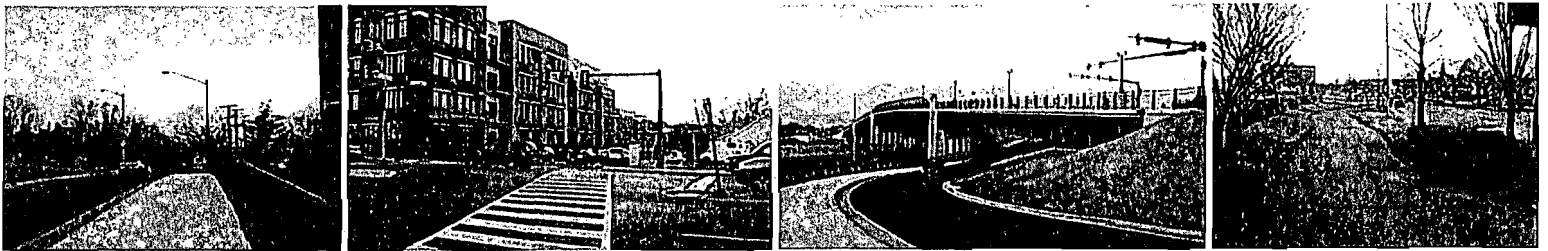


**STAFF REPORT  
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#3

# Potomac Yard Multimodal Transportation Study



ALEXANDRIA, VA

PREPARED FOR



PREPARED BY



Kimley-Horn  
and Associates

DECEMBER 2009

DECEMBER 2009

Potomac Yard Multimodal Transportation Study  
ALEXANDRIA, VA

## REPORT

# POTOMAC YARD MULTIMODAL TRANSPORTATION STUDY

*Prepared for:*



Department of Planning & Zoning  
City Hall, 301 King Street, Room 4130  
Alexandria, VA 22314

*Prepared by:*



Kimley-Horn  
and Associates, Inc.

13221 Woodland Park Road, Suite 400  
Herndon, Virginia 20171

December 2009

**TABLE OF CONTENTS**

<b>1. Introduction and Executive Summary</b>		<b>1</b>
1.1. Overview		1
1.2. Study Purpose		1
1.3. Public Involvement		2
1.4. Executive Summary		3
<b>2. Background Information</b>		<b>8</b>
2.1. Study Area		8
2.2. Description of On-site Development		8
2.3. Description of Nearby Uses		10
2.4. Description of Existing Roadways		12
2.5. Description of Programmed Transportation Improvements		12
<b>3. Analysis of Existing Conditions</b>		<b>13</b>
3.1. Introduction		13
General Transportation Issues	13	
3.2. Street Network		14
Study Area Streets	14	
Street Descriptions	14	
Study Intersections	16	
Traffic Data	18	
Intersection Capacity Analysis	19	
US Route 1 Corridor Travel Times and Speeds	22	
3.3. Transit Network		24
3.4. Pedestrian and Bicycle Network		27
Pedestrian Network	27	
Bicycle Network	32	
3.5. Parking		34
3.6. Summary		34
<b>4. 2030 Future Conditions without Development</b>		<b>35</b>
4.1. 2030 Future Transportation Network without Development		35
4.2. 2030 Future Traffic Volumes without Development		38
2030 Base Turning Movement Volumes	38	
Traffic Due to Nearby Approved and Unbuilt Developments	40	
2030 Future Traffic Volumes without Development	40	
4.3. 2030 Future Conditions without Development Capacity Analysis		42
Intersection Capacity Analysis	42	
US Route 1 Corridor Travel Times and Speeds	43	
Impact on Local Streets	44	
4.4. Conclusions on 2030 Future Conditions without Development		44
<b>5. Traffic Modeling Process and Methodology</b>		<b>45</b>
5.1. Existing Potomac Yard Trips to be Removed		45
5.2. Transportation Analysis Zones		46
5.3. Person Trip Generation		46



Potomac Yard Multimodal Transportation Study  
ALEXANDRIA, VA

5.4. Mode Choice Assumptions	49	
5.5. Internal Trips	49	
5.6. Mode Split	50	
5.7. Pass-by Trips	51	
<b>6. Site Trip Distribution and Assignment</b>		<b>53</b>
6.1. Trip Distribution	53	
6.2. Trip Assignment	53	
<b>7. 2030 Future Conditions with Potomac Yard Development in Landbays F and L</b>		<b>54</b>
7.1. 2030 Future Transportation Network with Development	54	
7.2. 2030 Future Traffic Volumes with Development	57	
7.3. 2030 Future Conditions with Development Capacity Analysis	57	
Intersection Capacity Analysis	57	
US Route 1 Corridor Travel Times and Speeds	60	
Impact on Local Streets	61	
7.4. Conclusions on 2030 Future Conditions with Potomac Yard Development	62	
<b>8. Multimodal Transportation Recommendations</b>		<b>63</b>
8.1. Best Practices for Transportation In Urban Environments	63	
Alexandria's Transportation Vision and Master Plan	62	
Transportation Planning Concepts and Best Practices	64	
Citywide Experience	68	
Regional Experience	69	
8.2. Transportation Demand Management		70
Background	70	
Recommendations	72	
8.3. Street Network		73
Background	73	
Recommendations	75	
8.4. Traffic Calming		78
Background	78	
Recommendations	79	
8.5. Transit Network		81
Background	81	
Recommendations	81	
8.6. Pedestrian and Bicycle Network		85
Background	85	
Recommendations	85	
8.7. Parking		89
Background	89	
Recommendations	90	
8.8. Phasing of Improvements		92
Background	92	
Phase Analysis	92	
Phased Recommendations	94	

Appendix

## **1.0 INTRODUCTION AND EXECUTIVE SUMMARY**

### **1.1 OVERVIEW**

Potomac Yard is one of the most important redevelopment properties in Alexandria. The City is developing a small area plan, which will focus on the northernmost parcel of Potomac Yard, an approximately 70-acre site currently occupied by big-box retail.

A century ago, Potomac Yard was one of the busiest railroad yards in the eastern United States. By the 1980s, rail operations ceased and planning began for redevelopment of the site. Along with the completion of a significant environmental cleanup program in the late 1990s, initial redevelopment included the construction of retail stores within an automobile-dependent site design on the northernmost parcel.

To supplement the current Potomac Yard approvals and zoning, the City is preparing a small area plan that will consider proposed redevelopment and rezoning for Landbay F ( $\pm 70$  acres). As a part of the small area plan, this multimodal transportation analysis is being prepared to study existing and future transportation conditions that will support the vision of the small area plan in the context of a redeveloped North Potomac Yard.

This report documents existing transportation conditions, future conditions without development including the planned transportation improvements and nearby development, analysis of conditions with development, and potential transportation improvements. The study report makes recommendations for future conditions for transportation demand management, streets, transit, bicycles, pedestrians, and parking related to Landbay F.

### **1.2 STUDY PURPOSE**

This study was performed concurrently with the land use plan development effort for North Potomac Yard to make recommendations for the future multimodal transportation network. The resulting transportation recommendations will become an appendix to the North Potomac Yard Small Area Plan (Landbay F). This study also will be used to comply with Virginia Department of Transportation (VDOT) traffic study requirements under Chapter 527 of the 2006 Code of Virginia.

### 1.3 PUBLIC INVOLVEMENT

Meaningful public involvement is important in developing community-focused transportation plans. A community's citizens have an intimate knowledge of the places where they live and travel and of the transportation problems they encounter. To make sure the transportation plan considered citizen concerns and interests, input was solicited from the general public as well as through the Potomac Yard Planning advisory committee, City staff, and various stakeholders. The advisory group involved in the planning and public workshops held during the process are described below.

#### Potomac Yard Plan Advisory Group

In the development of the Potomac Yard Small Area Plan, City staff, and the consultant team were advised by the Potomac Yard Planning Advisory Group (PYPAG), established to guide the planning process. The team will be informed also by the Potomac Yard Metrorail Station Feasibility Work Group, which explored the technical and financial feasibility of constructing a new Metrorail station to serve Potomac Yard.

#### PYPAG Transportation Subcommittee

This subcommittee was formed to focus on transportation aspects of the planning process. The subcommittee's stated purpose was, "To focus PYPAG involvement in the Potomac Yard Multimodal Transportation Study, in support of the development of the City's Small Area Plan for Potomac Yard." Members of the subcommittee had a set of responsibilities that included:

1. *Providing initial input to City staff and transportation consultant*
  - *Verify transportation needs in Potomac Yard, including multimodal access and relationships to adjacent landbays and neighborhoods (meeting/walkthrough)*
  - *Validate existing conditions, as described in the "Existing Transportation Conditions Summary" (to be developed as part of the study)*
2. *Reviewing and participating in the transportation analysis*
  - *Provide feedback on the findings from the analysis of existing and future transportation conditions*
  - *Participate in the development of recommendations on multimodal transportation solutions, including, but not limited to: streets, sidewalks, trails, transit routes, Metro station, parking, and travel demand management*
3. *Articulating study results to PYPAG and Alexandria citizens*
  - *Participate in presentation of transportation study results at PYPAG meetings*
  - *Advocate for transportation solutions as integral pieces of overall Potomac Yard Small Area Plan*

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## Public Workshop

A public workshop was conducted on January 31, 2009.

## 1.4 EXECUTIVE SUMMARY

### Site Location

Potomac Yard is located in the northeast corner of Alexandria. Arlington County and Four-Mile Run are immediately north, the Potomac River is to the east, Old Town Alexandria is to the south, and the residential neighborhoods of Del Ray and Lynnhaven are to the west. Potomac Yard is shown in the regional context in **Figure 1-1: Regional Context**. Landbay F is located in the north of Potomac Yard. Its location relative to other landbays in Potomac Yard is shown in **Figure 1-2: Potomac Yard Landbays**.



*PYPAG Transportation Subcommittee field visit focused on existing conditions*

### Description of Proposed Development

The land use scenario contained in the Master Plan may vary slightly in the type and location of density within the overall Potomac Yard site; however, it will be within an order of magnitude of the overall density analyzed in this study. The development analyzed in this transportation study for Potomac Yard Landbay F is as follows:

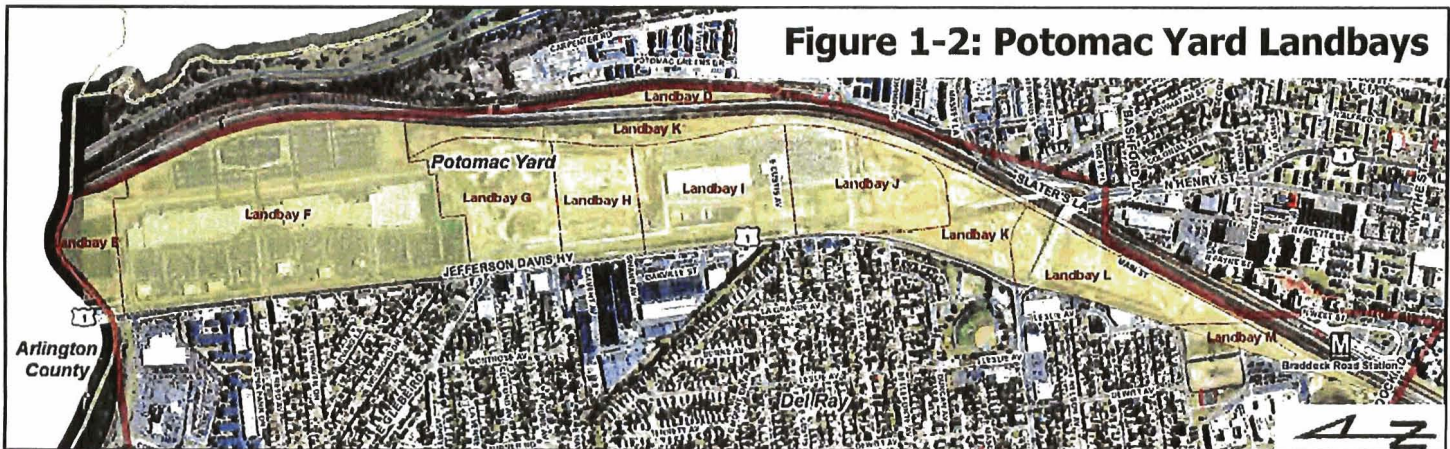
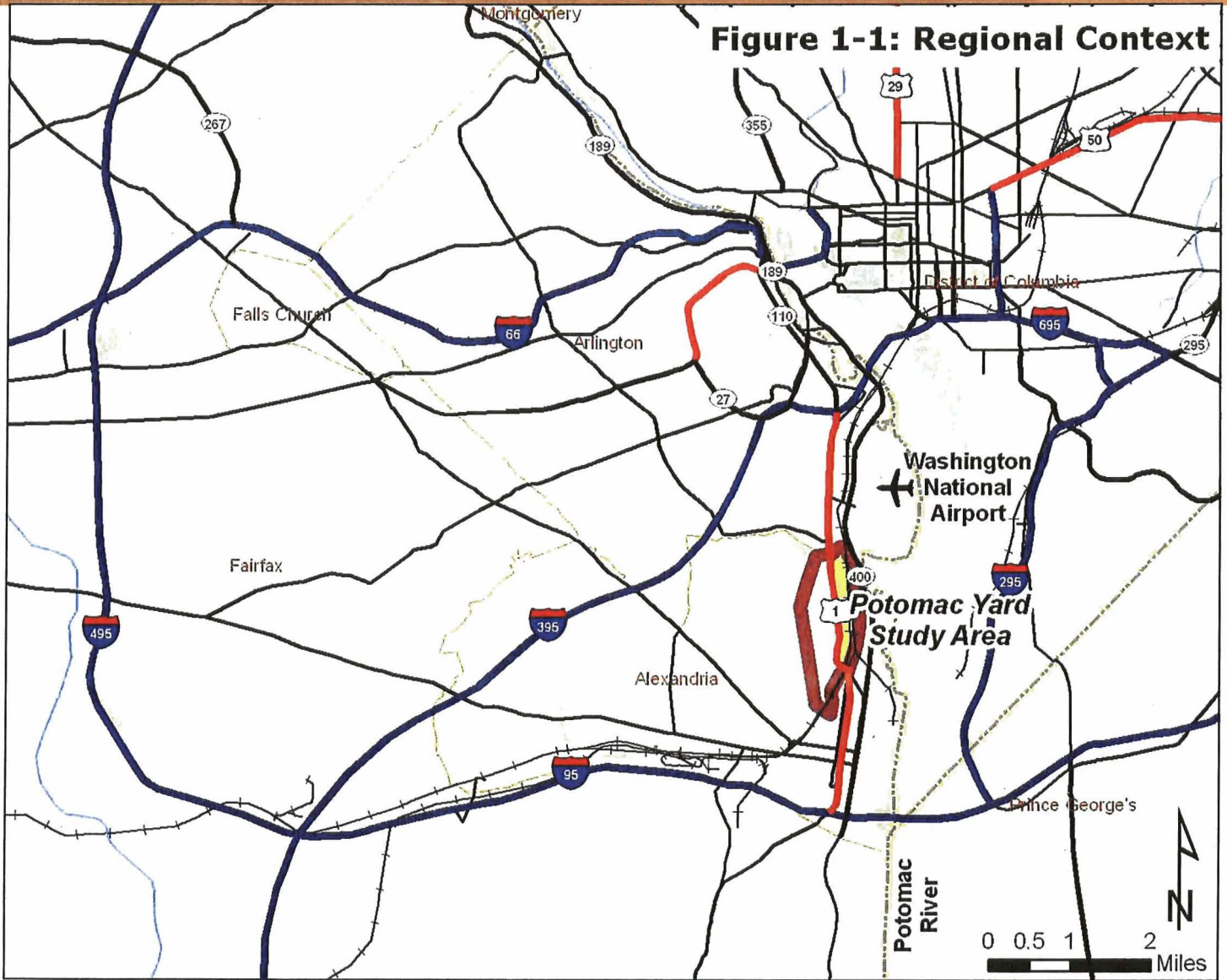
- Hotel: 300 rooms
- Office: 1,475,000 square feet (sf)
- Residential Units: 4,750 dwelling units (apartments and condominiums)
- Retail
  - 170,000 sf large-format retail
  - 70,000 sf grocery store
  - 670,000 sf specialty retail
  - 90,000 sf movie theater

The proposed development program for Landbay F described in the aforementioned will replace the existing large-format retail, specialty retail, and movie theater that currently exist on the site. The following possible future development in Potomac Yard Landbay L also was considered for this transportation study and is included in the future conditions analysis:

- Residential Units: 1,000 dwelling units (apartments and condominiums)
- Specialty Retail: 10,000 sf



# Potomac Yard Multimodal Transportation Study ALEXANDRIA, VA



## Principal Findings, Conclusions, and Recommendations

**Existing Conditions** - Existing transportation conditions in the study area vary. The existing retail center's auto-dependent configuration supports a limited number of transportation choices and many of the major street corridors in the study area are focused on moving automobiles. Intersection level of service (LOS) analyses show that most study area intersections operate acceptably.

Potomac Yard is served by transit services that include Metrorail, Metrobus, City bus services, and paratransit. The study area is proximate to regional trails including the Four-Mile Run trail and the Mount Vernon Trail.

**2030 Future Conditions without Development** - The analysis of 2030 future conditions without development considers the combined effects of the addition of approved unbuilt development, regional traffic growth, and programmed transportation improvements. Based on a review of VDOT data, daily traffic volumes on study area streets have not increased since 2001. Programmed transportation improvements include Potomac Avenue, an interconnected street grid in Potomac Yard between Landbays F and L, new trail connections, and the Crystal City/Potomac Yard Transitway. Findings from this analysis indicate that intersections along US 1, Mount Vernon Avenue, and Commonwealth Avenue are nearing capacity.

**Key Assumptions** - The analysis of 2030 future conditions with development considers the combined effects of the subtraction of existing Potomac Yard trips, the addition of trips from the proposed development, and recommended transportation improvements. Vehicular trips generated by the proposed development were calculated based on assumptions regarding internal trip-making, mode split, pass-by, and trip distribution.

The proposed transportation network within Potomac Yard Landbay F includes pedestrian and bicycle facilities, an interconnected network of streets, Potomac Avenue, the Crystal City/Potomac Yard Transitway, and a future Metrorail station. The proposed transportation network described in the Master Plan may vary slightly in the specific Landbay F street network, Transitway alignment, and Metrorail station configuration; however, it will result in similar future transportation conditions as those analyzed in this study. With the combination of an intentionally planned and designed compact mixed-use development, many convenient multimodal transportation options, a strong transportation demand management program, and parking management, the redevelopment of Potomac Yard will generate trips at a much lower rate per square foot than the existing retail center. Within the adjacent neighborhoods, traffic calming measures are recommended to preserve desirable street characteristics and minimize local street attractiveness for non-local traffic.

**2030 Future Conditions with Development** - With the recommended multimodal transportation network, most intersections will operate acceptably as shown in **Table 1-1**.



