8 TYSONS CORNER ANALYSIS

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8.1 INTRODUCTION

Because of the expected 2013 opening of the Silver Line Metrorail service through Tysons Corner to Wiehle Avenue station in Reston, the TDP includes this set of analyses specific to the needs of Tysons Corner. The objective of the analysis presented in this chapter is to develop an implementation-ready plan for neighborhood feeder bus and shuttle/circulator bus service in the Tysons Corner area of the County. The recommended bus routes would begin service upon completion of Phase 1 of the Silver Line. The bus routes include five "Tysons Link" internal shuttles plus numerous neighborhood feeders from the areas surrounding Tysons into Tysons Corner itself. The specific operating characteristics of these routes are all discussed in Chapter 7 along with the rest of the TDP route recommendations, while this chapter focuses on the other analyses related to Tysons, in particular the background information used to develop the five "Tysons Link" routes, the physical facilities that will be needed to support them, how they should be marketed, and how much they will cost.

Specifically, this chapter consists of background research on existing employee shuttles operating in Tysons Corner and a review of future transportation and land use changes that are expected to impact Tysons Corner over the ten year period of the TDP. In addition, there is a brief review of the proposed internal shuttle service proposed for Tysons Corner (discussed in detail in Chapter 7), an analysis of potential garage locations for the shuttles, an analysis of bus stop locations within Tysons Corner, and an analysis of options for branding the Tysons Corner area service. Finally, costs specific to the Tysons Corner service are detailed.

8.2 EXISTING SHUTTLE SERVICE REVIEW

8.2.1 Objective

As an initial step to developing an implementation-ready plan for bus service in the Tysons Corner area, existing shuttle operations that take employees from the West Falls Church and Dunn Loring-Merrifield Metrorail stations to Tysons Corner were documented. These Metro stations serve as the major feeders of employees who commute by transit to and from Tysons Corner Center and the many office buildings within the area. The shuttles that were reviewed consist of only employee shuttles; apartment, hotel, and auto dealership shuttles were not included.

8.2.2 Methodology

Fairfax County DOT staff provided a list of shuttle services operating in Northern Virginia. Since the list was created in 2008 and did not contain all the relevant information, further actions were taken to obtain current shuttle service information and narrow the list down to employee-based operations. Further details on shuttle characteristics were obtained through direct phone calls to companies or shuttle service contractors and by directly talking with shuttle drivers at the West Falls Church and Dunn Loring-Merrifield Metro Stations. Data was also collected through a visit the West Falls Church Metro during one morning peak period and the Dunn Loring-Merrifield Metro during another evening peak. These field visits focused on peak-period operations given that some employee-based shuttle services only operate during the peak periods as opposed to providing all-day service.

8.2.3 Findings

Table 8.1 lists ten employee-based shuttles that serve the Metro stations of interest. The list is organized by transportation providers, instead of companies that offer this service, since certain shuttles serve more than one corporate tenant occupying the same office building or office park. In other cases, shuttles reach multiple campuses of the same company.

The study found seven out of the ten shuttles listed in Table 8.1 operate as contracted services that transport employees between places of work and the Metro stations nearest to Tysons Corner. Among the remaining three shuttles, two services are corporate-leased or owned and operated, and for the last shuttle these operational details remain unknown. While most companies who contracted out their shuttle service disclosed the requested information, Capital One Financial Corporation expressed that the company did not wish to reveal their service provider.

More shuttle service was observed accessing the Dunn Loring-Merrifield Metro Station than West Falls Church. Six of the ten shuttles listed in Table 8.1 operate an all-day schedule, with service from the morning peak hours through evening peak hours. Three shuttles run on a 15-minute peak period headway; three on a 20-minute peak period headway; one on a 30-minute headway during peak hours only; two on 40 or 45-minute headways, and one shuttle runs once an hour all day.

The majority of the shuttle drivers spoken with expressed that they do not always follow a specific route when going to and from their origin and destination. Instead, they change their routes depending on traffic conditions at the time. For example, if Gallows Road is congested, drivers will most likely take alternate routes, mostly cutting through smaller streets adjacent to Gallows in order to reach their destinations. Drivers transporting employees between West Falls Church and offices take either Route 7 (Leesburg Pike) or Great Falls Street, depending on traffic. Since the only stops on the shuttle routes are at the Metro station and the destination, these dynamic routing decisions do not impose any negative impact on passengers. The main route structure of the shuttles have been mapped in Figures 8.1 and 8.2, showing shuttle access to the West Falls Church and Dunn Loring-Merrifield Metrorail stations. Figure 8.1 shows shuttles serving Tysons Corner, while Figure 8.2 shows the destinations of other shuttles operating out of the Dunn Loring-Merrifield station.

Table 8.1 includes two shuttles that serve the Metro stations (IDs 5 and 9) but do not go to Tysons Corner. These shuttles were included because they nonetheless travel on Gallows Road, a critical corridor within the study area. Finally, most shuttle providers do not track ridership. Capital One's shuttle driver was the only one who could provide a daily ridership estimate of 35-40 persons, as listed in Table 8.1.

Table 8.1 Corporate Shuttles Serving Tysons Corner

ID	Shuttle Co	Contact #	Companies served	Location	Origin	Destination	Service Hours (M-F)	Headway Peak / Off-Peak		Route Structure	Ridership
1	Mitre West Falls Church Shuttle	703 983-6000	Mitre Corporation	7515 Colshire Drive, Mclean VA	Mitre Corp.	West Falls Church	6:40 am to 5:40 pm	40 min	40 min	WFC -> Haycock -> Great Falls -> Anderson	n/a
2	Abe's Transportation	202-518-0333	Booz Allen Hamilton	8283 Greensboro Road, McLean 22102	Greensboro Drive	West Falls Church	6:35 am to 7:00 pm	20 min	20 min	Rt 7 -> International Dr -> exit 495	n/a
3	N/A	703-720-1202 Michael Kelly	Capital One Financial Corp	1680 Capital One Drive, McLean 22102	Capital One	West Falls Church and Dunn Loring	7:00 am to 9:00 am; 5:00 pm to 7:00 pm	30 min	no service	Rt 7 or Great Falls; Gallows	35-40 per day
4	Abe's Transportation	703-676-5550	SAIC locations - Tower I,II, II; Enterprise Center; Vienna Campus	1710 SAIC Drive; 8301 Greensboro Dr; 7990 Science Application Court	SAIC	Dunn Loring	7:00 am to 6:00 pm	1 hr	1 hr	Gallows -> International Dr -> Greensboro	n/a
5	Hunter Branch Office Park Shuttle		Zimmerman and Assoc.; Odin, Feldman, Pittleman; ICF Consulting; Foulfer Pratt; A.J. Dwoskin	9302 Lee Highway, Fairfax VA	9302 Lee Highway	Dunn Loring	7:00 am to 7:55 pm	10 -15 min	10-15 min	Gallows Rd	n/a
6	Inova Hospital Shuttle	571-274-2856	Inova Fairfax Hospital (employee-only)	3300 Gallows Road, Falls Church VA	Hospital	Dunn Loring	6:00 am to 8:00 pm	20 min	20 min	Gallows Rd	n/a
7	Company-leased and operated	571-226-2152, ext 2043 Dan	Raytheon	7700 Arlington Blvd, Falls Church VA	Raytheon	Dunn Loring	7:15 -8:00 am 5:00 -5:45 pm	45 min	no service	Gallows Rd -> Rt 50	n/a
8	Blue Ridge Limousine		FinCEN, Management Analysis Inc (tenants of Tycon Courthouse)	2070 Chain Bridge Road, Vienna 22182	2070 Chain Bridge Rd	Dunn Loring	6:30 am to 6:30 pm	15 min	30 min	Gallows Rd	n/a

ID	Shuttle Co	Contact #	Companies served	Location	Origin	Destination	Service Hours (M-F)	Headway Peak / Off-Peak		Route Structure	Ridership
9	Nova Transportation Co	703 573 3800 Tom	UNCF; Univ. of Phoenix; Perot; General Dynamics; Direct Holdings Time Life; BRTRC; Brandywine Realty; ASTRO	8280 Willow Oaks Corporate Drive; Falls Church VA	Willow Oaks Corporate Drive	Dunn Loring	6:45 am to 9:30 am 3:10 pm to 6:30 pm	20 min	no service	Gallows Rd	n/a
10	CSC Express		Computer Science Corporation	3170 Fairview Park		Dunn Loring	4:45 pm - 6:00 pm 7:45 am - 9:45 am	15 min	no service	Gallows -> Rt 29 -> Fairview	n/a

Figure 8.1 Current Employee Shuttle Routes to Tysons Corner from West Falls Church and Dunn Loring Metrorail Stations

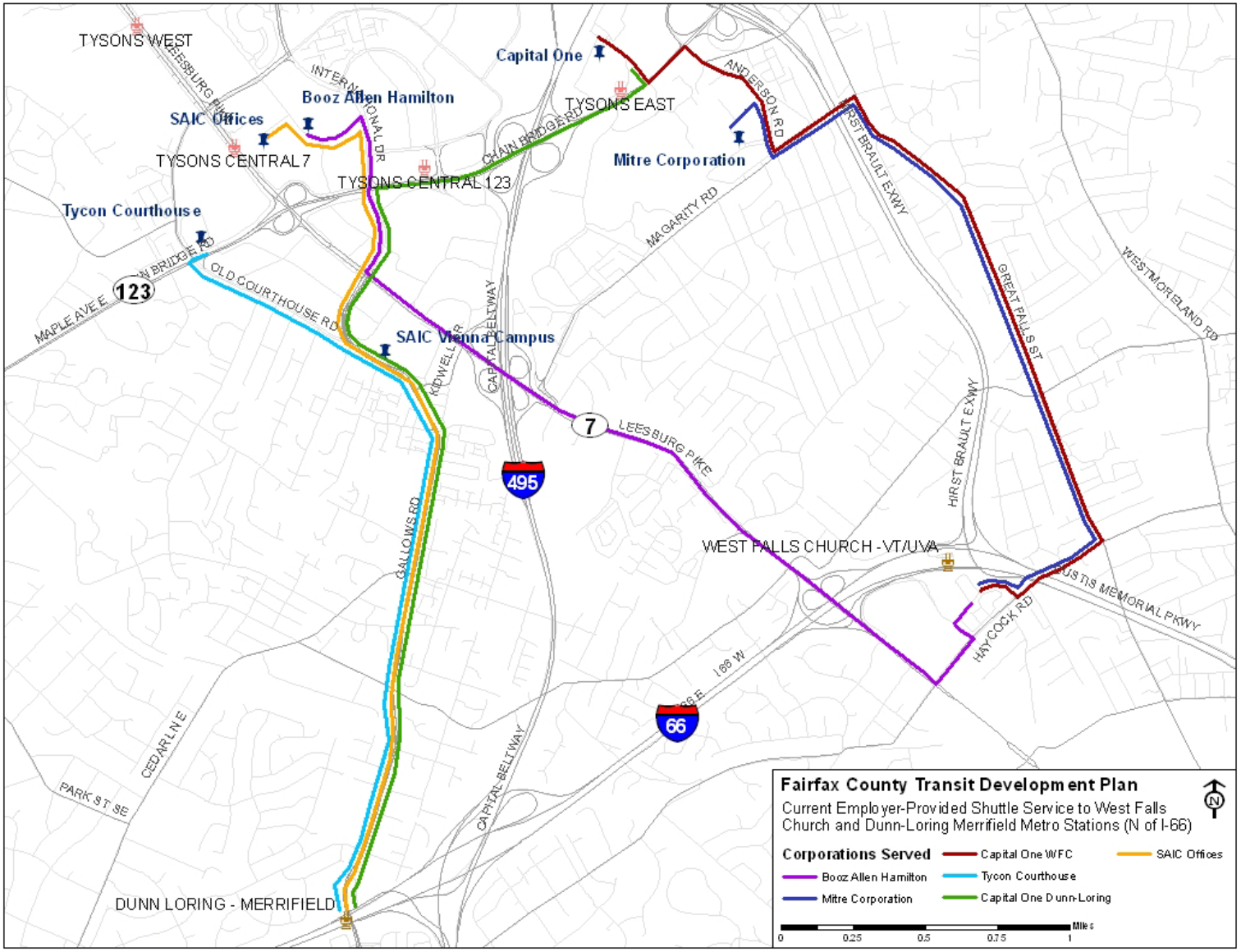
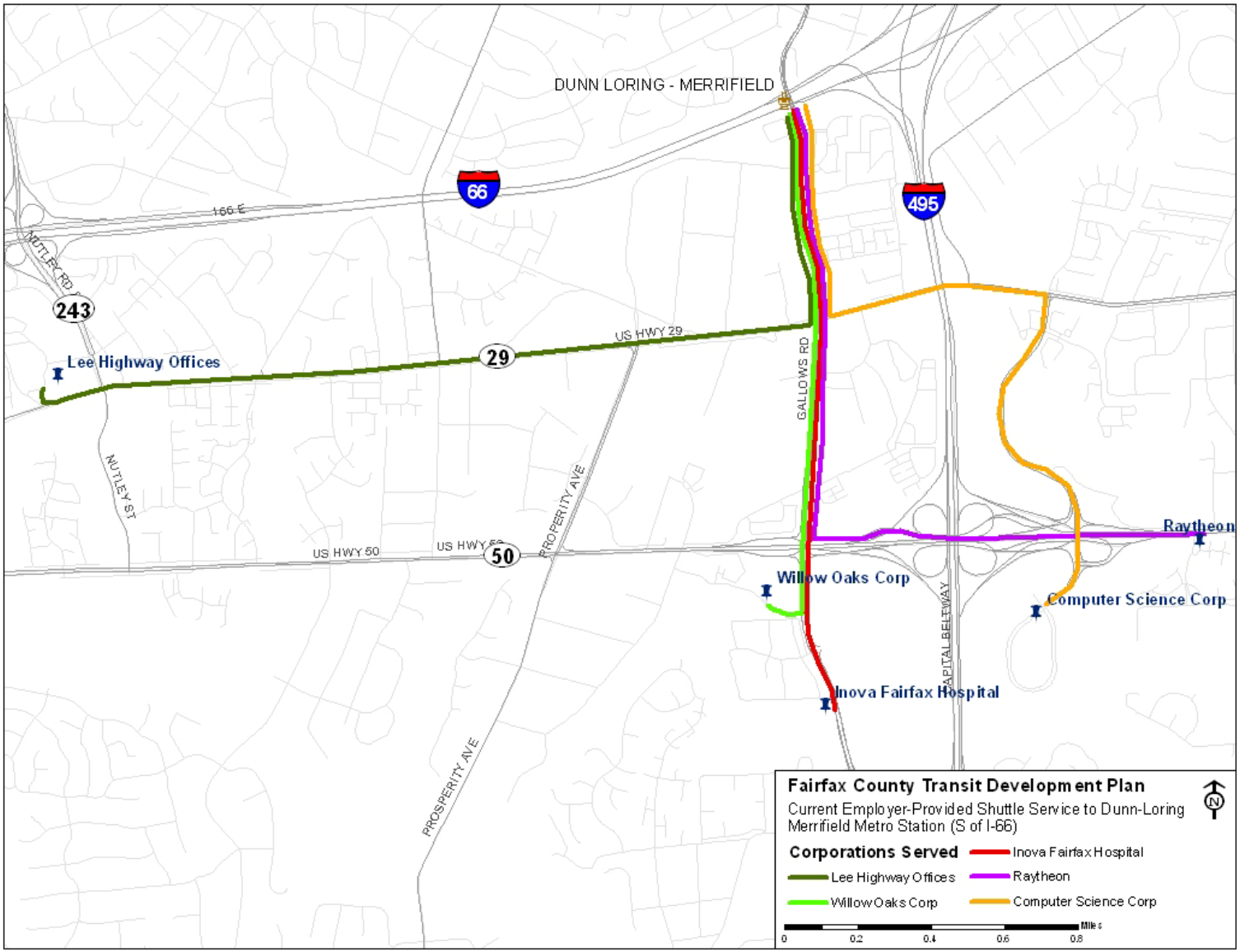


