

**Arlington County, Virginia  
Ad-Hoc Committee on  
North Glebe Road  
Pedestrian Safety**

**Final Draft Report  
July 25, 1999**

**Ad-Hoc Committee on North Road Pedestrian Safety**

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## EXECUTIVE SUMMARY

### **Purpose of the Ad-Hoc Committee on North Glebe Road Pedestrian Safety**

The purpose of this Committee is to assess existing conditions in Ballston along North Glebe Road between North Quincy Street and Washington Boulevard and to recommend changes aimed at increasing pedestrian safety by bringing the road into conformance with County policy and the vision of Ballston as an urban center.

### **Goals and Objectives for Achieving a Safe Glebe Road**

- 1) Slow traffic to no more than the posted 30 mph speed.
  - Implement road design consistent with the posted speed.
  - Control or eliminate vehicle “free” right turns, (right turns that are minimally constrained at intersections by “YIELD” signs).
- 2) Make pedestrian crossings non-intimidating and fully accessible to persons with disabilities.
  - Shorten crossing distances.
  - Add safe havens/median strips.
  - Enhance crosswalk visibility.
  - Renovate existing curb ramps.
  - Maintain accessibility to walkways during construction.
- 3) Open adjacent neighborhoods to pedestrian-friendly access.
  - Upgrade and maintain existing walkways in accordance with County policy.
  - Provide a safe connecting route for bicyclists entering Ballston from the west.
- 4) Implement existing pedestrian policies in a comprehensive and highly proactive manner taking maximum advantage of other County initiatives.

### **Recommendations**

The Committee has identified both short and long-term recommendations for improving pedestrian safety along Glebe Road. The majority of the short-term recommendations could be carried out relatively quickly, although many of these are interim solutions addressing problems that ultimately need to be resolved through planning and implementation of a comprehensive long-term plan. However, work needs to begin immediately on short-term projects in order to address critical public safety problems.

### **Conclusion**

The County needs to act on its commitment to walkable residential areas and pedestrian-friendly commercial centers. The frequent conflicts between pedestrians and motorists on Glebe Road are incompatible with the vision of Ballston as an urban center. Meaningful changes need to occur along Glebe Road in order to foster a pedestrian environment that will compliment the County’s vision of Ballston as a major commercial center.

**Arlington County’s goal should be to become a national leader in the design, engineering, innovation, and integration of pedestrian accessible business corridors with surrounding residential neighborhoods.**

## COMMITTEE REPORT

### A. Background

The growth of Ballston since 1974 represents one of the most “dramatic” transformations in recent urban history. As Ballston continues to mature, its success as a “people place” depends upon reconciling the swirl of motor vehicle activity with pedestrian activity in a safe and convenient way.<sup>1</sup> The current office square footage of about 5 million square feet could reach an ultimate build-out of as much as 9.2 million square feet. Housing in the Ballston area will increase by as many as 1800 additional units. The “sidewalk population” attributable Metro ridership alone will increase from 21,000 to 36,000 person trips per day.<sup>2</sup> Of that number, 44% will be arriving from the west with over 30% crossing Glebe Road.<sup>3</sup>

This transformation has occurred so rapidly that Ballston’s true character has been difficult to pin down. The road system, which had its design origins over a decade ago, is geared to moving motor vehicles through Ballston and for quick access to and from Interstate Route 66 (I-66). This focus on automobile access is particularly evident in the construction completed in 1996 that transformed Glebe Road from a four lane to six lane thoroughfare. As a result, there are few pedestrian accommodations. Yet the fact is that the Ballston area is, “a very urban site ringed by mature suburbs.”<sup>4</sup> The effects on Ballston pedestrian traffic patterns of recently completed projects that promise “around-the-clock” activities, such as the new Harris Teeter Grocery Store and the Ballston Commons 12, Regal Cinemas, are not yet fully appreciated by the community. New projects, such as Arlington Gateway and NRECA II, are becoming a reality but represent just part of remaining of the redevelopment planned for Ballston. To accommodate all of this expected development, planning is underway for a new West Ballston Metro Entrance.

It is important to keep in mind that only about 60% of the planned development for Ballston has taken place. It is therefore critical that the community take stock of, evaluate, and address the dichotomy that has developed and which threatens the community’s expectation of Ballston as a livable and vibrant environment and the County’s vision of Ballston as a model urban center.