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**Table 1-1  
Intersection Levels of Service (LOS) and  
Average Delay in Seconds for Weekday PM Peak Hour**

Intersection	Existing Conditions	2030 Future Conditions without Development	2030 Future Conditions with Development
1. US 1 and S. Glebe Road	C (29)	C (32)	C (29)
2. US 1 and driveway (near Four-Mile Run)	C (22)	C (23)	B (13)
3. US 1 and future Crescent Place	N/A	N/A	A (7)
4. US 1 and future Lincoln Avenue	N/A	N/A	A (8)
5. US 1 and E. Reed Avenue	C (22)	E (71)	E (67)
6. US 1 and future Diamond Avenue	N/A	N/A	A (3)
7. US 1 and Evans Lane	C (24)	B (17)	B (15)
8. US 1 and future Wesmond Drive	N/A	N/A	B (11)
9. US 1 and E. Glebe Road	D (37)	F (83)	F (94)
10. US 1 and Hume Avenue	A (1)	A (3)	A (2)
11. US 1 and Swann Avenue	A (2)	A (6)	A (6)
12. US 1 and E. Custis Avenue	A (2)	A (5)	A (4)
13. US 1 and E. Howell Avenue	A (2)	B (14)	B (12)
14. US 1 and existing E. Monroe Avenue/future Potomac Avenue	E (63)	C (28)	E (63)
15. US 1 and Slaters Lane	B (15)	B (17)	B (17)
16. Commonwealth Avenue and E. Glebe Road	B (11)	B (11)	B (17)
17. Commonwealth Avenue and Mt. Vernon Avenue	A (6)	C (31)	D (37)
18. Mt. Vernon Avenue and E. Braddock Road	B (13)	C (32)	C (33)
19. Potomac Avenue and future Crescent Drive	N/A	N/A	A (0)
20. Potomac and future Lincoln Avenue	N/A	N/A	A (9)
21. Potomac Avenue and future Reed Avenue	N/A	N/A	A (8)
22. US 1 and future Diamond Avenue	N/A	N/A	A (9)
23. Potomac Avenue and future Evans Lane	N/A	N/A	A (5)
24. Potomac and future Wesmond Drive	N/A	N/A	A (3)
25. Potomac Avenue and E. Glebe Road	N/A	C (21)	A (9)

\* Future conditions assume the construction of the transitway on US 1, Diamond Road, and Potomac Avenue  
 \*\* Under Future Conditions with Development, US 1 signals are timed with lead-lag left turns and coordinated with 140-second cycle length. Potomac Avenue is timed with coordinated, 90-second cycle length signals.  
 \*\*\* See transportation analysis appendix for further discussion of intersection LOS analysis  
 Source: Kimley-Horn and Associates, Inc.

The results of the intersection capacity analysis in Table 1-1 show that with the exception of the following intersections, study area intersections will operate acceptably:

- US 1 and E. Reed Avenue: LOS E
- US 1 and E. Glebe Road: LOS F
- US 1 and Potomac Avenue: LOS E

Additional intersection lanes or a better balanced distribution of traffic among all intersections and streets along US 1 would allow for traffic to be accommodated acceptably. The additional north-south capacity created by adding Potomac Avenue, the improvement of US 1 through the provision of left turn lanes at intersections, the improvement to side-street approaches to intersections, and US 1 signal retiming and coordination will help to offset the effects of increased traffic volumes.

**Phasing Analysis** - An analysis was completed to estimate the quantity of development that could be accommodated by the street network within each of the three phases of transportation infrastructure implementation. Assuming that the transitway and Metrorail station represent the most significant transportation investments, the following three phases of implementation were developed:

- Phase 1: Prior to transitway and Metrorail station
- Phase 2: Transitway fully implemented and operational
- Phase 3: Transitway and Metrorail station implemented and operational

The phasing analysis was based on considerations such as traffic volumes, other development in the area, trip-making characteristics of differing levels of development, and major road improvements. Levels of development which can be accommodated within each phase are summarized in the following:

- **Phase 1: Prior to transitway and Metrorail station** – 0.50 floor area ratio (FAR) assuming that the land use mix is approximately equivalent to the 2.5 FAR scenario. As density levels on Landbay F increase to meet or exceed 0.50 FAR, high-frequency local transit services would need to be operated to either the Braddock Road or Crystal City Metro stations and the transitway would need to begin substantial construction with the intention of reaching completion and operational status prior to overall densities in Landbay F meeting or exceeding 0.75 FAR.
- **Phase 2: Transitway implemented and operational** – 0.75 FAR assuming that the land use mix is approximately equivalent to the 2.5 FAR scenario. As density levels on Landbay F increase to meet or exceed 1.25 FAR, services on the transitway would need to be in full operation with service frequencies and duration similar to Metrorail service. At the same time, the Potomac Yard Metrorail station would need to be under construction with the intention of reaching completion and operational status prior to overall development densities in Landbay F meeting or exceeding 1.25 FAR.
- **Phase 3: Transitway and Metrorail station implemented and operational** – 1.25 FAR assuming that the land use mix is approximately equivalent to the 2.5 FAR scenario



## Potomac Yard Multimodal Transportation Study ALEXANDRIA, VA

## 2.0 BACKGROUND INFORMATION

### 2.1 STUDY AREA

Potomac Yard is located in northeast Alexandria. The study area encompasses the existing and future network of streets bounded by the following:

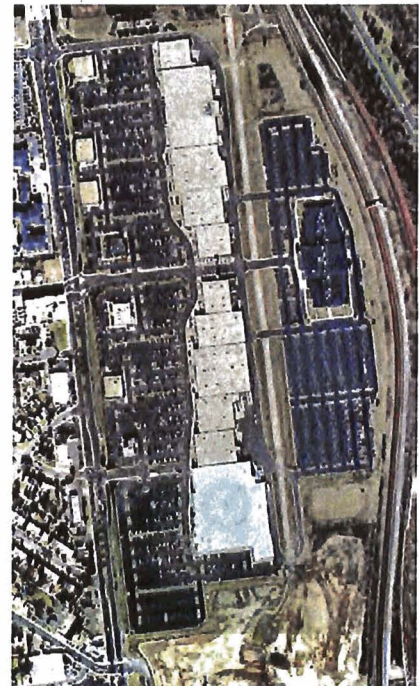
- Mount Vernon Avenue and Commonwealth Avenue on the west (from Braddock Road on the south end of this corridor to Four-Mile Run on the north end)
- CSX/Metrorail corridors (Potomac Yard limits) on the east
- Four-Mile Run on the north
- Braddock Road from Mount Vernon Avenue to Wythe Road on the south

The Potomac Yard area and project study area are shown in **Figure 2-1: Study Area**.

### 2.2 DESCRIPTION OF ON-SITE DEVELOPMENT

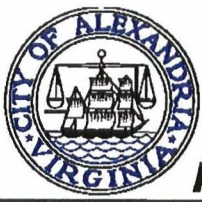
Potomac Yard is currently zoned as a Coordinated Development District (CDD). As defined by the City of Alexandria, CDDs are established for large areas that will have significant development related impacts on the City and require coordination among multiple property owners. CDDs are used to promote development consistent with the city's master plan. Potomac Yard is part of the Potomac Yard/Potomac Greens Small Area Plan and CDD #10, which was approved by City Council on October 16, 1999 along with a Concept Plan and associated conditions. The Concept Plan describes the total acreage, proposed uses and maximum densities, and minimum open space requirements for each landbay. Approved development levels for the entire CDD are the following:

- Hotel: 623 hotel rooms (an estimated 456,250 sf @ 650 sf/room +50 ,000 sf)
- Office: 1.9 million sf
- Residential units: 2,200 dwelling units (an estimated 3.3 million sf @ 1,500 sf/unit)
- Retail: 824,000 sf
- Total development: about 6.5 million sf



*Existing Potomac Yard Retail Center*

For Landbay F, the concept plan permitted a maximum of 600,000 sf of retail. Landbay F currently contains large-format retail, specialty retail, and a movie theater. **Figure 2-2: Existing Potomac Yard Land Use** shows the existing land use in Potomac Yard.



# Potomac Yard Multimodal Transportation Study

## Legend

- Potomac Yard
- Study Area



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and Associates, Inc.

# Figure 2-1: Study Area



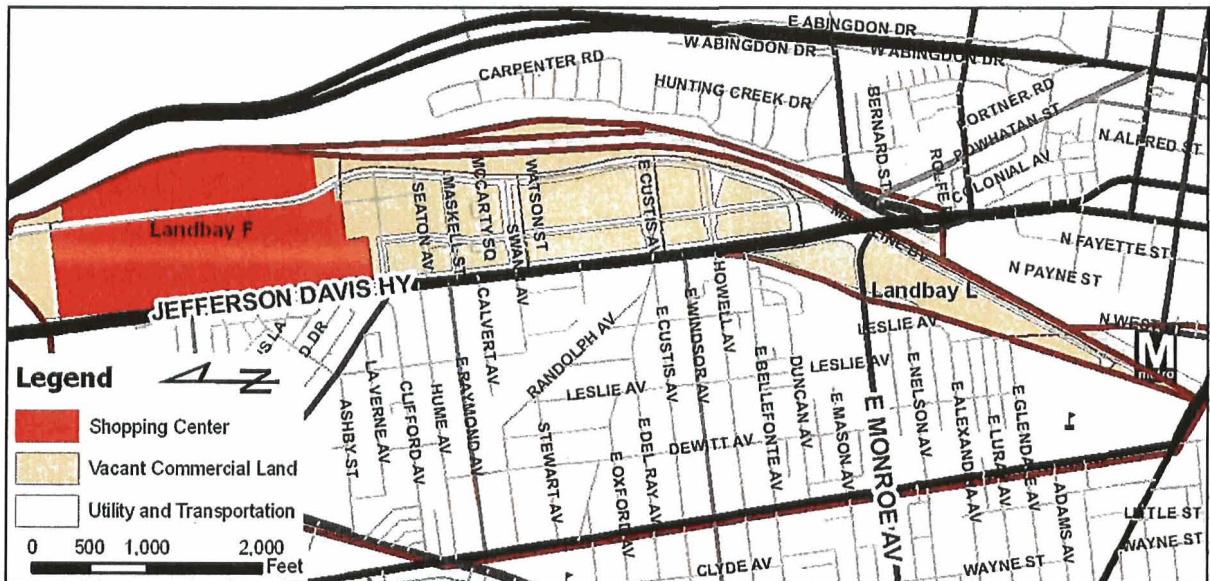


Figure 2-2: Existing Potomac Yard Land Uses

### 2.3 DESCRIPTION OF NEARBY USES

Potomac Yard is bordered by residential, commercial, industrial, and institutional land uses. The existing zoning in the vicinity of Potomac Yard is shown in **Figure 2-3: Existing Zoning**<sup>1</sup>.













Since the approval of the CDD in 1999, on June 14, 2008 City Council approved the following:

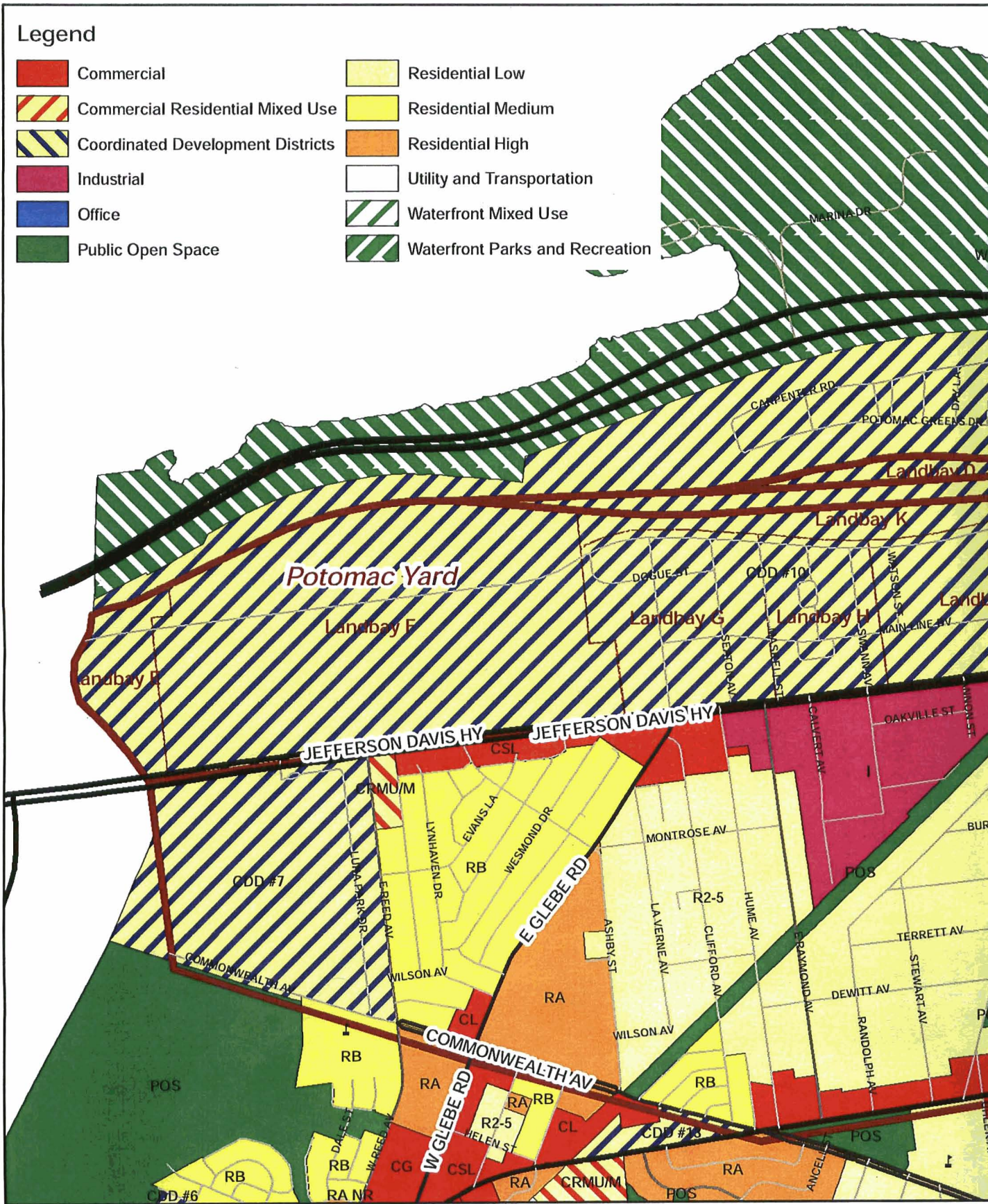
- A transfer of 765,000 sf of office gross floor area from Landbay J and Landbay L to Landbay H. Landbay H had previously been approved for the development of townhouses.
- The plan for the development of linear park – Landbay K. Landbay K is a 24 acre open space generally located between Potomac Avenue and the railroad tracks. It is intended to provide passive and active recreation opportunities such as pedestrian paths, playgrounds serving multiple age groups, and active recreation facilities such as basketball and tennis courts and soccer fields.
- Plans for Potomac Yard rail park, dog park, and the pedestrian bridge. The rail park is located between the railroad and Metro tracks near Potomac Avenue and Potomac Greens. The dog park was approved for a location on Monroe Avenue west of the US 1 Monroe Avenue Bridge. The pedestrian bridge was approved to extend from Potomac Greens across the Metrorail and railroad tracks to the linear park west at Potomac Avenue and the Town Center.

<sup>1</sup> City of Alexandria 2009 Zoning map and City of Alexandria 2009 GIS data

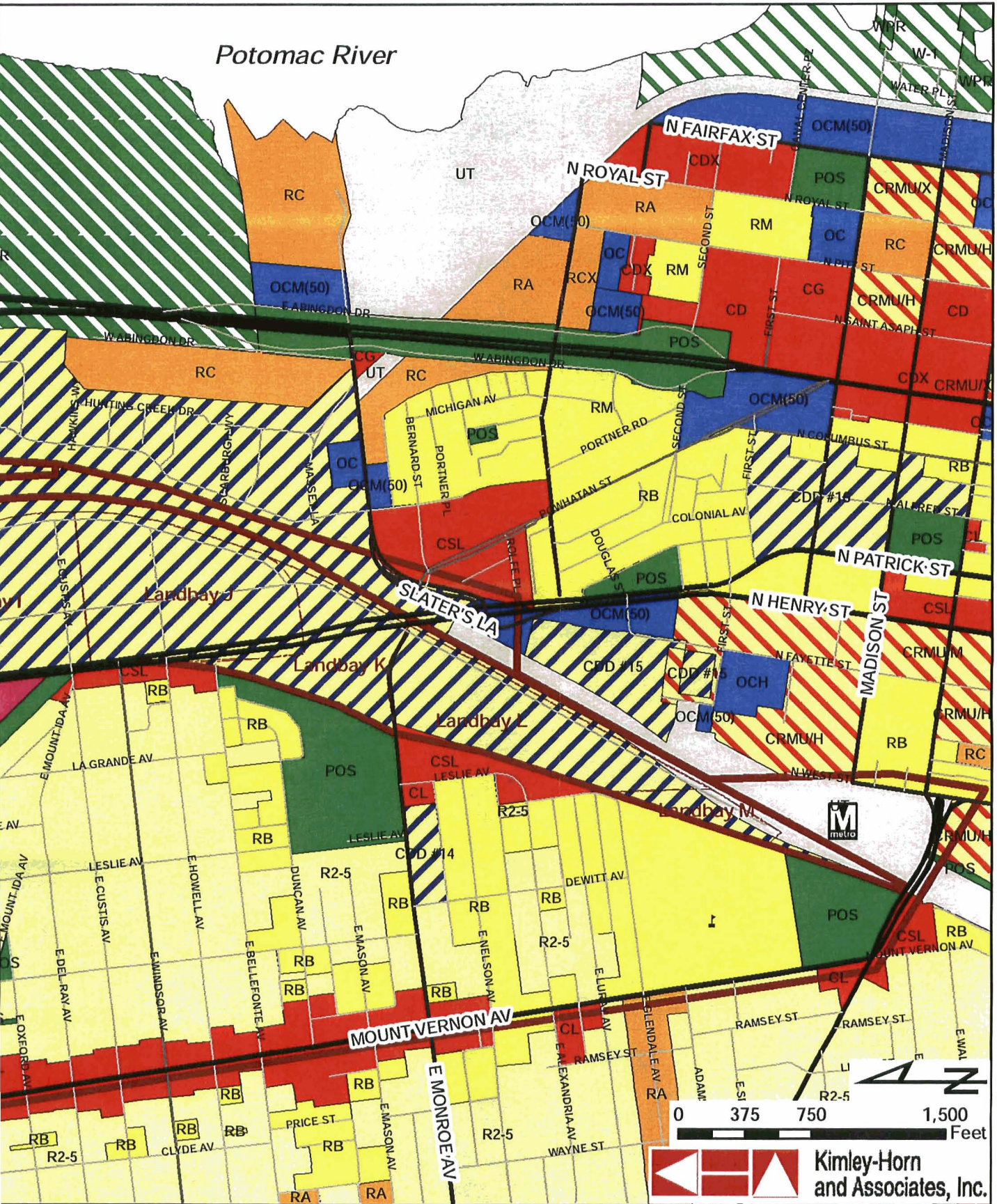


# Legend

- |   |                                   |   |                                 |
|---|-----------------------------------|---|---------------------------------|
|  | Commercial                        |  | Residential Low                 |
|  | Commercial Residential Mixed Use  |  | Residential Medium              |
|  | Coordinated Development Districts |  | Residential High                |
|  | Industrial                        |  | Utility and Transportation      |
|  | Office                            |  | Waterfront Mixed Use            |
|  | Public Open Space                 |  | Waterfront Parks and Recreation |



# Figure 2-3: Existing Zoning



Kimley-Horn and Associates, Inc.



