-type: none"> <li>Actuated-Coordinated Controller type</li> <li>Signal design allows crossing time for vehicular and pedestrian traffic</li> </ul>
Seminary Road and N. Beaugard Street	<p>12 ft wide travel lanes, unless otherwise noted</p> <p>Eastbound Approach - one 100 ft left turn bay, one exclusive through lane , one shared through- yield-controlled channelization right turn lane; Approach widens to three exclusive through lanes past the channelized right turn island</p> <p>Westbound Approach - one 200 ft left turn bay, one full left turn lane, one exclusive through lane, one shared through - yield controlled channelized right turn lane</p> <p>Northbound Approach - one 120 ft left turn bay, one full left turn lane, one exclusive through lane, one shared through-free right turn channelized lane</p> <p>Southbound Approach - one 90 ft left turn bay, one exclusive through lane, one shared through - right turn lane</p>	<ul style="list-style-type: none"> <li>Actuated-Coordinated Controller type</li> <li>Signal design allows crossing time for vehicular and pedestrian traffic</li> </ul>
N. Beaugard Street and Mark Center Drive	<p>12 ft wide travel lanes, unless otherwise noted</p> <p>Eastbound Approach - one 18 ft wide shared left-through- right turn lane</p> <p>Westbound Approach - one shared left-through lane, one full exclusive right turn lane</p> <p>Northbound Approach - one 150 ft left turn bay, one exclusive through lane , one shared through- right turn lane</p> <p>Southbound Approach - one 80 ft left turn bay, two exclusive through lanes, one shared through - right turn lane</p>	<ul style="list-style-type: none"> <li>Actuated-Coordinated Controller type</li> <li>Signal design allows crossing time for vehicular and pedestrian traffic</li> </ul>

### 4.3 Traffic Volumes

#### 4.3.1 Existing Traffic Volumes

Existing peak hour traffic data (2009) for the study area roadway network including I-395 mainline and ramps, Seminary Road, North Beaugard Street, Mark Center Drive and the roadway intersections were extracted from all prior Mark Center traffic studies and compared. Peak hour is that hour of the day when a roadway or public transport experiences the highest traffic demand. Traffic demand typically peaks once in the morning and once in the evening when most commuters travel. Even though peak periods extend anywhere from one to four hours, for analysis purposes, only the hours experiencing the highest demand in the morning and evening peak periods are used as samples.

After careful review, the reassigned-existing intersection turning movement counts from the *Wells & Associates 2008 Transportation Improvement and Management Plan (TIMP)*<sup>39</sup> were used in conjunction with the *City of Alexandria Mark Center (BRAC 133) Transportation Study* performed by VHB to develop future baseline traffic<sup>40</sup>. Existing traffic volumes and heavy vehicle percentages along I-395 GP and HOV mainline lanes and ramps were obtained from *VDOT's Mark Center (BRAC 133) Access Study Operational Analysis Report (IJR)*<sup>41</sup>. These volumes were balanced to obtain existing 2009 travel demand. Review of the MWCOCG travel demand model data conducted by previous studies indicate a half percent annual traffic growth rate for the study area roadway network.<sup>42</sup> This percent was utilized to project the existing 2009 traffic data to obtain baseline 2011 traffic data for the study area. Figure 4-4 shows the baseline traffic volumes for the year 2011 without BRAC growth. Peak hour heavy vehicle data obtained from VDOT's IJR for Mark Center reported a total of five percent trucks along I-395 mainline, with four percent utilizing the GP lanes, and one percent utilizing the HOV lanes.

The existing roadway conditions and 2011 baseline traffic volumes without BRAC growth were utilized to perform baseline traffic operational analysis to identify existing roadway and intersection locations operating at unacceptable levels.

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<sup>39</sup> *WHS Transportation Improvement and Management Plan, Wells and Associates, July 30, 2008.*

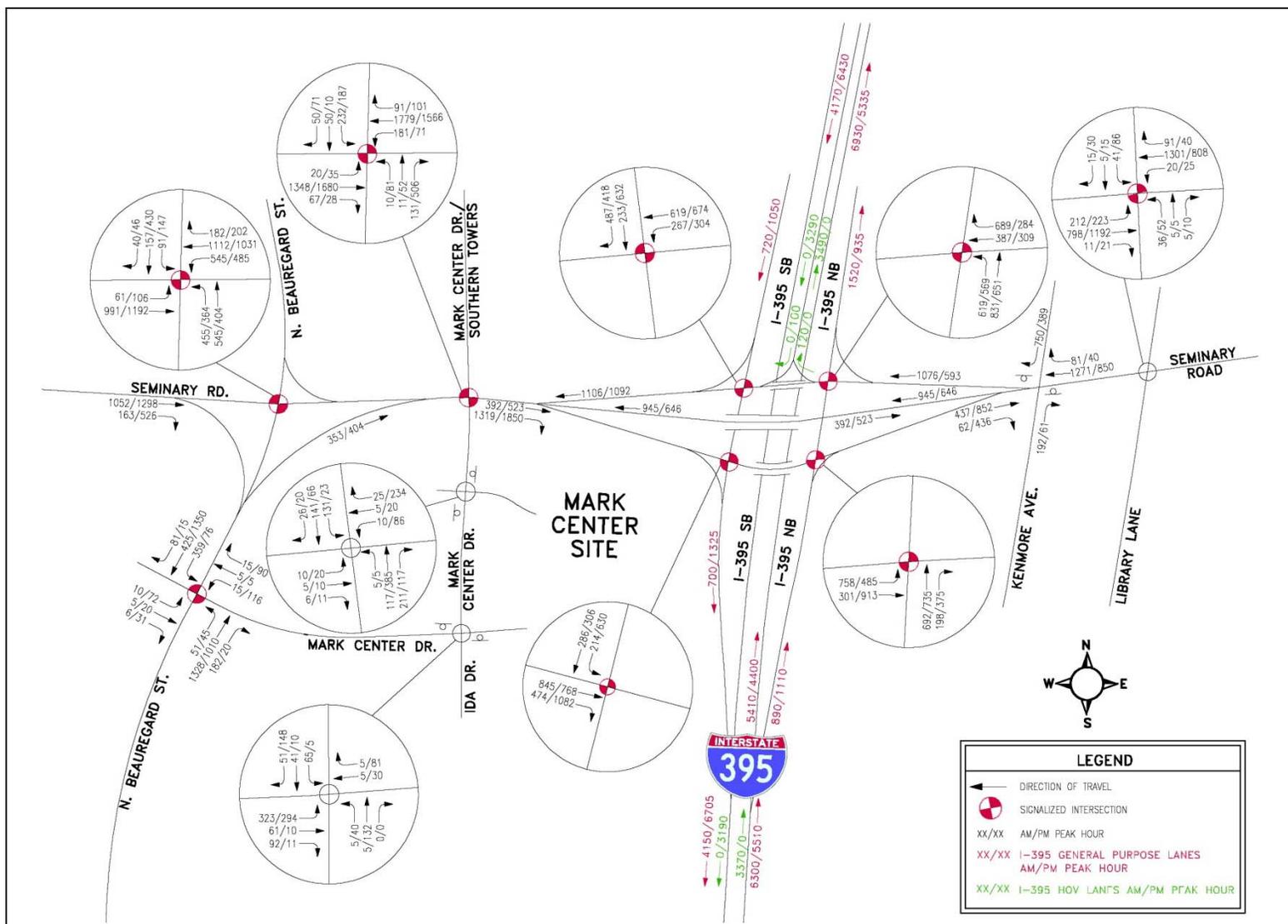
<sup>40</sup> *Mark Center (BRAC 133) Transportation Study, Vanasse Hangen Brustlin, Inc., November 2, 2009*

<sup>41</sup> *Mark Center (BRAC 133) Access Study Operational Analysis Report, VDOT web site*

<http://www.vamegaprojects.com/faqsdocuments/mark-center-documents> (last accessed May 1, 2010).

<sup>42</sup> *Mark Center (BRAC 133) Transportation Study, Vanasse Hangen Brustlin, Inc., November 2, 2009 & Mark Center (BRAC) Transportation Study, Technical Memorandum, Parsons Brinkerhoff (PB), April, 2009.*

Figure 4-4: Re-distributed 2011 Baseline Traffic Volumes without BRAC Growth



Data Source: WHS Transportation Improvement and Management Plan, Wells and Associates, July 30, 2008; Mark Center (BRAC 133) Transportation Study, Vanasse Hangen Brustlin, Inc., November 2, 2009; Mark Center (BRAC 133) Access Study Operational Analysis Report.

### 4.3.2 Projected Traffic Volumes

The projected trips identified in Section 2.3 were used in the determination of morning and evening peak hour trips and distribution of the projected peak hour trips along the existing adjacent roadway network roadway to determine projected traffic volumes for the 2011 build out condition. The morning and evening peak periods with the highest demand were identified from the fall 2009 WHS employee commute survey results along with the peak hours of travel during those periods. The travel patterns of the BRAC 133 employees indicate the morning peak period to the site extending from 6:00 AM to 9:00 AM with the highest peak hour demand occurring between 7:00 AM to 8:00 AM. The evening peak period extends from 3:00 PM to 6:00 PM with the highest peak hour demand occurring between 4:00 to 5:00 PM. The SOV trips including employee and visitor trips, and rideshare vehicle trips were distributed along the morning and evening peak periods of travel. Table 4-2 and Table 4-3 show the traffic distribution of the site generated trips for the morning and evening peak periods. The highest traffic demand from the morning and evening peak hours were used for trip distribution.

**Table 4-2: Projections of Peak Hour BRAC 133 Employee and Visitor SOV and Rideshare Trips – AM Peak Period**

Employee Occupancy	Total Number of Employees	57% Employee SOV Trips	Total Number of Visitor SOV Trips	11% Employee Rideshare Trips	AM Peak Period Trips				
					Hourly Trip Distribution	Peak Hour	Employee	Visitor	Rideshare
100% Occupancy	6409	3653	83	231	5%	5-6 am	183	4	12
					27%	6-7 am	986	22	62
					39%	7-8 am	1425	32	90
					24%	8-9 am	877	20	55
					5%	9-10 am	183	4	12
95% Occupancy	6089	3470	79	219	5%	5-6 am	174	4	11
					27%	6-7 am	937	21	59
					39%	7-8 am	1353	31	86
					24%	8-9 am	833	19	53
					5%	9-10 am	174	4	11
<b>90% Occupancy</b>	<b>5768</b>	<b>3288</b>	<b>75</b>	<b>208</b>	5%	5-6 am	164	4	10
					27%	6-7 am	889	20	57
					<b>39%</b>	<b>7-8 am</b>	<b>1282</b>	<b>29</b>	<b>81</b>
					24%	8-9 am	789	18	50
					5%	9-10 am	164	4	10
85% Occupancy	5448	3105	71	196	5%	5-6 am	155	4	10
					27%	6-7 am	838	19	53
					39%	7-8 am	1211	28	77
					24%	8-9 am	745	17	47
					5%	9-10 am	155	4	10

NOTE: (1) Refer to Section 2: Table 2-4 "Trip Projection of Mark Center Employees with Projected Mode Split".

(2) Assumes that the number of visitors per day is equivalent to 5% of the number of employees present on a typical day (as per previous Mark Center traffic studies). Assumes uniform visitor arrival rates throughout the day. Mode split for visitors was assumed to be the same as that of employees. Visitors attending conferences, seminars, and meetings at must conform to the parking protocol described in Section 5.4.4.

(3) Employee rideshare trips include trips generated by carpool and vanpool modes.

Table 4-3: Projections of Peak Hour BRAC 133 Employee and Visitor SOV and Rideshare Trips – PM Peak Period

Employee Occupancy	Total Number of Employees	57% Employee SOV Trips	Total Number of Visitor SOV Trips	11% Employee Rideshare Trips	PM Peak Period Trips				
					Hourly Trip Distribution	Peak Hour	Employee	Visitor	Rideshare
100% Occupancy	6409	3653	83	231	4%	2-3 pm	146	3	9
					21%	3-4 pm	767	17	48
					37%	4-5 pm	1352	31	85
					28%	5-6 pm	1023	23	65
					10%	6-7 pm	365	8	23
95% Occupancy	6089	3470	79	219	4%	2-3 pm	139	3	9
					21%	3-4 pm	729	17	46
					37%	4-5 pm	1284	29	81
					28%	5-6 pm	972	22	61
					10%	6-7 pm	347	8	22
<b>90% Occupancy</b>	<b>5768</b>	<b>3288</b>	<b>75</b>	<b>208</b>	4%	2-3 pm	132	3	8
					21%	3-4 pm	690	16	44
					<b>37%</b>	<b>4-5 pm</b>	<b>1216</b>	<b>28</b>	<b>77</b>
					28%	5-6 pm	921	21	58
					10%	6-7 pm	329	7	21
85% Occupancy	5448	3105	71	196	4%	2-3 pm	124	3	8
					21%	3-4 pm	652	15	41
					37%	4-5 pm	1149	26	73
					28%	5-6 pm	869	20	55
					10%	6-7 pm	311	7	20

- NOTE: (1) Refer to Section 2: Table 2-4 "Trip Projection of Mark Center Employees with Projected Mode Split".
- (2) Assuming that the number of visitors per day is equivalent to 5% of the number of employees present on a typical day (as per previous Mark Center traffic studies). Uniform visitor arrival rates were assumed throughout the day. Mode split for visitors was assumed to be the same as that of employees. Visitors attending conferences, seminars, and meetings at must conform to the parking protocol described in Section 5.4.4.
- (3) Employee rideshare trips include trips generated by carpool and vanpool modes.

The BRAC 133 site-generated employee and visitor trips were combined with the proposed IDA Building generated trips to obtain the overall generated trips to the future Mark Center location. The incoming and outgoing vehicle percentages were obtained from the *Wells & Associates 2008 TIMP*<sup>43</sup>. Table 4-4 shows the total BRAC 133 and IDA generated trips and the incoming and outgoing split for the AM and PM peak hour. Trips generated by BRAC 133 include those of employees, contractors, and other support personnel such as security staff, maintenance personnel, building management, and other support staff. To account for shift workers, and employees departing the site for meetings, a small percent of trips have been assumed to exit the site during the morning peak hour and enter the site during the evening peak hour. This is in alignment with Institute of Transportation Engineers recommended directional distribution for an office park and in conformity with all the prior Mark Center traffic studies.

**Table 4-4: BRAC 133 and IDA Building Site-Generated Trips**

90% Typical Day Shift Employee Occupancy	AM Peak Hour Trips			PM Peak Hour Trips		
	IN	OUT	TOTAL	IN	OUT	TOTAL
	95%	5%	100%	10%	90%	100%
BRAC 133 Employee SOV Trips	1218	64	1282	122	1094	1216
BRAC 133 Visitor SOV Trips	27	2	29	3	25	28
BRAC 133 Rideshare Trips	77	4	81	8	69	77
Other Site Generated trips <sup>1</sup>	32	2	34	3	30	33
Proposed DOD / WHS Shuttles <sup>2</sup>	30	30	60	30	30	60
Truck Trips <sup>3</sup>	4	4	8	4	4	8
<b>Sub-Total</b>	<b>1388</b>	<b>106</b>	<b>1494</b>	<b>169</b>	<b>1253</b>	<b>1422</b>
IDA Building 5 SOV Trips <sup>3,4</sup>	413	57	470	74	359	433
<b>TOTAL</b>	<b>1801</b>	<b>163</b>	<b>1964</b>	<b>243</b>	<b>1612</b>	<b>1855</b>

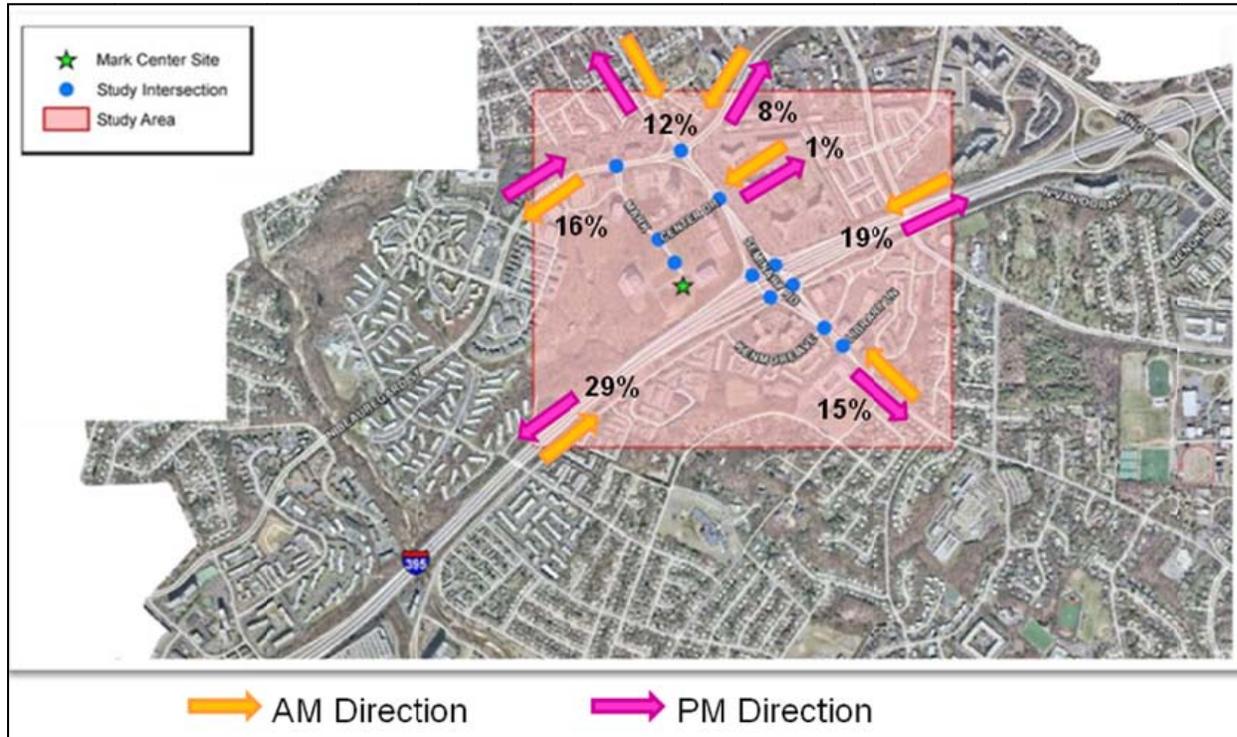
- NOTE: (1) Includes other federal and non-federal employees accessing the site comprising of security staff, maintenance personnel, building management and other service staff who would access the site on any typical day. A total of 150 other personnel are estimated to access the site. Projected mode split shown in Section 2.3.2 representative of the entire building population was used.
- (2) Based on proposed DOD WHS Shuttle Plan Alternative 1: Operates five routes (Ballston, Pentagon, King St, East Falls Church, West Falls Church) at 10-minute headways during the peak hour, as received on April 10, 2010. See Section 3 for the most recently updated DOD shuttle plan.
- (3) BRAC 133 Transportation Improvement and Management Plan (TIMP), Wells & Associates, July 2008.
- (4) Institute of Transportation Engineers Trip Generation Manual recommendations for an Office Park per 1000 Sq. Feet Gross Floor Area for 368,400 Sq. Feet.

The total site-generated trips were distributed based on the origin zip codes, existing travel patterns, future transit riding potential dependent on transit corridors adjacent to origin points, and future rideshare prospects along high density zip code clusters. The total SOV and rideshare trips generated from all Virginia locations, Washington D.C., and Maryland were distributed to routes along the existing roadway system within the City of Alexandria and to the Mark Center site from the north, south, east and west via I-395, Seminary Road and North Beauregard Street corridors. (Appendix B shows employee population density maps by home zip codes.) Based on the home zip codes, it was determined that most of the trips originating from north and south directions will travel along I-395, and access the site

<sup>43</sup> *Mark Center Parcel 1A and 1B Traffic Impact Study and Transportation Management Plan, Wells & Associates, March 31, 2003.*

at Seminary Road interchange. Figure 4-5 shows the BRAC 133 traffic distribution along the existing roadway network and their directions of travel.

Figure 4-5: BRAC 133 Trip Distributions along Existing Roadway Network



The projected Mark Center trips were internally distributed based on the percentage splits obtained from the *Wells & Associates 2008 TIMP* and the *WHS 2009 Internal Roadway Network Study*. Figure 4-6 shows the distribution of the BRAC 133 and IDA generated SOV, rideshare, and shuttle trips along the study area roadway network. Rideshare trips originating from the south along I-95/I-395 were assumed to use the GP lanes for projected traffic demand estimation purposes. However, there is a possibility that some or all of the northbound rideshare vehicles will use the I-95/I-395 HOV lanes, exit at the Pentagon, and turn around to travel along I-395 southbound GP lanes to Mark Center. The rideshare trips and shuttle buses originating from the north, and traveling southbound on I-395 will use the GP lanes, since the HOV lanes during the morning peak period serve only the northbound traffic. The projected trips were combined with the existing baseline trips to obtain the total future trips accessing the Mark Center site. Figure 4-7 shows the projected traffic volumes at build-out on opening day (2011), including baseline trips, and WHS and IDA generated SOV, rideshare, and shuttle trips along the study area roadway network. This projected traffic demand in combination with the proposed interim roadway improvements (as listed in Section 3.2.2) were added to the existing roadway network to determine the future traffic operations (levels of service) along the adjacent roadway network to Mark Center site.

Figure 4-6: BRAC & IDA Generated Peak Hour Trips

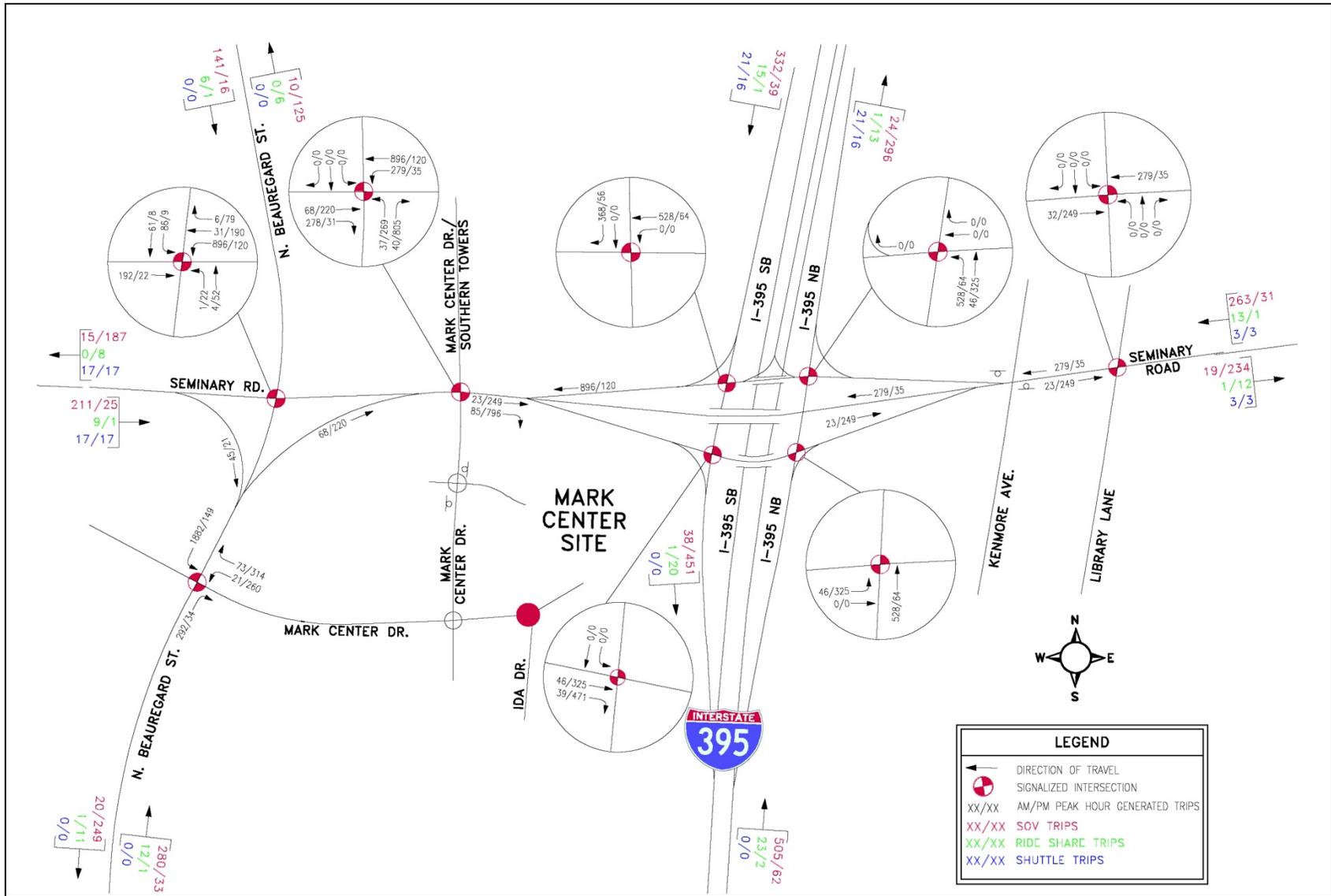
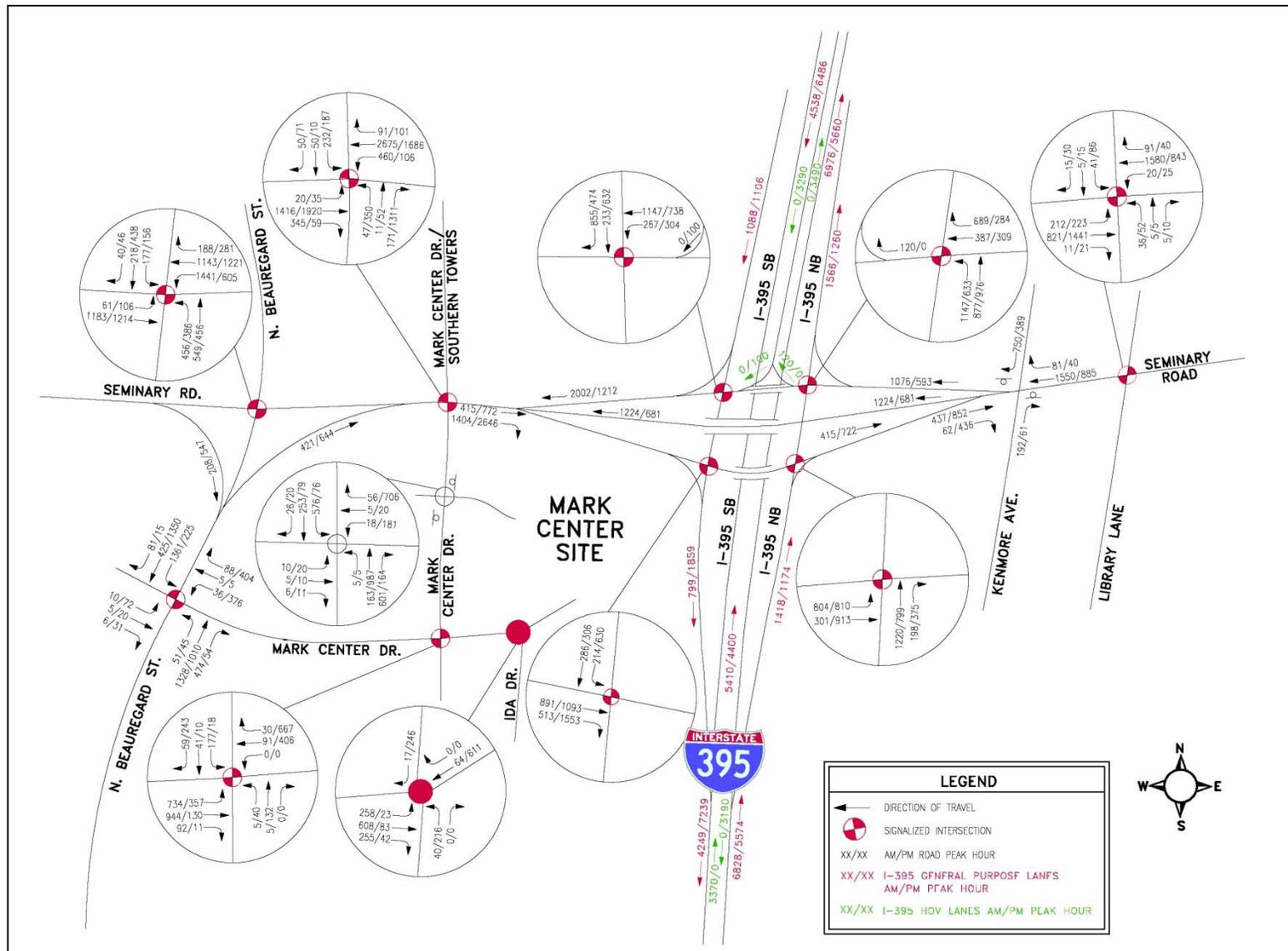


Figure 4-7: Projected (2011) Peak Hour Traffic Volumes (Baseline/BRAC 133/IDA Trips)



## 4.4 Traffic Operations

### 4.4.1 Simulation Modeling

Traffic operational analysis and micro simulation modeling for the overall study area was performed using TSIS-CORSIM software version 6.2. Existing and proposed site conditions under the baseline and projected traffic demand were performed and analyzed. Synchro, a macroscopic design software, was used to optimize signal timing and coordination for all the signalized intersections within the study area. The data obtained from the optimized Synchro traffic signal design model was then transferred to CORSIM to obtain the overall model operating under optimum conditions.

Synchro is a macroscopic signal design software based on the Highway Capacity Manual (HCM) recommended guidelines for signalized intersections. Synchro is a location-based analysis tool and is not used to model interactions between vehicles within the traffic stream. Synchro models traffic arriving or present at the intersection approaches and does not account for traffic flow or spillback conditions at adjacent intersections. Thus, CORSIM, a microscopic simulation model was used to accurately determine the traffic operations of the roadway network.

CORSIM is a time-based stochastic simulation model used to effectively simulate combined arterial and freeway traffic operations. CORSIM analyzes both the freeway (FRESIM) and arterial (NETSIM) elements of the study area to provide a detailed review of the overall traffic operations and problem locations. CORSIM accounts for individual vehicle travel patterns, lane changing behavior, adjacent intersection operations and its effect on upstream or downstream intersections. Comprehensive system and link measures of effectiveness (MOEs) can be collected for each vehicle entering the network for every second of model simulation. The link MOEs provide information for any part of the roadway network within the study area. The simulation model can be viewed using TRAFVU to study the traffic flow, queues and spillback effects. Because of the stochastic nature of the model, each simulation run results provide only an estimation of the model's true characteristic. Multiple simulations performed with varying random seeds provide an accurate representation of the network performance.

The overall CORSIM model developed for the study area includes the roadway extents and intersections as outlined previously in Section 4.2.1. The traffic model includes transit bus stations, transit bus routes and shuttle bus routes that currently exist within the study area extents. The model also integrates the proposed DoD shuttle plan (as of April 2010) along with the shuttle routes and shuttle trip headways.

### 4.4.2 Data Assumptions and Study Area Models

The model development process included compilation of all available data and CORSIM network coding to prepare the model for various analysis scenarios. The existing 2009 model was developed for morning and evening peak hours based on traffic volume and signal timing data obtained from the *City of Alexandria Mark Center (BRAC 133) Transportation Study* performed by VHB. Site observations were conducted to perform model verifications to improve the CORSIM model prior to developing models for future analysis scenarios. The existing 2009 morning and evening peak CORSIM models were refined and the default values revised where necessary, to ensure that the model throughputs matched actual traffic counts and the model generated queues reflected representative queues observed in the site.

Appendix F includes tables that present the Measures of Effectiveness for the critical freeway mainline and ramp sections and intersections within the study area for the existing 2009 morning and evening peak hour conditions. Details of the model assumptions and default value modifications that were made to refine the base models are elaborated below.

The Erlang distribution type with an Erlang distribution shape parameter value of one (1) was used for vehicle entry headways.

CORSIM does not allow actuated-coordinated type controls for multiple intersections controlled by one master controller. To obtain optimum interchange performance, the ramp terminal intersections at the Seminary Road rotary interchange were modeled as actuated-uncoordinated type controls, with the signal phasing and timing calibrated to simulate coordination conditions. Optimized signal timing and coordination plans were used in developing the 2011 baseline traffic models without BRAC improvements.

A 30 to 80 second dwell time was assumed for bus transit and shuttle bus vehicles traveling through the modeled roadway network. The lower range of dwell times were allotted to transit vehicles that did not have exclusive bus bays and stopped along the traffic lanes blocking the through traffic operations.

CORSIM assumes a 100 percent possibility of a vehicle discharging and joining a spillback during queue overflow and spillback from downstream intersections. The default factors were adjusted to assume zero probability of vehicles discharging and joining a spillback. MUTCD recommended "Do Not Block Intersection" (R10-7) signs should be installed along BRAC 133 internal roadway network at intersection crossings, especially at exit points from parking garages to reduce the likelihood of traffic from joining queues and obstructing other intersection approaches from discharging.

CORSIM assumes that 50 percent of the drivers within any modeled traffic network cooperating with a lane-change behavior will slow down to allow a lane change to occur in front of them. This default value was modified based on site observations to show 60 percent of drivers cooperating with a lane change maneuver. Existing conditions indicate that drivers are more cognizant of the various lane change maneuvers occurring along Seminary Road and North Beauregard Street, and in fact slow down to let other drivers change lanes in front of them.

Even though CORSIM does not explicitly model roundabout movements, it can be used to indirectly model one by accurately coding the traffic movements through the roundabout to their destination nodes, and by modifying gap acceptance parameters for driver types. The proposed roundabout at WHS Circle/IDA Drive - North Parking Garage was modeled in CORSIM. The default right turn gap acceptance parameters within the NETSIM setup were modified for the various driver types to accurately reflect gap acceptance behaviors at roundabouts. Table 4-5 shows the modifications to the gap acceptance parameters for various driver types.

Table 4-5: Modifications to Driver Gap Acceptance Parameters for NETSIM Right Turns

Parameters	Random Driver Type									
	From Least Aggressive Driver to Most Aggressive Driver									
	1	2	3	4	5	6	7	8	9	10
CORSIM Default Gap Acceptance	10.0	8.8	8.0	7.2	6.4	6.0	5.6	5.2	4.8	3.6
Modified Gap Acceptance for Roundabout Behavior	8.1	6.9	6.1	5.3	4.5	4.1	3.7	3.3	2.9	1.7

The refined CORSIM models were used to generate future analysis scenario models that helped identify the impacts of the projected growth. Micro simulation models of the study area were developed for two future analysis scenarios under the morning and evening peak hour traffic demands as shown below:

- Baseline (2011) Traffic Demand without Improvements
- Projected (2011) Traffic Demand with Interim Improvements

The traffic analysis includes operations of I-395 mainline and ramps at the Seminary Road interchange only and does not account for any potential adverse operations initiated by traffic queues or other operational impediments extending from the adjacent Duke Street and King Street interchanges. It is to be noted that traffic spillback extending from any upstream or downstream weaving sections and/or bottlenecks can severely degrade the interchange operations at I-395/Seminary Road, along with the operations of the ramp terminal intersections and cross street corridor. The existing conditions along northbound I-395 GP lanes indicate moderate to high congestion (LOS D - LOS E) between Duke Street and King Street interchanges during the morning peak hour, and light to moderate traffic (LOS B - LOS C) during the evening peak hour. The existing conditions along southbound I-395 GP lanes indicate light to high congestion (LOS C - LOS E) between Duke Street and King Street interchanges during the morning peak hour, and light to severe congestion (LOS C - LOS F) during the evening peak hour<sup>44</sup>. An overall analysis of the I-395 corridor including adjacent interchanges should be performed to accurately identify the operational impacts. Table 4-6 shows some of the traffic flow parameters used in developing the simulation models for the Mark Center traffic analysis.

<sup>44</sup> Mark Center (BRAC 133) Access Study Operational Analysis Report, VDOT web site <http://www.vamegaprojects.com/faqsdocuments/mark-center-documents> (last accessed May 1, 2010).

Table 4-6: Traffic Flow Parameters used in the CORSIM Model

Roadway	Free Flow Speed	Truck %	Lane widths
I-395 GP Mainline	65 mph	4%	12 ft
I-395 HOV Mainline	70 mph	1%	12 ft
I-395 Entrance Ramps	35 mph	2%	15 ft
I-395 Exit Ramps	35 mph	2%	15 ft
Seminary Road	35 mph	2%	12 ft
N Beauregard Street	35 mph	2%	12 ft
Mark Center Drive	25 mph	2%	12 ft

**4.4.3 Transit Routes and Schedules**

Existing public bus transit and shuttle bus routes and their service schedules within the study area were reviewed and summarized for morning and evening peak period and peak hour trips, route origin and destination points and bus stop locations. This data was coded in the traffic simulation model to accurately reflect the vehicle flow and vehicular interactions within the roadway network. Public bus transit service through the region is offered by DASH, and WMATA. Duke Realty Corporation, IDA, and CNA operate private shuttle bus service between Mark Center and the Pentagon Metrorail Station during hours for their tenant organizations. The proposed DoD shuttle bus trips to serve BRAC 133 were also included as part of the 2011 projected traffic simulation model (See Section 3.3.1 for details on existing public bus transit serving Mark Center and Appendix C for all the existing public transit bus routes).

Table 4-7 summarizes the bus routes and service trips that were included in the traffic simulation model. This table is different from that in Section 3, in that it shows all the buses including public transit and shuttles utilizing roadway networks in the study area whereas Table 3-1 summarizes buses that directly serve BRAC 133 employees within a half mile walking distance.

Table 4-7: Schedule and Routes of Bus Transit and Shuttle Bus Services adjacent to BRAC 133

Transit Agency	Route Number	Route Connection	Direction of Travel	Morning Peak Period 6:00 - 9:00 AM				Evening Peak Period 3:00 - 6:00 PM			
				Total # of Bus Trips	AM Peak Hour Trips	Peak Hour Headway (min)	Peak Hour Offset (min)	Total # of Bus Trips	PM Peak Hour Trips	Peak Hour Headway (min)	Peak Hour Offset (min)
DASH <sup>1</sup>	AT1	Van Dorn / Eisenhower Metro - Seminary Plaza	Northbound	7	2	25	19	7	2	25	14
			Southbound	7	2	30	28	7	2	30	28
DASH	AT2	Lincolnia (Landmark Mall) - King Street / Braddock Metro	Eastbound	9	3	17	11	7	2	30	5
			Westbound	7	2	30	15	9	3	20	12
WMATA <sup>2</sup>	7A,7F	Lincolnia - North Fairlington Line / Pentagon Metro	Northbound	0	0	-	-	6	2	29	23
			Southbound	6	2	25	21	2	0	-	-
WMATA	7W,7X	Lincolnia - North Fairlington Line / Pentagon Metro	Northbound	20	11	5.5	4	0	0	-	-
			Southbound	0	0	-	-	14	6	10	0
WMATA	16L	Annandale - Skyline City - Pentagon Metro	Eastbound	2	2	30	0	0	0	-	-
			Westbound	0	0	-	-	1	1	60	0
WMATA	25B	Landmark - Ballston MU	Northbound	6	2	30	26	6	2	30	5
			Southbound	6	1	30	25	6	2	30	5
WMATA	28A	Alexandria / King Street Metro - Tysons Corner	Eastbound	6	2	30	26	6	2	30	7
			Westbound	6	2	30	7	6	2	30	20
WMATA	28F	Skyline City - Pentagon Metro	Northbound	0	0	-	-	7	2	25	18
			Southbound	6	2	25	11	0	0	-	-
WMATA	28G	Skyline City - Pentagon Metro	Northbound	8	2	25	14	0	0	-	-
			Southbound	0	0	-	-	8	3	20	5
IDA/CNAC <sup>3</sup>	Shuttle	Pentagon Metro - Mark Center	-	12	4	15	0	12	4	15	0
Duke <sup>4</sup>	Shuttle	Pentagon Metro - Mark Center	-	21	10	6	0	11	5	12	0
Proposed DoD Shuttle Plan <sup>5</sup>	Shuttle	Pentagon Metro - Mark Center	-	18	6	10	0	18	6	10	0
		King Street Metro - Mark Center	-	18	6	10	0	18	6	10	0
		Ballston Metro - Mark Center	-	18	6	10	0	18	6	10	0
		East Falls Church - Mark Center	-	18	6	10	0	18	6	10	0
		West Falls Church - Mark Center	-	18	6	10	0	18	6	10	0

NOTE:

- (1) WMATA bus schedule data obtained from <http://www.wmata.com> Metrobus Virginia Timetables
- (2) DASH bus schedule data obtained from <http://www.dashbus.com> DASH system maps routes and schedules
- (3) IDA/CNAC shuttle schedules obtained from WHS
- (4) Duke shuttle schedules obtained from Mark Center Express flyer
- (5) Based on proposed DoD shuttle plan Alternative 1 - obtained from WHS April 10, 2010. See Section 3 for the most recently updated DoD Shuttle Plan.

### 4.4.4 Traffic Operational Measures of Effectiveness

Traffic operations of the transportation elements are usually defined in terms of LOS with the designations ranging from LOS A to LOS F. LOS A indicates free flow and LOS F indicates forced flow or breakdown conditions. The level of service of the various transportation elements are defined in terms of varying measures of effectiveness pertinent to the functional classification of the facility.

Traffic flow conditions and levels of service of freeway mainline and ramps are usually measured in terms of density expressed in vehicles per mile per lane (vpmpl). Density is defined as the total number of vehicles occupying a given length of a lane at a given time. Speed of the traffic stream will also be considered since it helps assess the service quality of the facility. Threshold values of density help determine level of service of the freeway and ramp facilities.

The level of service for signalized intersections is usually measured in terms of control delay values. The average control delay per vehicle in every lane group of the intersection approach is aggregated to obtain the overall control delay of the intersection. Control delay is expressed in seconds per vehicle (s/veh). The aggregation of control delay for every individual lane group at intersection approaches helps identify individual movements operating inefficiently, and consequently, hindering overall intersection operations. Threshold values of control delay per vehicle help determine level of service of the signalized intersections and its approaches.

The operation of multilane arterials is usually measured in terms of density, speed, and volume to capacity ratios. The level of service is usually defined in terms of density measured in vpmpl. Driver freedom to maneuver and change lanes is restricted at higher densities resulting in lower operating speeds. Forced flow or flow breakdown occurs when the vehicular demand or arrival rate exceeds that of the discharge rate. Volume to capacity (v/c) ratios greater than 1.0 indicates vehicular demand exceeding available capacity. The level of service for urban arterials is also influenced by the total number of signalized intersections per mile, signal timing, and signal coordination. Poor coordination can result in spillback affecting operations of downstream intersections. Threshold values of density and speed help determine levels of service of the freeway and ramp facilities.

The traffic operations of un-signalized intersections or roundabouts can be analyzed for individual approaches only and not for the whole intersection. Level of service is measured in terms of control delay expressed (s/veh). Threshold values of control delay values help determine level of service for the individual movements at unsignalized intersections or roundabouts. The capacity of a roundabout is however, dependent mainly on the gap acceptance behavior of the drivers with respect to critical gap and follow-up time parameters.

Table 4-8 shows the range of the Highway Capacity Manual (HCM) recommended threshold values for various roadway elements and their measures of effectiveness that can be used to determine level of service for the study area roadway network. The cumulative measures of effectiveness obtained from CORSIM output reports were compared against the threshold values to determine levels of service and operational conditions.

Table 4-8: HCM Recommended Threshold Values of Measures of Effectiveness for LOS Determination

LOS	Freeway Density Range (vpmpl)	Ramp Segment Density Range (vpmpl)	Intersection Control Delay per vehicle (s/veh)	Class III Urban Street (typical speed of 35 mph)	Roundabout Average Control Delay <sup>1</sup> (s/veh)
A	0-11	≤ 10	≤ 10	> 30	0-10
B	> 11-18	> 10-20	> 10-20	> 24-30	> 10-15
C	> 18-26	> 20-28	> 20-35	> 18-24	> 15-25
D	> 26-35	> 28-35	> 35-55	> 14-18	> 25-35
E	> 35-45	> 35	> 55-80	> 10-14	> 35-50
F	> 45	Note 2	> 80	≤ 10	> 50

Note:

1. Data Source - 2010 Highway Capacity Manual (Pre-Release)
2. Demand exceeds capacity

#### 4.4.5 Baseline Traffic Operations without Improvements

Traffic operational analysis of existing roadway network with 2011 baseline traffic volumes without any proposed BRAC 133 generated traffic was performed using CORSIM and Synchro analysis tools. The existing roadway geometry and lane configuration previously shown in Figure 4.3 and the baseline (2011) traffic volumes previously shown in Figure 4-4 were used as primary inputs to perform the existing condition traffic operational analysis for the morning and evening peak hour demands. Optimized signal timing and coordination plans were used in developing the 2011 baseline traffic models without BRAC improvements. Multiple simulation runs were made by changing the random seed values for vehicle entry headways, driver responses to traffic choices including gap acceptance, lane change and queue blockages, and driver and vehicle behavior assignment of to surface street vehicles. The data from the multiple runs was evaluated for the baseline condition morning and evening peak hour analysis. Flow rate, speed and density data for freeway mainline and ramp links, and flow rate, control delay, and maximum queue lengths by intersection approach movements for surface links were obtained from the simulation output reports to determine roadway traffic operations.

Table 4-9 and Table 4-10 show the 2011 baseline traffic operational analysis results for I-395 mainline and ramp sections including speed, density, and level of service. Table 4-11 and Table 4-12 show the 2011 baseline traffic operational analysis results of the arterial network including control delay, level of service and traffic queues by lane group movement, intersection approach, and overall intersection, for all the signalized intersections within the study area. In Tables 4-9 through 4-13, intersections with the highest levels of congestion (LOS E and LOS F) have been highlighted for ease of reference.

Results of the 2011 baseline operational analysis without BRAC improvements indicate most of the freeway network and overall signalized intersections operating at acceptable level of service, except for the Seminary Road and North Beauregard Street intersection that operates at a LOS E during the morning and evening peak hours, and the southeast rotary intersection that operates at a LOS E during the morning peak hour. However, as can be seen from Table 4-11 and Table 4-12, many of the lane group movements and intersection approaches operate at unacceptable level of service for the 2011

baseline condition. These degrading operations at the individual approaches will eventually lead to the failure of the overall intersection.

In addition to the above analysis, all the level of service results obtained from the prior traffic operational analysis and transportation studies conducted for the study area roadway network were summarized for comparison. Table 4-13 shows the comparative summary of level of service results from prior studies. In Tables 4-9 through 4-13, intersections with the highest levels of congestion (LOS E and LOS F) have been highlighted for ease of reference.

Table 4-9: Freeway Measures of Effectiveness for the Morning (AM) Peak Hour 2011 Baseline Traffic Operational Analysis without Improvements

		LOCATION		NODE		LENGTH (ft)	VOLUMES			LINK STATISTICS			AGGREGATE STATISTICS			REMARKS	
		From	To	From	To		Projected Demand	Model Throughput	Model Throughput vs Projected Demand	Speed (mph)	Density (vpmpl)	LOS	Speed (mph)	Density (vpmpl)	LOS		
I-395 GENERAL PURPOSE (GP) & HIGH OCCUPANCY VEHICLE (HOV) LANES	I-395 NORTHBOUND MAINLINE	NB GP	Begin I-395 GP Lanes South of Seminary Road Interchange	1000	1001	692	6300	6296	-4	62	35	D	61	32	D	NB Freeway Mainline	
				1001	1002	803	6300	6299	-1	61	34	D				NB Freeway Mainline	
				1002	1005	1073	6300	6310	10	59	28	D				NB Freeway Mainline	
		NB GP	Seminary Road Exit Ramp	1005	1006	790	5410	5415	5	61	29	D	61	30	D	NB Freeway Mainline	
				1006	1008	1235	5410	5420	10	61	30	D				NB Freeway Mainline	
				1008	1010	860	5410	5422	12	61	30	D				NB Freeway Mainline	
		NB GP	Seminary Road Entrance Ramp	1010	1011	1093	6930	6720	-210	57	26	C	57	27	D	NB Freeway Mainline	
				1011	1015	706	6930	6729	-201	57	29	D				NB Freeway Mainline	
		NB GP	King Street Exit Ramp	1015	1017	635	5890	5691	-199	60	32	D	60	31	D	NB Freeway Mainline	
		NB GP	End I-395 North of Seminary Road Interchange	1017	1019	485	5890	5691	-199	61	31	D				NB Freeway Mainline	
	NB HOV	Begin I-395 HOV Lanes South of Seminary Road Interchange	1052	1053	643	3370	3353	-17	67	26	C	66	26	C	NB Freeway Mainline		
			1053	1054	534	3370	3355	-15	68	25	C				NB Freeway Mainline		
			1054	1056	501	3370	3357	-13	67	25	C				NB Freeway Mainline		
			1056	1057	417	3370	3358	-12	66	25	C				NB Freeway Mainline		
			1057	1058	513	3370	3361	-9	66	26	C				NB Freeway Mainline		
			1058	1060	616	3370	3365	-5	65	26	C				NB Freeway Mainline		
			1060	1062	560	3370	3370	0	65	26	C				NB Freeway Mainline		
			1062	1063	525	3370	3373	3	65	26	C				NB Freeway Mainline		
	1063	1064	571	3370	3370	0	65	26	C	NB Freeway Mainline							
	1064	1066	675	3370	3370	0	65	26	C	NB Freeway Mainline							
	NB HOV	Seminary Road HOV Entrance Ramp	1066	1067	1074	3490	3479	-11	64	20	C	65	27	D	NB Freeway Mainline		
	NB HOV	End I-395 HOV Lanes North of Seminary Road Interchange	1067	1068	1010	3490	3481	-9	65	27	D				NB Freeway Mainline		
	SB GP	I-395 SOUTHBOUND MAINLINE	SB GP	Begin I-395 GP Lanes North of Seminary Road Interchange	2001	2002	812	3820	3822	2	64	15	B	64	15	B	SB Freeway Mainline
					2002	2004	1209	4170	4180	10	60	14	B				SB Freeway Mainline
			SB GP	Seminary Road Exit Ramp	2004	2005	502	3450	3511	61	63	14	B	63	14	B	SB Freeway Mainline
					2005	2007	920	3450	3515	65	63	14	B				SB Freeway Mainline
					2007	2009	1142	3450	3512	62	63	14	B				SB Freeway Mainline
	2009	2012	1179	3450	3524	74	63	14	B	SB Freeway Mainline							
	SB GP	Seminary Road Entrance Ramp	2012	2014	570	4210	4169	-41	56	17	B	59	17	B	SB Freeway Mainline		
	SB GP	End I-395 South of Seminary Road Interchange	2014	2015	728	4210	4169	-41	61	17	B				SB Freeway Mainline		
	NB GP	I-395 NORTHBOUND RAMPS	NB GP	Seminary Road Exit Ramp	1005	1201	299	890	953	63	34	28	D	34	28	D	Diverge Ramp Section
					1201	7002	203	890	951	61	34	28	D				Diverge Ramp Section
					7002	1203	232	890	884	-6	43	-	A				Class III Type Urban Arterial
			NB GP	Seminary Road Entrance Ramp	1206	1208	232	1520	1299	-221	27	-	B	34	20	C	Class III Type Urban Arterial
					1208	7003	201	1520	1300	-220	33	-	A				Class III Type Urban Arterial
					7003	1210	221	1520	1312	-208	34	21	C				Merge Ramp Section
	1210	1010	234	1520	1315	-205	34	19	B	Merge Ramp Section							
	NB HOV	Seminary Road Entrance Ramp	1212	1213	358	120	91	-29	27	-	B	47	2	A	Class III Type Urban Arterial		
			1213	7005	331	120	91	-29	37	-	A				Class III Type Urban Arterial		
			7005	1070	339	120	110	-10	45	3	A				Merge Ramp Section		
1070			1066	306	120	110	-10	49	2	A	Merge Ramp Section						
SB GP	I-395 SOUTHBOUND RAMPS	SB GP	Seminary Road Exit Ramp	2004	2201	313	720	675	-45	35	10	A	35	10	A	Diverge Ramp Section	
				2201	7004	485	720	676	-44	35	10	A				Diverge Ramp Section	
				7004	2204	491	720	613	-107	39	-	A				Class III Type Urban Arterial	
				2204	2205	376	720	616	-104	26	-	B				Class III Type Urban Arterial	
		SB GP	Seminary Road Entrance Ramp	2213	2215	197	760	658	-102	32	-	A	32	16	B	Class III Type Urban Arterial	
2215	7001	371	760	659	-101	33	-	A	Class III Type Urban Arterial								
7001	2216	279	760	701	-59	32	12	B	Merge Ramp Section								
2216	2012	427	760	699	-61	32	19	B	Merge Ramp Section								

Table 4-10: Freeway Measures of Effectiveness for the Evening (PM) Peak Hour 2011 Baseline Traffic Operational Analysis without Improvements

		LOCATION		NODE		LENGTH (ft)	VOLUMES			LINK STATISTICS			AGGREGATE STATISTICS			REMARKS			
		From	To	From	To		Projected Demand	Model Throughput	Model Throughput vs Projected Demand	Speed (mph)	Density (vpmpl)	LOS	Speed (mph)	Density (vpmpl)	LOS				
I-395 GENERAL PURPOSE (GP) & HIGH OCCUPANCY VEHICLE (HOV) LANES	I-395 NORTHBOUND MAINLINE	NB GP	Begin I-395 GP Lanes South of Seminary Road Interchange	1000	1001	692	5510	5499	-11	62	30	D	60	28	D	NB Freeway Mainline			
				1001	1002	803	5510	5496	-14	61	30	D				NB Freeway Mainline			
				1002	1005	1073	5510	5486	-24	58	24	C				NB Freeway Mainline			
		NB GP	Seminary Road Exit Ramp	1005	1006	790	4400	4309	-91	62	23	C	62	23	C	NB Freeway Mainline			
				1006	1008	1235	4400	4293	-107	62	23	C				NB Freeway Mainline			
	1008			1010	860	4400	4295	-105	62	23	C	NB Freeway Mainline							
	NB GP	Seminary Road Entrance Ramp	1010	1011	1093	5335	5241	-94	58	20	C	58	21	C	NB Freeway Mainline				
			1011	1015	706	5335	5240	-95	57	23	C				NB Freeway Mainline				
	NB GP	King Street Exit Ramp	1015	1017	635	4055	3940	-115	62	21	C	62	21	C	NB Freeway Mainline				
	NB GP	End I-395 North of Seminary Road Interchange	1017	1019	485	4055	3942	-113	62	21	C				NB Freeway Mainline				
	I-395 SOUTHBOUND MAINLINE	SB GP	Begin I-395 GP Lanes North of Seminary Road Interchange	2001	2002	812	5940	5942	2	63	24	C	61	22	C	SB Freeway Mainline			
				2002	2004	1209	6430	6433	3	60	21	C				SB Freeway Mainline			
			Seminary Road Exit Ramp	2004	2005	502	5380	5517	137	62	22	C				62	22	C	SB Freeway Mainline
				2005	2007	920	5380	5527	147	62	22	C							SB Freeway Mainline
		2007		2009	1142	5380	5523	143	62	22	C	SB Freeway Mainline							
		SB GP	Seminary Road Entrance Ramp	2012	2014	570	6768	6728	-40	48	32	D	54	30	D	SB Freeway Mainline			
				2014	2015	728	6768	6718	-50	58	29	D				SB Freeway Mainline			
		SB HOV	Begin I-395 HOV Lanes South of Seminary Road Interchange	1068	1067	1010	3290	3293	3	67	25	C	67	25	C	SB Freeway Mainline			
				1067	1066	1066	3290	3299	9	66	25	C				SB Freeway Mainline			
		SB HOV	Seminary Road Exit Ramp	1066	1064	685	3190	3171	-19	65	24	C	82	27	D	SB Freeway Mainline			
				1064	1063	564	3190	3171	-19	66	24	C				SB Freeway Mainline			
				1063	1062	582	3190	3167	-23	66	24	C				SB Freeway Mainline			
	1062			1060	505	3190	3167	-23	66	24	C	SB Freeway Mainline							
	1060			1058	616	3190	3170	-20	66	24	C	SB Freeway Mainline							
	1058			1057	513	3190	3170	-20	65	24	C	SB Freeway Mainline							
	1057			1056	417	3190	3172	-18	65	24	C	SB Freeway Mainline							
	1056			1054	477	3190	3175	-15	65	24	C	SB Freeway Mainline							
	1054	1053	456	3190	3181	-9	65	24	C	SB Freeway Mainline									
SB HOV	End I-395 HOV Lanes North of Seminary Road Interchange	1053	1052	654	3190	3182	-8	65	24	C	SB Freeway Mainline								
I-395 NORTHBOUND RAMPS	NB GP	Seminary Road Exit Ramp	1005	1201	299	1110	1123	13	33	34	D	33	34	D	Diverge Ramp Section				
			1201	7002	203	1110	1123	13	33	34	D				Diverge Ramp Section				
			7002	1203	232	1110	1123	13	43	-	A				Class III Type Urban Arterial				
	NB GP	Seminary Road Entrance Ramp	1206	1208	232	935	927	-8	29	-	B	34	14	B	Class III Type Urban Arterial				
1208			7003	201	935	927	-8	32	-	A	Class III Type Urban Arterial								
7003			1210	221	935	927	-8	34	15	B	Merge Ramp Section								
1210			1010	234	935	927	-8	34	14	B	Merge Ramp Section								
I-395 SOUTHBOUND RAMPS	SB GP	Seminary Road Exit Ramp	2004	2201	313	1050	921	-129	35	13	B	35	13	B	Diverge Ramp Section				
			2201	7004	485	1050	923	-127	35	13	B				Diverge Ramp Section				
			7004	2204	491	1050	920	-130	38	-	A				Class III Type Urban Arterial				
			2204	2205	376	1050	920	-130	28	-	B				Class III Type Urban Arterial				
	SB GP	Seminary Road Entrance Ramp	2213	2215	197	1388	1226	-162	30	-	B	32	29	D	Class III Type Urban Arterial				
			2215	7001	371	1388	1220	-168	32	-	A				Class III Type Urban Arterial				
			7001	2216	279	1388	1217	-171	32	21	C				Merge Ramp Section				
			2216	2012	427	1388	1211	-177	31	35	D				Merge Ramp Section				
SB HOV	Seminary Road Exit Ramp	1066	1070	317	100	125	25	49	3	A	49	3	A	Diverge Ramp Section					
		1070	7005	352	100	125	25	50	3	A				Diverge Ramp Section					
		7005	1213	340	100	125	25	56	-	A				Class III Type Urban Arterial					
		1213	1212	329	100	126	26	34	-	A				Class III Type Urban Arterial					
		1212	1211	130	100	126	26	16	-	C				Class IV Type Urban Arterial					

Table 4-11: Arterial Measures of Effectiveness for the Morning (AM) Peak Hour 2011 Baseline Traffic Operational Analysis without Improvements

		Location	Approach	Link	Projected Demand				Model Throughput				Model Throughput vs Projected Demand				Control Delay By Movement			LOS By Movement			LOS By Approach		LOS By Intersection		Modelled Storage and Maximum Traffic Queuing (ft)							
					Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Left	Thru	Right	Delay	LOS	Delay	LOS	Through	Left Turn	Right Turn					
					Link Length (ft)	Queue (ft)	Storage (ft)	Queue (ft)	Storage (ft)	Queue (ft)																								
MARK CENTER (BRAC 133) TRAFFIC ANALYSIS STUDY AREA	LIBRARY LANE	Library Lane / Seminary Road (Node #5003)	WB	5002-5003	20	1301	91	1412	24	1308	76	1408	4	7	-15	-4	14	9	7	B	A	A	9	A	10	A	310	720	50	120	-	-		
			NB	6017-5003	36	5	5	46	41	5	1	47	5	0	-4	1	29	27	3	C	C	A	28	C					264	100	-	-	-	-
			EB	5005-5003	212	798	11	1021	235	823	9	1067	23	25	-2	46	22	5	11	C	A	B	9	A					311	160	150	140	-	-
			SB	6018-5003	41	5	15	61	43	4	13	60	2	-1	-2	-1	32	39	17	C	D	B	29	C					216	120	-	-	-	-
	I-395 / SEMINARY ROAD ROTARY INTERCHANGE	I-395 NB Off-Ramp/Seminary Road (Node #5015)	NB	1203-5015	0	692	198	890	0	733	215	948	0	41	17	58	0	33	45	-	C	D	35	D	56	E	618	460	-	-	-	-		
			EB	5013-5015	758	301	0	1059	694	290	0	984	-64	-11	0	-75	79	63	0	E	E	-	74	E					331	300	331	280	-	-
		I-395 NB On-Ramp/Seminary Road (Node #5010)	NB	5015-5010	559	60	831	1450	564	59	801	1424	5	-1	-30	-26	7	17	21	A	B	C	15	B	23	C	276	240	75	200	-	-		
			WB	5009-5010	0	327	60	387	0	278	51	329	0	-49	-9	-58	0	53	42	-	D	D	51	D					160	140	-	-	-	-
		I-395 SB Off-Ramp/Seminary Road (Node #5012)	WB	5010-5012	267	619	0	886	273	567	0	840	6	-52	0	-46	4	4	0	A	A	-	4	A	16	B	300	140	300	180	-	-		
	SB		2205-5012	0	233	0	233	0	213	0	213	0	-20	0	-20	0	59	0	-	E	A	59	E					281	140	-	-	-	-	
	I-395 SB On-Ramp/Seminary Road (Node #5013)	SB	5012-5013	214	286	0	500	215	269	0	484	1	-17	0	-16	59	19	0	E	B	-	36	D	52	D	259	120	259	160	-	-			
		WB	5019-5013	0	845	0	845	0	786	0	786	0	-59	0	-59	0	60	0	-	E	-	60	E					357	340	-	-	-	-	
	MARK CENTER DRIVE	Mark Center Drive / Seminary Road (Node #5022)	WB 1	5021-5022	181	729	35	945	154	525	19	698	-27	-204	-16	-247	76	7	3	E	A	A	22	C	23	C	243	160	243	220	-	-		
			WB 2	5018-5022	0	1050	56	1106	0	980	49	1029	0	-70	-7	-77	0	14	14	-	B	B	14	B					637	440	-	-	-	-
			NB	5060-5022	10	11	131	152	15	9	134	158	5	-2	3	6	82	63	10	F	E	A	20	B					340	60	340	60	340	60
			EB	5023-5022	20	1348	67	1435	33	1322	41	1396	13	-26	-26	-39	55	15	0	D	B	A	15	B					395	300	150	80	395	160
N. BEAUREGARD STREET	N. Beaugard Street / Seminary Road (Node #5025)	WB	5023-5025	545	1112	0	1657	464	968	0	1432	-81	-144	0	-225	55	14	0	D	B	-	28	C	63	E	341	280	341	340	-	-			
		NB	6004-5025	455	545	0	1000	369	454	0	823	-86	-91	0	-177	289	56	0	F	E	-	161	F					347	380	175	160	-	-	
		EB	5026-5025	61	991	0	1052	56	988	0	1044	-5	-3	0	-8	79	35	0	E	C	-	37	D					323	300	100	100	-	-	
		SB	6002-5025	91	157	40	288	90	158	39	287	-1	1	-1	-1	75	41	27	E	D	C	50	D					250	120	135	120	-	-	
N. BEAUREGARD STREET	N. Beaugard Street / Mark Center Drive (Node #6005)	WB	5032-6005	15	5	15	35	26	12	26	64	11	7	11	29	86	80	10	F	E	B	54	D	51	D	286	40	-	-	286	60			
		NB	6007-6005	51	1328	182	1561	38	1172	151	1361	-13	-156	-31	-200	117	57	86	F	E	F	62	E					329	320	150	100	-	-	
		EB	5030-6005	10	5	6	21	13	6	2	21	3	1	-4	0	84	39	2	F	D	A	63	E					203	100	-	-	-	-	
		SB	6004-6005	359	425	81	865	351	359	75	785	-8	-66	-6	-80	60	4	2	E	A	A	29	C					435	420	350	380	-	-	

Table 4-12: Arterial Measures of Effectiveness for the Evening (PM) Peak Hour 2011 Baseline Traffic Operational Analysis without Improvements

		Location	Approach	Link	Projected Demand				Model Throughput				Model Throughput vs Projected Demand				Control Delay By Movement			LOS By Movement			LOS By Approach		LOS By Intersection		Modelled Storage and Maximum Traffic Queuing (ft)					
					Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Left	Thru	Right	Delay	LOS	Delay	LOS	Delay	LOS	Through	Left Turn	Right Turn	
					Link Length (ft)	Queue (ft)	Storage (ft)	Queue (ft)	Storage (ft)	Queue (ft)	Storage (ft)	Queue (ft)	Storage (ft)																			
MARK CENTER (BRAC 133) TRAFFIC ANALYSIS STUDY AREA	LIBRARY LANE	Library Lane / Seminary Road (Node #5003)	WB	5002-5003	25	808	40	873	23	819	37	879	-2	11	-3	6	21	9	5	C	A	A	9	A	10	A	310	160	50	40	-	-
			NB	6017-5003	52	5	10	67	53	5	6	64	1	0	-4	-3	34	27	31	C	C	C	33	C			264	80	-	-	-	-
			EB	5005-5003	223	1192	21	1436	245	1217	13	1475	22	25	-8	39	11	6	4	B	A	A	7	A			311	160	150	120	-	-
			SB	6018-5003	86	15	30	131	91	16	23	130	5	1	-7	-1	38	44	23	D	D	C	36	D			216	200	-	-	-	-
	I-395 / SEMINARY ROAD ROTARY INTERCHANGE	I-395 NB Off-Ramp/Seminary Road (Node #5015)	NB	1203-5015	0	735	375	1110	0	721	399	1120	0	-14	24	10	0	17	19	A	B	B	18	B	21	C	618	300	-	-	-	-
			EB	5013-5015	485	913	0	1398	487	855	0	1342	2	-58	0	-56	23	23	0	C	C	A	23	C			331	260	331	200	-	-
		I-395 NB On-Ramp/Seminary Road (Node #5010)	NB	5015-5010	569	651	0	1220	538	667	0	1205	-31	16	0	-15	9	7	0	A	A	A	8	A	10	A	276	120	276	200	-	-
			WB	5009-5010	0	309	0	309	0	319	0	319	0	10	0	10	0	15	0	A	B	A	15	B			160	120	-	-	-	-
		I-395 SB Off-Ramp/Seminary Road (Node #5012)	WB	1211-5012	304	674	0	978	308	643	0	951	4	-31	0	-27	10	9	0	A	A	A	10	A	12	B	300	100	300	100	-	-
	SB		2205-5012	0	632	0	632	0	539	0	539	0	-93	0	-93	0	16	0	A	B	A	16	B	281			180	-	-	-	-	
	I-395 SB On-Ramp/Seminary Road (Node #5013)	SB	5012-5013	630	306	0	936	583	260	0	843	-47	-46	0	-93	10	9	0	A	A	A	9	A	10	A	259	140	259	120	-	-	
		WB	5019-5013	0	768	0	768	0	750	0	750	0	-18	0	-18	0	11	0	A	B	A	11	B			357	140	-	-	-	-	
	MARK CENTER DRIVE	Mark Center Drive / Seminary Road (Node #5022)	WB 1	5021-5022	71	536	39	646	63	573	35	671	-8	37	-4	25	70	13	10	E	B	A	18	B	21	C	243	160	243	120	-	-
			WB 2	5018-5022	0	1030	62	1092	0	970	45	1015	0	-60	-17	-77	0	24	20	A	C	B	24	C			637	580	-	-	-	-
			NB	5060-5022	81	52	506	639	65	38	398	501	-16	-14	-108	-138	71	75	15	E	E	B	27	C			340	160	340	160	340	140
			EB	5023-5022	35	1680	28	1743	52	1668	23	1743	17	-12	-5	0	66	11	4	E	B	A	13	B			395	220	150	80	395	120
SB			5045-5022	187	10	71	268	192	9	68	269	5	-1	-3	1	66	80	17	E	E	B	54	D	252			200	252	100	252	80	
N. BEAUREGARD STREET	N. Beaugard Street / Seminary Road (Node #5025)	WB	5023-5025	485	1031	0	1516	505	991	0	1496	20	-40	0	-20	82	18	0	F	B	A	39	D	61	E	341	280	341	200	-	-	
		NB	6004-5025	364	404	0	768	371	390	0	761	7	-14	0	-7	199	57	0	F	E	A	126	F			347	380	175	160	-	-	
		EB	5026-5025	106	1192	0	1298	99	1212	0	1311	-7	20	0	13	136	31	0	F	C	A	39	D			323	300	100	100	-	-	
		SB	6002-5025	147	430	46	623	153	429	48	630	6	-1	2	7	167	49	52	F	D	D	78	E			250	240	135	160	-	-	
	N. Beaugard Street / Mark Center Drive (Node #6005)	WB	5032-6005	116	5	90	211	114	7	89	210	-2	2	-1	-1	62	89	5	E	F	A	39	D	23	C	286	260	-	-	286	60	
		NB	6007-6005	45	1010	20	1075	45	1018	12	1075	0	8	-8	0	70	9	3	E	A	A	12	B			329	280	150	80	-	-	
		EB	5030-6005	72	20	31	123	78	18	19	115	6	-2	-12	-8	62	66	47	E	E	D	60	E			203	200	-	-	-	-	
		SB	6004-6005	76	1350	15	1441	89	1328	21	1438	13	-22	6	-3	59	23	36	E	C	D	25	C			435	460	350	80	-	-	

Table 4-13: LOS Analyses of Previous Studies (Existing Conditions without BRAC 133)

Intersection	Intersection Approach	Wells & Associates Original TIS/TMP for NCPC, 2003 (Analysis Year 2002-2003)				Wells & Associates TIMP 2008 (Analysis Year 2008)				VHB Mark Center (BRAC 133) Study, City of Alexandria, 2009 (Analysis Year 2008)				PB Mark Center (BRAC 133) Study VDOT (Analysis Year 2008)				Mark Center (BRAC 133) IJR VDOT, 2010 (Analysis Year 2008)				Mark Center (BRAC 133) TMP USACE, 2010 (Analysis Year 2011)			
		By Approach		By Intersection		By Approach		By Intersection		By Approach		By Intersection		By Approach		By Intersection		By Approach		By Intersection		By Approach		By Intersection	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Seminary Rd. / Library Ln.	Eastbound									A	A							A	A			A	A		
	Westbound									A	B	A	B					B	B	B	B	A	A	A	A
	Northbound									E	D							D	D			C	C		
	Southbound									D	E							D	D			C	D		
I-395 NB Off-Ramp / Seminary Rd. (Southeast Rotary Intersection)	Eastbound	C	C			B	C			A	A			A	A			A	B			E	C		
	Westbound	-	-	B	C	-	-	B	C	-	-	F	F	-	-	D	E	-	-	F	F	-	-	E	C
	Northbound	C	C			B	B			F	F			F	F			F	F			D	B		
	Southbound	-	-			-	-			-	-			-	-			-	-			-	-		
I-395 NB On-Ramp / Seminary Rd. (Northeast Rotary Intersection)	Eastbound	-	-			-	-			-	-			-	-			-	-			-	-		
	Westbound	C	C			C	C	B	B	C	D	B	B	C	D	B	B	C	D	B	B	D	B	C	A
	Northbound	B	C			B	B			A	A			A	A			A	A			B	A		
	Southbound	-	-			-	-			-	-			-	-			-	-			-	-		
I-395 SB Off-Ramp / Seminary Rd. (Northwest Rotary Intersection)	Eastbound	-	-			-	-			-	-			-	-			-	-			-	-		
	Westbound	C	B			C	C	B	C	A	A	B	C	A	A	B	C	A	A	B	C	A	A	B	B
	Northbound	-	-			-	-			-	-			-	-			-	-			-	-		
	Southbound	B	C			B	C			C	D			C	D			C	E			E	B		
I-395 SB On-Ramp / Seminary Rd. (Southwest Rotary Intersection)	Eastbound	B	B			B	C			D	C			E	C			D	C			E	B		
	Westbound	-	-			-	-			-	-	C	C	-	-	C	B	-	-	C	C	-	-	D	A
	Northbound	-	-			-	-			-	-			-	-			-	-			-	-		
	Southbound	B	D			C	B			A	A			A	A			B	B			D	A		
Seminary Rd. / Mark Center Dr.	Eastbound	C	F			A	C			B	B			A	B			A	B			B	B		
	Westbound	D	D			D	B			C	C			B	C	B	C	D	C	D	D	C	C		
	Northbound	C	B			A	A			C	D			B	D			C	D			B	C		
	Southbound	B	D			D	D			D	D			D	D			D	D			F	D		
Seminary Rd. / N. Beauregard St.	Eastbound	D	D			C	C			D	D			D	E			D	C			D	D	E	E
	Westbound	D	F			C	D			C	C	D	D	D	D	D	E	E	C			D	D	C	D
	Northbound	C	D			C	D			E	F			D	E			C	D			F	F	E	E
	Southbound	C	C			C	D			D	E			D	E			D	D			D	E		
N. Beauregard St. / Mark Center Dr.	Eastbound	B	A			D	C			D	D			D	D			D	D			E	E		
	Westbound	B	B			C	B			D	E	A	B	D	E	C	B	D	D	B	B	D	C		
	Northbound	D	D			A	A			A	A			B	B			A	A			E	B	D	C
	Southbound	D	D			B	B			A	A			C	A			B	A			C	C		

### 4.4.6 Projected Roadway Traffic Operations

Traffic operational analysis for the proposed condition with projected BRAC 133 trips and interim roadway improvements was performed using CORSIM and Synchro analysis tools. The existing roadway geometry and lane configuration along with interim improvements as shown previously in Figure 4-3, and the projected build-out condition traffic volumes on opening day (2011), including baseline trips, BRAC 133 and IDA generated SOV, rideshare and shuttle trips as shown previously in Figure 4-6 were used as primary inputs to perform the proposed condition traffic operational analysis for the morning and evening peak hour demands.

