City of Falls Church
South Washington Street Corridor Study

August 2008

Metropolitan Washington Council of Governments (COG)
National Capital Region Transportation Planning Board (TPB)
Transportation/Land-Use Connections Program (TLC)

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CHAPTER 1: INTRODUCTION

The City of Falls Church is undergoing dramatic change. New buildings and construction projects are visible around the City. Much of this new activity is higher density multistory mixed use with potential for a fairly active street presence. New projects such as The Byron, The Spectrum, Pearson Square and the planned City Center signal a new era in the evolution of the city. Almost all new major projects are designed to create an interesting and inviting pedestrian environment, and it is anticipated that they will be shopping, entertainment and employment destinations for many Falls Church residents living in the surrounding neighborhoods.

Much of the 'traffic' to and from the city's new downtown is likely to be people walking, riding bikes, using transit, or other non-auto modes.

South Washington Street has dual roles in the city- it is simultaneously a major east-west route on the US highway system maintained by the Virginia Department of Transportation (VDOT) and it is a primary artery in the city's transportation network. In its current configuration, South Washington Street presents significant challenges for pedestrians. The road carries a significant amount of vehicle traffic, signalized crossings are few and far between and the relatively narrow sidewalks and shallow lot frontages force pedestrians to walk close to traffic. In spite of these shortcomings, there are a considerable number of pedestrians walking in the corridor every day.

There are several catalysts for major change in the study area, which is comprised of the areas along and adjoining South Washington Street (US Highway 29) from Broad Street (State Highway 7) to the city's western limits.

Due to a high quality of life, an excellent public school system, proximity and easy access to Washington, DC, stable neighborhoods and a variety of other contributing factors, Falls Church is a highly desirable community. Many people are willing to pay a premium to live in the city and take advantage of the assets Falls Church offers. Redevelopment and construction activity has remained vibrant in the city in spite of softening markets region-wide.

There are two Metro stations just outside of Falls Church that further contribute to the desirability of the community. The city is currently developing a streetscape plan for the portion of North Washington Street between Broad Street and the East Falls Church Metro Station. Additionally, the city is collaborating with Arlington County, the Washington Metropolitan Transportation Authority (WMATA) and VDOT on the East Falls Church Planning Study which result in a vision for transit-oriented development in the East Falls Church area of Arlington County and Falls Church.

The planned City Center project has allowed the city to reinvent its downtown- turning a once somber collection of commercial buildings into a vibrant and active environment that is likely to draw people in from the city and the region (see Figure 1-1). This project will anchor the eastern edge of the South Washington

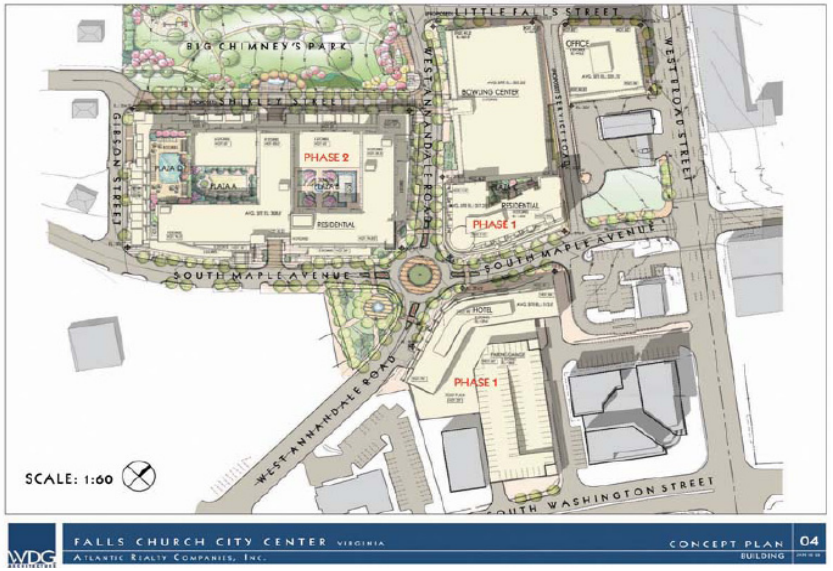


Figure 1-1: City Center Concept Plan
Source: Falls Church Department of Economic Development website: http://www.fallschurchva.gov/Content/Government/Departments/EconomicDevelopment/CityCenter.aspx?cnlid=386

Street corridor study area.

This report is divided into seven chapters and an appendix. Chapter 2 describes the existing conditions for pedestrians in the study area. Chapter 3 outlines a series of design principles that should inform the ultimate character and functionality of the corridor and guide land-use and transportation decisions made over time. These principles are meant to serve as the starting point for a larger discussion of land use, transportation and economic issues as part of any future planning processes.

Chapter 4 outlines short-term safety improvements to enhance the projects currently underway in the study area. These improvements will enhance the safety of pedestrians and bicyclists in the short-term. Chapter 5 provides long-term capital improvements to enhance pedestrian and bicycle access and mobility while improving vehicular safety and circulation. These improvements would involve more planning, time and investments, but should be considered as the area redevelops.

Chapter 6 provides concept-level cost estimates for implementing short- and long-term recommendations. Chapter 7 concludes this report and offers a vision for moving forward.

Full size maps showing conceptual recommendations have been appended to the report narrative. The appendix also includes a copy of the walking tour survey materials and responses.

Key Statistics

The City of Falls Church is located approximately five miles to the west of Washington, DC and is bordered to the east by Arlington County. Fairfax County borders the city to the north, west, and south.

The project study area is approximately one mile in length from the intersection of South Washington Street with Broad Street to the western edge of the City.

As of 2006, the city's population was 10,799.[1] Approximately 16% of the employed population takes public transportation (including taxicab) to work and 3% walk to work.[2]

About the Transportation and Land Use Connections Program

The Transportation and Land Use Connections (TLC) Program provides support to local governments in the metropolitan Washington region as they work to improve transportation/ land use coordination. Through the program, the Transportation Planning Board provides communities with technical assistance grants to catalyze or enhance planning efforts. TLC projects are generally targeted to a fairly small area or discrete set of issues. Lessons learned from these planning studies may then be implemented around the region.

[1] Source U.S. Census Bureau: State and County QuickFacts, 2006 Estimate.
[2] Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrices P30, P32, P33, P43, P46, P49, P50, P51, P52, P53, P58, P62, P63, P64, P65, P67, P71, P72, P73, P74, P76, P77, P82, P87, P90, PCT47, PCT52, and PCT53

CHAPTER 2: EXISTING CONDITIONS

This chapter focuses on existing transportation conditions along and in the immediate vicinity of South Washington Street. It discusses some of the core challenges that pedestrians face and highlights some of the recent developments in the area.

Orientation to the Study Area

Observations in this chapter are based on field reconnaissance, input and guidance from City staff, analysis of GIS data obtained from the City, Fairfax County, and the Virginia Department of Transportation, review of current planning documents and responses generated during a stakeholder walking tour.

Documents reviewed or consulted include:

- City of Falls Church Vision and Long-Term Strategic Plan (2006)
- City of Falls Church Comprehensive Plan (2004)
- City Center Transportation Master Plan (2007)
- City of Falls Church Bicycle Map
- VDOT Minimum Standards of Entrances To State Highways (2003)
- VDOT Road Design Manual
- VDOT Traffic Engineering Manual

Stakeholder Walking Tour

Key stakeholders were invited to participate in a facilitated walking tour of the study area (see Figure 2-1). Participants were selected for their knowledge with conditions along South Washington Street, familiarity or involvement with planning or interest in walkability and transportation in general. Stakeholders were given a written survey and maps of the study area and asked to provide impressions of South Washington Street on several topics relating to transportation. Participants also provided feedback orally during the walking tour. A copy of the walking tour and a spreadsheet summarizing the comments is appended to this document.

Observations

The character of South Washington Street changes as one moves from the intersection with Broad Street west to the city limits. There are general characteristics that reflect corridor-long conditions and there are more specific issues that are found in a particular segment of South Washington Street. For purposes of this report, the observations have been divided into five primary groupings:

1. Corridor-wide Observations
2. Broad Street to Hillwood Avenue
3. Hillwood Avenue to South Maple Avenue
4. South Maple Avenue to Greenway Boulevard
5. Greenway Boulevard to the City Limits (approx. Welcome Drive)

Figure 2-1: Stakeholder Walking Tour, South Washington Street

The following section provides a general discussion of the roadway, pedestrian accommodations and land use characteristics for each grouping. Also included are highlights from the stakeholder walking tour.

Corridor Long Observations

Roadway

South Washington Street is entirely within the City of Falls Church from Broad Street to approximately the intersection with South Maple Avenue. From this intersection west to the end of the study area, the city limit line runs down the centerline of South Washington Street with Falls Church on the north and Fairfax County on the south.