## 2.4 DESCRIPTION OF EXISTING ROADWAYS

The existing street network examined as part of this study includes major streets such as US 1, E. Braddock Road, and Mount Vernon Avenue as well as the local street grid in Del Ray. A brief description of the area street system is included in **Chapter 3, Section 2: Study Area Roadways**.

## 2.5 DESCRIPTION OF PROGRAMMED TRANSPORTATION IMPROVEMENTS

### US 1 Monroe Avenue Bridge

A new bridge was constructed over Monroe Avenue on US 1. The new US 1 Monroe Avenue Bridge has a straightened alignment. The project was completed as a part of the Potomac Yard development plan for Landbays G, H, I, and J. The new bridge provides four travel lanes and two dedicated turning lanes. In addition, a multiuse pedestrian/bicycle facility is provided on the east side of the bridge and a sidewalk will be located on the west side of the bridge. This transportation study was started prior to the bridge being completed.



*New US 1 Monroe Avenue Bridge*

### US 1 Widening for Transit

As a part of planned redevelopment in Landbay F, right-of-way will be dedicated and improved for US 1 to be widened to accommodate transit lanes to support the Crystal City/Potomac Yard Transitway. No widening is programmed to increase the number of general purpose vehicle travel lanes.

### Crystal City/Potomac Yard (CCPY) Transitway

The CCPY Transitway will travel through Potomac Yard and extend to Crystal City on the north and the Braddock Road Metrorail Station on the south. The concept of dedicated right-of-way for transit was adopted by the Alexandria City Council under the Transportation Master Plan. The future transit service is envisioned to operate efficiently within dedicated lanes to the maximum extent feasible. The initial service concept for the CCPY corridor is bus rapid transit; however, as demand and usage increase, conversion to streetcar or similar rail transit is possible.

### Bicycle and Pedestrian Improvements

As part of the Potomac Yard development plan for Landbays G, H, I, and J, a multi-use trail will be constructed in Potomac Yard Park. A pedestrian bridge also will be provided from Potomac Yard Park across the railroad tracks to Potomac Greens.

## 3.0 ANALYSIS OF EXISTING CONDITIONS

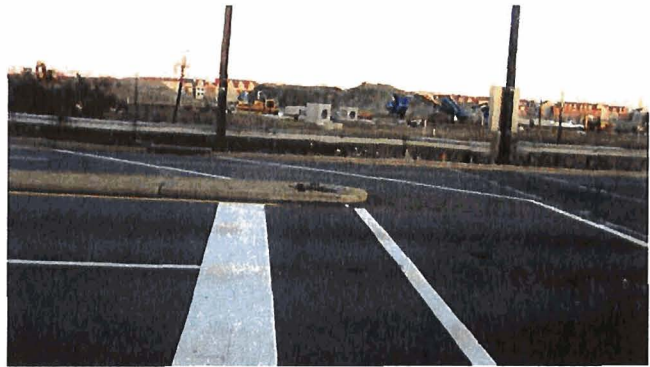
### 3.1 INTRODUCTION

This chapter of the report examines the existing multimodal transportation conditions in the Potomac Yard area. Included are descriptions of existing transportation issues, the street network, transit network, and bicycle/pedestrian networks.

#### General Transportation Issues

Understanding existing general transportation issues proximate to Potomac Yard provides a basis for creating an optimal multimodal transportation system for the future. Most of the existing transportation issues are related to the existing auto-centric Potomac Yard development. The existing retail center's auto-dependent configuration supports a limited number of transportation choices. The transportation issues in the study area include the following:

- US 1 caters almost exclusively to automobiles. Serving as a major regional facility, US 1 handles high traffic volumes and traffic signals are configured to progress through traffic and minimize green-time for side streets.
- US 1 is a barrier for pedestrians and bicyclists. There is little pedestrian and bicycle activity between Potomac Yard and Del Ray and Lynnhaven. While sidewalks, crosswalks, and pedestrian signals are provided at some intersections, the configuration of development in Potomac Yard is not inviting for pedestrians or bicyclists.
- Gaps exist in the bicycle and pedestrian networks. There are regional multi-use trails such as Four-Mile Run and the Mount Vernon Trail in the vicinity of the study area; however, direct access to these trails does not exist.
- Potomac Yard is not designed to engage transit use. A number of bus routes serve Potomac Yard; however, the availability of parking and lack of facilities discourages transit use.
- Abundance of surface parking. The visibility and size of the parking lots is an indication to the user that the development is automobile-oriented.



Existing US 1 Crosswalk at Swann Avenue



US 1 and Howell Avenue

## 3.2 STREET NETWORK

The existing street network examined as part of this study includes major roadways such as US 1, E. Braddock Road, and Mount Vernon Avenue as well as the local street grid in Del Ray and Lynnhaven. The following is a brief description of the area street system, study intersections, and intersection operations.

### Study Area Streets

#### Classification

Alexandria uses a functional classification system to characterize its streets based on connectivity and access. The classifications align with the functional classifications of the Federal Highway Administration (FHWA) and VDOT. Alexandria's system consists of expressways, arterials, primary collectors, residential collectors, and local streets. These are described briefly in the following:

- *Expressways* are controlled access facilities and provide movement for high volumes of people and goods over long distances. They do not provide access to adjacent properties.
- *Arterials* serve as primary links in Alexandria and to surrounding communities. Access is provided to adjacent land on a limited basis. Measures such as preferential signalization, signal progression, and linear continuity are provided on these streets. Arterials also may provide dedicated transit lanes.
- *Primary Collectors* provide access to major adjacent properties such as neighborhood shopping centers, mixed use hubs, and high schools. Primary collectors carry a mix of local and long-distance travel and link arterials.
- *Residential Collectors* carry relatively short trips and a large percentage of residential trips. They provide direct service to residential areas, local parks, neighborhoods, businesses, and schools. They connect local streets to higher classified streets.
- *Local Streets* provide direct access to homes, shopping, businesses, and other adjacent land. The local streets connect to collector streets and cut through traffic should be discouraged. For more information regarding the City of Alexandria's functional classification system, refer to the City of Alexandria's 2008 *Comprehensive Transportation Master Plan*.

## Street Descriptions

**US 1:** US 1 is a north-south arterial that connects Alexandria to the Metropolitan Washington Region. To the north, US 1 connects to Arlington County, Washington, D.C., and Maryland. To the south, US 1 connects to Old Town Alexandria, Fort Belvoir, and Richmond. US 1 generally parallels I-95 along the entire Eastern seaboard. North of Slaters Lane, US 1 also referred to as Jefferson Davis Highway is primarily a four-lane divided street with signals at major intersections and left-turn lanes at most intersections.



*US 1 – Looking south at Reed Avenue*

**E. Braddock Road:** Braddock Road is an east-west arterial between Commonwealth Avenue and N. West Street. Braddock Road connects between the northwestern Alexandria neighborhoods, the Braddock Road Metrorail station, and Old Town Alexandria. Between Mount Vernon Avenue and N. West Street, E. Braddock Road has a four-lane divided cross-section. West of Mount Vernon Avenue, it has a two-lane divided cross-section with on-street parking on both sides of the road.

**Mount Vernon Avenue:** Mt. Vernon Avenue is a north-south arterial between Commonwealth Avenue and E. Braddock Road. North of Commonwealth Avenue, Mt. Vernon Avenue is a primary collector street. Mt. Vernon Avenue is an important corridor for the Del Ray community of the City of Alexandria. In the study area, it has a two-lane undivided cross-section with on-street parking on both sides.

**Commonwealth Avenue:** Commonwealth Avenue is a north-south primary collector street between Reed Avenue and King Street. Commonwealth Avenue connects for the Del Ray community. Between Reed Avenue and Ashby Street, it has a two-lane divided cross-section with on-street parking on both sides of the street. Between Ashby Street and Mount Vernon Avenue, Commonwealth Avenue has a two-lane undivided cross-section.

**E. Glebe Road:** Glebe Road is an east-west primary collector connecting to S. Glebe Road in Arlington County and US 1 in Alexandria. In the study area, E. Glebe Road has a two-lane undivided cross-section and accommodates on-street parking on one or both sides.

**E. Monroe Avenue:** Monroe Avenue is an east-west primary collector street between Mount Vernon Avenue and US 1. Monroe Avenue provides an important connection between Russell Road and US 1. In the study area, E. Monroe Avenue has a two-lane undivided cross-section with on-street parking.

**Slaters Lane:** Slaters Lane is an east-west primary collector street between US 1 and the George Washington Memorial Parkway. In the study area, Slaters Lane has a four-lane undivided cross-section.

**E. Reed Avenue:** Reed Avenue is an east-west residential collector connecting Mount Vernon Avenue and US 1 in the Del Ray community of the City of Alexandria. In the study area, E. Reed Avenue has a two-lane undivided cross-section with on-street parking.

**Local Streets:** Evans Lane, Hume Avenue, Swann Avenue, Custis Avenue, and Howell Avenue are all classified as local streets. These streets provide access to property in Del Ray and Lynnhaven. Between Commonwealth Avenue, Mount Vernon Avenue, and US 1, these roads generally accommodate a two-lane undivided cross-section with on-street parking.

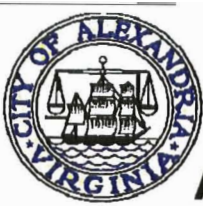
### Study Intersections

The vehicular impact of the Potomac Yard development was considered quantitatively for a specific set of signalized existing and future signalized intersections. The impact of development also was studied qualitatively for other intersections in the study area.

Existing intersections identified for quantitative study are the following:

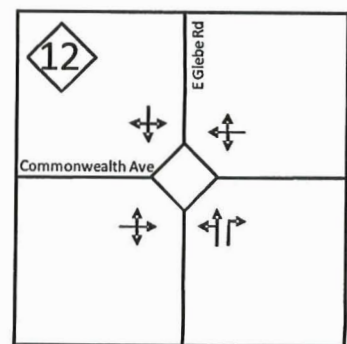
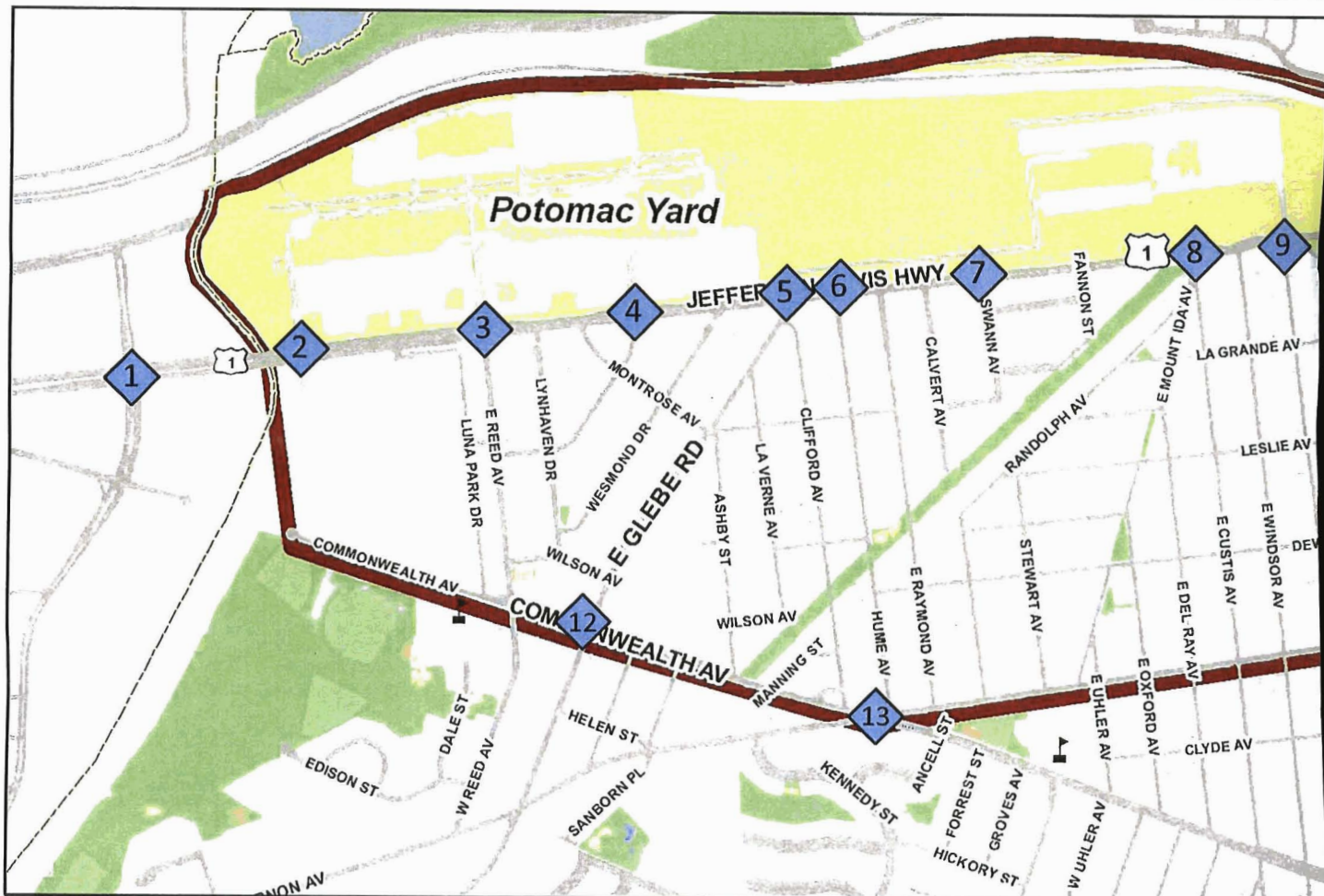
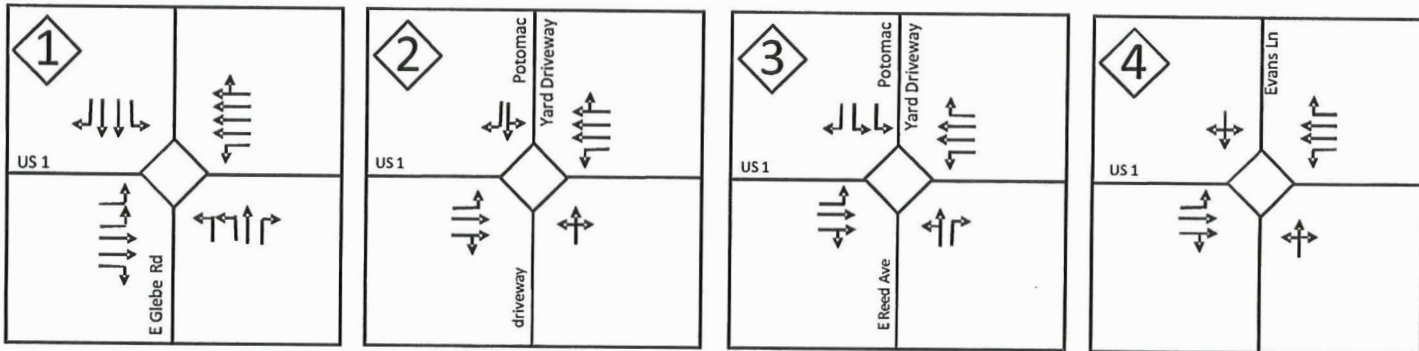
1. US 1 and S. Glebe Road (in Arlington County)
2. US 1 and Potomac Yard driveway (near Four-Mile Run)
3. US 1 and E. Reed Avenue/Potomac Yard driveway
4. US 1 and Evans Lane/Potomac Yard driveway
5. US 1 and E. Glebe Road/Potomac Yard driveway
6. US 1 and Hume Avenue
7. US 1 and Swann Avenue
8. US 1 and E. Custis Avenue
9. US 1 and E. Howell Avenue/Potomac Yard driveway
10. US 1 and E. Monroe Avenue
11. US 1 and Slaters Lane
12. Commonwealth Avenue and E. Glebe Road
13. Commonwealth Avenue and Mount Vernon Avenue
14. Mount Vernon Avenue and E. Braddock Road

Each of these study intersections is signalized. The existing laneage at the study intersections is shown in **Figure 3-1: Existing Intersection Laneage and Traffic Control.**