Optimized signal timing and coordination plans developed using Synchro were transferred appropriately to CORSIM to develop overall study area traffic models. As noted in Section 4.2.2, delineation of the existing island within the rotary and restriping would improve the rotary capacity. Traffic simulation models for the 2011 projected condition utilized this modified configuration to allow three full lanes to circulate the rotary. Multiple simulation runs were made by changing the random seed values for vehicle entry headways, driver responses to traffic choices including gap acceptance, lane change and queue blockages, and driver and vehicle behavior assignment of to surface street vehicles. The data from the multiple runs was evaluated for the projected condition morning and evening peak hour analysis.

Flow rate, speed and density data for freeway mainline and ramp links, and flow rate, control delay, and maximum queue lengths by intersection approach movements for surface links were obtained from the simulation output reports to determine traffic operations. Table 4-14 and Table 4-15 show the traffic operational parameters for the I-395 mainline and ramps under the 2011 projected conditions, including speed, density, and level of service.

Table 4-16 and Table 4-17 show the 2011 projected condition traffic operations of the arterial network including control delay, level of service, and traffic queues by movement, intersection approach and overall intersection for all the signalized intersections within the study area. In Tables 4-14 through 4-17, intersections with the highest levels of congestion (LOS E and LOS F) have been highlighted for ease of reference.

Table 4-14: Freeway Measures of Effectiveness for the AM Peak Hour 2011 Projected Traffic Operational Analysis with Interim Improvements

LOCATION		NODE		LENGTH (ft)	VOLUMES			LINK STATISTICS			AGGREGATE STATISTICS			REMARKS			
		From	To		From	To	Projected Demand	Model Throughput	Model Throughput vs Projected Demand	Speed (mph)	Density (vpmpl)	LOS	Speed (mph)		Density (vpmpl)	LOS	
I-395 GENERAL PURPOSE (GP) & HIGH OCCUPANCY VEHICLE (HOV) LANES	I-395 NORTHBOUND MAINLINE	NB GP	Begin I-395 GP Lanes South of Seminary Road Interchange		1000	1001	692	6828	6343	-485	37	58	F	41	69	F	NB Freeway Mainline
			1001	1002	803	6828	6346	-482	61	93	F						
			1002	1005	1073	6828	6264	-564	28	57	F						
		NB GP	Seminary Road Exit Ramp		1005	1006	790	5410	5002	-408	59	28	D	60	28	D	NB Freeway Mainline
			1006	1008	1235	5410	5007	-403	61	28	D						
			1008	1010	860	5410	5018	-392	61	27	D						
		NB GP	Seminary Road Entrance Ramp		1010	1011	1093	6976	6340	-636	57	24	C	58	25	C	NB Freeway Mainline
			1011	1015	706	6976	6344	-632	58	27	D						
		NB GP	King Street Exit Ramp		1015	1017	635	5936	5343	-593	61	29	D	61	29	D	NB Freeway Mainline
		NB GP	End I-395 North of Seminary Road Interchange		1017	1019	485	5936	5349	-587	61	29	D				
		NB HOV	Begin I-395 HOV Lanes South of Seminary Road Interchange		1052	1053	643	3370	3377	7	67	26	C	66	26	C	NB Freeway Mainline
			1053	1054	534	3370	3374	4	68	25	C						
			1054	1056	501	3370	3369	-1	67	25	C						
			1056	1057	417	3370	3364	-6	67	25	C						
			1057	1058	513	3370	3362	-8	66	26	C						
	1058		1060	616	3370	3359	-11	66	26	C							
	1060		1062	560	3370	3360	-10	66	26	C							
	1062		1063	525	3370	3361	-9	66	26	C							
	1063		1064	571	3370	3356	-14	65	26	C							
	1064	1066	675	3370	3356	-14	65	26	C								
	NB HOV	Seminary Road HOV Entrance Ramp		1066	1067	1074	3490	3484	-6	64	20	C	65	27	D	NB Freeway Mainline	
	NB HOV	End I-395 HOV Lanes North of Seminary Road Interchange		1067	1068	1010	3490	3479	-11	65	27	D					
	I-395 SOUTHBOUND MAINLINE	SB GP	Begin I-395 GP Lanes North of Seminary Road Interchange		2001	2002	812	4188	3926	-262	18	57	F	18	57	F	SB Freeway Mainline
			King Street Entrance Ramp		2002	2004	1209	4538	4033	-505	14	57	F				
		SB GP	Seminary Road Exit Ramp		2004	2005	502	3450	3359	-91	61	14	B	62	13	B	SB Freeway Mainline
			2005	2007	920	3450	3360	-90	63	13	B						
			2007	2009	1142	3450	3358	-92	63	13	B						
			2009	2012	1179	3450	3359	-91	63	13	B						
		SB GP	Seminary Road Entrance Ramp		2012	2014	570	4249	4062	-187	57	16	B	60	16	B	SB Freeway Mainline
	End I-395 South of Seminary Road Interchange		2014	2015	728	4249	4064	-185	62	16	B						
I-395 NORTHBOUND RAMPS	NB GP	Seminary Road Exit Ramp		1005	1201	299	1418	1246	-172	11	113	F	9	139	F	Diverge Ramp Section	
		1201	7002	203	1418	1130	-288	6	176	F							
		7002	1203	232	1418	1189	-229	10	-	F							
	NB GP	Seminary Road Entrance Ramp		1206	1208	232	1566	1283	-283	28	-	B	34	20	C	Class III Type Urban Arterial	
		1208	7003	201	1566	1281	-285	33	-	A							
		7003	1210	221	1566	1312	-254	34	21	C							
NB HOV	Seminary Road Entrance Ramp		1212	1213	358	120	111	-9	27	-	B	48	3	A	Class III Type Urban Arterial		
	1213	7005	331	120	111	-9	37	-	A								
	7005	1070	339	120	133	13	46	3	A								
1070	1066	306	120	132	12	50	3	A									
I-395 SOUTHBOUND RAMPS	SB GP	Seminary Road Exit Ramp		2004	2201	313	1088	661	-427	3	124	F	2	158	F	Diverge Ramp Section	
		2201	7004	485	1088	624	-464	2	179	F							
		7004	2204	491	1088	564	-524	1	-	F							
		2204	2205	376	1088	572	-516	1	-	F							
	SB GP	Seminary Road Entrance Ramp		2213	2215	197	799	693	-106	32	-	A	33	16	B	Class III Type Urban Arterial	
2215	7001	371	799	695	-104	33	-	A									
7001	2216	279	799	708	-91	33	12	B									
2216	2012	427	799	707	-92	33	19	B									

Table 4-15: Freeway Measures of Effectiveness for the PM Peak Hour 2011 Projected Traffic Operational Analysis with Interim Improvements

		LOCATION		NODE		LENGTH (ft)	VOLUMES			LINK STATISTICS			AGGREGATE STATISTICS			REMARKS
		From	To	From	To		Projected Demand	Model Throughput	Model Throughput vs Projected Demand	Speed (mph)	Density (vpmpl)	LOS	Speed (mph)	Density (vpmpl)	LOS	
I-395 GENERAL PURPOSE (GP) & HIGH OCCUPANCY VEHICLE (HOV) LANES	I-395 NORTHBOUND MAINLINE	NB GP	Begin I-395 GP Lanes South of Seminary Road Interchange	1000	1001	692	5574	5585	11	62	31	D	60	28	D	NB Freeway Mainline
				1001	1002	803	5574	5587	13	61	30	D				
				1002	1005	1073	5574	5588	14	58	25	C				
		NB GP	Seminary Road Exit Ramp	1005	1006	790	4400	4447	47	62	24	C	62	24	C	NB Freeway Mainline
				1006	1008	1235	4400	4445	45	62	24	C				
				1008	1010	860	4400	4445	45	61	24	C				
	NB GP	Seminary Road Entrance Ramp	1010	1011	1093	5660	5670	10	57	22	C	57	23	C	NB Freeway Mainline	
			1011	1015	706	5660	5671	11	56	25	C					
	NB GP	King Street Exit Ramp	1015	1017	635	4380	4373	-7	61	24	C	62	24	C	NB Freeway Mainline	
		End I-395 North of Seminary Road Interchange	1017	1019	485	4380	4376	-4	62	24	C					
	I-395 SOUTHBOUND MAINLINE	SB GP	Begin I-395 GP Lanes North of Seminary Road Interchange	2001	2002	812	5996	5993	-3	63	24	C	61	23	C	SB Freeway Mainline
				2002	2004	1209	6486	6490	4	59	22	C				
			Seminary Road Exit Ramp	2004	2005	502	5380	5504	124	62	22	C				
				2005	2007	920	5380	5509	129	62	22	C				
		SB GP	Seminary Road Entrance Ramp	2007	2009	1142	5380	5511	131	62	22	C	62	22	C	SB Freeway Mainline
				2009	2012	1179	5380	5507	127	61	23	C				
		SB GP	Seminary Road Entrance Ramp	2012	2014	570	7239	6927	-312	47	34	D	53	32	D	SB Freeway Mainline
			End I-395 South of Seminary Road Interchange	2014	2015	728	7239	6933	-306	58	30	D				
		SB HOV	Begin I-395 HOV Lanes South of Seminary Road Interchange	1068	1067	1010	3290	3290	0	67	25	C	67	25	C	SB Freeway Mainline
				1067	1066	1066	3290	3289	-1	67	25	C				
		SB HOV	Seminary Road Exit Ramp	1066	1064	685	3190	3190	0	66	24	C	82	28	D	SB Freeway Mainline
				1064	1063	564	3190	3196	6	66	24	C				
	1063			1062	582	3190	3193	3	66	24	C					
	1062			1060	505	3190	3188	-2	66	24	C					
	1060			1058	616	3190	3191	1	66	24	C					
	1058			1057	513	3190	3190	0	66	24	C					
	1057			1056	417	3190	3189	-1	65	24	C					
	1056			1054	477	3190	3193	3	65	24	C					
1054	1053	456	3190	3196	6	65	25	C								
SB HOV	End I-395 HOV Lanes North of Seminary Road Interchange	1053	1052	654	3190	3201	11	65	25	C				SB Freeway Mainline		
I-395 NORTHBOUND RAMPS	NB GP	Seminary Road Exit Ramp	1005	1201	299	1174	1145	-29	33	35	D	33	35	D	Diverge Ramp Section	
			1201	7002	203	1174	1146	-28	33	35	D					
			7002	1203	232	1174	1147	-27	43	-	A					
	NB GP	Seminary Road Entrance Ramp	1206	1208	232	1260	1224	-36	29	-	B	34	19	C	Class III Type Urban Arterial	
1208			7003	201	1260	1228	-32	32	-	A						
7003			1210	221	1260	1229	-31	34	20	B						
1210			1010	234	1260	1228	-32	34	18	B						
I-395 SOUTHBOUND RAMPS	SB GP	Seminary Road Exit Ramp	2004	2201	313	1106	983	-123	34	15	B	24	23	C	Diverge Ramp Section	
			2201	7004	485	1106	960	-146	18	28	C					
			7004	2204	491	1106	925	-181	38	-	A					
			2204	2205	376	1106	882	-224	13	-	E					
	SB GP	Seminary Road Entrance Ramp	2213	2215	197	1859	1420	-439	32	-	A	34	34	D	Class III Type Urban Arterial	
			2215	7001	371	1859	1419	-440	32	-	A					
			7001	2216	279	1859	1419	-440	38	24	C					
			2216	2012	427	1859	1420	-439	32	40	E					
SB HOV	Seminary Road Exit Ramp	1066	1070	317	100	97	-3	49	2	A	49	2	A	Diverge Ramp Section		
		1070	7005	352	100	98	-2	49	2	A						
		7005	1213	340	100	98	-2	56	-	A						
		1213	1212	329	100	99	-1	56	-	A						
		1212	1211	130	100	99	-1	20	-	C						

Table 4-16: Arterial Measures of Effectiveness for the AM Peak Hour 2011 Projected Traffic Operational Analysis with Interim Improvements

		Location	Approach	Link	Projected Demand				Model Throughput				Model Throughput vs Projected Demand				Control Delay By Movement			LOS By Movement			LOS By Approach		LOS By Intersection		Modelled Storage and Maximum Traffic Queuing (ft)					
					Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Left	Thru	Right	Delay	LOS	Delay	LOS	Through	Left Turn	Right Turn			
					Link Length (ft)	Queue (ft)	Storage (ft)	Queue (ft)	Storage (ft)	Queue (ft)																						
MARK CENTER (BRAC 133) TRAFFIC ANALYSIS STUDY AREA	LIBRARY LANE	Library Lane / Seminary Road (Node #5003)	WB	5002-5003	20	1580	91	1691	32	1584	74	1690	12	4	-17	-1	16	12	10	B	B	A	12	B	12	B	310	300	50	40	-	-
			NB	6017-5003	36	5	5	46	43	3	1	47	7	-2	-4	1	34	32	36	C	C	D	34	C			264	60	-	-	-	-
			EB	5005-5003	212	821	11	1044	214	792	9	1015	2	-29	-2	-29	21	6	8	C	A	A	9	A			311	180	150	120	-	-
			SB	6018-5003	41	5	15	61	42	5	12	59	1	0	-3	-2	30	29	13	C	C	B	26	C			216	80	-	-	-	-
	I-395 / SEMINARY ROAD ROTARY INTERCHANGE	I-395 NB Off-Ramp/Seminary Road (Node #5015)	NB	1203-5015	0	1220	198	1418	0	950	163	1113	0	-270	-35	-305	0	71	99	-	E	F	75	E	79	E	618	560	-	-	-	-
			EB	5013-5015	804	301	0	1105	779	261	0	1040	-25	-40	0	-65	86	70	0	F	E	-	82	F			331	300	331	300	-	-
		I-395 NB On-Ramp/Seminary Road (Node #5010)	NB	5015-5010	1087	60	877	2024	887	78	765	1730	-200	18	-112	-294	5	22	28	A	C	C	16	B	22	C	276	240	276	140	-	-
			WB	5009-5010	0	327	60	387	0	295	55	350	0	-32	-5	-37	0	53	32	-	D	C	50	D			160	140	-	-	-	-
		I-395 SB Off-Ramp/Seminary Road (Node #5012)	WB	5010-5012	267	1147	0	1414	223	951	0	1174	-44	-196	0	-240	5	6	0	A	A	-	6	A	15	B	300	200	300	100	-	-
	SB		2205-5012	0	233	0	233	0	222	0	222	0	-11	0	-11	0	58	0	-	E	A	58	E	281			160	-	-	-	-	
	I-395 SB On-Ramp/Seminary Road (Node #5013)	SB	5012-5013	214	286	0	500	201	246	0	447	-13	-40	0	-53	41	19	0	D	B	-	29	C	48	D	259	160	259	200	-	-	
		WB	5019-5013	0	891	0	891	0	841	0	841	0	-50	0	-50	0	58	0	-	E	-	58	E			357	340	-	-	-	-	
	MARK CENTER DRIVE	Mark Center Drive / Seminary Road (Node #5022)	WB 1	5021-5022	460	729	35	1224	304	611	22	937	-156	-118	-13	-287	195	40	49	F	D	D	91	F	51	D	243	280	243	260	-	-
			WB 2	5018-5022	0	1946	56	2002	0	1314	20	1334	0	-632	-36	-668	0	21	17	-	C	B	21	C			637	580	-	-	-	-
			NB	5060-5022	47	11	171	229	55	9	151	215	8	-2	-20	-14	94	105	9	F	F	A	35	C			340	80	340	120	340	60
			EB	5023-5022	20	1416	345	1781	35	1389	318	1742	15	-27	-27	-39	55	35	7	E	D	A	31	C			395	360	150	100	395	240
SB			5045-5022	232	50	50	332	246	54	38	338	14	4	-12	6	180	224	20	F	F	C	169	F	252			280	252	240	252	140	
N BEAUREGARD STREET	N. Beauregard Street / Seminary Road (Node #5025)	WB	5023-5025	1441	1143	0	2584	1070	853	0	1923	-371	-290	0	-661	56	10	0	E	B	-	36	D	68	E	341	240	341	360	-	-	
		NB	6004-5025	456	549	0	1005	354	471	0	825	-102	-78	0	-180	278	61	0	F	E	-	154	F			347	380	175	160	-	-	
		EB	5026-5025	61	1183	0	1244	47	1200	0	1247	-14	17	0	3	100	49	0	F	D	-	51	D			323	300	100	100	-	-	
		SB	6002-5025	177	218	40	435	169	222	43	434	-8	4	3	-1	155	43	32	F	D	C	86	F			250	260	135	140	-	-	
	N. Beauregard Street / Mark Center Drive (Node #6005)	WB	5032-6005	36	5	88	129	71	19	164	254	35	14	76	125	62	74	15	E	E	B	32	C	47	D	286	140	-	-	286	160	
		NB	6007-6005	51	1328	474	1853	32	1055	338	1425	-19	-273	-136	-428	123	67	26	F	E	C	58	E			329	360	150	100	-	-	
		EB	5030-6005	10	5	6	21	9	7	4	20	-1	2	-2	-1	73	42	10	E	D	B	50	D			203	60	-	-	-	-	
		SB	6004-6005	1361	425	81	1867	1074	375	67	1516	-287	-50	-14	-351	51	4	3	D	A	A	38	D			435	460	350	320	-	-	

Table 4-17: Arterial Measures of Effectiveness for the PM Peak Hour 2011 Projected Traffic Operational Analysis with Interim Improvements

		Location	Approach	Link	Projected Demand				Model Throughput				Model Throughput vs Projected Demand				Control Delay By Movement			LOS By Movement			LOS By Approach		LOS By Intersection		Modelled Storage and Maximum Traffic Queuing (ft)					
					Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Left	Thru	Right	Delay	LOS	Delay	LOS	Through	Left Turn	Right Turn			
					Link Length (ft)	Queue (ft)	Storage (ft)	Queue (ft)	Storage (ft)	Queue (ft)																						
MARK CENTER (BRAC 133) TRAFFIC ANALYSIS STUDY AREA	LIBRARY LANE	Library Lane / Seminary Road (Node #5003)	WB	5002-5003	25	843	40	908	22	865	28	915	-3	22	-12	7	26	7	6	C	A	A	8	A	10	A	310	140	50	20	-	-
			NB	6017-5003	52	5	10	67	55	4	8	67	3	-1	-2	0	40	40	14	D	D	B	37	D			264	100	-	-	-	-
			EB	5005-5003	223	1441	21	1685	201	1286	11	1498	-22	-155	-10	-187	10	6	4	A	A	A	7	A			311	160	150	120	-	-
			SB	6018-5003	86	15	30	131	94	18	21	133	8	3	-9	2	39	38	21	D	D	C	36	D			216	160	-	-	-	-
	I-395 / SEMINARY ROAD ROTARY INTERCHANGE	I-395 NB Off-Ramp/Seminary Road (Node #5015)	NB	1203-5015	0	799	375	1174	0	789	404	1193	0	-10	29	19	0	16	17	A	B	B	17	B	20	B	618	280	-	-	-	-
			EB	5013-5015	810	913	0	1723	691	751	0	1442	-119	-162	0	-281	22	22	0	C	C	A	22	C			331	280	331	240	-	-
		I-395 NB On-Ramp/Seminary Road (Node #5010)	NB	5015-5010	633	976	0	1609	572	923	0	1495	-61	-53	0	-114	8	7	0	A	A	A	7	A	10	A	276	140	276	180	-	-
			WB	5009-5010	0	309	0	309	0	327	0	327	0	18	0	18	0	20	0	A	B	A	20	B			160	120	-	-	-	-
		I-395 SB Off-Ramp/Seminary Road (Node #5012)	WB	1211-5012	304	738	0	1042	307	701	0	1008	3	-37	0	-34	9	9	0	A	A	A	9	A	14	B	300	100	300	100	-	-
	SB		2205-5012	0	632	0	632	0	537	0	537	0	-95	0	-95	0	23	0	A	C	A	23	C	281			220	-	-	-	-	
	I-395 SB On-Ramp/Seminary Road (Node #5013)	SB	5012-5013	630	306	0	936	570	266	0	836	-60	-40	0	-100	9	9	0	A	A	A	9	A	10	A	259	140	259	140	-	-	
		WB	5019-5013	0	1093	0	1093	0	884	0	884	0	-209	0	-209	0	10	0	A	B	A	10	B			357	160	-	-	-	-	
	MARK CENTER DRIVE	Mark Center Drive / Seminary Road (Node #5022)	WB 1	5021-5022	106	536	39	681	108	547	38	693	2	11	-1	12	66	15	11	E	B	B	23	C	54	D	243	140	243	160	-	-
			WB 2	5018-5022	0	1150	62	1212	0	1040	58	1098	0	-110	-4	-114	0	33	36	A	C	D	33	C			637	580	-	-	-	-
			NB	5060-5022	350	52	1311	1713	261	46	1001	1308	-89	-6	-310	-405	66	60	26	E	E	C	35	C			340	220	340	220	340	200
			EB	5023-5022	35	1920	59	2014	35	1609	65	1709	0	-311	6	-305	142	95	37	F	F	D	94	F			395	420	150		395	
SB			5045-5022	187	10	71	268	179	11	70	260	-8	1	-1	-8	68	86	21	E	F	C	56	E	252				252		252		
N BEAUREGARD STREET	N. Beaugard Street / Seminary Road (Node #5025)	WB	5023-5025	605	1221	0	1826	547	1095	0	1642	-58	-126	0	-184	70	23	0	E	C	A	38	D	77	E	341	360	341	220	-	-	
		NB	6004-5025	386	456	0	842	357	441	0	798	-29	-15	0	-44	178	51	0	F	D	A	107	F			347	360	175	160	-	-	
		EB	5026-5025	106	1214	0	1320	84	1052	0	1136	-22	-162	0	-184	157	79	0	F	E	A	85	F			323	320	100	100	-	-	
		SB	6002-5025	156	438	46	640	105	394	39	538	-51	-44	-7	-102	349	78	64	F	E	E	129	F			250	260	135	140	-	-	
	N. Beaugard Street / Mark Center Drive (Node #6005)	WB	5032-6005	376	5	404	785	335	1	304	640	-41	-4	-100	-145	45	24	8	D	C	A	27	C	22	C	286	320	-	-	286	320	
NB	6007-6005	45	1010	54	1109	48	1028	44	1120	3	18	-10	11	71	15	12	E	B	B	17	B	329	260			150	120	-	-			
EB	5030-6005	72	20	31	123	79	15	26	120	7	-5	-5	-3	50	41	37	D	D	D	46	D	203	180			-	-	-	-			
SB	6004-6005	225	1350	15	1590	217	1217	0	1434	-8	-133	-15	-156	56	16	0	E	B	A	22	C	435	440			350	160	-	-			

Results of the 2011 baseline operational analysis without BRAC improvements indicate some of the I-395 mainline and ramp sections serving Seminary Road interchange experiencing higher density values restricting lane changes and operating at unacceptable level of service. Many of the lane group movements at existing signalized intersections within the study area experienced severe delay under the projected demand operating at unacceptable levels of service. These degrading operations at the individual intersection approaches will eventually lead to the failure of the overall intersection. In addition, the overall intersection at the Seminary Road and North Beauregard Street intersection operated at unacceptable levels under the projected morning and evening peak hour demands, with all the intersection approaches and lane group movements experiencing severe delay. The Southeast rotary intersection serving the I-395 northbound exit ramp also operated at an unacceptable level under the projected morning peak hour demand.

Table 4-18 shows a comparative summary of the intersection levels of service for the morning and evening peak hours with and without BRAC 133 and IDA improvements for the opening year 2011. Table 4-18 intersections with the highest levels of congestion (LOS E and LOS F) have been highlighted for ease of reference.

Table 4-18: Comparative Analysis of the Intersection LOS for 2011 Baseline and Projected Morning & Evening Peak Hour Traffic Demand With and Without BRAC 133 and IDA Improvements<sup>45</sup>

			Mark Center (BRAC 133) TMP USACE, 2010 AM PEAK ANALYSIS				Mark Center (BRAC 133) TMP USACE, 2010 PM PEAK ANALYSIS				
			Baseline 2011 Without BRAC 133 & IDA		Projected 2011 With BRAC 133 & IDA		Baseline 2011 Without BRAC 133 & IDA		Projected 2011 With BRAC 133 & IDA		
			Location	Approach	LOS By Approach	LOS By Intersection	LOS By Approach	LOS By Intersection	LOS By Approach	LOS By Intersection	LOS By Approach
MARK CENTER (BRAC 133) TRAFFIC ANALYSIS STUDY AREA	LIBRARY LANE	Library Lane / Seminary Road Intersection (Node #5003)	WB	A		B		A		A	
			NB	C	A	C	B	C	A	D	A
			EB	A		A		A		A	
			SB	C		C		D		D	
	I-395 / SEMINARY ROAD ROTARY INTERCHANGE	I-395 NB Off Ramp / Seminary Road (Node #5015)	NB	D	E	E	E	B	C	B	B
			EB	E		F		C		C	
		I-395 NB On Ramp / Seminary Road (Node #5010)	NB	B	C	B	C	A	A	A	A
			WB	D		D		B		B	
		I-395 SB Off Ramp / Seminary Road (Node #5012)	WB	A	B	A	B	A	B	A	B
			SB	E		E		B		C	
		I-395 SB Off-Ramp (Free Right Turn)	SBRT	D	D	F	F	D	D	F	F
	I-395 SB On-Ramp / Seminary Road (Node #5013)	SB	D	D	C	D	A	A	A	A	
		EB	E		E		B		B		
	I-395 SB On-Ramp (Free Right Turn)	EBRT	D	D	D	D	E	E	F	F	
	MARK CENTER DRIVE	Mark Center Drive / Seminary Road Intersection (Node #5022)	WB 1	C		F		B		C	
			WB 2	B		C		C		C	
			NB	B	C	C	D	C	C	C	D
			EB	B		C		B		F	
			SB	F		F		D		E	
	N. BEAUREGARD STREET	N. Beauregard Street / Seminary Road Intersection (Node #5025)	WB	C	E	D	E	D	E	D	E
NB			F		F		F		F		
EB			D		D		D		F		
SB			D		F		E		F		
N. Beauregard Street / Mark Center Drive (Node #6005)		WB	D		C		C		C		
		NB	E	D	E	D	B	C	B	C	
		EB	E		D		E		D		
		SB	C		D		C		C		

<sup>45</sup> A third scenario was analyzed to identify the impacts of BRAC 133 traffic only (i.e., without the traffic from the IDA development). Results of the analysis for this scenario indicated only minor improvements in control delay values for signalized intersections within the study area, and a decrease in freeway and ramp densities. However, no significant change in LOS values for the freeway mainline, ramps, or signalized intersections was observed, with the exception of the I-395 NB GP lanes during the morning peak hour, which improved from LOS F to LOS E.

#### **4.4.7 Projected Internal Circulation and Traffic Operations**

Traffic simulation models developed for the Mark Center projected traffic condition show the proposed internal roadways operating at acceptable conditions with free flowing traffic throughout the internal roadways. The simulation model results were evaluated to identify traffic operations and levels of service for the proposed signalized intersection at Mark Center Drive and the proposed roundabout at WHS Circle/IDA Drive - North Parking Garage. The proposed roundabout within the Mark Center site was coded in as a one-way link circulating in a counterclockwise direction, with the roundabout approach legs controlled by yield signs. Conditional turn movements were used to accurately replicate Origin-Destination assignments of the left, through, and right turning movements. The output data from the multiple simulation runs were averaged for flow rate, control delay, average, and maximum queue lengths for approach movements. Table 4-19 shows the projected morning and evening peak hour traffic operations of the signalized intersection at Mark Center Drive and the roundabout at WHS Circle/IDA Drive-North Parking Garage.

Results from the above table indicate that the proposed internal roadway lane configurations and storage lengths adequately serve the site generated morning and evening peak hour traffic. In addition, the access control facilities at the South Parking Garage experience lesser peak hour vehicle demand than the maximum capacity of the proposed system. Hence, no traffic queues are expected to extend from the access control gates and adversely impact the internal roadway operations. The ACP also has a reserved inbound check-in lane that can be utilized during special scenarios when heavy inbound demand occurs.

Table 4-19: Traffic Operational Analysis of the Proposed Internal Roadway Network for 2011 Projected Morning & Evening Peak Hours

																										Modelled Storage and Maximum Traffic Queuing (ft)						
MARK CENTER INTERNAL ROADWAYS	Location	Approach	Link	Projected Demand				Model Throughput				Model Throughput vs Projected Demand				Control Delay By Movement			LOS By Movement			LOS By Approach		LOS By Intersection		Through		Left Turn		Right Turn		
				Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Left	Thru	Right	Delay	LOS	Delay	LOS	Link Length (ft)	Queue (ft)	Storage (ft)	Queue (ft)	Storage (ft)	Queue (ft)	
MARK CENTER INTERNAL ROADWAYS	Mark Center Drive / Mark Center Drive (Node #5033)	WB	35-5033	0	91	30	121	0	92	46	138	0	1	16	17	0	31	2	-	C	A	21	C			254	160	-	-	254	60	
		NB	5031-5033	5	5	0	10	9	1	0	10	4	-4	0	0	27	11	0	C	B	-	26	C	11	B	265	40	-	-	-	-	
		EB	5034-5033	734	944	92	1770	667	762	83	1512	-67	-182	-9	-258	9	8	4	A	A	A	8	A			167	180	167	180	-	-	
		SB	5060-5033	177	41	59	277	125	38	49	212	-52	-3	-10	-65	24	19	7	C	B	A	19	B			533	120	533	140	-	-	
	Mark Center Drive / Mark Center Drive (Node #5033)	WB	35-5033	0	406	667	1073	0	410	594	1004	0	4	-73	-69	0	15	4	-	B	A	9	A			254	140	-	-	254	140	
		NB	5031-5033	40	132	0	172	45	127	0	172	5	-5	0	0	18	17	0	B	B	-	17	B	11	B	265	120	-	-	-	-	
		EB	5034-5033	357	130	11	498	217	63	7	287	-140	-67	-4	-211	18	18	8	B	B	A	18	B			167	120	167	160	-	-	
		SB	5060-5033	18	10	243	271	15	8	181	204	-3	-2	-62	-67	9	11	4	A	B	A	5	A			533	20	533	120	-	-	
	ROUNDABOUT AM PEAK 1	WHS Circle/IDA Drive - North Parking Garage	EB	5033-35	258	608	255	1121	193	518	185	896	-	-90	-	-90							2	A			254	20				
			NB	5040-36	40	0	0	40	40	0	0	40		-	0	0							3	A			153	60				
			WB	5042-37	0	64	0	64	0	67	0	67	-	-	0	0							0	A			109	40				
			SB	5039-38	0	0	17	17	0	0	18	18	-	-	1	1							3	A			131	0				
ROUNDABOUT PM PEAK 1	WHS Circle/IDA Drive - North Parking Garage	EB	5033-35	258	608	255	1121	193	518	185	896	-	-90	-	-90							2	A			254	0					
		NB	5040-36	40	0	0	40	40	0	0	40		-	0	0							1	A			153	20					
		WB	5042-37	0	64	0	64	0	67	0	67	-	-	0	0							0	A			109	60					
		SB	5039-38	0	0	17	17	0	0	18	18	-	-	1	1							3	A			131	0					

NOTE:

1. Average control delay values in seconds per vehicle can be measured for individual approaches only and not for the whole roundabout intersection.

#### 4.4.8 Projected Problem Areas

Traffic operational analysis and simulation modeling results for the projected condition morning and evening peak hour demand indicated locations of concern throughout the study area roadway network that were marked by long traffic queues and spillovers. The LOS at these locations deteriorated to an unacceptable E or F, with demand exceeding capacity. Some of the notable locations that require improvements are shown below.

Along Interstate Mainline and Ramps:

- I-395 Northbound GP lanes south of the Seminary Road interchange and the Seminary Road exit ramp section
- I-395 Southbound GP lanes north of the Seminary Road interchange and the Seminary Road exit ramp section
- Seminary Road entrance ramp section to southbound I-395

Projected traffic queue spillback along southbound I-395 extends north past the King Street interchange, affecting the entrance ramp operations and weave section maneuvers from King Street. The extents of the northbound queue spillback and its impact on Duke and Seminary Road interchange operations should be evaluated.

Along Arterial Streets and Intersections:

- Southeast rotary intersection that controls the I-395 northbound exit ramp approach - identified as the primary cause of projected traffic congestion along southbound I-395 and eastbound Seminary Road
- North Beauregard Street and Seminary Road intersection - the heavy left turn demands from conflicting intersection approaches result in an inadequate allotment of green time splits that affects the capacity and operations of the overall intersection
- Eastbound Seminary Road queue spillback due to degrading traffic operations at the southeast rotary intersection

Other Concerns causing Traffic Operational Problems:

- Short distance weaving maneuvers executed by the following turn movements create vehicular conflicts and impedance of through traffic flow
  - Right turns from northbound North Beauregard Street to eastbound Seminary Road
  - Right turn movements from westbound Seminary Road to Southern Towers
  - Left turn movements to North Beauregard Street from northbound and southbound I-395 exit ramps
  - Right turn movements from eastbound Seminary Road to North Beauregard Street and making left turns into Mark Center Drive

- Existing lane configurations along Seminary Road have multiple lane merges and splits occurring over short distances at the following locations that require quick driver decision-making and reaction skills. Unfamiliar drivers and familiar drivers with slow reaction times who fail to execute these merge and lane change maneuvers in timely fashion may block traffic and impede traffic operations
  - I-395 exit ramp traffic merging with westbound Seminary Road traffic and positioning for executing left turns to head southbound on North Beauregard Street
  - Eastbound Seminary Road traffic positioning for the I-395 northbound or southbound entrance ramps

In addition, the traffic demand at many of the intersection approach movements within the study area exceed available capacity resulting in spillover and traffic overflow that extends into downstream intersections impeding corridor wide traffic flow and operations.

### 4.4.9 Suggestions that Require Further Review and Analysis

The locations identified in the previous section were assessed for potential improvements that would help improve overall operations. After review of the traffic characteristics and travel patterns from the simulation models under the projected demand conditions, preliminary improvements were identified that require further review and validation. Some of the proposed recommendations are long-term by nature, due to the associated costs and funding approval. Extensive coordination between participating agencies including VDOT, City of Alexandria, USACE, and other agencies in the surrounding jurisdictions is required in the identification of specific improvements and their implementation.

#### ***Suggested Roadway Improvements:***

1. Widen the existing single lane approach from I-395 north and south exit ramp traffic movements going westbound on Seminary Road, to two lanes. This significantly improves the southbound I-395 mainline and ramp operations at the Seminary Road interchange.
2. Widen northbound I-395 exit ramp approach to allow a longer two-lane wide ramp section. This adds more capacity to the ramp and helps mitigate some traffic congestion along I-395. However, this can only be a short-term improvement since the traffic queues are attributed to the inadequacy of the downstream rotary intersection.
3. Reconfigure the existing southbound I-395 entrance ramp from Seminary Road, and the ramp merge influence area to add capacity. The existing entrance ramp from Seminary Road tapers from a double lane to a single lane ramp before entering the freeway section via a 200 ft acceleration lane. The projected traffic demand requires a longer merge section.

#### ***Suggested Intersection Improvements:***

1. One long-term possibility could be to eliminate northbound left turns from the Seminary Road and North Beauregard Street intersection by constructing a three phase- signalized intersection at Foster Avenue for the redirected left turns. This will limit the number of signal phases at

North Beauregard Street and Seminary Road intersection and improve overall intersection capacity and corridor operations along Seminary Road and North Beauregard Street. This improvement requires the following concurrent capacity and traffic control modifications to obtain the required results without causing any adverse traffic operational impacts along North Beauregard corridor.

- a. Widen North Beauregard Street to receive four lanes of traffic at Foster Avenue with the two inside lanes operating as dedicated left turns.
  - b. Widen and improve Foster Avenue to receive two lanes of one-way traffic and provide a direct merge to Seminary Road.
  - c. Widen Seminary Road at the Fosters Avenue merge location to receive two additional full lanes; the added lanes should be tapered gradually to meet the existing lane geometry to allow smooth merging and eliminate any potential bottleneck.
  - d. Restripe the two northbound dedicated left turn lanes at the Seminary Road and North Beauregard Street intersection as through lanes.
  - e. Eliminate all southbound left turns from North Beauregard Street into Southern towers at the proposed Foster Avenue intersection location and redirect them to execute left turns at Seminary Road and North Beauregard Street intersection to access Southern Towers via Mark Center Drive. Additional capacity and signal timing review required to identify the impacts of this added traffic at Seminary Road and Mark Center Drive intersection.
  - f. Revise signage such that the right turns from Southern Towers to North Beauregard Street are yield-controlled.
  - g. Coordinate signal timing operations of the proposed signal with the existing signals along Beauregard corridor.
2. Optimize signal timing and coordination at the rotary interchange with the coordinated cycle length determined based on the demand experienced at the southeast rotary interchange.
  3. Install advance warning signs, lane guidance regulatory signs, informational guide signs and highly visible pavement markings along Seminary Road at I-395 ramp split locations to aid in advance decision making, and minimize vehicular conflicts.
  4. Provide exclusive bus bays at all existing bus stop locations to prevent blocking of through traffic by stopped buses.

***Suggested Traffic Control Improvements:***

1. Optimize signal timing and coordination along Seminary Road to serve the projected demand.
2. Modify east-west signal coordination along Seminary Road by coordinating the westbound through movement at Mark Center Drive intersection and the westbound left turn movement at

North Beauregard Street intersection. This will help clear Seminary Road at Mark Center Drive and North Beauregard Street intersections and reduce traffic queues, since most of the westbound through traffic exiting Seminary Road and Mark Center Drive intersection execute left turns to travel on North Beauregard Street. This will also improve the flow of the I-395 ramp traffic movement and minimize backups along I-395 mainline and ramps.

3. Improve existing pedestrian crossing signal equipment to include new countdown pedestrian signal heads, push buttons, audible pedestrian signals, and pedestrian signage that meet ADA and MUTCD guidelines to adequately inform and serve the projected pedestrian traffic.

### ***Recommended Internal Circulation Improvements within the Mark Center:***

Install MUTCD recommended “Do Not Block Intersection” (R10-7) signs along the Mark Center internal roadway network intersection crossings, especially at exit points from parking garages, to keep traffic from joining stopped queues and obstructing other intersection approaches from discharging.

### ***Other On-Going Studies:***

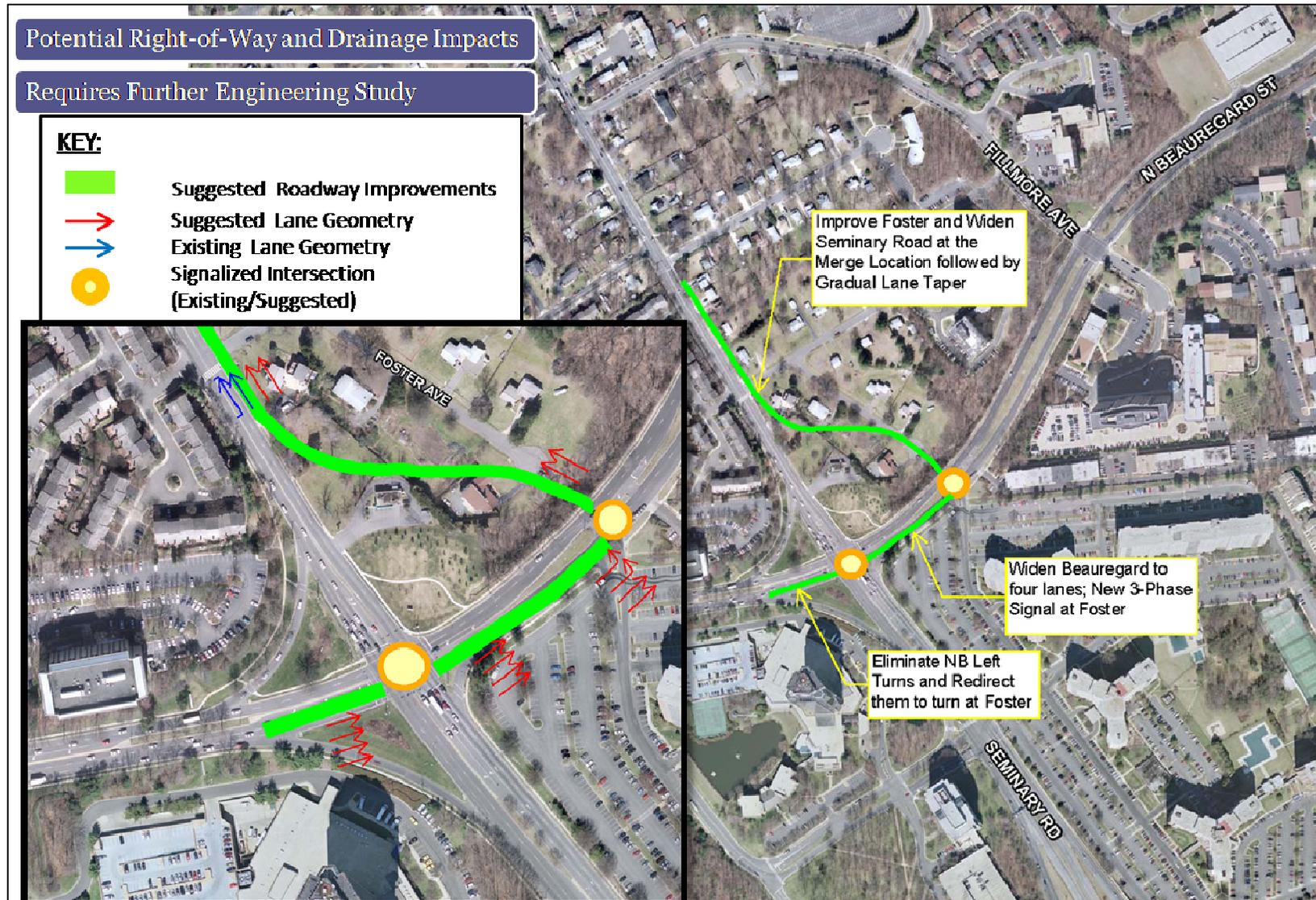
1. Currently, there is no direct HOV access from I-395 northbound to Seminary Road. There’s a single reversible lane ramp that provides access from Seminary Road to the northbound I-395 HOV lanes during the morning peak period and access from the southbound I-395 HOV lanes to Seminary Road during the evening peak period. However, this HOV access will not benefit the BRAC 133 traffic accessing the Mark Center site from either the north or south directions since the Mark Center traffic will be traveling in the opposite directions of the HOV lane direction of travel. VDOT is currently exploring the feasibility of adding a direct HOV access ramp from I-395 northbound to Seminary Road which would benefit BRAC 133 traffic traveling from the south and improve overall interchange traffic operations. The study is in its conceptual stage and it will take multiple years to identify funding sources and secure funding to design, and construct the project.
2. VDOT is currently analyzing short-term roadway and signal improvements recommended by the BRAC Advisory Group to determine the feasibility of implementation.

Figures 4-8 and 4-9 show details of the proposed suggestions to the adjacent roadway network.

Figure 4-8: Suggested Adjacent Roadway Improvements



Figure 4-9: Suggested Adjacent Roadway Improvements (cont'd)



## 4.5 Impacts on Employees and Residents

### 4.5.1 Citizen and Neighborhood Associations

The following are concerns that have been articulated by citizens and neighborhood associations in the vicinity of BRAC 133. This study did not examine or attempt to validate the concerns and/or assumptions made by citizens, nor has an effort been made reference any studies that may validate citizen assumptions. The following serves as a list of documented citizen concerns and assumptions to which stakeholders (i.e., DoD, the City of Alexandria, VDOT, etc.) are currently working together to address.

The primary concern of the citizens and neighborhood communities is the addition of about 3,800 new vehicular trips to the BRAC 133 location and its traffic impacts on the surrounding roadway network. Another concern was the fear that the provision of free employee parking at the site would encourage more SOV trips to the site and ultimately result in parking overflow. Reduction of site-generated SOV trips by more than 40 percent was suggested for consideration. Other concerns include current lack of an extensive shuttle service plan and shuttle service amenities, internal roadway circulation, pedestrian and bicycle traffic circulation and safety, access control point processing and traffic backups, and lack of a comprehensive intermodal plan for the region. USACE and its affiliated organizations are working in close coordination with the City staff and the BRAC Advisory Group to identify their concerns and take appropriate action.

In response to the already raised citizen and neighborhood concerns, the Army is making or has already made the following transportation improvements or plan changes to meet their demands:

1. Implement interim roadway and traffic control improvements identified and approved as part of the 2003 TIS/TMP to improve roadway capacity and traffic operations.
2. Eliminate left turns from I-395 exit ramp traffic at Mark Center Drive and Seminary Road intersection by constructing a physical barrier obstruction to reduce vehicular conflicts and minimize short distance lane change maneuvers.
3. Propose TDM strategies that account for 40 percent or more reduction in site-generated SOV trips.
4. Develop a pedestrian circulation and sidewalk plan that includes improvement to the existing sub-standard sidewalks, ADA ramps and crosswalks to meet ADA guidelines, continuity to the existing sidewalk system and connectivity to major activity centers.
5. Relocate visitor control center to the South Campus from its previous north campus location to minimize impacts of any traffic queues extending from the VCC and affecting Mark Center Drive and Seminary Road intersection operations.
6. Restrict site access control point (ACP) and verification guard booths to the South Campus location to minimize impacts of any traffic queues extending from the access control gates from affecting the traffic operations along North Beauregard Street and Mark Center Drive.

7. Construct a pedestrian bridge connecting North and South Parking Garages to help transport employees and visitors to the south ID verification and security checkpoint before entering into the facility. Restricting North Garage entering employees and visitors to use the pedestrian bridge for accessing the security and ID verification point eliminates potential traffic queues that may have originated from providing a second ACP at the North Parking Garage entrance.
8. Use Army recommended access control processing equipment with faster processing rates to adequately serve the peak hour arriving vehicular demand.
9. Provide multiple DoD/WHS shuttle bus services from the Pentagon Transit Center, Metrorail stations serving Blue, Yellow and Orange lines, and Virginia Rail Express (VRE) stations during the morning and evening peak periods of travel to promote Metrorail use and non-SOV site trips.
10. Provide a Transportation Center with five bus bays that will offer short-term parking for DoD shuttles and provide facilities for shuttle bus drivers.

The projected trip origin and distribution patterns and traffic operational analysis concerns raised by the citizens and neighborhood communities are being addressed in the TMP document. In addition, the short-term roadway improvements recommended by the BRAC Advisory Group staff were reviewed for feasibility. Some of the recommendations identified by the BRAC Advisory Group staff match the TMP proposed recommendations and should be further studied for implementation.

### 4.5.2 Employee Concerns

The comments obtained from the WHS commuter survey respondents were summarized to identify the primary concerns of the relocating employees to the BRAC 133 site. Many of the employees were uncertain of their proposed future travel patterns and mode choices since they had not yet been briefed on all the available transportation options to access BRAC 133. Some of the primary concerns expressed by employees include the lack of attractive public transportation/Metrorail to BRAC 133, existing congestion along I-395 corridor, the lack of direct HOV access from I395 South at Seminary Road interchange, lack of information on the DoD shuttle bus plan (including frequency of shuttle service, bus sizes, bus headways and serviced Metrorail stations), pedestrian and bicycle facilities, shuttle bus service during mid-day and off peak hours, parking restriction and management, slugging, emergency vehicle access, telecommuting and flexible work schedules. The traffic impacts from the proposed Mark Center site and the mitigation efforts in progress are outlined below.

1. The proposed development at BRAC 133 is expected to generate 57 percent drive-alone vehicle trips and 11 percent ride-share vehicle trips that include carpools, vanpools, and shuttle buses. The total development at BRAC 133 and IDA adds a total of about 2,000 new AM peak hour trips, and 1,900 new PM peak hour trips to the existing roadway network surrounding Mark Center. Forty-eight percent of all the new trips are projected to use I-395, with 19 percent from the north and 29 percent from the South.
2. Interim roadway improvements including roadway widening and traffic signal modifications are scheduled for completion before September 15, 2011 and will improve capacity and traffic operations. However, the Seminary Road exit ramps from I-395 north and south directions will

operate at unacceptable levels with traffic queues and congestion extending to the mainline. Traffic will also experience some delays at the Seminary Road and North Beauregard Street signalized intersection.

3. A currently on-going VDOT study to develop alternatives for providing a direct HOV access from I-395 South to Seminary Road is being reviewed by FHWA, VDOT, and other agencies for feasibility and funding. If approved, this improvement will reduce congestion on I-395 and provide direct HOV access to the site. In addition, other short term improvements recommended by the BRAC Advisory Group are also being reviewed and analyzed by VDOT for feasibility. The TMP also identifies short and long-term suggestions that require further review and analysis.
4. Long-term studies to widen I-395 between Duke Street and King Street interchanges are also being evaluated and studied by VDOT. However, the approval process and securing of federal funds may be time consuming.
5. Rideshare trips from I-395 South have the option to travel on I-395 HOV lanes, exit at the Pentagon, and use DoD shuttles to travel to Mark Center site.
6. Multiple DoD/WHS shuttle buses operating at 10 or 15 minute headways will serve BRAC 133 employees from the Pentagon Transit Center, the King Street Metrorail Station, Ballston, West Falls Church, and Franconia-Springfield Metrorail stations during the morning and evening peak periods of travel. Shuttle buses will operate off-peak service to the Pentagon every 15 minutes and off-peak service to Franconia-Springfield every 30 minutes. Shuttle service will be offered for 14 hours a day, from 5:30 AM to 7:30 PM. The proposed shuttle plan is flexible and will be modified for bus sizes and headways as per employee demand once the facility is open and operational.
7. Some Government vehicles may be made available by individual organizations for employee mid-day travel to off-site meetings.
8. A detailed pedestrian circulation and sidewalk plan that includes improvements to the existing walkway system (including, ADA ramps, crosswalks and pedestrian walkway facilities), provides continuity to the existing walkway system and connectivity to major activity centers is being implemented to promote pedestrian travel.
9. Bike racks and shower facilities with lockers are being provided at the site to serve employees who bike to work and to promote non-motorized mode of travel.
10. A slug lane with a pedestrian refuge area is being provided to anticipate slugging among employees.
11. Proposed Transportation Center with five bus bays will offer short-term parking and waiting area for DoD shuttles with facilities for shuttle bus drivers. A covered pedestrian bridge will safely transport employees entering or exiting the BRAC 133 complex to the North Parking Garage and the Transportation Center.

12. A total of 3,530 parking spaces will be available for employees with the exception of government vehicle and visitor parking spaces. A total of 320 priority designated parking spaces will be allotted for rideshare vehicles including carpools and vanpools. Alternative fuel vehicles will be allotted 192 designated parking spaces. A total of 48 ADA parking spaces will be located closer to the entry point for easy access. Parking spaces will be distributed to tenant organizations as per their employee ratios. Tenant organizations will be ultimately responsible for designating employees to receive parking permits. Parking permits will be assigned by parking garage to eliminate added internal circulation trips between the North and South Garages.
13. Telecommuting and flexible work schedules are being recommended for enforcement by tenant organizations to assist commuters and reduce traffic congestion problems.

Detailed discussions on TDM strategies including transit service, WHS/DoD shuttle plan alternatives, rideshare promotions and matching, public and private transit service, and parking management are included in the following Section 5.

## 5.0 Travel Demand Management (TDM) Plan

### 5.1 Existing Mark Center Transportation Management Plan

A new development's TMP must attempt to meld its goals and strategies with existing TMPs in the development's community. In this case, the BRAC 133 TMP has been designed to include the TDM strategies detailed in the existing *Mark Center Plaza 1A and 1B TMP*<sup>46</sup> (developed March 31, 2003) so as to comply with existing TMP strategies, in addition to implementing a variety of TDM strategies not included in the existing Mark Center TMP, in order to enhance TMP strategies available to BRAC 133 employees and the Mark Center community. The following section outlines the four major TDM strategies adopted as part of the 2003 Mark Center TMP and demonstrates the Army's commitment to including these strategies at a minimum, while building upon these strategies and incorporating additional strategies within the BRAC 133 TMP. The four TDM strategies are as follows:

#### i. Designation of a Transportation Management Plan Coordinator

Currently, the Mark Winkler Company's Commercial Property Manager of Alexandria properties (now Duke Realty Corporation) is designated as the Transportation Management Plan Coordinator (TMPC). Duties of the TMPC include:

- Managing the shuttle bus service between Mark Center and the Pentagon Metrorail station
- Promoting the use of carpools and vanpools, transit, flex-time, and other TDM programs to tenants and employees
- Administering a ridesharing program
- Providing annual reports to the City of Alexandria on the TDM program utilization
- Administering the on-site sale of transit fare
- Enforcing reserved carpool, vanpool, and flex-time employee parking
- Encouraging tenants to allow employee participation in flexible work hour programs
- Liaising with the City of Alexandria

The BRAC 133 TMP will tie all of the responsibilities of the TMPC into the roles and responsibilities of the BRAC 133 Transportation Coordinator, in addition to other responsibilities, as described in Section 5.2.2.

#### ii. Shuttle Service to Pentagon Metrorail Station

The first priority of the 2003 Mark Center TMP was the establishment of shuttle service between the Mark Center and Pentagon Metrorail station. Currently, Duke Realty, IDA, and CNA operate free shuttle services for their respective tenants and employees.

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<sup>46</sup> *Mark Center Parcel 1A and 1B Traffic Impact Study and Transportation Management Plan*, Wells & Associates, LLC for The Mark Winkler Company, March 31, 2003.

The BRAC 133 TMP includes the management of a free shuttle service for its employees to nearby Metrorail stations which includes service to the Pentagon, Ballston, King Street, West Falls Church, and Franconia-Springfield Metrorail stations.

### iii. **Reserved Flex-Time Employee Parking**

The current 2003 Mark Center TMP provides that up to three percent of new parking spaces for the area now encompassed by BRAC 133 will be reserved until 9:00 AM for flex-time employees.

The BRAC 133 TMP will not guarantee flex-time parking for employees. Currently over 40 percent of employees work a flexible work schedule; in addition, the TMP later states goals to increase this participation rate by an additional 25 percent, which would mean that 65 percent of employees would be guaranteed a parking space if flex-time parking was guaranteed. Guaranteeing parking for flex-time employees could result in an increase in SOV mode of travel, which is not an option for BRAC 133. Moreover, guaranteed flex-time parking only works if there is not a one-to-one parking permit process in place, as the flex-time parking in the 2003 TMP was only temporary and was lifted after 10:00 AM. This TMP advocates a one-to-one permit process to prevent spillover parking.

Instead of guaranteeing flex-time parking, the TMP is allocating five percent of parking to be allotted for carpools and vanpools, as well as three percent to be set aside for alternative and low/no-emissions vehicles. Details on priority parking are presented in Section 5.4.2.

### iv. **Reserved Carpool and Vanpool Parking**

The current Mark Center TMP indicates that up to five percent of new parking spaces for the area now encompassed by BRAC 133 will be reserved until 10:30 AM for carpool and vanpool parking. After 10:30 AM these spaces will be available for general use.

The BRAC 133 TMP will uphold the five percent parking allocation for carpools and vanpools, as well as three percent to be set aside for alternative and low/no-emissions vehicles. However, no time limits will be placed on the parking in order to encourage drivers to rideshare. Parking spaces for carpools and vanpools are priority spaces which are incentives to ridesharing to BRAC 133; as such, general users and single occupancy drivers will not be able to access these priority spaces. Details on priority parking are presented in Section 5.4.2.

Additional BRAC 133 TDM Plan strategies are derived from a multitude of other sources, in addition to the existing 2003 Mark Center TMP, including:

- DoD transportation program protocol
- Analysis of employee commute patterns and needs
- Research on Army transportation program needs
- Best practices and case studies in travel demand management

The following TDM Plan describes further the strategies of the BRAC 133 TDM Plan and corresponding details of its various programmatic elements.

## 5.2 Management Organization and Personnel

### 5.2.1 Managing Organizations

WHS will be managing the WHS Transportation Management Program (based upon this TDM Plan). In the past, WHS's Defense Facilities Directorate has managed the Pentagon's transportation program, including the current DoD Shuttle Bus Program, the Pentagon Transit Center, and the DoD NCR MTBP. WHS will lead the effort in managing the BRAC 133 property and associated facilities, including all transportation elements. In coordination with WHS, the PFFA PMB will manage BRAC 133 parking facilities and the parking program, as it does for the Pentagon.

- i. WHS will establish a "WHS Transportation Management Program Office" onsite at BRAC 133. The office will be staffed during normal weekday business hours with at least one BRAC 133 Transportation Coordinator who will serve as Program Manager for the "WHS Transportation Management Program" as well as employee point-of-contact for all commute-assistance inquiries and needs for BRAC 133 employees. This office will house information and staff dealing with the:
  - a) DoD Shuttle Program
  - b) DoD NCR Mass Transportation Benefit Program
  - c) Mark Center Transportation Center
  - d) BRAC 133 employee-commute assistance, including:
    - DoD Shuttle route and schedule information
    - Transit, Bike/Walk, and Rideshare Program materials
    - Transit subsidy dispersal and sales information
    - Ridematching assistance
    - Transit information, including schedules and maps
    - Bicycle and walking path maps
    - Information about the Mark Center community, including the location of shops, restaurants, retail facilities, banks, daycare, fitness, healthcare facilities, etc.
    - Taxi stand information
    - Slugging information
    - Car-sharing (i.e., Zipcar® and other car-sharing service providers) information, including information on Carshare Alexandria's car-sharing incentive program
    - Regional Commuter Program information (i.e., Commuter Connections enrollment information, Guaranteed Ride Home (GRH) program enrollment information)
- ii. The PFFA PMB will also have an onsite office at BRAC 133 that will deal with parking management operations, including parking permitting for commuters and visitors, as well as security within BRAC 133 parking facilities. The office will be located in the VCC.

### 5.2.2 Transportation Coordinator

At least one Transportation Coordinator shall be hired within 9 months of building operations to manage, operate, and maintain the WHS Transportation Management Program for BRAC. The Transportation Coordinator(s) will be housed and managed under the WHS Transportation Management Program Office and shall maintain normal weekday business hours and be available onsite at the WHS Transportation Management Program Office.

- i. A Transportation Coordinator's main objectives are to:
  - a) Encourage employees to utilize alternative modes of transportation to the BRAC 133 site, including transit, carpooling, vanpooling, bicycling or walking to work, and/or teleworking one or more days a week in order to reduce employee stress, increase employee family time, ease traffic congestion, and improve air quality.
  - b) Offer hands-on personalized<sup>47</sup> commute assistance and act as a point of contact for any BRAC 133 employee requesting assistance on finding an alternative commute mode and/or options for driving alone to work less often.
- ii. The Transportation Coordinator(s) will also attend at least one Employee Transportation Coordinator (ETC) Training, provided through the GSA, prior to building opening and annually thereafter to maintain ETC credentials. The Transportation Coordinator(s) must also organize a formal meeting with the City of Alexandria, VA's Employer Services Outreach Specialist in order to become familiar with the City's "Local Motion" program and its associated employer commuter services, both prior to the building opening and quarterly thereafter to maintain coordination with the City and receive updated information on City and community transportation programs.
- iii. The main responsibilities of the Transportation Coordinator(s) are to:
  - a) Brand the WHS Transportation Management Program (See Section 5.3.4) and organize program rules and registration design in order to cater to the needs of BRAC 133 employees.
  - b) Develop language and information updates to be posted on a WHS Transportation Management Program web page to be developed in coordination with WHS staff and as a web page addition to the "WHS Online Defense Facilities Directorate" website, specifically on transportation matters as they relate to BRAC 133 and its employees.
  - c) Develop and/or acquire both electronic and print media on local transportation schedules and route maps; bicycle/walk path and route maps; information about the Mark Center community, including the location of shops, restaurants, retail facilities, banks, daycare, fitness, healthcare facilities, etc.; taxi information; car-share program enrollment and membership information; slugging information; transit subsidy dispersal and sales information; and regional commuter program information (i.e., Commuter Connections enrollment information, Guaranteed Ride Home (GRH) program enrollment information).

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<sup>47</sup> Also known as "individualized commute assistance"

- d) Manage the Mark Center Transportation Center (See Section 3.3.3) by coordinating with local transit agencies to upkeep schedules and route information as well as with facilities maintenance staff to maintain the cleanliness and preservation of the Transportation Center.
- e) Manage the DoD Shuttle Bus Program operations between Mark Center and Metrorail stations. This will include coordinating with the Pentagon Shuttle Program point of contact and with local transit providers utilizing bus bays at the Transportation Center on a regular basis to ensure efficient operations in order to mitigate queuing back-up at bus bays assigned to shuttles. In addition, the Transportation Coordinator(s) will monitor and maintain shuttle service to all Metrorail stations in order to maintain schedule and prevent delays. The Transportation Coordinator(s) will also produce and maintain up-to-date information on scheduled pick-ups and drop-offs, route changes, Metrorail stop modifications and advertise the information both on the WHS Transportation Management Program web page and via print material.
- f) Participate in ETC, BRAC, and TDM-related planning and training forums held by MWCOG's Commuter Connections, Alexandria's Council of City Government, the Association for Commuter Transportation (ACT), and other related organizations whenever possible.
- g) Develop and maintain a "Ridematching Program" (See Section 5.6) by assisting employees in enrolling in the program, helping them to fill empty seats in carpools and/or vanpools, etc. The Transportation Coordinator(s) will also plan and conduct annual ridematching activities to encourage interested employees to find carpool/vanpool partners.
- h) Produce marketing materials to effectively promote the use of carpools, vanpools, transit, flex-time, bicycling, walking, telecommuting, and other TDM programs to employees.
- i) Organize, plan, and conduct two annual transportation-related events: a Transportation Fair in the fall and a Bike to Work Day event, in coordination with MWCOG's Bike to Work Day festivities, in the spring.
- j) Coordinate with the Mobile Commuter Store™ to administer the sale of transit fares at least biweekly on-site at BRAC 133.
- k) Coordinate with the PFPA PMB office on a routine basis to enforce reserved carpool, vanpool, and low/no-emission vehicle parking.
- l) Provide assistance to employees requesting commuting information to BRAC 133 and/or personalized<sup>48</sup> commute assistance.
- m) Enroll new employees into the WHS Transportation Management Program and assist them through educational orientation materials in making a decision on the most feasible commute for them.