South Washington Street is a four lane highway that is a signed and numbered route (Route 29) on the US highway system. Portions of the highway are divided by raised medians (concrete and landscaped), striped medians, center turn lanes, or twin yellow stripes.

There are modest elevation changes that impact sight distances along the corridor. For example, there is a depression at the intersection of South Maple Avenue and South Washington Street that impedes a pedestrian's ability to see westbound cars cresting a small rise in the road near the intersection with Tinner Hill Road.

The road carries approximately 26,000-29,000 vehicles per day (City Center Transportation Plan - 2007) and there are four signalized intersections in the study area (Broad Street, Annandale Road, Hillwood Avenue, Greenway Boulevard). Vehicle speed limit is posted at 25 mph on westbound South Washington Street in conformance with the city-wide maximum speed limit of 25 mph. However, there is a sign on eastbound South Washington Street indicating a speed limit of 35 mph (note- this speed limit sign is in the Fairfax County portion of South Washington Street).

There are 75 driveways and 18 bus stops along the length of the corridor. Many businesses have multiple driveways entering South Washington Street, and there are a few instances where there is a continuous curb cut stretching the entire frontage of a property.

Transit

Currently, transit service is provided by both Washington Metropolitan Transit Agency (WMATA) Metro bus and the City of Falls Church GEORGE local bus service. WMATA also provides service for disabled riders with the MetroACCESS system. Fairfax County Connector buses travel along the South Washington Street corridor but do not currently stop at any of the bus stops in the study area.

Pedestrian Accommodations

There is a continuous concrete sidewalk along both sides of South Washington Street, with the exception of the previously mentioned continuous curb cuts and the traffic island located at the intersection of South Washington Street and Hillwood Avenue.

Sidewalks are generally in good repair, but there are locations where sidewalks have been displaced by tree roots or other causes (see Figure 2-2). This creates a challenging situation for persons with disabilities, parents pushing strollers or others with mobility limitations.

There are three signalized crosswalks crossing South Washington Street: Broad Street, Annandale Road, and Marshall Street. There are few marked crosswalks running parallel to South Washington Street.

Figure 2-2: Sidewalk Displacement near Broad Street

The Falls Church Bicycle Map indicates that a planned bicycle route runs along East Fairfax Street, across South Washington Street to West Annandale Road. The bicycle route then continues to South Maple Avenue along a path connecting the intersection of West Annandale to the intersection of South Maple Avenue and Gibson Street. The bicycle route runs west along South Maple Avenue to Cavalier Trail Park where it turns off to the north on the Cavalier Trail.

During the stakeholder walking tour, a number of pedestrians were seen crossing South Washington Street mid-block (not at an intersection, see Figure 2-3). Few were actually seen using one of the crosswalks provided at signalized intersections.

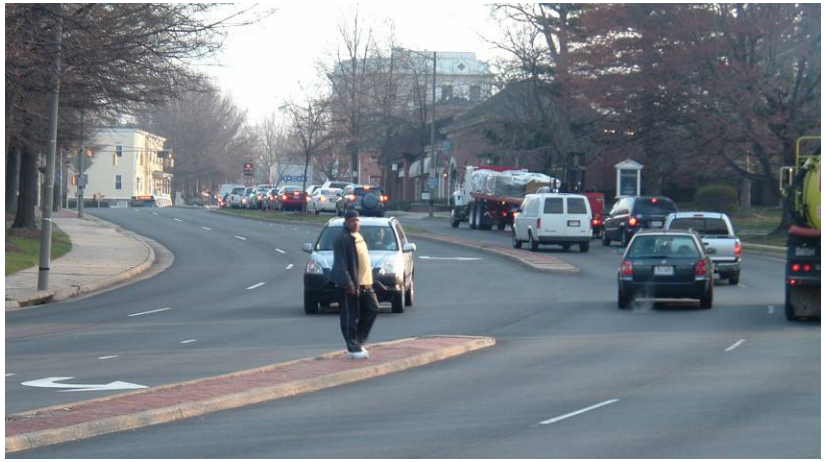


Figure 2-3: South Washington Street near The Falls Church

Traffic

Heavy traffic volumes and high speeds are a defining characteristic of the study area. According to the 2007 City Center Transportation Plan, there are almost 30,000 cars traveling on South Washington Street every day. In addition, the Washington Street/Broad Street intersection has the highest observed pedestrian counts (usage) in the city center according to the Transportation Plan. A critical challenge of redevelopment in the area is to encourage land use and transportation patterns that are safer and more comfortable for pedestrians and bicyclists, while still accommodating the large volumes of automobiles. While pedestrian and bicycle facilities and transit opportunities may encourage people to walk and bicycle, motor vehicle traffic in the area is projected to increase over time.

According to the 2004 Comprehensive Plan for the City of Falls Church, South Washington Street is one of the city roadways experiencing the most traffic and highest speeds. While the majority of Falls Church roadways have a posted speed limit of 25 miles per hour, portions of eastbound South Washington Street that are in Fairfax County have a posted speed limit of 35 miles per hour. Anecdotal evidence suggests that vehicles are routinely traveling at speeds exceeding either posted speed limit.

The City Center Transportation Plan provides additional evidence identifying South Washington Street as one of the more challenging venues in Falls Church. According to the plan, the intersection of South Washington Street and Annandale Road had the city's highest number of vehicle crashes in the two-year period between 2004 and 2006 (16 crashes).

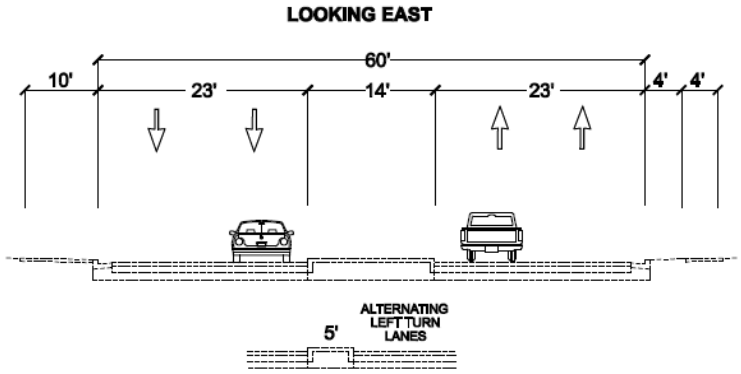
The following sections of this chapter provide a more detailed description of the four subareas of the South Washington Street study area:

1. Broad Street to Hillwood Avenue
2. Hillwood Avenue to South Maple Avenue
3. South Maple Avenue to Greenway Boulevard
4. Greenway Boulevard to the City Limits (approx. Welcome Drive)

Broad Street to Hillwood Avenue

Figure 2-4: Broad Street to Hillwood Avenue

Roadway
In this segment, South Washington Street is a four lane divided roadway with a 14-foot wide landscaped median.



Existing Section- Broad Street to Hillwood Avenue

There are alternating left turn bays at the intersections with Broad Street, Fairfax Street and Annandale Road. Left turns are prohibited from westbound South Washington Street onto Hillwood Avenue. There are signalized intersections at Broad Street, Annandale Road, and Hillwood Avenue.

Vehicles traveling eastbound on South Washington Street can make unrestricted turns onto southbound Hillandale Avenue via a high speed slip lane.

Pedestrian Accommodations
There is a mostly continuous sidewalk on both sides of South Washington Street in this portion of the corridor. However, there are no pedestrian signals, crosswalks or other pedestrian accommodations crossing Hillandale Avenue where it intersects with South Washington Street. Furthermore, the unrestricted right turn lane for eastbound traffic creates a challenging situation for pedestrians trying to walk along South Washington Street on the south side of the roadway.

Land Use
The easternmost portion of the corridor is occupied by The Falls Church and three to five story commercial properties. According to participants on the walking tour, there is a significant amount of foot traffic going to and from the church on weekends. The planned City Center project is located on the west side of South Washington Street at the intersection with Broad Street. This development will provide many amenities that are likely to draw people walking in from around the community.

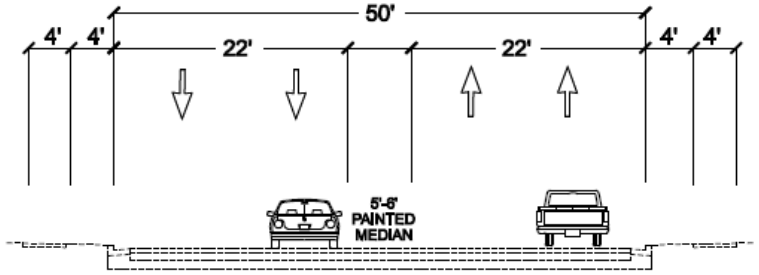
There is a bus transit center planned for the northwest corner of the Broad Street / Washington Street intersection. This will likely generate a considerable amount of foot traffic along Broad Street, South Washington and the surrounding streets.