Figure 8.2 Current Employee Shuttle Routes from Dunn Loring Metrorail South



8.2.4 Conclusions of Shuttle Analysis

More and lengthier field visits are required in order to capture the entirety of shuttles operating between the West Falls Church and Dunn Loring-Merrifield Metros and Tysons. For example, the field visits for this analysis focused on employee shuttles only, while many other types of shuttles also operate between these two stations and Tysons Corner. Additionally, while every effort was made to obtain requested details on shuttle operations, not all drivers that passed through the Metro stations could be interviewed, due to the driver's schedule constraints.

That said, this review of employer shuttles operating within the Tysons Corner area and surrounding communities does provide an overview of what service is out there today. As can be seen in Figure 8.1, employers operate in many cases overlapping, duplicative services that could be equally served with a single operator. Further, while the study did not attempt to quantify the magnitude of additional services, field observations indicated that many other types of shuttles operate in this area. These include various condominiums providing shuttles to employment sites and Metro; car dealerships serving Metro; and hotel shuttles serving both Metro and other destinations. All of this suggests that the provision of reliable transit services, on routes connecting the many key origins and destinations within and surrounding Tysons, could greatly reduce congestion on local roadways by consolidating duplicative services.

These findings provided a baseline understanding of existing employer shuttle services operating in and around Tysons Corner. This information was utilized in the development of detailed route recommendations (section 8.4), with efforts made to both capitalize on the identification of fast travel routes, and to connect key employers and transit stations with sufficient service to reduce the need for redundant operations by private companies.

8.3 OUTREACH

Before conducting the analysis to develop more detailed Tysons Corner bus service to tie in with the opening of Phase 1 of the Silver Line, meetings were held with the appropriate members of the Fairfax County Board of Supervisors and with appropriate business and community groups to obtain their input on what they would like to see from the new service. The individuals and groups met with are outlined in Table 8.2. Outreach to obtain comments on the proposed services was combined with outreach efforts for the full TDP, discussed in detail in Chapter 2.

Table 8.2 Outreach Meetings for Input for Tysons Area Routes

Meeting	Date
Supervisor Linda Smyth, Providence District	April 20, 2009
Supervisor John Foust, Dranesville District	April 21, 2009
Supervisor Catherine Hudgins, Hunter Mill District	April 29, 2009
McLean Citizens Association	June 9, 2009
Tytran	June 10, 2009
Rotonda Condominium Association	June 23, 2009
Vienna Transportation Safety Commission	June 30, 2009
Lewinsville Coalition	July 14, 2009

8.4 TRANSPORTATION AND LAND USE ANALYSIS

This section of the Tysons analysis provides a brief overview of the coming land use and transportation infrastructure changes expected at Tysons Corner within the coming decades. With the introduction of the Silver Line Metrorail stations, and its ultimate extension to Dulles Airport, Fairfax County took this opportunity to conceptually explore a new urban framework for Tysons. These efforts were carried out and summarized through the Tysons Land Use Task Force, which worked with a variety of stakeholders to establish an overarching vision. This vision then spurred further quantitative analysis for expected population and employment changes based on the envisioned higher residential and employment densities called for by the Land Use Task Force. These demographic analyses were carried out in ten year increments, beginning with 2010 and stretching to 2050. While these out-year estimates represent more possibility and potential than factual changes, they underscore the potential changes that Tysons may see in its future.

While these data support the broad vision espoused by the Tysons Land Use Task Force, the current TDP focuses on a much nearer timeframe. Planning frameworks and expected changes establish some context for how current transit planning efforts exist within a longer-term context, but the more immediate service planning needs must rely on existing roadway infrastructure and short-term growth expectations. These details are also presented, such that the future concepts for Tysons serve to provide context for upcoming service planning that not only seeks to better serve expanding transportation networks, but also helps further the paradigm shift needed to move Tysons its current auto-orientation to a vibrant pedestrian environment.

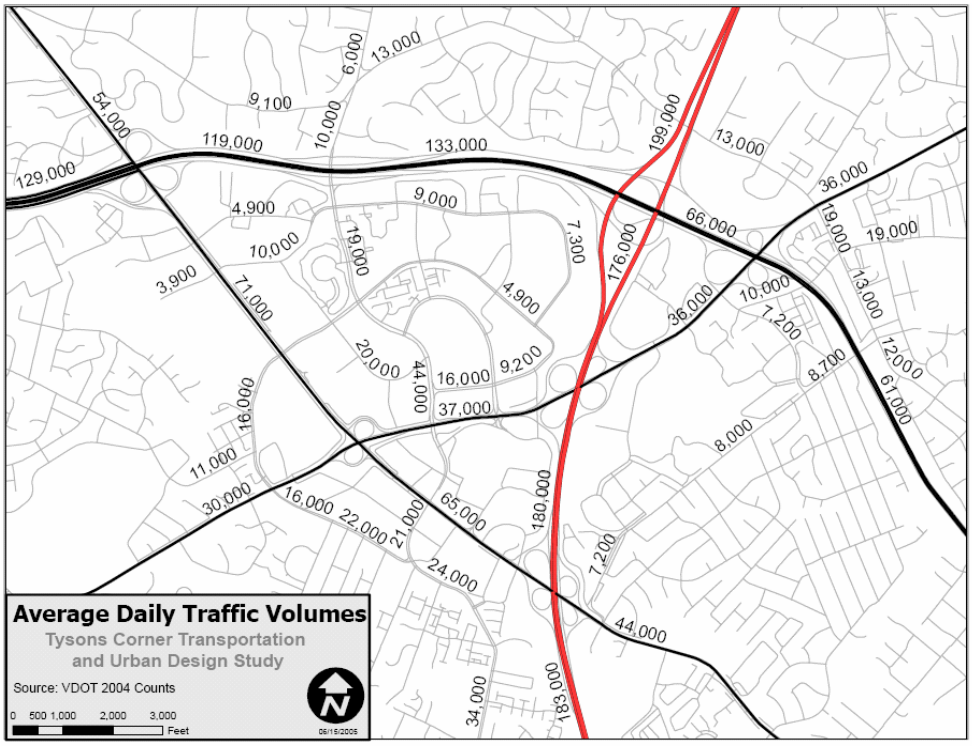
8.4.1 Transportation Infrastructure

Tysons Corner area is served by an extensive roadway network. Major highway facilities, such as the Dulles Toll Road, the Capital Beltway (Interstate 495), Leesburg Pike (VA Route 7), and Chain Bridge Road/Dolley Madison Boulevard (VA Route 123) provide regional access to the Tysons Corner area. In addition, public transportation also serves the area. Ten Metrobus routes, five Fairfax County Connector routes, and the Tysons Shuttle currently service this area. However, Tysons Corner lacks non-motorized transportation facilities. Therefore, plans to improve or build new pedestrian and bicycle facilities are underway.

Existing Roadway Conditions

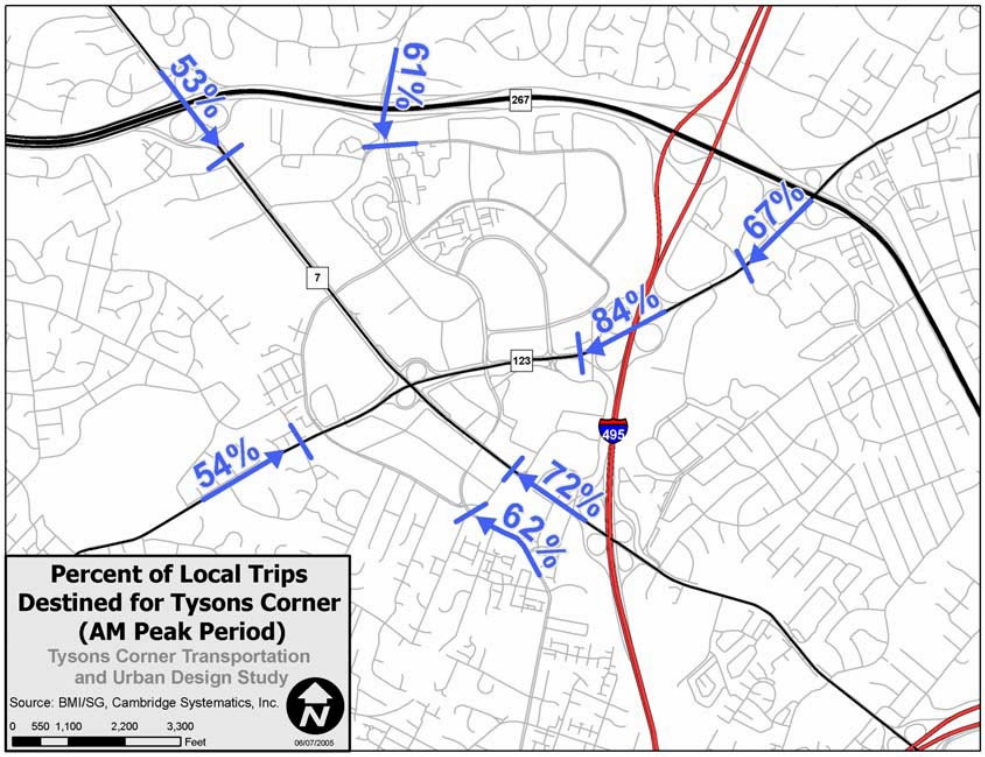
As a major activity center in Northern Virginia, Tysons Corner experiences high automobile traffic volumes. The highest traffic volumes occur on I-495, Route 267 (Dulles Toll Road), Route 7 (Leesburg Pike), and Route 123 (Chain Bridge Road). Compared to other local roads in the area, the Dulles Toll Road and I-495 have experienced faster growth in traffic volumes. As shown in Figures 8.3 and 8.4, the majority of morning peak-period traffic on the principal arterials is headed toward destinations in Tysons Corner.

Figure 8.3 Average Daily Traffic Volumes



Source: Tysons Corner Transportation and Urban Design Study, Cambridge Systematics, Inc

Figure 8.4 Percentage of Traffic Destined to Tysons Corner



Source: Tysons Corner Transportation and Urban Design Study, Cambridge Systematics, Inc

8.4.2 Planned Transportation Improvements

Numerous roadway improvements in the area have been proposed in various plans. The Fairfax County Comprehensive Plan proposes 21 roadway improvements. The Metropolitan Washington Council of Governments (MWCOG) lists several roadway projects in its Constrained Long Range Plan (CLRP). Other proposed major roadway improvements in the area are as follows:

- Widening of I-495 to provide a fifth lane in each direction from Dulles Toll Road to American Legion Bridge and from I-66 to Dulles Toll Road.
- Widening of the Dulles Airport Access Road from four to six lanes from Dulles Airport to VA Route 123.
- Widening of VA Route 7 to eight lanes between Dulles Toll Road and I-495 and from Reston Parkway to Tyco Road.
- Widening of VA Route 123 to eight lanes from Route 7 to I-495 and widening to six lanes from Route 7 to Old Court House Road.
- Widening of Gallows Road, Magarity Road, and Spring Hill Road

Once funding is allocated for the proposed projects listed above, they are included in the regional Transportation Improvements Plan (TIP). Therefore, TIP projects have the funding identified to make them a reality. Below are some example TIP projects in the Tysons Corner area:

- Dulles Corridor Rail Project
- Widening of Spring Hill Road to a four-lane divided section from Route 7 to International Drive
- Intersection Improvements at:
  - International Drive/Spring Hill Road/Jones Branch Drive
  - Gallows Road at Idylwood Road
  - Old Court House Road at Gallows Road
  - VA Route 7 at Marshall's Entrance, Spring Hill Road, and Tyco Road

<u>I-495 HOT Lanes</u>

High occupancy toll (HOT) lanes are being built on I-495 between the Springfield Interchange and Lewinsville Road. Providing two additional variable priced lanes in each direction, the HOT Lanes also include direct access ramps into Tysons Corner. The HOT Lanes offer a time-saving opportunity for transit riders into Tysons Corner, particularly for those commuting from south. The likelihood of increased transit ridership suggests the need for greater transit service within and surrounding Tysons Corner.