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<sup>48</sup> Also known as "individualized commute assistance"

- n) Liaise with the City of Alexandria to discuss updates to local transportation information and available City programs.
  - o) Develop an annual “Evaluation Report” for WHS detailing the success of the WHS Transportation Management Program in reducing single occupancy vehicle trips and improving mobility to and from the site as well as recommended Program modifications for the coming year.
- iv. The Transportation Coordinator(s) will also coordinate regularly with the “Pentagon/DoD Central Service Center” that will administer all DoD transportation-related matters. The Transportation Coordinator(s) will receive updated information on programmatic modifications to DoD programs, such as the Mass Transportation Benefit Program (which will continue to be maintained centrally out of the Pentagon, including for BRAC 133 employees) and Pentagon/BRAC 133 DoD shuttle buses. The Transportation Coordinator(s) will receive updates through routinely scheduled meetings with the Pentagon/DoD Central Service Center.

### 5.3 Pre-Relocation Outreach

#### 5.3.1 Marketing

WHS has already begun marketing and preparing employees and tenants for the move to BRAC 133. The Office currently maintains a “WHS BRAC 133” web page, under the “WHS Online Defense Facilities Directorate” website, which keep employees and the general public abreast of BRAC 133 activities. WHS also coordinates on a monthly basis with tenants moving to BRAC 133 and employee points of contact for BRAC 133 to discuss up-to-date information, such as transportation studies, relocation logistics, transportation concerns and/or ideas, etc. In May of 2010, WHS held its annual Transportation Fair at the Pentagon to educate DoD employees about transportation alternatives for commuting. This fair included a booth for BRAC 133 employees specifically in order to begin engaging employees to start re-examining or planning for their new commutes.

While WHS is marketing to BRAC 133 employees and tenants currently, WHS is also planning the following additional activities:

- i. WHS will continue to hold monthly tenant focus group meetings to issue the latest information on the BRAC 133 relocation and Transportation Management Program.
- ii. Upon acceptance of this TMP, WHS will conduct a focus group with tenants and employee points of contact to discuss major elements of the TDM Plan and associate Transportation Management Program in detail.
- iii. Within 9 months prior to relocation, WHS will hire the Transportation Coordinator(s) to help facilitate design and marketing of the Transportation Management Program.
- iv. Six months prior to relocation, WHS will also begin producing and/or acquiring brochures, pamphlets, posters, and other marketing media to increase employee awareness of transportation options available to BRAC 133. Other media will also include letters from ranked officers and other executives enforcing participation in the Transportation Management

Program and informing employees of schedules and deadlines for relocation, program enrollment, events, etc.

### 5.3.2 Employee Orientation

WHS will develop several employee orientation-related guidance materials and events in order to familiarize employees with the new site and the procedural guidelines for the relocation and determining transportation to and from the site. The goal of the orientation tasks is to prepare employees for the impending change in commutes and to provide a level of comfort for employees so that the first day of their new commutes is less unfamiliar and daunting. This level of comfort may also help reframe the intimidation that employees may be feeling in shaping a new commute and may allow employees to make more informed decisions in selecting alternative transportation modes, thereby increasing participation in the Transportation Management Program's various commute alternatives. WHS will conduct the following orientation activities in order to acquaint employees with new commutes and alternatives:

- i. Six months prior to the relocation, WHS will develop a "BRAC 133 Employee Orientation Handbook" which will include, at a minimum, the following:
  - a) Relocation Procedures
  - b) Codes of Conduct (including special events parking protocol for visitors and instructions for restricting parking in residential neighborhoods and neighboring properties)
  - c) Introduction to the Transportation Coordinator(s) Roles and Responsibilities & Contact Information
  - d) Transportation Management Program Details (including information on program registration and enrollment, benefits, and rules for participation)
  - e) Mark Center Community and BRAC 133 Building Amenities
  - f) Building Transportation Amenities Site Map (displaying location of bicycle facilities, retail facilities, etc.)
  - g) Parking Permit Protocol (for special permits, carpool/vanpool permits, and general use permits)
  - h) Telecommuting and/or Alternative work Schedule Requirements and Guidelines

The "Orientation Handbook" will be released at least 4 months before relocation.

- ii. After the release of the Handbook, WHS will organize an orientation outreach effort, backed by ranked officer and executive support, whereby various organizations that will be relocating will be scheduled for small group presentations to go over the Handbook and elements of the Transportation Program and advertise dates for the following events that will be used to educate employees on their travel options and promote their use of alternative transportation modes:

- a) WHS will hold multiple BRAC 133 Transportation Fairs at various current employee worksites to increase awareness of BRAC 133 commute options and programs, as well as to “meet and greet” transit agencies, vendors, and other commuter service-groups who will be invited and available to help acquaint employees with their travel options to Mark Center.
- b) WHS will hold home-location based focus group sessions for various communities where clusters of employees currently reside. Employees will register for the session that corresponds to the area in which they reside (i.e., Manassas Session, Centreville/Chantilly Session, Fairfax/Oakton Session, etc.). At the focus group, WHS will lead a couple of exercises, including a “know your neighbor” activity that will encourage employees to find potential ridesharing partners in their own neighborhood or zip code, as well as a scheduling exercise that will divide employees by the time they must report to work. WHS will then deliver instructions and guidelines on capitalizing on the proximities of these neighbors by starting a carpool or vanpool and disseminate information on the benefits and incentives available to employees for ridesharing.
- c) WHS will also hold a vanpool focus group session and “lunch and learns” to inform employees about the vanpool program, rules, and benefits, as well as register employees for internal BRAC 133 employee vanpools as well as regional vanpool options.

### 5.3.3 Survey

In the fall of 2009, WHS conducted a BRAC 133 employee transportation survey to gauge employee interest and participation in various commute-related programs (See Section 2.3). In July of 2010, WHS conducted a resurvey of both federal and non-federal employees to determine if their commuting patterns will change as a result of the relocation, now that employees are more informed about some of the options that will be available to them. However, at this point in time, the TMP and the corresponding TDM Plan has not yet been circulated to employees, nor have the details of the Transportation Management Program been announced, thus the results may not be precise. Therefore, WHS will conduct an additional resurvey in the winter of 2010. Both federal and non-federal employees will then be further informed about the TDM strategies that will be employed at BRAC 133 and the various events and programs that will be available to them. At this point, they will be able to make more informed decisions about what their transportation mode choice will be. The results of this survey will help WHS determine which transportation modes to market the most as target modes in the development of the BRAC 133 Transportation Management Program.

### 5.3.4 WHS Transportation Management Program & Employee Enrollment

The advantages of developing a branded WHS Transportation Management Program are to provide WHS with an accurate understanding of the planned commute choices in which employees are most interested as well as to inform the Transportation Coordinator(s) of the right target audience and interested parties on whom focus should be placed on marketing various commute options more accurately and effectively.

It is essential that employees are enrolled in a structured WHS Transportation Management Program in order to effectively maintain and develop an understanding of the commuting habits of BRAC 133 employees, and to keep firm control of BRAC 133 adherence to this TMP's goals for SOV reduction and improved mobility for BRAC 133 employees. It will be the responsibility of the Transportation Coordinator(s) to design and manage the Program; however, several components must be adhered to in order for it to be successful. The following are required program elements and procedures that the Transportation Coordinator(s) must follow at a minimum:

- i. Every BRAC 133 employee will pre-register and enroll in the BRAC 133 Transportation Management Program, including those indicating an interest in driving alone. All employees (including off-peak service personnel) will be allowed to enroll in the Program. Each tenant organization is responsible for their non-federal employees (e.g., contractors) and will determine program eligibility on a case by case basis. All non-federal employees enrolled in the Program will be expected to follow the same protocol as federal employees.
- ii. The Transportation Coordinator(s) will design Program rules of enrollment, electronic Program registry, and a registration and enrollment form (electronic and/or paper) that will, at a minimum, include the following mandatory information:
  - Employee Name, ID Number, and Office Name
  - Employee Home Address and Work Telephone/Email
  - Planned Primary Mode of Transportation to BRAC 133
  - Planned Secondary Modes of Transportation to BRAC 133
  - Enrollment in the Mass Transportation Benefit Program
  - Enrollment in Commuter Connections Guaranteed Ride Home Program
  - Parking Permit Number (if applicable)
- iii. The Transportation Coordinator(s) will also manually enter the registration forms into an electronic Program registry database (if forms are not electronic) for ease of reference and records management.
- iv. For all employees who do not elect to drive alone, the Transportation Coordinator will issue a notice to employees to verify acceptance of automatic enrollment into the Guaranteed Ride Home Program and will address employee questions/concerns regarding registration and membership information.

## 5.4 Parking Management

### 5.4.1 Permitting

PFPA PMB will be in charge of managing all parking operations, including parking permit allocation and distribution of permits to carpools, vanpools, and low/no-emission vehicles. However, tenant organizations are responsible for general use parking permit distribution to employees (i.e., permits for employees who want to drive alone to work). Priority parking permits for carpools and vanpools will be distributed before general use parking permits and will also be guaranteed to BRAC 133 employee

carpools and vanpools. The following information outlines the general use parking permitting process at BRAC 133:

- i. Parking spaces will be allocated by PFFA PMB to each tenant organization according to the percent of the total employee population that the organization employs located at BRAC 133. Organizations will only be allotted the number of permits that correspond to the number of parking spaces dedicated to the organization, thus there will be a one to one ratio of parking permits to parking spaces.
- ii. Each tenant organization will be responsible for distributing general use parking permits to employees. In order to receive a permit, employees must access an online application form and fill out information about the type of permit requested and vehicle identification information. Upon review by the employee's supervisor, a parking permit may be granted if the employee meets given criteria (i.e., does not desire to receive a mass transit benefit subsidy). Tenant organizations may only grant as many permits as there are parking spaces allocated to that organization. Permits will be granted on a first-come, first-serve basis to qualified applicants until the allotted number of permits within each organization is exhausted. Each tenant organization will determine whether their non-federal employees will be eligible for parking permits. Tenant organizations will be strongly advised to consider the potential benefits of including transit access, or lack thereof, as one of the criteria in determining eligibility for a parking permit.
- iii. Parking permits will be numbered, corresponding to a single employee's registered vehicle as indicated in the online application. Permits will also be colored according to type of permit (i.e., disabled, executive, carpool/vanpool, low/no-emission vehicle, government vehicle, etc.) and to which parking garage the permit is applicable (i.e., North or South Parking Garage). Parking permits will only be valid in one garage (either North or South Parking Garage).
- iv. PFFA PMB officers will be responsible for resolving permit violation issues, including towing of unauthorized vehicles, or those which do not display a permit. Officers may also issue Federal parking citations for parking in reserved areas, for vehicles parked unlawfully, etc. Officers will routinely patrol the parking garages to ensure compliance with protocol and security.

### 5.4.2 Priority Parking

PFFA PMB will be responsible for distribution of priority parking permits and spaces to employees who choose to carpool, vanpool, or utilize low/no-emission vehicles. There will not be a parking cap to the number of permits PFFA PMB can assign to carpool and vanpool commuters – parking for carpools and vanpools is guaranteed. A minimum of 320 carpool/vanpool priority parking spaces will be reserved in North Parking Garage closest to the pedestrian bridge as the North Parking Garage offers the least inconvenience to carpools/vanpools by eliminating dwell time at the security checkpoint. If the demand for carpool/vanpool parking permits is higher than the allotted amount of parking, spaces will be removed from general use permit parking and re-designated as carpool/vanpool permit parking. Parking is capped at 192 spaces for low/no-emission vehicle parking spaces, which will be located in the

South Parking Garage closest to the entrance of the building. Requirements and protocol for receiving a priority parking space are as follows:

- i. A qualified carpool or vanpool must have at least two DoD employees riding in the vehicle to apply for a permit, including a BRAC 133 employee driver. The driver of a carpool or vanpool must apply for a carpool/vanpool parking permit in person at the PFPA PMB office and show a valid driver's license. The driver must also list the names of the BRAC 133 employees also in the carpool/vanpool on the application. PFPA PMB will verify that the employees are designated riders in the driver's carpool/vanpool before a permit will be granted. Both the driver and riders agree to waive their right to the mass transit benefit subsidy in order to obtain the carpool/vanpool parking permit.
- ii. A qualified low/no-emissions vehicle must be an alternative fuel vehicle (ultra low sulfur diesel, CNG, LNG, electric, fuel cell, E85; or use average B50 biodiesel in standard diesel engine) and/or low-emission and/or fuel efficient vehicle (ZEV). Proof of vehicle eligibility will be determined upon review of the vehicle make, model, and registration as indicated on the employee permit application.
- iii. PFPA PMB officers will enforce permit requirements by conducting random phone calls to riders to ensure they are still members of the carpool/vanpool as well as through surveillance of carpools and vanpools into and out of the parking garage.

### **5.4.3 Overflow Management**

PFPA PMB is only responsible for the management of Army-owned property and parking facilities. However, businesses-owners and residents have reasonable concerns about spillover parking from BRAC 133 affecting the availability of parking near their businesses and homes. Although the majority of parking near the facility is permit or access controlled, some parking, both street and off-street may be impacted by spillover. The parking that may be impacted can be categorized as parking lots where enforcement may be challenging and/or where parking is unpermitted (i.e., residential community parking).

In order to mitigate parking overflow, several actions will or already have been implemented, by WHS as well as area businesses and residential associations, including:

- i. Installing parking garage barrier gates and counters and/or are staffing by parking management personnel at surrounding Mark Center properties with publicly accessible commercial parking capacity. These garages will also have a higher posted price for parking than for visitors to tenants in the property, who will receive parking validation upon exit. Therefore, it will be more expensive for BRAC 133 employees to park in commercial garages (if any desire to do so).
- ii. Limiting guest parking to 4 hours and implementing a towing program based on tire markings (or other means of identifying vehicles that have been parked too long) both in lots and garages. Employees or tenants of the commercial properties are exempt from the requirement through parking permits and/or a registry of employee license plates maintained by the parking management office or personnel.

- iii. Issuing resident and guest parking permits to residential community members and implementing a strict towing policy for vehicles not displaying a permit.

Properties that have not considered the aforementioned strategies should consider implementing one or more of these strategies to help mitigate the effects of any possible overflow parking.

WHS will maintain a BRAC 133 building management hotline for community members to voice a complaint about frequent parking violations. This hotline will be maintained by the Transportation Coordinator(s) at the WHS Transportation Management Program Office and frequent violations will be resolved through communications from the Transportation Coordinator(s).

### 5.4.4 Special Events Protocol

As the BRAC 133 will house many special events, including conferences, training seminars, and organized large meeting events, there will be special events parking protocol in place to which all visiting non-BRAC 133 employees must conform, including:

- i. Visitors will be strictly controlled and managed by PFFA PMB. Every visitor will be required to register in advance and receive approval from PFFA, at least one day prior to visiting the site, and when arriving at the site, the visitor credentials must be verified by the PFFA security guard before being permitted into the visitor parking area. This protocol must be followed if the visitor desires to drive to the special event.
- ii. All visitors attending a conference, training seminar, organized large meeting, or other special event who did not preregister for a visitor parking space must board a DoD shuttle bus from a designated Metrorail pick-up point. Visitors will not be permitted to park at the Pentagon if attending a special event at BRAC 133. Visitors may only park at a lot near the Metrorail station at which they are boarding a train, bus, or DoD shuttle bus, and/or at a commercial parking facility.
- iii. For visitors from outside of the DC Metropolitan Area, WHS will conduct arrangements with area hotels, such as the Hilton Alexandria Mark Center, that will allow for visitors to stay at the hotel and walk or be shuttled over by hotel shuttle or taxi to the BRAC 133 site.

These standard operating procedures will be included under special events protocol in the “Codes of Conduct” portion of the BRAC 133 Employee Orientation Handbook.

## 5.5 Public Transit Program

### 5.5.1 Subsidies

Effective October 1, 2000, Executive Order 13150 "Federal Workforce Transportation in the NCR" allows qualified employees to participate in a transportation fringe benefit program, otherwise known as the MTBP. WHS is managing this program for NCR employees and is assisted by the United States Department of Transportation (USDOT) in its implementation. The following guidance will apply to BRAC 133 employees:

- i. Upon registering for the WHS Transportation Management Program (See Section 5.3.4), employees who indicate that they intend to use transit as their primary mode will be directed to file a web based application (DD Form 2845) with the Defense Facilities Directorate Programs and Services Division, which will manage the MTBP enrollment process for the NCR, to include BRAC 133. All BRAC 133 employees who desire to be a part of the MTBP must reapply for the subsidy, even if they are currently utilizing transit to get to their current work location, in order to account for the potential change in transit fare that will be required to alight at a different Metrorail station or bus stop closer to BRAC 133 or DoD shuttle bus pick-up/drop-off points.
- ii. Participating employees will receive, in addition to their current compensation, transit subsidies in amounts equal to their personal commuting costs, not to exceed the amount as determined by law. Parking costs will not be used in establishing commuter costs. This benefit applies to both mass transit and qualified vanpool participants. Subsidies are dispersed in the following forms:
  - a) **Metro Fare Cards:** Metro fare card denominations issued will be \$1, \$5, \$10, and \$30. Those participants who ride those modes of transit that are compatible with the SmarTrip card will receive these fare cards at their quarterly distribution. Fare cards may be loaded directly onto a SmarTrip card, in the same fashion as the former metro check.
  - b) **SmartBenefit Vouchers:** Smart Benefit vouchers will be distributed to all participants who utilize forms of transportation that are not compatible with the SmarTrip technology, such as the VRE, MARC, many private commuter buses, etc.
  - c) **TranBen Vouchers:** Tranben Vouchers will be provided to those applicants who ride vanpools and Quick's bus lines.
- iii. Employees with subsidized parking must relinquish their parking permits to receive the transit subsidy. Similarly, employees who receive transit subsidies may not be counted as part of a DoD carpool for purposes of qualifying for a parking pass. Servicing parking offices will have the authority to make exceptions to this rule. They will notify WHS of any exceptions granted. Employees must give up their parking pass in order to receive this benefit.
- iv. Subsidies will be distributed quarterly on widely-advertised scheduled dates whereby MTBP staff will be on-site at BRAC 133 to distribute the passes. Employees will be notified of distribution dates via email, on the "WHS NCR-Transit Subsidy" web page, and/or via print media.

### 5.5.2 Onsite Transit Pass Sales

Due to liability limitations, employees will not be able to purchase transit fare media onsite through Metro fare vending machines. Instead, employees will have the ability to purchase transit fare media onsite through an arrangement with the Mobile Commuter Store™. WHS will make arrangements to have the Mobile Commuter Store™ be available on-site at the Mark Center Transportation Center twice

a week during off-peak hours<sup>49</sup>. The Mobile Commuter Store™ will also be accessible to Mark Center community employees and residents.

In addition to the Mobile Commuter Store™, employees may purchase transit fare media at many transit stores across the Greater Washington Metropolitan Region, as outlined in Table 5-1.

**Table 5-1: Alternate Transit Store Locations for Employee Fare Purchasing**

Transit Store Name	Address	City	State	Zip
Pentagon Transit Store	Pentagon Transit Center, Upper Level	Washington	DC	20301
Ballston Commuter Store	4238 Wilson Boulevard, Suite 2232	Arlington	VA	22203
Crystal City Commuter Store	1615-B Crystal Square Arcade	Arlington	VA	22202
Rosslyn Commuter Store	1700 N. Moore Street, Suite 235	Rosslyn	VA	22209
Shirlington Commuter Store	2975 S. Quincy Street	Shirlington	VA	22206
The Olde Town Transit Shop	1775C Duke Street	Alexandria	VA	22301
Connector Store	12530 Sunrise Valley Drive	Herndon	VA	20171
Connector Store	1860 Wiehle Avenue	Reston	VA	22090
Connector Store	12051 Bluemont Way	Reston	VA	20190
Connector Store	6880 Frontier Drive	Springfield	VA	22150
Connector Store	8300 Jones Branch Drive	McLean	VA	22102
TRiPS Commuter Store	8413 Ramsey Avenue	Silver Spring	MD	20910

Source: Arlington County "Commuter Page" web page, <http://www.commuterpage.com/storeoth.htm> (last accessed May 1, 2010).

**5.5.3 Marketing**

In order to maintain transit mode share at BRAC 133, the Transportation Coordinator(s) will commit to an aggressive transit marketing campaign. The Transportation Coordinator(s) will:

- i. Develop and/or acquire brochures, pamphlets, and posters advertising as well as posting information on the WHS Transportation Management Program web page on various transit options available in the region. The Transportation Coordinator will also maintain stock of brochures and schedules in the WHS Transportation Management Program Office.
- ii. Investigate the feasibility and, if funding is available, provide a “commuter kiosk” in order to provide employees with personalized<sup>50</sup> transit commute assistance through a touch screen application.
- iii. Organize, plan, and conduct an annual BRAC 133 Transportation Fair at BRAC 133 to increase awareness of BRAC 133 commute options and programs, as well as to “meet and greet” transit agencies, vendors, and other commuter service-groups who will be invited and available to help acquaint employees with their travel options to Mark Center.

<sup>49</sup> Dependent on discussions with Arlington County Department of Environmental Services and Arlington County Commuter Services and the availability of resources allocated for the Mobile Commuter Store™

<sup>50</sup> Also known as “individualized commute assistance”

### **5.5.4 Long-term Enhancements**

In the long run, there are some activities that WHS may explore in order to improve the effectiveness of their Transit Program, including the following:

- i. Examining the coordination of the DoD shuttle program with the development of improved public transit services, including shuttle schedule alignment with public transit, route alignment, etc.
- ii. Explore the feasibility of expanding the Mark Center Transportation Center to include additional bus bays and/or transit amenities. WHS may consider holding collaborative meetings with transit agencies, residential associations, and other Mark Center commercial properties to examine the probability of sharing costs of the expansion.
- iii. In the event the Transportation Center is expanded and transit service to the site becomes more abundant, WHS will explore the feasibility of a future transit store location at the Mark Center Transportation Center. WHS may consider holding collaborative meetings with transit agencies, residential associations, and other Mark Center commercial properties to examine the probability of sharing costs for the transit store.
- iv. Explore the feasibility of an open-to-the-public annual transit fair at or in the vicinity of the Mark Center Transportation Center. This fair will help showcase Army commitment to the Mark Center community and its goals to reduce traffic to the area, as well as become a more sustainable Federal entity. The fair will have transportation vendors on-site to answer Mark Center employee, resident, or visitor questions and encourage use of transit to and from the area, in a festive atmosphere.

## **5.6 Rideshare Program**

### **5.6.1 Carpools**

Encouraging carpooling is one of the most effective ways for employees to find a door to door commute solution. The Transportation Coordinator(s) will develop a Rideshare Program that is geared toward forming BRAC 133 employee-only carpools. The employee zip code analysis presented in Section 2.3 demonstrates that many employees live within the same zip code and/or residential community, but may work in separate offices and not even know that one another works at BRAC 133. Other than the pre-relocation home-location based focus group sessions described in Section 5.3.2, the Transportation Coordinator(s) will encourage use of carpooling through:

- i. Purchasing a licensing agreement to ridematching software and/or online applications that allow for employees interested in finding a carpool to enter their information, home address, and work schedule into a secure database for both BRAC 133 federal and non-federal employees only. The system will automatically send a message to other interested employees within the same zip code and/or geographic area, informing them of a match and will facilitate information exchange so that employees can setup a carpool on their own. The Transportation Coordinator(s) will advertise this option through the orientation handbook, email, and through

other media to be given to employees as they enroll in the BRAC 133 Transportation Management Program.

- ii. Organize, plan, and conduct a ridematching activity at the annual Transportation Fair that allows for employees to reevaluate their commutes and consider carpooling by meeting employees who may live in the same geographic area as one another.
- iii. Develop and/or acquire brochures, pamphlets, and posters advertising as well as posting information on the WHS Transportation Management Program web page on various carpool program options available in the region, including those provided through Commuter Connections and the City of Alexandria.

### 5.6.2 Vanpools

As many employees are commuting from long distances outside of a viable connection to transit, it is important that WHS develop a strong vanpool program. The Transportation Coordinator(s) shall also have the responsibility of coordinating vanpool formation and/or seat-filling for vanpools that contain BRAC 133 personnel. The Transportation Coordinator(s) will:

- i. Develop both a short-distance and long-distance oriented vanpool program to accommodate employees who live near and far from the BRAC 133 site, and are not convenient to transit. The Transportation Coordinator(s) will work with vanpool providers to develop an action plan for recruiting employees who are interested in vanpools and matching them to BRAC 133 only and community vanpools, such as those at IDA or CNA.
- ii. Conduct a Maryland commuter-focused vanpool seminar to engage Maryland commuters outside of the transit network in discussions about utilizing vanpools to get to BRAC 133. The Transportation Coordinator(s) will organize an event, in coordination with vanpool service providers with service in Maryland, to encourage Maryland commuters to utilize vanpools, including a vanpool matching exercise.
- iii. In addition to the vanpool “lunch and learns” in the pre-relocation outreach phase described in Section 5.3.2, the Transportation Coordinator will invite vanpool providers to the annual Transportation Fair and allow for various providers to hold “lunch and learns” at their discretion, as long as they are coordinated and scheduled with the Transportation Coordinator.
- iv. Maintain a vanpool database and/or board at the BRAC 133 Transportation Management Office that lists all registered BRAC 133 vanpools parked on the property, as well as any vanpools that employees may utilize to get to BRAC 133 (including those to the Pentagon). The board and/or database will display information on origin and destination of the vanpool, the seating capacity of the vanpool, whether the van is full, price per seat, and whether the vanpool is looking for additional riders. This information will be advertised and available to interested BRAC 133 employees.
- v. Develop and/or acquire brochures, pamphlets, and posters advertising as well as posting information on the WHS Transportation Management Program web page on various vanpool

program options available in the region, including those provided through Commuter Connections and private vanpool service providers.

### **5.6.3 Slug Lines**

The Transportation Coordinator(s) will be responsible for providing information on slugging and the location of the slugging area. As slugging is informal, casual, inconsistent, and self-organized, it will be difficult to set up a formal program for slugging; however, in order to promote the safe queuing of slugging, the Transportation Coordinator(s) will explain the location of slugging queue space available to slugs using site plans in the orientation handbook, as well as during the pre-relocation outreach meetings, described in Section 5.3.2.

### **5.6.4 Guaranteed Ride Home**

Guaranteed Ride Home (GRH) is a free service administered by MWCOG to provide Metropolitan Washington Area commuters who regularly carpool, vanpool, bike, walk, or take public transit to work a free ride home in the event of a personal emergency or if they work late at a supervisor's request. Commuters can utilize this service up to four times per year. If a commuter misses his or her ride home, GRH will arrange for a taxi, rental car, or paratransit service provider to take him or her. Members are issued a GRH card to be presented to the emergency ride driver to validate the four free rides.

Upon enrollment into the BRAC 133 Transportation Management Program, all employees who do not elect to drive alone will be notified by the Transportation Coordinator(s) to verify acceptance of automatic enrollment into the GRH Program. All employees who regularly carpool, vanpool, bike, walk, and/or take public transit must register into the GRH Program. Information on the GRH program will be posted on the WHS Transportation Management Program web page as well as advertised in the WHS Transportation Management Program Office.

### **5.6.5 Long-term Enhancements**

In the long run, there are some activities that WHS may explore in order to improve the effectiveness of their Rideshare Program, including the following:

- i. If demand is high for vanpools, WHS will consider hiring a Vanpool Coordinator to serve as employee interface for establishing or maintaining vanpools, and also as an interface between vanpool service providers and BRAC 133 tenant agencies.
- ii. A Vanpool Coordinator may also explore the feasibility of implementing SmartBenefits to provide ease of payment to vanpool providers. This would help make vanpooling more convenient for employees by removing the responsibility of coordinating payment from vanpool riders. It will also make payment for vanpool providers easier by removing the extra step for the vanpool service provider to trade in vouchers for payment and/or issue refunds for overpayment, as the cost of operating a vanpool fluctuates monthly.

### 5.7 Mid-Day Travel Options

The BRAC 133 site will have multiple options for employees to make mid-day trips without the use of a personal vehicle. The following are elements of the WHS Transportation Management Program as it relates to mid-day travel:

- i. Many tenant agencies at BRAC 133 will have their own government vehicles onsite. Many of these vehicles will be used to transport employees during the work day for meetings, special events, etc.
- ii. The DoD shuttle bus program will include mid-day services route to Metrorail stations throughout the day.
- iii. All of the DASH and Metrobuses serving the BRAC 133 site (except for Metrobus route 28G) offer mid-day service at 30-60 minute headways. Employees will be able to access these buses for service to areas outside of Mark Center as well as to seven local Metrorail stations, including Pentagon, Eisenhower, Braddock, Van Dorn, Ballston, West Falls Church, and King Street stations.
- iv. A mid-day taxi stand will be available at the slug area near the Transportation Center during mid-day, off-peak hours. In addition, the Hilton Alexandria Mark Center Hotel has a taxi stand within walking distance of the BRAC 133 site.
- v. A number of on-site amenities will be available to employees so that they will not need to make mid-day trips for errands or lunch, including:
  - Fitness Center
  - Cafeteria
  - Office supply store
  - Two snack/coffee shops
  - Health Clinic
  - Credit Union
- vi. In addition to on-site amenities, the Mark Center community houses a number of amenities within walking distance from BRAC 133, including restaurants, a bank, coffee shops, a grocery store, and other services.
- vii. Currently, there is one Zipcar® car-share vehicle available in Mark Center within walking distance from BRAC 133 (at 2001 North Beauregard Street). Employees who are registered with the Zipcar® program who do not have a parking permit but need to make a driving trip to their destination can reserve this vehicle for their own use.
- viii. Video-conferencing facilities are also available onsite to reduce the need for mid-day meeting travel.

### 5.7.1 Long-term Enhancements

In the long run, there are some activities that WHS may explore in order to improve the effectiveness of mid-day travel options, including the following:

- i. The Transportation Coordinator(s) will consider conducting a demand analysis for obtaining additional car-sharing vehicles to be available on-site or within walking distance of BRAC 133. The Transportation Coordinator will conduct a survey to determine employee interest in having additional car-share vehicles onsite. If there is a demand, discussions with car-sharing service providers will be held to develop a program for obtaining the vehicles as an additional amenity for the BRAC 133 site and Mark Center community.
- ii. In order to encourage non-driving solutions for mid-day travel, the Transportation Coordinator(s) will consider conducting a demand analysis for developing a bike-sharing program for travelers who wish to bicycle at lunch for fitness, to nearby destinations (i.e., Old Town Alexandria, Shirlington Village, etc.) for more retail and restaurant options and/or errands. The Transportation Coordinator will conduct a survey to determine employee interest in having a BRAC 133 bike-sharing program available on-site. If there is a demand, discussions with bike-sharing service providers will be held to develop a program for obtaining the bicycles as an additional amenity for the BRAC 133 site and Mark Center community. The same analysis can be done for those interested in having a Segway Personal Transporter-rental program, for walkable trips and/or an environmental travel option for the disabled.

## 5.8 Variable Work Hour/Flex Time

### 5.8.1 Flexible Work Week

Many BRAC 133 employees are eligible for the Flex Work Week (FWW) Program. According to the WHS fall 2009 commute survey, 25 percent of survey respondents currently work on an FWW schedule. A flexible work schedule allows employees to be flexible on the hour they come into work and when they leave, as long as employees work during core work hours (10:00 AM through 3:00 PM) and for the total hours necessary to fulfill their job type (i.e., 40 hours for full-time and 30 hours for part-time, etc). Types of FWW schedules and the corresponding percentage of survey respondents participating in that type include:

- **Flexitour (32 percent):** Employee selects starting and stopping times are within the flexible hours. Once selected, the hours are fixed.
- **Gliding (63 percent):** Employee selects a starting and stopping time each day, and may change starting and stopping times daily within the established flexible hours.
- **Maxiflex (2 percent):** Employee maintains core hours on fewer than 10 workdays in the pay period, but an employee may vary the number of hours worked on a given workday or the number of hours each week.

WHS will aim for a 15 percent increase in the number of employees participating in the FWW Program within one year of BRAC 133 relocation. In order to achieve this goal, the Transportation Coordinator(s) will:

- i. Coordinate with tenant organization points of contact to educate them on the importance of FWW schedules and encourage making most employees eligible for FWW.
- ii. Advertise FWW in the orientation handbook and encourage employees who have not taken advantage of FWW to do so as they relocate to BRAC 133 (as described in Section 5.3.2).
- iii. Develop new-hire orientation packets to inform employees about their FWW eligibility and encourage employees to travel during the early or later part of the peak period.
- iv. Coordinate with traffic engineers to conduct biannual traffic counts at key intersections and parking garage entrances to determine actual peak hour congestion levels. The Transportation Coordinator will issue a report to tenant organization points of contact detailing peak hours of congestion. If it is determined that at a certain peak hour, intersections are operating at consistently failing levels of service, the report will encourage supervisors within each tenant organization to inform employees to avoid traveling to work during the peak hour of congestion and encourage being flexible with their arrival time to work, within reason and when possible.
- v. Develop and/or acquire brochures, pamphlets, web-content, and posters advertising the FWW program.

### 5.8.2 Compressed Work Week

Many BRAC 133 employees are also eligible for the Compressed Work Week (CWW) Program. According to the WHS fall 2009 commute survey, 15 percent of survey respondents currently work on an CWW schedule. A compressed work schedule allows employees to be flexible the number of hours they work per day in order to work a shorter week and/or have a “compressed” day off. Types of CWW schedules include:

- **4/40 Work Week (11 percent):** Employee works 8 days in a pay period, 10 hours per day.
- **9/80 Work Week (89 percent):** Employee works 9 days in a pay period, 9 hours per day.

WHS will aim for a 10 percent increase in the number of employees participating in the CWW Program within 1 year of BRAC 133 relocation. In order to achieve this goal, the Transportation Coordinator(s) will:

- i. Coordinate with tenant organization points of contact to educate them on the importance of CWW schedules and encourage making more employees eligible for CWW.
- ii. Advertise CWW in the orientation handbook and encourage employees who have not taken advantage of CWW to do so as they relocate to BRAC 133 (as described in Section 5.3.2).
- iii. Develop new-hire orientation packets to inform employees about their CWW eligibility and encourage employees to travel during the early or later part of the peak period.

- iv. Coordinate with tenant organization points of contact and supervisors to allow employees to make their “compressed” day(s) off on days other than Friday whenever possible in order to alleviate congestion throughout the week.
- v. Develop and/or acquire brochures, pamphlets, web-content, and posters advertising the CWW program.

### 5.8.3 Telecommuting

Less than two percent of overall survey respondents indicated that they telecommute to work at least one day a week. However, 19 percent indicated they telecommute via Temporary Duty Assignment (TDY) multiple times during the year, if not regularly. This demonstrates that almost 20 percent of the BRAC 133 workforce responding to the survey is capable of working off-site. As well, most organizations that will be relocating to BRAC 133 do allow telecommuting, or are currently working on drafting a telecommuting policy. While many organizations do not permit telecommuting due to the nature of the organization’s work, those that can allow telecommuting will be encouraged to instate a formal written policy to allow for telecommuting at least once a week.

Therefore, WHS will aim for an 18 percent increase in the number of employees telecommuting within one year of BRAC 133 relocation. In order to achieve this goal, the Transportation Coordinator(s) will:

- i. Organize a meeting with the Telework!VA Statewide Telework Coordinator to better understand the resources available to help guide tenant organizations in crafting a telework program.
- ii. Coordinate with high-security organization points of contact and/or supervisors within those organizations that *can* allow telecommuting to participate in a training seminar on telecommuting options and policies in order to educate them on best practices in telecommute policy development. The Transportation Coordinator(s) will recruit telecommuting experts to run the training seminars.
- iii. Work with DoD and U.S. Department of State Telework Coordinators (list is provided by GSA) to develop a WHS eTelework application and remote encryption program, similar to the one being used currently by Department of State. The eTelework application automatically routes a telework agreement from employee to supervisor to executive director and creates an electronic record of the agreement and provides notifications to the employee when decisions on the application are made and again when the annual agreement is set to expire. This allows for monitoring of employee telework activities to ensure compliance. Remote encryption programs, such as those used when DoD employees are TDY, can also be used for telecommuting purposes and can link up with eTelework applications.
- iv. Provide guidance to organization representatives regarding the development of applicable telecommute policies for their organization so that each organization at BRAC 133 has a formal policy on telecommuting.
- v. Attend training seminars and/or information sessions on the latest high-security telework technologies in order to stay abreast of potential applications for use at the BRAC 133 site.

- vi. Educate supervisors and post information to the WHS Transportation Management Program website on the applicable use of telework centers, located throughout the region. Telework centers shorten the commute time of employees by allowing them to commute to their local center instead of to BRAC 133, in the event working from home does not provide employees with a structured work environment.

## 5.9 Bicycle and Pedestrian Program

### 5.9.1 Paths and Walkways

Many bicycle paths and routes are located within less than one mile of the BRAC 133 site. Table 5-2 outlines 17 of the bicycle paths and routes that can be used for travel into and out of the Mark Center area, including whether the path is classified as on-road or off-road.

**Table 5-2: Bicycle Paths and Routes within 3 Miles of BRAC 133**

Path/Route	Classification
Stream Valley Trail	Off-Road
Holmes Run	Off-Road
Richenbacher	On-Road
W. Braddock Rd	On-Road
W&OD	Off-Road
Four Mile Run	Off-Road
Dawes	On-Road
North Chambliss	On-Road
East Campus	On-Road
King Street	On-Road
Sanger	On-Road
Pegram	On-Road
Picket	On-Road
N. Howard	On-Road
S 28th	On-Road
S. Columbus	On-Road
Abingdon	On-Road
<b>TOTAL</b>	<b>17 Paths/Routes</b>

Source: City of Alexandria Bikeways Map

Over 500 employees live within three miles of BRAC 133, including over 400 employees within two miles, and over 100 employees in less than one mile. This indicates that many employees are able to bicycle or walk to BRAC 133 and be on-site in fewer than 20 minutes. Many employees also expressed an interest in learning about walking and bicycling, as observed from fall 2009 WHS survey comments. Appendix G illustrates various sample routes employees can utilize to travel to work by bicycle from a distance of less than three miles from Mark Center.

### 5.9.2 Bicycle Parking, Showers and Storage Facilities

The BRAC 133 building and parking garages are fully equipped to serve the bicycle and walking employee community. Accommodations for 167 bicycle parking racks will be located in the North

Parking Garage within feet of access to the pedestrian bridge. In addition, 44 showers are available on-site, with eight in the Fitness Center, and 36 designated bicyclist shower rooms in the lower level, complete with lockers. Bicycle parking and shower privileges are on a first-come, first-serve basis.

### 5.9.3 Marketing

The Transportation Coordinator will be responsible for:

- i. Developing and/or acquiring bicycle maps, brochures, pamphlets, and posters advertising as well as posting information on the WHS Transportation Management Program web page about bicycle commuting information.
- ii. Developing relationships with bicycle advocacy groups and bicycle shops in order to organize, plan, and conduct semi-annual health fairs and training seminars on bicycle and walking safety, bicycle maintenance, the health benefits of commuting for exercise, etc. The health fairs will help educate and market bicycling and walking as viable commuting options for BRAC 133 employees.
- iii. Organizing an annual Bike to Work Day pit-stop at Mark Center for bicycle commuters to receive giveaways, information, and other incentives for bicycling to work, as the site is a major employment center in the Mark Center community. The pit-stop will be located outside the secure perimeter so that other employees working within Mark Center may also partake in Bike to Work Day activities; therefore, the Transportation Coordinator will take part in marketing the event and pit-stop to outside employers and residents in the Mark Center community to gain their participation.
- iv. Organizing a “Walk-Buddy” Program for employees interested in walking to work to encourage safe walking. The Transportation Coordinator will use home address information and safe walkway knowledge to find interested employees a walking partner and safe route with which to walk to and from work.

### 5.9.4 Long-term Enhancements

WHS may explore the planning and development of a community “bike station” in order to improve the effectiveness of bicycle commuting options should bicycle commuting become a valid source of transportation for a rising number of commuters. A bike station is an enclosed patron-paid facility that allows bicyclists to store their bicycles safely in a secure environment, in addition to having one-stop access to bicycle repair facilities and personnel as well as bicycle parts/apparel. The Transportation Coordinator will consider conducting a demand analysis using Bike to Work Day Event headcounts and surveys to determine if there is a demand for a Mark Center community bike station. If there is a demand, the Transportation Coordinator will organize planning meetings with the Mark Center community, commercial property owners in Mark Center, and bike station developers to come up with a concept plan, design, and location for a community bike station.

### 5.10 Implementation Schedule

The BRAC 133 TMP development process has been a very involved, targeted process which began in 2009. In its pre-planning and planning stages, many elements of the TMP have already been achieved or at least initiated. Figure 5-1 demonstrates many steps accomplished and those to be completed, as well as associated timeframes for implementation, in the pre-plan period (Fiscal Year 2010-2011). Figure 5-2 details post-plan implementation activities and respective timeframes for completion of those activities (Fiscal Year 2012 and beyond).

TRANSPORTATION MANAGEMENT PLAN FOR BRAC 133 AT MARK CENTER

Figure 5-1: BRAC 133 Pre-Plan Implementation Timeline (2009 through September 15, 2011)

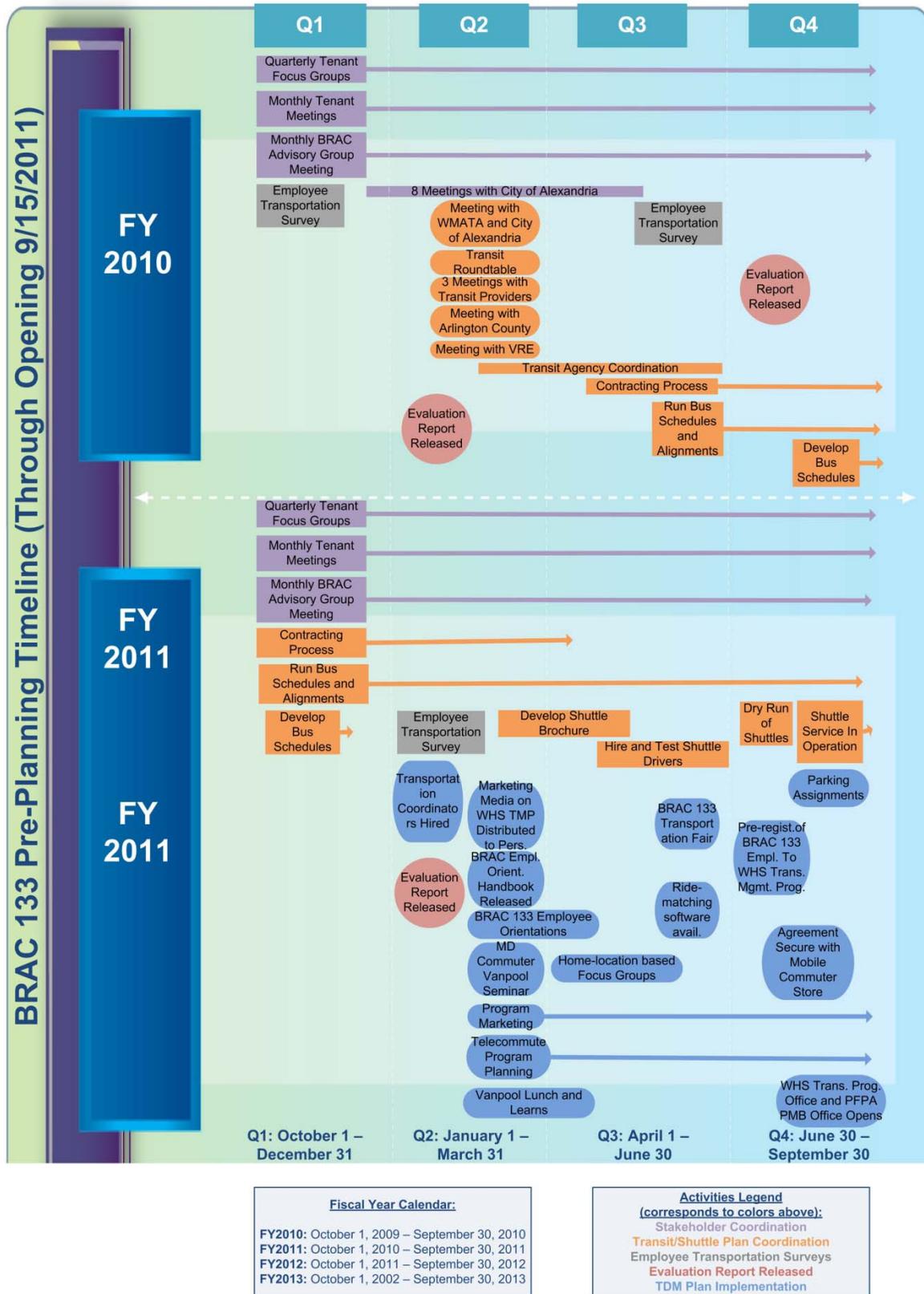
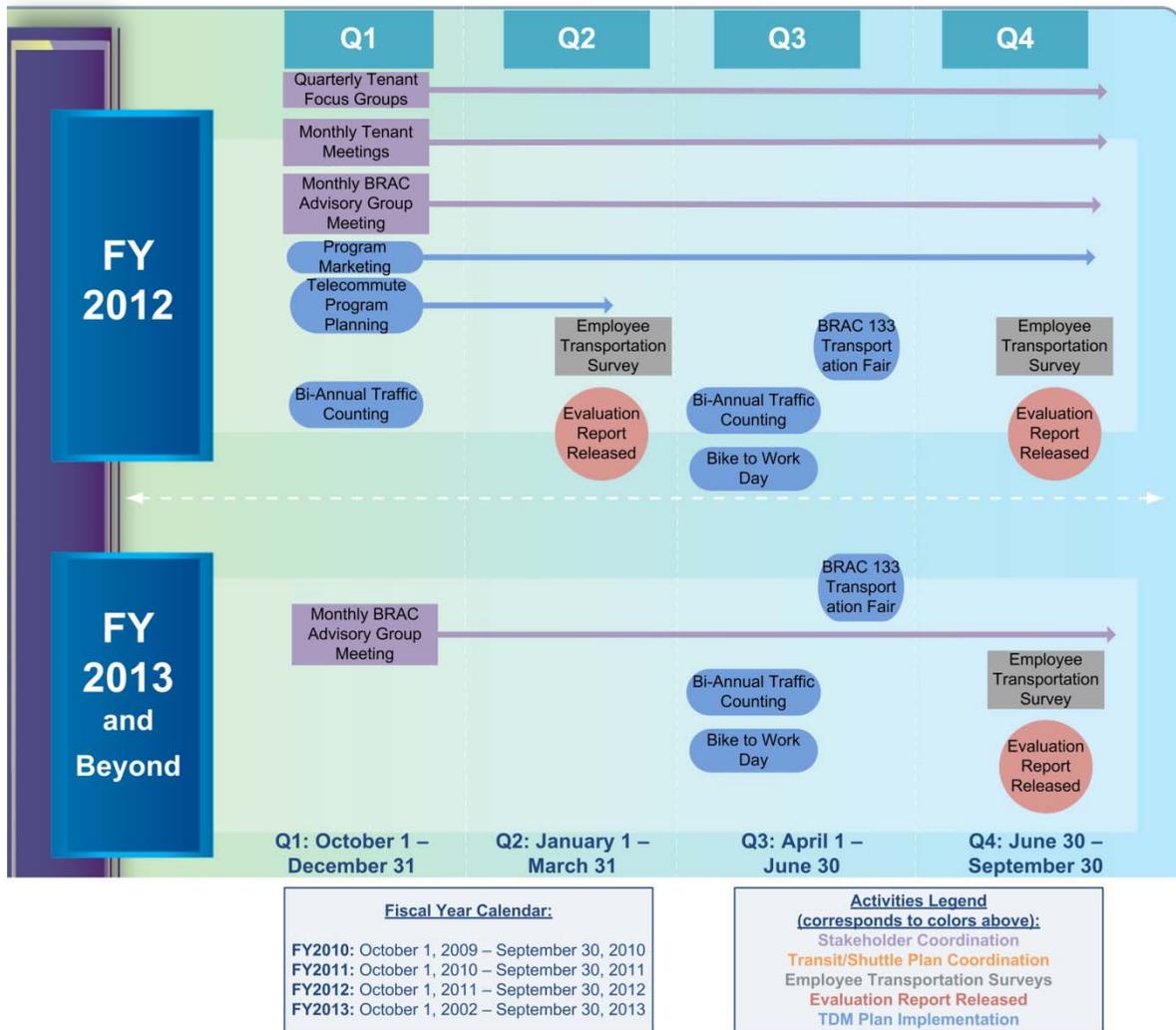


Figure 5-2: BRAC 133 Post-Plan Implementation Timeline (September 2011 and Beyond)



## 6.0 Monitoring & Evaluation Plan

### 6.1 Progress Monitoring & Annual Survey

In order to monitor the effectiveness of various transportation programs and strategies under the BRAC 133 Transportation Management Program, the Transportation Coordinator(s) will conduct surveys of both federal and non-federal employees 6 months after relocation, 1 year after relocation, and annually after the first year of the program. The purpose of the survey will be to measure TMP progress in meeting its goals and objectives as well as determine the effectiveness of TMP programs. The survey will have an employee satisfaction element to measure attitudes toward current program elements, such as marketing tools, educational tools, etc. The survey will include the following topics at a minimum:

- Employee Information (contact information, organization)
- Primary mode of transportation
- Secondary form(s) of transportation
- Work schedule (work days and hours)
- Participation in alternative work schedules and telecommuting
- Satisfaction rating scale for each of the programs and incentives offered under the BRAC 133 Transportation Management Program
- Interest rating scale for gauging reaction to new programs and/or program modifications
- Use of the DoD shuttle bus program
- Satisfaction rating scale for the shuttle bus program
- Marketing effectiveness rating scale
- Participation in MTBP
- Parking permit type (if applicable)
- Metrorail boardings and alightings information
- Bus transit provider and route information
- Mode shift as a result of BRAC 133 Transportation Management Program
- Anticipated/planned mode for the next year

The Transportation Coordinator(s) will compile the results from the survey and conduct a data analysis on the survey results. The Transportation Coordinator(s) will also work with traffic engineers to conduct vehicle and trip counts at major intersections, parking counts at both BRAC 133 garages, and other necessary traffic assessments on a biannual basis to determine infrastructure operability over time.

### 6.2 Evaluation Report

The Transportation Coordinator(s) will utilize survey results and results from traffic counts and assessments to develop the “WHS Transportation Management Program Evaluation Report” which will detail the progress of the BRAC 133 Transportation Management Program, describe program successes, and define areas for program restructuring. The City of Alexandria will be provided an Evaluation Report after 6 months of building operations, after 1 year of building operations, and then annually thereafter.

The Report will outline:

- The progress the program has made in achieving the goals of the TMP and various program-specific targets (e.g., employee mode split, increases in AVR, vehicle trip reduction)
- Program strengths and areas for improvement or restructuring
- Employee satisfaction with the program and reactions to new proposed program elements
- Roadway infrastructure operations information
- Parking utilization

The following are descriptions of the various performance measures that will be used to determine the effectiveness of the TMP and its various programmatic elements:

#### ***Average Vehicle Ridership***

The Report will express trip reduction using the Average Vehicle Ridership (AVR) calculation. AVR is a ratio of employee trips to vehicle trips. This ratio will be determined from survey data. As no baseline AVR has been established at the BRAC 133 site as of yet, the Transportation Coordinator(s) will utilize the survey taken after 6 months of BRAC 133 site occupation in order to establish a baseline AVR. The Transportation Coordinator(s) will then develop an AVR goal for the first full year of occupation and reexamine this goal on an annual basis. For example, if the AVR after 6 months of program operation is 1.5, the Transportation Coordinator could choose to set a higher goal for the next year for an AVR of 3.0. Setting an AVR goal will help focus program marketing and incentives on reducing the number of vehicle trips to the BRAC 133 site and help reach established TMP goals.

#### ***Parking Utilization***

The Report will describe parking utilization rates by conducting parking counts in both parking garages. Parking counts will be conducted by PFPA PMB staff on a routine basis. A ratio of parking spaces utilized on a typical day to parking capacity will be developed to determine if parking is being underutilized and/or if parking is operating at or over capacity. Based on utilization, the Transportation Coordinator(s) will propose modification to the parking management program if parking is underutilized as well as if parking is operating over capacity.

#### ***Mode Split***

The Report will include mode split information to determine which programs are working most effectively and to which commute options employees show preference. Mode split is the percentage of

people using various modes of travel. Particular attention will be paid to non-solo-driver mode shares, including carpooling, vanpooling, transit, bicycling, and walking. After establishing a baseline AVR after 6 months of operation, the Transportation Coordinator(s) will also establish non-solo driving goals for each of the various modes to be reached after 1 year of operations. Goals will be adjusted annually thereafter if needed. At a minimum, the non-solo driving goal for the site will be 40 percent to reflect TMP goals. Upon analyzing the results of the sixth month survey, the goal may need to be adjusted to reflect the best achievable potential mode split.

The Transportation Coordinator(s) may also set goals for each mode. For example, if after 6 months, the transit mode share is 30 percent, the year end goal could be increased to 35 percent transit mode share. The Transportation Coordinator(s) will propose transit program modifications to help reach the new goal.

In addition, the Transportation Coordinator will propose modifications to the shuttle program to best suit ridership needs. Depending on expected efficiency and cost-effectiveness gains, this could include consolidation of service with other transit and shuttle providers.

This section of the Report will aid WHS in determining funding needs for the transportation program and may streamline programs depending on which share the highest and lowest mode shares.

### 6.3 Amending the TMP

It is important to note that the major TMP goal of achieving 40 percent or more non-SOV person-trips to the site will not change over time. Any amendments to the TMP will be to ensure that the TMP's program elements continue to meet this goal. Upon review of the WHS Transportation Management Program Evaluation Report, the Transportation Coordinator(s) will conduct the following steps if TMP goals are not met:

- i. Develop and present proposed amendments to the TMP to WHS leadership in order to improve TMP performance, and restructure the program based upon employee satisfaction and interest. In the event amendments to the Program are necessary as a result of not meeting the TMP goals, WHS will re-examine program elements and make adjustments (i.e., if transit ridership goals are not met, WHS will analyze transit program utilization and shuttle plan efficiency in order to adjust program elements, such as onsite fare dispersal frequency, improve transit schedule information dissemination, alter shuttle schedule, headways, service provider, etc. in order to increase ridership)
- ii. Conduct a cost benefit analysis for suggested Plan amendments to determine feasibility of programmatic changes.
- iii. Conduct a review of the proposed amendments and finalize amendments for submission to Army executives as well as the City of Alexandria.

This TMP will be adopted by appropriate Army and DoD leadership, at all levels, to ensure compliance. Senior Army and DoD leadership will maintain situational awareness of the effectiveness of the TMP and will operationally support ongoing efforts to achieve the goals of the TMP.

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## **Appendix A**

# **Response to Comments on June 2010 Draft of BRAC 133 TMP**

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## GENERAL COMMENTS

### General Comments:

1. What environmental study has been done on the impact of the exhaust fumes from shuttle buses and additional traffic on the roadways from the King St. Metro station? Pg. 52

An environmental assessment in accordance with the National Environmental Policy Act (NEPA) was conducted prior to selection of the Mark Center site.

2. To what extent have the potential (traffic) ramifications of things such as the Beauregard Corridor Plan and the redevelopment of Landmark Mall and the Plaza at Landmark been considered?

The BRAC-133 TMP focuses on traffic impacts expected from the Mark Center only.

### Comments related to the Shuttle:

There were a number of comments related the shuttle plan. The shuttle plan details were not included in the draft TMP as they were not final at that time. As a result of these comments, the TMP has been amended to include information and/or clarification on the points discussed below.

3. What is the anticipated number of shuttle buses that will be leaving the King Street Metro Station in the morning and the number returning in the afternoon?

There are currently 6 buses planned per hour, for a total of 18 buses in the morning peak period and 18 buses in the afternoon peak period.

4. When will plans be final for the WHS DoD BRAC-133 shuttle program? Pg. 39

The following key details of the shuttle plan have now been finalized and are included in the TMP:

- Final routes (including a Franconia/Springfield Route) and preliminary routing
- System capacity
- Headways, or frequency of service from each pick-up location

5. Will shuttles run on Saturdays and Sundays? If not what is the projection for SOV traffic using network roadways serving BRAC-133? Pg. 40

No, there will be no service on weekends because tenants will not routinely operate for regular business on those days (except for security personnel). We do not anticipate significant numbers of weekend employees, thus we presume minimal SOV travel impacts to Mark Center during the weekend.

6. What criteria (data) will WHS use when analyzing shuttle rider ship trends? What amount of change will be required to warrant a change? Ten, fifty, one hundred plus or minus riders? Pg. 40

WHS will be looking at both ridership and survey results over time to determine needs. The minimum level of service for each route is 8 to 10 passengers per revenue hour during peak times. If a route services less than 8 to 10 passengers per revenue hour, the team (WHS/DFD) will need to examine the route and determine the correct strategy to improve the route's passengers per revenue hour. This may include increasing educational programs, making schedule adjustments, or altering the level of service.

If a route's level of service increases over LOS E/F or 150% of seating capacity, the team (WHS/DFD) will need to develop service improvements to the route. These may include additional revenue hours, larger vehicles, educational programs, coordination of services, or additional coordination.

In addition, the team (WHS/DFD) will use information from the annual surveys and analyses based on the levels of service and service quality standards from the TCRP report 100.

7. Are the shuttle frequencies a result of capacity/convenience/financial practicality or are they based solely upon projected demand?

The shuttle plan is being developed based on anticipated demand including a growth factor in case demand exceeds projections. In the TMP shuttle ridership is anticipated to be 23 percent whereas the shuttle plan is being developed to handle a capacity of 45 percent.

8. What do the shuttles do during off-peak hours? Does the extent of their off-peak utility impact the extent of the available shuttles at peak hours (i.e. limit the number of vehicles WHS would be prepared to purchase)?

The shuttle plan includes mid-day (off-peak) service. During other off-peak hours (e.g., weekends), the buses will either be parked or they will be used for other purposes. The off-peak utility of the vehicles will have no impact on the extent of the peak hour service to be provided.

9. Have the costs of the shuttle service(s) been calculated? Is there a point at which this would constrain WHS' ability to offer all the services desired/required?

Yes, costs for shuttle services have been calculated. Funding has been identified and approved for the services necessary to provide sufficient shuttle capacity to serve the building population.

10. Is there a point at which Alexandria will or could be expected to shoulder some of the costs?

No, the City of Alexandria is not expected to cover any of the costs for providing the DoD shuttle service.

11. To what extent has maximizing/optimizing the use of the existing DASH bus system been considered?

12. To what degree might economies of scale be realized by expanding the existing DASH bus system rather than establishing numerous new routes (and adding numerous new busses?) to the DOD shuttle system?

To answer both questions #11 and #12: DoD is evaluating the potential for local and regional service providers to provide part or all of the DoD Mark Center shuttle service. Decisions will be based on efficiency and cost effectiveness. DoD has not yet committed to any specific service providers. WHS will continue discussions with DASH and WMATA concerning possible route enhancements. Decisions will be made based on whether efficiency and effectiveness gains can be achieved.

13. Page 37: Would the proposed five bus bays be sufficient to handle all the local Mark Center express shuttle and DoD shuttles during the peak conditions? How many shuttles or buses will be needed considering the anticipated ridership? Have detail plans and the funding sources been identified for running the shuttle operations? Are adequate bus bays available at the transit hubs and Metro stations for the DoD shuttle service?

The capacity of the bus bays are sufficient as according to the requirements of TCRP Report 100: Transit Capacity and Quality of Service Manual. The current five bus bays also have excess capacity to support additional service. As discussed in Section 5.5.4, expanding the Transportation Center is something that will be considered in the future if needed. The final shuttle plan included in the TMP provides capacity for 45 percent of the employee population. As discussed in the response to comment #7, costs for shuttle services have been calculated and funding has been identified and approved for the services necessary to provide capacity for 45 percent of the building population. Certain Metro stations currently have limited bus bay capacity to accommodate the DoD shuttle service; however, WHS is working with WMATA and local jurisdictions to identify plausible bus queuing areas.

14. Is there the potential to, at some point, consolidate what will now be four different shuttle providers (Duke, CNA, IDA, WHS), which would presumably result in a variety of efficiencies?

15. At some point economies of scale could doubtless be realized by including IDA, CNA, Duke and possibly others in the program.

To answer both questions #13 and #14: Yes, WHS has engaged in preliminary discussions with other shuttle-providing entities at Mark Center about consolidating service. This could be a possibility in the future; however, parties have not come to agreements at this time.

16. Is there a possibility that those driving cars will pick commuters up at Metro locations thus diminishing the number of shuttle riders? Pg. 11

Yes, it is possible that drivers will pick up commuters at Metrorail stations; however, it is inconvenient to do so and therefore unlikely to occur.

17. Is there the possibility that shuttle buses will pick employees up at locations other than Metro stations?

No, this is not a possibility. Shuttle buses will only pick up and drop off employees at designated Metrorail station locations.

18. Has DoD coordinated these proposed pick-ups with the Washington Metro?

Yes, WHS is working with WMATA and local jurisdictions to identify plausible bus queuing areas in and around WMATA Metrorail stations.

19. What will happen if the travel lanes on Seminary Rd. east of 395 do not handle the east bound traffic (shuttle buses headed to the King St. Metro)? There is a right turn only lane and a left turn only lane at Seminary and N. Howard St. That leaves only one through lane. The right-turn only lane must remain for emergency vehicles turning to the INOVA Hospital.

The shuttle plan will add just six buses per hour to the existing traffic heading to/from the King Street Metrorail station. This addition is not significant given existing traffic patterns.

20. The plan and analysis totally ignores the Franconia-Springfield Railway Express station and availability of parking for employees travelling along the I-395 corridor. This option should be considered, just as options for shuttle service from the Pentagon Transit Center, King Street Metro

Station, Ballston, East Falls and West Falls Church Metrorail Stations, Metro and VRE stations were considered in the TMP.

21. There are 5,069 parking spaces at the Springfield-Franconia Metro/VRE station. This is a potential site for shuttling employees using the I-395 corridor.
22. Given the noted density of personnel along the I-95/I-395 corridor (also see page 11 for reference to this), why would one not consider shuttle service from the Franconia/Springfield station which is not only served by VRE and Metrorail but where there are 5,069 park and ride spaces (occupancy rate not provided - see page 43)?
23. With the highest density of employees going to the MARC Center site living in Fairfax County (south), the plan should include maximizing the potential utilization of the Franconia Springfield Transportation Center.
24. There were some good things that Alexandria mentioned including the comments on mode splits, transit, and vanpools but just before vanpools Alexandria has a comment about providing shuttle service to Franconia Springfield. This really concerns me and my neighbors as first there is currently no where to park, these people going to Brac will take up spaces that we use to ride the metro, and driving from that station to the Brac location on 395 takes a long time due to traffic. So my question is will Alexandria pay to add parking spaces to the metro station. I would think that someone in Alexandria has common sense to know that running shuttles on 395 in traffic is a stupid idea especially since they cannot run from the metro station to the Brac facility by HOV so does Alexandria plan to run those shuttles through our neighborhood? Traffic is already bad in the morning and afternoon along S. Van Dorn and adding those shuttles would just increase traffic. I thought the goal was to decrease traffic and all Alexandria is doing is putting the burden on those that live down here if that is the plan. Also those shuttles would get stuck in traffic on van dorn.

Comments #20-#24 are related to operating DoD shuttles to/from the Franconia-Springfield Metrorail station. The following consolidated response addresses the concerns addressed in comments #18-#22:

- The shuttle plan details were not included in the draft TMP due to City and Fairfax County staff requests to discuss the feasibility of service to Van Dorn and Franconia-Springfield Metro Stations.
  - The shuttle plan is included in the TMP with details on:
    - Final routes (including a Franconia/Springfield Route) and preliminary routing
    - System capacity
    - Headways, or frequency of service from each pick-up location
  - It is not expected that there will be a drastic increase in the number of commuters driving to the Franconia-Springfield Metrorail station in order to board the DoD shuttle as 17 percent of employees currently board Metrorail at this station. DoD is committed to providing appropriate shuttle service from sites such as Franconia-Springfield Metrorail station as the organization believes that convenient shuttle service is essential to reducing SOV trips not just locally, but regionally.
25. Has consideration (especially by Washington Metro) been given to the probability of WHS personnel driving to a Metro Stop and parking there and catching a DoD Shuttle so that they don't have to fight the traffic and hassle of parking at the Mark Center? These persons would take parking capacity away from the Metro and deprive the Metro of revenue from people riding the Metro.

Not all of the Metro Stations under consideration for DoD shuttles have parking. For those that do, yes, some BRAC 133 employees may choose to park at a Metro Station and take the DoD shuttle to the building as their primary mode. Certainly commuters in general do park at Metro Stations when using other modes and WMATA is aware of this. WHS coordinated with WMATA in selecting shuttle routes.

26. How many of the potential '69 buses including public transit vehicles and DoD shuttles during both the AM and PM peak hours that could serve the Mark Center Transportation Center will be coming from the King St. Metro station? Pg. 49

This statement refers to a finding of a previous study which is not relevant to the TMP now that there is more accurate data on the number of expected DoD shuttles serving the site. As discussed in Section 3.5.2, the number of anticipated DoD shuttles serving the site from King Street is 18 (6 per hour) during the three AM peak hours and 18 (6 per hour) during the three PM peak hours.

27. Where will the VRE riders exit the train? Will this require additional shuttle buses? Pg. 14, Pg. 17  
VRE riders are expected to disembark at King Street or Springfield Franconia stations. The shuttle bus plan includes capacity for these riders.

28. DoD shuttle buses for employees are proposed to be operating at 10 or 15 minute headways to and from Metro Stations during the AM/PM peak periods. The TMP should consider impacts on traffic near and in the metro station bus terminal area to ensure the shuttle buses are not adding to congestion and that employees can reasonably expect on time service.

The addition of the small number of buses at each station (6 per hour) is not anticipated to significantly increase congestion at those locations.

29. The traffic and roadway recommendations should be re-examined in the context of transit operations in the vicinity. The site will receive numerous buses and shuttles throughout the day, improvements that reduce or eliminate delays and do not preclude proposed bus routings would help maintain a desired level of service for transit operations. The final TMP should identify new shuttle bus routings in the vicinity of BRAC 133 and incorporate proposed bus routing changes that have been approved by DASH, WMATA and the City of Alexandria. Also, any new traffic signals should be able to accommodate future transit signal priority.

The final TMP identifies a proposed shuttle bus plan that has been coordinated with the City of Alexandria. USACE/WHS will continue to meet with the City, Fairfax County, and service providers to develop bus route changes that will benefit both the BRAC-133 project and the City.

30. Have there been any discussions (and agreements) with the activities who would be buying these buses?

USACE and WHS are engaged in ongoing discussions with the City of Alexandria, and transit providers regarding shuttle services, including source of buses, financing and operations. Buses may be leased, not purchased, and are expected to be available to support the opening of the building. The DoD shuttle system will likely operate separately from local bus systems.

31. To distribute the shuttle trips from the King St. Metro station equitably I propose that shuttles be coded indicating which ones will use King St. to N. Beauregard to BRAC-133, Braddock Rd. to N.

Beauregard to BRAC-133 and Seminary Rd. to N. Beauregard to BRAC-133. This would spread the traffic over three possible routes to help diminish the impact on only one route. Pg. 64

USACE, WHS, and the City will be examining all shuttle bus routes beginning in September to validate the most efficient structure to move BRAC 133 employees from King Street Metro to the Mark Center.