Hillwood Avenue to South Maple Avenue

Figure 2-5: Hillwood Avenue to South Maple Avenue

Roadway

The roadway in this section of South Washington Street is a four lane divided roadway with a 5' to 6' wide painted median.



Existing Section- Hillwood Avenue to South Maple Avenue

South Maple Avenue intersects South Washington Street at an angle, and there is a flashing yellow light across South Washington to alert oncoming traffic of turning vehicles. During the walking tour, eastbound turning vehicles were observed turning left onto South Maple Avenue at relatively high rates of speed, failing to yield to pedestrians.

Pedestrian Accommodations

There are continuous sidewalks along both sides of South Washington Street in this segment of the corridor. However, South Maple Avenue and the portion of Tinner Hill Road extending north to South Maple Avenue are the only side streets with sidewalks along this section of the corridor.

Figure 2-6: South Washington Street intersection with South Maple Avenue

Pedestrians walking east or west along the northern side South Washington Street must contend with a long crossing distance at the intersection with South Maple Avenue (approximately 100 feet). Furthermore, eastbound cars turning left off of South Washington Street onto South Maple Avenue are frequently moving very quickly and are not required to stop before turning, further complicating the crossing for pedestrians.

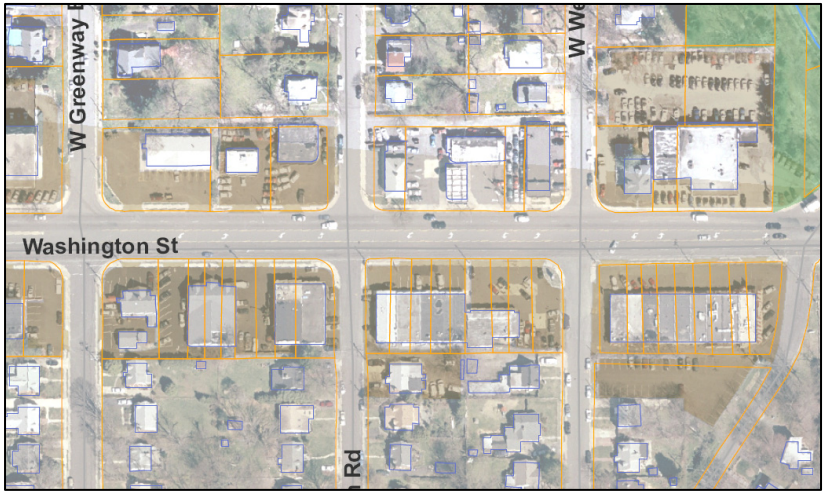
Land Use
The middle segment of the corridor is lined with low to modest scale commercial developments. Buildings tend to be single occupant. On the north side of South Washington Street, many of the building façades are fairly close to the roadway. Buildings on the southern side of South Washington Street have somewhat larger setbacks. Properties are designed and oriented primarily for access by automobile or truck. The commercial/light industrial character of this segment is punctuated by the Tinner Hill neighborhood on the south side of South Washington Street. This historic African American neighborhood consists of one block of single family dwellings and is still home to descendents of the founding families. Also in this segment is a construction supply yard, several auto services and other light industrial uses.

The new Pearson Square development is one block to the north on South Maple Avenue. This 230-unit multistory condominium complex was recently completed and is not fully sold out as of the preparation of this plan. This project, which is billed as being within "a short, pedestrian-friendly stroll of nearly everything Falls Church has to offer"[3] will likely generate significant pedestrian traffic in and around the study area.

Figure 2-7: Pearson Square Apartments
Source: www.pearsonsquare.com

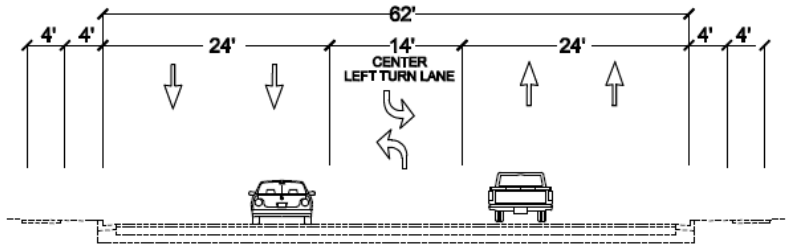
[3] Pearson Square in the News: http://www.newcondominiumguide.com/about/news_detail.html?news_id=47

Cavalier Trail Park is located just off South Washington Street at the intersection with South Maple Avenue. This park is a gateway to a popular recreational trail that draws visitors from around the city and portions of nearby Fairfax County.



South Maple Avenue to Greenway Boulevard
Figure 2-8: South Maple Avenue to Greenway Boulevard

Roadway
In this three block portions of nearby section; South Washington Street is a five lane roadway with a center turn lane.



Existing Section- South Maple Avenue to Greenway Boulevard

Pedestrian Accommodations
There are continuous sidewalks on both sides of South Washington Street in this segment of the study corridor; however there are no signalized intersections or other pedestrian accommodations to cross South Washington Street.

Land Use
From South Maple Avenue west, South Washington Street is divided between two jurisdictions. The westbound lanes are in the City of Falls Church, and the eastbound lanes are in Fairfax County.

This segment of the corridor is a mixture of residential, commercial and office buildings. Development is lower intensity than found closer towards the center of Falls Church. Strip commercial and office lines both the north and south frontages of South Washington Street and single family residential neighborhoods extend along the side streets to the north and south.

Greenway Boulevard west to End of Study Area

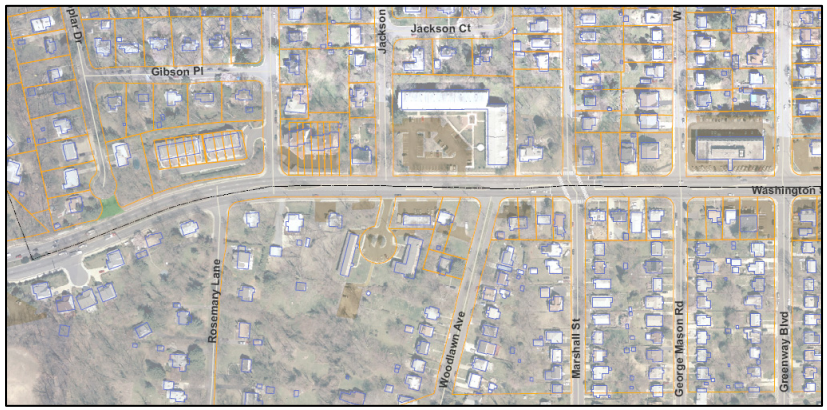
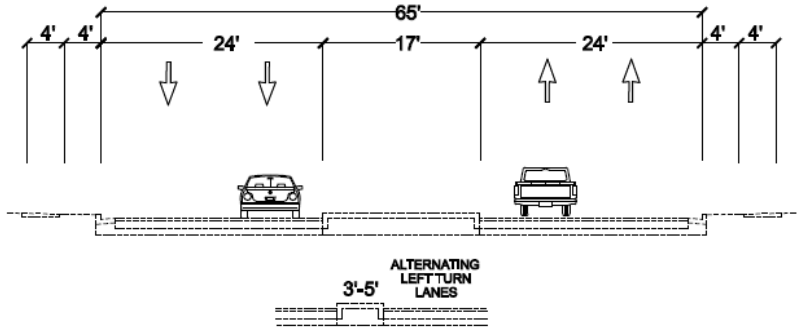


Figure 2-9: Greenway Boulevard to End of Study Area

Roadway
This section of South Washington Street is four lanes with a divided turn lane. Western portions of the corridor have a landscaped median. There is a signalized intersection at Marshall Street with crosswalks in four directions.



Existing Section – Greenway Boulevard to City Limits (Rosemary Lane)
[Greenway Boulevard to Woodlawn Avenue- Alternating Left Turn Lanes
Woodlawn Avenue to City Limits- Some Full Width Median]

Pedestrian Accommodations
There are continuous sidewalks on both sides of South Washington Street. The intersection at Marshall Street has marked crosswalks in all directions and pedestrians crossing South Washington may push a button to cross the roadway. There are no pedestrian signal heads however, and pedestrians are advised to cross with the green light.

Land Use
South Washington Street from Greenway Boulevard west has a similar character to the preceding section. Uses include single- and multi-family residential and office. Buildings are set back further from the roadway and are lower in scale relative to properties between South Maple Avenue and Broad Street. Side streets on either side of the corridor lead to established single family neighborhoods.

CHAPTER 3: DESIGN PRINCIPLES

This chapter outlines a series of design principles for pedestrian access and mobility along the South Washington Street corridor. These are meant to provide guidance for the ultimate character and functionality of the corridor and guide land-use and transportation decisions made over time. The specific short term (0-5 years) and long term (over 5 years) recommendations found in chapters 4 and 5 of this report are intended to help Falls Church transform South Washington Street into a road that balances the needs of the vehicle and the needs of pedestrians and bicyclists.