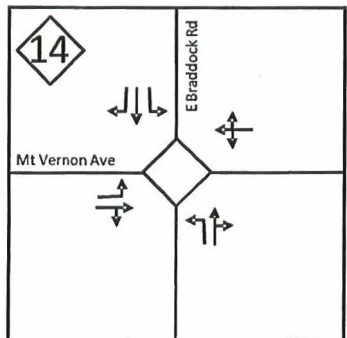
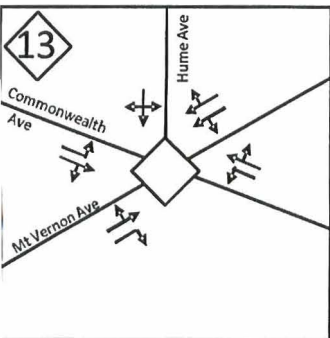
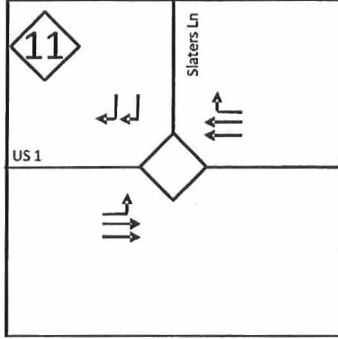
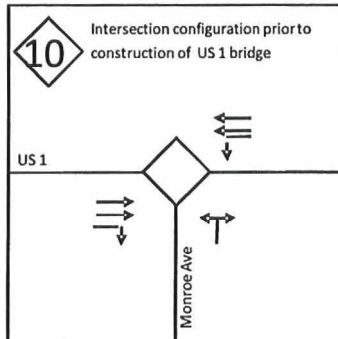
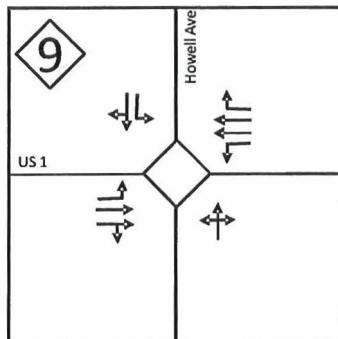
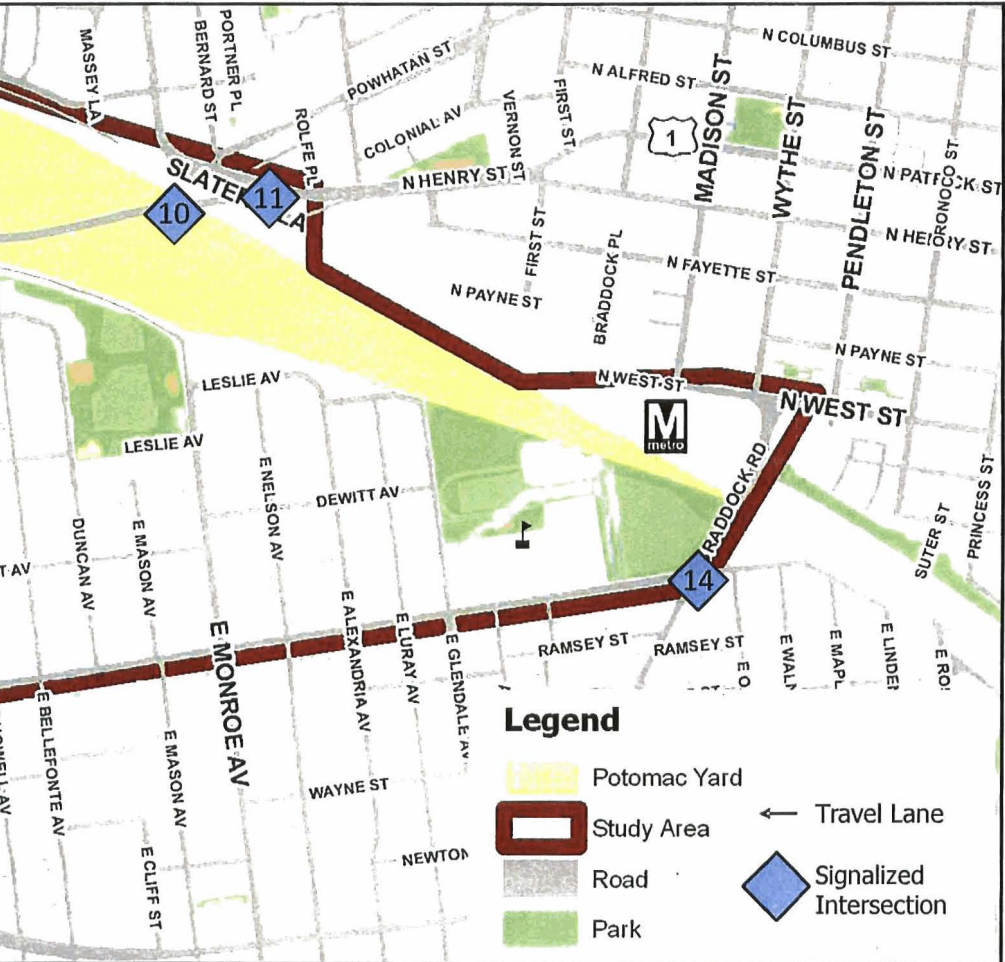
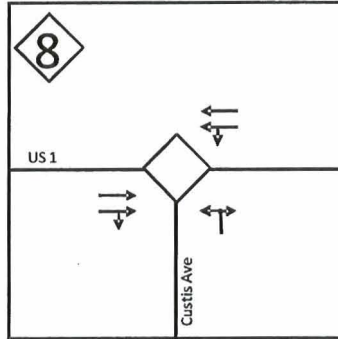
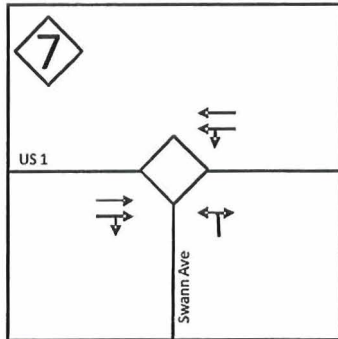
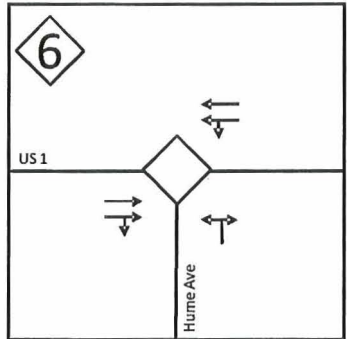
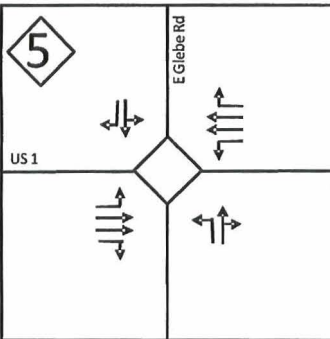
# Potomac Yard Multimodal Transportation Study

# Figure





# B-1: Existing Intersection Laneage and Traffic Control



## Traffic Data

Traffic data used for this study includes traffic counts conducted in January and February of 2009 by Kimley-Horn and Associates, Inc. and counts performed in previous studies. This data was used to establish current weekday PM peak hour traffic conditions. The PM peak hour was selected for the analysis in this study since it represents a condition with significant commuter traffic and considerable retail traffic. A review of existing traffic counts shows that there are heavier vehicle turning movements at some intersections in the weekday AM or Saturday peak hours than in the weekday PM peak hour. This stated, the weekday PM peak hour was still found to experience the highest overall traffic volumes.

The 2009 count data was compared with count data from the 2004 Potomac Yard Infrastructure Traffic Analysis and the 2007 Potomac Village Traffic Analysis. The comparison found that traffic volumes did not change significantly between 2004, 2007, and 2009. VDOT Daily Traffic Volume Estimates from 2004 through 2007 (most recent available) confirm that traffic volumes along US 1 did not increase. In 2004, VDOT reported an annual average daily traffic volume of 41,000 vehicles per day. In 2007, VDOT reported an annual average daily traffic volume of 40,000 vehicles per day. The demonstrated stabilization of traffic volumes along the corridor is consistent with the experience of little new development being completed in the vicinity of the study area and the US 1 Monroe Avenue Bridge construction.

A detailed comparison of weekday PM peak hour turning movement count data from 2009 and 2004 (Potomac Yard Infrastructure Traffic Analysis) showed that the southbound US 1 through traffic volume (peak direction traffic in the weekday PM peak hour) increased negligibly in this period. The northbound US 1 through traffic volume increased by approximately 150 vehicles per hour.

To adjust the data to 2009, the Potomac Yard Infrastructure Traffic Analysis weekday PM peak hour counts were increased by 150 vehicles in the northbound through direction. Southbound US 1 through volumes and left and right turning movements to and from US 1 were not adjusted.

The following list is a summary of the data source for existing traffic counts at each of the study intersections:

1. US 1 and S. Glebe Road	2008 Crystal City Multimodal Transportation Study
2. US 1 and Potomac Yard driveway	2007 Potomac Village Traffic Analysis
3. US 1 and E. Reed Avenue/Potomac Yard driveway	2007 Potomac Village Traffic Analysis
4. US 1 and Evans Lane/Potomac Yard driveway	2007 Potomac Village Traffic Analysis
5. US 1 and E. Glebe Road/Potomac Yard driveway	2007 Potomac Village Traffic Analysis



Potomac Yard Multimodal Transportation Study  
ALEXANDRIA, VA

6. US 1 and Hume Avenue	2004 Potomac Yard Infrastructure Traffic Analysis
7. US 1 and Swann Avenue	2004 Potomac Yard Infrastructure Traffic Analysis
8. US 1 and E. Custis Avenue	2004 Potomac Yard Infrastructure Traffic Analysis
9. US 1 and E. Howell Avenue/Potomac Yard driveway	2004 Potomac Yard Infrastructure Traffic Analysis
10. US 1 and E. Monroe Avenue*	2004 Potomac Yard Infrastructure Traffic Analysis
11. US 1 and Slaters Lane	January 2009 counts and Potomac Yard Infrastructure Traffic Analysis
12. Commonwealth Avenue and E. Glebe Road	January 2009 counts
13. Commonwealth Avenue and Mt. Vernon Avenue	January 2009 counts
14. Mt. Vernon Avenue and E. Braddock Road	January 2009 counts

\*Reflects condition where Monroe Avenue is open to traffic prior to US 1 bridge construction

Raw traffic count data is provided in **Appendix A**.

### Intersection Capacity Analysis

Intersection capacity analyses were conducted using existing weekday PM peak hour turning movement volumes for study intersections. The capacity analyses were conducted using Synchro, which utilizes methodologies contained in the *Highway Capacity Manual, 2000 Edition* (HCM) for signalized and unsignalized intersections. According to the HCM, capacity is defined as the maximum number of vehicles that can pass over a particular road segment or through a particular intersection within a fixed time duration. Operating conditions are described by level of service (LOS), which is a qualitative measure that describes operational conditions of an intersection or roadway and motorist perceptions within a traffic stream. The HCM defines six levels of service, LOS A through F, with A being the best and F the worst. **Table 3-1** shows levels of service and the ranges of delay per vehicle for intersections signalized and unsignalized. Alexandria's goal is to maintain an overall LOS D or better during peak traffic periods.

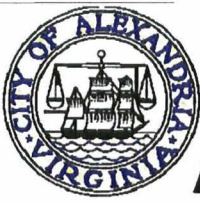
Level of Service (LOS)	Delay per Vehicle (seconds)	
	Signalized Intersections	Unsignalized Intersections
A	≤ 10	0-10
B	> 10 – 20	> 10 – 15
C	> 20 – 35	> 15 – 25
D	> 35 – 55	> 25 – 35
E	> 55 – 80	> 35 – 50
F	> 80	> 50

Source: *Highway Capacity Manual, 2000 Edition*

Existing conditions analyses were based on existing weekday PM peak hour turning movement volumes, existing laneage, and existing traffic control at the study intersections. Results of the intersection capacity analyses are summarized in **Table 3-2** and **Figure 3-2: Intersection Volumes and Levels of Service**. A table showing the existing levels of service by lane group is provided in **Appendix B**. The Synchro HCM reports with existing levels of service are provided in **Appendix C**.

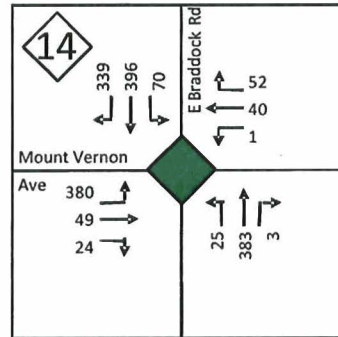
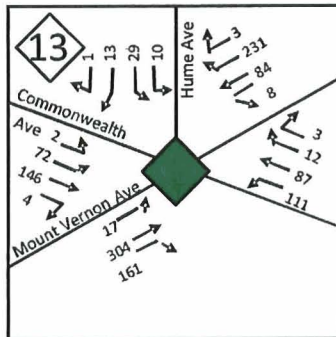
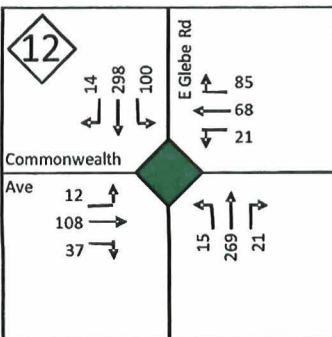
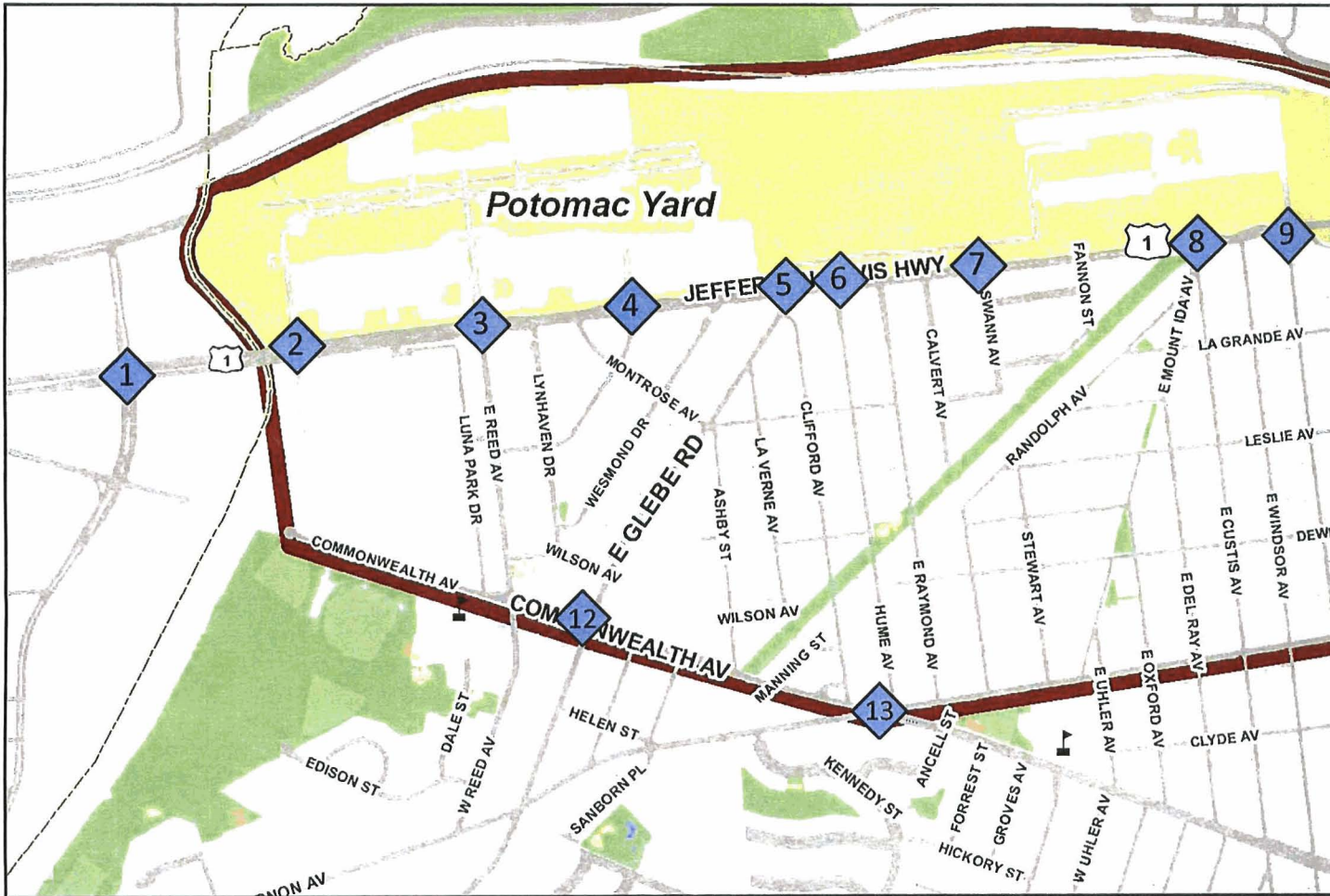
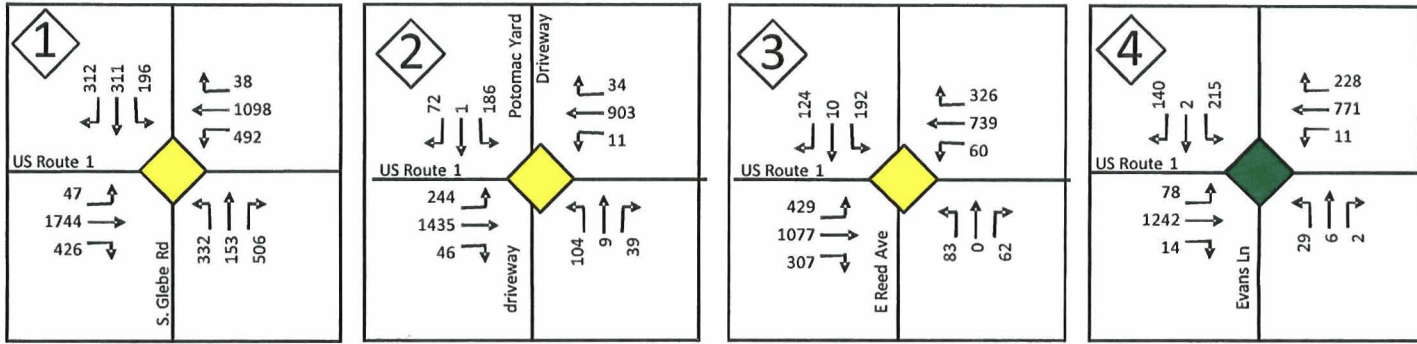
Signalized Intersection	LOS (sec/veh)
1. US 1 and S. Glebe Road	C (31)
2. US 1 and Potomac Yard driveway (near Four-Mile Run)	C (23)
3. US 1 and E. Reed Avenue/Potomac Yard driveway	C (29)
4. US 1 and Evans Lane/Potomac Yard driveway	B (15)
5. US 1 and E. Glebe Road/Potomac Yard driveway	C (28)
6. US 1 and Hume Avenue	A (2)
7. US 1 and Swann Avenue	A (3)
8. US 1 and E. Custis Avenue	A (1)
9. US 1 and E. Howell Avenue/Potomac Yard driveway	A (2)
10. US 1 and E. Monroe Avenue	B (19)
11. US 1 and Slaters Lane	B (16)
12. Commonwealth Avenue and E. Glebe Road	A (8)
13. Commonwealth Avenue and Mt. Vernon Avenue	C (31)
14. Mt. Vernon Avenue and E. Braddock Road	C (32)

\*Reflects condition where Monroe Avenue is open to traffic prior to US 1 bridge construction  
Source: Kimley-Horn and Associates, Inc.