32. Presumably many SOVs will pick up riders from local Metro stations in order to qualify for an HOV parking space, while reducing the need for shuttle service.

We do not foresee this happening as registered members of a carpool will not qualify for mass transit benefits. Riders from Metro stations are more likely to rely on the DoD shuttle system than forego this benefit.

### **Comments related to Satellite Parking:**

33. I also agree with Dave Cavanaugh that DoD shuttle service from satellite parking areas should also serve as an interim alternative. Could Landmark Mall as currently occupied, be an option for SOV parking? If so, a clear route from northbound I-395 into the Mall parking will need to be designated to go to the Van Dorn entrance. Vehicles presently get off the northbound interstate exit and cut into the dedicated left lane ramp entrance which is unsafe and not allowed.

34. Fails to consider DoD shuttle service from satellite parking areas as an interim alternative.

35. The TMP should be phased-in, with a percentage of employees parking at satellite parking facilities and brought to the WHS-BRAC-133 Complex by public transit or shuttle. This would require the DoD to rent space at vacant commercial sites for temporary parking until transit, road improvements, employees enrolled and elements of the Transportation Management Plan are fully implemented. Full use of the parking facilities at the WHS-BRAC should begin once objectives of the TMP and transit goals are met.

Comments #33-#35 are related to operating DoD shuttles to/from satellite parking areas. The following consolidated response addresses the concerns addressed:

- The DoD is committed to the parking cap that has been established for this site and has no plans to provide remote parking as an interim solution.
- The TMP will not be phased-in, but will be fully implemented upon the opening of the facility.

36. To what extent have shuttles from park and ride lots been explored?

WHS is coordinating with both public and private transit providers to establish service between park and ride lots and BRAC 133. At this time, DoD has no plans to provide DoD shuttle service to and from park and ride lots (other than those associated with Metrorail and/or VRE stations).

### **Comments related to the Moran Legislation:**

37. The plan does not discuss the provision in the FY 2011 House Armed Services Authorization bill that puts a temporary restriction on parking for BRAC-133 employees at 1,000 spaces. Is a contingency plan being prepared to address this limitation on parking?

38. First, with respect to Dave's comment regarding the temporary restriction to 1000 parking spaces addressed in the House version of the Defense Authorization Bill, a TMP approach addressing that possibility is essential, even if the provision is not incorporated in the final Authorization Bill. This would require TMP identification/provision of alternative transportation for an additional 2,430 no-drive and park commuters beyond the 2,970 asserted to be provided for in the Executive Summary of the current TMP draft. It must be recognized that traffic at critical intersections near the site is already bordering on failing service levels during rush hours and that much of this has occurred since earlier traffic studies cited in the draft TMP were prepared. There are no totally effective short-term solutions to these problems and it will be several years (as Dave points out) before major changes such as direct site access from 395 can be approved, funded, and completed.

39. The evaluation reports should report on the percentage of occupancy in the building if there is a phase in process, depending on the passing of the FY 2011 House Armed Services Authorization bill with Moran's parking space stipulation.

40. What is the plan if Representative Moran's "amendment" gets passed?

41. What happens if the Moran proposal goes through (which would prohibit alternative paid parking?)

Comments #37-#41 are related to the Moran Legislation. The following consolidated response addresses the concerns addressed: The TMP does not include language or strategies to address the proposed legislation. The introduction of the TMP has been revised to acknowledge that revisions to the TMP will be required if the legislation is passed.

### **Comments related to Cost/Financial Information:**

42. Will WHS be exclusively responsible for maintaining the Transportation Center? Is it anticipated that any portion of the expense will be borne by Alexandria?

Yes, WHS will be exclusively responsible for maintaining the Transportation Center. No, the City of Alexandria is not expected to cover any portion of the costs for maintaining the facility.

43. To what extent have cost ramifications been considered?

Yes, costs for shuttle services have been calculated. Funding has been programmed for the services necessary to provide capacity for 45 percent of the building population

44. Is there a potential that good ideas will not be pursued purely because of the economic consequences?

DoD has not and will not rule out creative solutions purely based on cost. Decisions have been and will continue to be made based on whether efficiency and effectiveness gains can be achieved from proposed solutions.

45. Has the City of Alexandria made any assessment of the cost ramifications to the City of what is or is not contemplated in the TMP?

46. Again, as but one example, how many more DASH busses might be needed? What's the lead time? How will/would they be paid for?

Comments #45 and #46 should be directed to the City of Alexandria.

47. Plan lacks necessary details on costs and sources of funding for proposed TMP improvement. The state is not a likely source for increased funding nor is the City and this is worrisome since changes will take a lot of money.

The DoD has programmed funding to implement the TMP strategies including the DoD shuttle service. DoD has also paid for the road improvements required by the City as a condition of the development (those referred to as "interim [2011] roadway improvements" in the TMP). The "Recommended Solutions" identified in Section 4.4.9 (now called "Suggestions that Require Further Consideration / Study") are possibilities for the future and are in response to general needs of the area, not just those related to BRAC 133. These items would require technical validation, legal authority, and identification of funding sources. It is expected that a number of these proposed improvements will be explored as part of the impending VDOT study of other potential mid- and long-term improvements, and as part of the City's development of the West End.

48. Who pays for the 'improvement of the existing walkways and addition of new sidewalks outside of the site? Have skywalks been considered? Pg. 27, Pg. 28

DoD is responsible for the cost of sidewalk improvements adjacent to the BRAC 133 site. See Figure 3-4 for the approved pedestrian sidewalk improvements. Skywalks have not been considered in the TMP.

49. In the traffic impact analysis section of the plan, reference is made to the ongoing VDOT study to develop alternatives for providing direct HOV access to the site from I-395. The plan should clearly indicate that it will take multiple years to fund, design, and construct such an access.

This comment has been noted. Language in the TMP has been modified to clarify this point.

50. On Page 90, Section 4.4.9 offers several roadway and intersection improvements to address impacts of the baseline and projected volumes. There is no discussion, however, of how to fund these improvements and what would happen if most or all could not be implemented.

It should be noted that the traffic analyses presented in the TMP do not rely on those recommended improvements presented in Section 4.4.9. These "Recommended Solutions" identified in Section 4.4.9 (now called "Suggestions that Require Further Consideration / Study") are possibilities for the future and are in response to general needs of the area, not just those related to BRAC 133. These items would require technical validation, legal authority, and identification of funding sources. It is expected that a number of these proposed improvements will be explored as part of the impending VDOT study of other potential mid- and long-term improvements, and as part of the City's development of the West End.

**Comments related to the TMP Goals:**

51. What is the baseline for the TMP goals of a "40% reduction in single occupancy vehicle trips?"

52. The TMP should state very clearly what the end state is that must be achieved. The Army, Duke, the City, et al heretofore have led us all to believe that the TMP was to get to a 40% non-single

occupancy mode share, which is not the same thing as a 40% reduction in SOV vehicle trips. The TMP goals need to be articulated so clearly that a 5th grader can understand them, e.g., no more than x% of total employee and visitor trips to the site will be by SOV.

53. I strenuously object to the goal as being to "encourage alternate commuter modes ...". That is a good intention, but the Road to Hell is paved with such things. The goal is to achieve (not encourage) major (or significant or substantial) diversion of commuter trips to ridesharing, transit, walking, and bicycle. And then this document is supposed to enumerate all the things which are incumbent on WHS, other parts of the Army, Duke, etc., to make sure -- absolutely and unequivocally -- that such diversion occur. And then to test to prove they are happening, and to revise and implement a stronger plan if they are not.

54. Perhaps it's only semantics but I would suggest that the TMP goal is to achieve (not "strive for") not more than "X %" of personnel using SOVs to access the site (as opposed to "a 40 per cent reduction [from what?] of SOV trips to the BRAC-133 site").

Comments #51-#54 are related to the word choice of how SOV reduction goal was stated in the TMP. The following consolidated response addresses the concerns addressed:

- The TMP includes new language to replace the existing language. The new language has been rephrased to more clearly align with the intent of the goal.
- It now reads, "To achieve 40 percent or more non-SOV trips to the site in order to minimize traffic impacts on the neighboring community."

55. ES-1 - How were the TMP goals established?

The TMP goals were established based on GSA/MWCOG/NCPC guidelines as referenced in Section 1.3. This guidance indicates that a TMP should include stated goals for single occupant vehicle (SOV) trip reduction, transportation mode split, and vehicle occupancy; strategies to minimize SOV work trips and to discourage SOV travel during peak and off-peak hours; measures to monitor achievement of goals and to adjust SOV trip reduction strategies, as needed; and a description of existing and projected peak hour traffic by mode.

56. Is there a commonly accepted way to assess how reasonable/ aggressive they are or aren't?

No, there is no commonly accepted mechanism for assessing the aggressiveness of goals.

57. What happens if 'striving for a 40 percent reduction of SOV trips to the BRAC-133 site in order to minimize traffic impacts on the neighboring community' does not happen? What is the contingency plan?

USACE/WHS are confident in the abilities of WHS to meet the goals of the TMP given that the DoD shuttle system will provide such extensive service with capacity for 45 percent of the building population, combined with the fact that the building will have such limited parking available, and finally given that WHS will be implementing a variety of other comprehensive TDM strategies. WHS will be evaluating achievement of goals over time (and formally with each Evaluation Report), and will be setting new goals over time based on findings.

The TMP includes language demonstrating examples of how goals will be assessed and rectified if not met, (i.e., if transit ridership goals are not met, WHS will re-examine the DoD shuttle plan and make changes to increase ridership, etc.).

**Comments related to Role of the BRAC Advisory Group:**

58. How many ideas and recommendations from the BRAC Advisory Group has become part of the plan? Pg. 3

59. Why did the study 'not examine or attempt to validate the concerns and/or assumptions made by citizens, nor has an effort been made to reference any studies that may validate citizen assumptions'? Pg. 92

In response to comments #58-#59: All ideas and recommendations of the BRAC Advisory Group were considered in the development of the TMP. In addition, several were integrated into the TMP. For example, many of the traffic improvements provided by the Group were validated and included in Section 4.4.9. Additionally, Franconia-Springfield Metro Station is now a shuttle pick-up/drop-off point for the DoD shuttle system, and the use of DASH to support the shuttle system is being explored.

60. The BRAC Advisory Committee needs to be provided copies of the brochures, pamphlets, posters, and other marketing media for employees as well as the Orientation Handbook. Pg. 102, Pg. 103

WHS will provide the representative materials as they become available.

61. The BRAC Advisory Committee needs to receive the results of the July 2010 resurvey of employees commuting patterns as well as the one in the winter of 2010. Pg. 104

WHS will report on the 2010 resurvey and future surveys.

62. City Staff and The BRAC Advisory Committee should approve any amendments to the TMP. Pg. 121

DoD will continue to coordinate with the City of Alexandria on changes to the TMP after the occupancy of the building, as stated throughout Sections 5 and 6 of the TMP.

63. Who is the intended "customer" of the TMP document? To what extent is it meant (essentially solely?) for WHS and to what extent is it intended or meant to inform the public? or the City? or NCPC? or who else?

According to NCPC TMP guidelines, "The purpose of a TMP is to document an employer's active program to foster more efficient employee commuting patterns by minimizing 'single occupant vehicle' (SOV) trips related to a federal agency." As such, the primary "user" of the TMP will be all of the BRAC 133 tenant organizations (or employers) housed at BRAC 133.

However, also according to NCPC TMP guidelines, "A TMP offers a set of strategies to reduce traffic congestion and air pollution," which has impacts on the surrounding community. Therefore, the document also serves to inform not only NCPC, but the City, neighboring jurisdictions, and the general public about the strategies being employed to reduce congestion and air pollution impacts to the community in which these tenant organizations are housed.

### **Comments related to Parking:**

64. Garage reserved spaces for govt vehicles, special fuel cars, etc. Will there be designated spaces equipped and assigned to accommodate vehicles which require electric recharging during their parking time?

No, there will not be electrical charging stations in the parking garage at this time.

65. Handicapped parking. Your 48 spaces sound ridiculously low (less than 1% of the workforce) to start with. Plus, this, in an age where a) more disabled people work/need to work, b) where people are working to a later age = more disabilities, and c) where the government will need to be providing more jobs for the Iraq-era disabled veterans and civilians. What realistic plans will you have to accommodate these factors? Then, add the people who will have temporary impairing conditions (medical, accidents, etc). The TMP seriously needs to address this situation.

48 spaces were provided per ADA requirements. As is the legal requirement for all disabled parking spaces, a disabled license plate and/or placard must be displayed to park in a disabled parking space. In the event more than 48 employees require reasonable accommodation in the form of a disabled parking space, WHS make adjustments to the parking plan as required.

66. While the parking management plan is the highlight of the TMP, the final distribution of parking spaces or parking permits among employees is determined by the tenant organization. The criteria for determining eligibility for a parking space still remain unclear. Tenant organizations are free to develop their own criteria. There is nothing in the TMP that would require these organizations to consider transit access, or lack thereof, as one of the criteria in allocating parking resources. The TMP does not suggest any parking allocation policy that would affect the geographic distribution of transit riders and thus impact the expected number of transit commuters arriving from each of the several Metrorail and bus transit access points.

The potential benefits of including transit access, or lack thereof, as one of the criteria in determining eligibility for a parking space will be explained to the tenant organizations and they will be strongly advised to consider this factor in assigning parking permits.

67. Does that then indicate that no space will typically be used for more than 8 hours per day, sitting unused for the remaining 16 hours?

68. Will the space assigned to someone working 5 (or 4) days a week then sit totally unused for the other 2 or 3 days a week?

69. One assumes peak occupancy will generally be from, say, 7 am to 6 pm Mondays through Fridays. If someone (whose vehicle is not among the chosen parking permit holders) works an appreciably different shift and/or on Saturday or Sunday are they unable to access garages which are presumably 80% or more vacant?

Comments #647-#69 are related to the one to one matching of permits to employees. The following consolidated response addresses the concerns addressed in comments #63-#65:

- There will be 150 other federal and non-federal employees at BRAC 133 providing a range of support functions, including security, IT, building management, and other service functions. Each tenant organization is responsible for their non-federal employees, and all non-federal employees will be expected to follow the same protocol as federal employees. The TMP strategies will also apply to these employees. Each tenant organization will determine whether their contract employees will be eligible for parking permits. These employees will be able to utilize the DoD shuttle, as the system has sufficient capacity to support these employees, even in the off-peak.
- A description clarifying the aforementioned description has been added to the TMP.

70. To the extent that all parking spaces are apparently pre-allocated how can "carpool/vanpool parking...not be capped"?

Parking permits for carpool/vanpool parking spaces will take priority over SOV parking permits. In the event that demand for carpool/vanpool permits exceeds the number of spaces initially designated for carpool/vanpool, additional SOV parking spaces will be converted to carpool/vanpool spaces and permits will be reassigned accordingly.

71. It would be helpful to know the percentage utilization of the WMATA park and ride facilities noted on page 43, as has been done in Appendix D for many other facilities.

This information on WMATA park and ride utilization rates was not available.

72. Given the calculations of page 18, at the "90% level" there will be 34 "available" (vacant) parking spaces. A significant portion of those will likely be "disabled spaces" (based upon 48 being provided [per page 41] and the perception that it is very uncommon to have full utilization of disabled spaces) so perhaps there are a net 20 (nondisabled) spaces available. Spread over 8 floors in two separate (and access controlled) buildings, how easy will it be for someone to find one of those empty spaces anytime during a "90% occupancy" period?

All 48 employee ADA parking spaces will be located at the ground level in the South Garage in order to be located within shortest walking distance to building entry. Three additional visitor parking spaces will be ADA spaces in the North Garage. Adjustments have been made to the TMP to indicate the location of the spaces.

73. Later in the report [see pages 105-106] it is indicated that all parking spaces will be pre-assigned. What then becomes of the 34 "available" (unused) spaces as calculated in Table 2-4 (page 18)?

There will not be 34 unused spaces. See revised tables.

74. It appears the assumption has been made that anyone carpooling, vanpooling or slugging will do so in a vehicle that will subsequently be parked at BRAC. Is that realistic? To the extent it might be overly conservative, that would obviously free up some additional parking spaces.

The TMP analysis included the most conservative assumption.

75. This section indicates there are 3,747 parking spaces (per page 41: 2,032 in the north garage and 1,715 in the south). We have repeatedly been told there are 1,854 spaces in the south garage and 2,044 in the north garage (for a total of 3,898 spaces) - is this incorrect?

The number of parking spaces has changed during the design process. The number of spaces specified in the TMP correctly states the number that will be constructed.

76. How will WHS insure that ALL special events participants will conform to parking protocol? Pg. 107

As stated in the TMP, visitors will be strictly controlled and managed by PFPA. Every visitor will be required to register in advance and receive approval from PFPA, at least one day prior to visiting the site, and when arriving at the site, the visitor credentials must be verified by the PFPA security guard before being permitted into the visitor parking area. This protocol must be followed if they would like to drive to the special event.

WHS will develop standard operating procedures under the “Codes of Conduct” portion of the BRAC 133 Employee Orientation Handbook for special events protocol, including both parking and shuttle use.

A statement has been added to the TMP to clarify these points.

77. Is it intended that arriving vehicles be distributed differently (between the two garages) at different times of the day?

78. Section 3 - How is it determined which vehicles use which garage?

Comments #77-#78 are related to the one to one matching of permits to employees. The following consolidated response addresses the concerns addressed: As discussed in Section 5.4.1, employee parking permits will be assigned to a garage and that permit will be valid only in that garage.

79. Tables suggest an excess of parking only when workforce is at or less than 90% for a given day. Also that there will only be a set number of permits (no greater than number of spaces). *I don't see how these two will match up when you have carpooling.* And what is the impact of having days when everyone needs to be there? Also the suggestion that there will be spots, though not guaranteed (on any given day) for some drivers. What happens when there turns out to be NO spot, after the driver arrives? What is the meaning of the section when you say you will have a backup plan and take care of this very problem?

The revised Table 2-4 explores multiple scenarios of trip generation possibilities and should address these questions.

80. The numbers seem to indicate that with the set aside parking there will only be 2,970 parking spaces for BRAC-133 employees. That would indicate a need for more (777) BRAC-133 employees to use other modes of transportation to reach the ‘goal’ stated in the TMP. How will this be accomplished? Pg. 41 & 42

The goal is to have a minimum of 40 percent non-SOV, which would result 60 percent (or less) of employees driving alone to BRAC 133. Having only 2,970 general use spaces and 48 ADA spaces, allows for only 47 percent of employees to drive alone, or 64 percent non-SOV, significantly exceeding the goal of 40 percent non-SOV. Adequate shuttle service and rideshare priority space allotments will help attain this goal. The revised Table 2-4 should clarify this.

81. On Page 98, what is the basis of allotting 5% parking for carpools and vanpools? Mode splits add up to be 8% for carpools and vanpools whereas description in Page 48 mentions the mode split to be 8.5%. What happens if a permit has been issued for a carpool vehicle and the carpool requirement is not fulfilled on certain days? How will this permit be monitored and enforced?

As discussed in Section 3.6.1, the minimum number of parking spaces designated for carpools and vanpools is driven by the LEED Gold requirements which require 5 percent to be set aside for carpools and vanpools. To encourage carpooling/vanpooling, WHS does not intent to cap carpool/vanpool spaces if demand exceeds five percent.

It is true that mode splits add up to 8 percent of employees, but with an average of 7 passengers per vehicle in each vanpool vehicle and with an average of 3 people per vehicle in every carpool vehicle, this 8 percent of employees accounts for a much smaller number of parking spaces.

Monitoring and enforcement of the carpool/vanpool program is discussed in Section 5.4.2.

82. In Section 5.4, Parking Management, the total number of parking permits will be set by the total number of parking spaces. This will cause under-utilization of the parking resource when staff is absent.

This was intentionally done to minimize the likelihood of spillover parking into neighboring communities and to further reduce traffic impacts on the surrounding community.

83. Parking permits will not be issued to staff who receives the mass transit benefit. Making limited parking available is important because one of the reasons staff may not accept the transit benefit is fear of where they will park on days when they must drive due to missing their bus, attending personal appointments, etc. Some allowance should be made so they can access parking a few times per month. Smart card garage access should be programmable for limited use, if electronic access is not used, punch cards or tear-off permits can be issued.

Smart cards will be used for access to the garage, employees still must call ahead and follow protocol to get a parking space- not all parking spaces will be allocated for permits; excess parking will be held for emergency use.

84. An explanation of why BRAC 133 cannot guarantee parking for flex time employees arriving after 9:00 AM needs to be provided in the TMP.

Currently over 40 percent of employees work a flexible work schedule and the TMP has goals to increase this participation rate by an additional 25 percent, which would mean that 65 percent of employees would be guaranteed a parking space. Guaranteeing parking for flex-time employees may result in an increase in SOV mode of travel.

Additionally, this TMP strategy only works if there is not a one-to-one permit process in place, as the flex-time parking in the 2003 TMP was only temporary and was lifted after 10am. Not having a one-to-one permit process would result in spillover parking.

Language has been included in the TMP to explain this.

### **Comments related to Building Support Staff/Shift Workers:**

85. The BRAC 133 Transportation Management Plan offers an extensive and detailed document that provides analysis of projected commuting patterns and traffic generation and a comprehensive list of strategies to meet target modal splits. However, the TMP does not address transportation demands and impacts created by the non-DoD/contractor staff that would be employed at the same premises. Such staff would include food service, maintenance and housekeeping employees and are anticipated to form a significant number. By not addressing them anywhere in the plan, the plan implies a 100 percent transit mode share for these employees, which is very unrealistic. Accounting for these occupants would affect parking strategies, traffic generation, estimated transit ridership and transit service needs.
86. Who is responsible for the over site [sic] of the non-federal employees (30%)? Pg. 8
87. To what extent can DOD influence (or dictate?) relevant contractor behavior?
88. Para 2.2 (pg 8) mentions federal employees account for 69% of the total employees. We assume the remaining 31% are Contractor employees? Will the [sic] be treated equally with the federal employees in allocating parking passes? If not, how will they be accounted for and what will their impact be to the surrounding communities as they struggle to find parking places? (Also addressed in para 5.4 on page 105)
89. Contract personnel ought to be included [in ridematching pool].
90. Are three work shifts per day still planned for the BRAC-133 site? Pg. 47
91. What will the impact on traffic be when one shift leaves and one shift arrives? Will this happen within the same time frame?

Comments #85-#91 are related to non-federal workers and shift workers. The following consolidated response addresses the concerns addressed:

- 31 percent of the building population of 6,409 represents contractor staff; these staff have been included in the analyses presented in the TMP.
  - Contractor staff will be permitted to be included in ridematching pools.
  - In addition to the 6,409 professional staff, there will be 150 other federal and non-federal employees at BRAC 133 providing a range of support functions, including security, IT, building management, and other service functions.
  - Each tenant organization is responsible for their non-federal employees, and all non-federal employees will be expected to follow the same protocol as federal employees. The TMP strategies will also apply to these employees. Each tenant organization will determine whether their contract employees will be eligible for parking permits. These employees will be able to utilize the DoD shuttle, as the proposed system has sufficient capacity to support these employees, even in the off-peak.
  - A description clarifying the aforementioned has been added to the TMP.
92. From a layman's perspective it seems strange not to at least try to survey all personnel, including those of the contractors (being 31% of the total site population). Given the severity of the transportation challenges and the seeming need to address the task on an almost individual-by-individual basis, why would one not want to, at a minimum, collect all zip codes rather than "interpolate" where 2,000 might live. Is there more to this than meets the eye?

It would obviously be preferable to obtain zip codes from all BRAC 133 employees, but it was not possible to obtain zip codes for contractor staff. As a result, federal zip codes were obtained and extrapolated to represent the larger population of employees. Sixty-nine percent of the population of employees is statistically representative of the larger population.

93. What arrangements are the various "agencies" making (in terms of report time) to accommodate tie-ups in getting to and into the buildings? And around during the day? Will this additional travel/wait time be on the government or the employee's time? What about for irregular needs (medical appts, eg.) Likely to be more than 4/yr (when added to other emergencies, work late, etc) for the Guaranteed ride option. Will employees just have to take the whole day off (on their own time) for something that should be only a few hours???

This will be at the discretion of the tenant organizations. We do not feel this will be a disincentive to transit usage.

94. What is capacity of the Mark Center Cafeteria? If inadequate to meet the needs of the Mark Center population, how will that impact mid-Day traffic?

The cafeteria is sized to serve the population of the Mark Center. Mid-day traffic impacts are not anticipated.

### **Comments related to Transit Improvements:**

95. One gets the sense that transit providers are largely going to wait and see what happens, then determine their response. It also sounds as though WHS is, to some degree, planning (or being advised) to do the same. Will there, in fact, be a very pro-active approach to assessing the very specific needs and desires of individual personnel and attempting (in advance of opening) to marry those with transit providers?

96. More emphasis needs to be placed on ensuring systems and infrastructure is in place to make transit more attractive increase use. WHS-BRAC 133 will become a major regional transportation center for DoD employees in the I-395 corridor and employees transferring to other DoD facilities (Pentagon). Currently, transit is not an attractive option, and the influx of employees will make it even less appealing. The TMP should aggressively provide transit infrastructure to accommodate their employees and make transit a viable option.

97. 'WMATA staff and transit staff from the City of Alexandria have identified a number of possible transit improvements that could be implemented to serve the BRAC-133 population...' What are these and when would they be implemented? Pg. 35, Pg. 36.

Comments #95-#97 are related to concerns about transit improvements. The following consolidated response addresses the concerns addressed in comments #80-#81:

- WHS is engaged in ongoing discussions with a variety of service providers to establish service to the Mark Center prior to occupancy.

- BRAC 133 is not intended to be a regional hub for DoD employees. The TMP does aggressively provide transit infrastructure through a robust DoD shuttle system and through support of other non-SOV options.
- DoD is evaluating the potential for local and regional service providers to provide part or all of the DoD Mark Center shuttle service. Decisions will be based on efficiency and cost effectiveness. As the result of previous discussion with the City, Van Dorn is not being considered as a shuttle destination. The existing frequency of the Van Dorn Metro Station DASH routes are considered adequate for the projected demand.
- Recent discussions between the Army and the City of Alexandria are intended to implement the recommendations contained in Table 3-2. The TMP has been adjusted to include all transit improvements agreed to. WHS will continue discussions with DASH and WMATA concerning possible route enhancements. Decisions will be made based on whether efficiency and effectiveness gains can be achieved.

98. The additional employees possibly using public transit will strain existing capacity, adversely impacting current service for Alexandria residents, with no additional reimbursement to the City or WMATA for increased public transit service.

The TMP assumes that 5 percent of employees will utilize local transit service. Based on discussions with transit providers regarding existing capacity on routes that currently provide service within ½ mile of BRAC 133, there is sufficient capacity to support this future level of ridership. Regarding reimbursement, BRAC 133 employees will pay for their ride like all other riders on public transit.

99. Coordination with the WMATA study should be included in the TMP. This would include recommendation on public transportation modifications.

100. The TMP should reference and be consistent/coordinated with the Washington Metropolitan Area Transit Authority's (WMATA) "Transit Service Impacts of the Base Realignment and Closure Recommendations in the Metropolitan Washington Region" Draft Report dated June 2010. The draft report outlines existing and proposed transit services including local bus, express bus and shuttle proposals servicing the Mark Center area. A copy of the "BRAC 133 (Mark Center)" section in the draft report is attached to this letter.

Comments #99-#100 are related to non-federal workers and shift workers. The following consolidated response addresses the concerns addressed:

- The TMP does reference coordination with WMATA and references the WMATA study (see Section 3.3.2 with a citation to the study on Table 3-2). The revised TMP includes a revised reference to the final report issued in June (after the public review version of the TMP was released). DoD intends to integrate its shuttle plan with WMATA routes and other service provider routes in the Mark Center area as it implements the TMP.

### **Comments related to the Transportation Center:**

101. The plan indicates that there will be only five bays at the Transportation Center to accommodate DoD shuttles, as well as Dash, Metro, and privately operated buses. The number of bays should be expanded to reduce the likelihood of service delays and traffic spillback.

102. Memorandum: Mark Center Transit Center, Wells and Associates, April 2009 projects the Mark Center Transportation Center could potentially be served by 69 buses including public transit vehicles and DoD shuttles during the AM and PM peak hours. The large number of buses and shuttles will potentially lead to back-up and delays in service and contribute to a significant number of trips to and from the WHS-BRAC-133 Transportation Center at Mark Center. Consequently, DoD should re-evaluate the size of the transit center to accommodate the large number of buses and shuttles for DoD and contractor employees living in the I-395 corridor.

Comments #101-#102 are related to transportation center bus bays. The following consolidated response addresses the concerns addressed in comments #84-#85: As discussed in Section 5.5.4, expanding the Transportation Center is something that will be considered in the future if needed. The capacity of the bus bays are sufficient as according to the requirements of TCRP Report 100: Transit Capacity and Quality of Service Manual. The current five bus bays also have excess capacity to support additional service.

**Comments related to LEED Certification:**

103. "As the building is LEED Gold certified..." It is? - 15 months before completion?

104. The plan indicates that the BRAC-133 office complex is LEED Gold certified. Has this certification been issued, and is it for both the office towers and the parking facilities?

Comments #103-#104 are related to a comment regarding LEED certification in the TMP. The following consolidated response addresses the concerns addressed in comments #103-104:

- The building has not yet received LEED Gold Certification.
- This statement as been reworded to state that the building is being designed to meet LEED Gold standards and requirements for "Gold" level certification.

**Comments related to Emergency Response:**

105. As stated in the last paragraph on page 89, *the traffic demand exceeds the available capacity that will result in spillover and traffic overflow that extends into downstream/upstream intersections impeding corridor wide traffic flow and operations.* In an emergency situation (terror attack, bombing etc.) how will emergency personnel be able to get to the site with the equipment needed to aid the injured? At peak AM and PM times how will emergency crews get to somebody having a heart attack?

106. Access issues addressed?

Comments #105-#106 are related to a comment regarding emergency response access. The following consolidated response addresses the concerns addressed in comments #88-89:

- It is not expected that response times will be significantly affected as emergency service personnel are experienced at maneuvering through congested conditions.
- PFFA personnel located on site are also trained in emergency response to handle emergencies until other emergency response personnel arrive to the scene.

### **Comments related to Site Information:**

107. For the record, the City of Alexandria did not master-plan this site "for a development of this size and character":

- The buildings are as much as 95 feet taller than the SUP called for (245 feet vs. 150 feet);
- The total footprint covers 77% more area than the SUP called for (210,200 sq. ft. vs. 118,850 sq. ft.);
- The gross square footage of the buildings is 30% more than the SUP called for (1,800,000 sq. ft. vs. 1,382,730 sq. ft.)

The phrase "for a development of this size and character" has been removed from the TMP.

108. On page ES-3, what is meant by "BRAC growth" in the middle of the page? Are there more buildings planned for the BRAC-133 site?

"BRAC growth" refers to the projected trips associated with the BRAC 133 development. There are no plans for additional construction on the BRAC-133 site.

109. What is meant by 'proper alignment with *future development* plans in this area'? Pg. 3

The intent of this statement is to indicate that the TMP considered the City ordinances which will ensure that the development fits in with the City's future development plans.

110. What is the 'proposed IDA Building', first line on page 64?

IDA is expanding. Although the opening date is not known at this time, it is expected to be occurring at some point in the near future. The TMP includes these trips to be parallel with all previous traffic studies which included these new expected trips.

111. As the TMP considers traffic flow into and out of the Mark Center, it is important to include traffic flow and patterns from the existing tenants: Institute for Defense Analysis (IDA), Center for Naval Analysis (CNA), the Hilton employees and guests, and the medical/commercial building.

The baseline traffic analysis includes all existing traffic into and out of Mark Center including commercial, residential, and pass-thru traffic. As with all other traffic studies, this data was obtained from traffic counts conducted as part of a prior traffic study as discussed in Section 4.3.1.

### **Comments related to Mode Split:**

112. It is anticipated that 23%, 1474 employees, will be using the Virginia Railway Express (VRE) to get to and from work. The analysis only includes the VRE station at the King Street Metro station. The TMP fails to analyze the potential impact of this increase on VRE service, the Metro station, and public and shuttle service to the WHS-BRAC Office Complex at Mark Center.

The TMP actually assumes that 23 percent of employees will ride "rail" as a whole, which includes both Metrorail and VRE. The vast majority of these employees are expected to take Metrorail (only 3 percent

utilize VRE as their primary mode today while an additional 3.6 percent use it along with other modes, and these numbers are expected to remain fairly constant).

113. Pg ES-2 - To what degree was "expected mode choice" of personnel solicited and analyzed? We had previously understood this information was not being requested.

WHS did ask employees about their expected mode choice on the survey conducted in the Fall of 2009. However, since this survey was conducted early-on in the process, many employees were not yet aware of commute options available at Mark Center at the time of the survey. As a result, this information was considered in projecting mode split, but was not the only factor. The projected mode splits in the TMP (presented in Section 2.3.2) are based on a variety of factors, only one of which is the self-reported "anticipated mode choice".

114. Pg ES-2 - The noted expected "mode splits" total 100% so apparently this list does not include multiple modes but rather is a tabulation of the (final) mode people will use to actually arrive at the BRAC site. However, 23% of the personnel (1,474 people) are projected to reach "the BRAC-133 site" via rail - but rail does not serve the site?

This is correct that the modes listed here represent the last mode that employees would use when arriving at the site. In the draft TMP, those represented under the mode "Rail Transit" actually represented those who would take rail and then the DoD shuttle. This information is now presented in a different way to make it more clear.

115. Pg ES-2 - "The proposed DOD shuttle(s)...from key Metrorail stations...is (are) expected to serve...a total of 2,970 commuters during the peak period..." But the preceding table indicated only 1,474 people in total would make use of (Metro)rail.

2,970 represents the total peak period capacity (i.e., over the course of the 3 peak hours during the AM or PM peak period) of the DoD shuttle system.

116. Again, are the "anticipated mode choices" based upon future preferences as stated by surveyed personnel or were the numbers projected based upon current mode choices?

The "anticipated mode choices" presented in Table 2-3 present only the mode choice that employees believed they would take when responding to the survey conducted in the Fall of 2009. Since this survey was conducted early-on in the process, and many employees may not have even been aware of commute options available at Mark Center at the time of the survey, the projected mode splits in the TMP (presented in Section 2.3.2) are actually quite different from these and are based on a variety of factors, only one of which is the self-reported "anticipated mode choice".

117. The tabulation in section 2.3.2 ("mode choice splits") totals 100%. One then assumes that the focus of these projections is (for those that make use of more than one mode) the final mode used to arrive at BRAC-133 site?

This is correct that the modes listed here represent the last mode that employees would use when arriving at the site. In the draft TMP, those represented under the mode "Rail Transit" actually represented those who would take rail and then the DoD shuttle. This information is now presented in a different way to make it more clear.

118. What does it mean to have "capacity to support a 20 to 40 percent mode split"?

The goal of "providing capacity to support a 20 to 40 percent mode split" means that one of WHS's goals in establishing the DoD shuttle was to provide capacity to serve at a minimum, 20 percent of BRAC 133 employees, and a maximum of up to 40 percent of BRAC 133 employees.

119. Also, I think the transit use projections are high. Mark Center isn't well service by transit. The Mark Center shuttle and the proposed DoD shuttle to Metro and VRE will help, but there isn't much in the way of bus service to Mark Center. The TMP basis a lot of the projected transit use on the number of existing employees that use transit now. However, the existing employees work at sites that have much better transit access and, for may are one-seat rides. I doubt many people will take the bus to the apartment complex on the other side of Seminary Road and walk to the facility - too dangerous and too long of a walk

With the extensive shuttle system planned, employee interest towards shuttle service and the limited availability of parking at and near BRAC 133, DoD believes that the transit projections are appropriate.

120. The vanpool use projection may be a bit high due to DoD's transit/vanpool benefit program that prohibits employees riding in vanpools operated by non-profit vanpool companies from receiving the benefit. Many of the vanpool companies in Virginia are non-profit. DoD needs to change their policy on this in order to have more employees use vanpools. Also, there policy is incorrect and may violate federal rules by discriminating against non-profit vanpool companies.

DoD believes that the vanpool projections are appropriate; however this is true that for purposes of the mass transportation benefit incentive, the Department of Defense distinguishes between vanpools operated for profit and those operated on a non-profit basis. Status as a profit or non-profit enterprise is determined under IRS regulations. The only vanpools for which eligible employees can use transit benefit vouchers are vanpools operated "for profit." Vanpools operated on a non-profit basis are not "qualified means of transportation" under the applicable DoD Instruction governing this benefit.

121. Again, it seems that focus was placed on how employees currently get to work and the "commute patterns" they currently use. Why would focus not be placed primarily on employees' future expectations, especially given that (a) rail, currently used by many, will no longer be an option to reach their final destination and (b) whereas rail is confined to specific routes, travel by road offers innumerable possibilities to most commuters and it is precisely the traffic conditions on those roads (and resultant route choices) that one is attempting to address?

As discussed in Section 2.3.1 (pg 14 following Table 2-3) the projected mode split was determined based on a variety of factors. Current mode use was not the primary factor, but was rather one of many factors. Inputs used to develop mode split and trip generation were as follows:

- Employee origin zip codes
- Modes based on what was viable or feasible for employees based on where they live
- Regional commute patterns from various sources
- Current mode use of employees and anticipated mode use in the future (WHS 2009 employee survey)
  - Sense of how "open" employees were to alternate modes of travel
  - Insight into which bus routes and rail lines employees use

122. Second, the Plan needs to consider, to the extent it has not already done so, the rush-hour impact of proposed vanpool and bus (and rail to bus) transit essential to accommodate those commuters that will not drive, slug, walk, or bike.

The traffic analysis conducted with the projected BRAC and IDA trips (termed “Projected 2011 with BRAC and IDA”) does include all trips, not just SOV trips. See Figure 2-4.

123. The other modes of transportation, van pools, shuttles, car pools are not incorporated into an overall system plan and will only add to the traffic congestion on roads and streets currently and projected to be operating at unacceptable levels of service.

The traffic analysis conducted with the projected BRAC and IDA trips (termed “Projected 2011 with BRAC and IDA”) does include all trips, not just SOV trips. See Figure 2-4.

124. Page 14 - Although based on the survey results, would the anticipated mode choice percentage be realistic considering the changes in accessibility to the transit stations adjacent to the Mark Center site when compared to the existing employment center location? According to Table 2-3, it would result in over 115 bikers and 123 people walking. In case the mode choice percentage for transit and carpool/vanpool can't be met due to various reasons, what would be the alternative plan?

The “anticipated mode choice” presented in Table 2-3 presents only the mode choice that employees believed they would take when responding to the survey conducted in the Fall of 2009. Since this survey was conducted early-on in the process, and many employees may not have even been aware of commute options available at Mark Center at the time of the survey, the projected mode splits in the TMP (presented in Section 2.3.2) are actually quite different from these and are based on a variety of factors, only one of which is the self-reported “anticipated mode choice”. As discussed in Section 6, WHS will be monitoring mode share over time and making adjustments to the shuttle service and to the ways in which they implement the various TDM strategies to cause a shift in mode choice as needed.

125. In Table 2-4, the source or methodology used for the applied rideshare vehicle occupancies of carpool (2.3), vanpool (7.0) and slugging (3.0) should be provided.

A source for these assumptions has been added.

## TRAVEL DEMAND MANAGEMENT PROGRAM COMMENTS

### Comments related to Parking Pricing:

126. On the other hand, the document (as others have pointed out) does not get into the issue of paid parking. Simply put, many (if not most) of the WHS staff who will be moved to Mark Center are already paying for parking, chiefly market pricing. Does anyone really think that not charging them will help them shift to a non-drive alone mode????
127. The plan states that “the BRAC-133 TMP will consider the Travel Demand Management Plan strategies (promoted by the City) detailed in the existing Mark Center Plaza 1A and 1B TMP (developed March 31, 2003) and meet or exceed the outcome of the strategies.” One key feature in the City’s Mark Center Plaza TMP is the requirement to charge market rates for parking at the site. The community strongly advocated for this requirement in order to reduce the volume of single-occupant vehicles and the requirement is an integral part of the Special Use Permit for the site. The BRAC-133 TMP needs to address this issue.
128. The TMP also fails to analyze impacts of providing free parking to employees and contractors at the WHS-BRAC Office Complex-Mark Center. Since employees are being consolidated from private leased space where they paid for parking, and since this facility is in an urban area, employees should be charged market rate for parking. This would provide additional incentives for building and providing better transit options.
129. The community has expressed concerns regarding the free parking provided to employees, making it less attractive and less likely employees will take public or private transit.
130. The TDM program includes most of the usual elements used by large employers in the region; these coupled with the transit subsidies available to most BRAC 133 staff will be helpful in increasing non-SOV share. However, in a location this far from rail transit, it will be a challenge to meet the 40% non-SOV goal. Other measures should be considered to support this goal. Parking pricing could help, but it is understand that pricing is not allowed as a matter of regulation or law. (It may be worth inquiring if the administrative cost of issuing permits could be recouped. This would provide further incentive to other modes.)

Comments #126-#130 are related to the one to one matching of permits to employees. The following consolidated response addresses the above concerns: As a matter of policy, DoD will not be charging employees for parking and has discussed this with the City of Alexandria. The limited parking availability at BRAC 133 along with the extensive TDM program will provide significant incentive for employees to use non-SOV modes of travel to the site.

**Comments related to the Bicycle Program:**

131. The "Bicycle Safe Route" from the Seminary is arguably not a safe route. Bicyclist must use the sidewalk, and there are areas near Hammond School where there is no curb break, requiring a bicyclist to dismount to cross a street or driveway. Biking in the area of I-395, even with a pedestrian ramp, is dangerous because of the merging action. If you use the pedestrian bridge to Southern Towers there are steps.
132. The on street-on sidewalk bicycle routes included in the Appendix are not routes normally taken by the few bicyclist brave enough to confront steep hills and traffic congestion. Since there are no attractive biking options, Appendix E is misleading.
133. Bicycle paths do not service the WHS-BRAC-133 Office Complex. They are nearly a mile away and the hilly terrain north and south on Beauregard, as well as the roadway congestion, makes bicycling a very unsafe, and unattractive option.
134. I work in Mark Center and commute by bicycle several days a week, whenever I can. I have done so for years. The flaw in the transportation plan with respect to bicycling is not the number of racks or the availability of showers, but the lack of bicycle access to the site. Only those who are comfortable riding in heavy traffic can get there now and the situation is likely to get worse. From no direction is bicycling easy and I don't consider riding on sidewalks an option. That is safe for neither bicycles nor pedestrians and none of the sidewalks in the area is wide enough or recognized for mixed use. Bicycles must and should be able to use the roadways.

From the southeast, once you are past Howard Road, you are riding among fast moving cars along Seminary (this is the route I take). The Plan suggests that "there is a pedestrian/bicycle bridge on the right side of Seminary Road going northbound that crosses over I-395." The sidewalk on the bridge is narrow, has a high drop on the road side, and cannot handle a bicycle and a pedestrian at the same time. I have no problems with this route now, but if the HOV lanes from 395 empty onto this bridge, it will be very difficult for bicycles to get to the left lane to turn into Mark Center Drive.

From the northwest, Seminary has four narrow lanes that make it difficult for cars to pass bicyclists safely. Beauregard street to the northeast is rideable, but only for those skilled in traffic. From the southwest, one can come up Chambliss street. I am not familiar with that route but at least one of my colleagues takes it. I am not sure where one cuts over to Mark Center.

It is not surprising that Table 5-2 lists neither Beauregard nor Seminary as a bicycle route in spite of what the figures in Appendix E might imply. If the Plan were serious regarding bicycling as mode of transportation, there would be more in the Plan regarding road improvements to ensure bicycle access; I haven't read the whole thing from cover to cover, but, in spite of the discussion of bicycle friendly improvements on the site, there is little regarding improvements in access to the site, and from what I can tell of the proposed roadway modifications, the obstacles to bicycle commuting will increase. I hope these comments are helpful, and I am happy to provide any additional information that I can.

135. The report provided optional bike paths of which two are unfeasible:
- a. E-1 (Lacy Route from Columbia Pike) has a steep hill and goes through Fairfax/City of Alexandria neighborhoods without sidewalks/dedicated bike lanes of which are presently

used as cut-through vehicle routes. E-1 illustrates the most roundabout way I have seen to go from Glen Hills Park to the Mark Center properties.

- b. N. Beauregard St. is the most likely northbound route from N. Morgan St. until the Holmes Crossing is completed. Realize, as well, that during the school year, the combination of bikers and elementary school children on the same sidewalks/sides of roads could be dangerous. There are approximately 1400 elementary children who attend Ramsey and John Adams Elementary Schools.

Comments #131-#135 are related to bicycle access and safety as referenced in the TMP. As a result of these comments, the TMP has been amended to include information and/or clarification on the following points:

- Adjustments have been made to the TMP to remove any instances of the word “safe” and to remove language referring to the use of sidewalks by bicycles.
- DoD is not funding offsite bicycle access improvements. Onsite safety improvements will be coordinated between the City Biking and Pedestrian Coordinator and the WHS Transportation Coordinator(s). The TMP will not include details or language on the safety examination.
- WHS will closely monitor the use of bicycles as one of its transportation demand management strategies and if the demand demonstrates a business case for participation in regional bike sharing programs, it will examine whether appropriated funds can be legally used for this purpose.

### **Comments related to Citizen Outreach:**

136. What is the WHS planned ‘outreach to residents’? Pg. 3

WHS will continue outreach to the community through continued coordination with the City of Alexandria and citizens through the BRAC Advisory Group.

137. How will the Washington Headquarters Services (WHS) support and assist the neighborhood residents of the BRAC-133 site? Pg ES-3

The intent of Section 5 is to present TDM strategies that will decrease SOV travel to the site, which will reduce impact to the surrounding community. One of the two goals of the TMP directly ties to the neighboring community. The first goal states, “...in order to minimize traffic impacts on the neighboring community.”

138. When will community members receive the ‘hotline’ number to voice a complaint about frequent parking violations? PG. 107

The hotline will be available prior to building occupancy.

139. How and when would the surrounding community be informed of the expanding of the Mark Center Transportation Center? It seems this would further increase traffic congestion in the Mark Center area. Pg. 110

Any possible expansion of the Mark Center Transportation Center would be coordinated with the City of Alexandria, and it is anticipated that the City would invite participation from citizens.

140. How will 'continued and ongoing communication with area residents' take place once the site is occupied? Will there be a phone number for residents to call when they need assistance with a BRAC-133 issue (parking, trash, etc.)? Pg. 3

BRAC 133 will maintain a BRAC 133 hotline. This is covered in Section 5.4.3 (pg 107) of the TMP.

141. There is no reference in the TMP that sufficient coordination has occurred with affected jurisdictions.

Coordination with neighboring jurisdictions is discussed in Section 3.3.2 on pg 35. WHS will be conducting ongoing coordination with jurisdictions as discussed throughout Section 5.

142. Where are residents and neighboring communities in Fig. 2-1: Organizational Chart? Pg. 8  
This chart presents the organizations involved in developing and managing the property.

### **Comments related to the Action Plan/Schedule:**

143. Finally, when the plan is delivered in its final approved form, time to implement its recommendations and the impact of delays must be carefully weighed. Accordingly the final version should address the full set of recommend actions, identify steps DoD must take to implement, and provide a critical timeline for implementation of each essential plan component.

144. Throughout the Transportation Management Plan (TMP), dates are identified for some activities to occur, but no consolidated schedule that would track implementation of the plan is provided. It would be helpful that a consolidated schedule for all time sensitive activities be included as a separate attachment.

145. To what extent has the timeline been given detailed attention?

Comments #143-#145 are related to the lack of a consolidated timeline in the TMP. As a result of these comments, the TMP has been amended to include information and/or clarification on the following points:

- The TMP has deadlines and milestones within each subsection for when initiatives will be implemented.
- Adjustments have been made to the TMP to consolidate critical milestones and dates for implementation of the TMP strategies onto one timeline for ease of reference.

### **Comments related to TMP Monitoring, Evaluation, and Enforcement:**

146. In Sec. 6, Monitoring and Evaluation, the City of Alexandria should have a consultation or approval role in accepting the annual report and/or amending the TMP.

As stated in the TMP, the Transportation Coordinator(s) must liaise with the City on a regular basis, including during the compilation of the evaluation report and in the event the TMP is amended. The City will be kept in regular communication with the Transportation Coordinator(s).

147. The TMP should stress the need for conducting employee survey and monitoring more frequently than the proposed biannual basis, during the initial year of the relocation to address any deficiencies and issues that may arise during this time.

WHS will conduct two surveys in the first year. This process will be flexible according to changing needs during the first year. An adjustment has been made to the TMP to clarify this.

148. A number of activities identified in the TMP address coordination with the City of Alexandria. Due to the proximity of this site to Fairfax County and the potential impacts not only to the local transportation network in the County along with the I-395 corridor and associated interchanges, Fairfax County should be included in all coordination activities during the planning, implementation, and monitoring of the TMP.

It is the recommendation of DoD and WHS that any coordination with other jurisdictions be done through the City of Alexandria. WHS is coordinating with Fairfax County on transit and shuttle route planning. Implementation and monitoring of the TMP will be handled by DoD in coordination with the City of Alexandria.

149. What are the 'measures to monitor achievement of goals and to adjust the SOV trip reduction strategies, as needed'? Pg. 3

This is covered in Section 5, TDM Strategies.

150. To the extent that initial goals are not achieved within a reasonable timeframe, what happens?

151. Without active engagement by the City of Alexandria and improved flexibility and cooperation by DoD officials, there is no assurance to the community or the City of Alexandria that "Senior Army and DoD leadership will maintain situational awareness of the effectiveness of the TMP and will operationally support ongoing efforts to achieve the goals of the TMP (p.121)."

Comments #150-#151 are related to the TMP enforcement. As a result of these comments, the TMP has been amended to include information and/or clarification on the following points:

- We are confident in the abilities of WHS to meet the goals of the TMP given that the DoD shuttle system will provide such extensive service with capacity for 45 percent of the building population, combined with the fact that the building will have such limited parking available, and finally given that WHS will be implementing a variety of other comprehensive TDM strategies. WHS will be evaluating achievement of goals over time (and formally with each Evaluation Report), and will be setting new goals over time based on findings.
- The TMP has been updated to include language that will demonstrate examples of how goals will be assessed and rectified if not met, (i.e., if transit ridership goals are not met, WHS will reexamine the DoD shuttle plan and make changes to increase ridership, etc.)

152. Does WHS have any role in enforcing "local" area parking restrictions?

153. Who is responsible for enforcing the parking rules for BRAC-133 employees in residential and business areas?

154. What are the plans for 'spillover' parking? Pg. 17

155. Page 107 – 5.4.3 – Overflow Management- Issuing resident and guest parking permits to residential community members and implementing a strict towing policy for vehicles not displaying a permit is a suggested strategy. What are the current plans for initiating this strategy in surrounding neighborhoods?

Comments #152-#155 are related to the local area parking enforcement. As a result of these comments, the TMP has been amended to include information and/or clarification on the following points:

- The BRAC 133 TMP and its managing entities will not be responsible for managing overflow parking outside of BRAC 133 property and garages. As stated in Section 5.4.3, it will be the responsibility of neighboring properties to mitigate overflow. This section of the TMP notes strategies that are currently in place or that are in the works, and suggests strategies that neighboring properties can implement in order to mitigate the effects of spillover parking.

**Comments related to Incentive Programs:**

156. Are there any incentive programs planned for employees not using SOV for their commute?

Employees using mass transit for their commute are eligible for the Federal transit subsidy program. Employees will also have access to the DoD-funded shuttle system. Carpools and vanpools will be guaranteed a parking space and will receive priority parking (i.e., most convenient parking spaces in the garages). Other incentives/rewards programs are not permitted.

**Comments related to TDM Programs:**

157. Para 5.1 says "...the BRAC 133 TMP will consider the TDM strategies detailed in the existing Mark Center Plaza 1A and 1B TMP (developed March 31, 2003)..." Using a 2003 document is absolutely unacceptable. Most of the previous studies were flawed, biased, superficial...or a combination of the above. Plus, traffic conditions have changed significantly since 2003. The final TMP must:

- Take into account current conditions
- Have accurate data
- Consider existing and planned infrastructure capacity
- Consider future development plans and
- Allow time for public review and comment

The intention of this statement was to make clear the fact that this TMP meets and exceeds the plans laid out in the previous TMP approved by the City. It is not the intent to imply that the prior TMP served as the basis for the current TMP.

158. The plan's discussion of the BRAC-133 Employee Orientation Handbook should highlight the fact that there will be restricted parking at the Southern Towers complex and in all of the nearby residential neighborhoods.

Adjustments have been made to TMP language on the Orientation Handbook to include language on parking restrictions both at BRAC 133 and in neighboring commercial properties and residential neighborhoods.

159. Guaranteed ride program. What happens to the employee who needs to work added hours more frequently than 4 times a year? (more typical situation, I would suspect). Also, not conducive to taking public transportation at a late hour (or after the shuttles end).

The regional Guaranteed Ride Home Program rules only allow for four free rides per year. If an employee exceeds this quota, the employee can still call the Guaranteed Ride Home Program number to arrange a ride for which the employee will need to pay the cost of the ride. The shuttle schedule will be planned accordingly in order to accommodate to employee schedules as indicated by tenant organizations.

160. Is there a contemplated seasonality to walking/biking?

Yes, for many employees bicycling and/or walking is a seasonal travel solution. However, employees living within walking/bicycling distance may also elect to arrange for a carpool ride, bus, taxi ride, and/or to utilize a BRAC 133 shuttle in order to get to the site during inclement weather.

161. Hopefully [ridematching software] would not be confined just to matching two automobile commuters but to all modes of transportation so, for example, bus companies could be made aware of opportunities to provide additional and valued services.

Ridematching software will be open to any employee (Federal or contractor) who desires to be put into the ridematching database. The intent of the software is only to match individuals to a carpool or vanpool; however, if there is an abundance of employees interested in ridematching who live in close proximity to one another, the Transportation Coordinator would also be made aware of an opportunity to develop a buspool from the software as well.

162. The plan needs more emphasis telework and commit DoD to meeting the federal telework goals.

The City has provided additional steps for developing the telecommute program. USACE/WHS will be coordinating with the state of Telework!VA statewide telework coordinator to help tenant organizations develop more definitive policies.

163. Based on the expected task the TMP coordinator will need to carry out, senior staff along with supporting staffs with transportation management expertise would be needed. Also, it is not mentioned anywhere in the TMP as to when the TMP coordinator is planned to be hired.

The TMP Coordinator(s) will be supported and supervised by WHS Transportation Management Program Office staff, which will include senior management as well as support personnel. The TMP states that that the TMP coordinator will be hired 9 months prior to relocation (see Section 5.3.1)

164. Individualized marketing and personal travel planning should be considered to increase the share on non-SOV commuters. Individualized marketing (aka IndiMark or TravelSmart) involves identifying and targeting marketing to transportation users who have access to modes other than driving alone and are willing to try these options. Personal travel planning is offered on a one-on-one consultation basis to encourage and plan alternative transportation travel. These outreach methods can be supportive of any alternative mode or TDM mitigation. Most IM demonstration projects have been conducted at the community level (public agency outreach to residents). The data indicates increase in non-SOV ridership of 5 to 10 percent. Here are two of the studies: [http://www.fta.dot.gov/index\\_4402.html](http://www.fta.dot.gov/index_4402.html) and <http://www.socialdata.de/info/IndiMark.pdf>

- Although it is a new concept, there has been some success in workplace-based individual marketing: Stanford University (<http://transportation.stanford.edu/>) and Portland's SmartTrips Downtown program
- <http://www.portlandonline.com/TRANSPORTATION/index.cfm?c=43820> are two notable examples.

Individualized travel planning is referred to as personalized commute assistance throughout Section 5 of the TMP. It is a major responsibility of the transportation coordinator(s) to provide individualized travel planning.

**Comments related to Slugging:**

165. The plan refers to a "pedestrian refuge area to promote slugging." (pg ES-2). Recommend the Plan flesh out this refuge area to better analyze projected traffic flow and impact. In particular, recommend it review the Pentagon refuge area to determine how to best organize and understand projected traffic flow. The Pentagon slugging area encompasses a significant amount of land and various allocation of slugging locations to maximize thru-put and matching of vehicle slug-lines and individual slugees. In particular they try differentiate between slugees heading west (I-66); those to the Springfield area ((-395) and those further south toward Prince William County/Fredericksburg (I-95).

166. It is highly questionable whether the flow of slug lines within the constricted space available within the Mark Center will be conducive to efficient and effective slugging. A deeper analysis and understanding of this process is highly recommended. (Slugging is also addressed in para 5.6.3 on pg 112...but our comments remain valid).

Comments #165-#166 are related to the slug queuing area. As a result of these comments, the TMP has been amended to include information and/or clarification on the following points:

- Usage of the slug area is difficult to predict at this time and will likely change over time. WHS will observe operations over time in and around the Transportation Center and the slug area and may choose in the future to alter shuttle routes or move the slug area to a different location.
- The number of slugs originating at Mark Center will be substantially less than the Pentagon since the Pentagon serves as a central hub for slugging.
- Anecdotal evidence suggests that for long-distance commuters (from Fairfax County and areas south), HOV access to the Mark Center via the Pentagon provides significantly better travel time as compared to using the general purpose lanes.

167. The plan fails to identify where on the site safe queuing for "slugging" can occur.

Figure 3-4 in Section 3.2.4 identifies the slug queuing area.

168. If someone "slugs" or transports others to somewhere other than BRAC-133 and arrives at BRAC as an SOV, do they get "credit" for being an HOV? If they leave BRAC empty with the intention of picking up "sluggers" even on the Mark Center site, how does that get substantiated or how do they get credit for it?

Unfortunately slugs cannot be granted carpool/vanpool privileges as slugging is an informal commute mode and is therefore difficult to predict and monitor. BRAC 133 employees who pick up slugs must have a general use parking permit in order to be a slug driver.

169. The 3% slugging use by creating a slug line is optimistic. Slugging works for the Pentagon and DC because there is density and access to transit to get to other destinations. I don't there will be that much slugging. Plus, there is no HOV lane access to the facility. Carpooling and vanpooling will also be hurt by the lack HOV lane access.

Slugging is an informal commute mode and is therefore difficult to predict. How slugging is expected to occur is discussed in Section 2.3 under “Slug” and in Section 3.4.

## TRAFFIC ANALYSIS COMMENTS

### Comments related to Study Area Limits:

170. Why is Library Lane used as a marker when it is on the east side of 395? Pg. 22

The intersection is located within 0.5 miles of the I-395 ramps/Seminary Road interchange and had to be included to develop an accurate analysis of the traffic operations.

171. What if the 'proposed internal and external roadway improvements that will be in-place to serve the opening day traffic demand' do not work? Is there a contingency plan? Pg. 24

VDOT is currently analyzing other short-term improvements proposed by the BRAC Advisory Group that include additional roadway and signal improvements. In addition, a direct HOV access from I-395 northbound to Seminary Road is currently being analyzed by VDOT and City of Alexandria for approval and funding.

172. Figure 2-2 - It would be helpful to see some figures with major roadways clearly overlaid on the employee distribution.

At this scale it would be impossible to showcase major roadways (beyond those already shown, which is all interstates) without cluttering the diagram.

173. Table 4-10 & 4-11 (Page 75, 76): Model throughput shows majority of the demand volume being accommodated for 2011 baseline condition without improvement conditions, showing LOS D or better for AM and LOS E or better or PM peak conditions. Would this be realistic considering the current level of congestion that is occurring along the corridor?

The model is restricted by the limits of the study area. However, Section 4.4.2 makes note of the existing congestion along I-395 mainline and interchanges adjacent to the Seminary Road interchange and the need for an overall analysis. Reference should be made to the VDOT IJR since it includes the adjacent I-395 interchanges of Duke Street/Little River Turnpike and King Street along I-395.

### Comments related to Site Access:

174. On page 56, third paragraph, it is stated "A single lane HOV ramp with a 450 foot long acceleration (or deceleration) lane allows direct access to Seminary Road from the north" I do not believe this is accurate. There is not an HOV ramp access to Seminary Rd. '*from the north*'. The HOV ramp *heads north*.

The intent of this phrase was to clarify that the HOV access ramp is only on the north side of the overpass. This has been revised in the TMP to clarify.

175. A correction is needed on page 65. '...the I-95/395 HOV lanes, exit at the Pentagon, and turn around to travel along I-395 northbound (should be southbound) GP lanes to Mark Center.

## APPENDIX A – RESPONSE TO COMMENTS

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176. One takes I-395 southbound (not "northbound") to reach Mark Center from the Pentagon. The HOV ramp from Seminary Road heads to the north in the morning and south in the evening.

To answer questions #175-#176: This error has been corrected in the TMP.

177. (ES-3) "A direct HOV access ramp plan from I-395 to Mark Center is also currently being evaluated by VDOT." I am assuming this is a reference to the long-discussed "direct access" into Mark Center as opposed to "Alternatives F and G" which are currently on the table but which feed into Seminary Road. So, with respect to "direct access", as I understand the use of the term on page ES-3, we have repeatedly been told that this option is no longer under consideration and is not a possibility.

This was an error. The intention was to refer to the direct HOV access ramp to Seminary Road that is under consideration by VDOT. Text has been revised to read "A direct HOV access ramp plan from I-395 to Seminary Road is also currently being evaluated by VDOT."

178. It would be helpful if all site plans, maps, road diagrams, etc. were oriented in the same direction, preferably with north at the top of the page, as we are generally accustomed to seeing.

Some of the maps and figures were oriented so for maximum legibility. The road diagrams will be reoriented where possible.

179. (22) The Seminary Road/Mark Center Drive intersection is west (or northwest) of the site, not east of it.

Text has been revised.

180. It would seem relevant to note that the "southbound auxiliary lane" of I-395 does not, in fact, extend entirely from King to Duke but merges to the left just before the exit ramp to eastbound Duke (and ramp from Duke to southbound I-395) causing major traffic issues.

Text has been added to the report.

181. Item 4 - "...site access (to Mark Center Drive) will be allowed for eastbound Seminary Road traffic only." Also for vehicles southbound out of Southern Towers, correct?

Yes; the TMP has been revised to clarify this point.

182. Page 23 "Only the westbound Seminary Road traffic can legally execute left turns at Mark Center Drive" - to do so (and be in the correct lane) vehicles must have already been on Seminary to the east of I-395; vehicles which exited I-395 at Seminary cannot/will not be able to do that.

Yes, this is stated in the sentences following that statement ("I-395 traffic accessing Mark Center is required to travel along Seminary Road and execute left turns at the Seminary Road and North Beauregard Street intersection and then access the site via North Beauregard Street and Mark Center Drive intersection. This is required due to the limited weaving distance available between the exit ramp merge point at Seminary Road and the beginning of the left turn lane taper at Mark Center Drive. ")

183. The plan indicates the site can be accessed via the intersection of Beaugard and Mark Center Drive and the intersection of Seminary Road and Mark Center Drive. In fact, the site generally can be accessed only via the intersection of Beaugard and Mark Center Drive. All vehicles coming from northbound and southbound I-395 will be required to use the Beaugard/Mark Center Drive access point.

Trips originating on Seminary Road (for example coming from the east in Alexandria) can, in fact, enter the site via the Seminary Road / Mark Center Drive intersection. The only trips prohibited from using this intersection would be the trips coming from I-395 (NB or SB).

184. Section 4 - What are the definitions of "north" and "south"?

In the context of this statement, "north" applies to areas to the north of the site along I-395 heading towards the Pentagon and "south" applies to areas to the south of the site along I-395 heading towards Springfield.

185. Figure 3-3 (Page 25): Signals and roundabouts usually don't mix well especially when placed right adjacent to one another. Has any analysis been performed to consider roundabout instead of the signal at Mark Center Dr and IDA Dr intersection since a roundabout is being proposed immediately to the south?

Refer to WHS Internal Roadway Network Traffic Analysis Report conducted by Wells & Associates, August 2009.

186. Table 4-16 (Page 82): The TMP states that the operations at the I-395 NB ramps to Seminary Road Exit ramp show an improvement. This contradicts the results in Table 4-11.

The density values remain almost the same with the density values falling within the limits of LOS D and LOS E thresholds {Table 4-11: I-395 NB Ramps Density-34.9 (LOS D) versus Table 4-16: I-395 NB Ramps Density-35.1 (LOS E)}. Refer to Table 4-9 for ramp density threshold values for LOS determination.

### **Comments related to Traffic Volume**

187. The Plan identified "2,022 trips in the morning peak hour and 1,910 trips in the evening peak hours." (pg ES-3 and pg 94). However, Table 2-4, "Trip Projection of BRA 133 Employees with Proposed Mode Split" (pg 18) shows (assuming 90% employees being present) 3,288 single occupant vehicle trips, with another 208 trips for Carpool, Vanpool, and Slug personnel, for a total of 3,496 total.

188. Table 2-4 also shows a total of 3,743 Employee Parking Spaces, of which 3,530 are available for BRAC 133 Employees, leaving 34 (less than 1%) parking spaces available. This means there should be 3,496 vehicle trips in the morning....and a similar number in the evening.

189. It appears the report erroneously took the Table 2-4 Trip Projections as "Round-Trip" rather than "Each Way" .....resulting in a peak hour flow 50% of actual reality. This miscalculation has significant adverse ramifications.

190. Pg 30 says "...each proposed ID check point will process 350 vehicles per hour, a maximum of 700 vehicles during the highest peak hour demand." If 90% of traffic arrives during the peak hours of 0600-0900, then 90% of 3,496 equals 3,146, which equates to 1,049/hour. The TMP needs to address how this peak flow will be addressed and how to prevent additional traffic (and safety) issues from traffic queue build-up.

To answer comments #187-#190: The trips identified in Table 4-4 are the number of trips arriving / leaving during the single AM peak hour and during the single PM peak hour whereas the trips identified in Table 2-4 are the total trips entering and leaving the facility across all morning hours (5:00 AM - 10:00 AM) and afternoon/evening hours (2:00 PM – 7:00 PM). Tables 4-2, 4-3 and 4-4 showing peak hour trip calculations have been revised for more clarity.

191. Pg 17 says "Based on the projected mode split employee trips for a typical day (90 percent occupancy), it is estimated that a buffer of 34 additional parking spaces would be available to satisfy unexpected parking demand." This is less than 1% of the total number of available parking places which is a very marginal buffer. The TMP needs to address how these 34 spaces will be allocated between the North and South garages. It also needs to address the traffic delays associated with people looking for the last one or two spaces in a garage. And finally, it needs to address those times when the buffer is exhausted.....how will this overflow impact the local communities?

192. I agree with Dave Dexter's comments with the following additions: In reviewing how the available 3747 parking spaces will be allocated, it appears there are 3003 spaces available for SOV that are not otherwise dedicated to a specific type of driver (Set aside spaces for government vehicles – 150, ADA/accessible – 48, vanpool -320, alternate fuel – 192, buffer -34) or, at the most 3243 spaces adding back ADA and alternate fuel spaces. The report states that 3430 "employees" will have parking spots (SOV only?). On page 95 it stated 57% of employees will be provided spaces (?). I did not see any comment about setting aside visitor spaces though understand that consultants will visit the site. I would strongly recommend more clearly elaborating on the number of true SOV spaces available for employee allocation as there seems to be some discrepancy.

To answer comments #191-#192: Table 2-4 has been revised to more clearly present the projected mode splits. Regarding the question about the visitor parking, the 67 visitor spaces are in a separate section of the North Garage and are not available to employees.

193. If the south garage has 1,715 spaces (see page 41) that would represent 45.8% of the 3,747 total available. If the peak hour traffic has 2,022 arriving vehicles (see page ES-3) and 45.8% of them go to the south garage, that is 926 vehicles. Yet, per page 30, that garage can serve "a maximum of 700 vehicles during the highest peak hour of demand".

First, the total number of peak hour trips includes both BRAC 133 trips and IDA trips, with 25 percent of the trips being IDA trips. The S. Parking and N. Parking garages are restricted to BRAC 133 employees only and will not be used by IDA employees. Also, S. Garage spaces will have permanent spaces allotted for government vehicles. Review Section 4 for more information.