Introduction

As the South Washington Street corridor develops over time, physical spaces should be provided that build community and that are well-connected, accessible and comfortable for pedestrians and bicyclists. Pedestrians should be a central component of the long-term vision for the corridor. The transportation system and surrounding land uses should encourage walking and development should place a high priority on the pedestrian environment.

Create Vibrant Civic Space

Vibrant civic space should be created along the corridor. Mixed use redevelopment and existing establishments along Broad Street at the eastern end of the corridor and the Pearson Square development on South Maple Avenue will generate relatively large numbers of pedestrians. These pedestrians should be provided with visible public spaces to gather, which encourage community cohesiveness. Surrounding land uses and buildings should celebrate and reinforce this civic space. The City is encouraged to explore opportunities to provide civic space within the study area, and should evaluate opportunities to create large public plazas as well as various smaller civic spaces.

Create a Pleasing Streetscape

Heavy traffic volumes and high speeds and little space between the roads and sidewalks create an inhospitable environment for pedestrians. As the area redevelops over time, pedestrian space should be separated from automobile space with landscape buffers that include street trees (recommended 5’ minimum), as well as other design approaches.

In addition, pedestrian space should be clearly articulated through design. As properties redevelop, the relocation of existing curb lines should be examined to maximize the length and width of center medians. Center medians provide pedestrian refuge at crossings, improve traffic flow by allowing left turn pockets, and provide a location for landscaping. Sidewalks should be wide enough to accommodate anticipated pedestrian volumes. A 5’ minimum sidewalk width is recommended. Significantly wider sidewalks should be considered at the east end of the corridor near Broad Street. Sidewalk surfaces should continue across driveways to clearly delineate the pedestrian space. Curb ramps should be provided for every crosswalk, to ensure safety and accessibility for all.

Automobile travel lanes should be no wider than is necessary to accommodate vehicles at the desired speed limits. Excessively wide lanes encourage drivers to travel at higher speeds and forces pedestrians to cross wider streets, while consuming space that could possibly be used for center medians or bicycle lanes.

In general, design elements should be selected that improve pedestrian safety and naturally calm traffic.

Reduce Pedestrian Crossing Distances

Pedestrians should not have to cross more than 60 feet of road width at a time. Center medians should be used for pedestrian refuges. Crosswalks should be brought to and through medians so pedestrians are not forced to choose between a median refuge and a crosswalk. The width of the pedestrian curb ramp through the center median should be as wide as possible (5’minimum) to accommodate users with assistive devices such as wheelchairs or multiple users at one time.

Maximizing the length and width of medians should be considered a priority given the key safety function that they serve. Medians are needed not only at mid-block crossings, but at signalized intersections as well. While each signal should be designed to

enable pedestrians to clear the entire width of the road, the median provides a refuge for slower moving pedestrians who may become caught in the center.

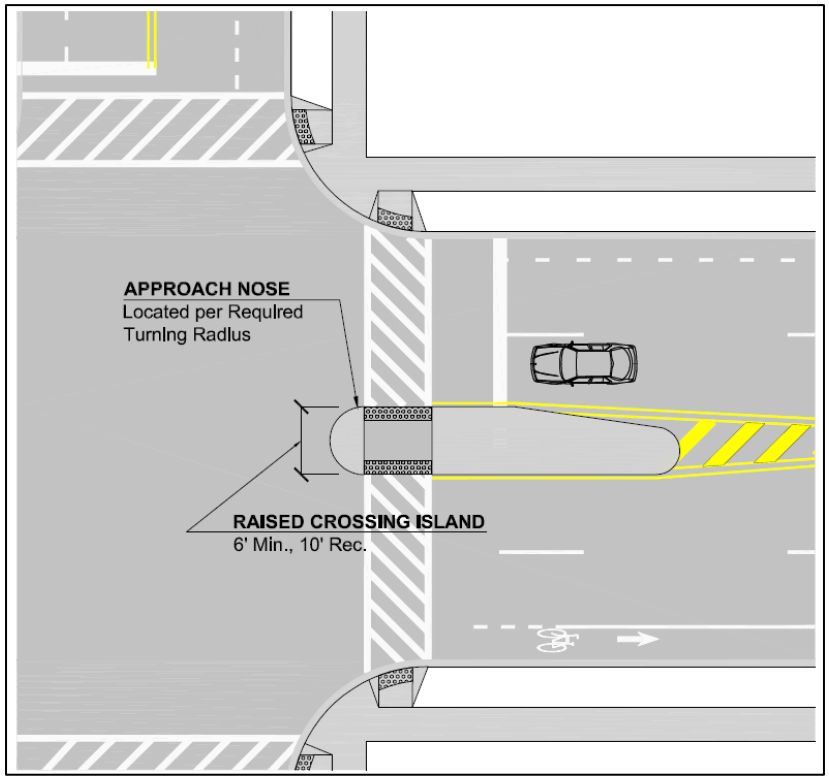


Figure 3-1: Median Design-Maryland SHA Bicycle and Pedestrian Guidelines

Figure 3-1 illustrates a typical design for a raised median at a street crossing. According to the AASHTO *Guide for the Planning, Design, and Operation of Pedestrian Facilities,* raised medians, or crossing islands "should be 6 ft or more to provide space for a wheelchair user or more than one pedestrian to wait." Travel lanes may be narrowed to 10 feet in constrained conditions to provide space for the median. However consideration should be given to traffic volume, speed, vehicle mix and presence of bicycles when narrowing lanes. While not recommended, raised medians may be narrower than 6 feet. However the cut-through width should be widened to accommodate waiting pedestrians or cyclists. [4]

Encourage Pedestrian-Friendly Land Use and Urban Design

Mixed-use development can be more convenient and accessible for people on foot, because it often provides more destinations in close proximity to one another.

At the east end of the corridor, the properties and city blocks become larger which can hinder pedestrian movement. In the long-term, large properties should be subdivided into multiple uses and a road grid or pedestrian access should be established. Access should be extended through larger properties, providing an opportunity to create traditional main street areas that tie into an urban street grid. Buildings should be brought to the edge of the property and parking, vehicular access and service entrances should be provided either in structures or at the rear of properties. Sidewalks should be provided along both sides of any new streets and added to existing side streets where missing.

Creating a more finely grained pedestrian network that provides pedestrians with choices about how to get to any location should be a critical element of the long-term vision for the area. This would also create opportunities to move buildings closer to the road and provide parking and access from the back. Development of this nature is more pedestrian friendly because it is at a scale comfortable for those on foot.

Driveway Width and Access Management

Arguably, the most significant impediment to pedestrian travel along the South Washington Street corridor is the width and number of existing driveways. Pedestrians must contend with numerous potential conflicting movements and face undue exposure on entrances that are excessively wide. VDOT's Entrance Standards recommend widths of 14' to 20' for one-way driveways and 30' to 40' for two-way driveways. To promote pedestrian

[4] p. 75-76, *Guide for the Planning, Design, and Operation of Pedestrian Facilities,* American Association of State Highway and Transportation Officials, July 2004.

travel, state-of-the-practice recommendations from other jurisdictions include 10' to 15' for one-way driveways and 22' to 25' for two-way driveways. As properties redevelop driveway widths should be reduced as much as practical.

As properties redevelop, access management techniques should be employed to reduce the number of driveways (i.e. conflicting turning movements). Access management should be thought of as an attempt to balance the need for good mobility for through traffic with the provision of reasonable access to land uses. The use of access management techniques results in better traffic flow, enhanced property access and improved safety for motorists and pedestrians. Techniques include:

1. Driveways located on side streets as opposed to the major roadway.
2. Driveways on the major roadway that are well offset from intersections, and are spaced as far apart as possible.
3. Restricting movements at driveways such as allowing "right in", "right out" only. This can be accomplished by raised medians on the major roadway, or channelizing medians at the driveway entrance.
4. Interconnecting parcels so vehicular movements from one property to another don't have to occur on the major roadway. This can be accomplished by service roads or connected parking lots, preferably behind buildings.

<u>Considerations for Proposed Recommendations</u>

The TLC program has an emphasis on providing conceptual approaches that can be replicated region-wide, rather than detailed design improvements for a specific situation. Therefore it should be understood that all proposed changes would require additional detailed design and engineering analysis to develop final plans for each recommendation.

Furthermore, proposed changes would require review and approval by both VDOT and the Fairfax County Department of Transportation (FCDOT) in addition to approval by City of Falls Church staff. Any changes that would impact transit stops would require additional coordination with the Washington Metropolitan Transit Authority (WMATA).

CHAPTER 4: SHORT-TERM IMPROVEMENTS

This chapter outlines short-term (0-5 years) improvements to enhance the pedestrian environment along the corridor. These improvements will enhance the safety of pedestrians and bicyclists in the short-term. It should be understood that these recommendations are conceptual in nature and additional analysis and engineering is required to determine feasibility and ultimate design. These short-term improvements can be done relatively quickly and would require relatively modest investments.