<u>Dulles Corridor Metrorail Project: The Silver Line Extension</u>

The project consists of two construction phases: 1) the extension from East Falls Church, including four stations in Tysons Corner and one on Wiehle Avenue in Reston; and 2) from Wiehle Avenue Station to Ashburn, including six stations along the Dulles Corridor including one at Dulles International Airport. Scheduled to open in 2013, the first construction phase of Silver Line intends to extend the existing Metrorail system from East Falls Church Station on the Orange Line in Fairfax County through Tysons Corner (see Figure 8.5 and Table 8.3). The second phase will connect to Washington Dulles International Airport and terminate at Route 772/Ryan Road in Loudoun County. The Silver Line will connect downtown Washington, D.C., the region's primary employment core, to another of the metropolitan area's major employment center at Tysons Corner.

Figure 8.5 Silver Line Metro Stations in Tysons Corner

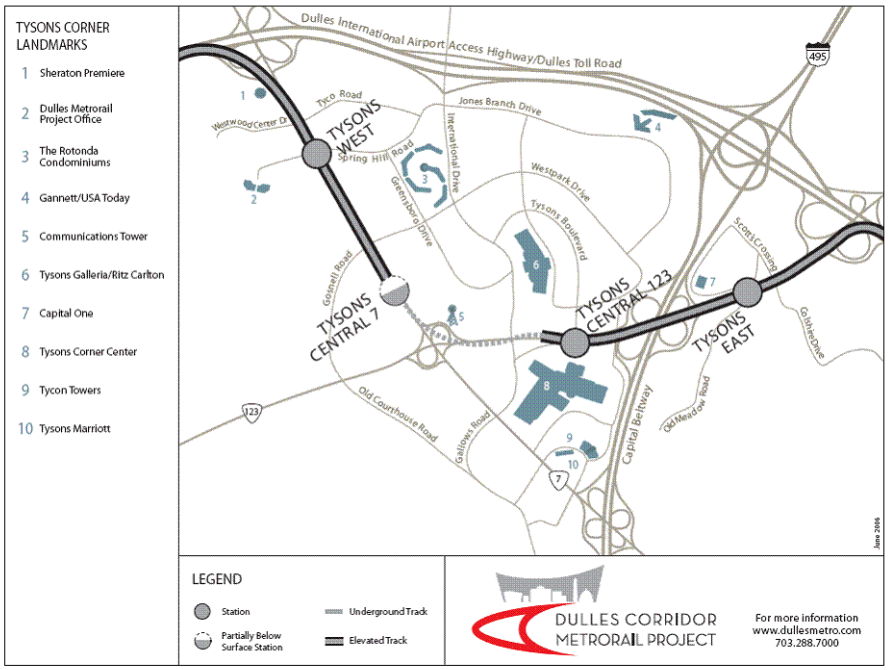


Table 8.3 Silver Line Stations in Tysons Corner

Stations	Tysons East	Tysons Central 123	Tysons Central 7	Tysons West
Location	-Route 123 at Scotts Crossing Road/Colshire Drive	-123 at Tysons Boulevard	-Route 7 just northwest of Route 123	-Route 7 at Spring Hill Road
Station Entrances	-Two on each side of Route 123	-Two on each side of Route 123	-Two on each side of Route 7	-Two on each side of Route 7
Accessibility	-Pedestrian bridge crossing Route 123 -Bus drop-off /pickup -Kiss and Ride	- Pedestrian bridge crossing Route 123 -Bus drop-off /pickup	- Station is partially below ground - Bridge spanning the roadway - No pedestrian bridge crossing or bus pickup/drop-off area	-Pedestrian bridge crossing Route 7 -Bus drop-off /pickup -Kiss and Ride

8.4.3 Review of Existing Transportation Studies

<u>Tysons Land Use Task Force Circulator Study</u>

The Tysons Land Use Task Force has proposed routes for Tysons Corner Urban Center Circulator System. The study assumes that there will be other transit services in the area connecting people to the new Metro stations and also to areas outside Tysons. The Task Force provided criteria and guidance for route development and drafted circulator route maps in the final report. The long-term goal is to run a circulator on a dedicated right of way. The routing for this long-term vision for a fixed-guideway circulator in Tysons Corner was reviewed for its merits as a foundation to the development of the internal circulation routes in Tysons Corner recommended as part of the TDP.

Dulles Metrorail Project TMP, FEIS, and Urban Design Study

The Dulles Metrorail Project Transportation Management Plan (TMP) includes a set of strategies that will be implemented during the construction period. The TMP will provide cost-effective alternative mobility options to commuters, shoppers, and residents in the corridor so they can move safely and efficiently within the construction zones.

The project's Final Environmental Impact Statement (FEIS) states that the existing feeder and the corridor bus network would be modified as necessary in order to accommodate the initial rail extension. Therefore, it is expected that several routes would be modified or eliminated and their frequencies adjusted to provide better service to the proposed Metrorail stations. Service routes and characteristics will be designed to better coincide with Metrorail headways and to reduce duplication of services. [1]

Lastly, this effort also reviewed the Tysons Corner Transportation and Urban Design Study. This report offered an extensive existing conditions report that fully explores the existing transportation network within Tysons Corner. Key details, particularly with respect to current operating conditions on key roadways, are included here.

8.4.4 Population and Employment in Tysons Corner

To better understand the need for the substantial transportation infrastructure coming to Tysons Corner, it is helpful to recognize its role as a major employment center for not just Fairfax County but for the entire metropolitan region. With the construction of the Silver Line Metrorail through Tysons, further employment growth is expected. Figure 8.6 shows the anticipated growth in employment from 2005 to 2020. Population growth in the next ten years is forecasted to concentrate around the new Metro stations, as shown in Figure 8.7.

[11] Tysons Corner Transportation and Urban Design Study, Cambridge Systematics.

Figure 8.6 Tysons Corner Employment Growth, 2005 – 2020

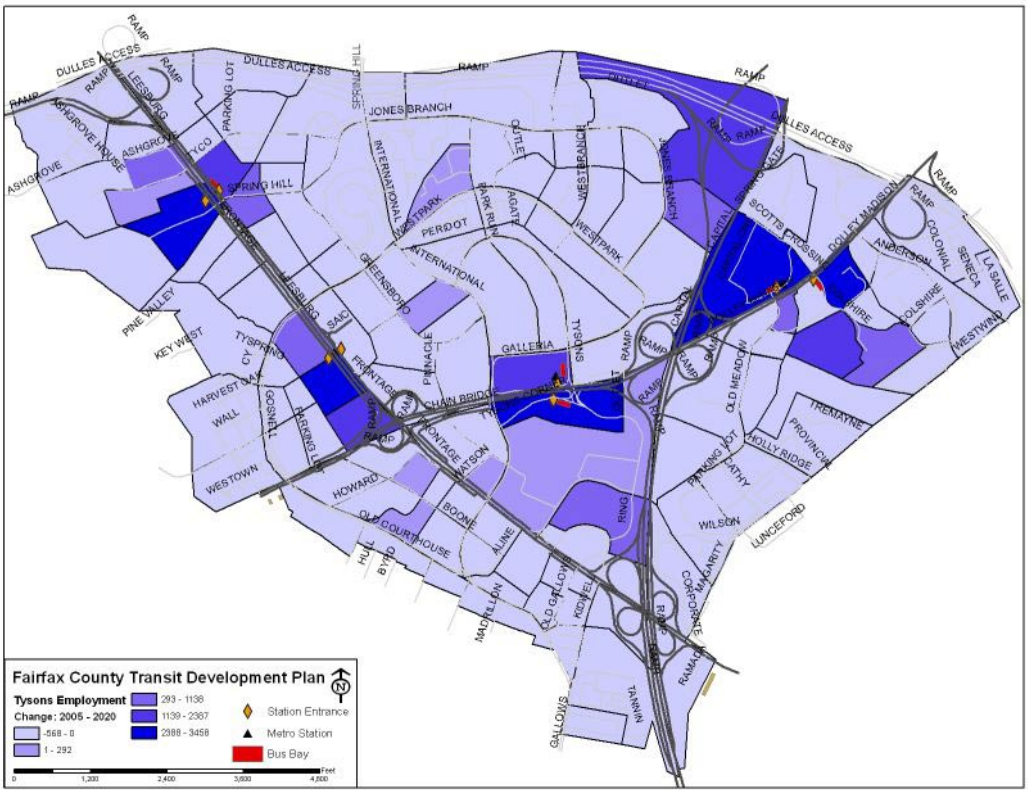
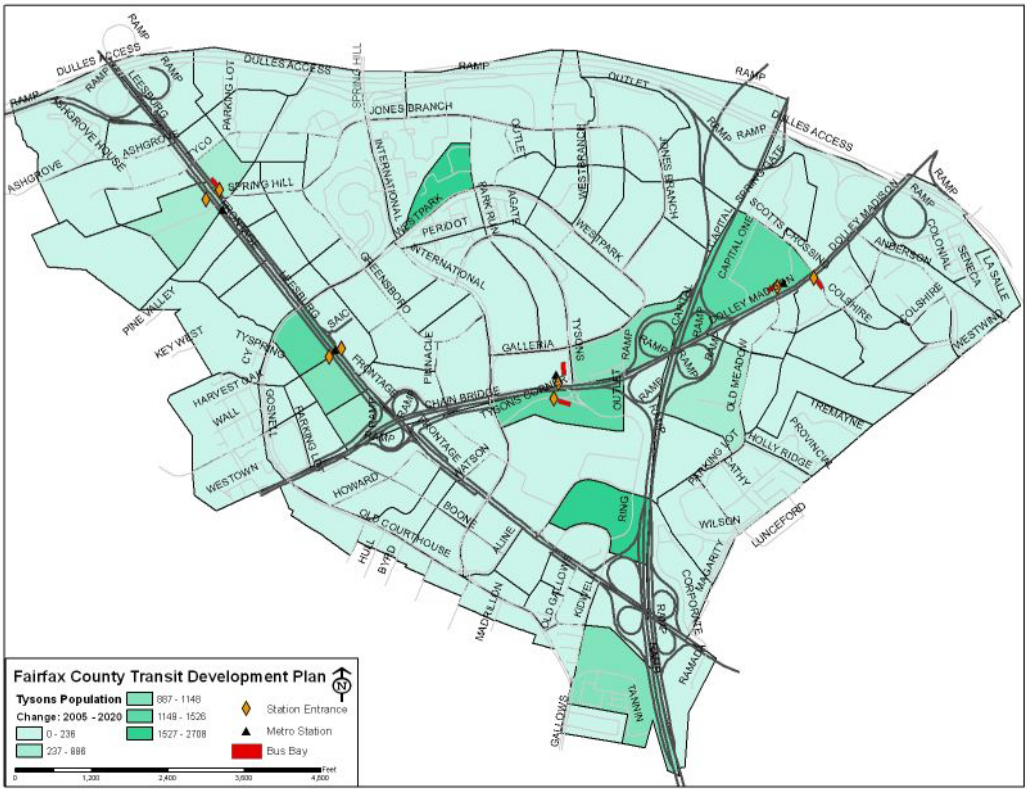


Figure 8.7 Tysons Corner Population Growth, 2005-2020

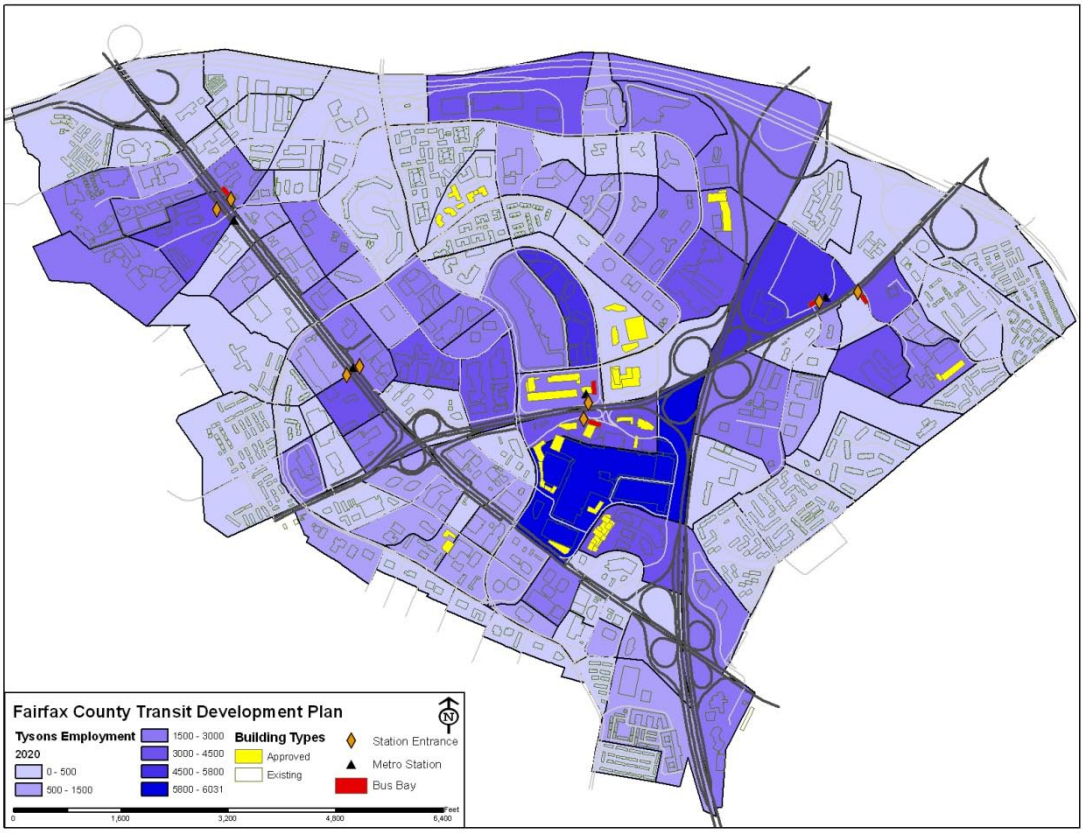


With the impending construction of the four metro stations in Tysons Corner, Fairfax County has the opportunity to transform Tysons to a vibrant urban environment. Therefore, the Board of Supervisors has authorized a special study to evaluate the area's transportation and land use needs and created the Tysons Land Use Task Force.

The Task Force consisted of 36 members and envisions Tysons Corner as a national model that will transform the existing auto-oriented developments and street network into a transit- and pedestrian-oriented destination. To accomplish this, the Task Force recommends encouraging mixed-use, high-density developments to support 24-hour activities that encompass work, entertainment, retail, and living spaces in sufficient proximity. Therefore, the new development pattern and transportation network would complement transit services and preclude the necessity for owning a car. Figure 8.8 illustrates existing and (future) approved buildings overlaying 2020 employment projections in Tysons Corner.