194. Numbers seem to be very optimistic in terms of # of people/vehicles processed. For example, in being inspected and entering garage. How many lanes will there be? (700/hr translated into less than 5 sec/vehicle). Also 700/hr does not address the head time for attempted entry when many are trying to report to work at the same time.

This processing rate only applies to the S. Garage which is within the secure perimeter and which will have a manned security checkpoint. Employees entering N. Garage will use a pedestrian walkway to enter the inspection facility before accessing the towers. See Section 3.2.5 for discussion on vehicles entering the S. Garage and processing rates.

195. Is it realistic that 90% of the entire 6,409-person workforce (5,768 people) will commonly be on site at the same time?

196. Over and above days off, vacation, travel, etc., one might hope that a genuine focus on things such as flextime, variable work schedules, working from home and the like would result in a "peak load" that results in considerably more than an estimated 640 personnel being "off site" (or at least off the roadways) at the hours recognized as being the most traffic-sensitive.

To answer comments #195-#196: It is anticipated that the typical day workforce presence at the site will be lesser than 90 percent of the entire workforce. With the implementation of Flexible Work Week, telecommuting, and Compressed Work Week programs it is estimated that the workforce present on the site on a typical day may be much lesser. A 90 percent assumption was made to be conservative in the traffic analysis. The TMP is a living document and will be amended periodically. The transportation coordinator will organize traffic counts and traffic studies over time and the findings of these data collection efforts will be used to identify the effectiveness of the TDM strategies, the average number of SOV trips made to the site on a daily basis, and the average workforce present on a typical day. See Section 5.8.1 for discussion.

197. Page 94 Point 4 "...direct HOV access from I-395 South to Seminary Road...will relieve I-395 congestion..." (the term "relieve" being undefined). That is not my understanding - it might lessen congestion somewhat but this implication would seem to materially overstate expectations.

Relieve is synonymous with lessen. The TMP will be changed to reflect this.

198. Page 22 states that the area is served by an "extensive road system" but failed to mention that it presently provides poor service to the immediate residents during peak hours.

The intent of this statement was not to address current traffic operations. Rather it was to discuss what roadways exist around the site, and there are two major arterials near the site as well as an interstate. The results of the baseline traffic analysis (without the projected BRAC and IDA trips) presented in Section 4 show that several intersections are currently failing.

199. Table 4-19 (Page 86) shows intersections serving as major access points still operating at LOS E with the project added trips and for some cases LOS improving (at the southeast intersection at the rotary). Would this be a reasonable result accounting the addition of project trips? The table clearly shows that although the LOS may be E, all the demand would not be met with close to 700 trips and 400 trips not being serviced at certain intersections during AM and PM peak hour conditions respectively.

Traffic models for future analysis cannot be anticipated to convey all the trips if there is congestion at the upstream intersections or ramp approaches. The future models were developed by refining the existing 2009 models to match site specific conditions. Refer to Section 4.4 and Appendix F. Improvements should be made to improve roadway and intersection operations along the rotary and at Seminary

Road/N. Beauregard Street and N. Beauregard Street / Mark Center Drive to effectively serve vehicle demand at intersection approaches.

200. Table 4-19 (Page 86) shows intersections serving as major access points still operating at LOS E with the project added trips and for some cases LOS improving (at the southeast intersection at the rotary). Would this be a reasonable result accounting the addition of project trips? The table clearly shows that although the LOS may be E, all the demand would not be met with close to 700 trips and 400 trips not being serviced at certain intersections during AM and PM peak hour conditions respectively.

Traffic models for future analysis cannot be anticipated to convey all the trips if there is congestion at the upstream intersections or ramp approaches. The future models were developed by refining the existing 2009 models to match site specific conditions. Refer to Section 4.4 and Appendix F. Improvements should be made to improve roadway and intersection operations along the rotary and at Seminary Road/N. Beauregard Street and N. Beauregard Street / Mark Center Drive to effectively serve vehicle demand at intersection approaches.

### **Comments related to Assumptions of Roadway Configurations**

201. On Page 57, Figure 4-3, the callout for the signal at the intersection of Seminary Road westbound and the ramp from I-395 southbound shows a right-turn-only lane from Seminary Road to the ramp in the wrong direction. Also, the callout for the signal at the intersection of Seminary Road eastbound and the ramp to I-395 southbound shows a right-turn-only lane from the rotary to Seminary Road in the wrong direction. The lane configuration at the intersection of I-395 Northbound and Seminary Road eastbound shows I-395 northbound off ramp having one through and one shared through-right turn lane (as described in Page 56 of the report as delineation of the existing island within the rotary and restriping). The current configuration has the off ramp lane only having one through and one exclusive right turn lane. Since this requires reconfiguration and retiming at the four ramp intersections, this needs to be identified as proposed improvement and noted in figure 4-3 as well. Also, the intersection configuration at North Beauregard St and Seminary Road does not depict the channelized right turn movements. In addition, the lane configurations at the two internal intersections seem is different from the existing conditions. The difference in these assumptions would be critical in interpreting the results from the simulation analysis.

In the TMP this figure has been edited for lane configuration and also shows the proposed roadway improvements along the rotary.

202. Page 68: How many multiple simulation runs were performed for CORSIM in summarizing and averaging the MOEs? Are the electronic files for Synchro and CORSIM available? Would the scenario analyzed with interim improvements include the addition of proposed lanes and signalization as shown in Figure 4-3, or would there be any additional improvement assumed? It is not clear as to what improvements are being proposed versus what is existing since some of the configurations depicted as existing don't coincide with the existing condition. This assumption would be critical in interpreting the results from Table 4-10.

203. Table 4-14 (Page 79): The table shows that the analysis results from the TMP study for 2011 would operate better when compared to that for the existing condition at majority of the intersections, especially at the intersection of I-395 NB off-ramp with Seminary Rd. It appears that

the analysis assumed delineation of the existing island within the rotary and restriping at the rotary of I-395 ramp and Seminary Rd for this TMP analysis. Difference in the assumption of the lane configuration needs to be clearly stated for the purpose of a fair comparison.

Response to comments #202-203: 11 simulation runs were executed for each scenario. Figure 4-3 has been edited to accurately reflect existing lane configurations and to show the rotary improvements that were assumed to be in place for the 2011 projected analysis. The 2011 baseline analysis includes the existing roadway configuration only with optimized signal timing and coordination, and re-distribution of I-395 ramp illegal WB left turns from Seminary Road/Mark Center Drive intersection to Seminary Road/N. Beauregard Street intersection. The 2011 projected analysis includes the interim (DOD) roadway improvements that are currently under construction along with the proposed restriping improvement to show three lanes along the rotary.

### **Comments related to Visitor Parking**

204. Table 4-2 At the 90% employee attendance rate (see page 18), there are 9 visitor vehicles arriving from 5-6 am; 45 from 6-7 am; 67 from 7-8 am; 42 from 8-9 am and 9 from 9-10 am. But there are only 67 visitor spaces to begin with.

205. Table 4-3 A similar question here. 64 visitors depart (from 67 visitor spaces) between 4 and 5 pm. Where then have the 48 that depart between 5 and 6 pm been parking?

To answer comments #204-#205: After discussions with WHS, these tables have been revised to reflect the actual number of visitors expected at the site. Also the tables have been revised to be presented more clearly.

### **Comments related to Foster Avenue**

206. It appears that Foster Avenue is proposed to be converted into a major connector from Beauregard to Seminary. Is that correct? I believe this is the first time the community has been advised of this? Have the residents of Foster been consulted?

- a. In the recommended intersection improvements section of the plan, there are problems with the three improvements related to Foster Avenue:
  - i. "Widen Beauregard to receive four lanes of traffic at Foster Ave." Foster Avenue does not connect to Beauregard.
  - ii. "Widen and improve Foster Ave. to receive two lanes of one-way traffic and provide a merge to Seminary Road." Foster Avenue runs parallel to Seminary Road and therefore a merge is not possible.
  - iii. "Widen Seminary Road at the Foster Ave. merge location." Again, Foster Avenue runs parallel to Seminary Road and a merge is not possible
- b. Also of concern is that the people drafting this plan may not have actually gone to the site---or they would have realized the inaccuracies with Foster Street.

Improvements to Foster were included only as a proposed suggestion for further consideration. This suggested recommendation has Right-of-Way and real estate implications involved as well as drainage

impacts and requires a detailed engineering study. To validate this recommendation the City would have to conduct additional corridor wide traffic analysis along Seminary Road and N. Beauregard Street.

### **Comments related to Citations**

207. Page ES-1 - Where would one find the "guidelines and standards" set forth by the NCPC, GSA and MWCOC?

A link to the guidelines are provided in Section 1.3 (a footnote on pg 3).

208. Page 73: Data source is noted as 2010 HCM. Is this source correct since the 2010 HCM has not been released yet?

Footnote corrected to 2010 HCM Pre-release.

### **Comments related to Calibration**

209. If the year 2011 was defined as baseline condition, how was the CORSIM model calibrated in order for the simulation model to replicate the existing conditions (in terms of volume, speed, and queue etc) to give better representation of the future scenarios evaluated? What was the basis for adjusting different parameters in preparing for the future simulation model?

Document has been revised to include calibration details. The future models were developed by refining the existing 2009 models to match site specific conditions. Refer to Section 4.4 and Appendix F.

### **Comments related to Previous Studies**

210. There have been a variety of studies completed since 2003. The studies are often different in scope and rely on different assumptions. Consequently, they arrive at different conclusions. However, it is generally agreed the proposed off site road improvements currently under construction will not adequately handle the additional site generated traffic and several intersections would operate at unacceptable levels.

The traffic impact analysis results and problem areas included in the TMP concur with this statement.

211. Page 58 - For benefit of our continuing education - why were the Wells and the VHB studies selected to be used as the basis for SAIC's projections?

The Wells & Associates TIMP, the VHB Study developed for the City of Alexandria, and the VDOT IJR were referred to in the TMP as they were used as sources to establish 2011 baseline traffic volumes. Wells' TIMP was the original study developed for the BRAC 133 development. This was compared with the VHB study and VDOT IJR, two standalone traffic reports generated for the government agencies, to obtain existing traffic volumes along I-395 mainline and ramp sections, and intersections.

212. The last paragraph on page 45 states 'The report concludes that with the implementation of the proposed roadway improvements and 10 percent TMP trip reduction, all study (studied) intersections will operate at an acceptable LOS under full build-out and occupancy conditions' And what happens if it does not work? Is there a Plan B?

This is just a summary of a prior study, the Mark Center Parcel 1A and 1B Traffic Impact Study and Transportation Management Plan conducted by a 2003 Wells & Associates Study. This is not a finding from the TMP.

213. The most recent Alternatives are not included on page 51. This needs to be updated to include the three new possibly Alternatives. Pg. 51

This is just a summary of the 2009 study. VDOT is in the process of evaluating additional alternatives and no alternative has been finalized yet (page 92).

## SECURITY-RELATED COMMENTS

There were a number of comments related to issues that cannot be addressed publicly due to the sensitive nature of the information. Due to security reasons, details on the topics below were not included in the TMP.

1. Have evacuation plans been made to address any possible emergency, attack or "event"?
2. If there are "problems" in the RIF, what procedures are to be followed?
3. Would they assist local law enforcement in determining if a vehicle belonged to a BRAC employee?
4. For sake of information (and to address the peace of mind of local residents) does a vehicle that "fail(s) the scan" at the RIF get nothing more than an "escort to exit the site"?
5. What are the combined numbers for the number of BRAC-133 employees from the King St. Metro and VRE at King St.? Pg. 39, Pg. 40
6. What proportion of the BRAC 133 employees will be civilians versus military personnel and how effective could the TMP be enforced and implemented?

## COMMENTS OUTSIDE THE DOMAIN OF A TMP

There were a number of comments received that relate to topics that are outside the domain of a TMP. These comments are provided here for reference but information on these comments is not included in the TMP.

1. What department is responsible for the “facilities maintenance staff” that will maintain the cleanliness and preservation of the Transportation Center? Pg. 100
2. Where will the VRE riders exit the train? Will this require additional shuttle buses? Pg. 14, Pg. 17
3. What is the ‘outdoor’ environmental quality standard? AC generator noise, transportation noise, water use (flushing of toilets, cafeteria use, showers etc.), sewer needs? Can the current infrastructure handle the volume? Pg. 19
4. What would the impact of private bus companies transporting BRAC-133 employees have on the local neighborhood traffic? Pg. 36
5. Who pays for trash pickup at the Transportation Center? Does the City of Alexandria have the funds to handle the new volume of trash that will be created by 6,400 plus employees? It appears at the current time we do not have enough funds to cover our current needs.
6. WHS should conduct an annual survey of the neighborhood residents surrounding the BRAC-133 site along with their survey of employees. The results should be given to the BRAC Advisory Committee. Pg. 119
7. Pg 26 says “Every visitor will be required to register in advance and receive approval from PFFA, at least one day prior to visiting the site.” As someone who has had multiple tours at the Pentagon, I can assure you issues pop-up without giving that lead-time specified. The TMP needs to address adverse impact to the mission of personnel being unable to attend a meeting or give necessary input due to this administrative limitation.
8. Has it been pointed out that the projected peak AM and PM hours are nearly identical to the start of the school day at the schools on Seminary Rd., King St. and Braddock Rd.? Has a safety evaluation been done to assess the impact on student safety? Pg. 61
9. The proposal to shift or add a stop for existing bus routes at the Mark Center would likely add time to the route. I would like the report to make a comment about projected trip duration impacts so that local residents are fully aware of a potential impact in their commute.
10. Alluded to, but not clearly stated, is likelihood that the north and south I-395 exists on either side of Seminary Rd (King St and Duke St/Little River Turnpike) will also be impacted by non-shuttle traffic trying to avoid the more congested Seminary intersection. Is there any way to evaluate how these intersections are impacted by BRAC-133 in the designated reporting intervals?
11. Buses, van pools, shuttles, bikes, pedestrians are all caught in AM/PM peak traffic congested road network. The TMP fails to provide a plan to addressing the overriding issue; traffic congestion related to WHS-BRAC 133.
12. DoD shuttle buses for employees are proposed to be operating at 10 or 15 minute headways to and from Metro Stations during the AM/PM peak periods. The TMP should consider impacts on traffic near and in the metro station bus terminal area to ensure the shuttle buses are not adding to congestion and that employees can reasonably expect on time service.
13. Residents have also expressed concern regarding impacts on fire and emergency medical service.

14. Given 1.1, it is difficult to know how much to say, question, ask. To the extent the public may not understand some of the methodology or conclusions, how much of an education are we due?
15. ES-3 - Will the commuting needs of personnel at IDA and CNA and/or others in the vicinity be considered in any manner?
16. I did not see information in this report which focused on any other than the AM or PM peak hour. Hell, we all know that the traffic stinks in this area for way longer than an hour. Why does this report not address that point? When I did the EIS for the relocation of all Naval Systems Command staff from Crystal City to one of five sites (including Mark Center) back in 1990, we specifically addressed the duration during which TMP efforts might mitigate those impacts. [By the way, we concluded what the City, the Army, and all their consultants failed to conclude this time – that there was no way in hell that Mark Center offered a reasonable location to place DOD personnel, due to the lack of a Metro station.]
17. Has money been identified for these buses?
18. There is a time lag between identifying a need and providing the resource. Has this timeframe been determined and planned for?
19. There is time required to integrate these buses into existing bus routes and adjust bus-stop schedules accordingly. Has this been considered and integrated into the plan?
20. Has the environmental (both pollution and traffic) impact of these additional buses been considered?
21. Has the scheduled usage of these buses at the Mark Center Transportation Center been considered and integrated into the overall schedule?
22. If the above have been considered...it needs to be made visible to the public. If it has not been studied and considered, it needs to be.
23. The traffic impact analysis section of the plan cites several studies that have been conducted between 2003 and the present. Unfortunately, there is no solid comparative analysis of the studies nor is there any attempt to reconcile the major differences that exist between them.
24. What was the traffic count for Seminary Rd from Quaker Lane west to N. Beauregard in the TIS/TMP study, March 31, 2003? Pg. 45
25. Because the PB, April, 2009 study stated in the TIMP that the road improvements identified would not be adequate to handle the additional site generated traffic, what is proposed for the network of roads serving the BRAC-133 site? Are there plans to widen King St., Braddock Rd or Seminary Rd. from Quaker Lane to Kenmore Ave.? Pg. 49
26. The delay in construction and funding for road and transit improvements should be taken into consideration in the Transportation Management Plan.
27. Who is paying for what [emergency services]?
28. Has responsibility for the provision of emergency services been resolved?
29. The plan should also include potential projects that would qualify for funding through the Defense Access Road program
30. Page 35: Has the need for modifying the transit routes been considered for Fairfax Connector? How would the new routes be funded and how will buses get to the transit center?

31. The TMP only provides an analysis for 2011 conditions (baseline + projected Mark Center/IDA) and lacks a longer term planning analysis. Assessing only opening year conditions seems short-sighted and does not account for significant future traffic issues post-BRAC 133.
32. On Page 90, Section 4.4.9 offers several roadway and intersection improvements to address impacts of the baseline and projected volumes. There is no discussion, however, of how to fund these improvements and what would happen if most or all could not be implemented.

### COMMENTS THAT ARE NOT ACTIONABLE

There were a number of comments received that were not actionable. These comments are provided here for reference.

1. The impact of BRAC 133 will extend far beyond the immediate intersections next to the Mark Center (pg ES-3). There will be additional traffic coming from the West (from Columbia Pike and Route 7...as well as Seminary Road and George Mason) as well as from the South (people exiting I-395 at Rt 235, or coming north on Van Dorn to cut over at Sanger Blvd to Beauregard) and from the East (from Maryland exiting Telegraph road to Rt 236, then North on Quaker Lane to Seminary Road West). These are just some examples of the regional impact BRAC 133 will have. The broader regional impact on traffic patterns should be studied and addressed.
2. The proposed Transportation Plan should directly address the traffic congestion issue. The increased impacts and cost on the City of Alexandria taxpayers and nearby residents should be borne by the Department of Defense. The DoD should place a high priority on safe, efficient transportation of their employees to the WHS-BRAC-133 Office Complex at Mark Center with no adverse impacts on existing levels of traffic and transit service, or environmental quality.
3. Pg 73 (and Tables 4-12 and 4-13) show many intersections and lane group movements operating at an unacceptable LOS currently. This will only get worse with the severe stress caused by BRAC 133. Pg 85 says "...These degrading operations at the individual intersection approaches will eventually lead to the failure of the overall intersection. In addition, the overall intersection at the Seminary Road and North Beauregard Street intersection operated at unacceptable levels under the projected morning and evening peak hour demands, with all the intersection approaches and lane group movements experiencing severed delay. ..." Since the BRAC improvements for traffic flow are minimal compared to the increase in traffic flow....catastrophic traffic impact is almost a certainty. The regional impact of this traffic must be considered.
4. I am very concerned about the statement on page 74 "These degrading operations at the individual approaches will eventually lead to the failure of the overall intersection." Pg. 74, Pg. 85
5. Additional car-sharing vehicles should not be allowed. This would negate the push to lower SOV. This would be counter to the TMP goals of reducing single occupancy cars on the roadway network. Pg. 114
6. Variable work hours/flex time/telecommuting needs to be strongly encouraged. This could be a great benefit to reducing the Peak time congestion. PG. 11
7. Third, to the extent the final Plan may consider recommending widening of any streets in the vicinity (beyond the essential "triple-turn" project now under way), it must be recognized that this too will not provide a solution or solutions that can be implemented before the facility opens.
8. The goal to establish a TMP office is not a goal at all. It is a statement of what must be done, but if the goals of a TMP are that soft (and unrelated to the outcome of traffic and trip levels and characteristics), then it really isn't a TMP at all.
9. Fails to adequately consider the impact of BRAC-133 on the regional and local transportation network and provide realistic solutions that can be implemented in the near and intermediate time periods.
10. Fails to address the full transportation impacts of 6409 employees occupying the building in September 2011. Some of these impacts not only have a detrimental effect on the quality of life of

people living in the area, but also result in taxpayers of Alexandria absorbing costs associated with street and road improvements, increased transit service, fire and emergency medical services, and costs associated with DoD shuttle service at metro stations.

11. The Special Events Protocol requiring visitors attending a conference, training seminar, organized large meeting or other special events to board a DoD shuttle bus from designated Metrorail pick-up points will be difficult to implement.
12. There is no reason the City of Alexandria or the local community can rely on trusting the DoD leadership to address concerns outside the area of the WHS-BRAC at Mark Center. The program is essentially voluntary. ("A monitoring and effectiveness plan will help the Transportation Coordinator to evaluate the effectiveness of the various transportation programs and strategies under the BRAC-133", ES-4)
13. I am suggesting that 'southbound' traffic on I-395 be encouraged to exit at King St. east to left at N. Beauregard. This would eliminate many left turns from Seminary Rd. onto N. Beauregard.
14. A recent I-95/I-395 Transit/Transportation Demand Management Study, April 2010 concludes: "The future Seminary Road/Mark Center Transit Center is projected to attract heavy ridership, both as an origin/destination and as a transfer point to the Pentagon". The report recommends a need for two additional BRT Bays, in addition to local and express bays.
15. While the TMP for the previous site was "approved" in 2003:
  - a. It was acknowledged to be incomplete;
  - b. It required that personnel pay market rates for parking;
  - c. The direct I-395 access was later waived with no commensurate reduction in the gross square footage permitted to be developed (a question for the City, rather than DOD, to answer).
16. It would be helpful to have further elaboration about the assignment of parking spaces. Apparently there will be no more than one permit per space (page 105) and it "...will be numbered, corresponding to a single employee's registered vehicle..." (page 106).
17. Contrary to the statement made on page 117, it is highly unlikely that many of the employees would walk to the site. With the exception of apartments at Southern Towers, it is unlikely there are many employees living within a twenty minute walk of WHS-BRAC0-133 at Mark Center. The Transportation Management Plan states: "Over 500 employees live within three miles of BRAC 133, over 400 employees within two miles and over 100 employees in less than one mile." It is highly unlikely that many would walk to the site because of:
  - a. Few residents live within walking distance of the complex,
  - b. Streets in the nearby neighborhoods are not on a normal street grid pattern, requiring pedestrians to take a more the circuitous route to the complex.
  - c. Sidewalks are too narrow; and
  - d. Wide streets, traffic and turning movements discourage pedestrian use in the immediate area of Seminary and Beauregard.
  - e. During inclement weather neither biking nor walking are attractive options.
18. The community is concerned regarding the addition of 3,800 new vehicle trips and many more if you add shuttles and buses.
19. Nearby residents are dissatisfied that appropriate measures are being taken to ensure employees and contractors will not be parking in neighborhood areas.
20. Proposals for bikes, walkway and paths, safe pedestrian crossings give a false impression. This is not a pedestrian-bike friendly area.

21. Residents remain skeptical the Transportation Management Plan will effectively mitigate traffic and transit impacts.
22. Other options for realigning the interchange or providing direct access to the WHS-BRAC Complex at Mark Center are dependent on approval of design and funding, and any solution is far into the future.
23. As outlined on page 94, most of the roadway improvement, including the Seminary Road exit ramps from I-395 north and south will continue to operate at unacceptable levels. High Occupancy Vehicle access to Seminary Road from I-395 and other short and long term improvements are being studied, and funding for any of the projects is uncertain.
24. It is interesting to note that "over 45 per cent of employees use some form of transit today", but two thirds of those use Metrorail for at least part of their trip - presumably on their final leg going to their office - and now none of those 1,956 people (30.53% Metrorail users of 6,409 total personnel) will have that option..
25. "...with 10 percent to 30 percent of employees riding Metrorail today, it is implicit that employees are accustomed to transit." Per page 11, 30.53% currently use Metro. One assumes convenience is a/the primary factor, given that most relocating personnel currently work at locations adjacent to Metrorail stations. Whatever their motivation, it will no longer be an option (at least as their final leg to reach their office)
26. 5.1.4. With respect to "character" I don't believe the City ever contemplated a major terrorist target, complete with a RIF.
27. 5.9.1. From my personal (layman's) perspective, the ridematching software referenced on page 111 could be a major key to successfully doing this.
28. 6.1. General Comment: To the extent that it is our tax dollars which have been used to pay for the bulk of the recent traffic studies, it is extremely disconcerting to see that the TMP lists no fewer than 12 of them with Benham's/SAIC's now representing number 13!
29. 6.5.2. While a major desire is to promote use of HOVs, the HOV lanes of I-395 don't offer the possibility of "accessing" the Seminary Road interchange.
30. 6.8.1. One is left with the very real sense that there are simply no materially significant traffic mitigation measures which can be implemented anytime in the foreseeable future. The question then becomes "What do we do?" Will we be compelled to live with "failure", "severe delay", multi-mile "spillbacks" impacting multiple interchanges? Will we be forced to accept the "unacceptable E or F" levels of service? What are our options? Have we any?
31. Point 3 "These improvements (as proposed in the TMP) if approved and implemented will alleviate traffic congestion and promote smooth travel." The term "alleviate" is undefined but the implied conclusion does not seem to align with earlier assertions about insolvable "failures" and anything but "smooth travel".
32. "Purchasing a licensing agreement to ridematching software and/or online applications..." (Or developing WHS'/DOD's own software?) To me, this is the best course of action with respect to addressing personnel needs and attempting to respond to them. Travel patterns are very personalized and options clearly extend far beyond printed transportation schedules, etc. The best option for any individual may well be just around the block or down the street. WHS needs to facilitate not only "matching" personnel having similar needs but to work, virtually individual by

individual, to see what "tweaks" can be made, services added, schedules altered, etc. in order to convert "doesn't meet my needs" to "I can do that".

33. I was not all that pleased with the document. On the one hand, there are things which are mentioned which I believe hold real promise for decreasing the impacts of BRAC 133, such as the significant DOD shuttle program from a variety of Metrorail stations. But the TMP does not (unless I missed it) really get into what needs to be done to make sure that WHS staff actually use these shuttles. I do not want to be paying federal taxes for such shuttles if they are not highly subscribed and if they do not significantly mitigate the traffic impacts of BRAC 133.
34. I am troubled by the lack of clear definition on p. ES-2 where the mode splits are listed as "anticipated." Are these anticipated with the TMP in full implementation? at opening day of BRAC 133? Or are these the baseline without the TMP in place? Here is what the TMP needs to state, something like this:
35. If BRAC is implemented and nothing else is done, here are the anticipated mode shares, and the traffic impacts of same. Here is a plan to make those impacts less, and achieve the goals. If the plan is implemented, then the resultant, improved mode shares would be as follows and they do or do not meet the goals set for this project.
36. The extent of the projected congestion is extremely concerning:
37. "...many of the lane group movements and intersection approaches operate at unacceptable LOS for the 2011 baseline condition. These degrading operations at the individual approaches will eventually lead to the failure of the overall intersection(s)."
38. "...without BRAC improvements..." (that term appearing to be generally undefined) "Some of the I-395 mainline and ramp sections (are already)...operating at unacceptable LOS."
39. "...all the (Seminary/Beauregard) intersection approaches and lane group movements experiencing severe delay."
40. "...locations of concern throughout the study area...long traffic queues and spillovers...unacceptable E or F, with demand exceeding capacity."
41. "...spillover along southbound I-395 extends north past the King Street interchange..." with the implication that the Duke Street interchange will experience the same thing.
42. Unfortunately the TMP does not appear to include any assessment of anticipated traffic conditions after the "solutions" (a term used in the Section 4.4.9 heading but which one might logically fear is a rather gross overstatement) are implemented. It is further noted that some of the proposed mitigation measures are "long-term" and will require "extensive coordination".
43. The SOV trip reductions rely mainly on the fact that there are only 3,747 employee and visitor parking spaces for 6,409 employees. However, I don't think they did enough analysis on parking near the facility. People will find parking where you least expect. There is a shopping center near the facility where employees will try to park.
44. This draft report, as presented on the City website, was illegible (particularly all the info presented in the tables, diagrams, etc). Thus I am not sure that some of my concerns might not have been addressed (but I doubt that they were). I was told by the Corps of Engineers that all community comments (via the City website) were to be transmitted by the City to the Corps by COB Friday June 18. (The website, however, posted an earlier cutoff for comments.) Due to the quality of the

document and my limited visual capability, it has taken me until now to get through this draft. *I am presuming that you will honor the June 18 cutoff for my remarks.*

45. I am suggesting that the move of 27 organizations to BRAC-133 be done in phases over a yearlong period of time. This would allow evaluation of road improvements, pedestrian walkways, signage and transit plans. Adjustments could be made as organizations moved into the buildings. This seems like the only sensible way to avoid a complete breakdown of the roadways surrounding Mark Center.
46. It is disappointing to note that WHS employees were apparently surveyed about their concerns but without having had any briefing and with their specifically noting a "lack of information". Are they not the key source of "input data" in addressing future transportation needs?
47. The visitors/meetings/conferences situation does not sound well thought out, either qualitatively or quantitatively. I think this will be a mess, especially if there are many frequent, or large meetings on site (which you already suggest will happen). Perhaps more so for meetings that do not span the day. Also for meetings which are not scheduled early enough to attempt a 24-hr advance parking (application) spot. And "park and ride" spaces at Metro stops are generally not available after early AM hours.
48. It is likely meetings and conferences will generate additional traffic and demand for parking in nearby neighborhoods.
49. Given the current state of traffic on I-395 and the expectation that it will only get worse, some would suggest that I-395 is one of their least attractive options and may well not be the route chosen by "most" commuters.
50. As but one example - I would assume that there are lengthy lead times in ordering, or even leasing, things like shuttle busses (and, if needed, more DASH busses).
51. And what might that infer about future traffic (westbound on Seminary) choosing to enter Southern Towers only to make a u-turn in order to access Mark Center?
52. ES-3. When personnel are presented with so many roadway options/alternatives how does one meaningfully distribute "generated trips...along the existing roadway network...as per the home zip code distribution"?
53. There was also the scenario of improving outside accessibility (walkways) for the disabled community. It was not clear what the geographical/topographical extent of these modifications are planned, so I cannot begin to comment on this point.
54. The TMP has something about service from the King metro station and it is only a 7 minute trip from our metro station to King metro station so people would not even concern using a shuttle from our station because it would be quicker for them to just get off on King street and they would actually be using the metro station instead of just parking there.
55. There is no guarantee that carpools and vanpools would be formed as anticipated although the zip code of employee origin may be identical. Also there are limitations in number of potential sluggers since no direct HOV access is provided to the site where the majority of the employee would be coming from during the peak direction (from I-395 NB to the site during AM and to I-395 SB from the site during PM).
56. Table 4-20 (Page 88) although the results show acceptable LOS, the trips being served are not all of the anticipated project demand trips.

57. Figure 3-8 (Page 41): Preliminary shuttle routes have limitation of capturing much of the employees coming from the south. Shuttle to and from the King Street Station would be critical in capturing Metrorail and VRE commuters from the south. Also depending on the origin of the employees, the shuttle serving the VRE Crystal City station would also need to be considered. One challenge in providing the shuttle service is avoiding the congested routes along with being on schedule for trips that are transferring from different modes.

## CITY OF ALEXANDRIA COMMENTS

### General Comments

1. The US Army did not include many of the transit improvements and TDM strategies recommended by City of Alexandria staff.

USACE/WHS included transit improvements that were deemed the most feasible and cost-efficient in the short term (see Section 3.3.2, Table 3-2). However, due to recent discussions with the City of Alexandria and the Ad Hoc BRAC Committee, many of the improvements in Section 3.3.2, Table 3-2 are currently being planned. The final TMP will be changed to include the improvements currently being planned.

The only TDM strategy not included is parking pricing.

WHS will continue discussions with DASH and WMATA concerning possible route enhancements to support BRAC-133.

2. There are several elements of the TMP which are not as complete as they should be. For example, the section on proposed shuttle routes is preliminary. While City staff understands the shuttle bus plan will need to be revised periodically, a final draft plan should have been included in the TMP.

The shuttle plan details were not included in the draft TMP due to City and Fairfax County staff requests to discuss the feasibility of service to Van Dorn and Franconia-Springfield Metro Stations.

The shuttle plan will be included in the final version of the TMP. The details that will be included are:

- System Service Capacity
- Number of Buses
- Headways
- Routes and Shuttle Destinations (including a Franconia/Springfield Route)
- Estimated Passengers

3. The TMP does not provide adequate information to feel confident that the proposed TMP will result in 40% reduction in single occupancy vehicle trips.

Upon discussion with the City, it was determined that lack of confidence in the TMP rested predominantly on the lack of inclusion of the final shuttle plan and transit improvements.

As the final shuttle plan will be included in the final TMP, as well as some of the agreed upon transit improvements being worked out with the Ad Hoc Committee and the City, USACE/WHS believe these additions will enhance confidence in the TMP.

USACE/WHS are confident in the abilities of WHS to meet the goals of the TMP due to the DoD shuttle system which will provide robust service with capacity for 40% of the building population, combined with the limited parking availability, and the TDM strategies to be implemented.

4. The TMP will need to be revised if the appropriations bill including the language added by Representative Moran is approved. The language limits the number of parking spaces that could initially be used to 1,000.

The final TMP will not include language or strategies to address the proposed legislation as it defines a specific set of conditions including 3,747 parking spaces.

The Army will include language in the transmittal forwarding the TMP that if legislation is passed an interim TMP must and will be developed and that the final TMP will be set aside until the full number of parking spaces is restored.

5. The BRAC TDM does not provide any indication of how people who are not counted in the 6,500 count will get to work. Does this count include contractors? Are people who do building maintenance, food service, or other functions included? If not, how will these people get there? Since these people may not be coming at peak times, we have to figure out how they will get there in order to minimize parking disruptions in neighbor communities. Will these people be able to use DoD shuttles or have the opportunity to obtain a parking permit? Good public transit options for these additional numbers are needed.

Thirty-one per cent of the building population of 6,409 represents contractor staff; these staff have been included in the analyses presented in the TMP.

In addition to the 6,409 professional staff, there will be 150 other federal and non-federal employees at BRAC-133 providing a range of support functions, including security, IT, building management, and other service functions.

Each tenant organization is responsible for their non-federal employees, and all non-federal employees will be expected to follow the same protocol as federal employees. The TMP strategies will also apply to these employees. Each tenant organization will determine whether their contract employees will be eligible for parking permits. These employees will be able to utilize the DoD shuttle, as the system has sufficient capacity to support these employees, even in the off-peak.

A description clarifying the aforementioned description will be provided in the final TMP.

Tables and figures will be adjusted to include a discussion of the additional 150 support personnel.

### **Mode Splits**

6. 23% Metro assumption is higher than the assumption used in other studies. The BRAC building is not within walking distance of any Metro Station. City staff believes that the 23% Metro use will not be achieved.

The TMP does not assume 23% Metrorail ridership – it assumes 23% rail transit ridership (including VRE).

It should be noted that prior studies assumed 20% Metrorail ridership, so the TMP projects a number which is only 3% higher than previous studies. The key reason for this higher assumption is the extensive shuttle system which will provide capacity for transporting up to 40% of the building population between the building and mass transit centers during peak periods. Prior studies were not aware of the details of the shuttle plan. This extensive shuttle system supports higher rail ridership. In fact, 23% is believed to be conservative given the shuttle system and the current commuting patterns of employees.

Upon discussions with the City, a major driver behind their assumption that 23% is too high is that studies have indicated that the further a worksite is from rail transit, the lower rail ridership is. However, those studies do not account for extensive connection services (like the DoD shuttle) that provide a link from distant rail transit to the worksite. Again, as the shuttle system will be able to serve 40% of the building population from both Metrorail and VRE, we believe that rail ridership will at a minimum be 23%.

7. The 5% bus transit assumption may not be achievable. The bus transit percentage was estimated assuming that routes providing service within one mile of the BRAC building could be considered as providing transit service to the site. One mile is not the proper standard. One-quarter mile or at most one-half mile should have been used for estimating bus transit usage. Most transit related studies show that 1000 feet (.19 miles) to 2000 feet (.38 miles) is an average distance people are willing to walk to a bus stop. Within the TMP under Pedestrian Access & Facilities, page 27, it states, "the existing pedestrian walkway system adjacent to the Mark Center site is in a poor condition with substandard effective sidewalk widths (4 feet or less) and pavement conditions, discouraging

pedestrian mode of travel and posing a threat to pedestrian safety, especially to the disabled pedestrians." With such pedestrian conditions in getting to the site, it would be difficult to assume the 5%.

The TMP only considered service that serves within ½ mile of BRAC-133. The reason for this confusion lies in Figure 3-5 which displays existing bus routes within 1 mile of the BRAC-133 facility. The final version of the TMP will be modified to only reflect those routes within ½ mile of the site.

Regarding assumptions about how far commuters will be willing to walk to a bus stop, many studies, including studies from MWCOG show that commuters are willing to walk up to 1 mile, so the assumption that employees would walk less than a ½ mile is a reasonable. Current bus stops on Beauregard and Mark Center Drive, as well as those at Southern Towers, are less than 2000 feet from the BRAC 133 building.

The Army and the City of Alexandria, continue to discuss implementation of Table 3-2 improvements to bring public transit to the transportation center. The final TMP will be adjusted to include all transit improvements agreed to, which will lessen the walking distance for pedestrians.

Regarding the pedestrian walkway system on page 27, note that the paragraph that follows these statements describes the proposed sidewalk and pedestrian circulation improvement plan that is being implemented by DoD as part of the off-site roadway improvements, which will improve the conditions of the current walkways (see Figure 3-4).

8. Explain the percentage of those using VRE and the percentage of those using Metrorail to assist in understanding where additional transit links/resources would be helpful.

Currently only 3% of employees use VRE and 9% use Metrorail as their primary mode of transportation. An additional 3.5% use VRE and 21% use Metrorail on occasion, or in combination with other modes of transportation, as shown in Table 2-3.

9. On page 14, there is a table showing the anticipated mode split based on employee surveys. The anticipated percentages in this table are very different than the anticipated mode splits found on pages ES-2, 13, 17, and 18. Why such a variance / how was the survey on page 14 factored into the mode splits found on ES-2, 13, 17, and 18?

The word "anticipated" was incorrectly used in the Executive Summary and will be corrected in the final version. The intention throughout the document was to use the term "anticipated" to refer to the survey results, thereby reflecting what employees thought they would do in the future at the new building. The term "projected" was to refer to the projected actual mode split. As discussed in Section 2.3, the projected mode split (shown in pages ES-2, 13, 17, and 18) was determined based on a variety of factors, only one of which is the "anticipated" mode split that employees indicated on the survey. Employee perceptions of expected mode split are not believed to be entirely accurate as many employees were not yet familiar with all modes of access to the site when responding to that early survey. Other inputs used to develop mode split and trip generation were as follows:

- Employee origin zip codes
- Modes based on what was viable or feasible for employees based on where they live
- Regional commute patterns from various sources
- Current mode use of employees and anticipated mode use in the future (WHS 2009 employee survey)
- Sense of how "open" employees were to alternate modes of travel (WHS 2009 employee survey comments)
- Insight into which bus routes and rail lines employees use (WHS 2009 employee survey)

10. How does the general commute pattern as referred to in the Executive Summary compare with the surveyed commute pattern of WHS shown in Table 2-3?

The statement in the Executive Summary indicating that the mode split was compared against general commute patterns in the region is perhaps too strong. The intent of this statement was to explain that commute patterns in the region were used to help inform the assumptions of mode split.

The Executive Summary will be revised to clarify this point.

### **Transit**

11. The TMP states that 45% of employees use some form of transit. The large proportion of transit users is primarily related to the proximity of their place of work to Metro stations. Since BRAC is not near a Metro station, the percentage of transit users will be significantly lower.

The TMP incorrectly states 45% - this number will be changed to "over 58%" to correctly reflect the survey data. Please note that this statistic illustrates the number of employees who **currently** use either Metrorail, VRE, or bus transit for some part of their commute, not necessarily as their primary mode or on a regular basis. This statistic was determined by adding the Metrorail (30.53%), VRE (6.65%), and Bus (21.29%) mode utilization rates in Table 2-1.

Specifics indicating that the 58% is a combination of transit modes will be included in the final TMP.

Note that in contrast to the 58% survey results, the mode split as projected for the Mark Center facility is only 28% (23% rail transit/5% local bus transit) as illustrated in Table 2-4.

12. The discussion of local bus transit needs to be more comprehensive.

We believe that the transit discussion meets the needs of the TMP since the 5% projected ridership should be able to be accommodated via existing local transit service.

Recent discussions between the Army and the City of Alexandria are intended to implement the recommendations contained in Table 3-2. The final TMP will be adjusted to include all transit improvements agreed to, which will lessen the walking distance for pedestrians.

WHS will continue discussions with DASH and WMATA concerning possible route enhancements to support BRAC-133.

13. The nearest bus stop for DASH AT1 and AT2 needs to be identified in the section on DASH service.

Adjustments will be made to the final TMP to show the nearest bus stops. The AT1 and AT2 routes serve Mark Center with a stop along N. Beauregard Street near the intersection of Mark Center Drive. The bus stop on the southbound side of the N. Beauregard and Mark Center Drive intersection is 0.29 miles from BRAC-133 while the bus stop on the northbound side of the N. Beauregard and Mark Center intersection is 0.25 miles from BRAC-133. The other nearby stop is at Southern Towers which is 0.26 miles from BRAC-133.

14. The description of Metrobus service seems to indicate that they are providing direct service to the Mark Center. They are not now, and would require additional subsidy to make local bus service viable. The exact location of the bus stops needs to be clarified.

The locations of these bus stops will be clarified in the final TMP. Metrobus routes 7A and 7F provide service to Mark Center at a stop on Mark Center Drive near the intersection of Mark Center Drive and Seminary Rd, which is less than 2000 feet from the BRAC 133 towers. Metrobus route 7X (as well as 7A and 7F) also provide direct service to Mark Center with a stop along N. Beauregard Street near the intersection of Mark Center Drive. The bus stop on the southbound side of the N. Beauregard and Mark Center Drive intersection is 0.29 miles from BRAC-133 while the bus stop on the northbound side of the N. Beauregard and Mark Center intersection is 0.25 miles from BRAC-133. Other Metrobus routes (all 7's, 25B, 28A, 28G) serve Southern Towers, which although not directly at Mark Center, is 0.26 miles from BRAC-133.

15. Southern Towers does not equal Mark Center. Under the local transit section, please change the language from "serve Mark Center" to something along the lines as "stops near Mark Center", etc. The only public transit routes that 'serve Mark Center' are WMATA's 7A & 7F routes.

Adjustment will be made to the final TMP to accommodate the suggested language.

16. Fix Figure 3.5 to add missing bus routes. WMATA service needs to be updated to reflect correct current routes.

Adjustment will be made to the final TMP to accommodate these routes.

The transit routes will be verified with the City of Alexandria before inclusion into the final TMP.

17. Discussion in 3.3.2 about using public transit services to serve BRAC is encouraging.

Thank you.

18. How do they address whether a transit route is diverted into BRAC? How do they address potentially turning deadhead trips into live trips?

The TMP assumes that the 5% projected ridership can be accommodated via existing local transit service without any changes.

USACE/WHS are currently in discussions with the City of Alexandria to plan for modifications to routes in the vicinity of the Mark Center to include the new Transportation center, including the conversion of current deadhead trips into revenue trips. Actual details of route changes and procedures will be the responsibility of transit agencies to coordinate.

WHS will continue discussions with DASH and WMATA concerning possible route enhancements.

19. Will WMATA and DASH buses be extended to BRAC?

USACE/WHS are currently in discussions with the City of Alexandria and the Ad Hoc BRAC Committee to plan for the route diversions to the transportation center and the reversal of deadhead trips.

20. Map on page A-5 showing bus systems and routes within 1 mile of BRAC-13 facility is incorrect.

The map was created based on GIS data files provided by both WMATA and the City.

Adjustments will be made to show correct routes. The transit routes will be verified with the City of Alexandria before inclusion into the final TMP.

21. All of the transit improvements included in Table 3.2 should be included as part of this TMP plan.

The possible transit improvements listed in Table 3-2 are dependent on WMATA and jurisdictional action; so the TMP cannot rely on all of these potential improvements. The TMP primarily relies on the robust DoD shuttle system as described in Section 3.5.2 that provides frequent service to a number of Metrorail stations.

Recent discussions between the Army and the City of Alexandria are intended to implement the recommendations contained in Table 3-2. The final TMP will be adjusted to include all transit improvements agreed to. WHS will continue discussions with DASH and WMATA concerning possible route enhancements.

22. The transit program should include:

- a. Provide a transit store at the Mark Center Transportation Center

Currently there is no planned space for a permanent transit store at the Transportation Center. There will be a mobile commuter store present at the facility twice a week (and more often during the first three months of the building being open). The provision of a transit store is a long-term strategy that can be implemented if sufficient demand is demonstrated as stated in Section 5.5.4.

- b. Provide funding to DASH and WMATA to increase the frequency of bus routes from King Street and Van Dorn Metro station.

DoD is evaluating the potential for local and regional service providers to provide part or all of the DoD Mark Center shuttle service. Decisions will be based on efficiency and cost effectiveness. As the result of previous discussion with the City, Van Dorn is not being considered as a shuttle destination. The existing frequency of the Van Dorn Metro Station DASH routes are considered adequate for the projected demand.

- c. Provide funding to WMATA and DASH to make modifications to existing routes that currently serve the area within one mile of BRAC-133 to serve the Transportation Center.

Recent discussions between the Army and the City of Alexandria are intended to implement the recommendations contained in Table 3-2. The final TMP will be adjusted to include all transit improvements agreed to. WHS will continue discussions with DASH and WMATA concerning possible route enhancements. Decisions will be made based on whether efficiency and effectiveness gains can be achieved.

- d. Expand the Mark Center Transportation Center to include additional bus bays to accommodate the enhancements listed above.

As discussed in Section 5.5.4, expanding the Transportation Center is something that will be considered in the future if needed. The capacity of the bus bays are sufficient as according to TCRP Report 100: Transit Capacity and Quality of Service Manual. The current five bus bays also have excess capacity to support additional service.

- 23. On page 29, it shows a bus stop on Mark Center Drive (south - closer to IDA). Transit is unaware of a bus stop being installed at this location. Is this a private bus stop to be used by IDA shuttles? A bus stop at this location does not make too much sense as buses coming from that direction will access the transit center, which is just a few feet to the north/east of the shown stop. Also, there is an existing bus stop on westbound Mark Center Drive at Highview Lane.

There are currently no plans for this to be a bus stop. The bus stop location will be removed from the figure in the final TMP.

- 24. There is only one bus stop across the street from the Transit Center, not two as stated in the TMP.

There is enough space for two buses to queue, but as it is currently approved by the City, these will be curb-side stops. Adjustment will be made to clarify this in the final TMP.

- 25. Page 38, will Duke & IDA continue to run shuttles after BRAC 133 opens? If so, will these shuttles use bus bays within the transit center?

Yes, Duke and IDA currently plan to continue their shuttles after BRAC 133 opens. However, these shuttles will not utilize the Transportation Center.

- 26. The TMP should include something on paratransit services available for employees and visitors with disabilities.

Paratransit services are available to employees and visitors through WMATA and DASH. The final TMP will include a reference to this available service.

27. Include something on average commute times via transit - bus, Metrorail, VRE to – to the Mark Center from various points in the region such as from Quantico, Woodbridge, Lorton, Fairfax City, Centreville, Chantilly, Dulles, Leesburg, Bethesda, Rockville, Silver Spring, DC, Greenbelt, Largo, Suitland, Annapolis, Waldorf, and etc...

The employee Transportation Coordinator will be responsible for personalized commute assistance which can include aiding employees in determining transit options and transit commute times from their point of origin.

These transit commute time details, however, will not be provided in the TMP.

### **Shuttle Routes**

28. The section on proposed shuttle routes is preliminary. While City staff understands the shuttle bus plan will need to be revised periodically, a final draft plan should have been included in the TMP.

The shuttle plan details were not included in the draft TMP as they were not final at that time.

The plan will be finalized before the TMP is finalized. Therefore the details of the shuttle plan will be included in the final version of the TMP. The details that will be included are:

- System Service Capacity
- Number of Buses
- Headways
- Routes and Shuttle Destinations (including a Franconia/Springfield Route)
- Estimated Passengers

29. Arranging a meeting with private companies to assess provision of transit connections from areas to the south (page 36) is not sufficient. Instead, the Army should initially provide shuttle service to Lorton/Quantico, Woodbridge and Fredericksburg. Successful service to these locations will help entice the private operators to provide the transit service from these locations.

The TMP relies on existing mass transit from the South including VRE, and bus service that typically runs to the Pentagon, along with alternative modes such as carpool, vanpool, and slugging to achieve the projected the non-SOV mode split.

The DoD shuttle system described in Section 3.5.2 will provide the final leg of the trip for rail transit riders.

WHS will continue to work with private transit providers to establish more direct service to Mark Center. It is important to note that the one service currently operating to Mark Center does so via the Pentagon.

Within six months of the relocation, WHS will administer results of their surveys to private companies in order to engage them in onboard surveys to determine if there is a high enough demand to provide direct transit service before relocation (see Section 3.3.2)

30. The shuttle bus plan does not include service to Springfield Metro or Van Dorn Metro. Frequent shuttle service should be provided to these two Metro stations.

There will be service to Franconia-Springfield and this will be noted in the final TMP. As the result of previous discussion with the City, Van Dorn is not being considered as a shuttle destination. As discussed elsewhere, the existing frequency of the Van Dorn Metro Station DASH routes are adequate for the projected demand.

31. Include trip times for shuttle runs via various routes.

The shuttle schedules are not finalized at this time. Once the schedules are finalized, they will be made available to City staff.

### **Carpool**

32. Explain in more detail how the number for carpool (2.3 passengers per vehicle) is obtained and how this number ties in to the HOV-3 required on I-395.

The 2.3 passengers per vehicle is a statistic that was obtained from a number of WMATA studies. While HOV does require a 3-person minimum in carpools, HOV also permits solo drivers in hybrids as well as motorcycles, (with I-66 requiring a 2-person minimum) which drops the average from 3 to 2.3 ppv. A citation in text will be made in the final TMP to explain the source of the number and how it was developed.

### **Vanpool**

33. Page 111, short distance vanpooling will be very difficult to do/organized and is not cost effective to those that use it. What is considered "short distance?"

The Team has engaged in a number of discussions with vanpool service providers and employees who believe that short distance vanpooling could be viable due to the parking restrictions at BRAC-133 and the clustering of zip codes. For employees who live within 10 miles of the site, but who live too far from transit (i.e., zip code 22212), it may be viable to consider using a vanpool as a type of "personalized self-driven shuttle service", providing the only other door-to-door solution aside from carpooling. While carpooling can be simpler for communities with lower densities, many employees live in clusters within the same zip code, making vanpool more efficient than usual.

34. Under vanpooling, the TMP mentions that there should be outreach done to get employees that live in Maryland to use vanpools; however, the TMP fails to mention park and ride facilities in Maryland. In most cases, vanpool pickups are at park and ride facilities. This TMP should include both NOVA and Maryland park and ride facilities and their respective capacities.

The TMP discusses park and rides from around the region in Section 3.3.2 and in Appendix D, and both sections make mention of park and rides in Maryland. Utilization information for park and rides was not available for all areas.

The City of Alexandria has agreed to coordinate with other agencies to determine if additional Maryland park and ride utilization information is available. If the information is available, the City will provide this data for inclusion in the final TMP.

### **Bicycling**

35. The TMP discusses a bike station on page 118, which is an interesting idea. Has this been explored with the City?

This is a long term solution that will not be discussed with the City until it is deemed viable, as per the stipulations detailed in Section 5.9.4. If there is a dramatic increase in mode share and a business case for a bike station, the idea will be examined at that time.

36. In Section 5.9.4, “Recommended Improvements”, WHS should include consideration of whether TMP funds may be directed to transportation demand management measures including participation in regional bicycle sharing programs.

WHS will closely monitor the use of bicycles as one of its transportation demand management strategies and if the demand demonstrates a business case for participation in regional bike sharing programs, it will examine whether appropriated funds can be legally used for this purpose.

37. Procedures, rules and regulations for bike locker usage should be developed.

Bike racks, not lockers, will be provided for employees, as stated in Section 5.9.2. The reference to lockers in the TMP refers to shower and gym lockers for personal possessions, which will be open for use by cyclists.

The Transportation Coordinator(s) will develop terms of use for all transportation-related facilities, including lockers, to be included under “Codes of Conduct” in the Orientation Handbook described in Section 5.3.2.

38. The Transportation Coordinator should also act as biking coordinator to help serve as an advocate and point of contact for the biking community.

The TMP currently states that the Transportation Coordinator(s) will manage the bicycle and walk program as well as be the point of contact for bicycle advocacy and community groups (see Section 5.9.3).

39. A thorough biking safety examination of bike ways in and out of the site and around the garage should be conducted with the Biking and Pedestrian Coordinator and the TDM Coordinator to help avoid future issues.

This is a separate exercise outside of the TMP that will be conducted with the WHS Transportation Coordinator(s).

The TMP will not include details or language on the safety examination.

40. Does the site plan to host its own Bike to Work Day event separate from the Council of Governments regional bike to work day event?

The Bike to Work Day event will be the regional event sponsored by MWCOG. Section 5.9.3 discusses WHS’s planned involvement in the regional event.

41. Periodic Confident Cycling Classes that are coordinated by the Washington Area Bicycle Association should be conducted on site for prospective bike commuters.

The TMP states that bicycle training and safety classes will be conducted on-site for bicycle commuters (Section 5.9.3). The exact classes will be determined by WHS at a later date and could very well include WABA classes.

42. Each of the proposed “Bicycle Safe Routes” in Appendix E contains text encouraging potential bicycle commuters to travel on “sidewalks” or “bicycle-designated sidewalks.” In Alexandria, city code Sec. 10-7-4 says that “no bicycle shall be operated on any sidewalk in city, except such sidewalks or portions thereof which city council shall by resolution designate as bicycle routes.” For this reason, bicyclists should not be directed to ride on sidewalks in the City. In Virginia, a bicycle is considered a vehicle when ridden on roads and streets and Sec. 46.2-904 allows localities to prohibit bicycles from using sidewalks, although this must be done with conspicuously posted signs. The City completed a Bicycle Level of Service analysis for the existing on-street bikeway network which

grades roadways (A-F) for bicycle use. A map of current Bicycle Level of Service in Alexandria is online here >>

[http://alexandriava.gov/uploadedFiles/localmotion/info/gettingaround/Fig15Bicycle\\_Level\\_Of\\_Service.pdf](http://alexandriava.gov/uploadedFiles/localmotion/info/gettingaround/Fig15Bicycle_Level_Of_Service.pdf)

Adjustments will be made to remove any instances of the word “safe” and to remove language referring to the use of sidewalks by bicycles.

### **Pedestrian**

43. In Section 3.2.4 “Pedestrian Access Facilities” , any references to off-site improvements that are not currently proposed for improvement as part of the site planning should be coordinated with proposed pedestrian improvements in the City’s 2008 Pedestrian and Bicycle Mobility Plan >>  
<http://alexandriava.gov/localmotion/info/default.aspx?id=11418>

Any off-site improvements included in this diagram are those that have already been approved by the City. The sidewalk plans for the offsite road improvements (along Seminary, Beauregard, and Mark Center Drive) were part of an offsite road package submitted to the City, and therefore were reviewed extensively by City staff prior to City signoff of the plans. On-site sidewalks (the walks around the north parking garage and round-a-bout), were not subject to formal City review; however, the entire site, landscape, and pedestrian circulation plan was reviewed with City Planning staff as part of BRAC 133 design coordination.

### **Telecommuting**

44. The Draft TMP includes almost no discussion about telecommuting. More thorough treatment is needed.

Section 5.8.3 of the TMP presents a 1-page discussion on telecommuting at BRAC-133.

The City has indicated they will provide additional steps for ensuring telecommute goals that will be provided to the BRAC 133 Team for inclusion in the TMP. USACE/WHS will review these procedures for compliance with DoD protocol and determine which steps (if any) are applicable and can be included in the final TMP.

45. For mid day trips, include something on video conference meetings via a conference room, laptop, notebook, smartphone, etc. to reduce the number of trips needed during the mid day (if feasible).

Adjustments will be made to the final TMP to accommodate this language.

### **Slugging**

46. Need more specifics regarding how slugging will occur. How will they deal with no HOV off ramp at Seminary and I-395?

Slugging is an informal commute mode and is therefore difficult to predict. How slugging is expected to occur is discussed in Section 2.3 under “Slug” and in Section 3.4.

47. The 3% for slug in the anticipated mode split is high for several reasons: there is only 140’ of dedicated space for slugs; the nearest HOV entrance going southbound is 2.5 miles away, and the nearest HOV exit going northbound is at Franconia Springfield and the Pentagon; individuals in Fairfax, Burke, West Springfield, Springfield areas working at BRAC 133 using I-495 to access I-395

will have little incentive to slug as they will not be able to take advantage of the HOV unless they plan to drive to the Pentagon and turn around. Is it safe to assume that traffic going southbound on I-395 in the AM peak will increase as more people will be traveling to places such as BRAC 133, Fort Belvoir, the EPG, Springfield, etc. Also, one must have a permit to park in order to slug from BRAC 133.

See response to comment #1 above.

48. On page 15, the TMP mentions The Native Slugs of Northern Virginia study shows that 65 percent of sluggers travel to work anywhere from 10 minutes to greater than 30 minutes beyond the slugging drop-off point. Once dropped off, sluggers then either walk, bike, or take transit to get to their employment destination. Is this a correct assumption or is the assumption that people that are taking slugs will then drive 10 to 30 minutes more to their place of employment? Also within that particular study, the change of employment location was one of the main reasons why people decided to make a change to another mode other than slugging. Was this factored into the 3% for slug?

It has been verified that the above assumption is correct. As discussed on page 26 of that report, 65% of sluggers do travel an additional 10-30+ minutes from their slugging drop off point, be it via rail or bus, or even driving as 1/3 of the respondents to that survey represented drivers.

Yes, this study found that change of employment location was a reason for changing to a different mode, but this was a hypothetical question and likely most respondents answered the question with the thinking that a change in work location could involve a variety of complex changes such as taking a job that was not in the region, that was too far from the slugging drop off point, or that does not have transit connections. This will not be the case at BRAC 133 as shuttle service will be available to a major slugging drop off point, the Pentagon.

49. Employees with parking permits that drive slugs to the Pentagon or other drop off points would still require a parking permit at the Mark Center and would still impact the local roads and community. These should be included as part of the percentage of SOV trips, as they have the same impact as SOVs.

Slug trips are included in the traffic analysis of total trips to the site, but the slug drivers were not considered as part of the SOV commuters since slugging is a recognized alternate commute mode.

50. Slugs that arrive at the Pentagon and then take the DoD shuttle should be included in the transit percentages, not in the slug percentages.

Slugs who ride to the Pentagon and then take the DoD shuttle should be reflected in both the slug numbers and in the shuttle numbers. The final version of the TMP will be updated to reflect the final shuttle plan and will include these slugs who ride the shuttle. To be conservative it will be assumed that no slugs get a ride directly to Mark Center so all have to ride the DoD shuttle.

51. If employees are able to arrive by slugging, the vehicle they arrive in for drop-off (if not a BRAC permitted vehicle) eliminates the need for parking, but still impacts the local road system and community.

See response to comment #4 above.

52. The location of the dedicated slug lanes / off peak taxi stand adjacent to the transit center / parking garage may cause issues with traffic leaving the garage, those making right hand turns onto Mark Center Drive, and with buses making right turns to access the transit center.

Usage of the slug area is difficult to predict at this time and will likely change over time. WHS will observe operations over time in and around the Transportation Center and the slug area and they may choose in the future to alter shuttle routes or move the slug area to a different location.

### **Taxis**

53. Under Slug Lines & Taxis, nothing is mentioned about taxis.

An adjustment will be made to correct this in the TMP.

54. The TMP needs to expand on the plan to integrate taxi service at the facility.

Section 5.7 describes the plan to integrate taxi service during the off-peak. An adjustment will be made to describe this earlier in the final TMP.

### **TDM Plan**

55. The branding of the WHS TMP should be strongly linked and subsidiary to Local Motion.

As discussed in the TMP, the Transportation Coordinator(s) will liaise with the City of Alexandria, VA's Employer Services Outreach Specialist in order to become familiar with the City's "Local Motion" program and its associated employer commuter services, both prior to the building opening and quarterly thereafter to maintain coordination with the City and receive updated information on City and community transportation programs (see Section 5.2.2). The program will be branded as the WHS Transportation Management Program and will therefore not be linked as a subsidiary of the Local Motion Program.

56. All employees should be enrolled in the WHS TMP.

The intent is to have all BRAC-133 employees enrolled in the program.

57. The employee orientation materials and handbook should include information on Local Motion and bicycle maps.

As described in Section 5.2.1, the WHS Transportation Management Program Office will house various materials including information on transportation programs in the region and bicycle maps.

58. There appears to be no mention of ongoing and/or regularly distributed forms or marketing and promotion, i.e. a webpage or website, newsletter, etc.

Every subsection within Section 5 of the TMP includes mention of ongoing marketing and web updates.

59. A contractor should be hired to assist with marketing, outreach, and promotional events

This is part of the responsibilities of the Transportation Coordinator (see Section 5.2.2).

60. The Site should reach out to the Patent and Trademark Office in Alexandria and the EPA buildings located in Arlington Potomac Yard to glean information on TMP/TDM best practices, successes, and failures.

In developing the TMP the team has gleaned information from multiple City and other agency TMPs. WHS will liaise with other agency Transportation Coordinators moving forward.

61. Relationships should be created and maintained with the following organizations:

- a. VPSI (area's largest vanpool provider for federal agencies),
- b. Commuter Connections
- c. the Virginia Department of Rail and Public Transportation (VA's TDM agency),
- d. Bike/Walk Alexandria,
- e. WABA,
- f. [www.slug-lines.com](http://www.slug-lines.com),
- g. Telework!VA
- h. Association for Commuter Transportation

WHS has existing and ongoing relationships with most of the organizations listed above. The Transportation Coordinator(s) will have the responsibility for liaising with any and all regional transportation resources as necessary to manage a successful program.

62. There should be some sort of cash-out option for those that use alternative modes of transportation other than transit, including a provision for a mix and match program option for those that use multiple types of alternate modes.

The only Federal benefit for alternative modes of travel is the Federal transit subsidy. It's believed that restrictions on its use are well-defined and understood.

### **Transportation Coordinator**

63. Local Motion is the City's TDM Program, so it should be explicitly stated that a close relationship between the Transportation Coordinator and the program will be essential.

Section 5.2.2 of the TMP currently states that the Transportation Coordinator will liaise with the City's Local Motion Program.

64. The Transportation Coordinator (TC) should be required to become a member of the Association for Commuter Transportation (ACT). ACT is the TDM industry's largest trade association and it supports individual mobility management professionals and organizational members in their efforts to reduce traffic congestion, conserve energy and improve air quality.

WHS will consider requiring their Transportation Coordinator to join ACT.

65. The TC should be required to attend any employee orientations that the tenants have to discuss the all TDM programs and services and transportation alternatives to driving alone.

The TMP currently states that the Transportation Coordinator(s) will enroll new employees into the WHS Transportation Management Program and assist them through educational orientation materials in making a decision on the most feasible commute for them (see Section 5.2.2).

The TMP also states throughout Section 5 that the Transportation Coordinator is in charge of organizing all employee orientations and that these orientations will be run specifically to discuss transportation options and TDM programs.

66. The TC should be required to regularly attend the regional Commuter Connection and Council of City Government planning meetings and trainings.

WHS will continue to attend and actively participate in regional transportation forums.

This language will be included in the final TMP.

### **Commuter Store**

67. The site needs to have a staffed permanent transportation center/transit store.

Currently there is no planned space for a permanent transit store at the Transportation Center although there will be a mobile commuter store present at the facility twice a week (and more often if possible during the first several months of the building being open). The provision of a transit store is a long-term strategy that will be implemented if there is a rise in transit use and/or use of the Transportation Center whereby expansion will be necessary, as stated in Section 5.5.4.

68. It will be very difficult to secure the Mobile Commuter Store twice a month let alone twice a week due to both price and capacity. Further definitive discussions with the Mobile Commuter Store need to occur and the inclusion of the Mobile Commuter Store in the TMP should be adjusted accordingly.

WHS has been and will continue having discussions regarding this topic. The intent is to have the Mobile Commuter Store present at Mark Center twice a week.

### **Transit Subsidy**

69. Are Metro Fare Cards in the denominations of \$1, \$5, \$10, and \$30 available as indicated in 5.5.1(ii)a? The WMATA site seems to only list \$10 and \$20.

Yes, Metro fare cards are in denominations of \$1, \$5, \$10, and \$30 as indicated in the TMP.

70. With the SmartBenefits program and the IRS mandate that begins on 1/1/2010, will Metro farecards still be distributed? Does DoD need to comply with the IRS mandate for SmartBenefits / the federal transit subsidy program? If so, the language on the distribution of farecards should be changed.

Additional information including appropriate regulatory references are needed to respond. DoD programs comply with appropriate laws.

### **Ridematching**

71. In response to purchasing ridematching software, Commuter Connections, a regional network of transportation organizations coordinated by the Metropolitan Washington Council of Governments, has a very comprehensive ridematching database that can be accessed online and used by BRAC-133 commuters.

The Team agrees and is aware of this option-however, due to the nature of work and to protect the identity and privacy of employees, an internal ridematching software is still preferred and will be made available in addition to regional ridematching programs. Part of the Transportation Coordinator(s)' responsibilities is to make all regional and local ridematching programs known to employees, as stated in Section 5.6.1, item iii; however, it is up to the employee to decide which ridematching database to utilize.

### **Carsharing**

72. The City's carshare incentive program, Carshare Alexandria program needs to be mentioned here to help incentivize employees to use the lone Zipcar in the immediate area.

An adjustment will be made to the final TMP to include this incentive.

73. Hertz Connect, a new Carsharing company in the area should be contacted about the possibility of adding a car on site.

Section 5.7.1 of the TMP states that there will be a demand analysis done for obtaining additional car-sharing vehicles. The vendor would be determined at that time.

### **Parking**

74. Information on how many ADA parking spaces will be provided in each garage should be provided.

All 48 employee ADA parking spaces will be located in the South Garage in order to be located within shortest walking distance to building entry.

Three additional visitor parking spaces will be ADA spaces in the North Garage.

Adjustment will be made to the TMP to indicate the location of the spaces

75. Information on how many carpool and vanpool parking spaces will be provided in the north parking garage should be provided.

The TMP states that all 320 carpool and vanpool parking spaces will be provided in the North Garage (see Section 5.4.2).

76. Carpool and Vanpool parking spaces should be provided in their South parking garage.

With the primary security checkpoint being located in the South Garage, it is more favorable for carpools and vanpools that are carrying multiple employees to save time by parking in the North Garage where security checkpoint queuing can be avoided, as stated in Section 5.4.2. It should also be noted that the North Parking Garage meets LEED Gold requirements for proximity to building entrances.

77. What is the definition of “preferential” when referring to parking for car and vanpools?

“Preferential Parking” is a TDM term synonymous to “priority parking”. “Preferential Parking” indicates spaces that give specific parking privileges to carpool/vanpool permit holders (i.e., guaranteed parking space, parking close to the entrance of the worksite, parking near the “fastest way in and out”, etc.).

78. It should be noted that spots for electric cars at the EPA Arlington/Potomac Yard building have not been utilized once since the building was constructed 4 years ago.

Noted.

79. Signatures of the primary driver’s supervisor should be required for carpool and vanpool priority parking applications.

PFPA PMB is the supervisory organization that manages and distributes carpool/vanpool spaces (as stated in Section 5.4.2). Upon PFPA PMB review of the application, PFPA PMB will authorize priority parking applications.

80. The discussion/comparison of flex-time parking between the 2003 Mark Center TMP and the BRAC-133 TMP is confusing and should be further explained. For example, explain why “the BRAC 133 TMP is not able to guarantee flex-time parking for employees” and the impact of that practice on the parking.