(Note: order does not indicate importance)

S-1. **GEOMETRIC CHANGES**
Geometric changes are recommended to improve vehicular and pedestrian safety by reducing pedestrian crossing distances, slowing vehicle turning movements and increasing driver visibility. Currently South Maple Avenue intersects South Washington Street at a significant skew angle. This creates site distance issues by making South Maple Avenue southbound drivers look over their shoulder to see vehicles and pedestrians approaching from the their left (east). Due to the flat angle, eastbound left turns can be taken at a relatively high speed. The skew angle also lengthens the pedestrian crossing on the north side of South Washington Street, increasing pedestrian exposure. The recommended geometric changes include:

a. Reconfiguring the intersection of South Maple Avenue and South Washington Street as more of a "tee", and closing the entrance just to the west. This will create fewer, slower and more predictable turning movements while reducing the pedestrian crossing distance. The proposed signalization mentioned later in this chapter (recommendation S-3) will also improve intersection safety.

S-2. **CURB EXTENSIONS AND CORNER RADIUS REDUCTIONS**
Curb extensions and corner radius reductions can be used to shorten pedestrian crossing distances, minimize exposure and improve sight distances. Several of the side streets along the corridor appear to have extra pavement width, particularly those with on-street parking that is restricted near the corners. These locations could be retrofitted with curb extensions that essentially push the curb line into the street the width of the parking and leave approximately 24' of width for vehicular passage.

Some locations appear to have corner radii larger than necessary. These locations could be retrofitted with smaller radii, which slow turning vehicles, reduce pedestrian crossing distances and allow curb ramps and crosswalks to be placed closer to the corner, increasing the visibility of pedestrians. The ultimate feasibility of the proposed curb extensions and radius reductions will be dependent on an engineering analysis considering the turning movements of appropriate design vehicles. Some of the curb extension locations may require the relocation of existing storm drainage inlets. All of these considerations should be included in a detailed feasibility analysis prior to actual design and construction. Curb extensions are recommended for the following South Washington Street intersections:

a. Rosemary Lane
b. Jackson Street
c. Woodlawn Avenue
d. Marshall Street
e. George Mason Road
f. Greenway Boulevard
g. Cameron Road
h. Westmoreland Street/Summerfield Road
i. Cavalier Trail
j. Tinner Hill Road
k. Wallace Street
l. East Fairfax Street

S-3. **TRAFFIC SIGNALS**

New traffic signals are recommended along the corridor for a number of reasons. With the relatively long distance between existing signals at Marshall Street and Hillwood Avenue, traffic has the opportunity to reach higher speeds without stopping, and gaps in traffic to accommodate turning or crossing (including pedestrians) are significantly reduced. New signals would serve to calm traffic, and create gaps for turning and crossing movements. The ultimate feasibility of signals at these locations is dependant on a signal warrant and traffic analysis.

a. A signal is recommended at Greenway Boulevard which serves Thomas Jefferson Elementary School on the north side of the corridor and the communities of Jefferson Village and Greenway Downs on the south side.

b. A second signal is recommended at South Maple Avenue to facilitate a pedestrian crossing in the vicinity of Cavalier Trail Park and the commercial establishments on the south side of South Washington Street. This location also corresponds to recommendations made by stakeholders in a survey conducted earlier in the project. It should be noted that a signal at this location might be later relocated if the portion of South Maple Avenue intersecting South Washington Street is closed (see recommendation L-4).

c. A pedestrian hybrid signal is recommended at the uncontrolled pedestrian crossing east of Tinner Hill Road. The existing crosswalk serves bus stops and commercial establishments on each side of road and is located at a crest in South Washington Street which provides relatively good sight distance approaching the crossing. The pedestrian hybrid signal is recommended based on the relatively high volume of approximately 25,000 vehicles per day and lack of a center median for pedestrian refuge.

A pedestrian hybrid signal, also known as a "Hawk" signal is a special type of signal used to warn and control traffic at a marked crosswalk and otherwise unsignalized location (see Figure 4-1). The signal is pedestrian activated and controls traffic on the road using a combination of red and yellow signal lenses, while the pedestrian crossing is controlled by pedestrian signal heads. The pedestrian hybrid signal should be accompanied by pedestrian warning signs and advance stop bars to improve the visibility of the crossing.

The signal has been used in other jurisdictions with high motorist yielding rates. Drafts of the upcoming version of the *Manual on Uniform Traffic Control Devices (MUTCD)* contain guidance on the application, design and operation of these signals.

Figure 4-1: HAWK signal, Tucson, Arizona

S-4. **SIDEWALK REPAIRS**
Sidewalks should be repaired where there are significant cracks, differential settlement and displacement caused by tree roots. Several locations needing repair were observed during site visits.

Locations needing relatively significant repair include:

a. The north side of South Washington Street between Jackson Street and Marshall Street.

b. The southeast corner of the Cameron Road intersection with South Washington Street- an existing utility pole reduces the effective sidewalk width to approximately 2.5'. The sidewalk should be widened into the adjacent parking lot to provide a clear sidewalk width of 5' to 6'.

c. The south side of South Washington Street near Broad Street.

S-5. **CROSSWALK MARKING**
Crosswalks should be striped on all four legs of signalized intersections.

a. High visibility or "ladder" style markings are recommended at signalized intersections and for the crossing of South Washington Street east of Tinner Hill Road to increase the visibility of the crossings.

b. At Tinner Hill Road, relatively high turning volumes are anticipated towards Pearson Square to the north; therefore, it is recommended that the crossing on the north side of the intersection be a raised "speed table" crosswalk to slow turning traffic (see Figure 4-2).

c. At the intersection of Marshall Street and South Washington Street, the existing crosswalk markings are skewed, creating a longer than necessary crossings and increasing pedestrian exposure. Consideration should be given to making these crosswalks perpendicular to the road. It should be noted that this would require additional pedestrian signals, pushbuttons and curb ramps.

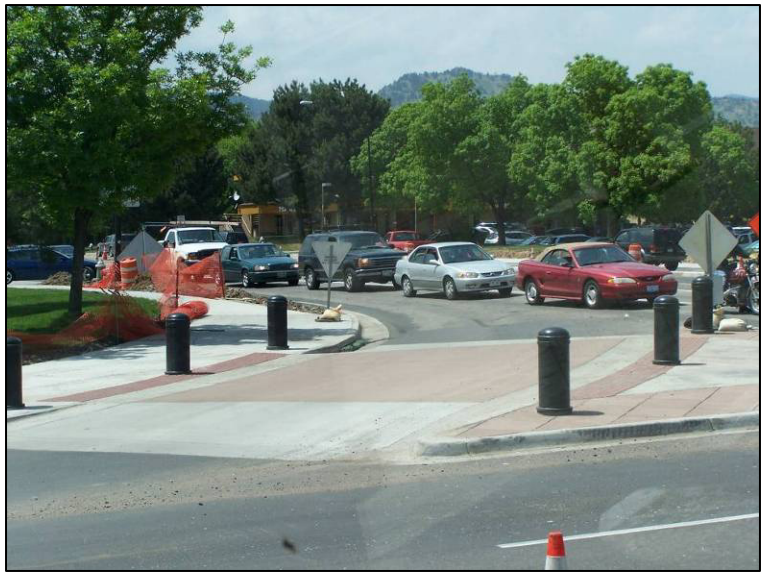


Figure 4-2: Raised speed table crosswalk, Boulder, Colorado

d. Parallel crosswalk markings are recommended at crosswalks across side streets on both sides of South Washington Street. A key reason for this is to provide visual continuity of the pedestrian corridors along South Washington Street.

e. At the intersection of South Washington Street and Hillwood Avenue, crosswalks are recommended for the north and east legs of the intersection (see Figure 4-3).

Due to the relatively high speed and uncontrolled turning movements by eastbound vehicles turning off of South Washington Street onto Hillwood Avenue, crosswalk markings on the southern or western legs of the intersection are not included in the short term recommendations. These crosswalks

should be installed in conjunction with geometric changes to the intersection (see long term recommendation L-3).