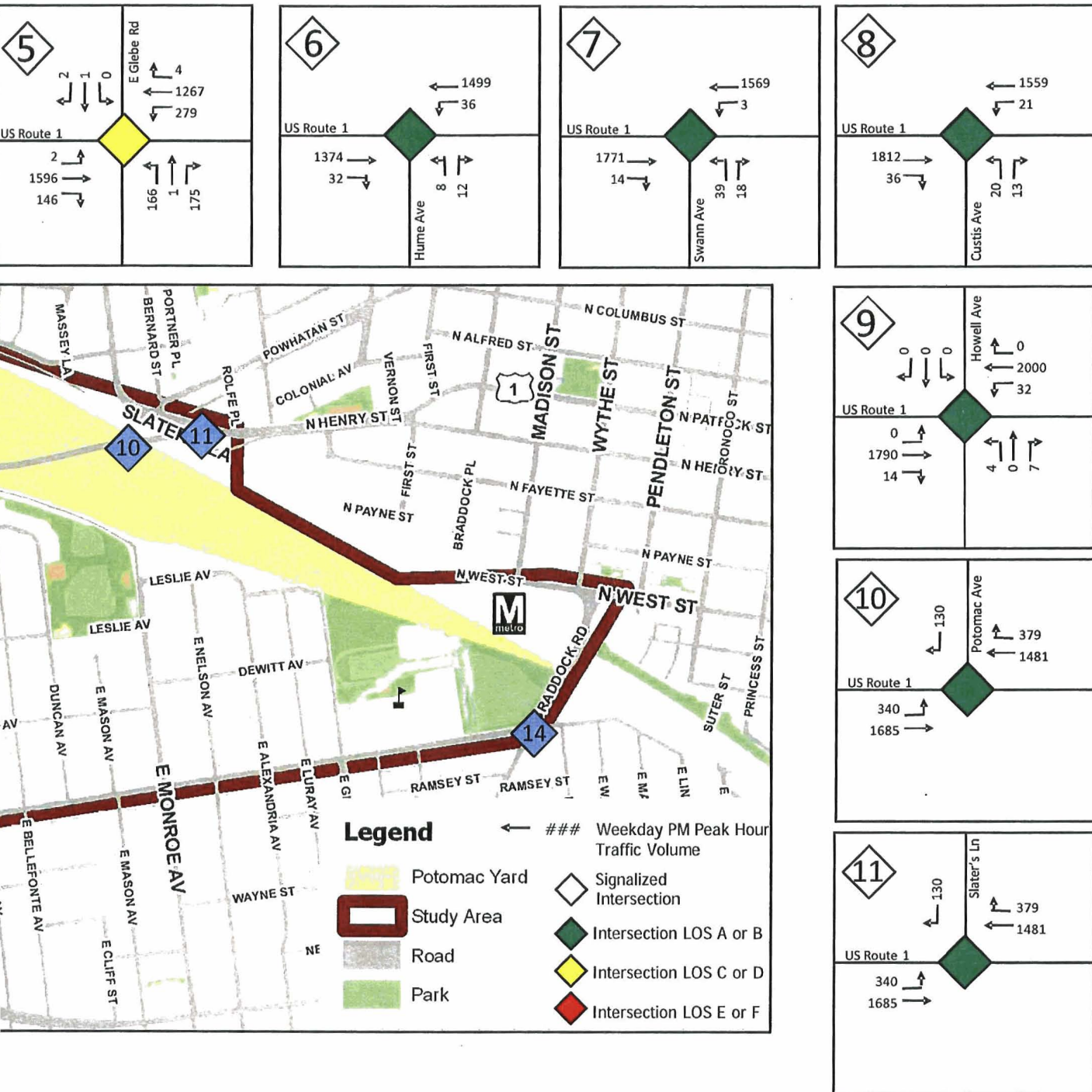


# Potomac Yard Multimodal Transportation Study

Figure



# Figure 3-2: Existing Intersection Volumes and Levels of Service



The analysis shows that most study intersections operate at acceptable levels of service under existing conditions. The intersection of US 1 and E. Monroe Avenue operated at an unacceptable LOS prior to the US 1 Monroe Avenue Bridge being completed.

The local street network to the west and south of Potomac Yard provide convenient opportunities for vehicle, pedestrian, bicycle, and transit travel due to the interconnected nature of the network. The interconnected network of streets allows for efficient dispersion of traffic allowing the unsignalized intersections to operate efficiently.

### US 1 Corridor Travel Times and Speeds

There are many measures of effectiveness that can be used to benchmark or document the traffic operations of a street. These include level of service, amount of average delay, speed, length of traffic back-up (queue), and travel time. Travel time is a useful measure in documenting a corridor's performance as it is relatively easy to measure, straightforward to explain to a broad audience, and simple to compare from one year to another and between similar corridors under similar conditions during the course of time.

The weekday PM peak hour was used in the Potomac Yard evaluation since it represents the busiest period for major travel corridors serving Potomac Yard. A summary of PM peak hour average travel speed and time for the approximately 1.7-mile section of US 1 between S. Glebe Road and Slaters Lane is shown in the following:

- **Northbound:** 22.3 mph, 4.5 minutes
- **Southbound:** 20.9 mph, 5 minutes

As a benchmark for comparison, existing and future, Alexandria staff measured PM peak hour travel times for several important corridors in its urban core as shown in **Table 3-3**.

<b>Location/Direction</b>	<b>Average Travel Speed (mph)</b>	<b>Average Travel Time (in minutes for 1.7 miles*)</b>
US 1 Southbound in Old Town	5.3	19.0
US 1 Northbound in Old Town	13.0	8.0
Washington Street Southbound	8.8	11.5
Duke Street (Westbound)	14.4	7.0
Duke Street (Eastbound)	11.6	9.0

\* This is the equivalent time required to travel 1.7 miles, which is the same as the length of US 1 from S. Glebe Road to Slaters Lane  
Source: City of Alexandria

During morning and afternoon peak hours, some back-ups occur on US 1; however, traffic congestion is not persistent. By contrast, conditions for bicycles and pedestrians are relatively poor, owing to the significant vehicular focus along the US 1 corridor and the lack of high-quality facilities and conditions. Currently, transit usage is low (compared to other parts of the city) along the corridor similarly owing to a vehicular focus along US 1 with regard to urban design, land use, and limited transit service.

The majority of traffic travels north/south along US 1 and correspondingly, traffic signal timings are devised to progress this traffic as efficiently as possible, while offering side-streets and pedestrians the minimum amount of time needed to serve demand reasonably. Currently, US 1 along Potomac Yard operates with reasonable levels of delay during normal weekday and weekend peak periods. Under average weekday peak period conditions, vehicles on US 1 do not wait through multiple signal cycles at normal intersections, traffic flows relatively steadily throughout the corridor, and travel speeds are moderate typical of an urban roadway. Based on field observations, travel speed is higher and travel time is less on US 1 in the Potomac Yard corridor than on other similar length and character urban corridors in Alexandria such as US 1 in Old Town, Washington Street, and Duke Street.



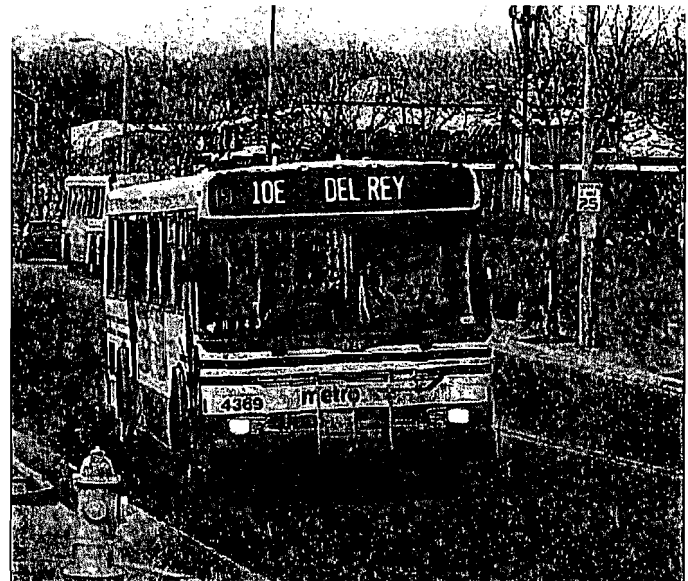
### 3.3 TRANSIT NETWORK

The Potomac Yard study area is directly served by commuter bus services. The area also is served indirectly by Metrorail and Virginia Railway Express. Existing transit services are shown in Figure 3-3: Existing Transit Network and described in the following:

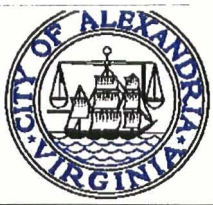
**Metrorail Services:** The Potomac Yard study area is served by the Yellow and Blue lines via the Crystal City and Braddock Road stations. The Braddock Road station currently has some short-term vehicle parking, bicycle parking, and car sharing available in addition to being served by Metrobus and DASH. The Crystal City station currently has bicycle parking and car sharing available in addition to being served by Metrobus and ART.

**Metrobus:** Routes in the vicinity of the Potomac Yard study area are the following:

- Metrobus Routes 9A and 9E (Huntington – Pentagon Line) provides service between the Huntington, Braddock Road, and Pentagon Metrorail stations. Routes 9A runs through Old Town and Potomac Yard along US 1. Route 9A provides service every 30 minutes every weekday and Saturday and service every 40 to 60 minutes on Sunday. Route 9E runs from the Braddock Road to the Pentagon Metrorail station along US 1 and service is provided in the southbound direction during the weekday AM peak period and northbound direction during the weekday PM peak period.
- Metrobus Routes 10A and 10E (Hunting Towers-Pentagon Line) provides service between Hunting Towers, Braddock Road Metrorail station, Crystal City, and the Pentagon Metrorail station. Through the Potomac Yard area, Routes 10A and 10E provide service along Mount Vernon Avenue and Braddock Road. Route 10A provides service every weekday, Saturday, and Sunday and the Route 10E line is provided in the northbound direction during the weekday AM peak period and southbound direction during the weekday PM peak period.
- Metrobus Route 10B (Hunting Towers-Ballston Line) provides service between Hunting Towers, Braddock Road Metrorail station, Shirlington, and the Ballston-MU Metrorail station. Through the Potomac Yard area, Route 10B provides service along Mount Vernon Avenue and Braddock Road on weekdays, Saturdays, and Sundays.



Route 10E Metrobus



# Potomac Yard Multimodal Transportation Study

## Legend

-  DASH
-  Metro Station
-  Metrorail
-  Metrobus
-  Potomac Yard
-  Study Area



Figure 3-3: Existing Transit Network



## Potomac Yard Multimodal Transportation Study ALEXANDRIA, VA

- Metrobus Route 11Y (Mount Vernon Express Line) provides service from Mount Vernon to the Potomac Park in the District of Columbia. Through the Potomac Yard area, Route 11Y runs along the George Washington Memorial Parkway. This is an express service running northbound during the weekday AM peak period and southbound during the PM peak period every 15 to 20 minutes. The number of stops is restricted to reduce travel times. The closest bus stop is at the intersection of Abingdon Drive and Slaters Lane.

**DASH** routes in the vicinity of the Potomac Yard study area are the following:

- Routes AT3 and AT4 provide service between Hunting Towers, Alexandria City Hall, Braddock Road Metrorail station, Shirlington, and the Pentagon Metrorail station. Through the Potomac Yard area, Routes AT3 and AT4 run along Braddock Road, N. West Street, and Pendleton Street. Routes AT3 and AT4 service is provided every 20 minutes during weekday AM and PM peak periods and Route AT4 also provides Saturday service every 60 minutes. A Route AT3-4 Loop is provided during the weekday mid-day and during evenings, Saturdays, and Sundays every 60 minutes.
- Route AT10 provides service between the Potomac Yard shopping center and the King Street Metrorail Station. Through the Potomac Yard area, Route AT10 runs along Reed Avenue, Mount Vernon Avenue, Monroe Avenue, and Commonwealth Avenue.

**DOT** is the City of Alexandria's paratransit service. Users must meet eligibility requirements. Trips are provided by taxis and wheelchair accessible vans. DOT provides service throughout the City of Alexandria, City of Falls Church, Arlington County, Fairfax County, and Fairfax City. DOT service operates seven days a week and is by advance reservation.



*Route A10 DASH Bus*

### 3.4 PEDESTRIAN AND BICYCLE NETWORK

There are numerous existing pedestrian and bicycle facilities located in the study area. A summary of these facilities and analysis from the City of Alexandria Pedestrian and Bicycle Mobility Plan are described below. The existing pedestrian and bicycle networks are shown in **Figure 3-4: Pedestrian and Bicycle Network**.

#### Pedestrian Network

Pedestrian facilities include multi-use paths, sidewalks, crosswalks, pedestrian signals, and pedestrian push buttons. Sidewalks run along many roads in the study area. **Table 3-4** summarizes the sidewalk coverage on study area streets.



*PYPAG Transportation Subcommittee site visit at existing US 1 crosswalk*

Street	From	To	Sidewalks
US 1	Four-Mile Run	E. Glebe	both sides
US 1	E. Glebe	E. Monroe	east side
US 1	E. Monroe	Slaters Lane	east side
E. Braddock Rd	Mt. Vernon	US 1	both sides
Commonwealth Ave	Four-Mile Run	E. Reed	east side
Commonwealth Ave	E. Reed	Mt. Vernon	both sides
E. Glebe Road	Commonwealth	US 1	both sides
E. Monroe Avenue	Mt. Vernon	US 1	both sides
Mt. Vernon Avenue	Commonwealth	Braddock Road	both sides
Slaters Lane	US 1	Powhattan	south side
E. Reed Avenue	Commonwealth	US 1	both sides
Local Streets	in Del Ray community		generally both sides

Source: Kimley-Horn and Associates, Inc.

**Figure 3-5: Existing Pedestrian Walking Conditions along Roadways** shows the results of the pedestrian network evaluation along streets included in the 2007 Bicycle and Pedestrian Mobility Study. The results show that conditions are not ideal along the following:

- West side of US 1 from Four-Mile Run to Slaters Lane
- East side of US 1 from Slaters Lane to East Glebe Road
- North side of East Glebe Road from Commonwealth Avenue to US 1
- Some portions of Monroe Avenue from Mount Vernon Avenue to US 1



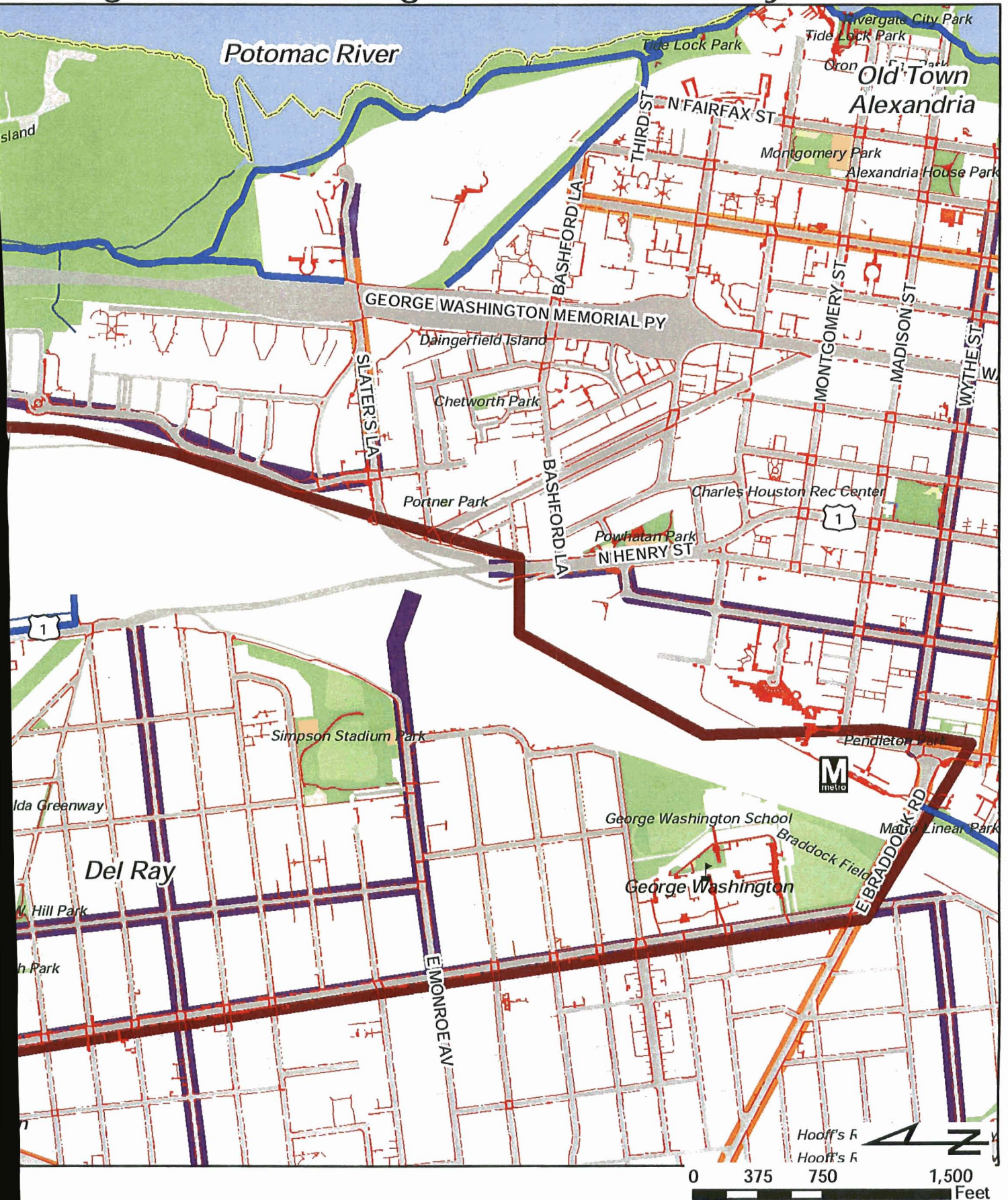
# Potomac Yard Multimodal Transportation Study

## Legend

-  Off Street Trail
-  On Street Bike Facility
-  Shared Roadways
-  Existing Sidewalk
-  Potomac Yard
-  Study Area



Figure 3-4: Existing Pedestrian and Bicycle Network



# Potomac Yard Multimodal Transportation Study ALEXANDRIA, VA

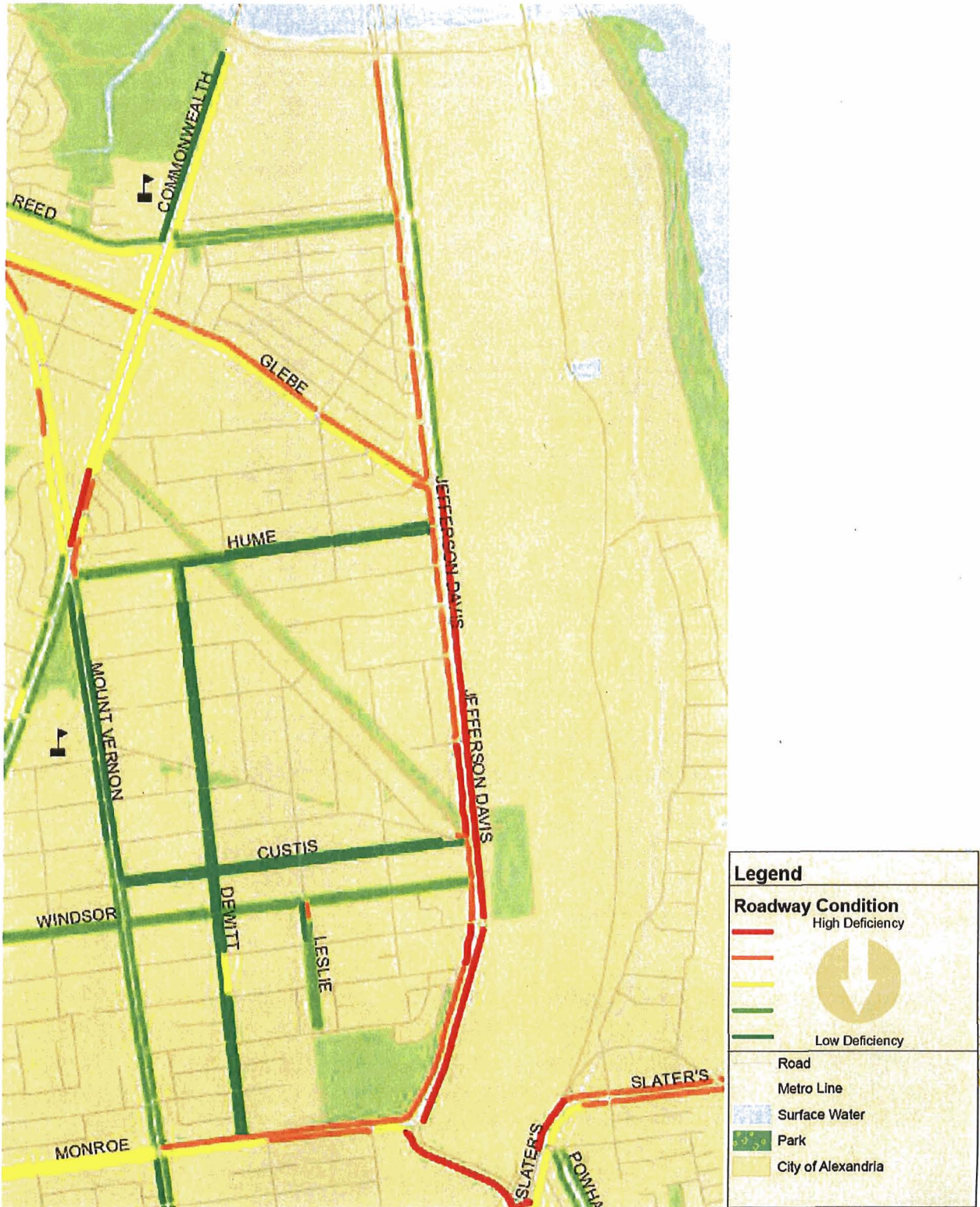


Figure 3-5: Existing Walking Conditions along Roadways

Source: City of Alexandria Pedestrian and Bicycle Mobility Plan, November 2007 Draft, Figure 11





Potomac Yard Multimodal Transportation Study  
ALEXANDRIA, VA

Table 3-5 presents an inventory of pedestrian facilities at the study intersections.