### B. Findings

**Committee members agreed, without reservation or qualification, that North Glebe Road in its current condition poses a formidable obstacle and safety hazard to pedestrians walking to and from Ballston.**

The Committee initially met in the field on April 1, 1999 during the evening rush hour to observe first hand the conditions along Glebe Road at the key intersections of Fairfax Drive and Wilson Boulevard. On June 10, 1999, committee members met again to observe conditions at the Quincy/Henderson, Randolph, and Carlin Springs Road intersections. Members of the committee independently observed conditions at N. 11<sup>th</sup> Street and Washington Boulevard.

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<sup>1</sup> *Ballston Metro Access Study*, by Harry Weese Associates for Arlington County Department of Public Works/Planning Division, December, 1998, page 1.

<sup>2</sup> *Ibid.*, page 2.

<sup>3</sup> *Ibid.*, Table 4.

<sup>4</sup> *Ibid.*, page 2.

### General Observations from the April 1, 1999 Site Visit

- Vehicular traffic moves too fast, well past the posted speed limits.  
*Although vehicle speed seems excessive all along Glebe Road, this is particularly the case on Fairfax Drive ramps to and from I-66.*
- It is extremely intimidating as a pedestrian to walk across Glebe Road during rush hour.  
*There is insufficient time to walk across Glebe Road. Crosswalks are too long. Vehicles making left turns compete with pedestrians in crosswalks. Pedestrians stranded in the 3' median areas are extremely vulnerable to passing traffic.*
- Glebe Road acts as a barrier between adjacent residential neighborhoods and Ballston. There is no safe connection for bicyclists coming into Ballston from the west.
- The Glebe Road intersections constitute a major hazard to persons with disabilities.
- The Wilson Boulevard crossing places pedestrians in the path of fast moving traffic.
- The ultimate build-out of Ballston will result in other significant impacts on pedestrian and vehicle traffic flow depending on parking garage entrances and other site features.
- There is no apparent adverse impact to rush hour traffic despite the temporary closure of the right lane of northbound Glebe Road.

### Additional General Observations from the June 10, 1999 Site Visit

- Vehicles making right turns on to or from Glebe Road frequently ignore pedestrians.
- The Glebe Road transitions from three lanes to two lanes are not clearly marked, are confusing to motorists, and create another element of uncertainty in a pedestrian environment.
- An accommodation is needed for residents utilizing the garage entrance to Hyde Park on Glebe Road.

### C. General Principles Applied

The following general principles for analyzing the many problems observed along Glebe Road were taken primarily from a variety of Arlington County policy statements and adopted as a basis for making Committee recommendations.

- 1) The transportation needs of pedestrians, especially their safety requirements, must be considered as equal or superior to those of motorists.<sup>5</sup>
- 2) Pedestrians need to feel comfortable, safe and secure when walking on sidewalks and crosswalks. As long as traffic volumes and speeds are intimidating to pedestrians, they will not feel comfortable using the street.<sup>6</sup>
- 3) County policies must be aggressively implemented, particularly along Glebe Road in Ballston, if the County Board's vision of "good urban design with walkable residential areas and pedestrian-friendly commercial centers"<sup>7</sup> is to be realized.
- 4) The Ballston walkway network must be made as fully accessible and convenient for all users, including persons with disabilities, the elderly, children, bicyclists, and visitors to our community.<sup>8</sup>

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<sup>5</sup> Arlington County, Virginia, *Pedestrian Transportation Plan*, page 29.

<sup>6</sup> Planning Commissioner's Journal, Nov./Dec. 1991, *Taming the Automobile: How We Can Make Our Streets More "Pedestrian Friendly"*, by Richard Untermann, page 3.

<sup>7</sup> Arlington County Board Chairman Chris Zimmerman's New Year's Day Statement, 1998.

<sup>8</sup> Arlington County, Virginia, *Pedestrian Transportation Plan*, page 24.

## D. Recommendations

All intersections along Glebe Road from Washington Boulevard to North Quincy Street are in need of some degree of improvement. It should be noted that, although every effort has been made by the Committee to make its evaluation as comprehensive as possible, neither all issues nor all solutions have been necessarily identified in this report. Where an intersection is not specifically addressed, the General Recommendations, at a minimum, are applicable. The specific intersections that are addressed are considered to have unique problems requiring special attention.