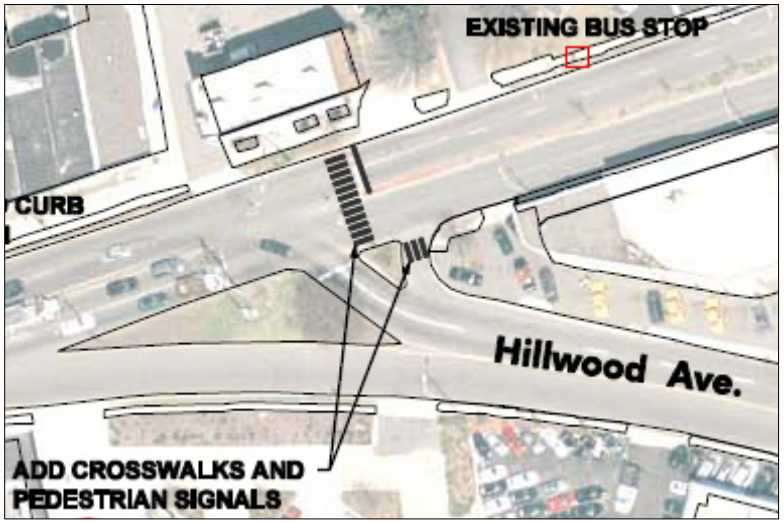


Figure 4-3: Short-term Recommendations for Hillwood Ave. Intersection

S-6. **CURB RAMPS**
Curb ramps provide a transition from the street pavement level up to the sidewalk level. Any locations in the study area with missing curb ramps, or curb ramps that are missing detectable warnings, landing areas at the top and bottom of the ramps, or exceed the slope values required by ADA Accessibility Guidelines should be improved.

Current best practices indicate a preference for using paired perpendicular ramps, (two ramps on each corner). Single large diagonal ramps tend to mislead pedestrians who are blind. Two ramps per corner should be provided throughout the study area.

S-7. **RAISED MEDIANS**
Raised medians or pedestrian refuge islands are very useful for improving the safety of pedestrian crosswalks, particularly on multi-lane roadways with heavy traffic volumes and relatively high speeds. They improve pedestrian safety at locations with and without traffic signals and may be used at both intersection and midblock locations. According to a Federal Highway Administration (FHWA) study on crosswalks at uncontrolled locations, "the presence of a raised median was associated with a significantly lower pedestrian crash rate at multi-lane sites with both marked and unmarked crosswalks." [5]

In order to provide safety benefits, a median must physically protect pedestrians. Along the South Washington Street corridor, medians should be extended to make them as long and wide as possible. Accessible pedestrian walkways should be provided through medians and crosswalks should be shifted to create additional space for a raised approach nose. Design considerations are included below.

- Raised medians require at-grade cut-throughs or curb ramps to provide an accessible path
- Medians should be aligned directly with crosswalks
- Raised approach noses should be included at intersection crossing islands
- Medians should meet the luminance contrast levels needed to improve detection by older drivers, per the recommendations in FHWA's Highway Design Handbook for Older Drivers and Pedestrians (2001)
- If the median is landscaped, the vegetation must not obstruct necessary clear sight triangles

Final median location and shape will be dependent on an engineering analysis considering the turning envelops of appropriate design vehicles. Due to the constraints of

[5] Zegeer, C., J. Stewart, H. Huang, and P. Lagerwey. "Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations- Executive Summary and Recommended Guidelines." Report No. FHWA-RD-01-075, Federal Highway Administration, Washington, D.C., February 2002.

geometry and limited road width, raised medians may be limited to the following locations:

a. The addition of raised medians appears feasible between Greenway Boulevard and South Maple Avenue.
b. A raised median extension is possible at the South Washington Street / Annandale Road intersection
c. A raised median extension is possible at the South Washington Street / and Broad Street intersection.

S-8. **PEDESTRIAN COUNTDOWN SIGNALS**

All signalized crossings should include pedestrian countdown signals. Countdown signals are beneficial because they give information to the pedestrians on the time remaining to cross the street.

Countdown signals should be added at Marshall Street, Hillwood Avenue, Broad Street and new proposed signals. They should also be added to the two approaches at Annandale Road that don't currently have them.

Traffic signals in the area should not rely entirely on pedestrian actuated systems. A number of studies have shown that pedestrians typically are unaware that they must press the push button in order for the signal to provide adequate time for a pedestrian clearance. If possible, considering traffic implications, all signal phases should be timed so that they accommodate pedestrian crossings. If needed, activated signals should be used primarily for locations where pedestrians need to "call" a red phase (such as at minor streets).

Right turn on red restrictions and leading pedestrian intervals should be considered at locations with heavier volumes of pedestrian crossings with many turning movements. The existing right turn on red restrictions should remain at Broad Street.

All signals in the study area should include Accessible Pedestrian Signals (APS). APS include a variety of different features that make traffic signals more accessible, particularly to pedestrians with vision impairments. The most common feature of these signals is the use of audible tones and/or vibration to indicate the WALK interval. The signals may include a number of additional features, including but not limited to, tactile arrows, tactile maps, and Braille and raised print information. Pushbuttons should be placed in accessible locations near the appropriate crosswalk/curb ramp.

S-9. **RECONFIGURE BUS STOPS**

Eighteen bus stops are located along the study corridor and are situated with various orientations to adjacent intersections; however most are situated on the near side of intersections. Several jurisdictions have published guidance regarding the placement of bus stops and adjacent amenities while considering intersection characteristics, pedestrian access and safety, and bus route operation. *Arlington County's Bus Stop Design Standards* are a good source for state-of-the-practice guidance and give advantages and disadvantages for various situations.

In general, bus stops located on the far side of intersections are better for pedestrian safety because the stopped bus does not obscure traffic control devices or pedestrian movements at the intersection. It is recommended that the City evaluate the existing bus stops while considering these best practice guidelines.

S-10. **REDUCE SPEED LIMITS**

In accordance with the City of Falls Church standards, and to assist with slowing vehicular traffic and improving the pedestrian environment, it is recommended that 25 mile per hour speed limit signs be posted along the corridor on both the Falls Church and Fairfax County sides of the street.

S-11. **INSTALL GATEWAY TREATMENTS**

In an effort to calm traffic approaching the corridor from the west where the posted speed is 45 miles per hour, "gateway treatments" are recommended. Gateway

treatments could include a speed display, and visual narrowing such as alternate color or painted gutters. Another gateway treatment could be the use of optical speed bars, i.e. transverse pavement marking lines with spacing that decreases in the direction of travel to give the driver the sensation that they are moving at an excessive speed. Gateway treatments are recommended on eastbound South Washington Street in the area of Rosemary Lane and Woodlawn Avenue.

S-12. **IMPROVE BICYCLE ROUTE SIGNAGE**

One of the City's bike routes crosses the corridor near E. Fairfax Street and Annandale Road then follows South Maple Avenue west to the Cavalier Trail Park near the intersection of South Maple Avenue and South Washington Street. Improved wayfinding signage is recommended near E. Fairfax Street, Annandale Road and South Maple Avenue to inform cyclists where to turn and what facility to use (i.e., street, sidewalk or path) to safely remain on the route. Signage would include advanced information before decision points, clear direction at decision points, destination and mileage information. This signage would also be useful for pedestrians trying to access key destinations such as Cavalier Trail Park.

CHAPTER 5: LONG-TERM IMPROVEMENTS

This chapter provides recommendations for long-term (over five years) capital improvements to enhance pedestrian the pedestrian environment. These improvements would involve additional planning and design and higher levels of investment, but should be considered as the area redevelops over time. (Note: order does not indicate importance)

L-1. **Develop Streetscape Plan for South Washington Street**
A primary goal of the streetscape plan would be to create physical buffers between the road and sidewalk and improve the pedestrian environment for walkers. Where possible, physical buffers such as trees or decorative lights, should be provided between the road and sidewalks.

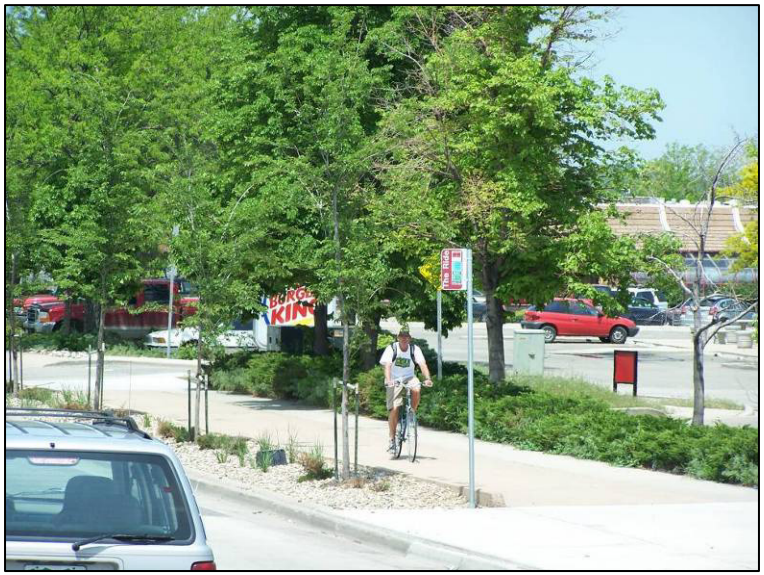


Figure 5-1: Physical buffers, Boulder, Colorado

L-2. **Develop Maintenance Plan for South Washington Street**
A rigorous maintenance and re-striping plan should be developed to ensure that crosswalks, stop lines and other road markings are visible.