Table 3-5: Existing Pedestrian Accommodations at Study Intersections		
Intersection	Crosswalks*	Pedestrian Signals
1. US 1 and S. Glebe Road	all legs	yes
2. US 1 and Potomac Yard driveway (near Four-Mile Run)	all legs	yes
3. US 1 and E. Reed Avenue/Potomac Yard driveway	all legs	yes
4. US 1 and Evans Lane/Potomac Yard driveway	all legs	yes
5. US 1 and E. Glebe Road/Potomac Yard driveway	all legs	yes
6. US 1 and Hume Avenue	E, N, S legs	no
7. US 1 and Swann Avenue	S, E, W legs	yes
8. US 1 and E. Custis Avenue	N leg	yes
9. US 1 and E. Howell Avenue/Potomac Yard driveway	N/A	N/A
10. US 1 and E. Monroe Avenue	N leg	yes
11. US 1 and Slaters Lane	all legs	yes
12. Commonwealth Avenue and E. Glebe Road	N, NE, SE, SW legs	yes
13. Commonwealth Avenue and Mt. Vernon Avenue	S, E, W legs	yes
14. Mt. Vernon Avenue and E. Braddock Road	all legs	yes
<p><b>Legend</b>                      * N – Northbound leg                      S – Southbound leg                      W – Westbound leg                      E – Eastbound leg                      NE – Northeast leg                      SE – Southeast leg                      Source: Kimley-Horn and Associates, Inc.</p>		

Figure 3-6: Roadway Crossing Conditions shows the assessment of the condition of street crossings for pedestrians and bicycles included in the 2007 Bicycle and Pedestrian Mobility Study. The results show that the crossings of US 1 at the Potomac Yard driveway (Four-Mile Run), E. Reed Avenue, Evans Lane, E. Glebe Road, Hume Avenue, E. Raymond Avenue, Custis Avenue, and Windsor Avenue have highly deficient crossing conditions.

# Potomac Yard Multimodal Transportation Study ALEXANDRIA, VA

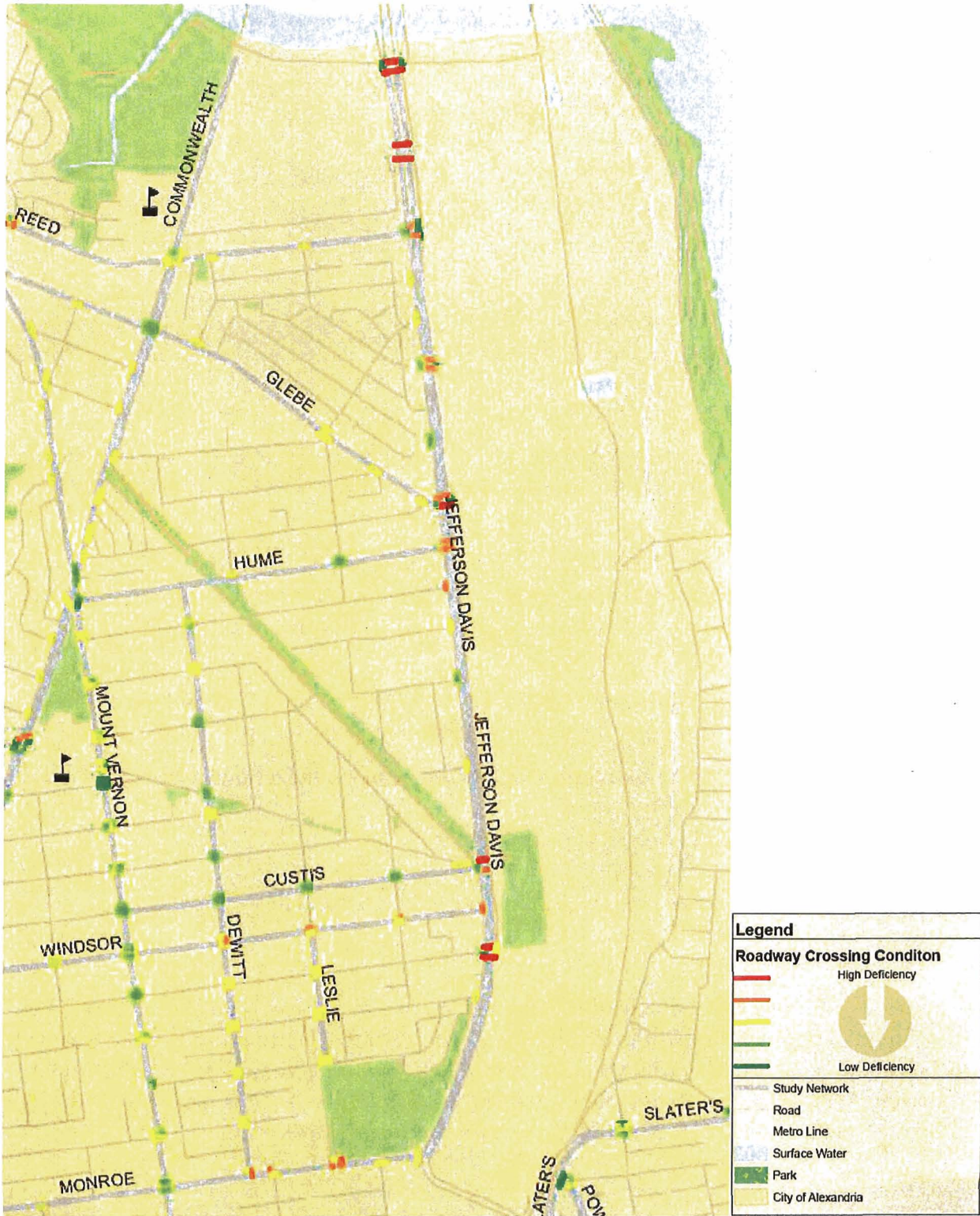


Figure 3-6: Roadway Crossing Conditions

Source: City of Alexandria Pedestrian and Bicycle Mobility Plan, November 2007 Draft, Figure 12

## Bicycle Network

On-street facilities include bike lanes and signed bike routes. Off-street facilities include side paths, cycle tracks, and other facilities that follow the alignment of a road and trails that are separated from a road.

Bicycle facilities in the study area include the following:

- An asphalt path along the east side of US 1. The path runs from the Potomac Yard driveway just south of Four-Mile Run to Custis Avenue.
- A path along Four-Mile Run from Mount Vernon Avenue to US 1. This trail provides access to the Four-Mile Run trail in Arlington County, which leads to the W&OD trail.
- The Mount Vernon Trail is located east of Potomac Yard along the George Washington Memorial Parkway. There is currently no direct access from Potomac Yard in Alexandria to the Mount Vernon Trail. The nearest access is immediately to the north in Arlington County.
- A relatively short off-street trail located in the Mt. Jefferson Park and Greenway in the Del Ray community to the west of Potomac Yard.
- On-street facilities in the study area are located along the following streets:
  - Commonwealth Avenue
  - Mt. Vernon Avenue, Dewitt Avenue
  - E. Windsor Avenue
  - Leslie Avenue between E. Windsor Avenue and E. Monroe Avenue
  - E. Monroe Avenue
  - Slaters Lane.



*Multi-use trail and bus shelter along US 1 – looking north*

**Figure 3-7: Bicycle Level of Service** shows results from the bicycle level of service (BLOS) included in the 2007 Bicycle and Pedestrian Mobility Study. The results of the BLOS show that the on-street bicycle facility on Commonwealth Avenue from E. Glebe Road to Mount Vernon Avenue has an existing BLOS of A and Mount Vernon Avenue from Commonwealth Avenue to Monroe Avenue has an existing BLOS of C.

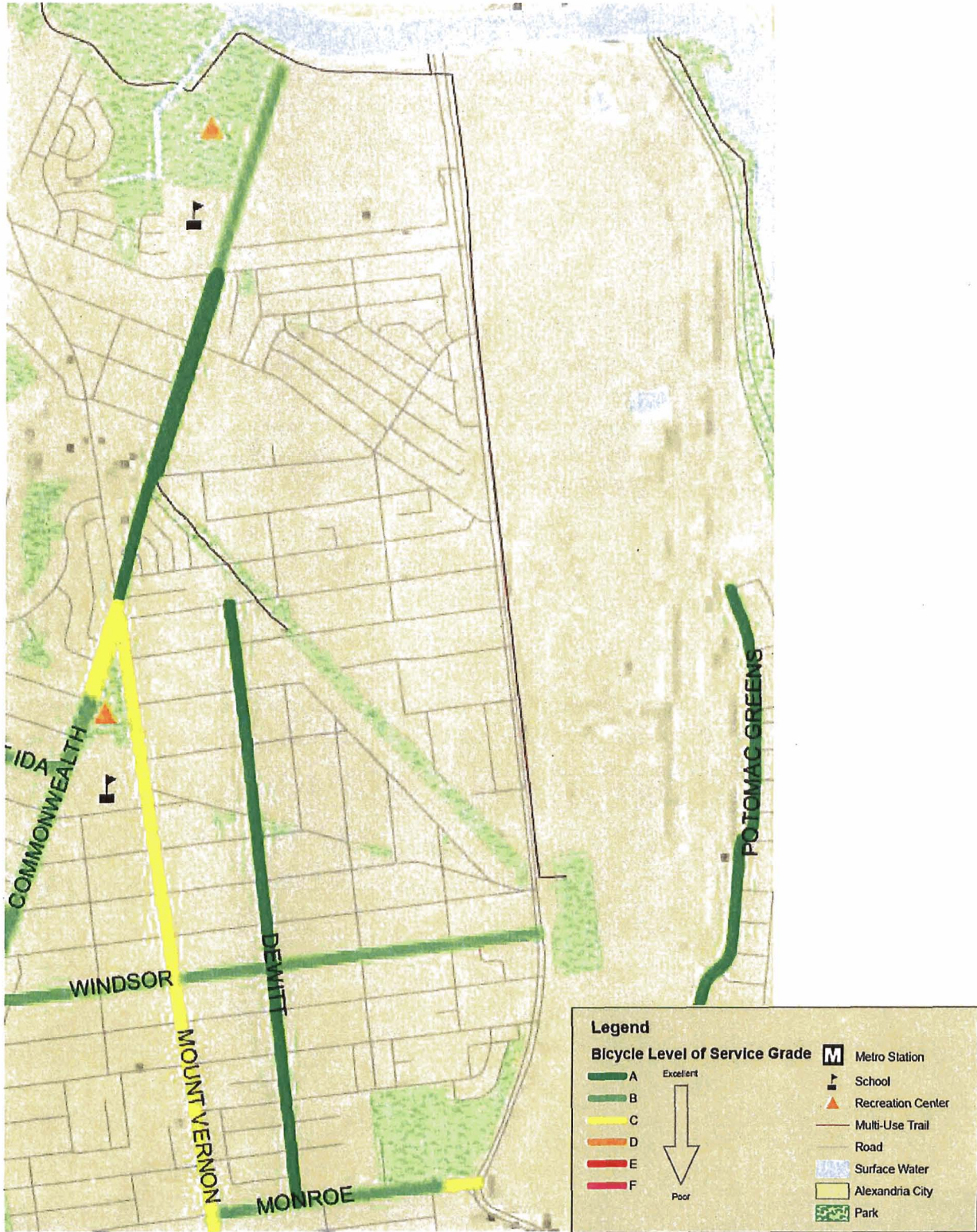


Figure 3-7: Bicycle Level of Service  
Source: City of Alexandria Pedestrian and Bicycle Mobility Plan, November 2007 Draft, Figure 15



## Potomac Yard Multimodal Transportation Study ALEXANDRIA, VA

### 3.5 PARKING

There is an abundant supply of free-of-charge surface parking at the existing retail center. The parking occupancy is higher on weekends and holidays than average weekday peak periods.

### 3.6 SUMMARY

Existing transportation conditions in the study area vary. Many of the major street corridors in the study area are focused on moving automobiles. The existing retail center has a suburban configuration and adjacent US 1 is auto-oriented. Intersection LOS analyses show that most study area intersections operate acceptably. Signal timing along US 1 is set to progress through traffic. The intersection of US 1 and E. Monroe Avenue operated at an unacceptable LOS prior to the completion of the new US 1 Monroe Avenue bridge. The local street grid to the south and west of Potomac Yard efficiently disperses traffic and allows most intersections to operate acceptably.

The Potomac Yard study area is served by transit services that include Metrorail, Metrobus, City bus services, and paratransit. The existing Potomac Yard shopping center is not designed to encourage transit use.

The study area is proximate to regional trails including the Four-Mile Run trail and the Mount Vernon Trail. There is a well-developed sidewalk network in the Del Ray community to the west and south of Potomac Yard. In Potomac Yard, there is an asphalt path along the east side of US 1. Additional connectivity to nearby regional trails, completing the sidewalk network, establishing an interconnected network of bicycle facilities, and improving crossings should be considered to enhance non-vehicular conditions in the study area.

## 4.0 2030 FUTURE CONDITIONS WITHOUT DEVELOPMENT

This chapter examines the 2030 conditions without proposed redevelopment in Potomac Yard Landbay F. Included in this chapter are descriptions of the future transportation network, future traffic volumes without development, and future conditions without development traffic analysis results.

### 4.1 2030 FUTURE TRANSPORTATION NETWORK WITHOUT DEVELOPMENT

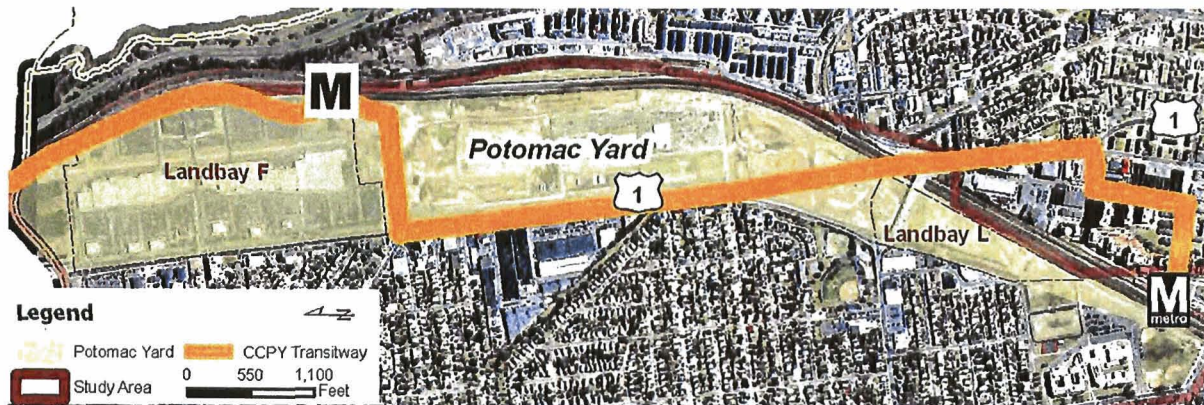
The following are transportation improvements that have been planned and are anticipated to be completed prior to 2030.

**US 1 Widening for Transit:** As a part of the planned redevelopment in Landbay F, right-of-way will be dedicated and improved for US 1 to be widened to accommodate transit lanes to support the Crystal City/Potomac Yard Transitway. No widening is programmed to increase the number of general purpose vehicle travel lanes.

**Crystal City/Potomac Yard (CCPY) Transitway:** The CCPY Transitway will travel through Potomac Yard and extend to Crystal City on the north and the Braddock Road Metrorail Station on the south. The concept of dedicated right-of-way for transit was adopted by the Alexandria City Council under the Transportation Master Plan. The future transit service is envisioned to operate efficiently within dedicated lanes to the maximum extent feasible. The initial service concept for the CCPY corridor is bus rapid transit; however, as demand and usage increase, conversion to streetcar or similar rail transit is possible.

The proposed alignment of the transit corridor is shown in **Figure 4-1: Crystal City/Potomac Yard Transitway Alignment under Future Conditions without Development**. The CCPY service will operate in mixed traffic lanes northbound until crossing the Monroe Avenue bridge. The route will operate on dedicated transit lanes north of the bridge on US 1 and continue through Potomac Yard, turning north on Potomac Avenue, and travelling to Arlington County. Prior to the proposed development in Landbay F, the transitway will travel between US 1 and Potomac Avenue on E. Glebe Road as an interim route. The transit corridor along US 1 will be median-running. A final determination has not been made as to technology and the final design vehicle. This study assumes that the entire transit corridor will be located in the median.