### 1) General Recommendations

#### **Allow parking along Glebe Road during non-peak hours.**

*Ballston was planned around the Ballston Metro Center as well as pedestrian use. There continues to be a shortage of street parking. Allowing additional parking along Glebe Road (and Wilson Boulevard at Ballston Commons) during non-peak hours would encourage patronization of businesses and provide the added benefit of traffic calming.*

#### **Design and Construct a suitable gateway feature for North Fairfax Drive and North Glebe Road.**

*Ballston is one of the major commercial anchors of Arlington County and continues to be the recipient of significant private investment to its physical and economic infrastructure. It is no coincidence that one of the long awaited projects is known as Arlington Gateway.<sup>9</sup> Yet there are no signature features that identify Ballston as the urban center that it has become. This type of feature also has the benefit of traffic calming.*

#### **Insist that new projects contribute to the Ballston infrastructure.**

*There is no question that a good physical environment creates a good economic environment where people will actually want to spend their time and money. Where tested, this approach inevitably pays far greater dividends to the business community than could ever have been predicted.<sup>10</sup> Projects along Glebe Road such as Ballston Gateway, Ballston Point, NRECA II, and Fairgate II will benefit from whatever they contribute to the Ballston infrastructure. The County needs to insist that developers invest in a community environment that will support businesses that they will bring to Ballston.<sup>11</sup>*

#### **Crosswalks -- Short Term**

- Use high visibility/enhanced pavement striping to better highlight pedestrian crossings.  
*Higher, enhanced visibility includes things like pavement reflectors or high-reflective striping.*
- Lengthen "WALK" times for Glebe Rd crossings.  
*Crosswalks are too long and pedestrian crossing times are too short.  
Eliminate the need to push a button to get a "WALK" signal. Ensure that all pedestrian signals engage automatically.*
- Implement standards for notifying users of sidewalk closings prior to and during construction.

<sup>9</sup> *Ballston Metro Access Study*, by Harry Weese Associates for Arlington County Department of Public Works/Planning Division, December, 1998, Table 6. According to this Study, the Arlington Gateway Project (also referred to as Ballston Gateway) will generate 10,300 daily person-trips.

<sup>10</sup> *The Urban Oasis, Guideways to Greenways in the Human Environment*, McGraw Hill, 1998, by Roxanne Warren, page 46.

<sup>11</sup> Ballston Point, NRECA II, and Fairgate II together will generate 9,000 daily person-trips to Ballston, (see *Ballston Metro Access Study*, by Harry Weese Associates for Arlington County Department of Public Works/Planning Division, December, 1998, Table 6).

## **Crosswalks -- Short Term (continued)**

- Add audible signal devices where missing, upgrade existing signal devices, and investigate alternative devices that would enhance safety and aid the visually impaired.
- Rebuild and orient curb ramps with the flow of traffic.

*Many of the curb ramps along Glebe Road have been constructed so that persons with disabilities must go outside the limits of the crosswalk in order to gain access to sidewalks.*

## **Crosswalks -- Long Term**

- Increase lighting at intersections.  
*Install in-pavement crosswalk lighting or other innovative solution to at-grade pedestrian crossings.*
- Broaden and lengthen at-grade medians as safety zones and add and install medians where missing.
- Create 8' to 12' center median strip in Glebe Road to reduce pedestrian crossing distances and slow traffic.

## **Traffic -- Short Term**

- Ensure that the traffic management plan for Ballston is comprehensive, taking into account pedestrian flow and traffic impacts on neighborhoods.
- Provide proper road signage to eliminate confusion for motorists, particularly where roads go from three lanes to two lanes.
- Prohibit right turn on red from 7am to 7pm Monday through Saturday at key intersections without free right turns.

## **Traffic -- Long Term**

- To the extent that left turn signals would not interfere with pedestrian access, add left turn signals (and left turn lanes where missing) on Wilson Boulevard and Fairfax Drive.  
*There are no left turn signals for traffic and vehicles queue up adding another adverse element to safe pedestrian access.*
- Design road improvements for 30mph.  
*Eliminate excess lane width from 12 feet to 10 or 11 feet. Use the extra width for median islands.  
Reduce curb return radii.*

## **Neighborhood Access**

- Extend the Ballston Greenway across Glebe Road and into the Bluemont Neighborhoods.
- Widen existing sidewalks in accordance with accessibility guidelines for the disabled and provide sufficient separation (buffer strip) between pedestrian areas and vehicle travel ways.