Currently over 40% of employees work a flexible work schedule and the TMP has goals to increase this participation rate by an additional 25%, which would mean that 65% of employees would be guaranteed a

parking space. Guaranteeing parking for flex-time employees may result in an increase in SOV mode of travel.

- Additionally, this TMP strategy only works if there is not a one-to-one permit process in place, as the flex-time parking in the 2003 TMP was only temporary and was lifted after 10am. Not having a one-to-one permit process would result in spillover parking.
- Language will be included in the final TMP to explain this.

81. Address how BRAC-133 is going to address overflow parking in public and private areas. The TMP should make provisions for providing gates for lots, etc when an overflow parking problem occurs due to BRAC employee parking.

The BRAC 133 TMP and its managing entities will not be responsible for managing overflow parking outside of BRAC 133 property and garages. As stated in Section 5.4.3, it will be the responsibility of neighboring properties to mitigate overflow. This section of the TMP notes strategies that are currently in place or that are in the works, and suggests strategies that neighboring properties can implement in order to mitigate the effects of spillover parking.

82. The TDM plan calls for 48 disabled parking spaces in the parking facilities. What is the plan if more than 48 employees qualify for a disabled spot? Will the disabled employee be required to have a state-issued disabled license plate or placard?

48 spaces were provided per ADA requirements. As is the legal requirement for all disabled parking spaces, a disabled license plate and/or placard must be displayed to parking in a disabled parking space.

In the event more than 48 employees require reasonable accommodation in the form of a disabled parking space, WHS will comply with the law and make adjustments to the parking plan as required.

83. Will the government vehicle parking include on-site vehicles as well as employees with take-home government vehicles? What is the number of take-home government vehicles among the combined tenant organizations?

It is not known at this time how many government vehicles will be take-home vehicles, but it is not expected to be significant.

84. Section 3.6.2 states that the many park and ride lots have excess capacity. Which of the park and ride lots are underutilized? How will this information be distributed to the commuting population?

Appendix D indicates capacity and utilization for a number of Northern Virginia park and ride lots. Capacity and utilization information was not available for all park and ride lots. This information will be distributed in the Orientation Handbook described in Section 5.3.2

85. A reference is made to free parking. The Army needs to provide the proper legislation that negates Circular No. A-118, dated August 13, 1979, in which the Executive Office of the President, Office of Management and Budget (OMB) announced the establishment of a Government-wide policy dealing with Federal parking facilities. According to OMB, a basis for charging for the use of parking facilities needed to be established which was equitable among employees and consistent with related policies regarding air quality, energy conservation and reduced traffic congestion.

As a matter of policy, DoD will not be charging employees for parking and has discussed this with the City of Alexandria. The limited parking availability at BRAC-133 along with the extensive TDM program will provide significant incentive for employees to use non-SOV modes of travel to the site.

86. Section 4.5.2 mitigation effort number 8 states that some government vehicles may be made available for mid-day travel to off-site meetings. This language should be strengthened to say government vehicles will be provided, so that SOV trips due to midday off-sites will be discouraged.

Not all government vehicles will be available for employee travel use so the suggested change is not valid. It should be noted that DoD is planning on shuttle service throughout the work day for official travel.

87. Criteria for issuance of a parking permit should be established and consistent throughout tenant organizations.

Criteria for issuance of a parking permit will be up to the operating procedures and parking policies of each individual tenant organization. PFPA will not control these policies and procedures.

### **Traffic Impact Analysis**

88. The findings and recommendations included in the traffic analysis section are not reliable as the traffic micro-simulation models were not properly calibrated.

Document is being revised to include model verification details that replicate existing AM and PM peak field conditions. The volume throughputs and representative queue data that were used to verify the existing AM and PM peak hour models will be provided.

The document will also be edited to clarify that these existing models were used in the development of the 2011 models and CORSIM default value assumptions.

The calibration data will be appended to the final TMP.

89. What do the recommendations from the TIA add to a TMP? Is the analysis and suggestion of recommendations appropriate for this type of document?

Recommendations based on the TIA were not required; however, this section was added to accommodate all feasible recommendations made by the BRAC Advisory Group. In this section the team also took the liberty of adding additional recommendations based on the results of the analysis which should inform ongoing analysis of future transportation improvements under consideration.

The title of this section (Section 4.4.9 Recommended Solutions) will be adjusted to have softer language and will remove the term recommendations and will take on a title such as "Suggestions that require further consideration/study". Emphatic language will be added indicating that these solutions require additional analysis and resources.

Adjustments will be made to the final TMP to clarify this.

90. The CORSIM study area used for the analysis was very limited. The limitations in the study area reduce the validity of the transportation analysis.

The traffic study included as part of the TMP is a Traffic Impact Analysis (TIA) for the proposed development and therefore includes the roadway network only within the proposed development and in the surrounding area that is immediately affected by the development within the City of Alexandria. This study area is also consistent with other traffic reports developed for the Mark Center site.

This TIA study is not similar in nature to VDOT Interchange Justification Report (IJR) which focuses on the I-395 corridor and the adjacent interchanges within the region, and hence should not be compared to the BRAC 133 TMP. The IJR was developed for FHWA to justify the improvements to the interchanges on I-395. Therefore, the study area used is appropriate for the type of traffic analysis that was performed for the BRAC 133 site. It conforms to methodologies recommended by the Institute of Transportation Engineers (ITE) and industry standards.

The results of the traffic impact analysis are valid for the key internal roadway intersections.

91. Other On-Going Study Improvements (page 92): VDOT is also doing a detailed operational assessment of short-term improvements.

Adjustment will be made to the final TMP to accommodate this language.

92. Page 22 refers to the HOV lanes in I-395 serving Seminary Road. Clarification is needed on whether there an exit or entrance from northbound or southbound HOV lanes, and if not, where the closest access would be for entry to or exit from the HOV lanes.

Adjustment will be made to the final TMP to accommodate this language.

93. Section 3.2.1 refers to providing a “concrete barrier obstruction”. This needs to be replaced with “physical barrier.”

Adjustment will be made to the final TMP to accommodate this language.

94. The study conclusion in Section 4.1.9 discusses the effect of turn lane improvements on the PM peak hour, but did not address the AM peak hour.

Adjustment will be made to the final TMP to accommodate this language.

95. Section 4.4.8 needs to specify locations where the short distance merges are projected to cause traffic operational problems as referenced under “Other Concerns”.

Adjustment will be made to the final TMP to accommodate this language.

96. The recommended roadway improvement number 4 in Section 4.4.9, “Provide a direct HOV access ramp from I-395 south to Seminary Road” is already in existence.

DoD is aware that this recommendation for constructing a direct HOV access ramp is being examined by VDOT and the City of Alexandria.

An adjustment will be made to the final the TMP that will clarify that this is an existing recommendation that is currently being examined; however, it is an improvement that needs to be not just studied, but implemented.

97. Include analysis for Recommended Intersection Improvement No. 1 in section 4.4.9.

A figure representing the proposed improvement has been appended to the report. This is a suggested recommendation with spot analysis only. Additional corridor wide analysis is required to validate this solution.

Language will also be adjusted to indicate that this improvement is not a recommendation but a solution for further consideration.

98. The Recommended Traffic Control Improvements No.1 in section 4.4.9 has been completed.

Adjustment will be made to the final TMP to accommodate this language.

99. Signage on private streets as suggested in Recommended Internal Circulation Improvements in section 4.4.9 should be coordinated with property owners.

Proposed signage is only along Seminary Road at I-395 ramp traffic merge and diverge locations and internally within the Mark Center site. No signage has been proposed along private streets. Adjustment will be made.

100. Section 4.5.1 should include in its list of improvements being made by the Army the increase in number of buses on King Street to King Street Station.

The City of Alexandria has instructed USACE/WHS not to respond this comment.

### **Reporting**

101. In order that the City and the DOD can continue to be partners in adjusting the TMP to minimize the impact of BRAC-133 on adjoining neighborhoods, a regular method of reporting information to the City, which the DOD is promising to collect, should be established in the TMP document.

As stated in Section 6.2, copies of evaluation reports will be provided to the City as they are available.

Language on reporting frequency will be added to the final TMP.

102. The State of the Commute Report needs to be shared with the City of Alexandria. The TMP should state such within the document.

The “State of the Commute Report” is the same as the Evaluation Report described in Section 6.2 whereby the City does receive a copy of the report. Adjustment will be made to the TMP to clarify this discrepancy.

103. On page 120, indicate that an Evaluation Report will be submitted to the City of Alexandria every six months.

The City will be provided an evaluation report twice in the first year, and annually thereafter.

An adjustment will be made to the final TMP to clarify this.

104. The TMP should address what steps will be taken if goals are not met. The TMP should also address what the reserve plan is if the goals are not met.

We are confident in the abilities of WHS to meet the goals of the TMP given that the DoD shuttle system will provide such extensive service with capacity for 40% of the building population, combined with the fact that the building will have such limited parking available, and finally given that WHS will be implementing a variety of other comprehensive TDM strategies. WHS will be evaluating achievement of goals over time (and formally with each Evaluation Report), and will be setting new goals over time based on findings.

The final TMP will include language that will demonstrate examples of how goals will be assessed and rectified if not met, (i.e., if transit ridership goals are not met, WHS will reexamine the DoD shuttle plan and make changes to increase ridership, etc.)

### **Funding**

105. Provide information on funding for implementation of TDM strategies. For example, amount available for implementation, annual monies available for operations, etc.

The TMP will include language that DoD is programming for funding to fully support TDM strategies, including the robust shuttle system described therein.

# Appendix B

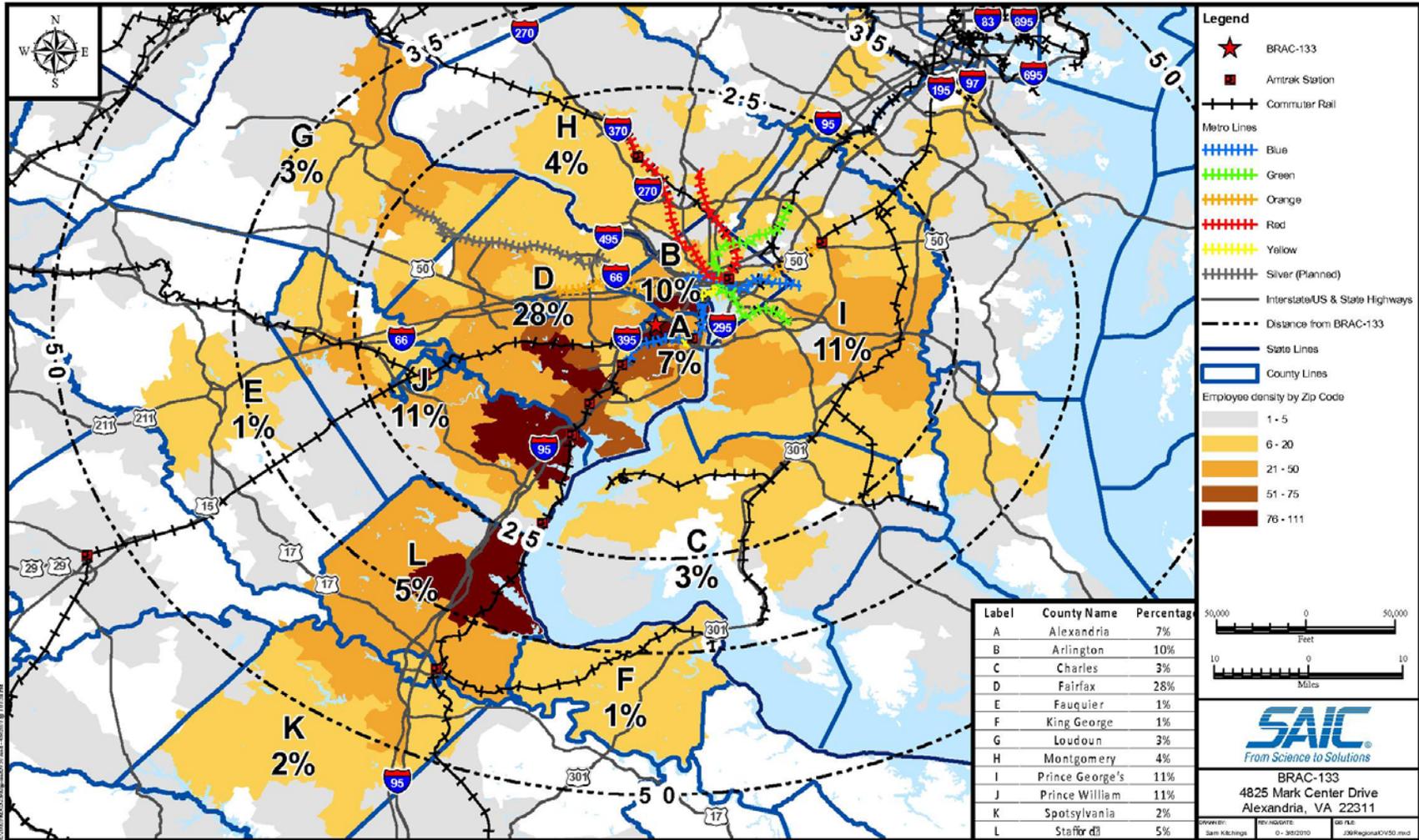
## Zip Code Analysis

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## Part I: Actual Population

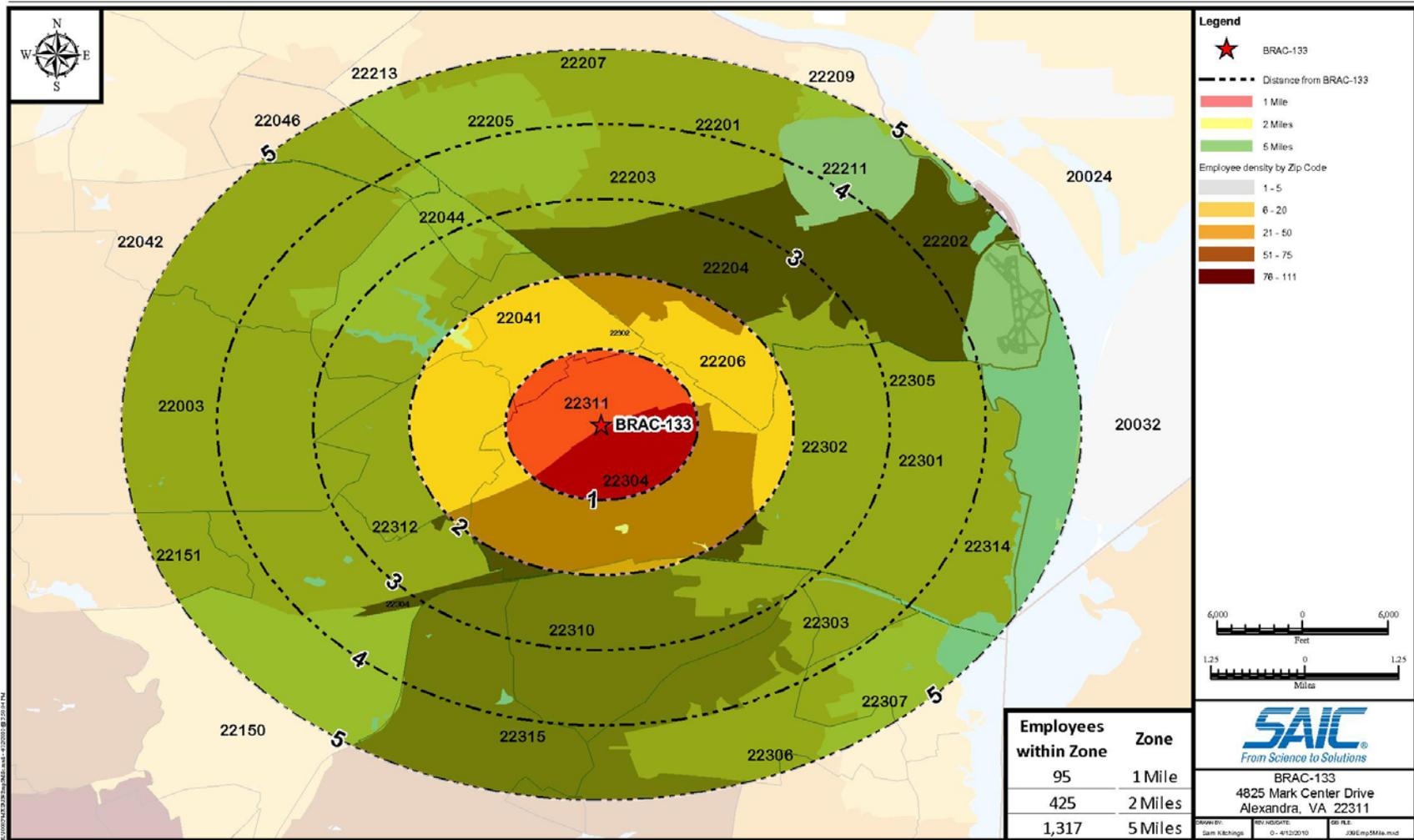
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- NOTE:
- <sup>1</sup> BRAC 133 FEDERAL EMPLOYEE POPULATION ZIP CODE DATA PROVIDED BY DOD DEPARTMENT OF HUMAN RESOURCES RECORDS
  - <sup>2</sup> DATA ACCOUNTS FOR 69 PERCENT OF TOTAL BRAC 133 POPULATION
  - <sup>3</sup> DATA DOES NOT INCLUDE ZIP CODE DATA FOR CONSULTANTS/CONTRACTORS
  - <sup>4</sup> GIS DATA PROVIDED BY ESRI
  - <sup>5</sup> TRANSIT DATA PROVIDED BY WMATA & CITY OF ALEXANDRIA



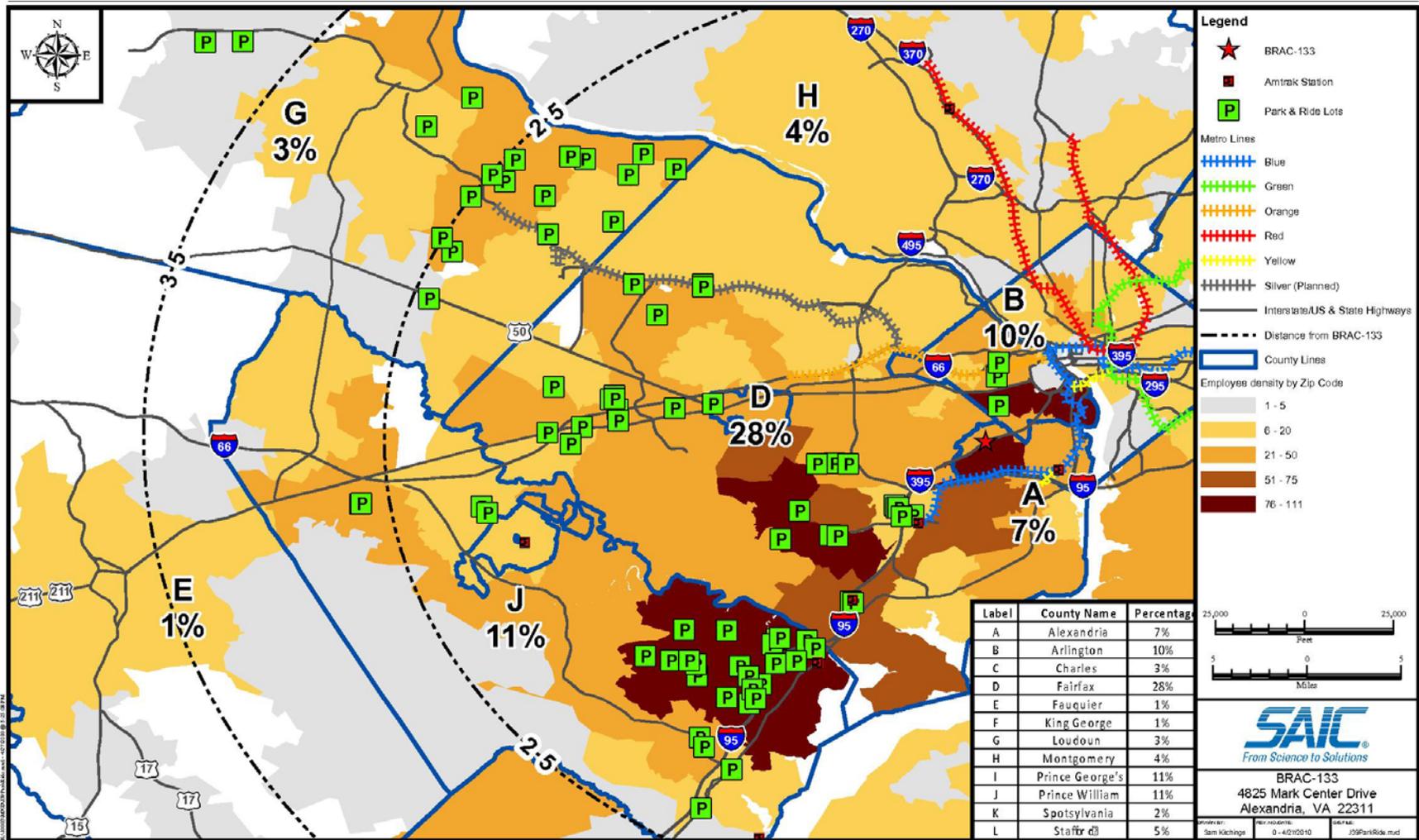
Location of Core Employee Population Density

APPENDIX B – ZIP CODE ANALYSIS



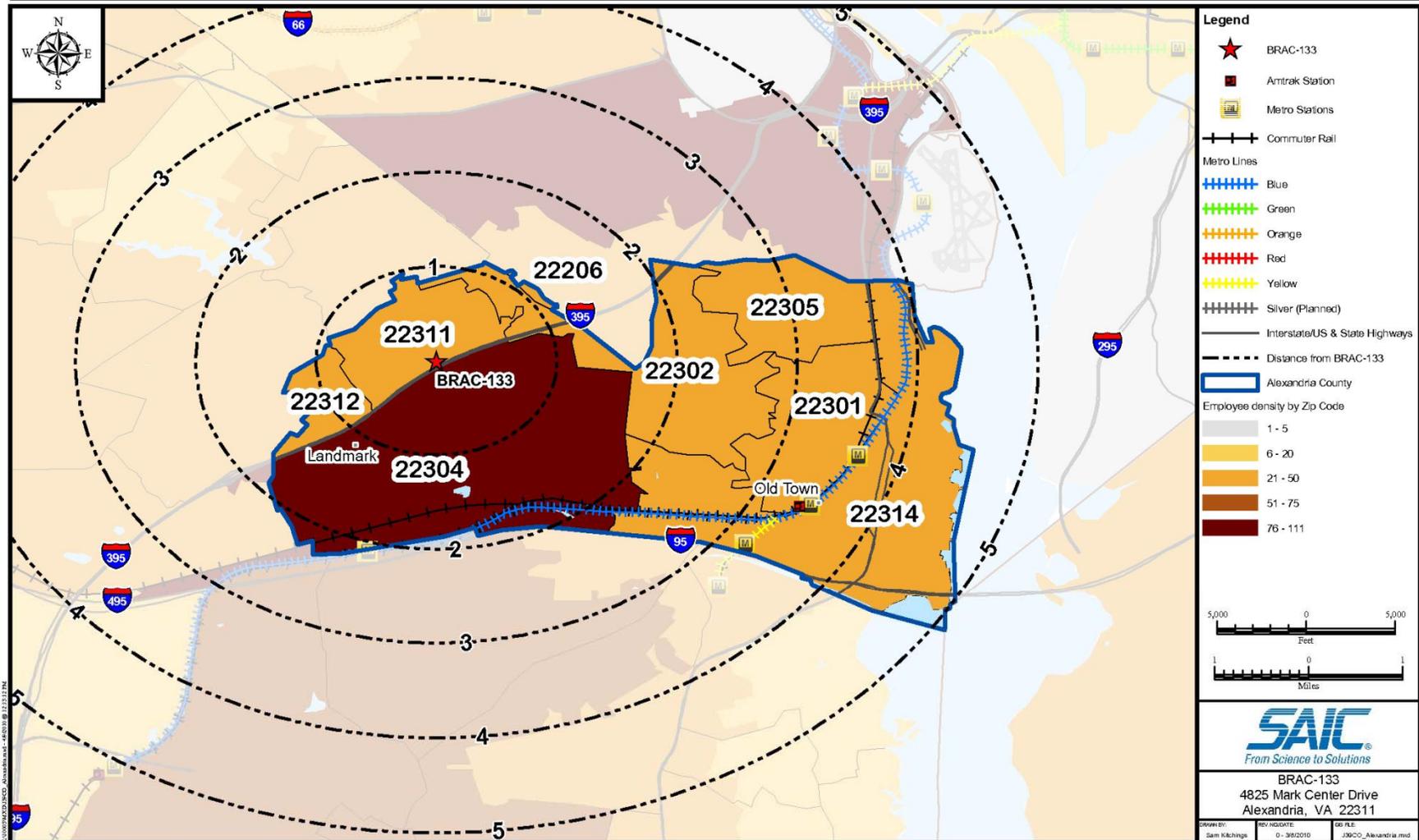
Employees within 5 Miles of BRAC-133

# TRANSPORTATION MANAGEMENT PLAN FOR BRAC 133 AT MARK CENTER



Northern Virginia Park and Ride Lots, Source: VDOT

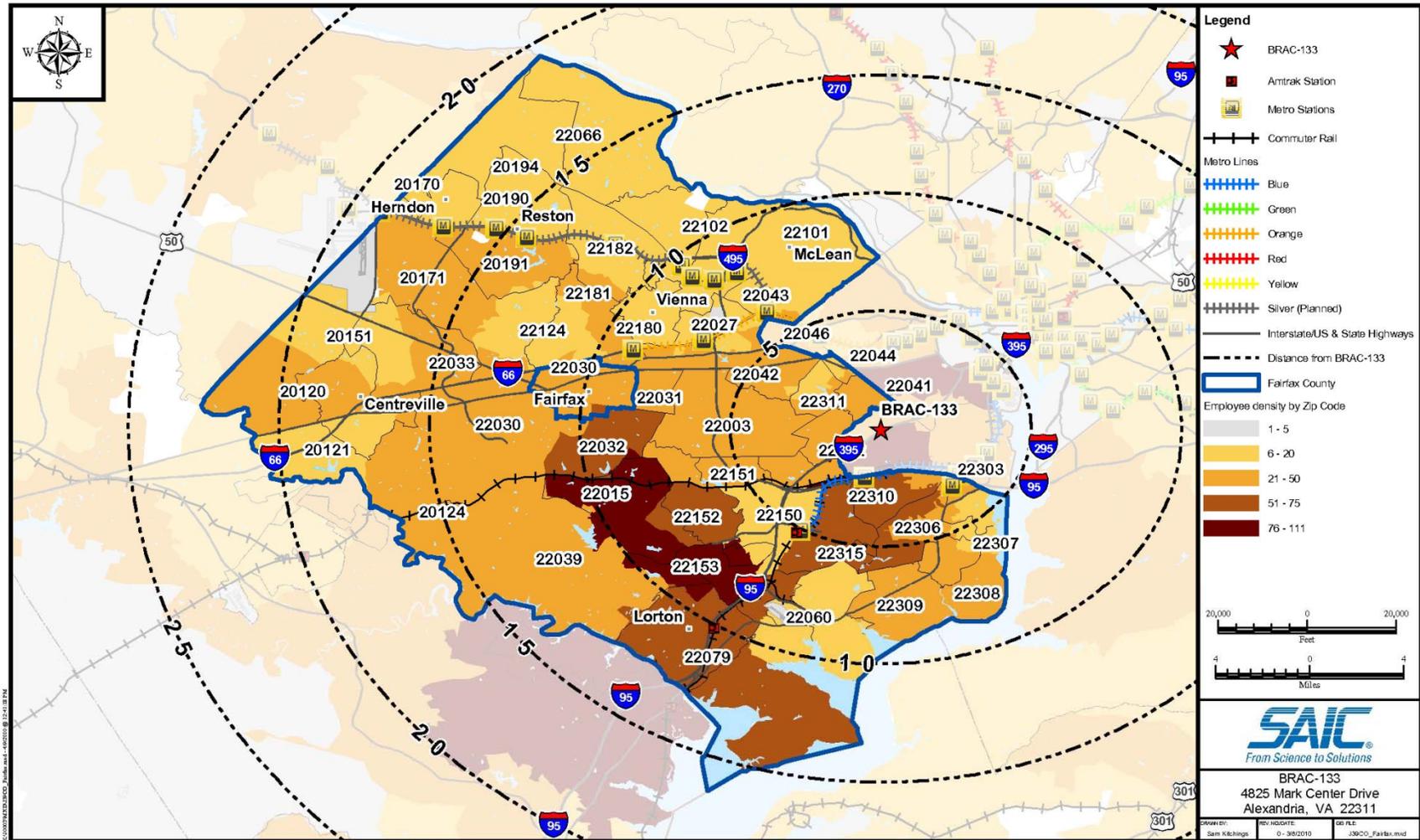
APPENDIX B – ZIP CODE ANALYSIS



Employee Population Density by Home Zip Code – City of Alexandria



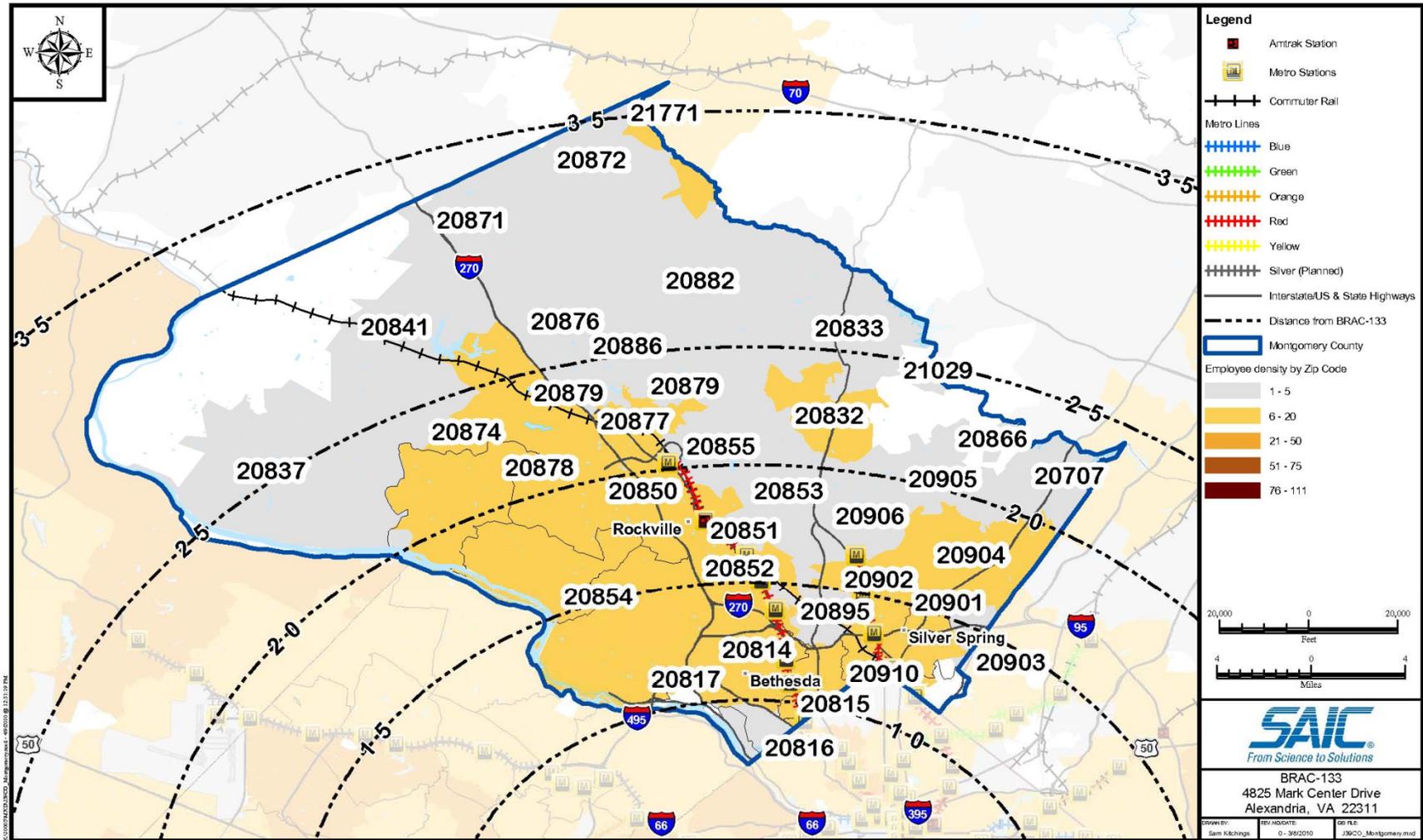
APPENDIX B – ZIP CODE ANALYSIS



Employee Population Density by Home Zip Code – Fairfax County

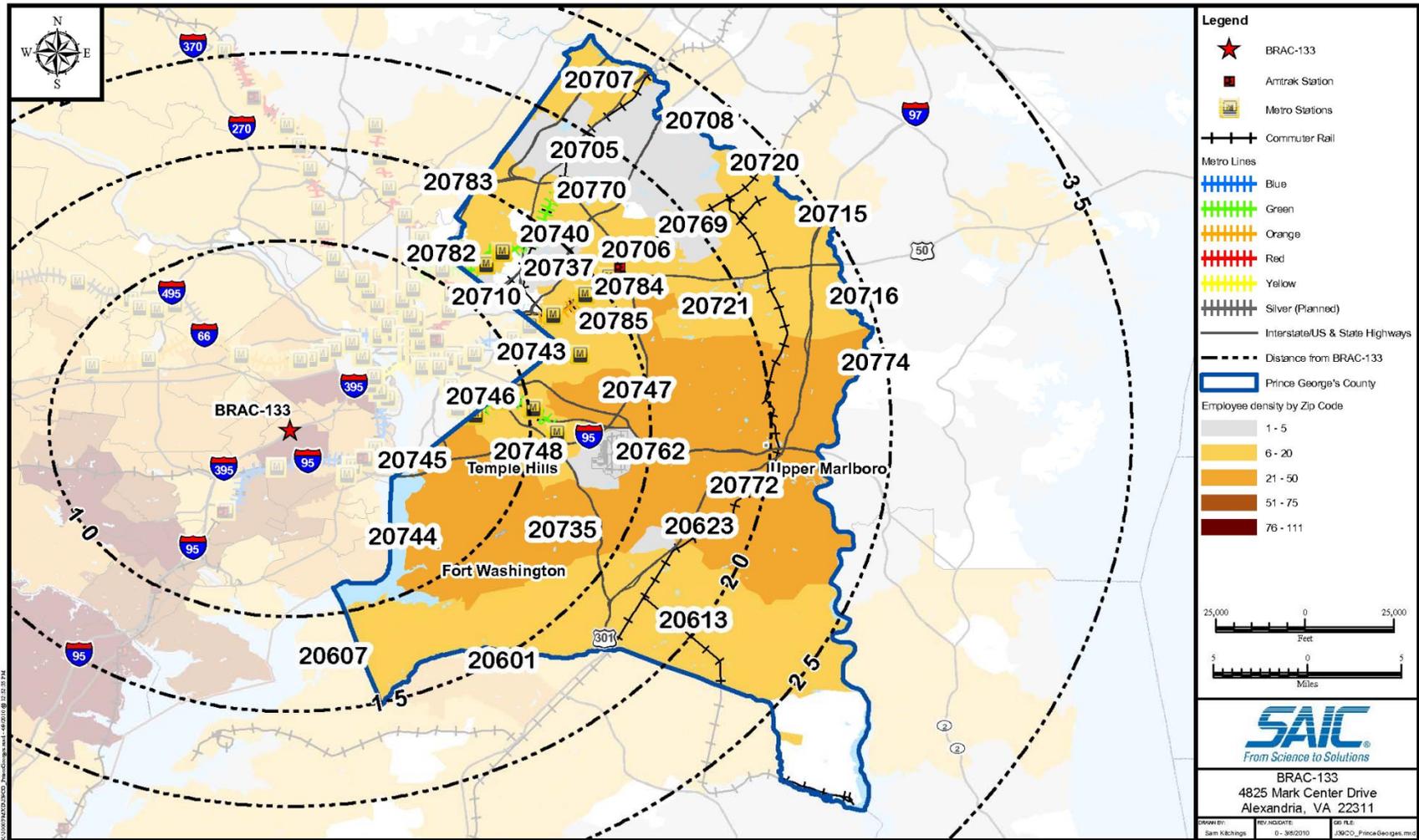


APPENDIX B – ZIP CODE ANALYSIS



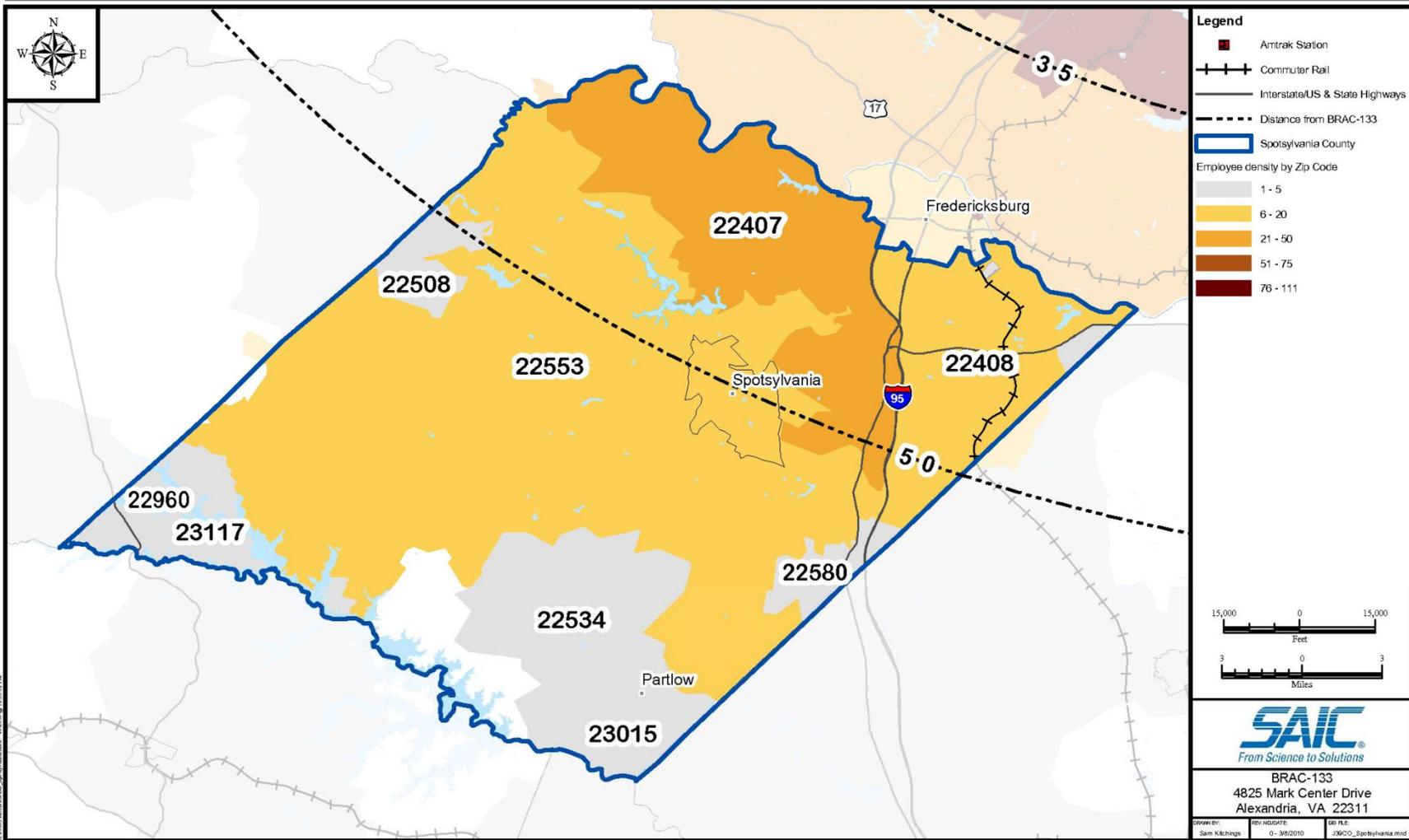
Employee Population Density by Home Zip Code – Montgomery County

TRANSPORTATION MANAGEMENT PLAN FOR BRAC 133 AT MARK CENTER



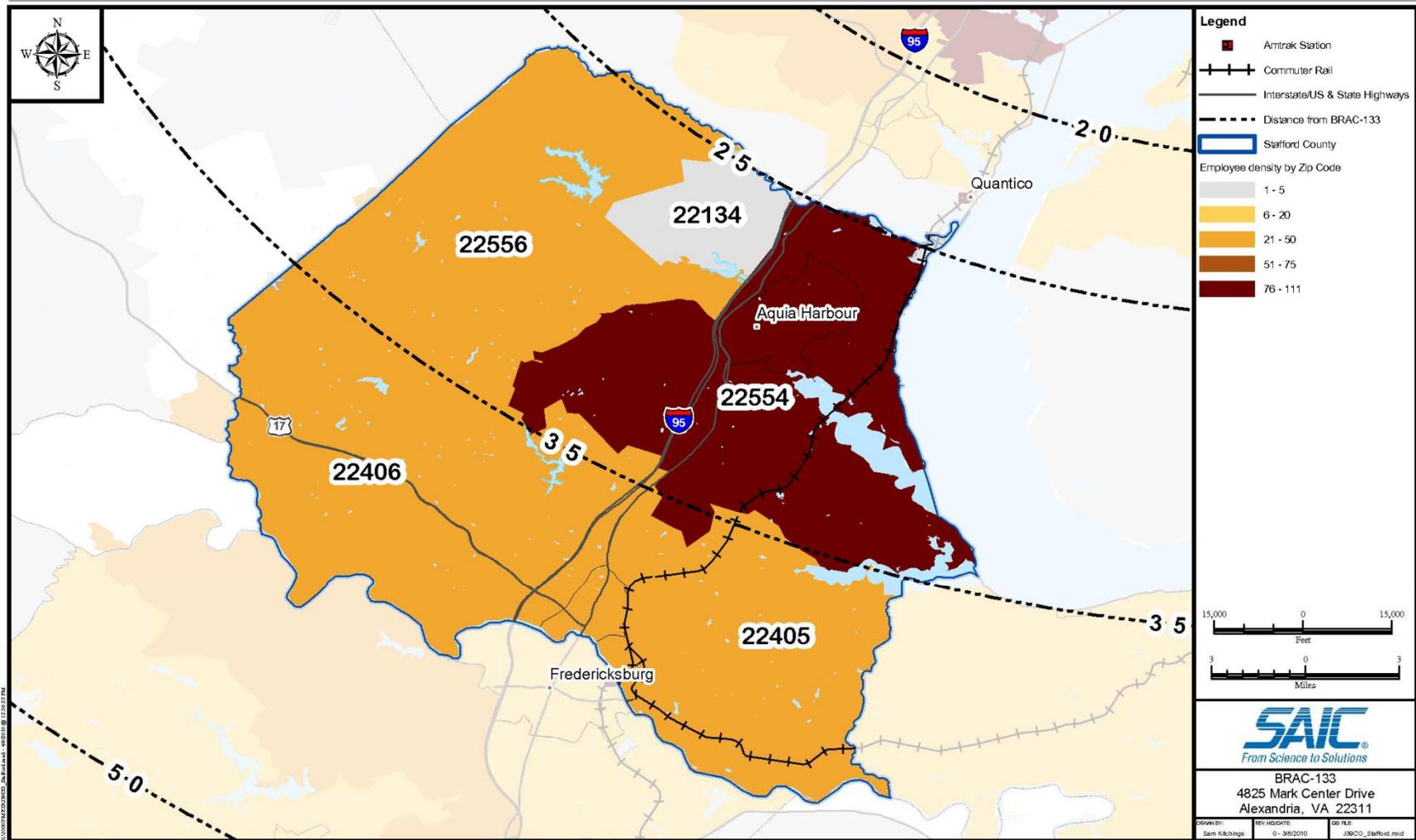
Employee Population Density by Home Zip Code – Prince George's County





Employee Population Density by Home Zip Code – Spotsylvania County

APPENDIX B – ZIP CODE ANALYSIS



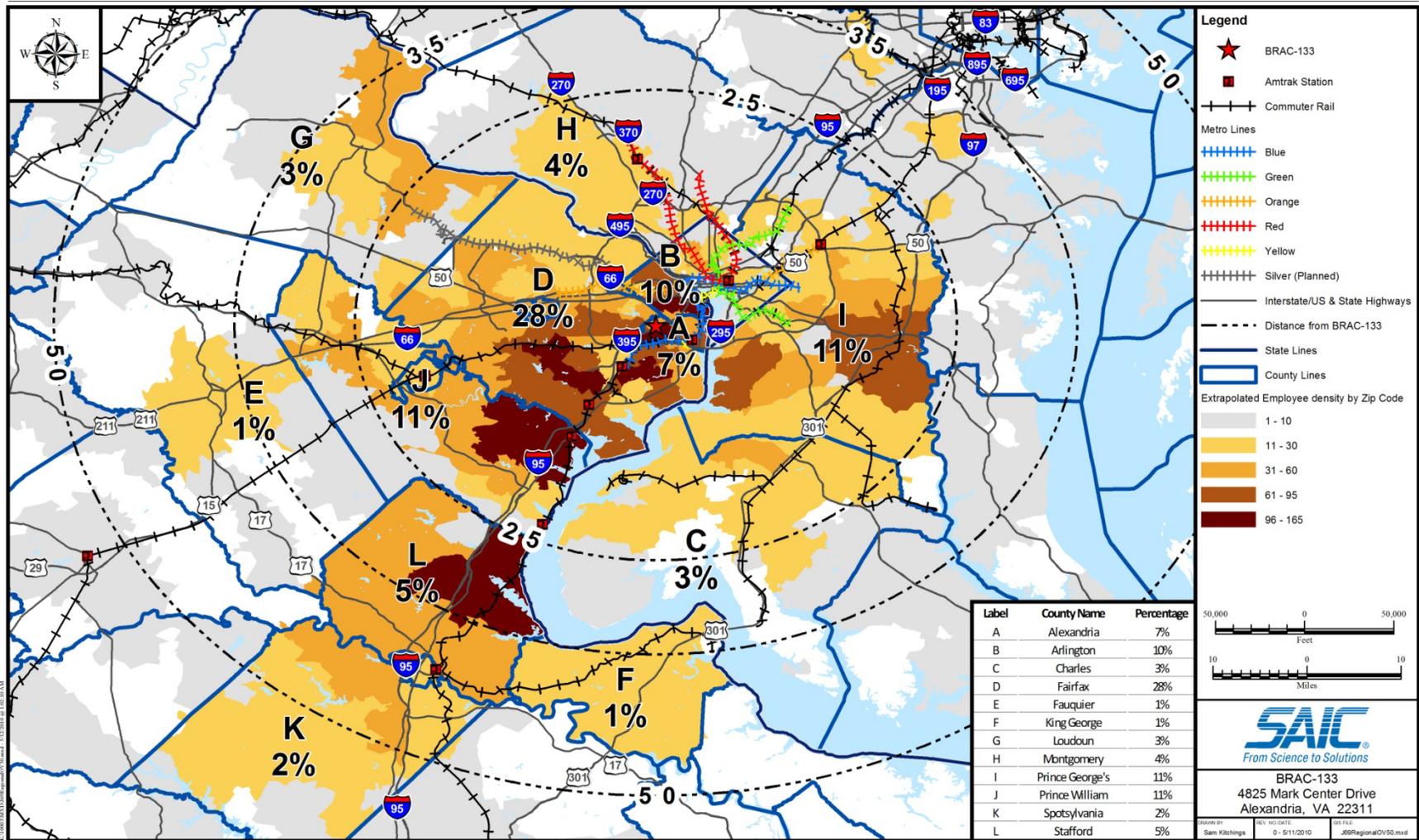
Employee Population Density by Home Zip Code – Stafford County

## Part II: Extrapolated Population

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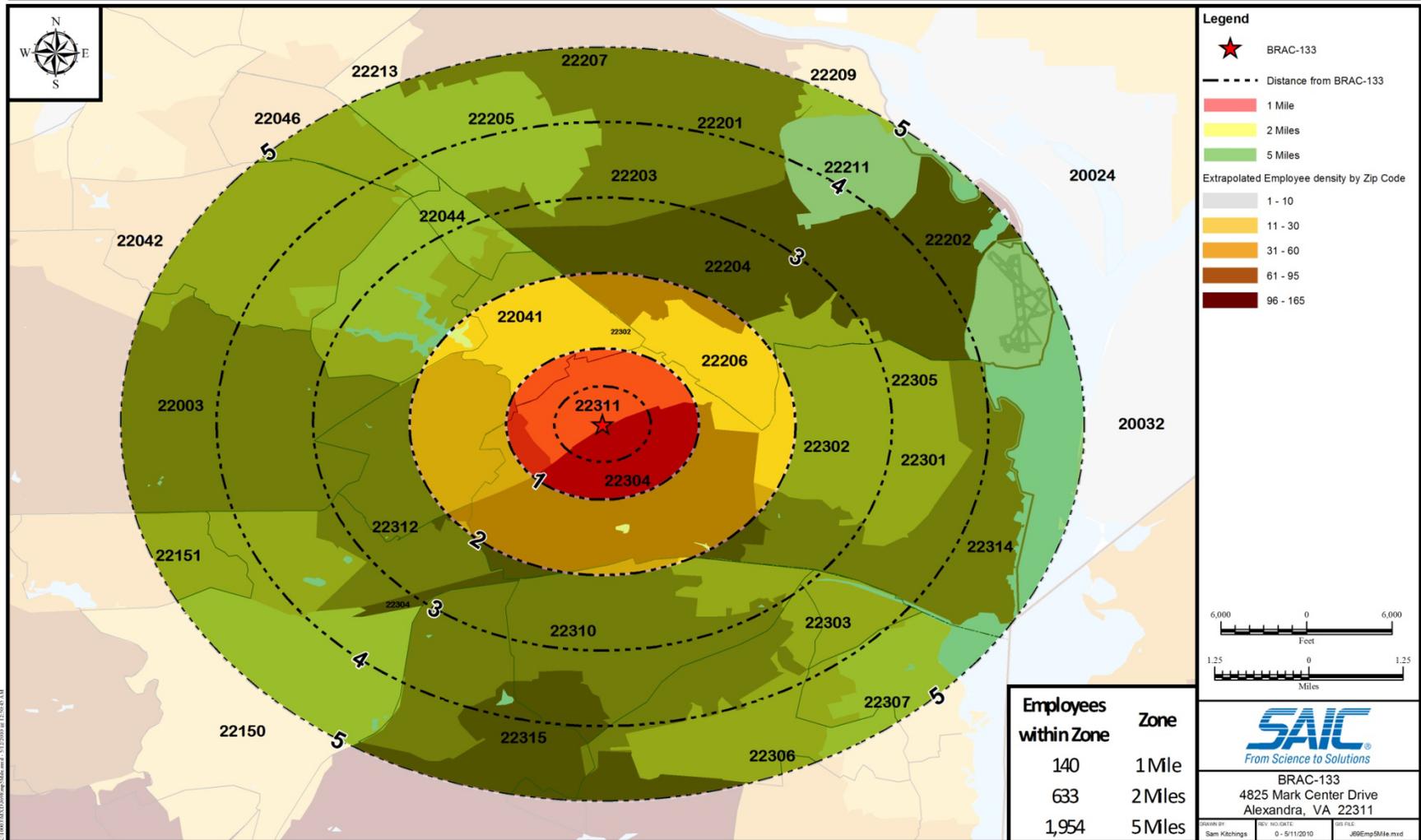
- NOTE:
- <sup>1</sup> BRAC 133 FEDERAL EMPLOYEE POPULATION ZIP CODE DATA PROVIDED BY DOD DEPARTMENT OF HUMAN RESOURCES RECORDS
  - <sup>2</sup> ZIP CODE DATA IS EXTRAPOLATED TO ACCOUNT FOR 31 PERCENT OF TOTAL BRAC 133 CONSULTANT/CONTRACTOR POPULATION
  - <sup>3</sup> DATA IS STATISTICALLY VOID
  - <sup>4</sup> GIS DATA PROVIDED BY ESRI
  - <sup>5</sup> TRANSIT DATA PROVIDED BY WMATA & CITY OF ALEXANDRIA

APPENDIX B – ZIP CODE ANALYSIS



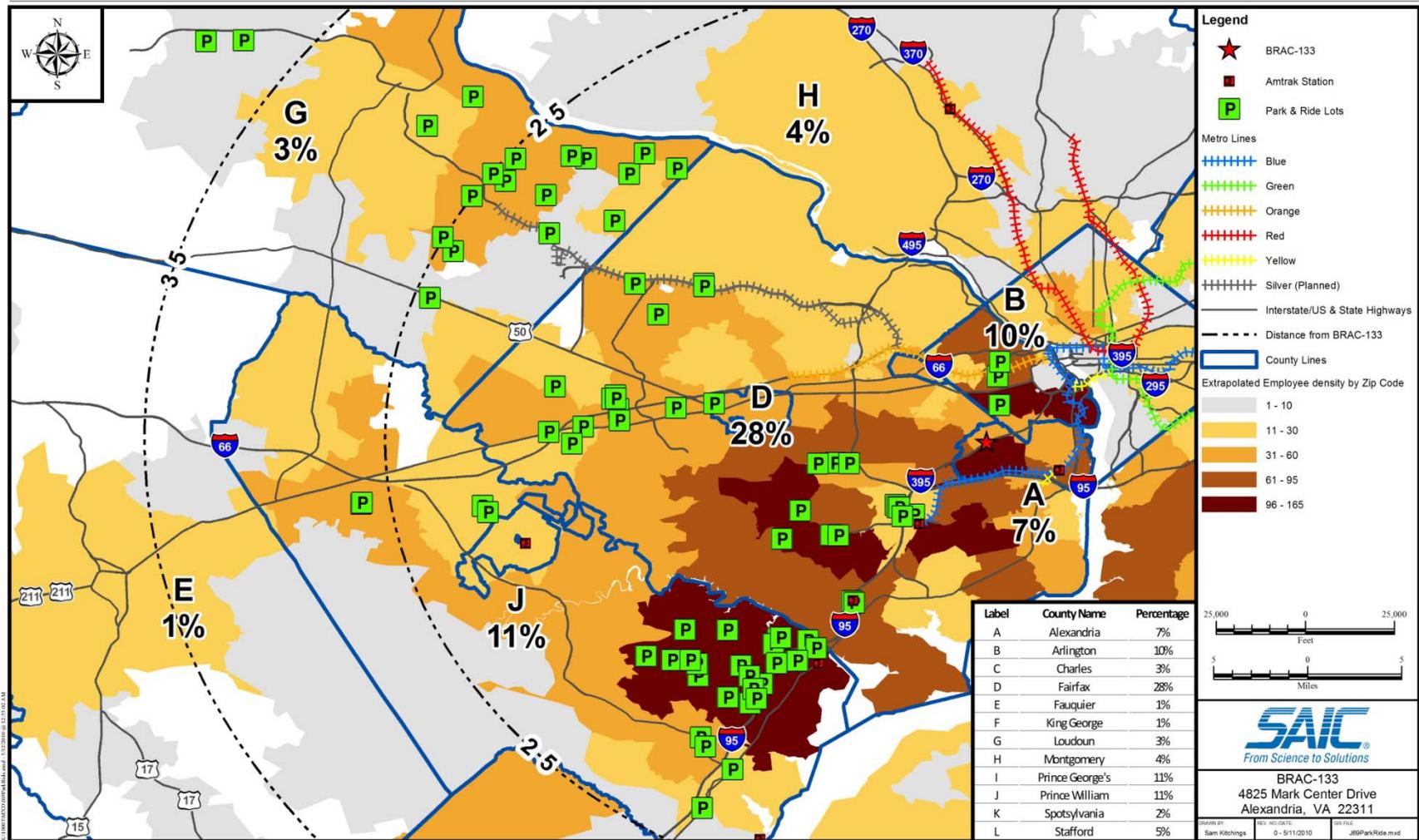
Location of Core Extrapolated Employee Population Density

# TRANSPORTATION MANAGEMENT PLAN FOR BRAC 133 AT MARK CENTER



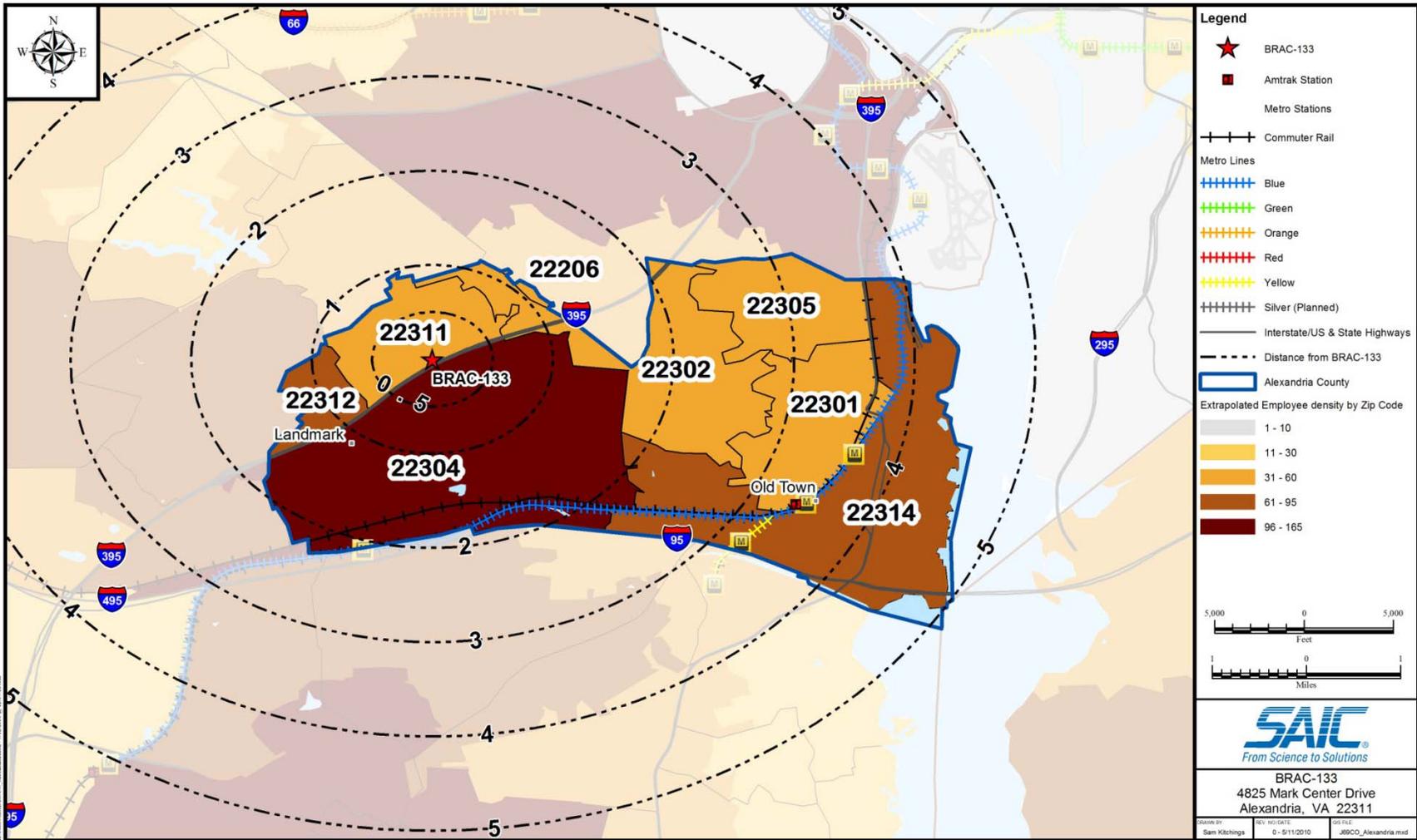
Extrapolated Employees within 5 Miles of BRAC-133

APPENDIX B – ZIP CODE ANALYSIS



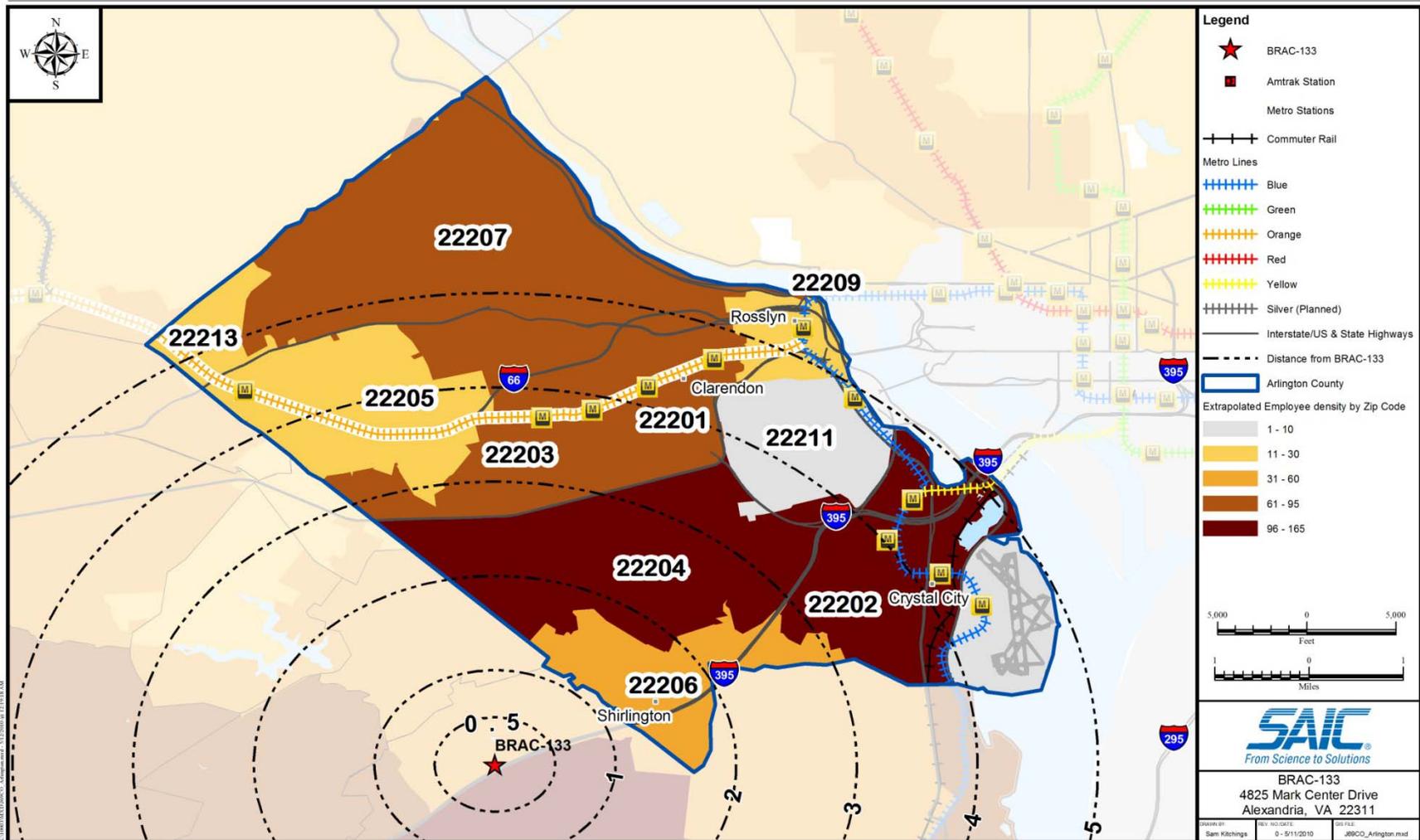
Northern Virginia Park and Ride Lots, Source: VDOT