As can be seen, a cluster of developments will soon occur adjacent to the Tysons Central 123 Station. But much of the pending employment growth focuses on existing developments. This ultimately suggests that transit planning within the coming decade must support growth at the new Metro stations, but that it must enhance service to existing developments that will see even greater employment densities going forward.

Figure 8.8 Tysons Corner Existing and Future Building Footprint



8.4.5 Future Land Use

The Tysons Land Use Task Force has gathered community inputs and recommended changes to the Tysons Comprehensive Plan, looking at a planning horizon of forty years. In the fall of 2008, the Board of Supervisors accepted reports submitted by the Task Force and referred them to the Planning Commission and staff (Tysons Corner Committee) for detailed Comprehensive Plan development. It is important to note that because the Task Force plans are based on a forty year planning horizon, while the TDP is focusing on short-term improvements (ten years), the recommendations of the task force must be taken with much caution in terms of their applicability to the needs for transit service during the timeframe of the TDP.

The Task Force recommendations for changes to the Comprehensive Plan focus on growth within walking distance of transit, measured in a half mile radius from a rail station or 600 feet of other transit. According to the Task Force, ninety-five percent of development will occur within a half-mile distance of the Metro stations and the edge of Tysons will capture only about five percent of development. Figure 8.9 shows the planning areas within Tysons Corner that were identified by the Task Force, and some details on the existing and proposed land use in those areas follows in Table 8.4.

Figure 8.9 Tysons Corner District Map

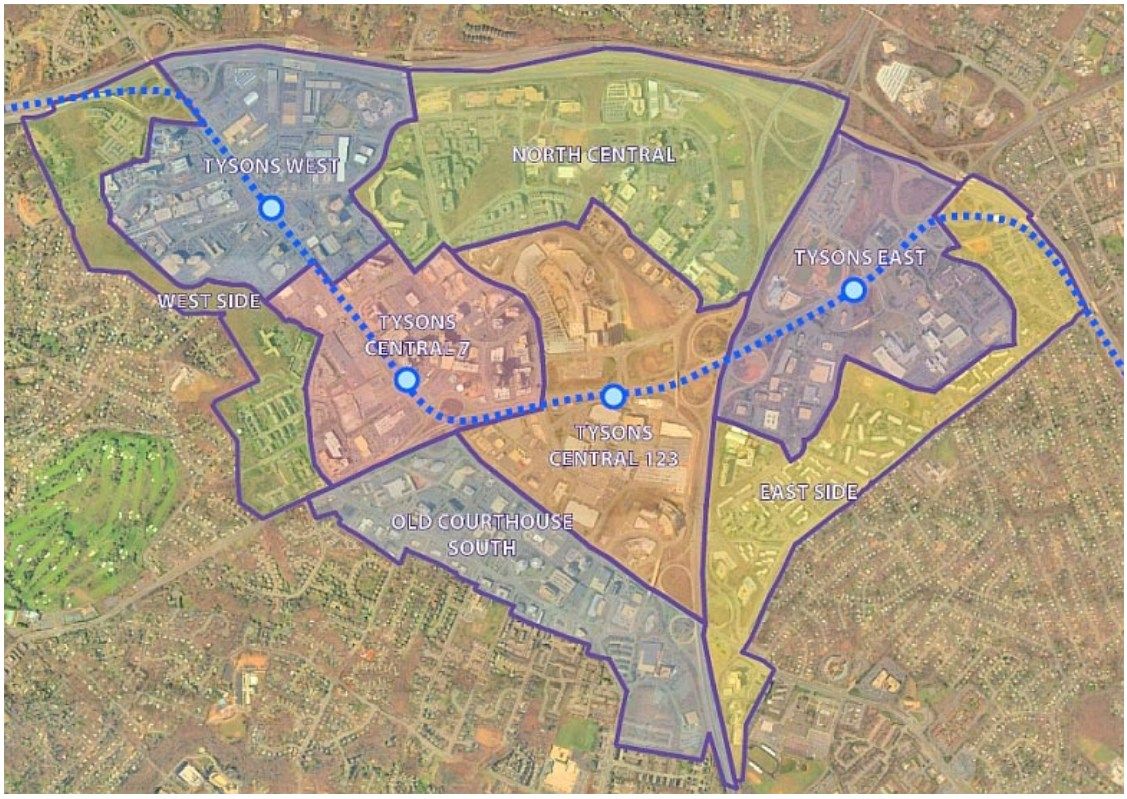


Table 8.4 Summary of Existing and Future (2050) Land Use by District

	Existing Land Use	Future Land Use	Proposed Height
Tysons West	-Low density use like auto dealership - Light industrial use	-High rise offices and hotels close to the Metro - Arts and Entertainment district (nightlife-rich)	-360 ft adjacent to the Metro -125 ft beyond ½ mile of the Metro
Tysons Central 7	- Multi-family and office uses along Gosnell Road -Auto dealerships and large retailers occupy frontage along Route 7	-High rise offices -Public space	-75 to 360 feet depending on the location
Tysons Central 123	-Retail (Tysons Corner Center and Galleria) -Hotels and high rise offices	-Mixed use high rise hotels - Conference facilities with street parking and large garages	-Up to 150 feet within ½ mile from the metro; (above 150 feet is conditional to compatibility with the existing Rotunda development)
Tysons East	-Residential -Office mixed use and light industrial	- Urban park (Scotts Run) surrounded by mixed use development that includes the full range of office, hotel, retail and residential uses. -Public and institutional facilities	-105 to 360 feet depending on the location
North Central	-Office Use -Tysons West*Park Transit Station	-Mix of office and residential -Circulator route is planned for this area -Urban parks and public space	-Up to 150 feet depending on the location
East side	- Primarily Residential -Office	- Limited retail or office use	-Up to 150 feet depending on the location
Old Courthouse	-Residential -Auto dealership, services and large retail	-Residential mixed use -Small scale office building and residential -Transition between Tysons Central and neighboring communities	-Up to 35 feet depending on the location
Westside	-Two Residential neighborhoods -Public park	- Residential - Public park (most of existing land use is already consistent with the future vision)	- Up to 50 feet depending on the location

8.5 SHUTTLE/CIRCULATOR SERVICE RECOMMENDATIONS

The 2013 opening of Silver Line service to Tysons Corner will have a major impact on transit accessibility to this large regional activity center. To complement the rail service, an initial service concept for internal circulation routes in Tysons Corner has been developed, and was presented in detail in Chapter 7. To recap, the "Tysons Link"[2] service consists of five routes, described below. Previous circulation plans for Tysons had used one or two routes with a loop structure to cover the many trip generators in the area. It should be noted that, despite the fact that Tysons is envisioned to have a modified street network over the next five to forty years, the routes proposed as part of the TDP utilize only the existing street grid. When and if new connections become reality, the shuttle route network will be reviewed and may need to be modified to both serve and take advantage of those new connections.

Each route, shown in the map in Figure 7.21 (Chapter 7), was designed to connect areas of employment and residences with two Silver Line stations and shopping and eating establishments. All routes serve the Tysons Central 123 station, four of them also serve Tysons West, and one also serves Tysons East. At the present time, it is assumed that this service would be operated by Metrobus.

- The Beltway Link serves the area inside the Capital Beltway, including the Capital One complex, Old Meadow Road, Colshire, and Tysons East station. It links these areas to Tysons Central 123 via Dolley Madison Drive, and during lunchtime will circulate through the Galleria at Tysons II.
- The East Link serves Jones Branch and the eastern edge of Westpark Drive, connecting employment and the Hilton hotel with the Galleria at Tysons II. It runs between Tysons West and Tysons Central 123, and also would make the lunchtime loop through the Galleria.
- The Central Link serves residential areas such as the Rotonda and housing along Westpark Drive and then operates through the heart of the Galleria (using the mall road as the Lunch Shuttle, started November 2009, does) and then a loop through Tysons Corner Center.
- The Greensboro Link operates between Tysons West and Tysons Central 123, and connects the employment along Greensboro Drive to Tysons Corner Center and Westwood Center Drive.
- Finally, the West Link operates along VA 7, Gosnell, Old Courthouse, Boone, and Gallows to provide access to buildings along VA 7 and areas to the west. It connects Tysons West and Tysons Central 123, and also serves Westwood Center Drive.

[2] This is a working name for the purpose of discussing the service concept; a discussion of possible branding of the service is in Section 8.5, and selection of a final name will occur later.

In addition to the five "Tysons Link" routes serving internal circulation needs within Tysons Corner, the TDP recommends other bus services to provide transit service into Tysons Corner:

- Neighborhood Feeders
    - McLean Connector
    - McLean North Connector
    - Wolf Trap Shuttle
    - Fairfax Connector 462 (from Dunn Loring Metro)
    - Fairfax Connector 463 (from Vienna Metro)
    - Metrobus 2T (from Dunn Loring Metro via Vienna)
    - Metrobus 3T (from West Falls Church Metro)
    - Metrobus 24T (from East Falls Church Metro)
    - Metrobus 28T(from West Falls Church Metro)
- Regional Service
    - Fairfax Connector 401 (from Franconia-Springfield Metro via Backlick and Gallows Roads)
    - Fairfax Connector 574 (from Herndon via Route 7)
    - Metrobus 2C (from East Falls Church Metro via Dunn Loring Metro)
    - Metrobus 15M (from George Mason University via Chain Bridge Road and Maple Avenue)
    - Metrobus 23A (from Ballston)
    - Metrobus 28AB (from King Street via Route 7)

8.6 GARAGE LOCATION ANALYSIS

8.6.1 Scope and Methodology

An analysis of possible garage locations was conducted to identify sites that would support efficient transit operations within Tysons Corner, in particular to house the Tysons Link routes proposed as part of the Transit Development Plan. Tysons Corner was chosen to house a garage in support of the Link routes in an effort to decentralize bus operations to reduce deadheading and lower operating costs. A potential bus garage would have space for a building of about 25,000 to 30,000 square feet to garage the 20 to 25 vehicles, perform light maintenance and have a driver check in room. The site would have parking for the drivers and maintenance personnel and enough room to maneuver. This proposal is not viewed as a heavy maintenance facility; such activities will continue to occur at the Connector's existing garages, such as its West Ox Road maintenance facility. Tysons West*Park Transit station, which will cease to operate once the Silver Line opens, is a prime choice for a bus garage since it is already designed for transit operations; this analysis seeks to confirm its suitability and compare it to other potential sites.

While the proposed garage will be utilized in the short to mid-term for buses, it is possible that in the long-term this location could be used as a facility for the fixed guideway Circulator proposed as part of the Tysons Land Use Task Force. However, two factors may make this infeasible. First, the potential garage sites may not be sufficiently large to support the vehicles selected to operate the proposed Circulator. Secondly, the proposed sites may not be sufficiently close to the final alignment of the proposed Circulator to economically support the service.

To find suitable locations, GIS and Fairfax County property data were used to identify potential locations based on the following criteria:

1. Location
    a. Accessibility - Bus garages with direct access to major roads and the proposed Tysons Link routes to minimize deadheading and cut operating costs.
    b. Zoning – Light Industrial and Commercial zoning is preferred for bus garages due to the greater compatibility of these land uses as compared to residential developments; it should also be recognized that mixed use opportunities may exist through collocation of transit facilities with residential or office complexes. For this analysis, areas that are zoned residential are thus included along with areas that are zoned commercial and industrial, although it is recognized that residential locations in particular present challenges due to a lack of support by surrounding residents.
    c. Minimal traffic delay- Bus garages are preferred in areas that are not too close to traffic chokepoints so that buses can access their routes without undue delay. The location of traffic lights, creating suitable breaks in traffic, may also be important depending on roadway volumes.

2. Design
    a. Ease of entry and egress – A bus garage site needs to have enough space to maneuver, and have big enough turning radii for buses to enter and exit the facility easily.
    b. Availability of Space –It is recommended that the parcel for the bus garage be at least 2.5 acres, or 108,900 square feet, to accommodate the building, parking, and internal circulation. A figure of 25 vehicles was used to estimate the size of the parcel, reflecting the current service plan for the Tysons Link, along with spares, while providing some extra capacity in the case of increased frequencies or route variations.

3. Cost – Since the Tysons Corner area has very high real estate values, it is important to know the value of land for any proposed garage site. Lower-cost sites are preferred to minimize financial burden of acquiring the parcel. For the purposes of this analysis, land costs were compared on a per-square-foot basis, calculated by dividing the total value of a given parcel by its size ($/square foot). Costs range up to $89.88 per square feet for the land, based on land values obtained from the County's Department of Tax Administration Real Estate Assessment Information site. The costs are then broken down into four broad categories: no cost, low ($22 - $44 per square foot), medium ($45– $67 per square foot) and high ($68 - $90 per square foot).

4. Future Developments – Garage sites should not preclude any future developments that are intended to turn Tysons into a more pedestrian-friendly activity center. Garage locations should preferably be on the periphery of Tysons, rather than in the central core, to allow pedestrian-oriented developments to locate closer to the existing retail centers and soon-to-operate rail stations.

8.6.2 Site Summary

Based on the analysis of these four criteria, 13 potential sites in Tysons Corner were identified (see Figure 8.10). Visits to each of these 13 locations allowed for further evaluation of their feasibility for a bus garage. General attributes of these sites are provided in Table 8.5.