## **Planning**

- Take advantage of the County's "Way Finding" program. Use signage to identify Ballston as a pedestrian zone.
- Ensure that the proposed coordinated traffic management system for Ballston takes into account pedestrian flow and traffic impacts on nearby neighborhood streets in a comprehensive manner.
- Allow a mid-block crossing for an extension of the 9<sup>th</sup> Street Greenway to allow for an additional safe crossing zones across Glebe Road. Include appropriate crosswalks and/or traffic signals.
- Engage local business in the problem solving process.
- Review existing site plans on file for projects yet to be built and assess long term impacts on pedestrian access.

## **Public Awareness**

- Develop and promote County programs to educate motorists, pedestrians, and Public School students on safe habits for driving and walking in pedestrian areas.

## 2) Recommendations for Specific Intersections

### (a) Wilson Boulevard Crossing -- Additional Recommendations

**Key Problem:** Vehicles are routed too close to pedestrians crossing at the northerly crosswalk on Glebe Road at Wilson Boulevard. Pedestrians are extremely vulnerable at this crosswalk since they are within the travel envelope of vehicles traveling westbound on Wilson Boulevard through Glebe Road. The severity of this problem is compounded given the geometry of the intersection and the 120' to 135' long crosswalks that must be walked in an extremely short time.

**Action:** Relocate the crosswalk. Shorten crosswalk distances by eliminating free right turns and creating crosswalks that cross Glebe Road at a 90 degree angle, in a normal manner.

#### Crosswalks -- Short Term

- Install a curb ramp at the northeast corner of the intersection.
- Crosswalks to be painted for high visibility.
- Install and enforce “STOP” signs at “free right turn” islands and other locations where appropriate.  
*Change “YIELD” signs at all intersections to “STOP” or “STOP WHEN PEDESTRIANS ARE PRESENT”.*

#### Crosswalks -- Long Term

- Enlarge or eliminate triangular islands to shorten crossing distances and slow traffic.
- Extend medians into crosswalks.
- Create median “safe haven” for pedestrians.

#### Traffic -- Long Term

- Reconfigure triangular islands, including a decrease in curb return radii, for slower right turns.

Pictured to the right is Wilson Blvd. westbound at N. Glebe Rd.

Vehicles are often forced to move into the crosswalk because of the congestion in the intersection during peak hours. But motorists also end up in the crosswalk because of the travel lane geometry through the intersection. The many conflicting turning movements of vehicles in the intersection adds to the confusion and increases the risk of a mishap. Pedestrians seem at times to be surrounded by cars. The current pedestrian signal flashes 8 seconds “WALK” and 35 seconds “DON’T WALK” requiring a person on foot to cross the 120’ walkway in 43 seconds.



**(b) North Fairfax Drive Crossing -- Additional Recommendations**

**Crosswalks -- Short Term**

- Crosswalks to be painted for high visibility.
- Install and enforce “STOP” signs at “free right turn” islands and other locations where appropriate.  
*Change “YIELD” signs at all intersections to “STOP” or “STOP WHEN PEDESTRIANS ARE PRESENT”.*

**Crosswalks -- Long Term**

- Enlarge triangular islands to shorten crossing distances and slow traffic.
- Extend medians into crosswalks.
- Improve drainage at pedestrian crossings.  
*Very poor drainage results in difficulty walking to and through the intersections during heavy rains. This problem has been further exacerbated with the recent 2’ widening of the free right turn lane on the south side of eastbound N. Fairfax Drive.*

**Traffic -- Long Term**

- Reconfigure triangular islands, including a decrease in curb return radii, for slower right turns.

**Neighborhood Access**

- Accommodate bicyclists along Fairfax Drive.  
*There is no accommodation for a bicycle route to Ballston where the Bluemont Junction Bicycle Trail terminates at Fairfax Drive.*
- Widen sidewalk on Fairfax Drive in front of Holiday Inn and include a buffer strip. Paint crosswalks across Holiday Inn driveways.



Pictured above is Fairfax Dr. at N. Glebe Rd. looking west at the south side of the intersection. This is a major route for pedestrians and bicyclists traveling to and from the Ballston Metro Station and also is used by guests staying at the Holiday Inn. Free right turns, uncontrolled left turns, lack of high visibility pavement striping, and speed of traffic are some of the elements that create a challenging crossing for pedestrians. This intersection becomes extremely difficult to cross in rainy weather. Water ponds to a level that makes crossing within the designated crosswalk almost impossible. And the experienced commuting pedestrian stays far from the curb line to avoid the wash from passing vehicles.