L-3. **Hillwood Avenue and South Washington Street Intersection Improvements**
Geometric changes are recommended to the intersection of Hillwood Avenue and South Washington Street to eliminate the free flow right turn movement from eastbound South Washington Street. The current intersection configuration makes pedestrian travel along the south side of South Washington Street relatively difficult by forcing pedestrians to cross relatively high speed traffic on the free-flow ramp.

A reconfigured intersection could either make eastbound right turns occur at the existing signal, or a realigned slip ramp that forces turning traffic to slow as they turn onto Hillwood Avenue. Crosswalks and pedestrian signals on the southern and western side of the intersection should be installed concurrently with the roadway geometry modifications.

The ultimate feasibility of the proposed intersection reconfiguration will depend on an engineering analysis considering the turning envelops of appropriate design vehicles, and a traffic analysis that evaluates the congestion implications of the modified turning movements.

L-4. **Expand Cavalier Trail Park**
The City of Falls Church expressed a desire to evaluate closing South Maple Avenue and expanding Cavalier Trail Park towards South Washington Street. This would eliminate the existing geometric issues involving the skew of South Maple Avenue, and provide a very visible gateway to the park. Property ownership and right-of-way issues would have to be resolved prior to this change.

The modifications would involve creating a cul-de-sac on South Maple Avenue approximately 150’ north of South Washington Street. Vehicular entrances to the Aurora House

and Cavalier Trail Park would be provided from the cul-de-sac. The existing South Maple Avenue Bridge and building over the stream would be removed. Stream embankment restoration would be needed. A new pedestrian/trail bridge is recommended to provide a direct connection from South Washington Street to the existing trail. Existing pavement in the area would be removed and replaced with vegetation.

With the closure of South Maple Avenue, a new signal is recommended at the South Washington Street/Tinner Hill Road intersection. This signal would provide the desired traffic calming previously mentioned for the proposed South Maple Avenue signal. With a signal provided at Tinner Hill Road, the short-term improvements of a raised crosswalk and hybrid signal just to the east would not be needed. The closure of South Maple Avenue and the new signal at Tinner Hill Road would require a signal warrant and traffic analysis. Proposed stream changes may require a hydrologic and hydraulic analysis.

CHAPTER 6: COST ESTIMATES

The construction cost estimates were developed for the various improvement recommendations by identifying pay items and establishing rough quantities. Unit costs are based on 2008 dollars and were assigned based on historical cost data from the Virginia Department of Transportation and other sources. The costs shown only reflect cost associated with construction of the particular pedestrian facility indicated, and do not reflect other costs that may be associated with a larger project. The costs are intended to be general and used for long-range planning purposes. A 25% contingency is applied to the cost for each item. The construction estimates **do not** include costs for planning, surveying, engineering design, right-of-way acquisition, mobilization, maintenance of traffic during construction, utility adjustments, lighting, or future maintenance. Construction costs will vary based on the ultimate project scope (i.e. combination with other projects) and economic conditions at the time of construction.

A detailed breakdown of the cost estimate is included in the appendix.

Construction Cost Estimate

No.	Recommendation	Cost
Short-Term - 1	Geometric Changes to the S. Maple Street/S. Washington Street Intersection (Geometric changes only, signal and crosswalk changes are not included)	$36,000
Short-Term - 2	Curb Extensions and Radius Reductions (Assumes some drainage inlet modifications)	$340,000
Short-Term - 3	New Traffic Signals at Greeway Boulevard and S. Maple Street	$375,000
Short-Term - 3c	Pedestrian Hybrid Signal East of Tinner Hill Road	$100,000
Short-Term - 4	Sidewalk Repair (Assumes 20 Spot Improvements)	$10,000
Short-Term - 5	Crosswalks at Signals and Across Side Streets	$15,000
Short-Term - 6	New and Upgraded Curb Ramps	$300,000
Short-Term - 7	New Raised Medians and Extended Medians	$110,000
Short-Term - 8	Pedestrian Countdown Signals	$250,000
Short-Term - 9	Relocate Existing Bus Stops (Assumes moving 9 bus stops)	$12,000
Short-Term - 10	Posted Speed Limit Signs (Assumes 6 signs)	$2,000
Short-Term - 11	Gateway Treatments	$55,000
Short-Term - 12	Wayfinding Signage Improvements	$3,000
	Short Term Subtotal	**$1,600,000**
Long-Term - 3	Geometric Changes to the Hillwood Avenue/S. Washington Street Intersection (Geometric changes only, signal and crosswalk changes are not included)	$150,000
Long-Term - 4	Closing S. Maple Street at S. Washington Street (Includes geometric changes: road, building and bridge demolition; new trail bridge and stream restoration. Signal and crosswalk changes are not included)	$750,000
	Long-Term Subtotal	**$900,000**
	Total Estimated Cost	**$2,500,000**

CHAPTER 7: CONCLUSION

The Falls Church *Vision and Long Term Strategic Plan* articulates a number of policies that emphasize community-level walkability. The vision statement describes a Falls Church that is "…built on a human scale, where visitors and residents alike can find everything they need while experiencing the fabric of life in a friendly, close-knit community."

Today's Falls Church is not far from achieving this vision, and recent planning decisions move the city closer to the ideal of a walkable community supported by human scale development. Now is the time to begin an extensive planning process that builds on improvements currently underway and ensures that current opportunities are fully captured. Through its emphasis on pedestrian issues, this study establishes multi-modal transportation (including transit, motor vehicles, walking and bicycling) as a cornerstone goal of all improvements and redevelopment in the area. Additional goals of this study are listed below.

- Improve pedestrian access and mobility
- Balance short-term safety versus long-term vision
- Provide recommendations that are transferable to other locations in the Metropolitan Washington region.

The South Washington Street corridor has the ability to become a vibrant pedestrian space. Many challenges lie ahead, as the area is characterized today by sprawling suburban style development that is primarily oriented to motor vehicle travel. With ongoing and future redevelopment opportunities, now is the time to redesign the corridor to achieve a balanced transportation system that equally accommodates all modes.

Appendix

Falls Church Improvements – Detailed Cost Assessment

							Total	Quant	Item	Unit	Unit Cost	Total
		Geometric Changes										
Short Term	S-1	Geometric Changes to S. Maple Street					1					
			Assume 2' Depth					200	Remove Pavement	CY	$25.00	$5,000.00
			Assume LF per Location					150	Remove Curb	LF	$10.00	$1,500.00
			Assume LF per Location					150	New Curb	LF	$35.00	$5,250.00
			Assume 24 SF per location					0	Detectable Warning	SF	$8.00	$0.00
			Assume 2.5' Depth					200	Fill, Seed and Mulch	CY	$30.00	$6,000.00
			Assume 6' Wide					900	Concrete Sidewalk	SF	$5.00	$4,500.00
			Assume New Drainage Inlets					2	Drainage Inlet and Connection	EA	$4,000.00	$8,000.00
			Traffic Items 10%					1	Traffic Items 10%	LS	$3,025.00	$3,025.00
			Landscaping 10%					1	Landscaping 10%	LS	$3,025.00	$3,025.00
		Proposed Signs										
Short Term	S-12	Bike Wayfinding					10	10	Sign	EA	$250.00	$2,500.00
Short Term	S-10	Speed Limit					6	6	Sign	EA	$250.00	$1,500.00
		Bus Stop										
Short Term	S-9	New Bus Stop				*Assume*	9					
			Assume Bus Stops are 10'x80'x2' depth = 60 CY					0	Remove Pavement	CY	$20.00	$0.00
			Assume Bus Stops are 10'x80'x2' depth = 60 CY					0	New Reinf Conc Pave	CY	$200.00	$0.00
			Assume 6' by 20' = 120SF					1080	Concrete Sidewalk	SF	$5.00	$5,400.00
								9	Sign	EA	$250.00	$2,250.00
Short Term	S-9	Remove Bus Stop				*Assume*	9					
			Assume Bus Stops are 10'x80'x2' depth = 60 CY					0	Remove Reinf Conc Pave	CY	$125.00	$0.00
			Assume Bus Stops are 10'x80'x1' depth = 30 CY					0	New Aggregate Base	CY	$50.00	$0.00
			Assume Bus Stops are 10'x80'x1' depth = 60 ton					0	New Asphalt Pave	Ton	$60.00	$0.00
								9	Remove Sign	EA	$250.00	$2,250.00