Potomac Yard Multimodal Transportation Study  
ALEXANDRIA, VA



**Figure 4-1: Crystal City/Potomac Yard Transitway Alignment under Future Conditions without Development**

**Potomac Avenue:** This new major street will connect US 1 on the south to Arlington to the north and will provide additional north/south capacity to the transportation network.

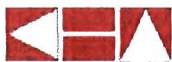
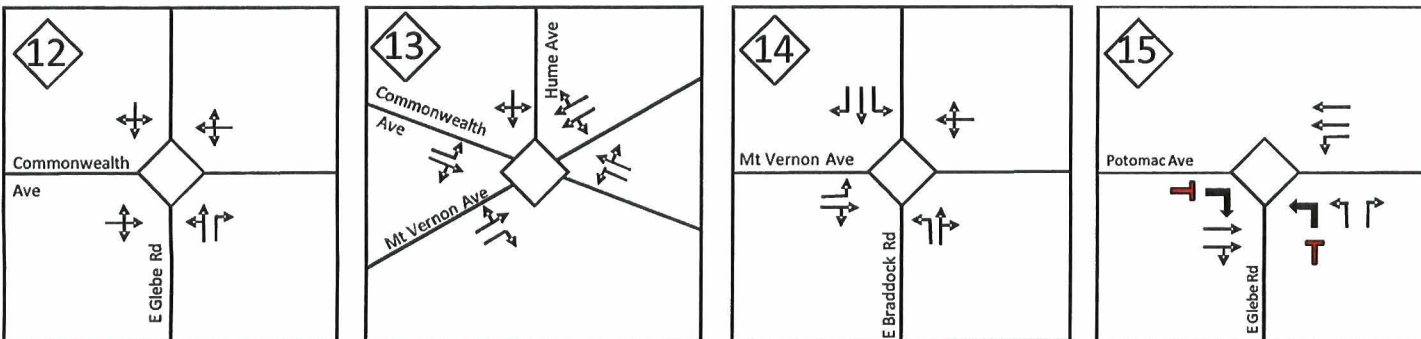
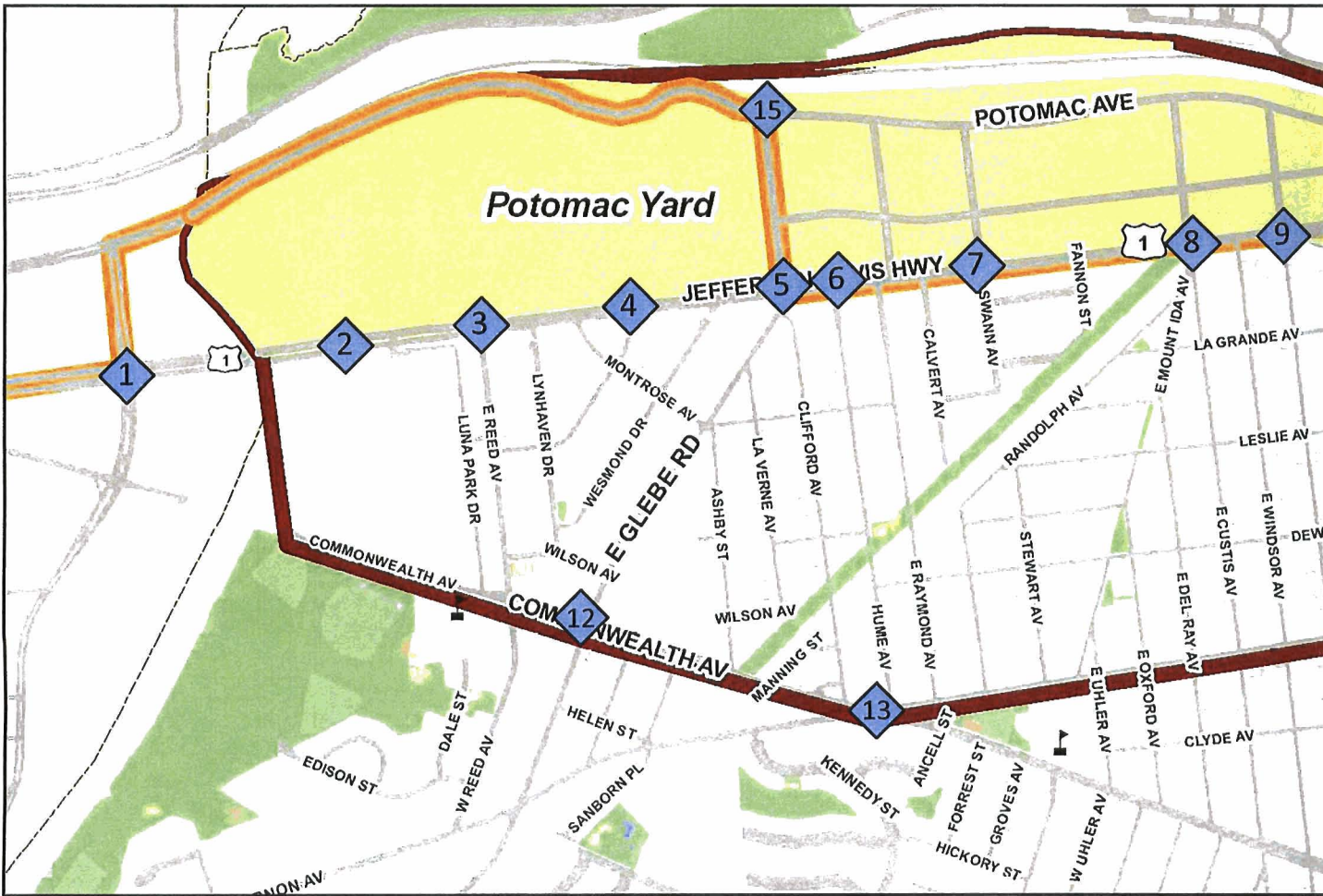
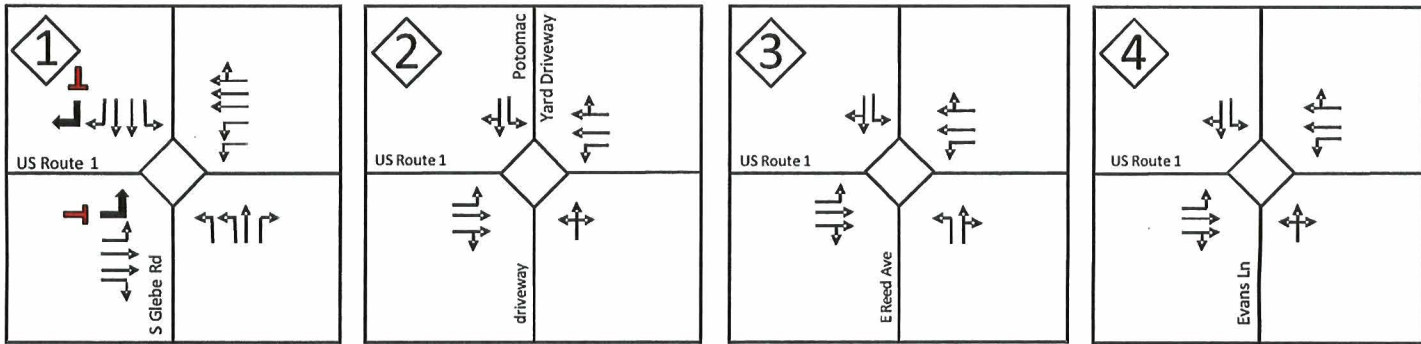
**Internal Street Network:** A fine-grained interconnected network of streets will be constructed in Potomac Yard in the landbays located between Landbays F and L.

**New Landbay K Bicycle/Pedestrian Connection:** This trail connection will connect Potomac Yard directly to Four-Mile Run through a linear park connecting Braddock Road and Four-Mile Run, enhancing its access to the regional major trail network. In future development phases, a pedestrian bridge also will be provided from Potomac Yard Park across the railroad corridor to Potomac Greens as a part of the new Metrorail station.

Laneages at the study intersections are shown in **Figure 4-2: 2030 Future Intersection Laneage and Traffic Control without Development** for the future transportation network without development. **Figure 4-2** also shows the tentative CCPY alignment as currently planned by City staff.

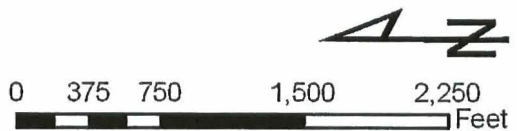
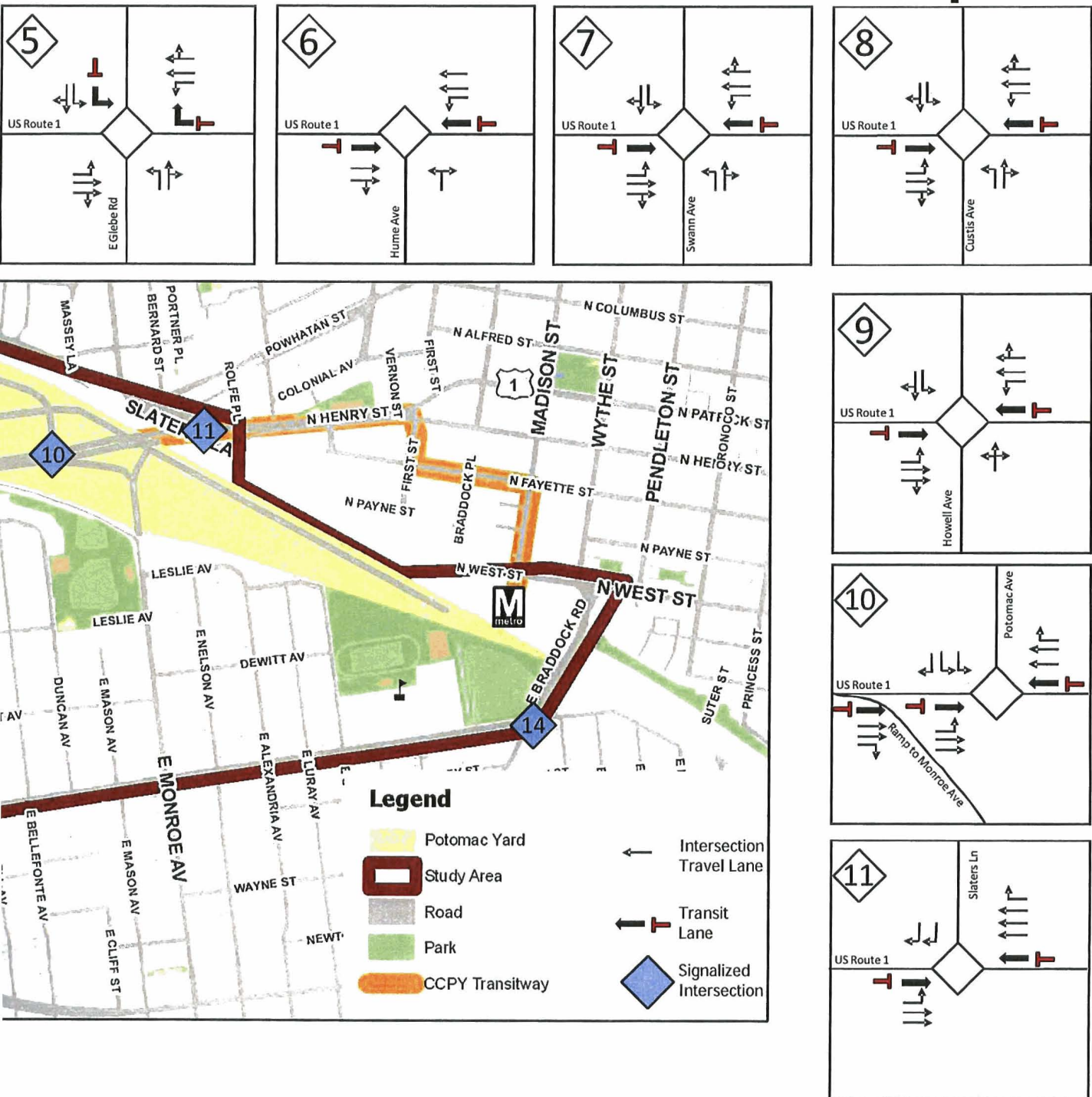


# Potomac Yard Multimodal Transportation Study





# Figure 4-2: Future Intersection Laneage and Traffic Control without Development



## 4.2 2030 FUTURE TRAFFIC VOLUMES WITHOUT DEVELOPMENT

Future weekday PM peak hour turning movement volumes without development are the traffic volumes that will travel through study area intersections without the proposed redevelopment in Potomac Yard Landbay F in 2030. Future traffic volumes without development are anticipated to increase from the existing traffic volumes due to non-specific regional traffic growth, development activity in Crystal City, and nearby approved and unbuilt developments.

### 2030 Base Turning Movement Volumes

To forecast additional traffic volumes attributed to regional traffic growth, data from VDOT daily traffic counts was reviewed from 2001 to 2007. Table 4-1 summarizes data available from VDOT's daily counts for study area streets.

			Average Daily Traffic (veh/day)			Total Traffic Growth		
Street	From	To	2001	2004	2007	2001 to 2004	2004 to 2007	2001 to 2007
US 1	Monroe	North City line	43,000	41,000	40,000	-1.6%	-0.8%	-1.2%
Slaters Lane	US 1	GW Parkway	12,000	12,000	11,000	0.0%	-2.9%	-1.4%
Commonwealth	Mt. Vernon	Reed	4,100	3,700	4,200	-3.4%	4.3%	0.4%
Mt. Vernon	Braddock	Commonwealth	9,600	8,500	8,600	-4.0%	0.4%	-1.8%
Monroe	Russell	US 1	13,000	10,000	9,900	-8.4%	-0.3%	-4.4%
E. Glebe	Mt. Vernon	US 1	8,500	9,600	10,000	4.1%	1.4%	2.7%
Reed	Mt. Vernon	US 1	4,100	3,600	3,500	-4.2%	-0.9%	-2.6%
Custis	Russell	Rosscrest	310	310	320	0.0%	1.1%	0.5%
US 1	Rt. 241 (S of Alexandria)	South City line	57,000	58,000	53,000	0.3%	-1.8%	-0.7%
US 1	Monroe	North City line	-	43,000	41,000	-	-0.9%	-
US 1	NCL	Route 233	52,000	-	53,000	-	-	0.2%

Source: VDOT

Based on a review of VDOT data, daily traffic volumes on study area streets have not increased since 2001. The lack of growth is attributed to the minimal development activity in the area, the presence of high-quality transit, and capacity limitations on streets. The only street that experienced an increase in daily traffic was E. Glebe Road. This increase can be attributed to the traffic diversion during US 1 Monroe Avenue bridge construction project. It

also should be noted that Monroe Avenue showed a large decrease in daily traffic volume, which can be attributed to its partial closure during US 1 bridge construction. The main source of future traffic growth on study area streets is likely to be created by the Potomac Yard development.

Travel demand will continue to grow as Alexandria and the Washington D.C. region will experience further influxes of population, employment, and services. In 2006, The National Capital Regional Transportation Planning Board (TPB) undertook the Regional Mobility and Accessibility Scenario Study to examine the impacts of alternative transportation and land use scenarios in the region. The study found that under current regional plans, freeway and arterial lane miles in the region will increase by 16 percent while daily vehicle miles traveled will increase by 37 percent by 2030. Based on this finding, it can be inferred that road corridors across the region will experience more congestion in 2030 than today and that currently planned increases in road capacity will not adequately meet projected demand.

In addition to a distributed growth scenario, the TPB study also considers a scenario focusing on transit-oriented development that assumed that 70 percent of new jobs and 80 percent of new housing would be located adjacent to transit stations (half mile from rail, quarter mile from bus) and that the existing transit network would be expanded to include currently funded projects. Under this analysis, auto use and congestion decreased and transit trips increased compared to the 2030 baseline.

In urban localities such as Alexandria, Arlington, and the District of Columbia, travel growth will manifest itself not only on streets, but also in the form of more transit, walking, and bicycling trips. This understood, Potomac Yard assumes a level of general traffic growth on US 1 at a rate less than would be used in an environment with fewer modal choices. The evaluation conducted for the 22-year period assumes a conservative one percent per year growth factor for weekday PM peak hour turning movement volumes up to a maximum of 10 percent on US 1. This general growth is intended to reflect increases in traffic attributable to general city growth and currently unknown development in the vicinity of Potomac Yard. This factor is applied to the northbound and southbound through movements only. The resulting 2030 weekday PM peak hour base turning movement volumes are shown in **Appendix D**.



**Traffic Due to Nearby Approved and Unbuilt Developments**

Nearby approved and unbuilt developments included in this study are the Potomac Yard South Tract (One Potomac Yard and The Eclipse on Center Park), Potomac Greens, and Potomac Yard Landbays G, H, I, J, and K. Forecasted weekday PM peak hour trips generated by each of the approved and unbuilt developments was determined from respective traffic studies for each development<sup>1</sup>. The traffic generated by the approved and unbuilt developments is shown in Table 4-2.

Development Site	PM Peak Hour Trips		
	Total	In	Out
Potomac Yard South Tract	1,844	424	1,420
Potomac Greens	1,960	502	1,458
Potomac Yard Landbays G, H, I, J, and K	2,362	856	1,506
<b>Total</b>	<b>6,166</b>	<b>1,782</b>	<b>4,384</b>

Source: Potomac Yard Infrastructure Traffic Analysis

The assignment of the trips generated by the approved and unbuilt developments was taken from the traffic impact studies for each development. The weekday PM peak hour trip assignments for each development are shown in **Appendix D**.

It is possible that Landbay L will be developed in the future. There are no current approvals for development in Landbay L; possible future development is considered in the Future Conditions with Development section.