Pictured above is the free right turn lane on Fairfax Dr. at Glebe Rd. looking west at the north side of the intersection. The crosswalk is not readily visible. It does not have high visibility pavement striping and is also partially obscured by a sign and utility pole. There are no warning signs for motorists, although a “YIELD” sign is posted on the other side of the crosswalk. This location has proven particularly hazardous for neighborhood residents with disabilities who regularly cross at this location. Those crossing Glebe Rd. at this intersection have a pedestrian signal that flashes 7 seconds “walk” and 27 seconds “don’t walk” requiring a person on foot to cross the 100’ walkway in 34 seconds.

**(c) I-66 Ramp to Fairfax Drive -- Additional Recommendations**

**Traffic -- Short Term**

- Slow traffic exiting I-66.  
*The off ramp speed should be made as slow as possible (35mph).  
 The "REDUCED SPEED AHEAD" sign should be moved as close as permissible to the start of the off-ramp of I-66.  
 The 30 mph zone should begin as soon as permissible on the off-ramp so that motorists will be traveling at the 30 mph speed limit once they reach the end of the noise barrier at Holiday Inn.  
 Install rumble strips on the off ramp to remind motorists to slow vehicles to the 30mph speed limit.*

**Traffic -- Long Term**

- Install a speed sensitive traffic signal at the existing Holiday Inn traffic signal set to stop speeding traffic exiting from I-66.
- Narrow Fairfax Drive in front of the Holiday Inn to accommodate an appropriate pedestrian walkway to Ballston that is safe for persons with disabilities.

Pictured below is an aerial view of the Route 66 off-ramp at the Ballston exit. Traffic exits at this location at 45 mph and is then informed of "REDUCED SPEED AHEAD." The reduced speed of 30 mph is posted at the end of the sound barrier at the first entrance to the Holiday Inn (see photo to the right). Traffic, however, does not slow significantly until the Fairfax Dr. and N. Glebe Rd. intersection. Vehicles often continue at a high rate of speed through the free right turn on to Glebe Road. The sidewalk directly in front of the Holiday Inn is not



ADA compliant and is heavily traveled by pedestrians walking to and from the Ballston Metro Station. The Bluemont Junction Bicycle Trail, as well as a spur trail to the I-66 Bicycle Trail, terminate adjacent to and opposite the Holiday Inn respectively. The speed at which vehicles travel this access route to Ballston from I-66 to a great extent determines driving habits throughout the Fairfax Dr. and N. Glebe Rd. corridors.



**(d) North Randolph Street Crossing -- Additional Recommendations**

**Crosswalks -- Short Term**

- Crosswalks to be painted for high visibility.
- Install and enforce “STOP” signs at “free right turn” islands and other locations where appropriate.  
*Change “YIELD” signs at all intersections to “STOP” or “STOP WHEN PEDESTRIANS ARE PRESENT”.*

**Crosswalks -- Long Term**

- Enlarge or eliminate triangular islands to shorten crossing distances and slow traffic.

**Traffic -- Short Term**

- Upon the opening of the Harris-Teeter Supermarket, evaluate traffic patterns and implement traffic controls to avoid conflicts with pedestrians.



Pictured above is the intersection of N. Randolph Street and N. Glebe Road looking west at the new Harris-Teeter Supermarket. This intersection will need to be carefully monitored once the store opens. Free right turns, vehicles attempting to access Hyde Park from northbound N. Glebe Rd., and supermarket traffic entering and leaving a relatively small parking lot are some of the elements that will create another challenging crossing for pedestrians.

**(e) North Carlin Springs Road Crossing -- Additional Recommendations**

**Traffic -- Short Term**

- Prohibit right turn on red from 7am to 7pm Monday through Saturday at the Carlin Spring Intersection with Glebe Road.

**Traffic -- Long Term**

- Move forward with the plan to construct a pedestrian bridge at this intersection.