Falls Church Improvements – Detailed Cost Assessment												
							Total	Quant	Item	Unit	Unit Cost	Total
		Traffic Signal Equipmnet										
Short Term	S-3	Add Full Signal					2	2	New Full Signal	EA	$150,000.00	$300,000.00
Short Term	S-3	Add Hawk Signal					1	1	New Hawk Signal	EA	$80,000.00	$80,000.00
Short Term	S-8	Pedestrian Signal Heads					34	34	Add 4 Pedestrian Signal Heads	EA	$5,000.00	$170,000.00
Short Term	S-8	Remove or Fix Push Button					34					
			Assume 1 Button Per Location					34	New Push Button	EA	$500.00	$17,000.00
		Curb Ramp										
Short Term	S-6	Construct Curb Ramp					76					
			Assume 70SF per location					5320	Remove Conc Sidewalk	CY	$30.00	$159,600.00
			Assume 20LF per location					1520	Remove Curb	LF	$10.00	$15,200.00
			Assume 20LF per location					1520	New Curb	LF	$20.00	$30,400.00
			Assume 70SF per location					5320	Concrete Sidewalk	SF	$5.00	$26,600.00
			Assume 12SF per location					912	Detectable Warning	SF	$8.00	$7,296.00
		Crosswalk										
Short Term	S-5	Build Raised Crossing					1					
			Assume 25' by 25' = 90SY per location					70	Milling	SY	$6.00	$420.00
			Assume 25' by 25' average 2" height = 8 Ton per location					8	Asphalt	Ton	$60.00	$480.00
			Assume 6 Symbols and some lines per locaiton					6	Pavement Marking Symbols	EA	$300.00	$1,800.00
Short Term	S-5	Stripe Parallell Line Crosswalk					15					
			Assume 50' Crosswalk, Assume 150 LF of 4"					2250	Pavement Marking 8" (4"x2)	LF	$1.50	$3,375.00
Short Term	S-5	Stripe High Visibility Crosswalk					18	18	HV Crosswalk	EA	$300.00	$5,400.00
Short Term	S-3	Stripe Stop Bar					15					
			Assume 30' Per EA, Assume 200 LF of 4"					3000	Pavement Marking 12" (4"x6)	LF	$1.50	$4,500.00
			Assume 4 signs per location					0	Signs	EA	$250.00	$0.00
Short Term	S-10	Stripe Optical Speed Bars & Narrowing & Speed Display										
			Assume 30' Per EA, Assume 3600 LF of 4"					3600	Pavement Marking	LF	$1.50	$5,400.00

Falls Church Improvements – Detailed Cost Assessment												
							Total	**Quant**	**Item**	**Unit**	**Unit Cost**	**Total**
			Assume 5000 LF of 4" for narrowing					5000	Pavement Marking	LF	$1.50	$7,500.00
			Assume 4 signs per location					4	Signs	EA	$250.00	$1,000.00
			Speed Display					1	Speed Display	EA	$30,000.00	$30,000.00
		Sidewalk										
Short Term	S-4	Reconstruct/Repair Sidewalk or Surface					20					
			Assume 6' by 10' = 60 SF					1200	Concrete Sidewalk	SF	$5.00	$6,000.00
			Assume 0.33' by 6' by 100' = 8CY					160	Excavation	CY	$15.00	$2,400.00
		Others					**EA**	**SF**				
Short Term	S-2	Build Curb Extension					26	10400				
		Assume 25% Are for Bus Bulb Outs										
			Assume 2' Depth					770	Remove Pavement	CY	$25.00	$19,259.26
			Assume 100 LF per Location					2600	Remove Curb	LF	$10.00	$26,000.00
			Assume 100 LF per Location					2600	New Curb	LF	$35.00	$91,000.00
			Assume 1.67' Depth					643	Fill	CY	$20.00	$12,865.19
								10400	Concrete Sidewalk	SF	$5.00	$52,000.00
			Assume 24 SF per location					624	Detectable Warning	SF	$8.00	$4,992.00
			Assume 20% Require New Drainage Inlet					5	Drainage Inlet and Connectin	EA	$4,000.00	$20,800.00
Short Term	S-7	Extend Median					3					
		Assume 25' by 8' Extension										
			Assume 2' Depth = 15 CY					45	Remove Pavement	CY	$25.00	$1,125.00
			Assume 15 LF per Location					45	Remove Curb	LF	$10.00	$450.00
			Assume 60 LF per Location					180	New Curb (Granite)	LF	$55.00	$9,900.00
			Assume 24 SF per location					72	Detectable Warning	SF	$8.00	$576.00
			Assume 200 SF by 2.5' depth = 20 CY per location					60	Fill, Seed and Mulch	CY	$30.00	$1,800.00
Short Term	S-7	Construct Median					3					
		Assume 300' by 6' Extension										
			Assume 2' Depth = 130 CY					390	Remove Pavement	CY	$25.00	$9,750.00
			Assume 0 LF per Location					0	Remove Curb	LF	$10.00	$0.00
			Assume 620 LF per Location					1860	New Curb	LF	$35.00	$65,100.00

Falls Church Improvements – Detailed Cost Assessment												
							Total	**Quant**	**Item**	**Unit**	**Unit Cost**	**Total**
			Assume 24 SF per location					72	Detectable Warning	SF	$8.00	$576.00
			Assume 200 SF by 2.5' depth = 0 CY per location					0	Fill, Seed and Mulch	CY	$30.00	$0.00
							EA	**SF**				
Short Term	S-2	Reduced Turning Radius					7	1050				
		Assume 30' Radius Reduce to 15'										
			Assume 2' Depth					78	Remove Pavement	CY	$25.00	$1,944.44
			Assume 100 LF per Location					700	Remove Curb	LF	$10.00	$7,000.00
			Assume 100 LF per Location					700	New Curb	LF	$35.00	$24,500.00
			Assume 1.67' Depth					65	Fill	CY	$20.00	$1,298.89
								1050	Concrete Sidewalk	SF	$5.00	$5,250.00
			Assume 24 SF per location					168	Detectable Warning	SF	$8.00	$1,344.00
			Assume 10% Require New Drainage Inlet					1	Drainage Inlet and Connectin	EA	$4,000.00	$2,800.00
							EA	**SF**				
											Subtotal	**$1,284,902**
											Contingency (25%)	0.25
											Total Short Term Recommendations	**$1,606,127**
Long Term	L-4	Expand Cavalier Trail Park/Close S. Maple Ave					1					
			Assume 2' Depth					1178	Remove Pavement	CY	$25.00	$29,444.44
			Assume LF per Location					800	Remove Curb	LF	$10.00	$8,000.00
			Assume LF per Location					670	New Curb	LF	$35.00	$23,450.00
			Assume 24 SF per location					0	Detectable Warning	SF	$8.00	$0.00
			Assume 2.5' Depth					1178	Fill, Seed and Mulch	CY	$30.00	$35,333.33
								1600	Concrete Sidewalk	SF	$5.00	$8,000.00
			Assume New Drainage Inlets					4	Drainage Inlet and Connectin	EA	$4,000.00	$16,000.00
			Assume 1' Depth					111	New Aggregate Base	CY	$50.00	$5,555.56
			Assume 1' Depth					222	New Asphalt Pave	Ton	$60.00	$13,333.33
								4500	Remove Existing Bridge	SF	$15.00	$67,500.00
								1	Remove Existing Structure	LS	$10,000.00	$10,000.00

Falls Church Improvements – Detailed Cost Assessment												
							Total	**Quant**	**Item**	**Unit**	**Unit Cost**	**Total**
								1000	New Trail Bridge	SF	$150.00	$150,000.00
								1	Stream Restoration/Remove Walls	LS	$120,000.00	$120,000.00
								1	Traffic Items 10%	LS	$48,661.67	$48,661.67
								1	Landscaping 10%	LS	$48,661.67	$48,661.67
												$583,940.00
											0.25	**$729,925.00**
Long Term	L-3	Hillwood Avenue Reconfiguration					1					
			Assume 2' Depth					667	Remove Pavement	CY	$25.00	$16,666.67
			Assume LF per Location					800	Remove Curb	LF	$10.00	$8,000.00
			Assume LF per Location					600	New Curb	LF	$35.00	$21,000.00
			Assume 24 SF per location					0	Detectable Warning	SF	$8.00	$0.00
			Assume 2.5' Depth					667	Fill, Seed and Mulch	CY	$30.00	$20,000.00
								2700	Concrete Sidewalk	SF	$5.00	$13,500.00
			Assume New Drainage Inlets					4	Drainage Inlet and Connectin	EA	$4,000.00	$16,000.00
			Assume 1' Depth					33	New Aggregate Base	CY	$50.00	$1,666.67
			Assume 1' Depth					67	New Asphalt Pave	Ton	$60.00	$4,000.00
								1	Traffic Items 10%	LS	$10,083.33	$10,083.33
								1	Landscaping 10%	LS	$10,083.33	$10,083.33
												$121,000.00
											0.25	**$151,250.00**
											Subtotal	**$704,940**
											Contingency (25%)	0.25
											Total Long Term Recommendations	**$881,175**