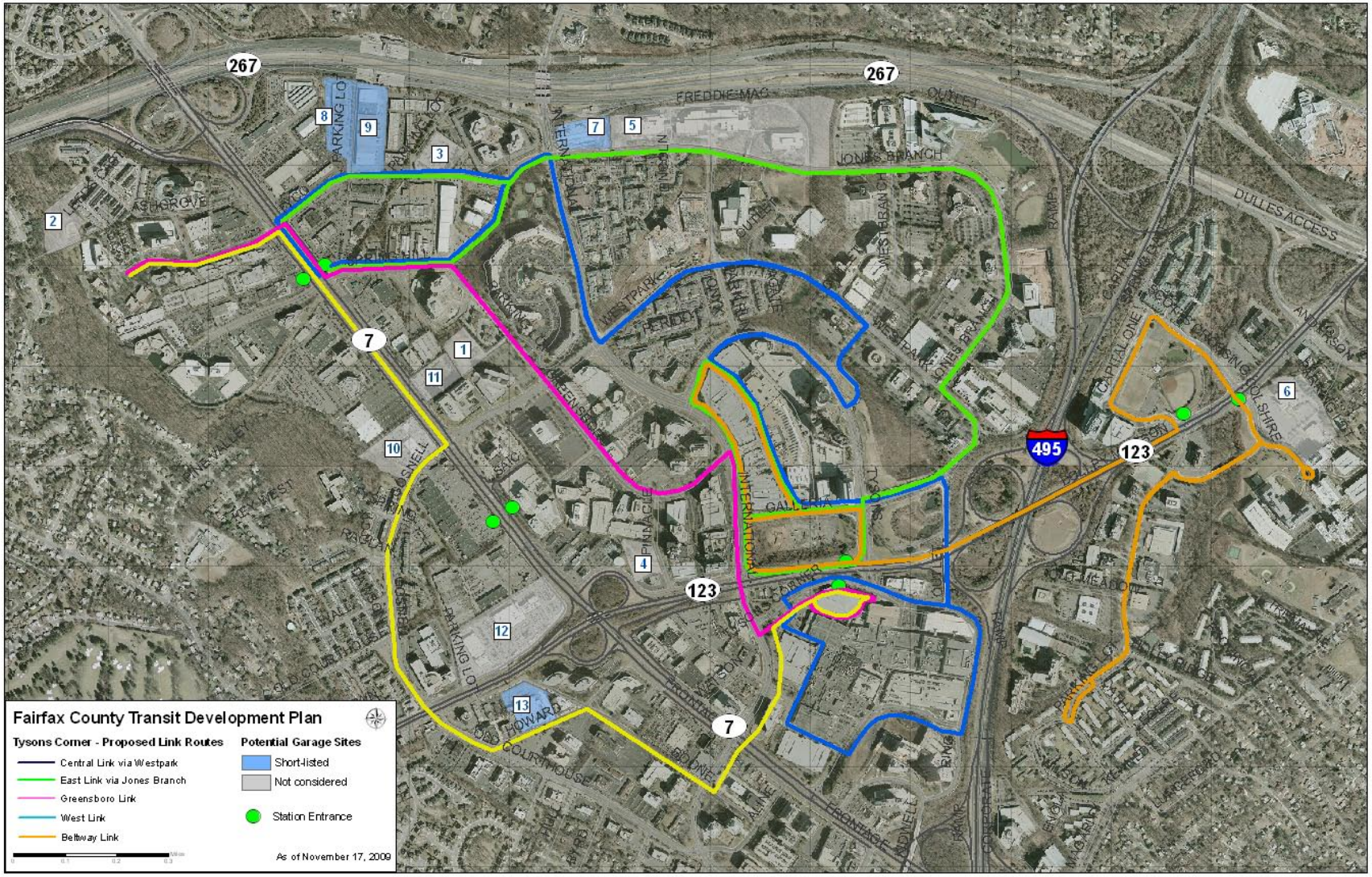
Table 8.5 SUMMARY OF GARAGE SITE CHARACTERISTICS

Site #	County Map No.*	Property Location	Land Use	Zoning	Parcel Size / ft.^{2}	Land Value**	Comments
1	0293010063B	8333 Greensboro Drive	Vacant	C-4 high density office	129,060	$11.6 M	Not accessible; needs access points
2	028213B1	West of the interchange of Dulles Toll Rd and Rte 7)	Recreation Facility	PDH -12 Residential 12units/acre	194,992	$0.1 M	Woods/park; poor accessibility
3	0291010050C	8440 Tyco Rd	Electric transmission ROW, electric plant	Industrial w/res/apt zoning	143,262	N/A	Electric plant would need relocation; parcel is assessed by State Corporate Commission
4	0293010069	1744 Pinnacle Dr	Communications	R-1 Residential 1 unit/acre	117,133	$3.7 M	Communication tower would need relocation; parcel is located on a hill
5	0292150004B2	8100 Jones Branch Drive; Freddie Mac Office	Low Rise Office	C-3 Office	1,173,933	$95.8 M	About 1/5 of the parcel is vacant; property name is 'Freddie Mac additional land'
6	030328004A1	7598 Colshire Drive	Mid/High rise Office	C-3 Office	459,015	$10.5 M	Empty parking lot; direct access to Colshire drive is needed
7	029114A	West*Park Transit Center	Other Retail	C-3 Office	176,601	$12 M	Existing bus transit center; very accessible
8	0291 01 0022A	Adjacent to Site #9 at 8500 Tyco Road	Wholesale, warehousing	I-5 Industrial General	239,111	$7.8 M	Big warehouse with parking lot; nicely tucked away from the main road
9	0291 01 0018	8500 Tyco Road	Other repair	I-4 Industrial (med. density)	306,679	$ 9.2 M	Motor vehicle service center
10	0293010038	8433 Leesburg Pike	Motor Vehicle Sales	C-7 Regional Retail	268,315	$16.1 M	Volkswagen dealership
11	0293010044	8448 Leesburg Pike	Motor Vehicle Sales	C-7 Regional Retail	128,310	$11.5 M	Tysons Dodge Jeep dealership
12	0293 01 0031	Boone Blvd off of Route 123; 2000 Chain Bridge Road	Motor Vehicle Sales	Regional Retail	616,000	$47M	Koons, Chevy, Buick dealership and service center; this is a huge parcel; part of it can be turned into a garage site
13	0391 06 0009	2051 Chain Bridge Road (across from #12)	Other retail	Commercial	188,000	$14 M	Furniture Brand Outlet Store; empty building and parking lot; service road parallel to Rte 123

*County Map Number – the Tax Map Reference Number is an alphanumeric string that uniquely identifies a parcel. This number is obtained from Fairfax County's website.

**Land value information is obtained from the County's Department of Tax Administration's Real Estate Assessment Information Site

Figure 8.10 Map Location of Evaluated Sites and Proposed Shuttle Routes



8.6.3 Garage Site Evaluation

To compare and contrast specific sites, an evaluation matrix was developed (Table 8.6). Sites are noted as either addressing or not addressing the criteria described above, while costs are generally detailed as "low," "medium," or "high."

Findings from the analysis are as follows:

- Site #1 is vacant, low in cost, and has suitable space available, but has no access points.
- Site #2 is a County Parks and Recreational facility and therefore has no cost associated with its acquisition, although costs would be involved in relocating the recreation facility, should the County so desire. It has suitable space, but it has poor vehicular accessibility into the site as it functions as an open space/recreation amenity.
- Site #3 is zoned Industrial, is close to Leesburg Pike and offers good accessibility to and from the site; the electric plant that is currently situated on the parcel would need to be relocated.
- Site #4, off of Leesburg Pike on Pinnacle Drive may have some geometric constraints as the parcel is situated on a grade.
- Site #5 presents a vacant parcel owned by Freddie Mac that does not have access points and has very high land value.
- Site #6 which is off of Colshire drive, providing a large parking lot which seems to have a very low utilization rate; however direct access to and from Colshire drive would be needed for buses to easily get in and out of the site.
- Site #7 is the West*Park Transit Center, currently used by many bus routes in Tysons. The facility is situated close to main roads and is already designed to accommodate large buses. As mentioned, this site is an obvious choice for a bus garage, and its viability as such is validated by the analysis conducted here.
- Sites #8 and #9 which are located on Tyco Road off of Leesburg Pike and also have potential for a bus garage due to their proximity to main roads, good access points to the site, supportive zoning and lower land values as compared to the other sites.
- Sites #10 and #11 are situated on Leesburg Pike and are currently being used for auto dealerships (Volkswagen/Dodge/Jeep). Both sites are very visible from Route 7, situated directly on the roadway and offer prime frontage that also corresponds to higher property values.
- Site #12 is a relatively large facility (14 acres) currently used for an auto dealership (Koons Chevy/Buick). However, such a large site may be more than needed and is also very costly to purchase.
- Site # 13, located directly across from Site #12 off of Boone Blvd, has an empty building and a parking lot with a service road. This site is close to major roads with access points and has potential to be turned into a bus garage.

Based on the analysis, sites chosen for further consideration are highlighted in green (Sites 7, 8, 9 and 13). These facilities provide suitable attributes and cost characteristics while also being located near or along the shuttle routes proposed to coincide with the opening of the Silver Line. A more detailed discussion follows.

Table 8.6 Garage Site Evaluation Matrix

Site #	Property Location	Location			Design		Cost
		Accessibility	***Current Low density land use***	***Short Distance to Bus Routes***	***Ease of entry and egress***	***Availability of Space >2.5 acre?***	***No Cost, Low, Med, High***
1	8333 Greensboro Drive					X	High
2	West of the interchange of Dulles Toll Rd and Rt 7)					X	No Cost
3	8440 Tyco Rd	X	X			X	Low
4	1744 Pinnacle Dr		X	X	X	X	Low
5	8100 Jones Branch Drive; Freddie Mac Office	X		X	X	X	High
6	7598 Colshire Drive					X	Low
7	**West*Park Transit Center**	**X**	**X**	**X**	**X**	**X**	**No Cost**
8	**Adjacent to #9**	**X**	**X**	**X**	**X**	**X**	**Low**
9	**8500 Tyco Road**	**X**	**X**	**X**	**X**	**X**	**Low**
10	8433 Leesburg Pik	X	X			X	Med
11	8448 Leesburg Pike	X	X			X	High
12	Boone Blvdoff of Rt 123; 2000 Chain Bridge Road	X	X	X	X	X	High
13	**2051 Chain Bridge Road (across from #12)**	**X**	**X**	**X**	**X**	**X**	**High**

8.6.4 Detailed Review of Recommended Sites

West*Park Transit Station (Site #7)

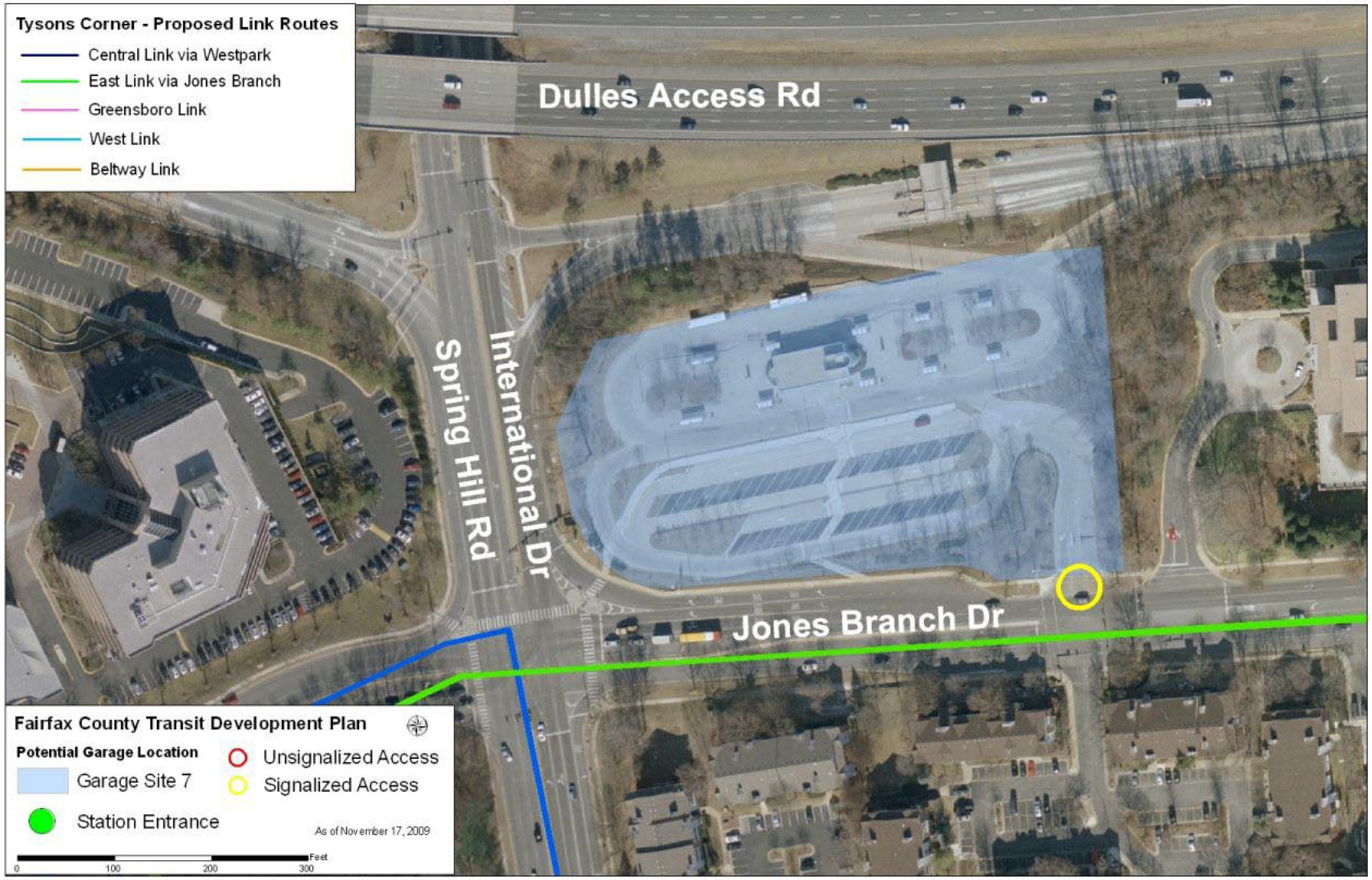
The West Park Transit Station is at the corner of Jones Branch Drive and Spring Hill Road. Access to the Transit Station is provided from Jones Branch Drive, just east of Spring Hill Road, where a traffic signal controls ingress and egress to the facility. Two proposed Tysons Link routes would pass by this access point. Since this facility is currently being used as a bus transit center, its current design permits access of buses. The parcel is zoned as C-3 Office and is 176,601 sq. ft. (4.1 acres) in size. The land value is $12 million or $68/sq ft. Because the County already owns the site, the cost represents an opportunity cost—the amount of money that the County would forgo by not selling the site. As the County already owns the site, there is no extra cost to acquire this land. This site complies with all of the criteria listed above for a bus garage in the Tysons Corner area. This transit center will cease to operate once the Silver Line opens and therefore, this site provides an ideal location for future transit use and conversion it into a bus garage.