Pictured above is N. Glebe Road eastbound at the intersection of N. Carlin Springs Rd. Crossing at this location is particularly difficult for the many senior residents who live nearby in The Carlin and Hyde Park. Vehicles turning right from Carlin Springs Rd. to Glebe Rd. often cut-off pedestrians trying to cross the street. The current pedestrian signal flashes 7 seconds "walk" and 27 seconds "don't walk" requiring a person on foot to cross the 113' walkway in 34 seconds. This is another intersection that will have to be monitored carefully to evaluate the impact of the recently opened Regal Cinemas and the soon to be opened Harris-Teeter Supermarket. The construction of a proposed pedestrian bridge at this location from the current Goodyear site to Ballston Commons will greatly improve safe access to Ballston Commons and Metro, particularly for neighborhood seniors. At grade crossings, however, will still be required for the many other neighbors who will likely find it inconvenient to use a pedestrian bridge.

**(f) North 7<sup>th</sup> Street Crossing -- Additional Recommendations**

**Crosswalks -- Short Term**

- Install a crosswalk across Glebe Road at the south side of the intersection. Include appropriate stop lines and signage to allow for safe pedestrian crossing.

*This intersection is currently utilized as a crossing by pedestrians, but pedestrians often need to meander through stopped cars to cross the street.*

**Crosswalks -- Long Term**

- Signalize this intersection as needed based on construction of Ballston point or other adjacent projects.



Pictured above is the intersection of N. 7<sup>th</sup> Street and N. Glebe Road facing Ballston Commons opposite the Hecht Co. entrance. Currently there is no crosswalk at this location, although many pedestrians utilize this intersection for access to Ballston Commons and the Ballston Metro Station. A good line of sight up and down Glebe Rd. along with the lack of a wide median strip with appropriate ground cover to discourage jaywalking encourages pedestrians to take the shortest path to their destination. Pedestrians can often be seen walking between stopped cars that queue up on N. Glebe Rd. at this location during peak hours.

## Appendix A -- Summary of Report Recommendations

### General Recommendations

- Implement existing pedestrian policies in a comprehensive and proactive manner.
- Insist that new projects contribute to the Ballston infrastructure.
- Slow traffic to no more than the 30mph posted speed limit.
- Open adjacent neighborhoods to pedestrian-friendly access.
- Provide a safe connecting route for bicyclists entering Ballston from the west.
- Allow parking along Glebe Rd. during non-peak hours.
- Design and construct a suitable gateway feature at the Fairfax/Glebe intersection.
- Extend the N. 9th St. Greenway across Glebe Rd.
- Implement a traffic management system that accounts for pedestrian flow and traffic impacts on neighborhoods.
- Implement County standards for sidewalk closure notification to all users and maintain accessibility during construction.
- Take advantage of other County initiatives.
- Develop and promote County programs to educate motorists and pedestrians on safe driving and walking habits.