TRANSPORTATION MANAGEMENT PLAN FOR BRAC 133 AT MARK CENTER



Extrapolated Employee Population Density by Home Zip Code – City of Alexandria

APPENDIX B – ZIP CODE ANALYSIS

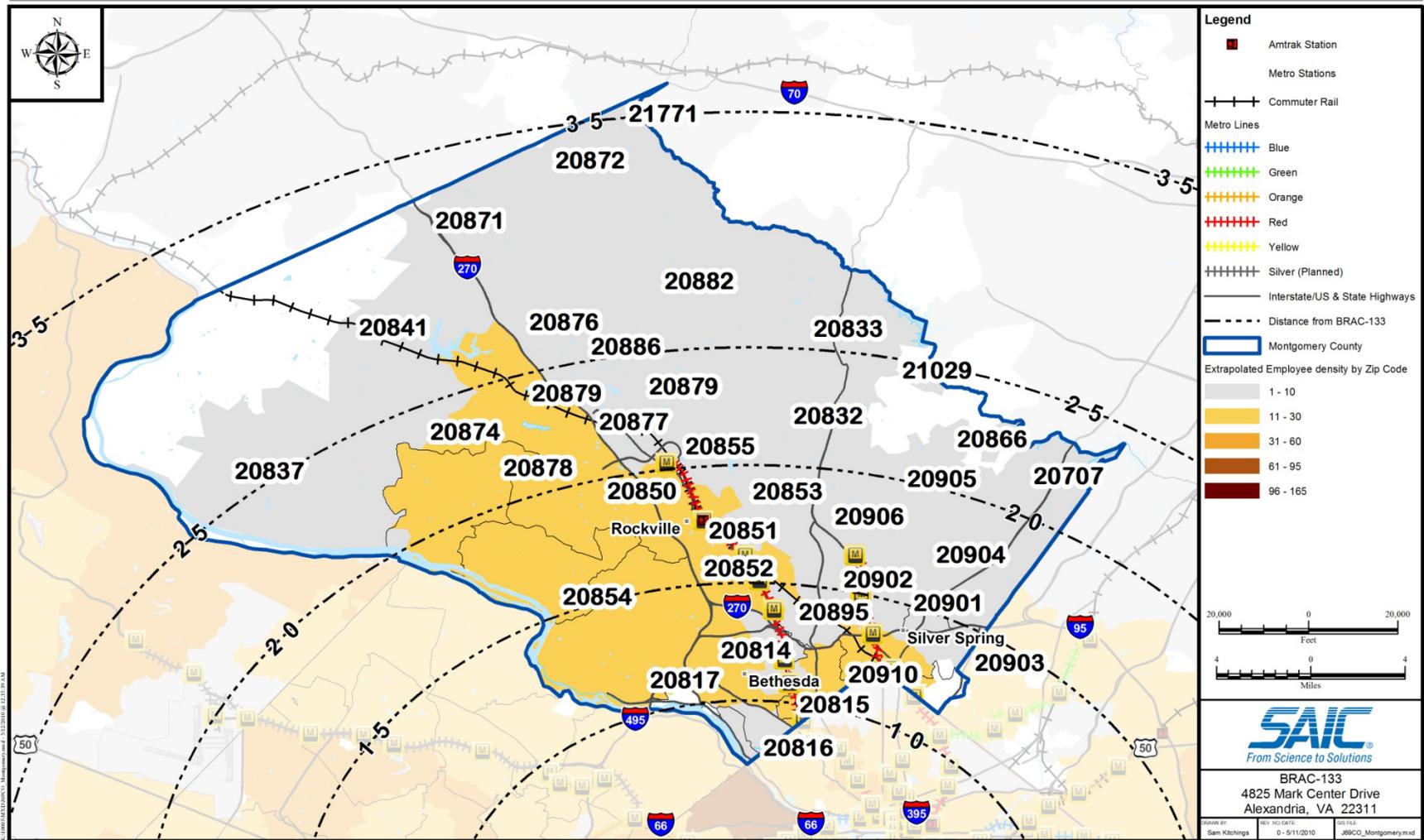


Extrapolated Employee Population Density by Home Zip Code – Arlington County



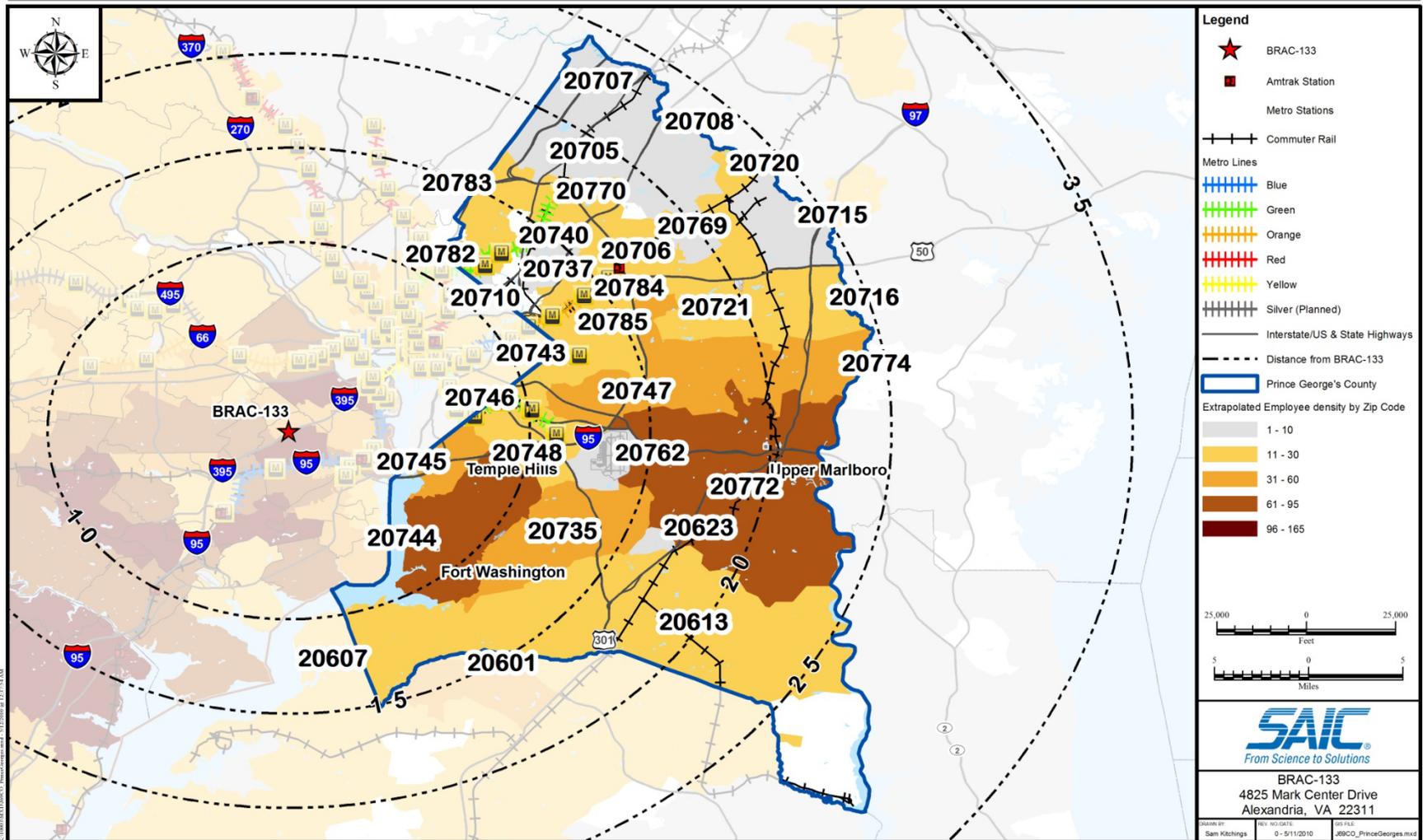


TRANSPORTATION MANAGEMENT PLAN FOR BRAC 133 AT MARK CENTER



Extrapolated Employee Population Density by Home Zip Code – Montgomery County

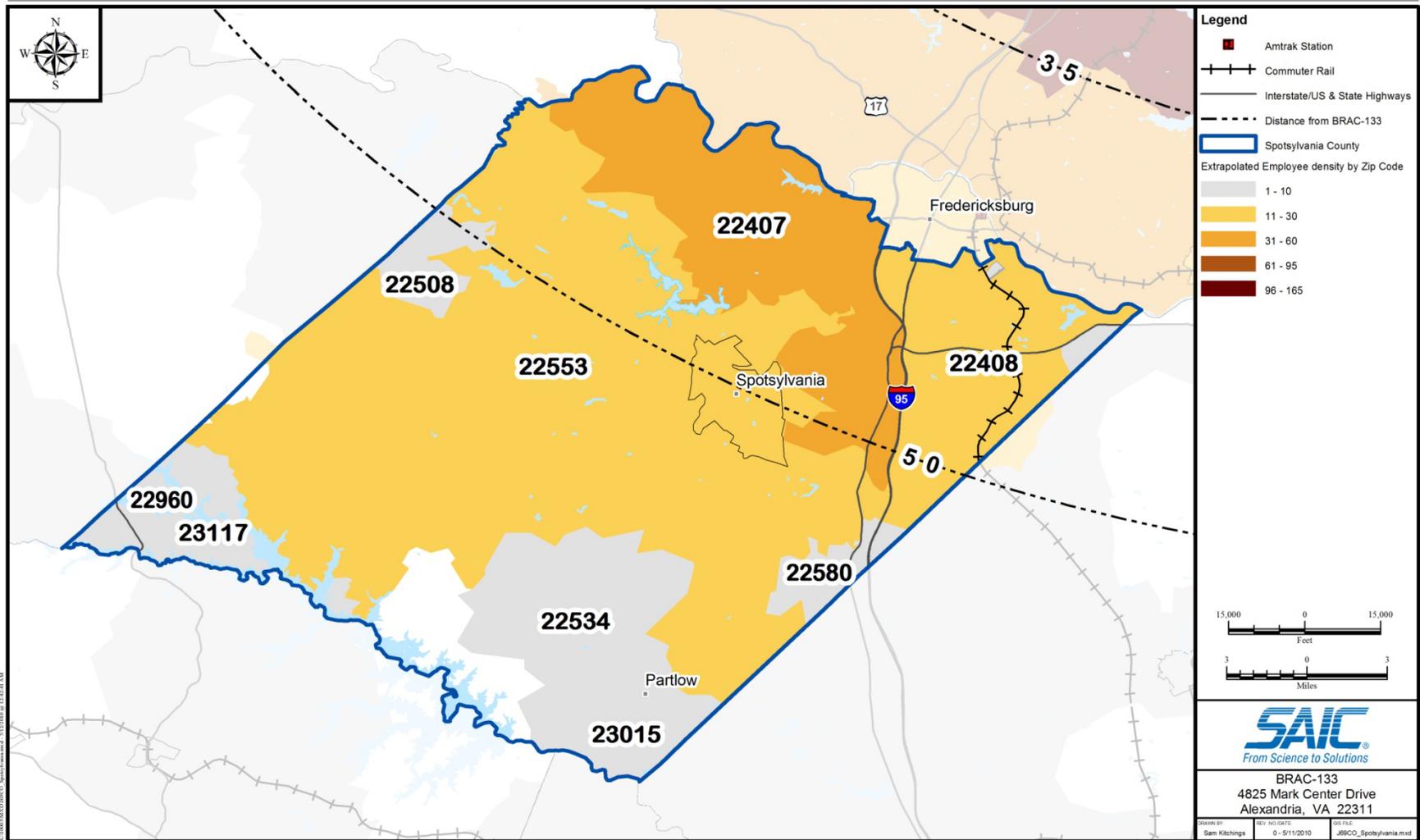
APPENDIX B – ZIP CODE ANALYSIS



Extrapolated Employee Population Density by Home Zip Code – Prince George's County

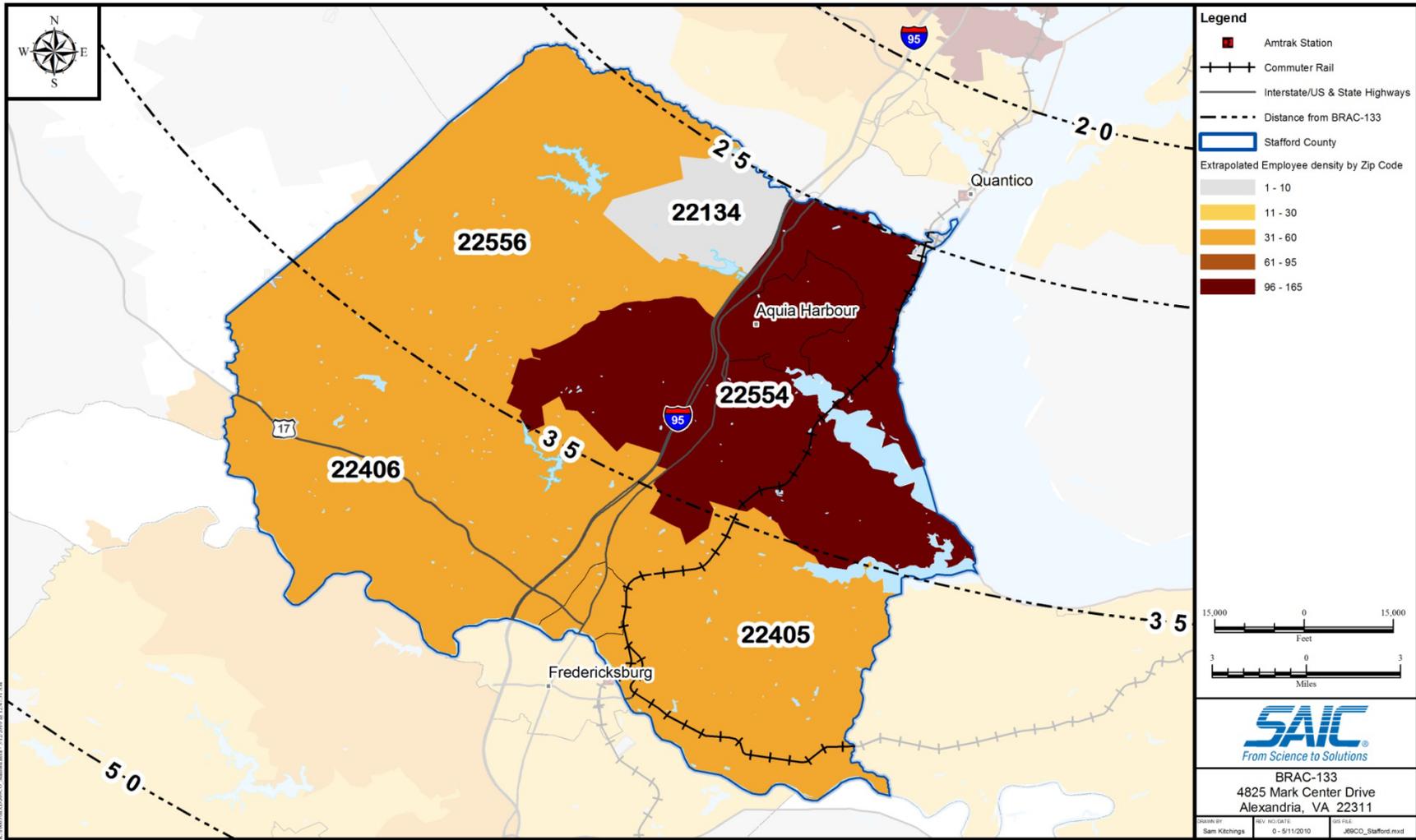


APPENDIX B – ZIP CODE ANALYSIS



Extrapolated Employee Population Density by Home Zip Code – Spotsylvania County

TRANSPORTATION MANAGEMENT PLAN FOR BRAC 133 AT MARK CENTER



Extrapolated Employee Population Density by Home Zip Code – Stafford County

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**Appendix C**

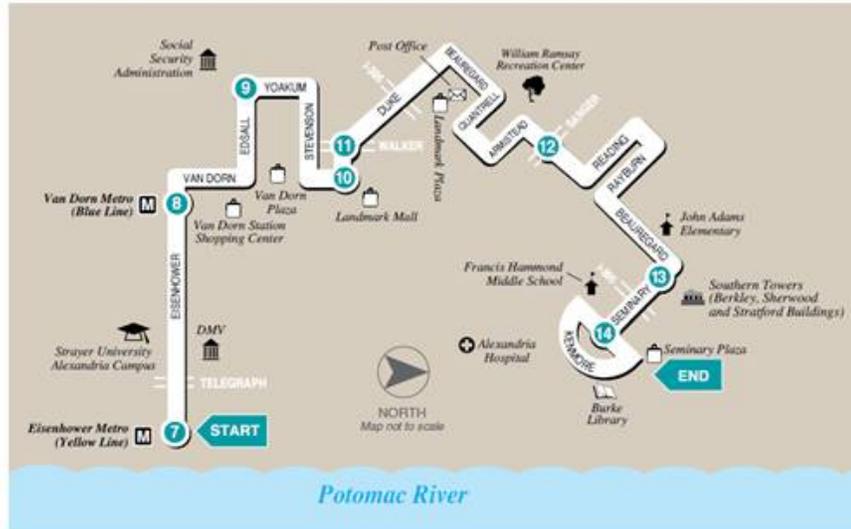
**Public Transit Route Maps  
& Public Feeder Services**

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## DASH AT1 Service Map

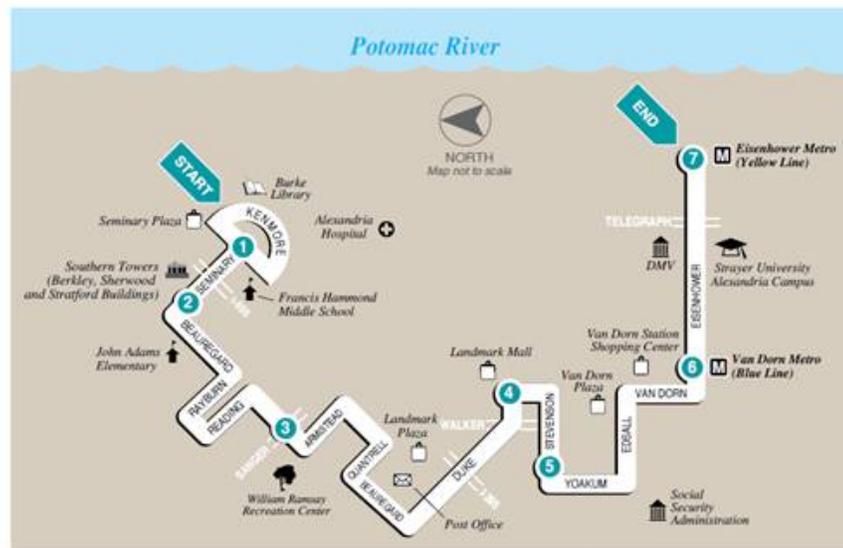
### ROUTE AT1 TO SEMINARY PLAZA

**Northbound**  
Eisenhower Metro  
and Van Dorn Metro  
to Southern Towers  
and Seminary Plaza



### ROUTE AT1 TO VAN DORN M EISENHOWER M

**Southbound**  
Seminary Plaza to  
Van Dorn Metro and  
Eisenhower Metro



DASH AT2 Service Map

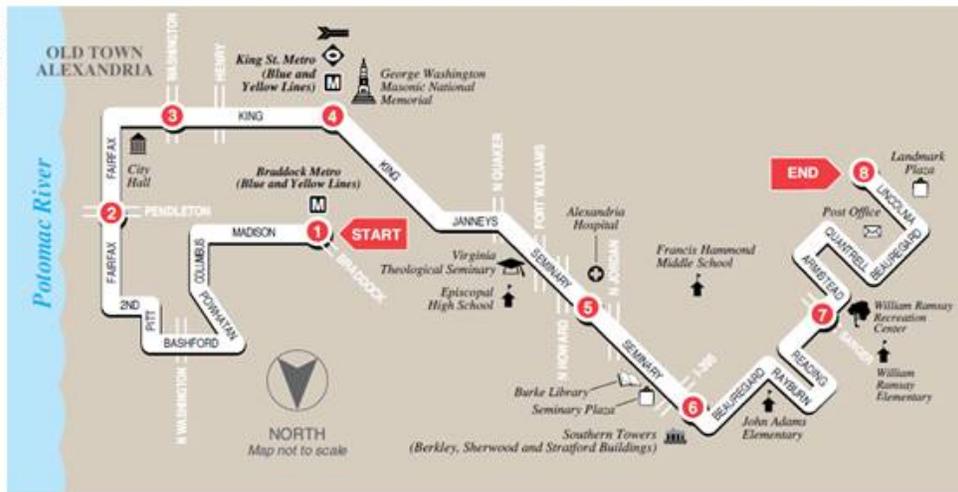
**ROUTE AT2 TO BRADDOCK M VIA OLD TOWN**

**Eastbound**  
Lincolnia to  
Braddock Metro  
via Old Town  
Alexandria

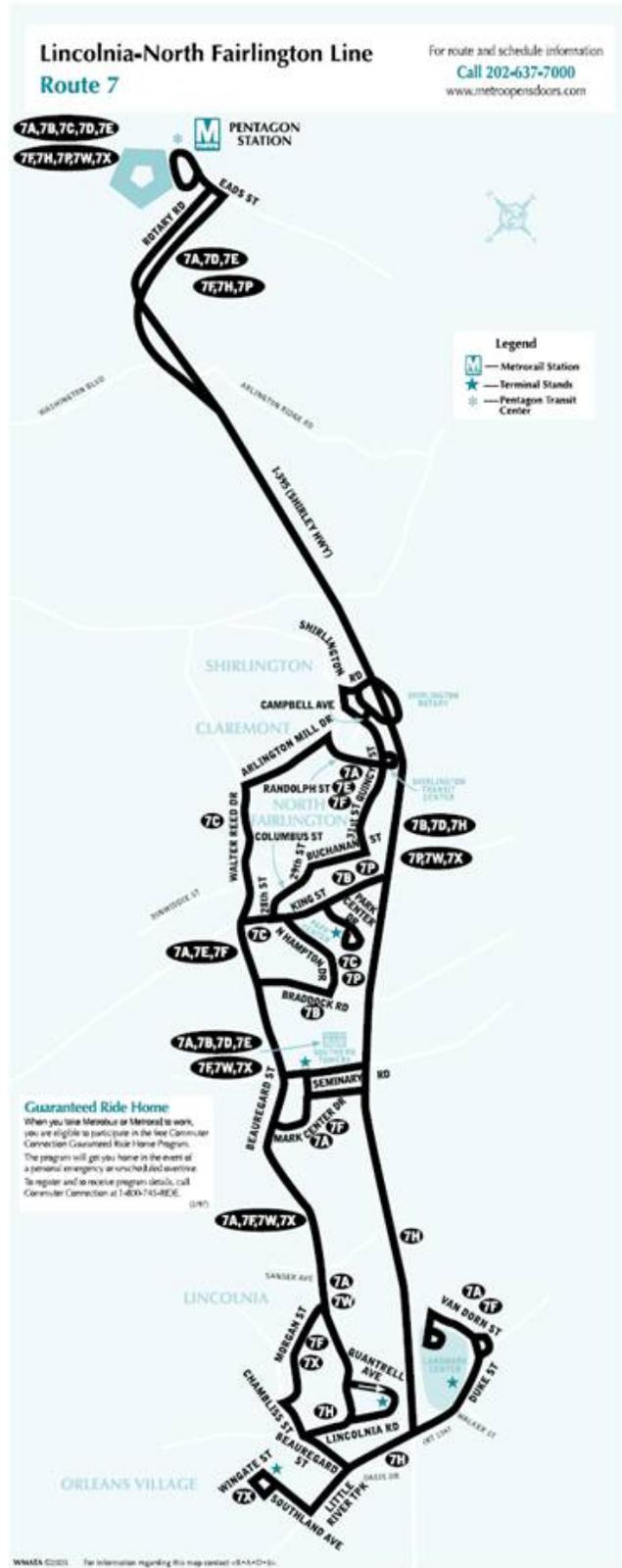


**ROUTE AT2 TO LINCOLNIA**

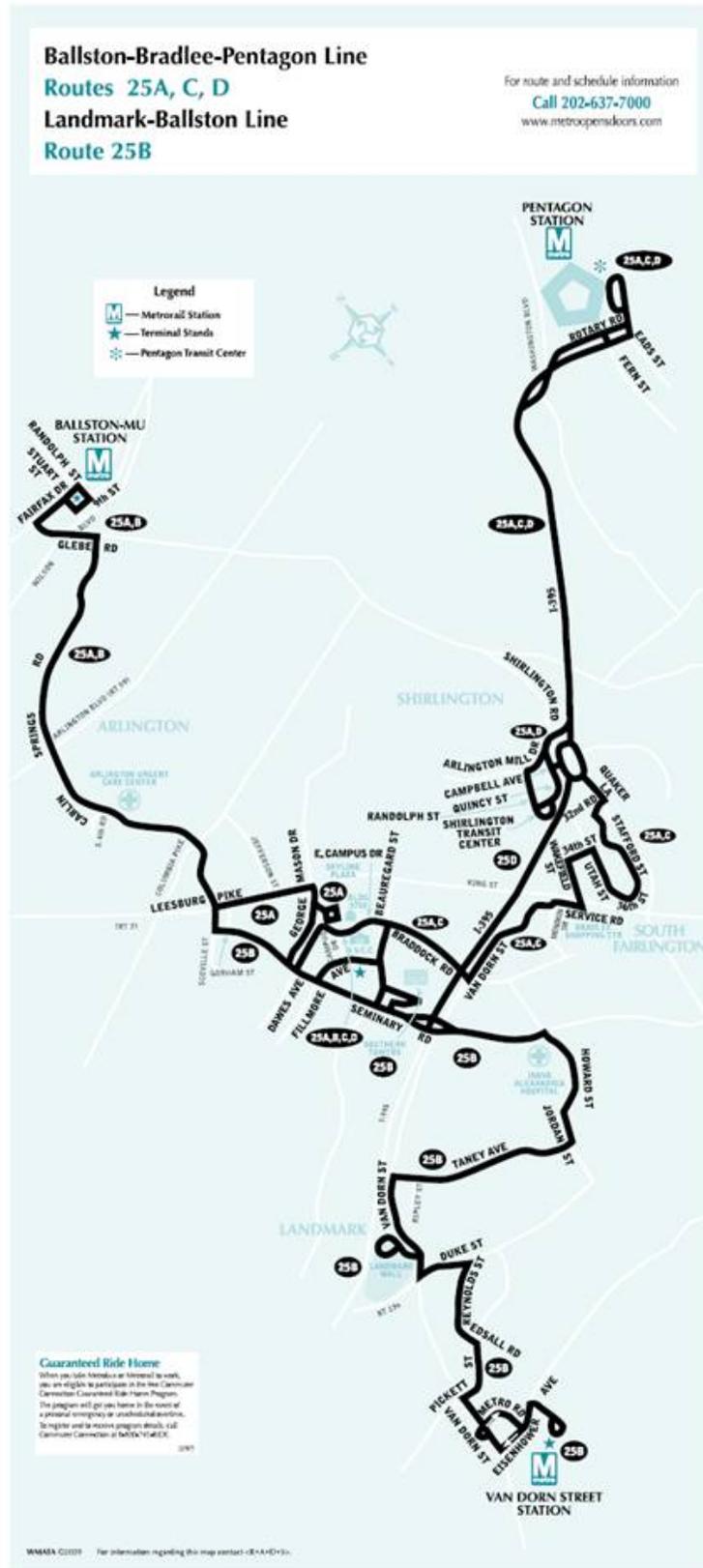
**Westbound**  
Braddock Metro  
to Lincolnia via  
Southern Towers



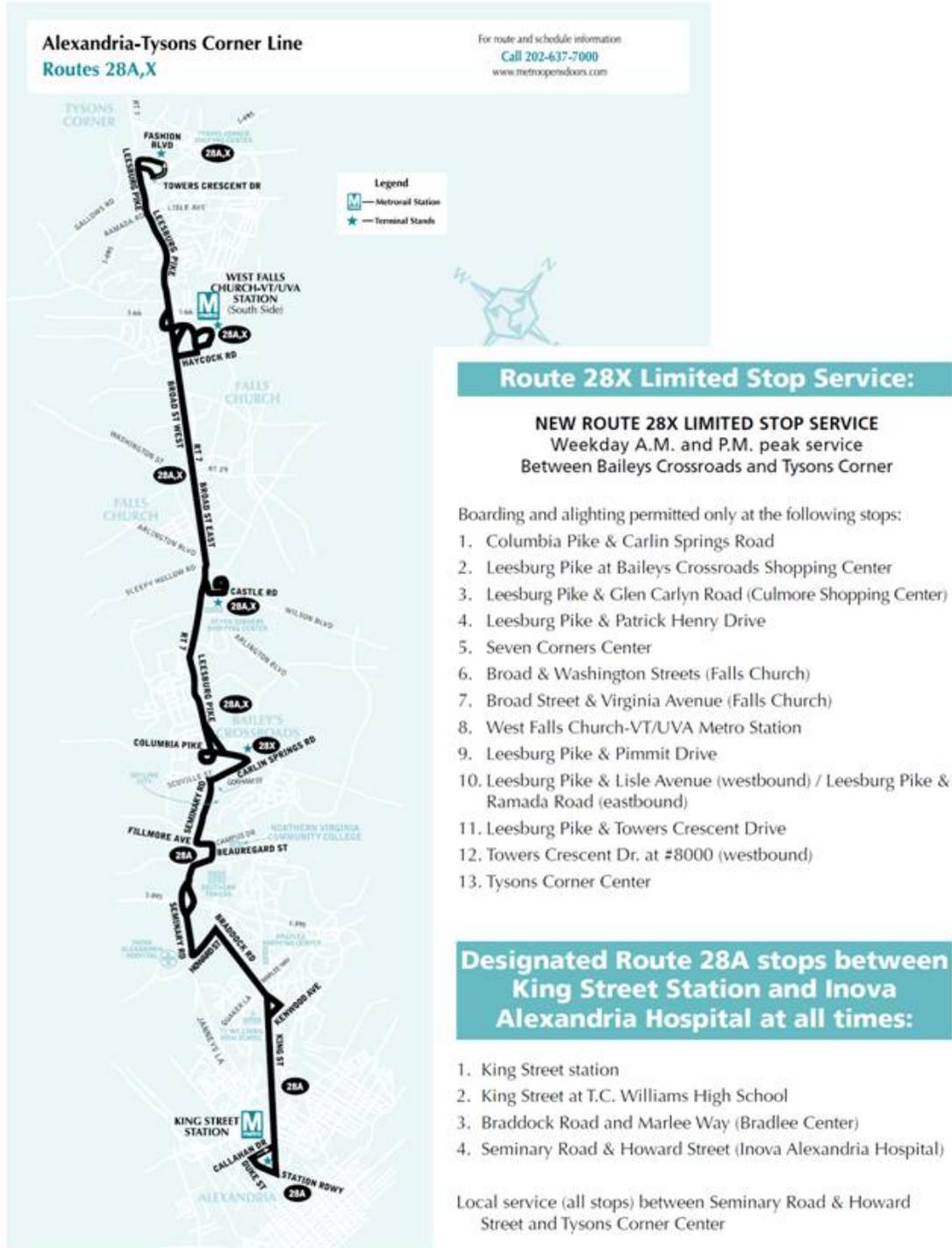
# Metrobus Route 7 Service Map



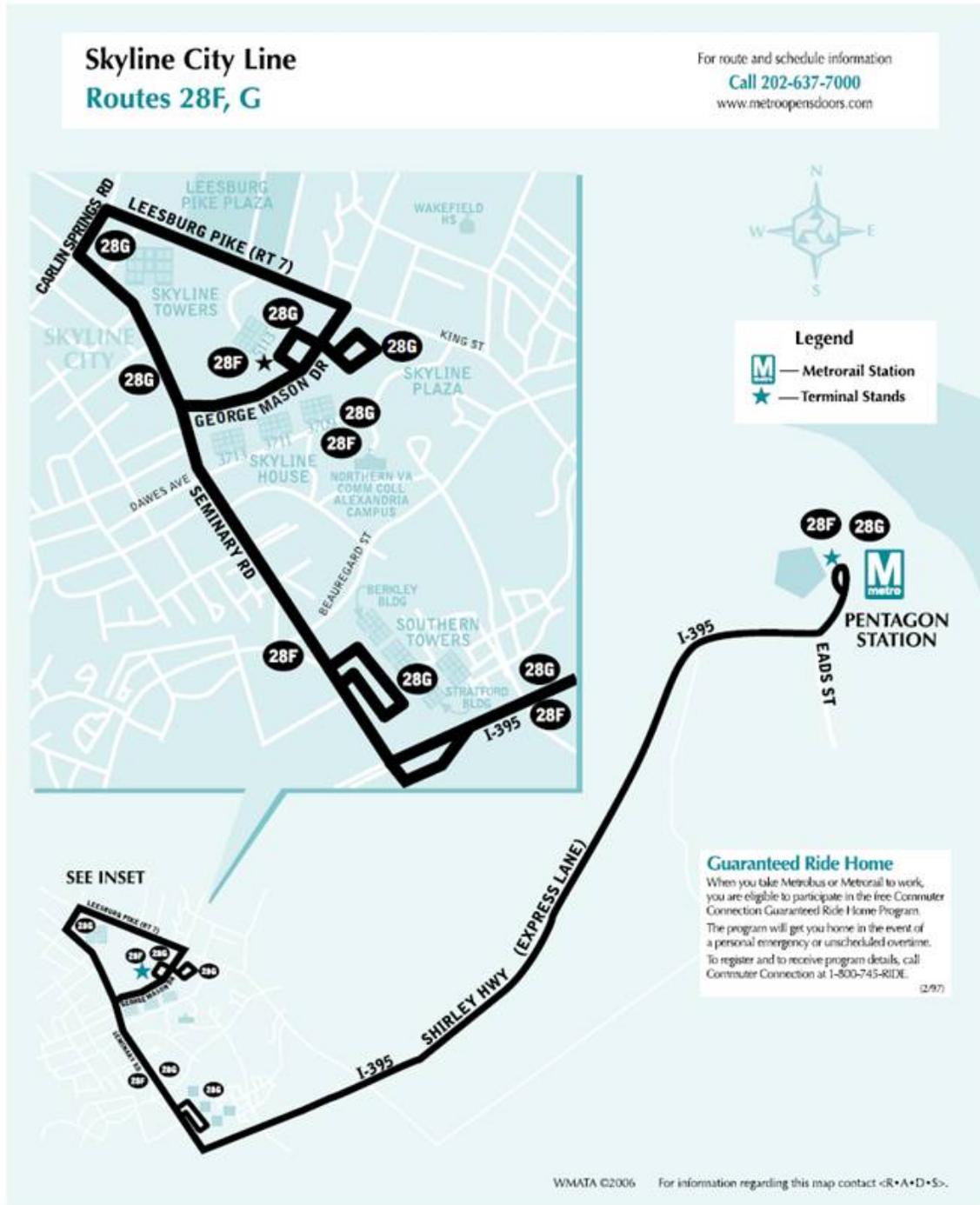
# Metrobus Route 25B Service Map



## Metrobus Route 28A Service Map



# Metrobus Route 28G Service Map



## APPENDIX C – PUBLIC TRANSIT ROUTE MAPS & FEEDER SERVICE

### Available Public Feeder Services throughout the Region that serve Metrorail and VRE Stations

Metrorail Station Served	Operating Agency	Route No.	Headways during Peak	Route Origin	Route End	Express?	Web Link to Route Details
Pentagon	OmniRide	R1	NA	Dale and Lindendale	Pentagon	Yes	<a href="http://www.prtctransit.org/commuter-bus/schedules/rosslyn">http://www.prtctransit.org/commuter-bus/schedules/rosslyn</a>
Pentagon	OmniRide	R2	NA	Dale and Lindendale	Pentagon	Yes	<a href="http://www.prtctransit.org/commuter-bus/schedules/rosslyn">http://www.prtctransit.org/commuter-bus/schedules/rosslyn</a>
Pentagon	OmniRide	R3	NA	Dale and Lindendale	Pentagon	Yes	<a href="http://www.prtctransit.org/commuter-bus/schedules/rosslyn">http://www.prtctransit.org/commuter-bus/schedules/rosslyn</a>
Pentagon	OmniRide	R4	NA	Dale and Lindendale	Pentagon	Yes	<a href="http://www.prtctransit.org/commuter-bus/schedules/rosslyn">http://www.prtctransit.org/commuter-bus/schedules/rosslyn</a>
Franconia/ Springfield	OmniRide	PMD	NA	PRTC Transit Center	Franconia/Springfield	Unknown	<a href="http://www.prtctransit.org/commuter-bus/schedules/pwmd-am.php">http://www.prtctransit.org/commuter-bus/schedules/pwmd-am.php</a>
West Falls Church	OmniRide	LMD	NA	Limestone	West Falls Church	Yes	<a href="http://www.prtctransit.org/commuter-bus/schedules/lhmd">http://www.prtctransit.org/commuter-bus/schedules/lhmd</a>
West Falls Church	OmniRide	MMD	NA	Manassas Junction	West Falls Church	Unknown	<a href="http://www.prtctransit.org/commuter-bus/schedules/mmd">http://www.prtctransit.org/commuter-bus/schedules/mmd</a>
Union Station	OmniRide	C1	NA	Dale City Commuter Lot	7th & Independence	No	<a href="http://www.prtctransit.org/commuter-bus/schedules/caphill">http://www.prtctransit.org/commuter-bus/schedules/caphill</a>
Pentagon	OmniRide	D-201	20	Dale City Commuter Lot	12th & Old Jefferson	No	<a href="http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php">http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php</a>
Pentagon	OmniRide	D-202C	30	Lindendale Commuter Lot	12th & Old Jefferson	No	<a href="http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php">http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php</a>
Pentagon	OmniRide	D-203	20	PRTC Transit Center	12th & Old Jefferson	No	<a href="http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php">http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php</a>
Pentagon	OmniRide	D-204T	20	Dale City Commuter Lot	13th & Old Jefferson	No	<a href="http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php">http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php</a>
Pentagon	OmniRide	D-205C	120	Lindendale Commuter Lot	14th & Old Jefferson	No	<a href="http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php">http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php</a>
Pentagon	OmniRide	D-206	20	Dale City Commuter Lot	15th & Old Jefferson	No	<a href="http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php">http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php</a>
Pentagon	OmniRide	D-207C	Last	Lindendale Commuter Lot	16th & Old Jefferson	No	<a href="http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php">http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php</a>
Pentagon	OmniRide	D-208	20	Dale City Commuter Lot	17th & Old Jefferson	No	<a href="http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php">http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php</a>
Pentagon	OmniRide	LX-1	20	Dale City Commuter Lot	Pentagon	Yes	<a href="http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php">http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php</a>
Pentagon	OmniRide	LX-2	Last	Dale City Commuter Lot	Pentagon	Yes	<a href="http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php">http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php</a>
Pentagon	OmniRide	M-1	15	Manassas Mall	Virginia & 21st	No	<a href="http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php">http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php</a>
Pentagon	OmniRide	M-2	15	Manassas Mall	Virginia & 21st	No	<a href="http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php">http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php</a>
Pentagon	OmniRide	M-3	15	Manassas Mall	Virginia & 21st	No	<a href="http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php">http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php</a>
Pentagon	OmniRide	M-4	15	Manassas Mall	Virginia & 21st	No	<a href="http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php">http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php</a>
Pentagon	OmniRide	M-5	15	Manassas Mall	Virginia & 21st	No	<a href="http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php">http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php</a>
Pentagon	OmniRide	M-6	15	Manassas Mall	Virginia & 21st	No	<a href="http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php">http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php</a>
Pentagon	OmniRide	M-7	15	Manassas Mall	Virginia & 21st	No	<a href="http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php">http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php</a>
Pentagon	OmniRide	M-8R	15	Manassas Mall	Pentagon	No	<a href="http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php">http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php</a>
Pentagon	OmniRide	M-9	15	Manassas Mall	Virginia & 21st	No	<a href="http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php">http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php</a>
Pentagon	OmniRide	M-10	15	Manassas Mall	Virginia & 21st	No	<a href="http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php">http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php</a>
Pentagon	OmniRide	M-11R	15	Manassas Mall	Pentagon	No	<a href="http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php">http://www.prtctransit.org/commuter-bus/schedules/dalectcity-pentagon-am.php</a>
Greenbelt Metro	TheBus (PG County)	11	30	Greenbelt Metro	Greenbelt Metro	No	<a href="http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/Rt12.pdf">http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/Rt12.pdf</a>
West Hyattsville Metro	TheBus (PG County)	12	30	West Hyattsville Metro	West Hyattsville Metro	No	<a href="http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/RT13TIME.pdf">http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/RT13TIME.pdf</a>
West Hyattsville Metro	TheBus (PG County)	13	40	West Hyattsville Metro	West Hyattsville Metro	No	<a href="http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/RT13TIME.pdf">http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/RT13TIME.pdf</a>

## TRANSPORTATION MANAGEMENT PLAN FOR BRAC 133 AT MARK CENTER

### Available Public Feeder Services throughout the Region that serve Metrorail and VRE Stations (cont.)

Metrorail Station Served	Operating Agency	Route No.	Headways during Peak	Route Origin	Route End	Express?	Web Link to Route Details
Prince George/College Park	TheBus (PG County)	14	45	Prince George Metro	College Park Metro	No	<a href="http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/Rt14.pdf">http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/Rt14.pdf</a>
Greenbelt Metro	TheBus (PG County)	15	60	Greenbelt Metro	Maryland Corporate Center	No	<a href="http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt15web.pdf">http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt15web.pdf</a>
New Carrollton/Greenbelt Metro	TheBus (PG County)	15 Express	80	New Carrollton Metro	Greenbelt Metro	Yes	<a href="http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt15X.pdf">http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt15X.pdf</a>
New Carrollton/Greenbelt Metro	TheBus (PG County)	16	30	New Carrollton Metro	Greenbelt Metro	No	<a href="http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/rte16.pdf">http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/rte16.pdf</a>
Largo Town Center/New Carrollton	TheBus (PG County)	21	30	Equestrian Center	New Carrollton Metro	No	<a href="http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt21.pdf">http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt21.pdf</a>
NewCarrollton Metro	TheBus (PG County)	21 Express	20	New Carrollton Metro	Motor Vehicle Admin	Yes	<a href="http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt21X.PDF">http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt21X.PDF</a>
Morgan Boulevard Metro	TheBus (PG County)	22	40	Morgan Boulevard Metro	Landover Mall	No	<a href="http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt22.pdf">http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt22.pdf</a>
Addison Road/Cheverly Metro	TheBus (PG County)	23	30	Addison Road Metro	Cheverly Metro	No	<a href="http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt23web.pdf">http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt23web.pdf</a>
Morgan Boulevard/Capitol Heights Metro	TheBus (PG County)	24	30	Morgan Boulevard Metro	Capitol Heights Metro	No	<a href="http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt24web.pdf">http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt24web.pdf</a>
Capitol Heights Metro	TheBus (PG County)	25	35	Capitol Heights Metro	Capitol Heights Metro	No	<a href="http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt25.pdf">http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt25.pdf</a>
Morgan Boulevard/Largo Town Center Metro	TheBus (PG County)	26	40	Morgan Boulevard Metro	Largo Town Center Metro	No	<a href="http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt26web.pdf">http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt26web.pdf</a>
Landover Metro	TheBus (PG County)	27	30	Landover Metro	Landover Metro	No	<a href="http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt27web.pdf">http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt27web.pdf</a>
Largo Town Center Metro	TheBus (PG County)	28	30	Largo Town Center Metro	Campus Way North at Grey Gables Court	No	<a href="http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt28.pdf">http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/wRt28.pdf</a>
Branch Avenue Metro	TheBus (PG County)	30	40	Stuart Lane at Surratts Rd.	Branch Avenue Metro	No	<a href="http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/Route30Web.pdf">http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/Route30Web.pdf</a>
Naylor Road Metro	TheBus (PG County)	32	30	Clinton Fringe Parking Lot	Naylor Road Metro	No	<a href="http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/Rt32.pdf">http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/Rt32.pdf</a>
Southern Avenue Metro	TheBus (PG County)	33	40	Old Branch Avenue at Allentown Way	Southern Avenue Metro	No	<a href="http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/Rt33.pdf">http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/Rt33.pdf</a>
Suitland Metro	TheBus (PG County)	34	15	Suitland Metro	Suitland Metro	No	<a href="http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/Rt34.pdf">http://www.princegeorgescountymd.gov/Government/AgencyIndex/DPW&amp;T/Transit/Rt34.pdf</a>
L'Enfant Plaza Metro	Tri-County	901	10	La Plata Park & Ride	State Department	No	<a href="http://mta.maryland.gov/services/commuterbus/schedulesSystemMaps/901_HTML_sched.cfm">http://mta.maryland.gov/services/commuterbus/schedulesSystemMaps/901_HTML_sched.cfm</a>

## APPENDIX C – PUBLIC TRANSIT ROUTE MAPS & FEEDER SERVICE

### Available Public Feeder Services throughout the Region that serve Metrorail and VRE Stations (cont.)

Metrorail Station Served	Operating Agency	Route No.	Headways during Peak	Route Origin	Route End	Express?	Web Link to Route Details
L'Enfant Plaza Metro	Tri-County	902	20	La Plata Park & Ride	State Department	No	<a href="http://mta.maryland.gov/services/commuterbus/schedulesSystemMaps/902_sched.cfm">http://mta.maryland.gov/services/commuterbus/schedulesSystemMaps/902_sched.cfm</a>
L'Enfant Plaza Metro	Tri-County	904	15	North Beach	State Department	No	<a href="http://mta.maryland.gov/services/commuterbus/schedulesSystemMaps/904_sched.cfm">http://mta.maryland.gov/services/commuterbus/schedulesSystemMaps/904_sched.cfm</a>
L'Enfant Plaza Metro	Tri-County	905	15	California (Regional Airport)	Office of Personnel Mgmt.		<a href="http://mta.maryland.gov/services/commuterbus/schedulesSystemMaps/905_sched.cfm">http://mta.maryland.gov/services/commuterbus/schedulesSystemMaps/905_sched.cfm</a>
West Falls Church	Loudoun County	WFC Express	NA	West Falls Church	West Falls Church	No	<a href="http://www.loudoun.gov/controls/speerio/resources/RenderContent.aspx?data=51d70efcaa0f426a8ddb011da05bed04&amp;t">http://www.loudoun.gov/controls/speerio/resources/RenderContent.aspx?data=51d70efcaa0f426a8ddb011da05bed04&amp;t</a>
Pentagon	Loudoun County	DC2E	NA	Purcellville	H & 4th Str.	No	<a href="http://www.loudoun.gov/controls/speerio/resources/RenderContent.aspx?data=886d715ac3ab4c4ea6a8dd6a50ed4458&amp;">http://www.loudoun.gov/controls/speerio/resources/RenderContent.aspx?data=886d715ac3ab4c4ea6a8dd6a50ed4458&amp;</a>
Pentagon	Loudoun County	DC5E	NA	Purcellville	H & 4th Str.	No	<a href="http://www.loudoun.gov/controls/speerio/resources/RenderContent.aspx?data=886d715ac3ab4c4ea6a8dd6a50ed4458&amp;">http://www.loudoun.gov/controls/speerio/resources/RenderContent.aspx?data=886d715ac3ab4c4ea6a8dd6a50ed4458&amp;</a>
Rosslyn Metro	Loudoun County	DC7	NA	Purcellville	H & 4th Str.	No	<a href="http://www.loudoun.gov/controls/speerio/resources/RenderContent.aspx?data=886d715ac3ab4c4ea6a8dd6a50ed4458&amp;">http://www.loudoun.gov/controls/speerio/resources/RenderContent.aspx?data=886d715ac3ab4c4ea6a8dd6a50ed4458&amp;</a>
Rosslyn Metro	Loudoun County	DC11	NA	Purcellville	H & 4th Str.	No	<a href="http://www.loudoun.gov/controls/speerio/resources/RenderContent.aspx?data=886d715ac3ab4c4ea6a8dd6a50ed4458&amp;">http://www.loudoun.gov/controls/speerio/resources/RenderContent.aspx?data=886d715ac3ab4c4ea6a8dd6a50ed4458&amp;</a>
Pentagon	Loudoun County	DC17E	NA	Purcellville	H & 4th Str.	No	<a href="http://www.loudoun.gov/controls/speerio/resources/RenderContent.aspx?data=886d715ac3ab4c4ea6a8dd6a50ed4458&amp;">http://www.loudoun.gov/controls/speerio/resources/RenderContent.aspx?data=886d715ac3ab4c4ea6a8dd6a50ed4458&amp;</a>
Rosslyn Metro	Loudoun County	DC20	NA	Purcellville	H & 4th Str.	No	<a href="http://www.loudoun.gov/controls/speerio/resources/RenderContent.aspx?data=886d715ac3ab4c4ea6a8dd6a50ed4458&amp;">http://www.loudoun.gov/controls/speerio/resources/RenderContent.aspx?data=886d715ac3ab4c4ea6a8dd6a50ed4458&amp;</a>
Rosslyn Metro	Loudoun County	DC21	NA	Purcellville	H & 4th Str.	No	<a href="http://www.loudoun.gov/controls/speerio/resources/RenderContent.aspx?data=886d715ac3ab4c4ea6a8dd6a50ed4458&amp;">http://www.loudoun.gov/controls/speerio/resources/RenderContent.aspx?data=886d715ac3ab4c4ea6a8dd6a50ed4458&amp;</a>
Rosslyn Metro	Loudoun County	DC26	NA	Purcellville	H & 4th Str.	No	<a href="http://www.loudoun.gov/controls/speerio/resources/RenderContent.aspx?data=886d715ac3ab4c4ea6a8dd6a50ed4458&amp;">http://www.loudoun.gov/controls/speerio/resources/RenderContent.aspx?data=886d715ac3ab4c4ea6a8dd6a50ed4458&amp;</a>
Rosslyn Metro	Loudoun County	DC36	NA	Purcellville	H & 4th Str.	No	<a href="http://www.loudoun.gov/controls/speerio/resources/RenderContent.aspx?data=886d715ac3ab4c4ea6a8dd6a50ed4458&amp;">http://www.loudoun.gov/controls/speerio/resources/RenderContent.aspx?data=886d715ac3ab4c4ea6a8dd6a50ed4458&amp;</a>
College Park Metro	Howard Transit	G	60	Laurel Mall	College Park Metro	No	<a href="http://www.corridortransit.com/static/website/54/54619/files/docs/G_Route.pdf">http://www.corridortransit.com/static/website/54/54619/files/docs/G_Route.pdf</a>
Rosslyn Metro	Georgetown	N/A	10	DuPont Circle	Rosslyn Metro	No	<a href="http://www.georgetowndc.com/getting-here/shuttle">http://www.georgetowndc.com/getting-here/shuttle</a>
East Falls Church	GEORGE	26E	25	East Falls Church Metro	West Falls Church	No	<a href="http://www.fallschurchva.gov/Content/CultureRecreation/G">http://www.fallschurchva.gov/Content/CultureRecreation/G</a>
West Falls Church	GEORGE	26W	30	West Falls Church	East Falls Church	No	<a href="http://www.fallschurchva.gov/Content/CultureRecreation/G">http://www.fallschurchva.gov/Content/CultureRecreation/G</a>
West Falls Church	Fairfax Connector	425	20	West Falls Church	West Falls Church	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/425.pdf">http://www.fairfaxcounty.gov/connector/pdf/425.pdf</a>
West Falls Church	Fairfax Connector	427	21	West Falls Church	West Falls Church	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/425.pdf">http://www.fairfaxcounty.gov/connector/pdf/425.pdf</a>
West Falls Church	Fairfax Connector	505	15	Reston Town Center	West Falls Church	Yes	<a href="http://www.fairfaxcounty.gov/connector/pdf/505.pdf">http://www.fairfaxcounty.gov/connector/pdf/505.pdf</a>
West Falls Church	Fairfax Connector	551	30	Herdon/Monroe Park & Ride	West Falls Church	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/551.pdf">http://www.fairfaxcounty.gov/connector/pdf/551.pdf</a>
West Falls Church	Fairfax Connector	553	30	Reston South Park	West Falls Church	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/553.pdf">http://www.fairfaxcounty.gov/connector/pdf/553.pdf</a>
West Falls Church	Fairfax Connector	557	30	Reston South Park	West Falls Church	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/557.pdf">http://www.fairfaxcounty.gov/connector/pdf/557.pdf</a>
West Falls Church	Fairfax Connector	552	30	Ring Rd	West Falls Church	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/552.pdf">http://www.fairfaxcounty.gov/connector/pdf/552.pdf</a>
West Falls Church	Fairfax Connector	554	30	Wiehle Ave	West Falls Church	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/552.pdf">http://www.fairfaxcounty.gov/connector/pdf/552.pdf</a>

## TRANSPORTATION MANAGEMENT PLAN FOR BRAC 133 AT MARK CENTER

### Available Public Feeder Services throughout the Region that serve Metrorail and VRE Stations (cont.)

Metrorail Station Served	Operating Agency	Route No.	Headways during Peak	Route Origin	Route End	Express?	Web Link to Route Details
West Falls Church	Fairfax Connector	585	25	Reston South Park & Ride	West Falls Church	Yes	<a href="http://www.fairfaxcounty.gov/connector/pdf/585.pdf">http://www.fairfaxcounty.gov/connector/pdf/585.pdf</a>
Pentagon	Fairfax Connector	595	30	Reston East	Pentagon	Yes	<a href="http://www.fairfaxcounty.gov/connector/pdf/595.pdf">http://www.fairfaxcounty.gov/connector/pdf/595.pdf</a>
West Falls Church	Fairfax Connector	950	20	Reston Town Center	West Falls Church	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/950.pdf">http://www.fairfaxcounty.gov/connector/pdf/950.pdf</a>
West Falls Church	Fairfax Connector	980	6	Herdon/Monroe Park & Ride	West Falls Church	Yes	<a href="http://www.fairfaxcounty.gov/connector/pdf/950.pdf">http://www.fairfaxcounty.gov/connector/pdf/950.pdf</a>
Huntingdon	Fairfax Connector	101	30	Mount Vernon	Huntingdon Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/101.pdf">http://www.fairfaxcounty.gov/connector/pdf/101.pdf</a>
Huntingdon	Fairfax Connector	109	35	Van Dorn Metro	Huntingdon Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/109.pdf">http://www.fairfaxcounty.gov/connector/pdf/109.pdf</a>
Huntingdon	Fairfax Connector	151	30	Huntingdon Metro	Huntingdon Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/151.pdf">http://www.fairfaxcounty.gov/connector/pdf/151.pdf</a>
Huntingdon	Fairfax Connector	161	30	Huntingdon Metro	Huntingdon Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/161.pdf">http://www.fairfaxcounty.gov/connector/pdf/161.pdf</a>
Huntingdon	Fairfax Connector	162	30	Huntingdon Metro	Huntingdon Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/162.pdf">http://www.fairfaxcounty.gov/connector/pdf/162.pdf</a>
Huntingdon	Fairfax Connector	171	30	Fraconia/Springfield Metro	Huntingdon Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/171.pdf">http://www.fairfaxcounty.gov/connector/pdf/171.pdf</a>
Van Dorn Metro	Fairfax Connector	231	30	Fraconia/Springfield Metro	Fraconia/Springfield Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/231.pdf">http://www.fairfaxcounty.gov/connector/pdf/231.pdf</a>
Van Dorn Metro	Fairfax Connector	232	30	Fraconia/Springfield Metro	Fraconia/Springfield Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/232.pdf">http://www.fairfaxcounty.gov/connector/pdf/232.pdf</a>
Huntingdon	Fairfax Connector	301	30	Fraconia/Springfield Metro	Huntingdon Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/301.pdf">http://www.fairfaxcounty.gov/connector/pdf/301.pdf</a>
Franconia/Springfield	Fairfax Connector	304	30	Fraconia/Springfield Metro	Fraconia/Springfield Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/304.pdf">http://www.fairfaxcounty.gov/connector/pdf/304.pdf</a>
Franconia/Springfield	Fairfax Connector	305	30	Newington Forest	Huntingdon Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/305.pdf">http://www.fairfaxcounty.gov/connector/pdf/305.pdf</a>
Pentagon	Fairfax Connector	306	25	GMU	Pentagon	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/306.pdf">http://www.fairfaxcounty.gov/connector/pdf/306.pdf</a>
Franconia/Springfield	Fairfax Connector	310	30	Rolling Valley P&R	Huntingdon Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/310.pdf">http://www.fairfaxcounty.gov/connector/pdf/310.pdf</a>
Van Dorn Metro	Fairfax Connector	321	30	Van Dorn Metro	Van Dorn Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/321.pdf">http://www.fairfaxcounty.gov/connector/pdf/321.pdf</a>
Van Dorn Metro	Fairfax Connector	322	30	Van Dorn Metro	Van Dorn Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/322.pdf">http://www.fairfaxcounty.gov/connector/pdf/322.pdf</a>
Franconia/Springfield	Fairfax Connector	331	30	Fraconia/Springfield Metro	Fraconia/Springfield Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/331.pdf">http://www.fairfaxcounty.gov/connector/pdf/331.pdf</a>
Franconia/Springfield	Fairfax Connector	332	30	Fraconia/Springfield Metro	Fraconia/Springfield Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/332.pdf">http://www.fairfaxcounty.gov/connector/pdf/332.pdf</a>
Pentagon	Fairfax Connector	380D	20	Gambriel P&R	Pentagon	Yes	<a href="http://www.fairfaxcounty.gov/connector/pdf/380-">http://www.fairfaxcounty.gov/connector/pdf/380-</a>
Franconia/Springfield	Fairfax Connector	401	15	Fraconia/Springfield Metro	Tysons West Park Transit	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/401.pdf">http://www.fairfaxcounty.gov/connector/pdf/401.pdf</a>

## APPENDIX C – PUBLIC TRANSIT ROUTE MAPS & FEEDER SERVICE

### Available Public Feeder Services throughout the Region that serve Metrorail and VRE Stations (cont.)

Metrorail Station Served	Operating Agency	Route No.	Headways during Peak	Route Origin	Route End	Express?	Web Link to Route Details
Franconia/Springfield	Fairfax Connector	402	15	Fraconia/Springfield Metro	Tysons West Park Transit	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/402.pdf">http://www.fairfaxcounty.gov/connector/pdf/402.pdf</a>
Vienna	Fairfax Connector	462	30	Van Dorn Metro	Old Lee Hwy & Hilltop	Yes	<a href="http://www.fairfaxcounty.gov/connector/pdf/462.pdf">http://www.fairfaxcounty.gov/connector/pdf/462.pdf</a>
Vienna	Fairfax Connector	463	30	Van Dorn Metro	Old Lee Hwy & Hilltop	Yes	<a href="http://www.fairfaxcounty.gov/connector/pdf/462.pdf">http://www.fairfaxcounty.gov/connector/pdf/462.pdf</a>
Vienna	Fairfax Connector	466	32	Vienna Metro	Vienna Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/462.pdf">http://www.fairfaxcounty.gov/connector/pdf/462.pdf</a>
Vienna	Fairfax Connector	621	20	Vienna Metro	Vienna Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/621.pdf">http://www.fairfaxcounty.gov/connector/pdf/621.pdf</a>
Vienna	Fairfax Connector	622	20	Vienna Metro	Vienna Metro	Yes	<a href="http://www.fairfaxcounty.gov/connector/pdf/621.pdf">http://www.fairfaxcounty.gov/connector/pdf/621.pdf</a>
Vienna	Fairfax Connector	623	20	Vienna Metro	Vienna Metro	Yes	<a href="http://www.fairfaxcounty.gov/connector/pdf/621.pdf">http://www.fairfaxcounty.gov/connector/pdf/621.pdf</a>
Vienna	Fairfax Connector	630	60	Central P&R	Vienna Metro	Yes	<a href="http://www.fairfaxcounty.gov/connector/pdf/630.pdf">http://www.fairfaxcounty.gov/connector/pdf/630.pdf</a>
Vienna	Fairfax Connector	631	35	Braddock Rd	Vienna Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/630.pdf">http://www.fairfaxcounty.gov/connector/pdf/630.pdf</a>
Vienna	Fairfax Connector	632	30	Park Meadow	Vienna Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/630.pdf">http://www.fairfaxcounty.gov/connector/pdf/630.pdf</a>
Vienna	Fairfax Connector	640	60	Lee Rd	Vienna Metro	Yes	<a href="http://www.fairfaxcounty.gov/connector/pdf/640.pdf">http://www.fairfaxcounty.gov/connector/pdf/640.pdf</a>
Vienna	Fairfax Connector	642	30	Sully Station P&R	Vienna Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/640.pdf">http://www.fairfaxcounty.gov/connector/pdf/640.pdf</a>
Vienna	Fairfax Connector	644	15	Centerville P&R	Vienna Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/640.pdf">http://www.fairfaxcounty.gov/connector/pdf/640.pdf</a>
Vienna	Fairfax Connector	650	45	Avion Parkway	Vienna Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/650.pdf">http://www.fairfaxcounty.gov/connector/pdf/650.pdf</a>
Vienna	Fairfax Connector	651	30	Lee Rd	Vienna Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/650.pdf">http://www.fairfaxcounty.gov/connector/pdf/650.pdf</a>
Vienna	Fairfax Connector	652	35	Lee Jackson Hwy	Vienna Metro	No	<a href="http://www.fairfaxcounty.gov/connector/pdf/650.pdf">http://www.fairfaxcounty.gov/connector/pdf/650.pdf</a>
Vienna	CUE	Green 1	35	Vienna Metro	Vienna Metro	No	<a href="http://www.fairfaxva.gov/cueBus/GreenRoute_S.pdf">http://www.fairfaxva.gov/cueBus/GreenRoute_S.pdf</a>
Vienna	CUE	Green 2	35	Vienna Metro	Vienna Metro	No	<a href="http://www.fairfaxva.gov/cueBus/GreenRoute_S.pdf">http://www.fairfaxva.gov/cueBus/GreenRoute_S.pdf</a>
Vienna	CUE	Gold 1	30	Vienna Metro	Vienna Metro	No	<a href="http://www.fairfaxva.gov/cueBus/GoldRoute_S.pdf">http://www.fairfaxva.gov/cueBus/GoldRoute_S.pdf</a>
Vienna	CUE	Gold 2	30	Vienna Metro	Vienna Metro	No	<a href="http://www.fairfaxva.gov/cueBus/GoldRoute_S.pdf">http://www.fairfaxva.gov/cueBus/GoldRoute_S.pdf</a>
Pentagon	Valley Coach Connector (private)	1	15	Strasburg	K St & 18th	No	<a href="http://www.shenvalleycommuters.com/Home_Page.php">http://www.shenvalleycommuters.com/Home_Page.php</a>
Vienna Metro	Valley Coach Connector (private)	2	NA	Front Royal	Vienna Metro	Yes	<a href="http://www.shenvalleycommuters.com/Home_Page.php">http://www.shenvalleycommuters.com/Home_Page.php</a>
Pentagon	Valley Van Connector (private)	3	20	Front Royal	Union Station	No	<a href="http://www.shenvalleycommuters.com/Home_Page.php">http://www.shenvalleycommuters.com/Home_Page.php</a>
Pentagon	Martz Bus (private)	DC10 to Pentagon	NA	Rt. 208	14th & Indiana	Yes	<a href="http://www.martzgroupva.com/commuter-service-morning">http://www.martzgroupva.com/commuter-service-morning</a>
Pentagon	Martz Bus (private)	Pentagon Express	NA	Rt. 209	15th & Indiana	Yes	<a href="http://www.martzgroupva.com/commuter-service-morning.asp">http://www.martzgroupva.com/commuter-service-morning.asp</a>

# Appendix D

## Existing Slug Pick-Up Points

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**APPENDIX D – EXISTING SLUG PICK-UP POINTS**

**AM Slug Pick Up Points-Springfield/Woodbridge**

	Pickup location	Destination	Hours	Parking	Connecting Bus Line
Springfield	Bob's: Just west of I-95 near the intersection of Old Keene Mill Road and Bland Street in Springfield, VA. Currently the line still operates out of the Long John Silver's parking area. However, at some point this line may move to the commuter lot next to K-Mart.	L'Enfant Plaza, 14th Street (all points), Memorial Bridge Area, 23rd Street	5:45 - 7 am (good) 7-8 am (excellent)	Commuter lot next to K-Mart with 155 spaces	Fairfax Connector route numbers are (110, 111, 204), MetroBus (18A, B, E, F, G, H, J, KL, P, R)
	Daventry: The Daventry slug line is located in the Daventry Subdivision. Because of the safety hazard of stopping on this road, the line has relocated from the bus stop on Old Keene Mill Road to the new location about 50 yards south on Hunter Village Drive. Slugs wait next to the curb in the median island.	Pentagon	5:30 - 7 am (very good) 7 - 8 am (good)	Limited curbside parking; Park on shoulder of Hunter Village Drive but pay close attention to no parking signs.	Fairfax Connector
	Cardinal Plaza: The Cardinal Forest (occasionally called Rolling Road) slug line operates next to the Shell station on Old Keene Mill Road, across from the Cardinal Forest Shopping Area. Slugs stand a few yards from the bus stop, actually putting them on the edge of the Springfield Golf and Country	Pentagon	6-7 am (slow) 7-8 am (good)	Commuter lot with 100 spaces; lot is in Cardinal Forest Shopping Center.	Metrobus (18P) and Fairfax Connector
	Rolling Valley: Springfield/Burke, in the commuter lot near the intersection of 9300 Old Keene Mill Road and Shiplett Boulevard.	All areas: Heaviest volume is to Pentagon; less volume to: Foggy Bottom, 20th and L, Crystal City, 14th and constitution, L'Enfant Plaza, 18th Street, and Rosslyn	5:45 - 7 am (good) 7-8 am (excellent) 8-8:30 am (good)	Commuter lot with 628 spaces	Fairfax Connector, Metrobus (18P)
	Huntsman: Springfield, near the intersection of Huntsman Blvd. and Sydenstricker Road.	Pentagon, Rosslyn	5:30-7 am (very good) 7-8:30 (good)	Limited parking on shoulder of Huntsman south of intersection or on Sydenstricker near school.	Fairfax Connector
	Sydenstricker Commuter Lot: West Springfield, near the intersection of Sydenstricker and Hooes Road (Hwy 640) adjacent to the Fairfax County Parkway (Hwy 7100).	Pentagon, Rosslyn	5:45-7 am (very good) 7-8:30 am (good)	Commuter lot with 167 spaces	Fairfax Connector (305 and 385)
	Woodbridge	Old Hechinger's: Woodbridge, at Old Hechinger's, near the intersection of Old Bridge Road and Gordon Boulevard (Route 123). Approximately 1310 Old Bridge Road, Woodbridge, VA 22192	14th and Constituion, 14th and I, 18th Street	6-7 am (good), 7-8:30 am (excellent)	Commuter lot with 594 spaces.
Tackett's Mill: Lake Ridge, near the intersection of Minnieville Road and Old Bridge Road.		Pentagon (heaviest volume), Crystal City, Rosslyn	5:45-7 am (old lot), 7-8:30 am (new lot)	New lot: 530 spaces, Old lot: 120 spaces	OmniRide
Dillingham: Lake Ridge, near the intersection of Giffith Avenue and Cotton Mill Drive.		Pentagon	5:45- 8 am (sporadic)	Parking along curb	OmniRide
Horner Road: Woodbridge, near the intersection of Prince William Parkway and Horner Road just west of I95 off exit 158.		Pentagon, Crystal City, Rosslyn, 14th Street (all points), L'Enfant Plaza, 18th Street and Constituion, Memorial Bridge area, 23rd Street, Washington Navy Yard	5:30- 7 am (excellent)	Commuter lot with 2425 spaces	OmniRide
Potomac Mills: Woodbridge, on the South side of Potomac Mills Shopping Mall near the main entrance in parking areas #12 and #13. Approximately at 14362 Gideon Drive, Dale City, VA 22193		Pentagon, Rosslyn, 14th Street (all points), Crystal City, 18th Street and Constitution, L'Enfant Plaza, Memorial Bridge area, 23rd Street	5:30-9 am (excellent)	Commuter lot with 950 spaces.	OmniRide
Montclair Fire Station: Waterway Drive and Spring Branch Blvd., Montclair, VA		Pentagon	6-6:30 am (good)	Limited curbside parking along Spring Branch Blvd.	OmniRide
Montclair Northgate: Montclair at the intersection of Waterway Drive and Northgate		Pentagon	5:30-6:30 am	Parking on the shoulder of Northgate	OmniRide
Route 234 (Dumfries Road): Rt. 234 (Dumfries Road) is located off Exit 152 and east of I-95 and just prior to Route 1 across from McDonald's.		Pentagon, 14th and Constitution, 14th at Commerce Department, 14th and New York, 14th and F, 18th Street, L'Enfant Plaza	Before 7 am	Commuter Lot	OmniRide

Source: [www.slug-lines.com](http://www.slug-lines.com), (last accessed on May 1, 2010).

AM Slug Pick Up Points-Springfield/Woodbridge

	Pickup location	Destination	Hours	Parking	Connecting Bus Lines
Stafford	Route 610: Stafford, in the commuter lot behind McDonald's, north of Garrisonville Road (Route 610 ) off Stafford Boulevard. Use exit 143B (Route 610, Garrisonville) off I-95. Lot is near the intersection at Garrisonville and Mine Road, Stafford, VA 22554	Pentagon, Crystal City, Rosslyn (Possible)	5:45 - 7:30 am	Commuter Lot (generally full by 6:45 am); after 6:45, new lot on Mine Road; Garrisonville park-and-ride lot is located on Stafford Borough Blvd just off Garrisonville Road 1/2 mile west of I-95	Martz Bus
	Route 630: Stafford, use exit 140 (Route 630, Stafford) off I-95. Commuter lot and slug line are located approximately .2 miles west on Route 630 on the left side of the road. Approximately 1000 Courthouse Road, Stafford, VA 22554	Pentagon, Crystal City, Rosslyn, 14th Street	5:30-8:30 am	Commuter lot	National Coach, Lee, and Quick's Bus Service
Fredericksburg	Route 17: Fredericksburg, use exit 133B (Route 17, Warrenton) off I-95. Commuter lot and slug line are located approximately .5 miles north on Route 17 on the left side of the road. Street address - 575 Warrenton Rd. Fredericksburg, VA, 22405	Pentagon, Crystal City, Rosslyn, 14th Street, 14th and G, L'Enfant Plaza	5:30-8:30 am	Commuter lot	National Coach, Lee, and Quick's Bus Service
I-66/Manassas	Manassas Starbucks: At Starbucks in Manassas on Route 234 located at Manaport Plaza, 8329 Sudley Road Manassas VA, 22110	Pentagon	5:45 - 8:30 am	None listed	None

Source: [www.slug-lines.com](http://www.slug-lines.com), (last accessed on May 1, 2010).

**APPENDIX D – EXISTING SLUG PICK-UP POINTS**

**PM Slug Pick Up Points-Northern Virginia**

	Dropoff location	Destination	Hours	Parking	Connecting Bus Lines
Pentagon	North Rotary Road	Horner Road/ Potomac Mills	3-6 pm	Permit only, reserved at all times to include the new carpool permits. Some meter parking along Fern Street and Army Drive south of I-395.	MetroBus: 7A, B, C, D, E, F, H, P, W, X, 8S, W, X, Z, 9A, E, 10A, E, 13A, B, F, G, 16A, B, C, D, E, F, G, J, 16L, 16S, U, W, X, 17A, B, F, M, 17G, H, K, L, 18E, F, 18G, H, J, 18P, 21A, B, C, D, F, 22A, B, C, F, 24M, P, 25A, F, G, J, P, R, 28F, G, 29C, E, G, H, X, P13; OmniRide, Fairfax Connector, Alexandria DASH
		Montclair			
		Tackett's Mill/ Lorton VRE			
		Springfield/ Burke			
	Fern Street	Route 3, Fredericksburg/ Gordon Road			
		Rt. 17 Stafford (should be labeled Rt. 17 Fredericksburg)			
		Rt. 610 Mine Road			
	Rt. 610 Stafford				
Crystal City	1200 Crystal Drive and 12th Street.	Horner Road	4-5 pm	Metered parking and parking garages	OmniRide, Metrobus (11P, 23A, C)
		Potomac Mills			
		Tackett's Mill			
		Route 610 Stafford			
		Route 234 Dumfries			
Rosslyn	Lee Hwy Service Road	Potomac Mills	3:15-6 pm; Peaks at 4:30 pm	Meter parking along most streets as well as pay parking garages.	GW Shuttle, State Department Shuttle, Pentagon Shuttle, Metrobus (3A, 3B, 3E, 3F, 4A, 4B, 4E, 4H, 4S, 4L, 38B)
		Horner Road			
		Tackett's Mill			
		Route 610 Stafford			
		Route 3 - Gordon Road Fredericksburg			
	North Kent Street	Rolling Valley	4:45-5:15 pm		
		Sydenstricker			
		Davenport			
		Cardinal Forest			
	Wilson Blvd and Kent Street	Route 17			

Source: [www.slug-lines.com](http://www.slug-lines.com), (last accessed on May 1, 2010).