Location:	Jones Branch Drive and Spring Hill Rd
Owner :	Board of Supervisors, Fairfax County
Owner Location:	12000 Government Center Parkway
	Suite 533
	Fairfax, VA 22035
Land Area:	176,601 sq. ft.
Land Value:	$12 million
Zoning:	C-3 Office

West Park Transit Station: Front View

Entry point to the Transit Station

Figure 8.11 Aerial View of Site 7, West*Park Transit Station



Property Adjacent to 8500 Tyco Road (Site #8)

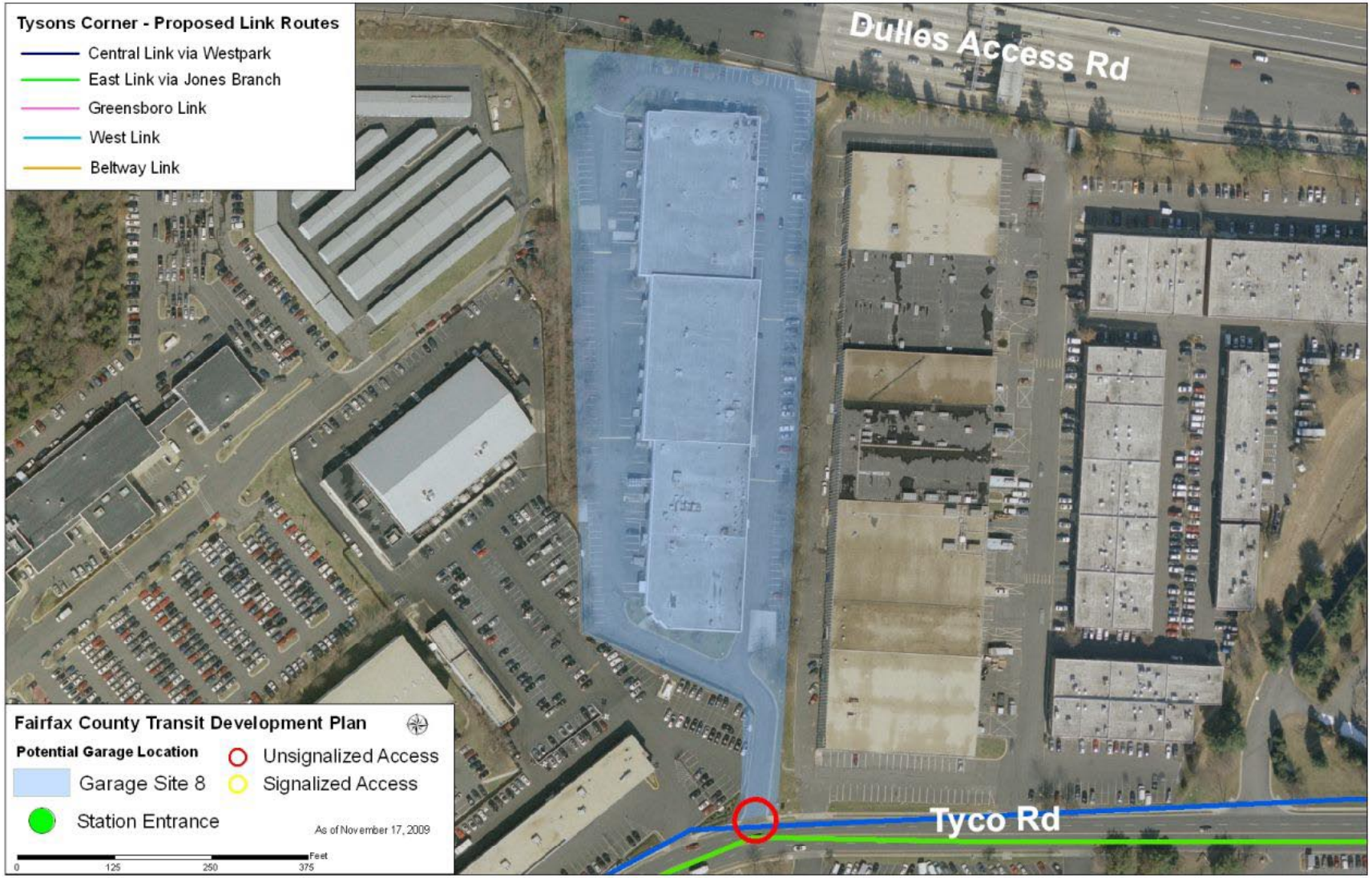
This parcel is adjacent to site #9 (8500 Tyco Road). The parcel is currently zoned for medium density commercial activity and serves a wholesale warehouse. Access to this site is also provided from Tyco Road on which two of the proposed Link Routes are recommended to run. The parcel size is 239,191 square feet and is valued at $7.9 million ($33 per square foot). The value of this parcel is relatively low, comparable to Site #9; because of its smaller size it could be obtained for less cost to the County.

Location:	Adjacent to 8500 Tyco Road
Owner :	Tysons West LLC
Owner Location:	2900 Eisenhower Avenue
	Third Floor
	Alexandria, VA 22314
Land Area:	239,191 sq. ft.
Land Value:	$7.9 million
Zoning:	I-5 Industrial General

Front view and access point to the site

Side view

Figure 8.12 Aerial View of Site 8, Property Adjacent to 8500 Tyco Road



8500 Tyco Road (Site #9)

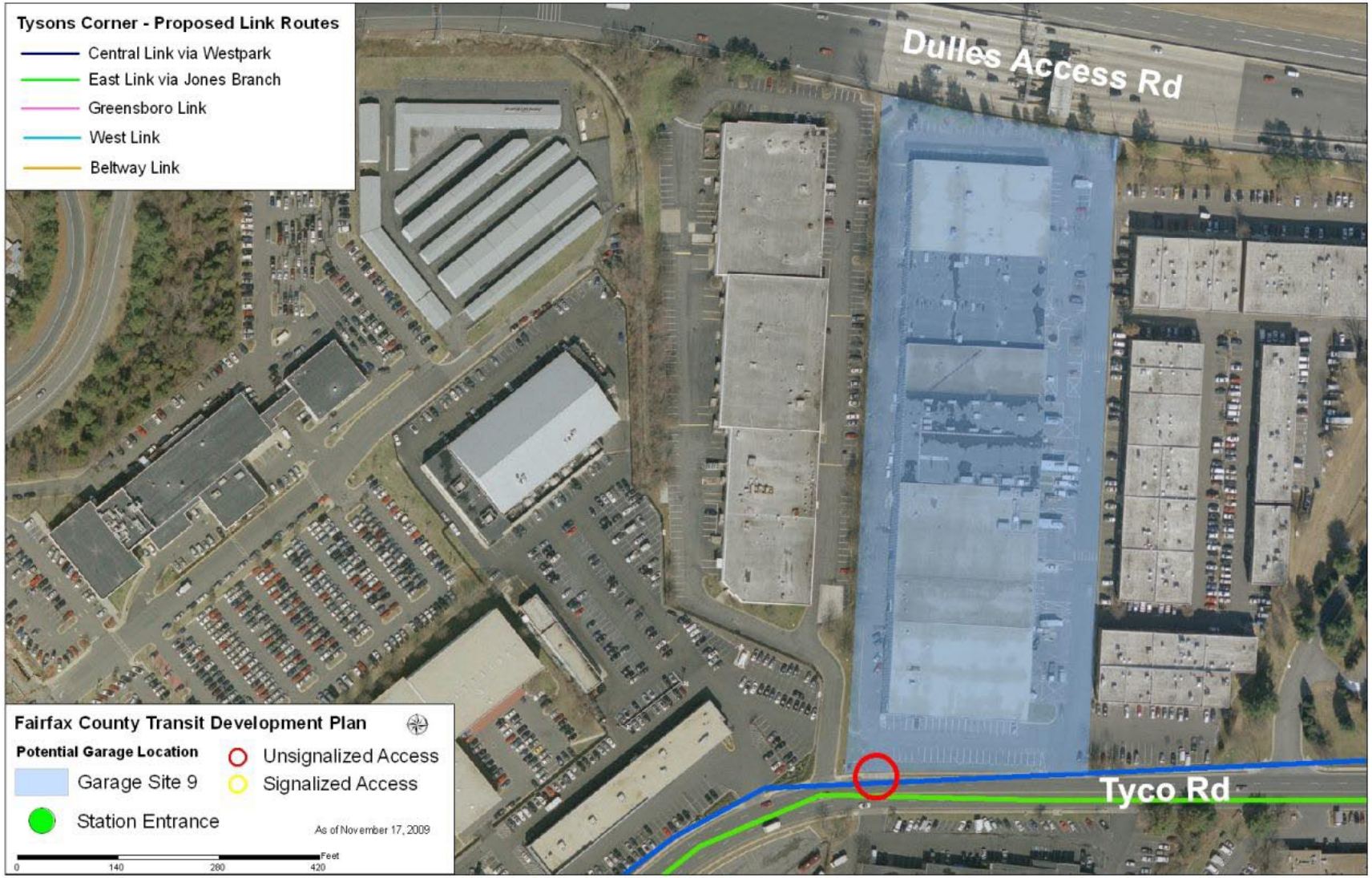
This parcel is located at 8500 Tyco Road, close to Leesburg Pike. The parcel is currently zoned for medium density industrial use and is now used as a motor vehicle service center. Access is provided from Tyco Road on which two of the proposed Link Routes are recommended to run. The parcel size is 306,679 square fteet and is valued at $9.2 million dollars, or $30 per square foot. The cost of this parcel is much lower than other parcels that were considered in the analysis.

Location:	8500 Tyco Road
Owner :	McIlvaine Don C Trs
Owner Location:	6231 Leesburg Pike Suite 100
	Care Trimark Corporation
	Falls Church, VA 22044
Land Area:	306,579 sq. ft.
Land Value:	$9.2 million
Zoning:	I-4 Industrial

Front view

Access point to the site from Tyco road

Figure 8.13 Aerial View of Site 9, 8500 Tyco Road



2051 Chain Bridge Road (Site #13)

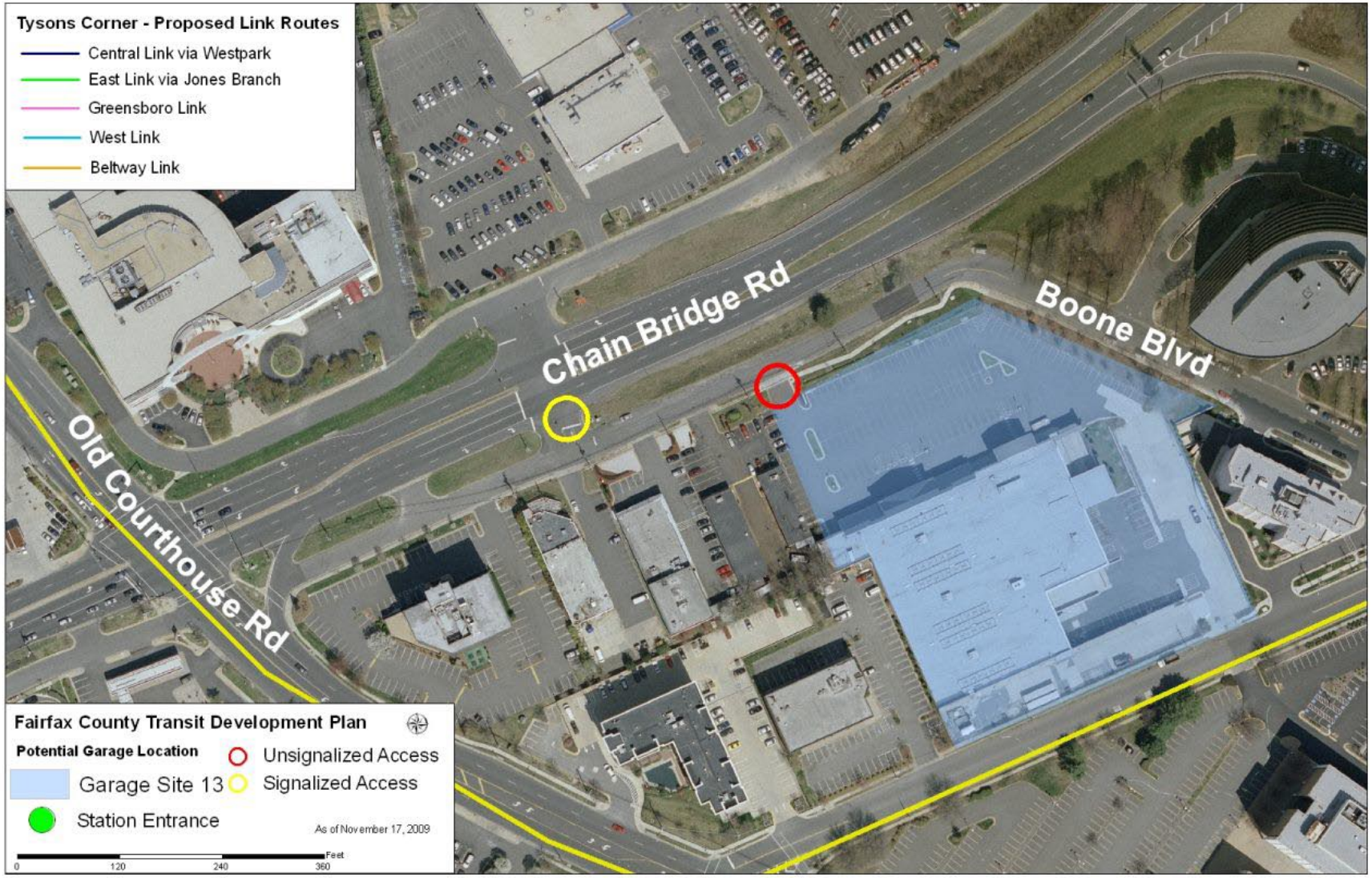
This site is located at 2051 Chain Bridge Road, close to the intersection at Leesburg Pike. The parcel is zoned Commercial and is currently used for retail purposes. The existing business appears closed; the site consists of a parking lot but also contains an existing structure that would likely need to be demolished to make room for a garage. This site has a service road that runs parellel to Chain Bridge Road to provides access. A traffic light at Chain Bridge Road controls ingress and egress. The parcel size is 188,175 square feet and is valued at $14 million ($75 per square foot). The cost of this site is the highest among the four recommended locations. While this presents a challenge to its acquisition, the site nonetheless offers excellent accessibility to and from major roadways while providing adequate room for a small bus operations facility.