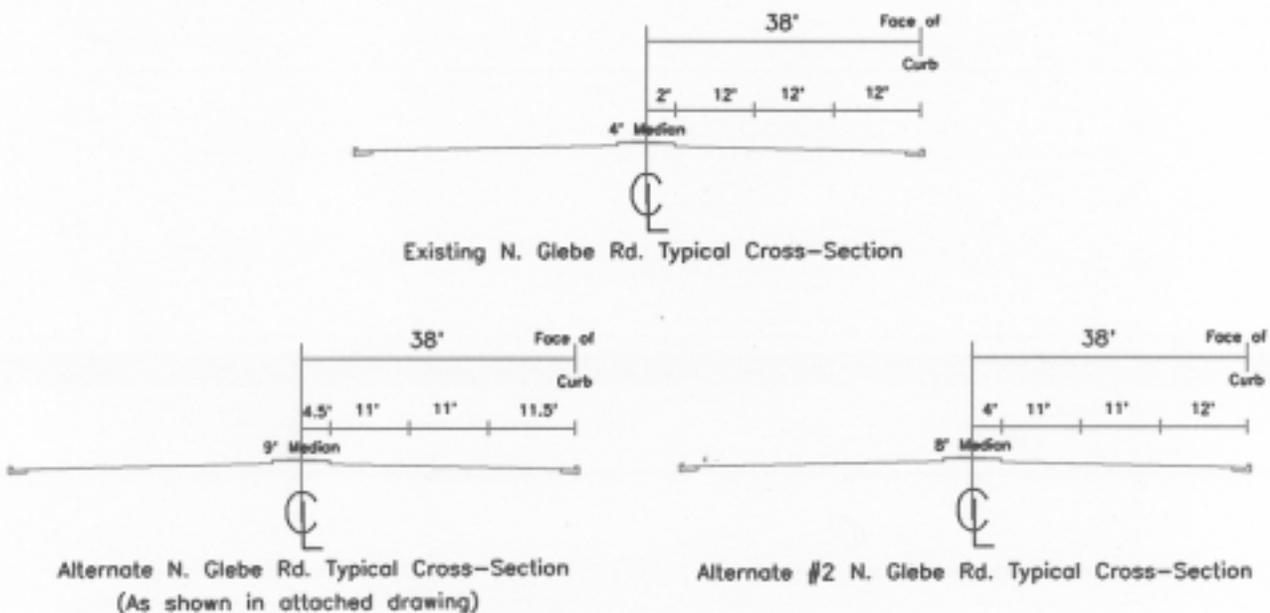
	<i>Washington Blvd.</i>	<i>N. 11th St.</i>	<i>N. Fairfax Dr.</i>	<i>N. 9th St. Extension</i>	<i>Wilson Blvd.</i>	<i>N. 7th St.</i>	<i>N. Carlin Springs Rd.</i>	<i>N. Randolph St.</i>	<i>N. Quincy/Henderson</i>	<i>I-66 Ramp/Fairfax Dr.</i>
<b># of Known Pedestrian Accidents, 1990-98</b>	3	1	4	n/a	4	-	7	-	-	-
<b>Intersection Specific Recommendations</b>										
<b>Short Term Recommendations</b>										
enhance crosswalk visibility	✓	✓	✓		✓	✓	✓	✓	✓	
increase "walk" times	✓	✓	✓		✓		✓	✓	✓	
eliminate need to activate "walk" signal	✓	✓	✓					✓	✓	
control/eliminate "free" right turns			✓		✓			✓		
renovate curb ramps	✓	✓	✓		✓	✓	✓	✓	✓	✓
improve/revise road signage			✓		✓		✓	✓	✓	✓
install rumble strips										✓
eliminate drainage problems			✓							✓
install missing crosswalks						✓		✓		
no right turn on red							✓			
<b>Long Term Recommendations</b>										
provide median safety refuges	✓	✓	✓		✓	✓	✓	✓	✓	
reduce travel lanes to 11' width	✓	✓	✓		✓	✓	✓	✓	✓	✓
add/widen medians to 8'-12'	✓	✓	✓		✓	✓	✓	✓	✓	✓
reduce curb return radii	✓		✓		✓		✓	✓	✓	
improve crosswalk lighting	✓	✓	✓		✓	✓	✓	✓	✓	✓
widen existing sidewalks			✓		✓					✓
shorten crosswalks			✓		✓					
provide mid-block crossing				✓						
eliminate "free" right turn islands			✓		✓			✓		
add/upgrade audible signal devices	✓	✓	✓		✓		✓	✓	✓	✓
install speed sensitive traffic signal										✓
add left turn signals safe for pedestrians			✓		✓			✓		

**Appendix B – Alternative North Glebe Road/Wilson Boulevard Intersection**

The existing pedestrian crossings at the North Glebe Road and Wilson Boulevard intersection are particularly hazardous and confusing for pedestrians and motorists alike, and are in urgent need of relocation. The attached drawing has been included as an alternative layout for the intersection. This alternative should be considered as a point of departure for discussions leading to the planning and construction of a new intersection. It is hoped that Arlington County, together with the Virginia Department of Transportation (VDOT), will develop a fast-track design process for constructing an improved intersection that takes advantage of proposed development and, to the extent possible, private funding from new projects. It is also hoped that, until the final changes are in place, the County and VDOT will implement interim measures to improve pedestrian safety at this intersection.

The attached drawing was computed based on Virginia Department of Transportation highway plans for North Glebe Road. Note that the drawing includes a reference to in-pavement amber LED flashing lights. This is a relatively new innovation in pedestrian safety that could have relevance for this intersection. A more detailed discussion on in-pavement lighting is included in Appendix D.

Shown below is the typical cross-section for existing North Glebe Road as well as two alternatives. The dimensions shown are identical for both sides of the road. The first alternative provides the means to widen the median strip to 9 feet. The second alternative allows for an 8' median. An 8' to 12' median is recommended for landscaping purposes. The proposed reduced pavement width is consistent with recognized standards for urban roads and results in no reduction to road capacity.