# Appendix E

## Regional Park & Ride Lots

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**APPENDIX E – REGIONAL PARK & RIDE LOTS**

**Availability and Capacity of Park and Ride Lots in Northern Virginia**

Jurisdiction	Lot #	Lot name	Location	Corridor	2009		
					Capacity	Usage	% used
<b>Arlington</b>							
	55	Ballston Public Parking Garage	North Glebe Road and Randolph Street	I-66	500	0	0%
	39	Columbia Pike @ Four Mile Run	Columbia Pike & Four Mile Run	I-66	24	23	96%
	56	North Quincy Street	Quincy Street @ 17th Street	I-66	356	71	20%
<b>Arlington Totals</b>					<b>880</b>	<b>94</b>	<b>11%</b>
<b>Loudoun</b>							
	89	Algonkian	Our Lady of Hope Catholic Church, Intersection of Algonkian Parkway and Cascades Parkway	Dulles Toll Road	100	54	54%
	93	Ashburn	Crossroads United Methodist Church, 43454 Crossroads Drive (Gravel lot across from the church)	Dulles Toll Road	90	3	3%
	63	Ashburn Farm	Summerwood Circle and Ashburn Farm Parkway	Dulles Toll Road	20	13	65%
	101	Ashburn North	Russell Branch Parkway at Richfield Way (near Strayer University)	Loudoun	190	77	41%
	62	Ashburn Village Soccer Field	Grottoes Drive and Gloucester Parkway	Dulles Toll Road	40	3	8%
	85	Barber and Ross	Harrison Street / Catoctin Circle	Dulles Toll Road	365	416	114%
	90	Brambleton	Creighton Road east of Route 659	Dulles Toll Road	100	0	0%
	87	Broad Run Farms	Galilee Methodist Church on Winding Rd of Algonkian Pkwy	Dulles Toll Road	48	8	17%
	91	Broadlands	Caliborne Parkway at Village Drive (HOA office/Park on west side of Claiborne Parkway)	Dulles Toll Road	30	4	13%
	92	Broadlands South	Broadlands Southern Walk Village Center near Harris Teeter	Dulles Toll Road	75	28	37%
	64	Cascades Lot	Palisades Pkwy, .25 mi E of Cascades Pkwy. Lot is near library and close to Community Lutheran Church	Route 7	55	49	89%
	76	Dulles North	Lockridge Road at Moran Road	Dulles Toll Road	750	765	102%
	88	Dulles South	Stone Ridge Village Center	Dulles Toll Road	250	145	58%
	82	Lowes Island	Great Falls Plaza entrance off Hardwood Forest Dr.	Route 7	65	59	91%
	102	Patrick Henry College	1 Patrick Henry Circle	Loudoun	130	104	80%
	84	Potomac Station Dr.	Potomac Station Drive (PSD) and Rivercreek Parkway (RP). On PSD east of RP at the community park with tennis court and tot lot	Route 7	48	0	0%
	57	St. Andrew's Presbyterian Church	711 West Main Street, Purcellville	Route 7	90	73	81%
	66	Sterling Park Shopping Center	Enterprise St & Maple --Sterling Plaza	Dulles Toll Road	45	0	0%
<b>Loudoun County Totals</b>					<b>2491</b>	<b>1801</b>	<b>72%</b>

Source: VDOT

**TRANSPORTATION MANAGEMENT PLAN FOR BRAC 133 AT MARK CENTER**

**Availability and Capacity of Park and Ride Lots in Northern Virginia (cont.)**

Jurisdiction	Lot #	Lot name	Location	Corridor	2009		2009 % used
					Capacity	Usage	
Prince William							
	15	Bethel United Methodist Church	Smoketown & Minneville	I-95	68	21	31%
	3	Brittany Neighborhood Park	Exeter Drive off VA 234	I-95	85	69	81%
	11	Cherrydale @ Dale Blvd	Cramer Mews off Cherrydale Dr.	I-95	20	6	30%
	16	Christ Chapel	Smoketown Rd & Pr. Wm. Pkwy	I-95	300	0	0%
	21	Church of the Brethren	Intersection Horner Rd and Millwood Dr.				
	9	Dale City Commuter Lot	Woodbridge	I-95	31	20	65%
			Minnieville Road and Dale Boulevard	I-95	591	275	47%
			Limestone Road and Mile Stone Ct.,				
	100	Gainesville United Methodist Church	Gainesville	I-66	75	0	0%
	22	Harbor Drive	Harbor Drive and Minnieville Road	I-95	200	1	1%
	25	Hechinger's - Old Bridge	Intersection Rte 123 and Old Bridge Road	I-95	580	594	102%
	8	Hillendale Commuter Lot	Hillendale Road and Dale Boulevard	I-95	248	80	32%
	26	I-95/123 Loop Interchange	Intersection I-95 and Rte 123, Exit 160	I-95	580	139	24%
	7	Kirkdale @ Dale Blvd	Intersection Dale Blvd @ Kirkdale Rd	I-95	41	0	0%
	12	K-Mart, Dale City	Intersection Dale Blvd & Gideon Dr.	I-95	90	66	73%
	24	Lake Ridge Commuter Lot	Minnieville Road & Old Bridge Road	I-95	638	622	97%
			Limestone Road and Mile Stone Ct.,				
	99	Limestone Road lot	Gainesville	I-66	182	81	45%
	6	Lindendale Commuter Lot	Lindendale Road and Dale Boulevard	I-95	216	85	39%
	74	Manassas Mall	Manassas Mall: Sudley Rd (234) and Rixlew La	I-66	217	120	55%
	4	Montclair Commuter Lot	VA 234 North of Stockbridge Drive	I-95	50	49	98%
	14	Old Bridge Festival Shopping Center	Old Bridge Road and Smoketown Road	I-95	56	21	38%
	40	Portsmouth Road Commuter Lot	Portsmouth Road and Williamson Blvd.	I-66	605	47	8%
	19	Potomac Mills Mall	Potomac Mills Mall across from Pier I imports	I-95	936	936	100%
	13	Prince William County Stadium	Off Davis Ford Road at Stadium	I-95	190	58	31%
	20	Prince William Parkway lot	Prince William Parkway at I-95	I-95	2363	2293	97%
	17	Prince William Square	Smoketown Road and Gideon Drive	I-95	45	0	0%
	5	Princedale at Northton	Princedale Dr, W of Dale Blvd	I-95	43	0	0%
	18	PRTC Transit Center	Potomac Mills Road at Telegraph Road	I-95	200	152	76%
			Minnieville Road & Old Bridge Road in				
	23	Tackett's Mill Specialty Center	shopping center	I-95	170	110	65%
	1	Triangle	VA 619 and US 1	I-95	31	29	94%
	2	US1/VA 234	VA 234 & US 1	I-95	850	610	72%
			<b>Prince William County Totals</b>		<b>9701</b>	<b>6484</b>	<b>67%</b>
			<b>Grand Total</b>		<b>13072</b>	<b>8379</b>	<b>64%</b>

Source: VDOT

**APPENDIX E – REGIONAL PARK & RIDE LOTS**

**Park and Ride Lots in Fairfax County**

NAME	ADDRESS	DISTRICT	PARKING SPACES		MOST RECENT CAPACITY COUNT	% OF UTILIZATION OF LOT	AMENITIES						BUS ROUTES THAT SERVES THIS LOCATION	GRAVEL/PAVED LOT
			SPACES	HANDICAP SPACES			CONNECTOR STORE ON-SITE	LIGHTS	PAY PHONE	BIKE RACKS/LOCKERS	TRASH CANS	BUS SHELTERS		
American Legion	6520 Amherst Avenue Springfield, VA 22150	Lee	100	0	100	100%	NO	YES	NO	0	NO	NO	NONE	Paved
AMF Centreville Lane	13814 Lee Highway Centreville, VA 20120	Sully	35	0	0	0%	NO	YES	NO	0	NO	NO	NONE	Paved
Autumn Willow Park	13090 Autumn Willow Dr. Centreville, Va 20120	Sully	100	0	0	0%	NO	NO	NO	0	YES	NO	12M	Gravel
Backlick North	6831 Backlick Road Springfield, VA 22150	Lee	279	7	73	25%	NO	YES	NO	0	YES	YES	310, 331, 332	Paved
Canterbury Woods Centreville Park & Ride(Rt. 29 & Stone Rd)	5018 Wakefield Chapel Road Annandale, VA 22003  14700 Lee Highway Centreville, VA 20120	Braddock  Sully	29  372	0  8	0  372	0%  100%	NO  NO	NO  YES	NO  YES	2 bicycle racks  4 bicycle racks	YES  YES	NO  YES	306, 17A,B,F,G, H,K,L  12A,C,E,F	Gravel  Paved
Centreville United Methodist Church	6400 Old Centreville Rd Centreville, Va 20121	Sully	144	8	60	41%	NO	YES	NO	2 bicycle racks	YES	YES	12A,E,F,R	Paved
Fairfax County Government Center	12000 Government Center Parkway Fairfax, VA 22035	Springfield	170	8	91	53%	NO	YES	NO	1 bicycle rack	YES	YES	605,621,623	Paved
Gambrill Road	7321 Gambrill Road Springfield, VA 22153	Springfield	225	7	121	53%	NO	YES	NO	12 lockers	YES	YES	305, S3018R	Paved
Greenbriar Park	4600 Stringfellow Road Fairfax, VA	Sully	60	0	0	0%	NO	YES	NO	0	YES	NO	605,12S	Gravel & Paved
Herndon Monroe Park and Ride	12530 Sunrise Valley Drive Herndon, VA 20191	Hunter Mill	1745	34	1744	99%	YES	YES	YES	10 lockers / 9 bicycle racks	YES	YES	551,922,924,926,927,929,950,951,952,980, RIBS2, Metrobus 5A	Paved
Lorton Market Street	9405 Lorton Market Street Lorton, VA 22079	Mt. Vernon	65	0	3	4%	NO	YES	NO	0	NO	NO	171	Paved
Lorton Park & Ride	9300 Gunston Cove Road Lorton, VA 22079	Mt. Vernon	170	5	65	3%	NO	YES	YES	24 lockers	YES	YES	307	Paved
Parkwood Baptist Church	8726 Braddock Road Annandale, VA 22003	Braddock	279	0	0	0%	NO	NO	NO	0	NO	NO	306,17A,F,H,K	Paved
Poplar Tree Park	4718 Stringfellow Road Chantilly, VA 20151	Sully	820	0	0	0%	NO	NO	YES	0	YES	NO	605,12S	Gravel

Source: Fairfax Connector

## TRANSPORTATION MANAGEMENT PLAN FOR BRAC 133 AT MARK CENTER

### Park and Ride Lots in Fairfax County (cont.)

NAME	ADDRESS	DISTRICT	PARKING SPACES		MOST RECENT CAPACITY COUNT	% OF UTILIZATION OF LOT	AMENITIES						BUS ROUTES THAT SERVES THIS LOCATION	GRAVEL/PAVED LOT
			SPACES	HANDICAP SPACES			CONNECTOR STORE ON-SITE	LIGHTS	PAY PHONE	BIKE RACKS/LOCKERS	TRASH CANS	BUS SHELTERS		
Reston East	1860 Wiehle Avenue Reston, VA 20190	Hunter Mill	820	17	820	100%	YES	YES	YES	10 lockers / 13 bicycle racks	YES	YES	504,505,551,5 52,554,557,59 5,597,RIBS1,2, 3	Paved
Reston North	11300 Sunset Hills Road Reston, VA 20190	Hunter Mill	368	8	368	100%	NO	YES	YES	4 bicycle racks	YES	YES	505,952	Paved
Reston South	2531 Reston Parkway Reston, VA 20191	Hunter Mill	412	10	175	42%	NO	YES	YES	11 bicycle racks	YES	YES	553,557,585	Paved
Rolling Valley	9220 Old Keene Mill Road Burke, Va 22015	Springfield	664	16	440	66%	NO	YES	YES	8 bicycle racks	YES	YES	310,18G,J,P,R,S	Paved
Sydenstricker Road	8500 Hooes Road Springfield, VA 22153	Springfield	170	6	170	100%	NO	YES	NO	14 lockers	YES	YES	305	Paved
South Run District Park	7550 Reservation Drive Springfield, VA 22153	Springfield	52	3	0	0%	NO	YES	NO	0	YES	NO	18R	Paved
Springfield Mall	6717 Frontier Drive Springfield, VA 22150	Lee	500	3	500	100%	NO	YES	NO	0	NO	NO	321,322,33,33 2, 401,580,591	Paved
Springfield Plaza	6400 Springfield Plaza Springfield, VA 22150	Lee	254	0	254	100%	NO	YES	NO	0	NO	NO	331,332,18E	Paved
Springfield United Methodist Church	6501 Springfield Road Springfield, VA 22150	Lee	56	0	56	100%	NO	YES	NO	0	NO	NO	18G,J,P	Paved
St. Paul Chung Catholic Church	4712 Rippling Pond Dr Fairfax, VA 22033	Springfield	100	5	9	9%	NO	YES	NO	0	NO	NO	12S	Paved
Stringfellow Road	4920 Stringfellow Rd. Centreville, VA 20120	Sully	385	8	385	100%	NO	YES	NO	2 bicycle racks	YES	YES	12E,D,M,S	Paved
Sully Station	4900 Stonecroft Blvd. Centreville, VA 20151	Sully	38	0	10	26%	NO	YES	YES	5 bicycle racks	YES	YES	12C,D,R,S	Paved
VRE Backlick Road Station	6900 Hechinger Drive Springfield, VA 22151	Lee	220	5	132	55%	NO	YES	YES	6 bicycle racks	YES	YES	321,322,401 18E	Paved
VRE Burke Centre Station	5671 Roberts Pkwy. Burke, VA 22015	Springfield	543	9	400	73%	NO	YES	YES	1 bicycle racks	YES	YES	17B,L	Paved
VRE Lorton Station	8990 Lorton Station Blvd. Lorton, VA 22079	Mt. Vernon	466	7	256	55%	NO	YES	YES	6 bicycle racks	YES	YES	171,307	Paved
VRE Rolling Road Station	9016 Burke Road Burke, VA 22015	Springfield	368	9	358	97%	NO	YES	YES	10 bicycle racks	YES	NO	17L	Paved
Wakefield Park	8100 Braddock Road Annandale, VA 22003	Braddock	50	0	0	0%	NO	NO	NO	0	NO	NO	306, 17A,B,F,G,H,K. L	Paved

Source: Fairfax Connector

Park and Ride Lots in the District of Columbia

Name	Jurisdiction	Location	Parking Spaces	Connecting Services
Anacostia Metro Station	DC	Shannon Pl, SE between MLKing Ave & Firth Sterling	408	Metrobus
Deanwood Metro Station	DC	Minnesota Ave between Nash & 48th Sts, NE	373	Metrobus
Fort Totten Metro Station	DC	Galloway St east of South Dakota Ave, NE	340	Metrobus
Minnesota Ave Metro Station	DC	Minnesota Ave north of Grant St, NE	194	Metrobus
Rhode Island Ave Metro Station	DC	Rhode Island Ave west of 8th St, NE	641	Metrobus
Union Station Rail Station	DC	60 Mass. Ave. & 1st St. N.E.	45	Amtrak, VRE, WMATA, MARC, Metrobus, Red Line

Source: *Commuter Connections*

Park and Ride Lots in Maryland

Name	Jurisdiction	Location	Parking Spaces	Connecting Services
Bristol	Anne Arundel	MD 4 and MD 258 (Bay Front Road West)	100	MTA Commuter Bus
Crofton	Anne Arundel	MD 3 at Crofton Country Club	10	Metrobus
Davidsonville	Anne Arundel	US 50/301 & MD 424 (Davidsonville Road)	100	MTA Commuter Bus
Harry S Truman	Anne Arundel	Harry S Truman Pkwy & Riva Road	100	MTA Commuter Bus
Lower Pindell Road	Anne Arundel	MD 980 at Lower Pindell Road	138	MTA Commuter Bus
Navy Stadium	Anne Arundel	Navy Stadium at Rowe Blvd & Taylor Ave	480	MTA Commuter Bus
Severna Park	Anne Arundel	MD 2 at Jones Station Road	400	MTA Local Bus
Waysons Corner	Anne Arundel	MD 4 (So. Maryland Blvd.) & MD 408 (Mt. Zion Marlboro Road.)	138	MTA Commuter Bus
Dunkirk Park	Calvert	MD 4, Dunkirk Park in Dunkirk	106	MTA Commuter Bus
Sunderland	Calvert	MD 2 & MD 4	35	MTA Commuter Bus
Smallwood Drive	Charles	US 301 at Smallwood Dr.	-	MTA Commuter Bus
Urbana (North Lot)	Frederick	I-270 & MD 80 Exit 26	164	Ride-On, MTA Commuter Bus
Urbana (South Lot)	Frederick	I-270 & MD 80 Exit 26	230	Ride-On, MTA Commuter Bus
Marywood	Harford	US 1 at MD 24	385	MTA Commuter Bus
Broken Land Pkwy East	Howard	MD 32 and Broken Land Pkwy.	210	MTA Commuter Bus
Broken Land Pkwy West	Howard	MD 32 & Broken Land Pkwy.	325	MTA Commuter Bus, Connect-a-Ride, Howard Transit
Clarksville	Howard	MD 32 & MD 108	300	MTA Commuter Bus, Howard Transit
Long Gate	Howard	Long Gate Pkwy & MD 100	318	MTA Commuter Bus, Howard Transit
Scaggsville	Howard	US 29 & MD 216	42	MTA Commuter Bus
Snowden River	Howard	MD 175 & Snowden River Pkwy.	356	MTA Commuter Bus, Howard Transit Connector
Briggs Chaney	Montgomery	Briggs Chaney Road. at Gateshead Manor Way	200	Metrobus, Ride-On
Burtonsville	Montgomery	US 29 north of MD 198 (Burtonsville Crossing Shpg. Ctr.)	131	Metrobus, MTA Commuter Bus, Connect-A-Ride
Colesville	Montgomery	MD 650 and Randolph Road	475	Metrobus
Comus Road	Montgomery	MD 355 north of Comus Road (Clarksburg, MD)	300	Ride-On
Forcey Memorial Church	Montgomery	E. Randolph Road at Old Columbia Pike	167	Metrobus
Forest Glen Metro Station	Montgomery	Georgia Ave & Forest Glen Rd	1,319	Metrobus
Gaithersburg	Montgomery	Quince Orchard Road at west side of I-270	583	Ride-On

Source: Commuter Connections

Park and Ride Lots in Maryland (cont.)

Name	Jurisdiction	Location	Parking Spaces	Connecting Services
Gaithersburg Rail Station	Montgomery	5 S. Summit Ave. @ East Diamond Ave.	3,364	Ride-On
Germantown Rail Station	Montgomery	19320 Mateny Hill Rd. @ Md. 118	46	Ride-On
Germantown Transit Center	Montgomery	Germantown Road & Aircraft Dr	200	Ride-On
Glenmont Metro Station	Montgomery	Georgia Ave & Layhill Rd	368	Metrobus, Ride-On
Greencastle	Montgomery	Greencastle Road & Turnbridge Dr	214	Metrobus
Grosvenor-Strathmore Metro Station	Montgomery	Rockville Pike between Montrose Ave & Tuckerman Ln	5,467	Metrobus
Kensington Rail Station	Montgomery	Howard Ave. & Montgomery Ave.	22	Ride-On
Kingsview	Montgomery	Clopper Road & Kingsview Village Blvd	820	Ride-On
Lakeforest Mall	Montgomery	Lost Knife Road & Odenhal Ave	236	Metrobus, Ride-On
Metropolitan Grove Rail Station	Montgomery	Clopper Rd. (near I-270) adjacent to MVA	306	Ride-On
Milestone Shopping Center	Montgomery	Shakespeare Blvd. & MD 355	35	Ride-On
Montgomery Mall	Montgomery	Westlake Ter & Westlake Dr near I-270	314	Metrobus, Ride-On
Montrose Road (permit & fee 301-770-8108)	Montgomery	Rockville Pike & Montrose Road	245	Ride-On
Norbeck Road	Montgomery	Norbeck Road. 1/4 mi. east of Georgia Ave.	353	Metrobus, Ride-On
Rockville Metro Station	Montgomery	Hungerford Dr near Park Ave	982	Metrobus
Rockville Rail Station	Montgomery	307 Stonestreet Ave. off MD 355 @ Rockville Metro Station	15	Metrorail Red Line, Metrobus, Ride-On
Shady Grove Metro Station	Montgomery	MD-355 & Shady Grove Rd	1,098	Metrobus
Silver Spring Metro Station	Montgomery	Colesville Rd between East-West Hwy and Second Ave	3,643	Metrobus, Ride-On
Tech Road	Montgomery	Tech Road at Old Columbia Pike	416	Metrobus, Ride-On

Source: Commuter Connections

Park and Ride Lots in Maryland (cont.)

Name	Jurisdiction	Location	Parking Spaces	Connecting Services
Twinbrook Metro Station	Montgomery	Twinbrook Pkwy & Halpine Rd. east of Rockville Pike	977	Metrobus, Ride-On
Washington Grove Rail Station	Montgomery	Railroad St. & Oakmont Ave.	352	Ride-On
West Diamond Ave	Montgomery	W Diamond Ave & I-270	192	Ride-On
Wheaton Metro Station	Montgomery	Georgia Ave & Reedie Dr	530	Metrobus, Ride-On
White Flint Metro Station	Montgomery	Rockville Pike & Marinelli Rd	716	Metrobus, Ride-On
Accokeek	Prince George's	MD 210 at MD 373	412	Metrobus
Addison Road-Seat Pleasant Metro Station	Prince George's	100 Addison Rd & Central Ave	808	Metrobus, THE BUS
Bowie	Prince George's	MD 197 at Northview Dr	99	Metrobus
Bowie (Market Place Mall)	Prince George's	MD 450 & Market Place Mall	19	Metrobus
Bowie State Rail Station	Prince George's	Laurel-Bowie Rd. (MD Rt. 197) @ BSU	652	Metrobus
Branch Avenue Metro Station	Prince George's	Auth Way & Old Soper Rd at Auth Rd	1,980	Metrobus, THE BUS
Capital Plaza	Prince George's	MD 450 at 62nd Ave.	265	Metrobus
Capitol Heights Metro Station	Prince George's	Southern Ave & E. Capitol St	1,268	Metrobus
Cheverly Metro Station	Prince George's	Columbia Park Rd south of Rt 50	1,866	Metrobus
Clinton	Prince George's	MD 5 at Woodyard Road	100	Metrobus, THE BUS
College Park - U of MD Metro Station	Prince George's	Calvert Rd & 50th Ave	1,068	Metrobus, Connect-A-Ride, THE BUS, UM Student Shuttle
College Park Rail Station	Prince George's	Calvert Rd. adjacent to the College Park Metro Station	15	Metrorail Green Line, Metrobus
Eastover Shopping Center	Prince George's	MD 210 at Audrey Lane	424	Metrobus
Equestrian Center	Prince George's	MD 4 & Water St.	576	MTA Commuter Bus, THE BUS
Fort Washington	Prince George's	East Swan Creek Road. & MD 210	649	Metrobus

Source: Commuter Connections

## APPENDIX E – REGIONAL PARK & RIDE LOTS

### Park and Ride Lots in Maryland (cont.)

Name	Jurisdiction	Location	Parking Spaces	Connecting Services
Greenbelt Armory	Prince George's	MD 193 at B-W Pkwy.	62	Metrobus
Greenbelt Metro Station	Prince George's	Cherrywood Ln off of exit 24 of I-495	422	Metrobus, Connect-A-Ride, THE BUS
Greenbelt Rail Station	Prince George's	Greenbelt Metro Drive @ Greenbelt Metro Station Near Cherrywood Ln.	652	Metrorail, Metrobus, THE BUS, Connect-A-Ride
Landover Metro Station	Prince George's	Pennsy Dr north of Landover Rd	1,980	Metrobus, THE BUS
Laurel	Prince George's	Sandy Spring Road. at Van Dusen Rd.	684	Metrobus
Laurel South	Prince George's	MD 197 & Briarcroft Lane	70	Metrobus
Montpelier Recreation Park	Prince George's	MD 197 at Montpelier Dr.	50	Metrobus
Naylor Road Metro Station	Prince George's	Naylor Rd & Suitland Pkwy & Branch Ave	5,100	Metrobus
New Carrollton Metro Station	Prince George's	West of Garden City Dr north of John Hanson Hwy	3,364	Metrobus
New Carrollton Rail Station	Prince George's	4300 Garden City Dr. @ New Carrollton Metro Station	264	921, Amtrak, Metrorail Orange Line, Metrobus, THE BUS
Oxon Hill	Prince George's	Oxon Hill Road. near MD 210	100	Metrobus
Penn-Mar Shopping Center	Prince George's	Donnell Dr. at Marlboro Pike	300	Metrobus, THE BUS
Prince George's Plaza Metro Station	Prince George's	East-West Hwy west of Belcrest Rd	453	Metrobus
Riverdale Rail Station	Prince George's	Queensbury Rd. & Cleveland Ave.	299	Metrobus
Seabrook Rail Station	Prince George's	Lanham Severn Rd. (MD Rt. 564) @ Seabrook Rd.	375	Metrobus
Southern Avenue Metro Station	Prince George's	Southern Ave & Valley Terr, SE	1,781	Metrobus
Suitland Metro Station	Prince George's	North of Suitland Pkwy & west of Silver Hill Rd	3,072	Metrobus, THE BUS
West Hyattsville Metro Station	Prince George's	Ager Rd north of Queens Chapel Rd	1,890	Metrobus, THE BUS
Stevensville	Queen Anne's	US 50/301 at MD 8	50	MTA Commuter Bus
Charlotte Hall	St. Mary's	MD 5 at Charlotte Hall Shopping Center	80	MTA Commuter Bus
		<b>Total</b>	<b>61,273</b>	

Source: Commuter Connections

## **Appendix F**

# **Existing (2009) Traffic Simulation Models Measures of Effectiveness (MOE)**

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**Table F-1: Freeway Measures of Effectiveness for the Morning (AM) Peak Hour 2009 Baseline Traffic Operational Analysis without Improvements**

		LOCATION		NODE		LENGTH (ft)	VOLUMES			LINK STATISTICS			AGGREGATE STATISTICS			REMARKS
		From	To	From	To		Actual Demand	Model Throughput	Model Throughput vs Actual Demand	Speed (mph)	Density (vpmpl)	LOS	Speed (mph)	Density (vpmpl)	LOS	
I-395 GENERAL PURPOSE (GP) & HIGH OCCUPANCY VEHICLE (HOV) LANES	I-395 NORTHBOUND MAINLINE	NB GP	Begin I-395 GP Lanes South of Seminary Road Interchange	1000	1001	692	6230	6240	10	61	35	D	51	38	E	NB Freeway Mainline
				1001	1002	803	6230	6238	8	57	37	E				NB Freeway Mainline
				1002	1005	1073	6230	6216	-14	39	41	E				NB Freeway Mainline
		NB GP	Seminary Road Exit Ramp	1005	1006	790	5355	5326	-29	60	30	D	60	29	D	NB Freeway Mainline
				1006	1008	1235	5355	5317	-38	61	29	D				NB Freeway Mainline
				1008	1010	860	5355	5322	-33	61	29	D				NB Freeway Mainline
		NB GP	Seminary Road Entrance Ramp	1010	1011	1093	6855	6615	-240	57	26	C	57	27	D	NB Freeway Mainline
				1011	1015	706	6855	6620	-235	57	29	D				NB Freeway Mainline
		NB GP	King Street Exit Ramp	1015	1017	635	5835	5574	-261	60	31	D	60	31	D	NB Freeway Mainline
		NB GP	End I-395 North of Seminary Road Interchange	1017	1019	485	5835	5578	-257	61	31	D				NB Freeway Mainline
		NB HOV	Begin I-395 HOV Lanes South of Seminary Road Interchange	1052	1053	643	3340	3335	-5	67	26	C	66	25	C	NB Freeway Mainline
				1053	1054	534	3340	3338	-2	68	25	C				NB Freeway Mainline
				1054	1056	501	3340	3339	-1	68	25	C				NB Freeway Mainline
				1056	1057	417	3340	3338	-2	67	25	C				NB Freeway Mainline
				1057	1058	513	3340	3343	3	66	25	C				NB Freeway Mainline
	1058			1060	616	3340	3342	2	66	25	C	NB Freeway Mainline				
	1060			1062	560	3340	3342	2	66	25	C	NB Freeway Mainline				
	1062			1063	525	3340	3339	-1	66	25	C	NB Freeway Mainline				
	1063			1064	571	3340	3348	8	66	26	C	NB Freeway Mainline				
	1064			1066	675	3340	3350	10	65	26	C	NB Freeway Mainline				
	NB HOV	Seminary Road HOV Entrance Ramp	1066	1067	1074	3450	3433	-17	65	20	C	65	26	D	NB Freeway Mainline	
	NB HOV	End I-395 HOV Lanes North of Seminary Road Interchange	1067	1068	1010	3450	3423	-27	65	26	D				NB Freeway Mainline	
	I-395 SOUTHBOUND MAINLINE	SB GP	Begin I-395 GP Lanes North of Seminary Road Interchange	2001	2002	812	3810	3811	1	64	15	B	64	15	B	SB Freeway Mainline
				2002	2004	1209	4160	4164	4	60	14	B	60	14	B	SB Freeway Mainline
		SB GP	Seminary Road Exit Ramp	2004	2005	502	3450	3532	82	63	14	B	63	14	B	SB Freeway Mainline
				2005	2007	920	3450	3530	80	63	14	B				SB Freeway Mainline
				2007	2009	1142	3450	3545	95	63	14	B				SB Freeway Mainline
				2009	2012	1179	3450	3546	96	63	14	B				SB Freeway Mainline
	SB GP	Seminary Road Entrance Ramp	2012	2014	570	4145	4155	10	57	17	B	60	17	B	SB Freeway Mainline	
			2014	2015	728	4145	4145	0	62	17	B				SB Freeway Mainline	
I-395 NORTHBOUND RAMPS	NB GP	Seminary Road Exit Ramp	1005	1201	299	875	886	11	8	111	F	8	118	F	Diverge Ramp Section	
			1201	7002	203	875	876	1	7	128	F				Diverge Ramp Section	
	NB GP	Seminary Road Entrance Ramp	7003	1210	221	1500	1296	-204	34	21	C	34	20	C	Merge Ramp Section	
			1210	1010	234	1500	1295	-205	34	19	B				Merge Ramp Section	
	NB HOV	Seminary Road Entrance Ramp	7005	1070	339	110	84	-26	47	2	A	48	2	A	Merge Ramp Section	
			1070	1066	306	110	82	-28	49	2	A				Merge Ramp Section	
I-395 SOUTHBOUND RAMPS	SB GP	Seminary Road Exit Ramp	2004	2201	313	710	633	-77	35	9	A	35	9	A	Diverge Ramp Section	
			2201	7004	485	710	632	-78	34	9	A				Diverge Ramp Section	
	SB GP	Seminary Road Entrance Ramp	7001	2216	279	695	605	-90	33	10	A	33	14	B	Merge Ramp Section	
				2216	2012	427	695	604	-91	34	16	B				Merge Ramp Section

Table F-2: Freeway Measures of Effectiveness for the Evening (PM) Peak Hour 2009 Baseline Traffic Operational Analysis without Improvements

		LOCATION		NODE		LENGTH (ft)	VOLUMES			LINK STATISTICS			AGGREGATE STATISTICS			REMARKS
		From	To	From	To		Actual Demand	Model Throughput	Model Throughput vs Actual Demand	Speed (mph)	Density (vpmpl)	LOS	Speed (mph)	Density (vpmpl)	LOS	
I-395 GENERAL PURPOSE (GP) & HIGH OCCUPANCY VEHICLE (HOV) LANES	I-395 NORTHBOUND MAINLINE	NB GP	Begin I-395 GP Lanes South of Seminary Road Interchange	1000	1001	692	5450	5454	4	62	30	D	60	27	D	NB Freeway Mainline
				1001	1002	803	5450	5449	-1	61	30	D				NB Freeway Mainline
				1002	1005	1073	5450	5449	-1	58	24	C				NB Freeway Mainline
		NB GP	Seminary Road Exit Ramp	1005	1006	790	4355	4361	6	62	24	C	62	24	C	NB Freeway Mainline
				1006	1008	1235	4355	4356	1	62	24	C				NB Freeway Mainline
				1008	1010	860	4355	4356	1	62	24	C				NB Freeway Mainline
	NB GP	Seminary Road Entrance Ramp	1010	1011	1093	5275	5230	-45	59	19	C	58	21	C	NB Freeway Mainline	
			1011	1015	706	5275	5236	-39	56	23	C				NB Freeway Mainline	
	NB GP	King Street Exit Ramp	1015	1017	635	4015	3909	-106	62	21	C	62	21	C	NB Freeway Mainline	
	NB GP	End I-395 North of Seminary Road Interchange	1017	1019	485	4015	3913	-102	62	21	C				NB Freeway Mainline	
	I-395 SOUTHBOUND MAINLINE	SB GP	Begin I-395 GP Lanes North of Seminary Road Interchange	2001	2002	812	5880	5896	16	63	24	C	61	22	C	SB Freeway Mainline
				2002	2004	1209	6360	6368	8	60	21	C				SB Freeway Mainline
		SB GP	Seminary Road Exit Ramp	2004	2005	502	5330	5437	107	62	22	C	62	22	C	SB Freeway Mainline
				2005	2007	920	5330	5435	105	62	22	C				SB Freeway Mainline
				2007	2009	1142	5330	5419	89	62	22	C				SB Freeway Mainline
				2009	2012	1179	5330	5417	87	61	22	C				SB Freeway Mainline
		SB GP	Seminary Road Entrance Ramp	2012	2014	570	6625	6546	-79	51	30	D	55	29	D	SB Freeway Mainline
				2014	2015	728	6625	6545	-80	59	28	D				SB Freeway Mainline
		SB HOV	Begin I-395 HOV Lanes South of Seminary Road Interchange	1068	1067	1010	3250	3247	-3	67	25	C	67	24	C	SB Freeway Mainline
				1067	1066	1066	3250	3245	-5	67	24	C				SB Freeway Mainline
		SB HOV	Seminary Road Exit Ramp	1066	1064	685	3160	3154	-6	65	24	C	82	27	D	SB Freeway Mainline
				1064	1063	564	3160	3151	-9	66	24	C				SB Freeway Mainline
				1063	1062	582	3160	3144	-16	66	24	C				SB Freeway Mainline
				1062	1060	505	3160	3146	-14	66	24	C				SB Freeway Mainline
	1060			1058	616	3160	3138	-22	66	24	C	SB Freeway Mainline				
	1058			1057	513	3160	3139	-21	65	24	C	SB Freeway Mainline				
	1057			1056	417	3160	3139	-21	65	24	C	SB Freeway Mainline				
	1056			1054	477	3160	3141	-19	65	24	C	SB Freeway Mainline				
1054	1053			456	3160	3139	-21	65	24	C	SB Freeway Mainline					
SB HOV	End I-395 HOV Lanes North of Seminary Road Interchange	1053	1052	654	3160	3135	-25	65	24	C				SB Freeway Mainline		
I-395 NORTHBOUND RAMPS	NB GP	Seminary Road Exit Ramp	1005	1201	299	1095	1082	-13	33	35	E	33	35	E	Diverge Ramp Section	
			1201	7002	203	1095	1081	-14	33	35	E				Diverge Ramp Section	
	NB GP	Seminary Road Entrance Ramp	7003	1210	221	920	881	-39	34	14	B	34	13	B	Merge Ramp Section	
			1210	1010	234	920	882	-38	34	13	B				Merge Ramp Section	
I-395 SOUTHBOUND RAMPS	SB GP	Seminary Road Exit Ramp	2004	2201	313	1030	931	-99	35	13	B	35	13	B	Diverge Ramp Section	
			2201	7004	485	1030	932	-98	34	14	B				Diverge Ramp Section	
	SB GP	Seminary Road Entrance Ramp	7001	2216	279	1295	1211	-84	33	20	B	33	28	D	Merge Ramp Section	
			2216	2012	427	1295	1218	-77	33	33	D				Merge Ramp Section	
	SB HOV	Seminary Road Exit Ramp	1066	1070	317	90	103	13	49	2	A	49	2	A	Diverge Ramp Section	
			1070	7005	352	90	103	13	49	2	A				Diverge Ramp Section	

Table F- 3: Arterial Measures of Effectiveness for the Morning (AM) Peak Hour 2009 Baseline Traffic Operational Analysis without Improvements

		Location	Approach	Link	Actual Demand				Model Throughput				Model Throughput vs Actual Demand				Control Delay By Movement			LOS By Movement			LOS By Approach		LOS By Intersection		Modeled Storage and Maximum Traffic Queuing (ft)					
					Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Delay	Thru	Right	Delay	LOS	Delay	LOS	Through		Left Turn		Right Turn	
																											Link Length (ft)	Queue (ft)	Storage (ft)	Queue (ft)	Storage (ft)	Queue (ft)
MARK CENTER (BRAC133) TRAFFIC ANALYSIS STUDY AREA	LIBRARY LANE	Library Lane / Seminary Road (Node #5003)	WB	5002-5003	20	1345	90	1455	34	1340	85	1459	14	-5	-5	4	14	9	7	B	A	A	9	A	10	A	310	240	50	40	-	-
			NB	6017-5003	50	5	10	65	48	9	8	65	-2	4	-2	0	29	27	3	C	C	A	25	C			264	100	-	-	-	-
			EB	5005-5003	210	790	10	1010	184	813	5	1002	-26	23	-5	-8	22	5	11	C	A	B	8	A			311	140	150	120	-	-
			SB	6018-5003	40	5	15	60	37	3	20	60	-3	-2	5	0	32	39	17	C	D	B	27	C			216	60	-	-	-	-
	I-395 / SEMINARY ROAD ROTARY INTERCHANGE	I-395 NB Off-Ramp/Seminary Road (Node #5015)	NB	1203-5015	0	680	195	875	0	683	193	876	0	3	-2	1	0	70	10	-	E	A	57	E	39	D	618	620	-	-	-	-
			EB	5013-5015	750	355	0	1105	722	341	0	1063	-28	-14	0	-42	25	20	0	C	C	-	24	C			331	300	331	280	-	-
		I-395 NB On-Ramp/Seminary Road (Node #5010)	NB	5015-5010	555	55	820	1430	574	48	785	1407	19	-7	-35	-23	6	14	13	A	B	B	10	B	18	B	276	240	75	80	-	-
			WB	5009-5010	0	325	55	380	0	299	36	335	0	-26	-19	-45	0	44	48	-	D	D	44	D			160	140	-	-	-	-
		I-395 SB Off-Ramp/Seminary Road (Node #5012)	WB	5010-5012	265	615	0	880	286	592	0	878	21	-23	0	-2	7	5	0	A	A	-	6	A	17	B	300	140	300	180	-	-
	SB		2205-5012	0	230	0	230	0	212	0	212	0	-18	0	-18	0	59	0	-	E	A	59	E	281			120	-	-	-	-	
	I-395 SB On-Ramp/Seminary Road (Node #5013)	SB	5012-5013	270	225	0	495	286	212	0	498	16	-13	0	3	10	10	0	B	A	-	10	A	21	C	259	120	259	120	-	-	
		WB	5019-5013	0	835	0	835	0	805	0	805	0	-30	0	-30	0	27	0	-	C	-	27	C			357	300	-	-	-	-	
	MARK CENTER DRIVE	Mark Center Drive / Seminary Road (Node #5022)	WB	5021-5022	410	1530	90	2030	350	1410	74	1834	-60	-120	-16	-196	54	14	12	D	B	B	22	C	22	C	243	240	243	220	-	-
			NB	5060-5022	10	10	130	150	5	6	87	98	-5	-4	-43	-52	70	71	5	E	E	A	13	B			340	40	340	60	340	40
			EB	5023-5022	20	1275	65	1360	18	1278	59	1355	-2	3	-6	-5	51	13	5	D	B	A	13	B			395	120	150	60	395	140
	N. BEAUREGARD STREET	N. Beauregard Street / Seminary Road (Node #5025)	WB	5023-5025	310	1100	0	1410	304	1009	0	1313	-6	-91	0	-97	66	18	0	E	B	-	29	C	39	D	341	260	341	200	-	-
NB			6004-5025	450	466	0	916	460	463	0	923	10	-3	0	7	86	34	0	F	C	-	60	E	347			320	175	160	-	-	
EB			5026-5025	60	980	0	1040	68	991	0	1059	8	11	0	19	76	29	0	E	C	-	32	C	323			240	100	100	-	-	
SB			6002-5025	90	155	40	285	83	155	48	286	-7	0	8	1	53	28	19	D	C	B	34	C	250			120	135	120	-	-	
N. BEAUREGARD STREET	N. Beauregard Street / Mark Center Drive (Node #6005)	WB	5032-6005	15	5	15	35	34	12	31	77	19	7	16	42	54	38	20	D	D	B	37	D	6	A	286	100	-	-	-	-	
		NB	6007-6005	50	1175	180	1405	68	1156	177	1401	18	-19	-3	-4	3	3	2	A	A	A	3	A			329	180	150	40	-	-	
		EB	5030-6005	10	5	5	20	11	4	4	19	1	-1	-1	-1	69	58	3	E	E	A	53	D			203	60	-	-	-	-	
		SB	6004-6005	125	420	80	625	113	414	77	604	-12	-6	-3	-21	18	2	1	B	A	A	5	A			435	100	350	140	-	-	

Table F-4: Arterial Measures of Effectiveness for the Evening (PM) Peak Hour 2009 Baseline Traffic Operational Analysis without Improvements

		Location	Approach	Link	Actual Demand				Model Throughput				Model Throughput vs Actual Demand				Control Delay By Movement			LOS By Movement			LOS By Approach		LOS By Intersection		Modelled Storage and Maximum Traffic Queuing (ft)					
					Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Left	Thru	Right	Delay	LOS	Delay	LOS	Through		Left Turn		Right Turn	
					Link Length (ft)	Queue (ft)	Storage (ft)	Queue (ft)	Storage (ft)	Queue (ft)	Storage (ft)	Queue (ft)																				
MARK CENTER (BRAC 133) TRAFFIC ANALYSIS STUDY AREA	LIBRARY LANE	Library Lane / Seminary Road (Node #5003)	WB	5002-5003	25	800	40	865	20	825	29	874	-5	25	-11	9	35	11	9	D	B	A	12	B	13	B	310	180	50	40	-	-
			NB	6017-5003	35	5	5	45	40	4	0	44	5	-1	-5	-1	47	25	0	D	C	A	45	D			264	80	-	-	-	-
			EB	5005-5003	220	1180	20	1420	223	1235	13	1471	3	55	-7	51	14	9	11	B	A	B	10	A			311	200	150	120	-	-
			SB	6018-5003	85	15	30	130	91	17	22	130	6	2	-8	0	41	39	26	D	D	C	38	D			216	180	-	-	-	-
	I-395 / SEMINARY ROAD ROTARY INTERCHANGE	I-395 NB Off-Ramp/Seminary Road (Node #5015)	NB	1203-5015	0	725	370	1095	0	701	401	1102	0	-24	31	7	0	95	41	A	F	D	75	E	46	D	618	520	-	-	-	-
			EB	5013-5015	475	965	0	1440	424	972	0	1396	-51	7	0	-44	19	23	0	B	C	A	21	C			331	280	331	240	-	-
		I-395 NB On-Ramp/Seminary Road (Node #5010)	NB	5015-5010	560	640	0	1200	565	636	0	1201	5	-4	0	1	7	5	0	A	A	A	6	A	11	B	276	220	75	80	-	-
			WB	5009-5010	0	305	0	305	0	299	0	299	0	-6	0	-6	0	31	0	A	C	A	31	C			160	140	-	-	-	-
		I-395 SB Off-Ramp/Seminary Road (Node #5012)	WB	1211-5012	285	670	0	955	281	679	0	960	-4	9	0	5	10	10	0	A	A	A	10	A	34	C	300	100	-	-	-	-
	SB		2205-5012	0	620	0	620	0	568	0	568	0	-52	0	-52	0	75	0	A	E	A	75	E	281			240	-	-	-	-	
	I-395 SB On-Ramp/Seminary Road (Node #5013)	SB	5012-5013	680	225	0	905	639	207	0	846	-41	-18	0	-59	8	7	0	A	A	A	8	A	16	B	259	160	259	220	-	-	
		WB	5019-5013	0	760	0	760	0	724	0	724	0	-36	0	-36	0	25	0	A	C	A	25	C			357	200	-	-	-	-	
	MARK CENTER DRIVE	Mark Center Drive / Seminary Road (Node #5022)	WB	5021-5022	130	1490	100	1720	130	1475	80	1685	0	-15	-20	-35	64	23	12	E	C	B	26	C	24	C	243	240	243	220	-	-
			NB	5060-5022	80	50	500	630	71	59	390	520	-9	9	-110	-110	53	55	7	D	E	A	19	B			340	80	340	160	340	140
			EB	5023-5022	35	1600	25	1660	49	1609	24	1682	14	9	-1	22	63	20	10	E	B	A	21	C			395	220	150	100	395	20
			SB	5045-5022	185	10	70	265	183	7	74	264	-2	-3	4	-1	49	78	6	D	E	A	38	D			252	140	252	60	252	60
N BEAUREGARD STREET	N. Beauregard Street / Seminary Road (Node #5025)	WB	5023-5025	425	1020	0	1445	422	998	0	1420	-3	-22	0	-25	66	13	0	E	B	A	29	C	46	D	341	200	341	240	-	-	
		NB	6004-5025	360	390	0	750	408	397	0	805	48	7	0	55	132	55	0	F	E	A	94	F			347	280	175	160	-	-	
		EB	5026-5025	105	1180	0	1285	96	1214	0	1310	-9	34	0	25	81	28	0	F	C	A	32	C			323	280	100	100	-	-	
		SB	6002-5025	145	425	45	615	147	425	39	611	2	0	-6	-4	61	44	34	E	D	C	47	D			250	220	135	140	-	-	
	N. Beauregard Street / Mark Center Drive (Node #6005)	WB	5032-6005	115	5	90	210	193	7	137	337	78	2	47	127	46	49	34	D	D	C	41	D	11	B	286	260	-	-	-	-	
		NB	6007-6005	5	925	20	950	13	916	20	949	8	-9	0	-1	14	6	6	B	A	A	6	A			329	200	150	20	-	-	
		EB	5030-6005	70	20	30	120	77	18	23	118	7	-2	-7	-2	44	39	26	D	D	C	40	D			203	140	-	-	-	-	
		SB	6004-6005	20	1335	15	1370	32	1300	18	1350	12	-35	3	-20	12	3	3	B	A	A	3	A			435	160	350	60	-	-	

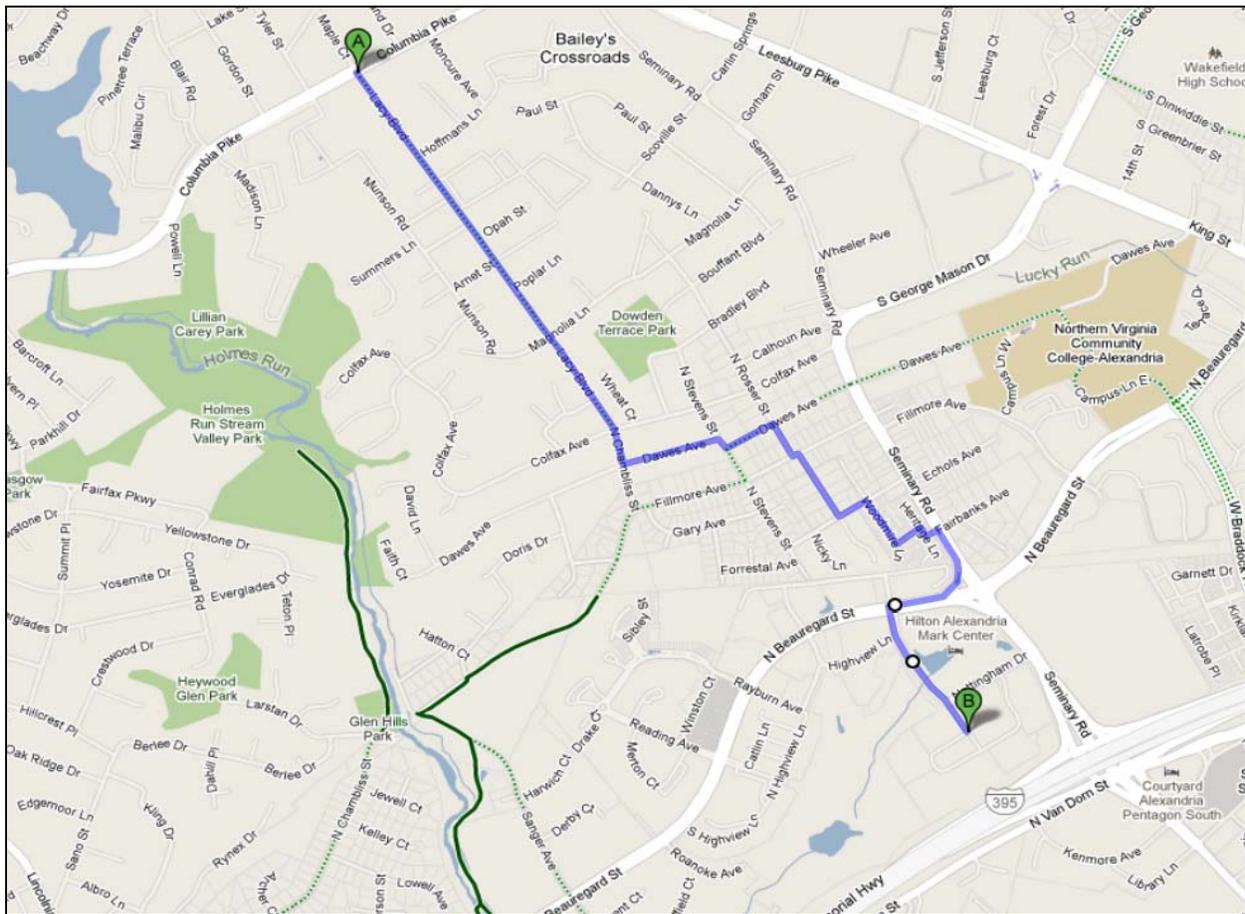
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## **Appendix G**

# **Possible Bicycle Routes to BRAC 133**

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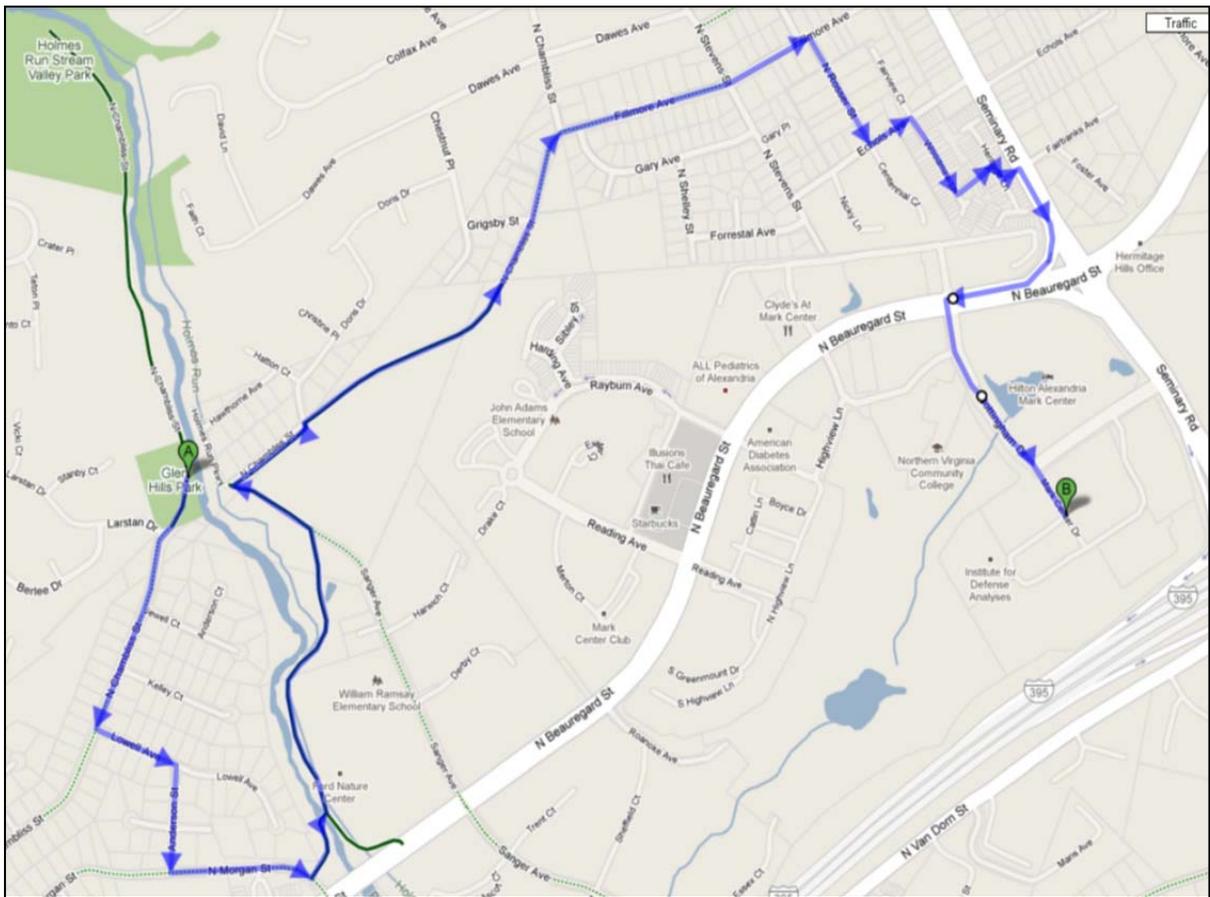
Figure G-1: Southbound Route from Columbia Pike/Bailey’s Crossroads via Lacy Boulevard



Source: Google Maps, ©2010

**Figure G-1** illustrates a southbound route from Columbia Pike/Bailey’s Crossroads via Lacy Boulevard. The route is about two miles long and about a 12 minute trip to BRAC 133. Lacy Boulevard primarily consists of residential traffic. The route mostly covers residential areas before reaching Seminary Road. An improved signalized crosswalk is in place for left turns from North Beauregard Street onto Mark Center Drive.

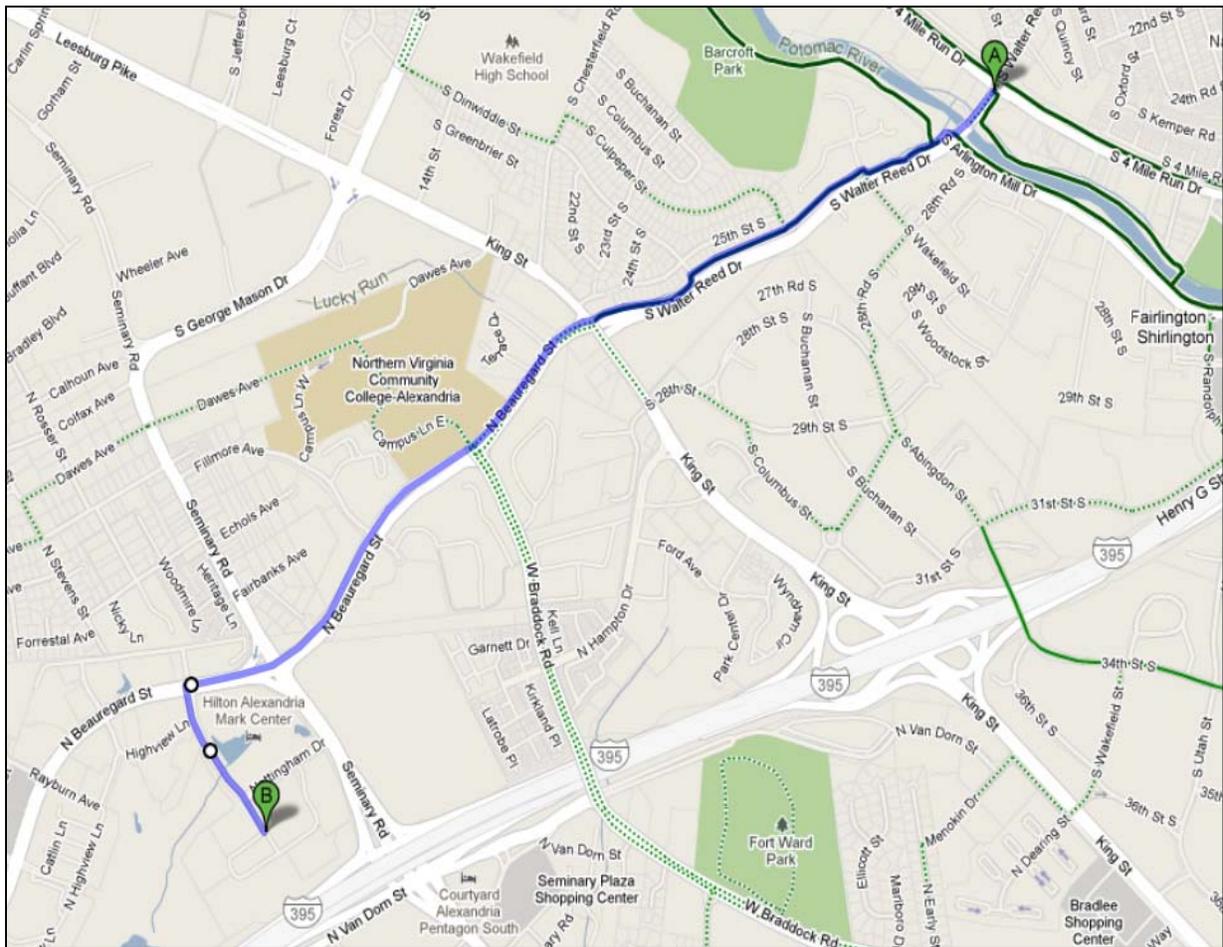
Figure G-2: Eastbound Route from Glen Hills Park via Holmes Run Stream Valley Trail



Source: Google Maps, ©2010

**Figure G-2** illustrates an eastbound route from Glen Hills Park via Holmes Run Stream Valley Trail. The route is about 2.8 miles long and about a 20 minute trip to BRAC 133. Sanger Avenue eventually becomes a bicycle trail. The route covers primarily residential areas before reaching Seminary Road. An improved signalized crosswalk is in place for left turns from North Beauregard Street onto Mark Center Drive.

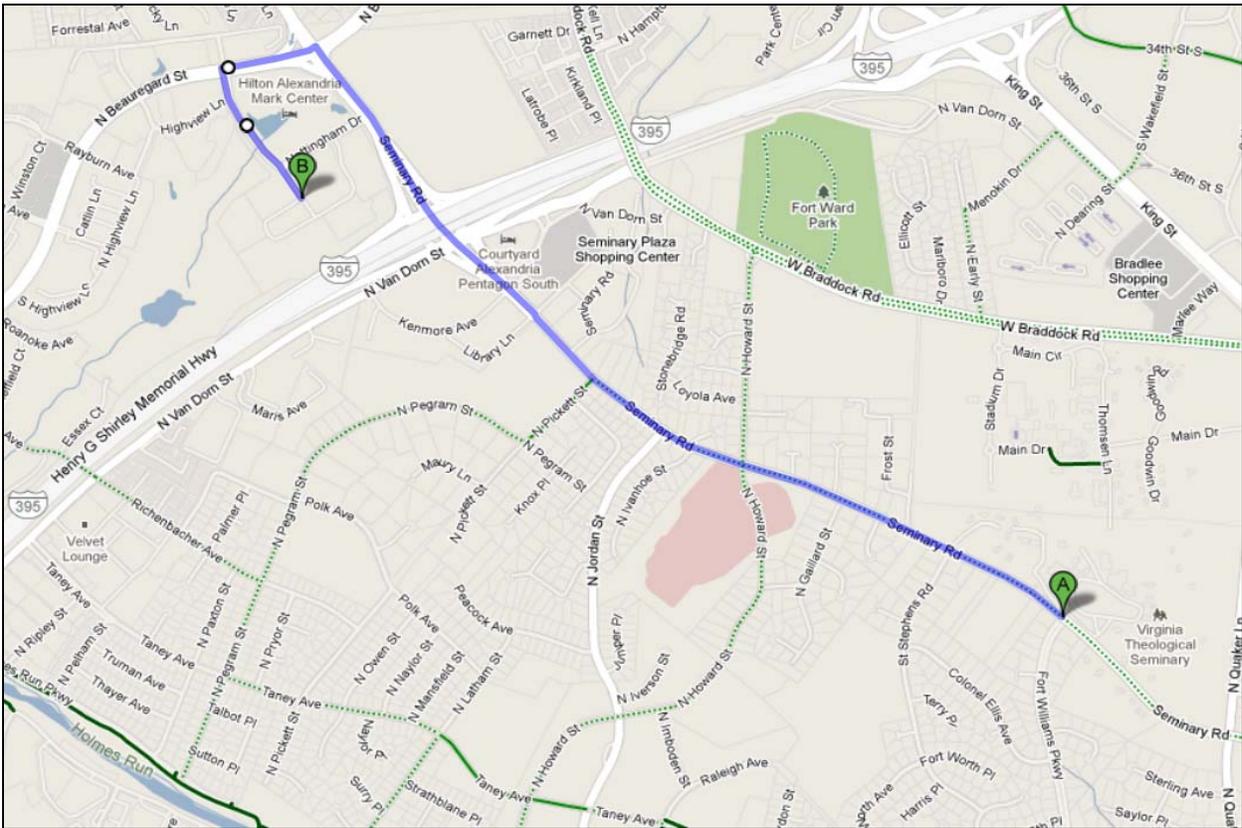
Figure G-3: Westbound Route from Arlington County via Four Mile Run



Source: Google Maps, ©2010

**Figure G-3** illustrates a westbound route from Arlington County via Four Mile Run. The route is about 1.9 miles long and about a 15 minute trip to BRAC 133. Connecting from Four Mile Run, there is a designated bike path in both directions along the westbound side of S. Walter Reed Drive. An improved signalized crosswalk is in place for left turns from North Beauregard Street onto Mark Center Drive.

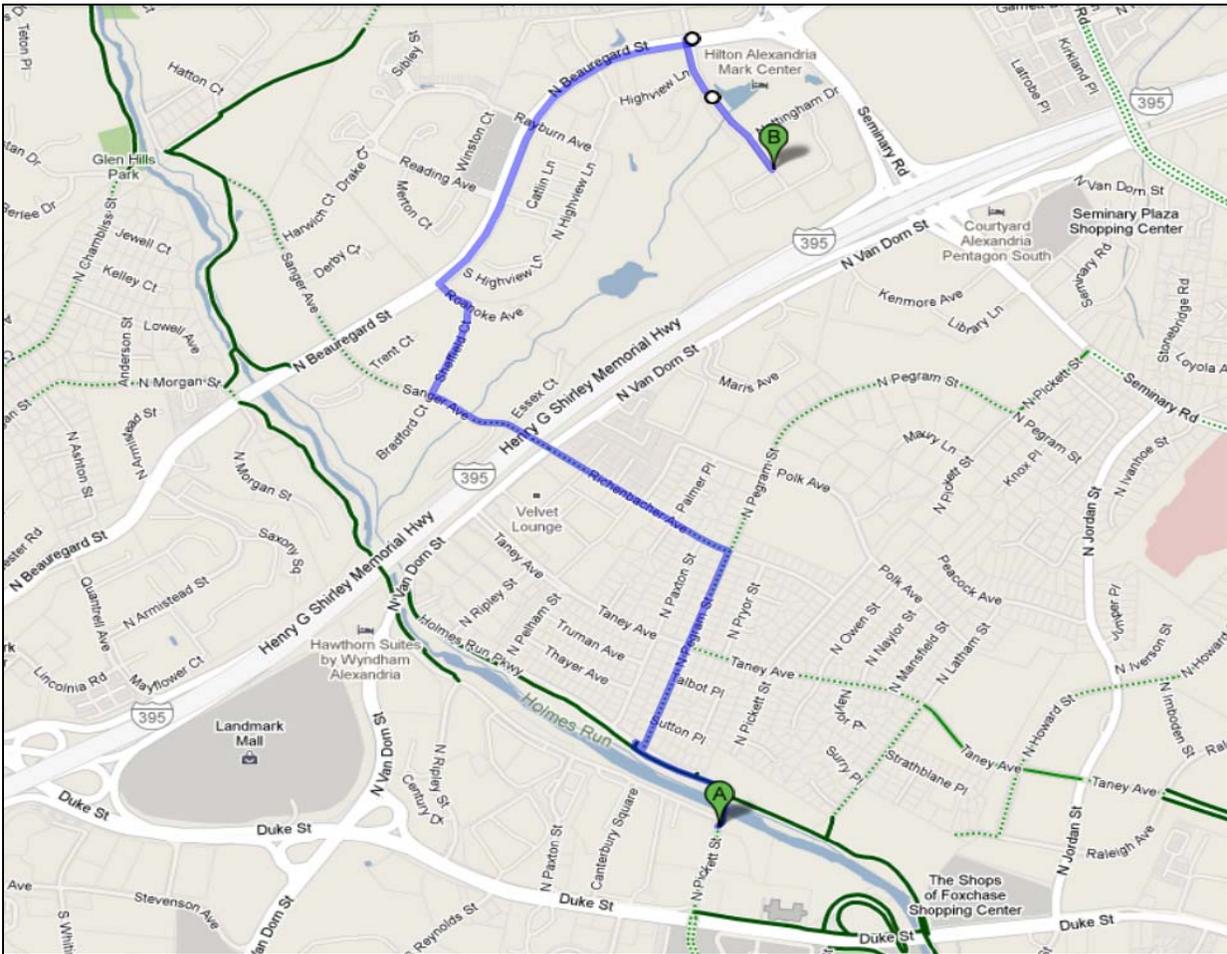
Figure G-4: Northbound Route from Seminary Hill via Seminary Road



Source: Google Maps, ©2010

Figure G-4 illustrates a northbound route from Seminary Hill via Seminary Road. The route is about two miles long and about a 10 minute trip to BRAC 133. There is a pedestrian/bicycle bridge on the right side of Seminary Road going northbound that crosses over I-395. There is a signalized intersection at Seminary Road and North Beauregard Street that includes signalized crosswalks to make the left turn along the route.

Figure G-5: Northbound Route from Cameron Station via Holmes Run Stream Valley Trail



Source: Google Maps, ©2010

**Figure G-5** illustrates an additional northbound route from Cameron Station via Holmes Run Stream Valley Trail. The route is about 2.2 miles long and about a 17 minute trip to BRAC 133. Starting on Holmes Run Stream Valley Trail out of Cameron Station, the route follows N. Pengram Street, Rickenbacher Avenue, and Sheffield Court. An improved signaled crosswalk is in place for left turns from North Beauregard Street onto Mark Center Drive.