Location:	2051 Chain Bridge Road
Owner:	June LLC
Owner Address:	4445 Willard Ave Suite 700
	JBG Rosenfeld
	Chevy Chase, MD 20815
Land Area:	188,175 sq ft
Land Value:	$14 million
Zoning:	Commercial

Front view

Access to the site

Figure 8.14 Aerial View of Site 13, 2051 Chain Bridge Road



8.6.5 Garage Analysis Conclusions

The analysis here utilized existing land use, zoning and property records data to identify sites suitable for a future bus garage in Tysons Corner. The sites were analyzed against a set of criteria intended to both maximize operational efficiency and be compatible with surrounding and future land uses. Four sites were identified that presented cost-effective and operationally sound potential locations for a bus garage. The analysis indicates that Tysons West*Park should be carried forward as the primary garage location, given its existing use, good location, and relatively minimal cost. Still, the analysis has shown there are three other suitable sites should concerns arise with the West*Park parcel, providing Fairfax County with some options in determining where to locate a support facility for the Tysons Link bus services.

8.7 BRANDING

8.7.1 Introduction

An internal circulation network of five short and convenient routes tentatively designated as the "Tysons Link"[3] has been designed to connect areas of employment, shopping, restaurants, and residences with three of the four Silver Line stations being constructed in Tysons Corner. These routes would be implemented upon completion of the Silver Line first phase in 2013, and have been planned to support the vision for Tysons as a pedestrian-friendly, mixed-use community.

These Silver Line feeder routes are intended to complement other bus services that currently service or are recommended in the TDP to service the Tysons community. The local transit network will both link residents to the new rail service as well as provide access from the Silver Line to destinations within Tysons Corner.

Use of the Silver Line into Tysons Corner would likely necessitate the transfer to the "Tysons Link" services for many riders to get to their final destination within Tysons, and to allow for travel throughout the day. For that reason, the internal circulation service needs to be attractive and prominent enough to get potential rail riders out of their cars and using the Silver Line, with a full awareness that a high quality bus service awaits for further movement within Tysons Corner. Branding the "Tysons Link" service would help make the service more obvious and recognizable for people who don't normally ride the bus and who would be inclined to ride if it were attractive and easy to use.

This section of the Tysons analysis will review three basic questions:

1. Should a new brand for the "Tysons Link" be established or should the same branding elements used for the Fairfax Connector services (either the standard Fairfax Connector brand or the brand for the Tysons Connector lunchtime shuttle) be applied to the proposed Tysons Corner services?

2. If a new brand is desirable, should it include only the five new Tysons Corner internal circulator routes or should other neighborhood or even regional feeder routes to Tysons be included?

3. If it is agreed that a new brand is desirable, then should a specialty "Tysons Link" brand be created, or should a standard county-wide "Link" brand be employed across all similar transit services to be operated by the Fairfax Connector within other communities?

8.7.2 Use of Branding

General Terminology

A brand is commonly defined as a "name, term, sign, symbol or design, or a combination of them intended to identify the goods and services of one seller or group of sellers and to differentiate them from those of other sellers."[4] A recent FTA research publication states that "Branding involves a wide

[3] "Tysons Link" is the working name used originally for the purpose of introducing the service concept; the selection and acceptance of a final name by FCDOT for branding purposes will be required.

[4] Philp Kotler, Marketing Management, Prentice-Hall Inc. Englewood, NJ 1976 p. 190 and as adopted by the American Management Association

range of strategies and tactics to package a set of product characteristics and service attributes and to build and reinforce a brand that communicates the distinct characteristics of a product…" [5] This FTA research suggests, as noted in the generic branding literature, that there are at least two major characteristics or elements of branding:

- **Marketing Classification** – a description of how the service fits in with the remainder of the system, reflecting its attributes and how it is marketed.
- **Branding Devices** – primarily, as noted above, the use of names, logos and designs to help customer association and identification with the new product or service.

Public transit operators around the county have created special brands on new services, with much of the current documented experience related to BRT or BRT-like services; however lessons from these services can be applied to other types of bus services as well. Local examples of special branded services include WMATA's Metro Extra and REX services and the DC Circulator, while Boulder, Colorado and Los Angeles offer other interesting examples.

WMATA Branding Efforts

WMATA implemented "Metro Extra" in 2007 as a limited stop service to supplement local service. WMATA's initial Metro Extra route, Route 79 along the Georgia Avenue/7th Street corridor, is operated with new low emission, low floor CNG buses with a unique blue and silver paint scheme. WMATA has employed the blue and silver scheme for its collateral materials such as public timetables as well for bus stop signs installed at the designated stops to clearly indicate access to the new service. WMATA intends to roll-out the Metro Extra concept along other Metrobus corridors.

WMATA also operates the REX, or Richmond Highway Express, as a limited stop service with unique livery and collateral materials whose buses are provided with signal priority technology designed to provide faster "express-like" service. REX was one of the first branded bus services in the Washington region and was implemented as a "standalone" brand, rather than part of a regional branding strategy (such as the Metro Extra initiative).

The DC Circulator is managed by a private contractor who operates the service with highly distinctive red buses with large windows and three side doors for quick boarding and alighting. Five routes circulate through downtown Washington on ten minute headways, primarily oriented toward making it easier for tourists, travelers and downtown employees to get around. A GPS based system tracks bus movements to assist trip planning by riders. Since the Circulator is not part of the WMATA system, there was no effort to coordinate branding strategies with those of WMATA.

Denver Regional Transit District Branding Efforts

Some programs like "GO Boulder" in Boulder, Colorado (GO stands for "Great Options"[6]) employ descriptive and colorful names. Denver Regional Transit District (RTD) calls its Community Transit Network (CTN) routes names such as HOP, SKIP, JUMP, and DASH to reinforce an image of fast, frequent and convenient services and, as the agency claims, "… by providing easy access around Boulder and to

[5] Characteristics of Bus Rapid Transit for Decision Making, prepared by the National Bus Rapid Transit Institute for the US DOT Federal Transit Administration, Washington, DC February 2009 p. 2-134

[6] GO Boulder is an initiative of the city of Boulder Colorado providing residents incentives to bike, bus or walk to their destinations. The bus service is operated by the Denver area RTD and coordinated with other local and express routes

and from surrounding communities." This common nomenclature ties together a network of local and express services each with a distinctive color scheme and logo and clean, comfortable, "neighborhood-scale" buses.[7]

Los Angeles County Metropolitan Transportation Authority Branding Efforts

The Los Angeles County Metropolitan Transportation Authority (MTA) distinguishes among its service types with the prefix "Metro" followed by the mode and with vehicle paint designs unique to each as listed:

- Metro Rail - Light and heavy rail services with stainless steel vehicles with various trim colors
- Metro Local – Local bus service generally with frequent stops and silver and orange buses
- Metro Express – Bus services that operate along the freeways with dark blue buses
- Metro Rapid – BRT and BRT-Lite services with red buses with a silver stripe

The Metro Rapid service was initiated in 2000 as the MTA began converting local bus services applying seven key attributes listed below. With a focus toward faster service, Metro Rapid passenger trip times have been reduced by as much as 29 percent.[8]

1. Simple Route Layouts which are easy to understand and use
2. Frequent Service with headway based schedules of 10 minutes or better during the peak period.
3. Fewer stops with an average spacing of ¾ mile
4. Level boarding and alighting with low-floor buses
5. Bus priority at traffic signals with extended green time for bus lanes
6. Color coded buses and stops with the use of a distinctive color scheme to identify stops and buses
7. Enhanced Stations with passenger amenities (e.g. canopies and lighting) and 'Next Bus" display and other information

Overall Branding Effort Examples

In all cases, transit operators have succeeded in positioning their new services as different from their traditional bus services, designing them to include service attributes that non-users claim critical to entice them to try transit. WMATA has reported that the REX and Georgia Avenue Metro Extra services continue to gain popularity. The GO Boulder CTN routes experienced an eight percent increase in local passenger transit trips and a 13 percent increase in regional trips in 2008. Meanwhile in Los Angeles, the MTA reports that Metro Rapid services have achieved ridership gains as much as 40 percent with 1/3 of the ridership new riders to transit.

[7] City of Boulder Colorado web site:
http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=8823&Itemid=2989
[8] Los Angeles County MTA web site: http://www.metro.net/projects_studies/rapid/overview.htm

8.7.3 Fairfax County Resident Survey Results and Branding

The resident survey conducted as part of the TDP provides insight on how best to attract non-users as has been achieved elsewhere in the transit industry. Survey respondents agree that the private car offers the following important transportation attributes:

- Is available when they need it
- Goes to the places they need to go
- Is easy and convenient to use
- Meets the transportation needs of people like them
- Gets them to their destinations on time, and/or
- Is safe from crime

Neither Metrobus nor the Connector received high ratings for these attributes. Approximately 79% of the Fairfax County residents surveyed report that their primary mode is the private automobile, noting that the above attributes are very important to them. The survey concludes that the following service attributes are important to convert, retain or increase transit use among the entire population:

- Bus stops close to where they live and to their destination
- Enhanced service information to increase awareness and confidence on the use of the service
- Travel time competitive with the private automobile

These design attributes are all typically associated with branded service, and have been key to the success of the services mentioned earlier especially as presented for the DC Circulator, "GO Boulder" CTN and LACMTA "Metro Rapid" services.

8.7.4 "Tysons Link" Service Attributes

The proposed plan for the "Tysons Link" routes embrace a number of quality of service attributes that would serve as the basis for a potential branding strategy.

- **Frequent service** – 10 minute peak headways.
- **Short routes/quick trips** – each route less than four route miles long.
- **Activity-center based** – dedicated to the Tysons Corner activity center.
- **Span of service** – service provided throughout the workday.
- **Convenient access** – stops close to major residential, employment and commercial centers to serve Tysons' residents and workers.

This set of attributes provides a foundation to build a system that will yield the convenience that Fairfax residents claim is necessary in a transit service to attract and to retain ridership. A branding strategy could be effective in establishing an identity to distinguish the proposed service as a transit service noticeably different from the transit services currently operated within the county.

In addition to the above basic design attributes, the "Tysons Link" service should also incorporate the following elements, as the resident surveys suggest that these elements are also critical to attracting choice riders.

- **Reliability** – with frequent and faster service and services operated on schedule, customers will perceive wait time to be acceptable and reliability to exceed the typical Connector and Metrobus experience.
- **Small buses** – easy to board and alight and sized to match the expected demand, which minimizes excess dwell times allowing for quicker travel times and clearly distinct from the standard large buses operated by the Fairfax Connector and Metrobus.
- **Passenger amenities** – items such as shelters, benches, schedule and real-time information to help manage and improve passenger wait time experience.
- **Collateral materials** - clear information on how to use the "Link" service explaining where and how to access the bus, where each route goes, and what the schedule is.
- **Bus stop signage** – signage should be clear, simple and recognizable.

A positioning strategy should explain how the new branded service is different from the traditional services. A lack of knowledge of where traditional bus routes go is a major obstacle for use by new or infrequent riders. The goal in Tysons would be to attract riders to the new bus service who would not ordinarily think of themselves as bus riders in the context of Connector and Metrobus. The "Tysons Link" brand should convey the idea that this service is a frequent, short and easy to understand shuttle route that will cover all important destinations in Tysons.

Given the special set of attributes for the "Tysons Link" service as listed, it would appear highly desirable for Fairfax County DOT to develop distinctive brand and positioning strategies to clearly communicate to potential riders the benefit of using the "Tysons Link" services. It is critical that the final strategy focus on the brand's target population and on the objectives to ensure that the service is easy to identify and to use to travel to destinations within the local Tysons community.

8.7.5 Other Tysons Corner Services

Fairfax Connector and Metrobus currently operate a number of neighborhood feeder and regional bus services in Tysons Corner, and there are several TDP proposals to restructure these routes and add new routes as summarized in Table 8.7.

Table 8.7 Existing and Proposed Tysons Corner Routes

Neighborhood Feeders	Regional Services	"Tysons Link" Services
Fairfax Connector	*Fairfax Connector*	Beltway Link
McLean Connector	401 Backlick-Gallows Road Line	East Link
McLean North Connector	574 Herndon to Tysons	Central Link
Wolf Trap Shuttle		Greensboro Link
462 Dunn Loring Metro to Tysons	*Metrobus*	West Link
463 Vienna Metro to Tysons	23A McLean – Crystal City Line	
	28AB Alexandria – Tysons Corner Line	
Metrobus		
2T Tysons – Dunn Loring Line		
3T Pimmit Hills Line		
24T McLean – East Falls Church Line		
28T Tysons – West Falls Church Line		

The existing and proposed Tysons area neighborhood and regional service routes listed in Table 8.7 on the whole do not have the same service attributes as the proposed "Link" routes, especially as headways are typically longer than 10 minutes, most routes are considerably longer and serve multiple communities, while some operate during peak periods only. As such, it is recommended that a brand identity should focus on the proposed "Tysons Link" services and not include these other routes. Indeed, including these other routes would undermine the value of the brand for the Link routes.

8.7.6 Specialty versus County-Wide Brand

Fairfax Connector and Metrobus currently operate several local circulator routes within the County with characteristics similar to the proposed "Tysons Link." In addition, the preliminary recommendations from the draft TDP include the addition of similar routes in several local communities, such as Springfield and Merrifield, over the next ten years. Accepting the benefits of establishing a " Link" brand in Tysons Corner, the next logical question is should this brand be applied county-wide, e.g. "Springfield Link"[9] or "Merrifield Link," or should individual brands be created that are unique to each community served?