## Appendix C -- Ballston Build-Out, Statistics and Locations

The three aerial slides in Appendix C show North Glebe Road from North Quincy Street to Washington Boulevard, the area evaluated by the Committee. The slides also indicate the development that is currently planned for this stretch of North Glebe Road in Ballston.

The attached Table 4 shows the geographic distribution of pedestrians accessing the Ballston Metro Station. This information was taken from, *Ballston Metro Access Study*, performed by Harry Weese Associates and prepared for the Arlington County Department of Public Works, Planning Division.

The information shown below, indicating the number of daily person-trips that each of the proposed projects is expected to generate, was also taken from the *Ballston Metro Access Study*. Three of these projects, Ballston Point, NRECA II, and Arlington Gateway, are currently undergoing County approval and will likely move forward towards construction in the near future. The Harris Teeter Supermarket will open later in the year.

Project Name	Size	Use	Daily Person-Trips	Daily Metro Trips
Harris Teeter N. Glebe Rd. @ N. Randolph St.	49,753 SF	Retail	2,349	348
Ballston Tower N. Glebe Rd. @ N. Carlin Springs Rd.	220,000 SF	Office	2,664	375
Ballston Point N. Glebe Rd. @ Wilson Blvd.	330,000 SF	Office/ Retail	3,997	628
NRECA II N. Glebe Rd. @ Wilson Blvd.	216,000 SF	Office/ Retail	2,616	483
Arlington Gateway N. Glebe Rd. @ N. Fairfax Dr.	486,000 SF	Office/ Retail	10,332	2,622
Fairgate II N. Glebe Rd. @ N. Fairfax Dr.	202,000 SF	Office	2,446	465
<b>Totals</b>	<b>1,503,753 SF</b>		<b>24,404</b>	<b>4,921</b>

## Appendix D -- Crosswalk Warning Systems Utilizing In-Pavement Flashing Lights

The purpose of an In-Pavement Flashing Lights Crosswalk Warning System is to warn motorists of the presence of pedestrians in the crosswalk of an intersection. The City of Santa Rosa, California initiated this new concept in proactive pedestrian warning systems in 1993 after experiencing a significant number of pedestrian fatalities and injuries at uncontrolled intersections. The City of Kirkland, Washington has installed the system at eighteen (18) intersections. The California Transportation Department has announced its intention to adopt standards for the use of the system.<sup>1</sup> A version of the system has been successfully installed at a notoriously dangerous uncontrolled intersection in Howard County, Maryland.<sup>2</sup>

The concept of flashing amber lights embedded in crosswalks has been found to have a clear effect on a driver's awareness of crosswalks and to modify driving habits in a manner that is more favorable to pedestrians. The flicker rate of the flashing signal from the imbedded amber lights is designed to attract the reflex response mechanism of the human eye, but yet does not present a distraction. The most recent generation of the low profile signal heads are durable enough to withstand snow plow activities, are visible even in bright sunlight, and have an enhanced LED design that does not degrade over time. The system oper-

ates on 12 volts and is capable of being powered by solar cells. Designed to be low maintenance, a signal head is easily replaced when needed (six screws will remove the unit). An independent evaluation of the system has been quite favorable.<sup>3</sup>

Testing to date has focused on utilization of the system at uncontrolled intersections where the need for evaluating an inexpensive alternative to the installation of traffic signals has been given the highest priority. The cost of installation is typically 20% of that for a fully signalized intersection. Because of the focus on uncontrolled intersections, testing and standards for use of the system at controlled intersections has not yet taken place. According to the Federal Highway Administration (FHWA) Safety Management and Policy Division, the system seems best suited for low speed and low volume intersections. The manufacturer's testing, however, indicates that the system would work equally effectively at controlled intersections. FHWA would sanction use of the system at controlled intersections on an experimental basis.

<sup>1</sup> LightGuard Systems, Inc., Press Release posted on <http://www.lightguardsystems.com/news.htm> (7/16/99).

<sup>2</sup> *Traffic Management & Safety: The ITS supplement to ROADS & BRIDGES*, December, 1998.

<sup>3</sup> *An Evaluation of a Crosswalk Warning System Utilizing In-Pavement Flashing Lights*, April 10, 1998. Study conducted by W-Trans, Santa Rosa, Ca. for the State of California Office of Traffic Safety.