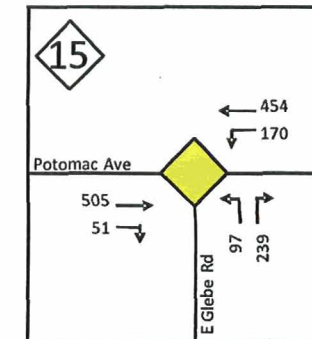
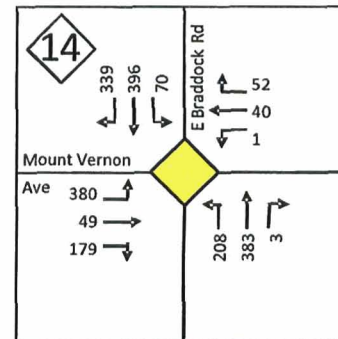
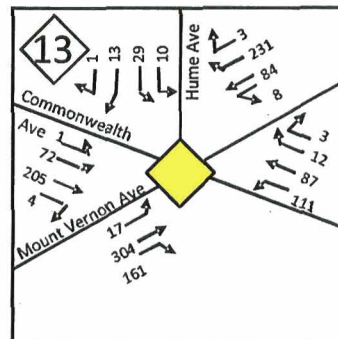
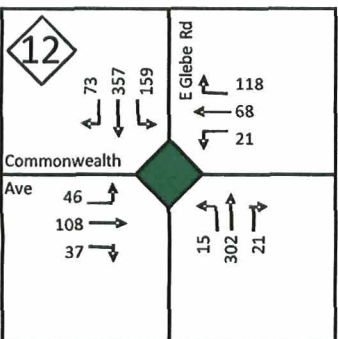
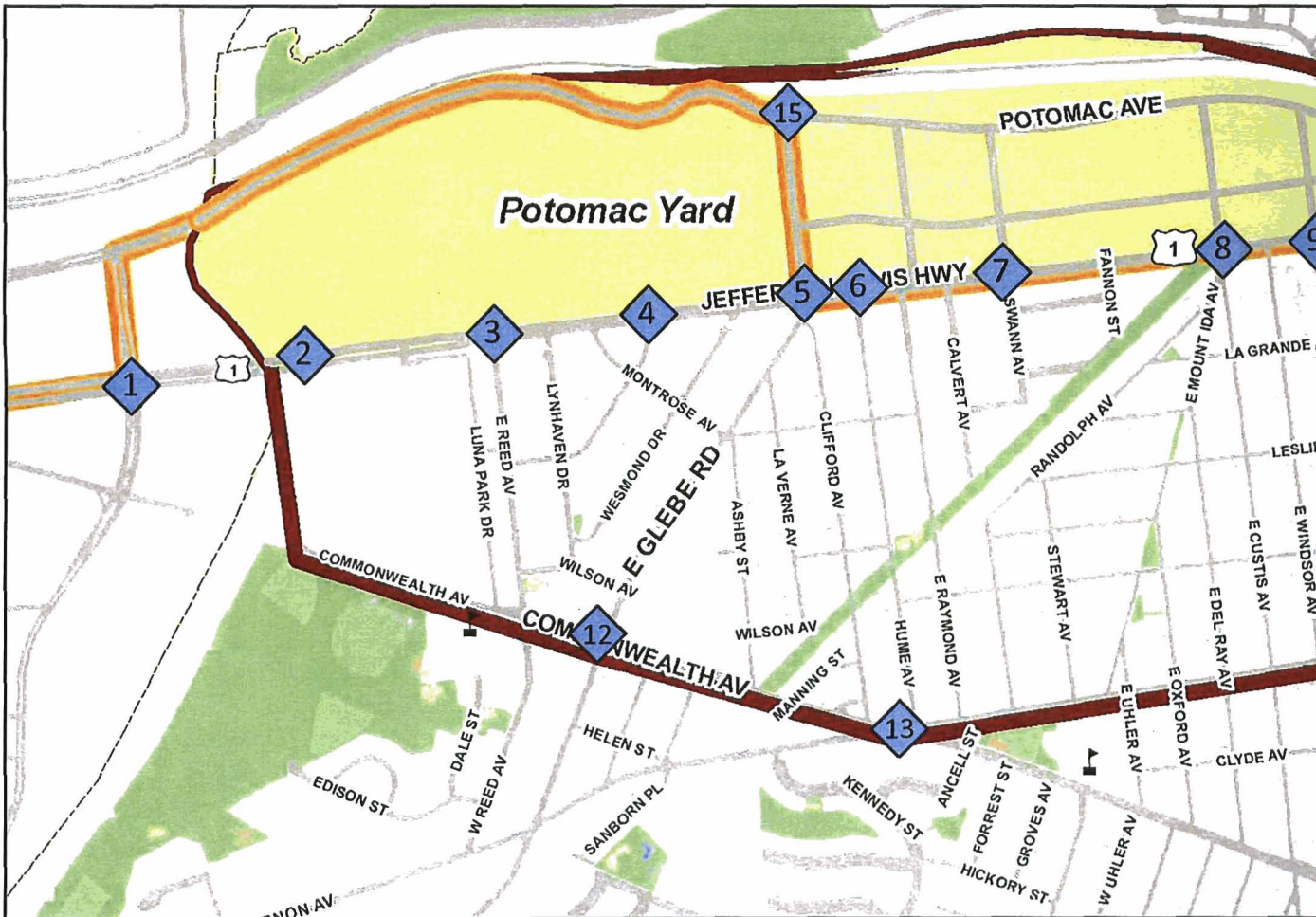
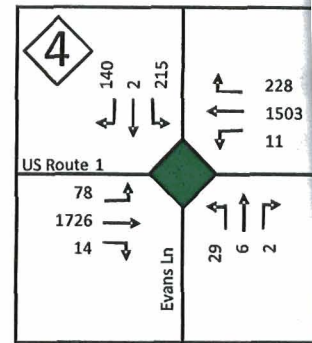
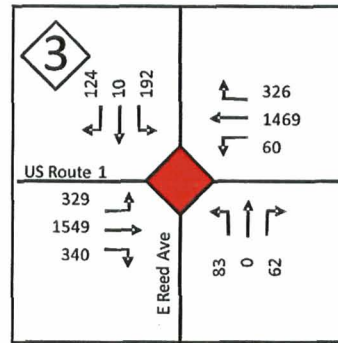
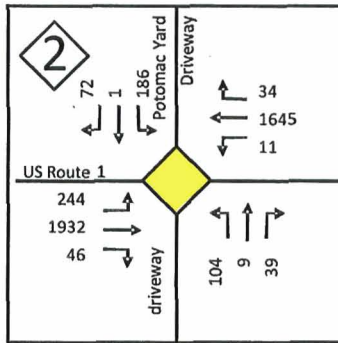
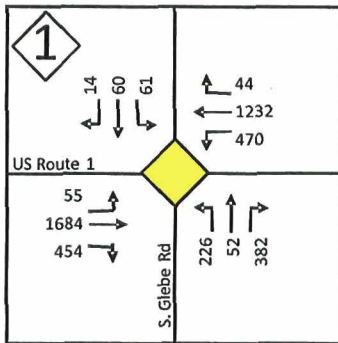
**2030 Future Traffic Volumes without Development**

The 2030 weekday PM peak hour future turning movement volumes without development were calculated by adding the existing turning movement volumes increased by the 10 percent growth factor along US 1 with the turning movement volumes generated by the approved and unbuilt developments. The weekday PM peak hour turning movement volumes at study area intersections are shown in **Figure 4-3: 2030 Future Turning Movement Volumes and Levels of Service without Development**.

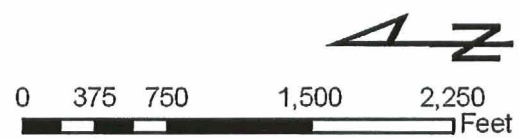
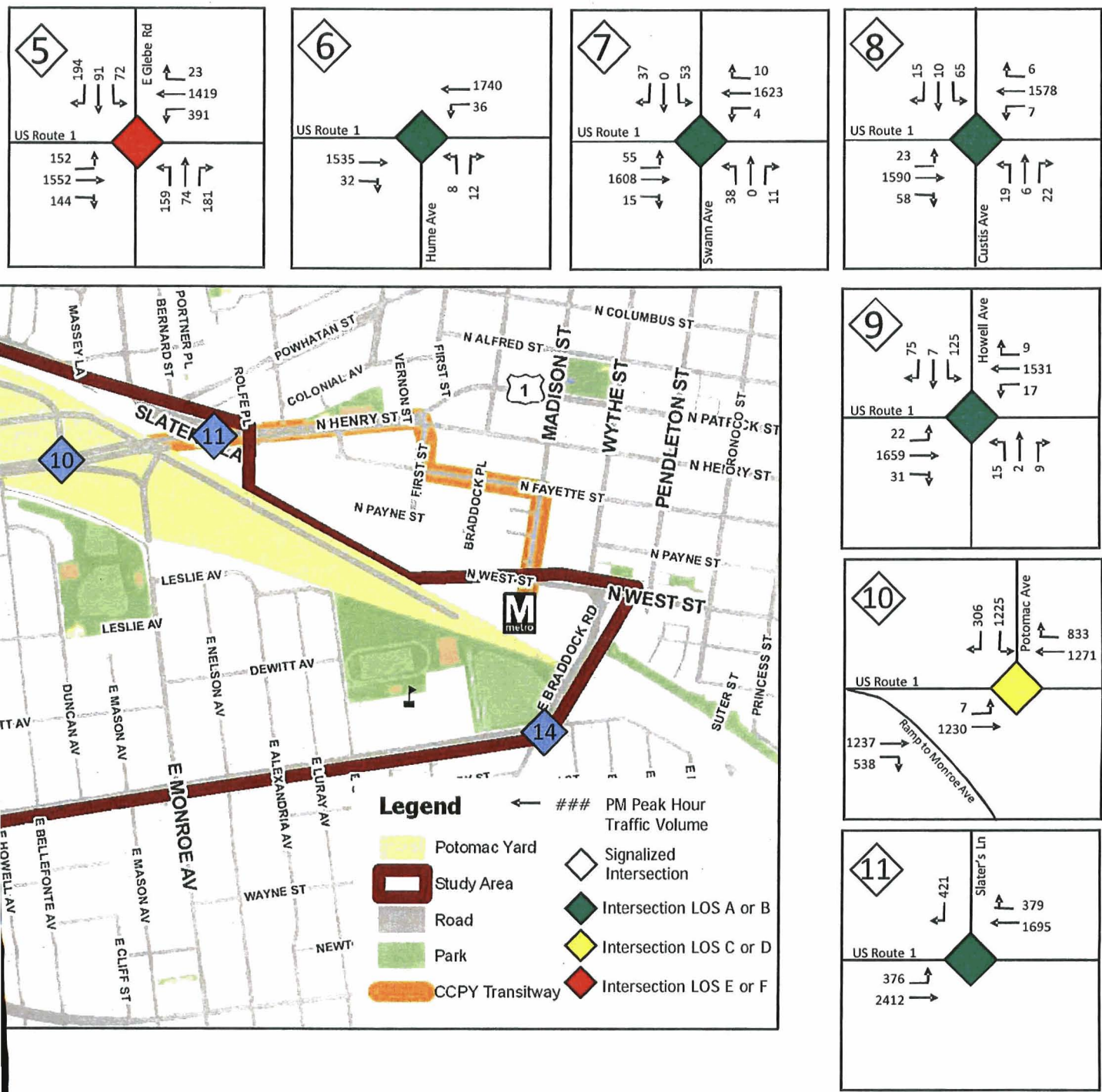
<sup>1</sup> Potomac Yard Infrastructure Traffic Analysis performed by Wells and Associates, Inc. dated February 10, 2005 and revised on December 2, 2005.



# Potomac Yard Multimodal Transportation Study



# Figure 4-3: Future Volumes without Development



### 4.3 2030 FUTURE CONDITIONS WITHOUT DEVELOPMENT INTERSECTION CAPACITY ANALYSIS

The 2030 future conditions without development analysis was based on the 2030 future transportation network without the development and accompanying future turning movement volumes without development.

#### Intersection Capacity Analysis

Level of service results of this analysis are summarized in Table 4-3. A table showing the existing levels of service by lane group is provided in Appendix B. The Synchro HCM reports for future conditions without development are provided in Appendix E.

Signalized Intersection	Existing Conditions (sec/veh)	2030 Future Conditions without Development (sec/veh)
1. US 1 and S. Glebe Road	C (29)	C (32)
2. US 1 and Potomac Yard driveway (near Four-Mile Run)	C (22)	C (23)
3. US 1 and E. Reed Avenue/Potomac Yard driveway	C (22)	E (71)
4. US 1 and Evans Lane/Potomac Yard driveway	C (24)	B (17)
5. US 1 and E. Glebe Road/Potomac Yard driveway	D (37)	F (83)
6. US 1 and Hume Avenue	A (1)	A (3)
7. US 1 and Swann Avenue	A (2)	A (6)
8. US 1 and E. Custis Avenue	A (2)	A (5)
9. US 1 and E. Howell Avenue/Potomac Yard driveway	A (2)	B (14)
10. US 1 and E. Monroe Avenue/future Potomac Avenue	E (63)	C (28)
11. US 1 and Slaters Lane	B (15)	B (17)
12. Commonwealth Avenue and E. Glebe Road	B (11)	B (11)
13. Commonwealth Avenue and Mt. Vernon Avenue	A (6)	C (31)
14. Mt. Vernon Avenue and E. Braddock Road	B (13)	C (32)
15. Potomac Avenue and S. Glebe Road	N/A	C (21)

\* Future conditions assume the construction of the transitway on US 1, E. Glebe Road, and Potomac Avenue  
 \*\* Under Future Conditions without Development, US 1 signals are timed with lead-lag left turns and coordinated with a 140-second cycle length. The intersection of Potomac Avenue and E. Glebe Road is timed with a 90-second cycle length.  
 Source: Kimley-Horn and Associates, Inc.



Potomac Yard Multimodal Transportation Study  
ALEXANDRIA, VA

The results of the 2030 future conditions without development intersection capacity analysis shows that several of the study area intersections operate near-, at-, or over-capacity under future conditions without development during the PM peak hour. The following intersections were found to operate near-, at-, or over-capacity under future conditions without development:

- US 1 and E. Reed Avenue: LOS E
- US 1 and E. Glebe Road: LOS F

**US 1 Corridor Travel Times and Speeds**

Table 4-4 shows a summary of travel times and average speeds on US 1 in the study area under conditions without the proposed development. The Synchro travel time reports for future conditions without development are provided in Appendix E.

Scenario	Southbound			Northbound		
	Speed (mph)	Travel Time (min)	Increase in Travel Time (from existing)	Speed (mph)	Travel Time (min)	Increase in Travel Time (from existing)
Existing	20.9	5.0	-	22.3	4.5	-
Future Conditions without Development	13.6	7.5	50%	14.8	7.0	56%

\* Future conditions assume the construction of the transitway on US 1, E. Glebe Road, and Potomac Avenue  
 \*\* Under Future Conditions without Development, US 1 signals are timed with lead-lag left turns and coordinated with a 140-second cycle length. The intersection of Potomac Avenue and E. Glebe Road is timed with a 90-second cycle length.  
 Source: Kimley-Horn and Associates, Inc.

As the level of traffic increases, contributed to by a number of factors, weekday PM peak hour travel speed and delay increase.



**Impact on Local Streets**

In addition to reduction in travel speed on US 1, volumes will increase on some local and minor collector streets. Future weekday PM peak hour volume forecasts were prepared for E. Reed Avenue, E. Glebe Road, Hume Avenue, Swann Avenue, Custis Avenue, and Howell Avenue within the study area. To ensure that the study was suitably conservative, as shown in Table 4-5, E. Reed Avenue and E. Glebe Road were assumed to carry the majority of forecasted local and minor collector street traffic.

Table 4-5 2030 Future Conditions without Development Additional PM Peak Hour Two-Way Volume (number of vehicles)						
Scenario	E. Reed Avenue	E. Glebe Road	Hume Avenue	Swann Avenue	Custis Avenue	Howell Avenue
Future Conditions without Development	0	277	0	0	56	32

Source: Kimley-Horn and Associates, Inc., Reference: Potomac Yard Infrastructure Traffic Analysis

**4.4 CONCLUSIONS ON 2030 FUTURE CONDITIONS WITHOUT DEVELOPMENT**

The analysis of 2030 future conditions without development considers the combined effects of the addition of approved unbuilt development, regional traffic growth, and programmed transportation improvements. Findings from this analysis indicate that intersections along US 1, Mount Vernon Avenue, and Commonwealth Avenue are nearing capacity. Based on these findings, for the area to continue to accommodate increases in development and maintain an adequately functioning vehicular transportation network, measures to increase non-auto mode share along with strategic vehicular capacity-enhancing modifications to area streets and intersections will need to be implemented.



## 5.0 TRAFFIC MODELING PROCESS AND METHODOLOGY

This chapter summarizes the travel demand methodology used to develop Potomac Yard Landbay F and L traffic forecasts. The proposed redevelopment and rezoning of Landbay F is the focus of this study. Landbay L also may be developed in the future. A possible development scenario for Landbay L was considered for this transportation study as part of the Future Conditions with Development. The forecast process consisted of the following steps:

- Summarizing existing Potomac Yard trips to be removed
- Identifying transportation analysis zones (TAZ)
- Generating person trips
- Developing internal Potomac Yard trip-making assumptions
- Developing mode split assumptions
- Developing pass-by trip assumptions
- Assigning vehicular trips to transportation network

The following sections describe each part of the forecast development process.

### 5.1 EXISTING POTOMAC YARD TRIPS TO BE REMOVED

Redevelopment of Potomac Yard Landbay F will result in a removal of trips generated by the existing shopping center. The existing Potomac Yard Landbay F weekday PM peak hour turning movement volumes were computed by adding the total entering and exiting traffic at the US 1 driveways. Table 5-1 shows the total estimated PM peak hour traffic volumes generated by Potomac Yard Landbay F. Existing Potomac Yard trips to be removed are shown in Appendix F.

<b>Table 5-1</b>			
<b>Existing Potomac Yards Trips to be Removed</b>			
	<b>Total</b>	<b>In</b>	<b>Out</b>
PM Peak Hour	1,695	965	728
Daily*	19,513	11,129	8,384
*Estimated using the ratio of daily to PM peak hour trip generation rates Source: Kimley-Horn and Associates, Inc.			

## 5.2 TRANSPORTATION ANALYSIS ZONES

Transportation analysis zones (TAZ) represent specific geographic areas, generally bounded by roads or other physical features. The land uses in each TAZ are aggregated and used as the basis for the generation of person trips. In the Potomac Yard model, four TAZs in Landbay F and one in Landbay L represent the study area. These are shown in **Figure 5-1: Study Area TAZs**.

## 5.3 PERSON TRIP GENERATION

In the model process, land use development totals ultimately need to be translated into trips by mode—vehicle trips, walking and bicycle trips, and transit trips. To develop trips by mode, a person trip generation calculation was conducted by using rates published by the Institute of Transportation Engineers (ITE) and by applying appropriate factors to account for the planned mixed-use and multimodal conditions of Potomac Yard.

The *ITE Trip Generation Manual* summarizes data collected at thousands of developments of various types and sizes related to the number of trips entering and exiting the sites. The manual provides a summary rate and/or equation to estimate the number of trips generated based on independent variables such as gross floor area, number of dwelling units, and employees. The manual is the industry-recognized standard for trip generation. The majority of data contained in the manual was collected in suburban areas and development with a single land use. For this reason, it is necessary to make adjustments to account for mixed use development and urban conditions with a consequential mode split.

Land uses for each block in the study area were provided by the City and aggregated into TAZs. For this analysis, the land use scenario assumes the proposed 2.5 FAR in Landbay F and possible 2.0 FAR in Landbay L. The land use scenario contained in the final Master Plan may vary slightly in the type and location of density within the overall Potomac Yard site; however, it will be within an order of magnitude of the overall density analyzed in this study. A summary of the future land use information studied is shown in **Table 5-2**.

**STAFF REPORT  
CONTINUED IN NEXT LINK**