A number of fundamentals must be considered as input to the decision whether to establish a single county-wide brand or a set of individual service brands if at all for similar services. Brands are established to distinguish substantially different types of services. Further, a service or set of services should not be included within an established brand until all the prerequisite service attributes have been implemented. For example a "Merrifield Link" should not be introduced until the services meet the intended attributes and fit the desired image. Some questions that should be considered when deciding between an individual or a county-wide brand include:

- Will the service attributes and elements be applied uniformly across each service area, such as for bus design, stops, passenger amenities, information technology, and collateral materials?
    - If not, will the brand be diluted if non-uniformly applied across the county?
- Will the same bus be used for each service area which would help to reduce spare requirements and parts inventories?
- Will additional garage storage and maintenance capacity be required?
- Will the same logo, graphics and color schemes be used for each service area?
- Will county residents perceive different "Link" networks as serving the same or different needs and purpose?
- Will FCDOT have the resources to implement and consistently maintain multiple brands?

Experiences with BRT branding efforts have been decidedly in favor of a system-wide (or county-wide) brand. System-wide branding has been favored by many agencies as it is believed to enhance overall user understanding, although most BRT operations began service over a single corridor.

[9] The Transportation Association of Greater Springfield known as TAGS sponsors a two route circulator system operated under contract to WMATA within the immediate Springfield area. Among the TDP recommendations for this area are additional circulator services designated as routes 341/342 to link the neighboring commercial and retail area that abuts the west side of I-95 with the Springfield Mall area and the Franconia-Springfield Metrorail Station. The TAGS group may be interested in expanding their services to include the 341/342 and sponsor a 'LINK' type service.

Specialty Brand

Developing brand names with its associated identities unique to individual locations, for example the "Tysons Link" versus the "Hybla Valley Hop" would allow considerable focus to be placed promoting the attributes of the individual service brand. As a result, it is likely that Country residents and potential riders will perceive each application as a different type of service. These riders would need to gain an understanding for each of the services that they may use, even if they turn out to be similar. It is acknowledged that many riders' trip habits tend to keep them on only a few of the services offered so they only need to acquire service details on those routes that they frequently use. A specialty brand would match these needs. On the other hand, a series of individual community based brands may make it difficult for those that are inclined to travel about the County to be fully cognizant of the service options available.

County-Wide Brand

The basic objectives of a county-wide proposed "Link" brand is to make the service easy to identify and to create a unique, high quality image distinct from the Fairfax Connector traditional bus service. The use of a common county-wide brand simplifies efforts to promote the "Link" brand.

The implementation of a county-wide brand, assuming relatively uniform and consistent implementation provides several operational and promotional benefits.

- Use of a standard bus across multiple services reduces spare bus requirements and simplifies parts inventory needs and maintenance practices.
- A standard brand offers economies in the preparation and distribution of common collateral materials and allows the agency a single focus to reinforce the brand image.
- Use of common bus stop amenities and signage would make services readily identifiable and minimize fabrication, installation and maintenance costs.

8.7.7 Branding Conclusions

The above discussion has listed many advantages of a branding strategy for the "Tysons Link" and presented the pros and cons of specialty and county-wide brands. It is very likely that Tysons Corner will be the first instance of a major branding effort for local circulator routes in Fairfax County, and that analogous branding effort in other activity centers would follow at least a few years later.

Therefore, it is recommended that the County establish a "Tysons Link" brand as a high-profile pilot project for the future county-wide "Link" brand. In order to justify the investment in the future county-wide brand, it is essential that the "Tysons Link" routes succeed. While branding is only one factor in their potential success, industry experience (as discussed above) indicates that it can be critical in drawing new riders to the system. Thus, the "Tysons Link" brand should be pursued as a specialty brand that is setting the stage for the future county-wide Link brand. The success in Tysons can be leveraged to launch the future Springfield Link, Merrifield Link, Herndon Link, Lorton Link, or whichever other local circulators are deemed viable in the future.

The "Tysons Link" should be pursued as a specialty brand for two reasons. First, since there are no other "Links" in operation, nor will there be within the first few years, the economies associated with the county-wide brand (such as sharing vehicles and marketing materials) are not immediately relevant. Second, given the automobile-dominated environment in Tysons, everything possible must be done to draw riders out of their cars. Having the Tysons name prominently displayed on all of the vehicles and

collateral materials (not just the electronic headsigns which will be needed to differentiate the five "Tysons Link" routes from each other) will reassure potential riders that they are not boarding a "regular" bus which may take them far from their destination. They should feel comfortable that even if they board the wrong "Tysons Link" bus by mistake (a great fear among the non-riding public), that they will still be in the Tysons area.

Once the "Tysons Link" service is established and awareness has grown within the area about what these routes do, the brand can be modified to make it more interchangeable with a county-wide brand. At that point, a new "Link" service could be initiated in another activity center, and people there will recognize that they are getting the great service that the "Tysons Link" has offered for the past few years. In this way, the "Link" brand can grow organically, and develop into a county-wide brand that can take advantage of the economies discussed above.

8.8 TYSONS BUDGETS

8.8.1 Cost Overview

The costs for operating the five Tysons Link services, along with all other bus services to Tysons Corner, are included in Chapter 12, Costs of Recommendations. This section will review the costs to operate the Tysons Link services as well as additional costs involved in developing this service, such as a new bus garage to house the vehicles and marketing and branding costs.

8.8.2 Start-Up Costs

It is assumed that operation of the Tysons Link services would be added to an existing contract that the County has with an operator, so that there would be no contract costs associated with an RFP or bid process. Any costs involved with hiring new drivers, including interviewing and training, would be borne by the contractor.

The County would assume internal staff time costs to re-evaluate the route structure proposed in the TDP closer to the time of service operation, approximately one year before the opening of Phase 1 of the Silver Line. In addition, County staff would need to spend the time to create the detailed schedules and run-cuts for the Link routes.

8.8.3 Bus Capital Costs

The proposed system of five "Tysons Link" routes, if they were all operated at a peak headway of 10 minutes, would require 15 buses at peak times. Using a standard spare ratio of 15%, two to three additional buses would be necessary as spares to guarantee operational reliability.

The Link routes are envisioned as "shuttles" or "activity center circulators" and thus would be appropriately operated with small buses no greater than 30 feet in length. The County would have several options, including inexpensive cutaway vans, replica trolleybuses, small electric or hybrid buses (22 feet in length), or small heavy-duty transit buses (29-30 feet in length). The County could choose to operate electric or hybrid-electric buses on these shuttle routes to save on fuel costs, reduce noise and emissions, and further differentiate this service from the regular Connector fleet. Such a choice would likely increase the purchase cost for the vehicles and have impacts on the vehicle support infrastructure needed.

It is assumed that any vehicle purchased for this service would be wheelchair accessible, and preferably low-floor to speed boarding and alighting. If no fare is charged for the service, vehicles with two doors (front and rear) could allow boarding at either door to help to reduce dwell time.

Because the exact type of bus will not be decided at this point, as with the rest of the buses that would need to be purchased for TDP-related service increases, a per bus cost of $500,000 (2010 dollars) is used to estimate bus purchase capital costs. Assuming a 3% annual growth in bus purchase costs, the buses could be expected to cost approximately $530,000 each in 2012, for a total initial purchase price of nearly $10 million, as shown in Table 8.8.

Table 8.8 Tysons Link Bus Purchase Costs

Tysons Link Route	Peak Buses	Cost
Beltway Link	3	$1,590,000
Central Link	3	$1,590,000
East Link	4	$2,120,000
Greensboro Link	2	$1,060,000
West Link	3	$1,590,000
Spares	3	$1,590,000
Total	18	$9,540,000

8.8.4 Bus Operating Costs

The Tysons Link routes, as indicated above, are assumed to be run through an existing Fairfax Connector operating contract. Therefore, the operating costs would be based on current Connector costs per revenue hour of service. The annual costs of operating the Tysons Link routes, beginning at the end of 2013, are shown in Table 8.9. The costs were developed using the baseline cost of $107.55 per revenue hour, a 2010 figure that includes costs for revenue hours plus platform hours. The cost was inflated to 2014 dollars for developing the annual costs during the first year of operations, resulting in a cost per revenue hour of $136.

In the period immediately following the initiation of service on the Tysons Link routes, it is likely that a local garage facility would not be ready for operations. If the Tysons West*Park site is chosen, it would presumably be in service as a passenger transit center up to the time when the Silver Line opens, and thus would require at least a year or two for retrofitting and construction of a maintenance facility. It is possible that other garage sites could be ready in time for the December 2013 opening, but in that case the County would need to be acting in the very near term (2010) to procure the land and begin design of the facility.

Rather, it is more likely that vehicles for the Tysons Link will be garaged at West Ox, as is the case for the current Tysons lunchtime shuttle. The deadhead distance is about 14 miles in each direction, and could take 20 to 40 minutes depending on traffic conditions. Each of the 15 buses in service would need to make this trip daily, though driver shift changes could happen “on street” in Tysons, rather than requiring a bus to come back to the garage in the middle of a block. It is also assumed that the buses could layover between peak periods of operation somewhere in Tysons Corner, presumably at the West*Park transit station.

To assign a cost for all of this deadheading to West Ox while the garage in Tysons is being finalized, the costs would entail additional fuel and bus depreciation. Under the proposed operating scenario, the deadhead miles would be based on 15 buses each deadheading approximately 28 miles per day for 256 weekdays, plus three buses each deadheading 28 miles per day for 109 weekend days. This would be a total of 116,676 miles on the buses and approximately 23,335 gallons of fuel annually until a Tysons area garage is built. This deadhead mileage represents approximately 9% of the total annual revenue miles for the five routes, or 8% of the total annual vehicle miles.

Among the four alternative locations identified for potential garage sites within the Tysons Corner area, there are negligible differences in the operating cost associated with non-revenue time and mileage. All of them are directly on one of the proposed routes, and they are all less than a mile from one of the

proposed terminals (Tysons West or Tysons Central 123). Sites 7, 8, and 9 are within a half mile of each other and very close to Tysons West. Site 13 may incur slightly higher non-revenue costs as it is more distant from the terminals, but the difference is still minimal and hardly a decisive factor on which site to choose.

8.8.5 Garage Design and Construction

Section 8.5 reviewed possible garage locations for storing, washing, and light maintenance of the Tysons Link routes, resulting in four possible locations: West*Park Transit Center, 8500 Tyco Road, Property Adjacent to 8500 Tyco Road, and 2051 Chain Bridge Road. Each of these properties has a land acquisition cost associated with it, as well as a cost to design and build the facility. The land for the garage would have to be acquired, except for the West*Park transit station option, which the County already owns. Therefore, the cost for land acquisition would range from $0 for Tysons West*Park to $14 million for the most expensive land at 2051 Chain Bridge Road.

Without a detailed design, it is impossible to estimate the exact cost of such a facility. However, using the assumption of approximately $160 per square foot to design and build the facility, a garage between 25,000 and 35,000 square feet, as discussed in Section 8.5, would cost between $4 million and $6 million to build (in 2009 dollars). Given costs of inflation, it is likely that the cost would escalate to between $4.5 and $7 million by the time construction would begin in 3-5 years.

8.8.6 Branding/Marketing

It is anticipated that the Tysons Link services would be branded as a first step in implementing a County-wide activity center based shuttle service system, as discussed in Section 8.6. While there are many benefits to having a branded service, not the least of which is making the service well known and well patronized, there are numerous additional costs associated with such a service. In order to provide such a service, costs include developing the branding concept and design, developing and producing advertising and marketing materials, and developing and producing the physical elements of the service to distinguish it from other bus service, including distinctive bus wraps/paint schemes and bus stop signage.

Based on costs that have been recently attributed to branding the Tysons Connector (lunchtime shuttle), it is estimated that startup costs for the branded service would include about $75,000 for concept development, $150,000 for advertising and marketing, plus costs of about $300,000 for bus wraps and stop signage, for a total of about $500,000. In addition to the startup costs, it is anticipated that an annual budget of $50,000-$100,000 would need to be allocated to continue marketing and advertising the service.

8.8.7 Total Costs

Based on all of the above analysis, the start up costs for the Tysons Link service as well as annual operating costs for the first five years of the service are outlined in Table 8.10.

Table 8.9 Operating Cost Inputs and Annual Cost for Tysons Link Routes

	Headway						Cycle Time						Period Length (hours)						
Route	Peak+Lunch	Midday not lunch	Evening	Saturday	Sat early/late	Sunday	Peak+Lunch	Midday not lunch	Evening	Saturday	Sat early/late	Sunday	Peak+Lunch	Midday not lunch	Evening	Saturday	Sat early/late	Sunday	Annual Cost (for first year of service)
Tysons Link Beltway	10	25	25				30	25	25				10	3.5	4.5				$1,401,324
Tysons Link East	10	20	20				25	20	20				10	3.5	4.5				$1,216,939
Tysons Link Central	10	20	20	10	10	10	40	30	30	40	30	30	10	3.5	4.5	8	8.5	13.5	$2,701,092
Tysons Link Greensboro	10	20	20				25	20	20				10	3.5	4.5				$1,216,939
Tysons Link West	10	25	25				30	25	25				10	3.5	4.5				$1,401,324
Total																			**$7,937,619**

Table 8.10 Costs for Tysons Link Service

		Startup Costs	Year 1	Year 2	Year 3	Year 4	Year 5
	Bus Purchase	$9,540,000					
Bus Operations	Tysons Link Beltway		$1,401,324	$1,485,404	$1,574,528	$1,669,000	$1,769,139
	Tysons Link East		$1,216,939	$1,289,956	$1,367,353	$1,449,394	$1,536,358
	Tysons Link Central		$2,701,092	$2,863,157	$3,034,946	$3,217,043	$3,410,066
	Tysons Link Greensboro		$1,216,939	$1,289,956	$1,367,353	$1,449,394	$1,536,358
	Tysons Link West		$1,401,324	$1,485,404	$1,574,528	$1,669,000	$1,769,139
	Total Bus Operations		$7,937,619	$8,413,876	$8,918,708	$9,453,831	$10,021,061
	Garage Land Acquisition	$0 - $14,000,000					
	Garage Design/Construction	$4,500,000 - $7,000,000					
	Marketing/Branding	$500,000	$75,000	$75,000	$75,000	$75,000	$75,000
	Total (millions)	**$14.5 - $31.0**	**$8.0**	**$8.5**	**$9.0**	**$9.5**	**$10.1**

8.9 BUS STOP PLACEMENT AND CONFIGURATION

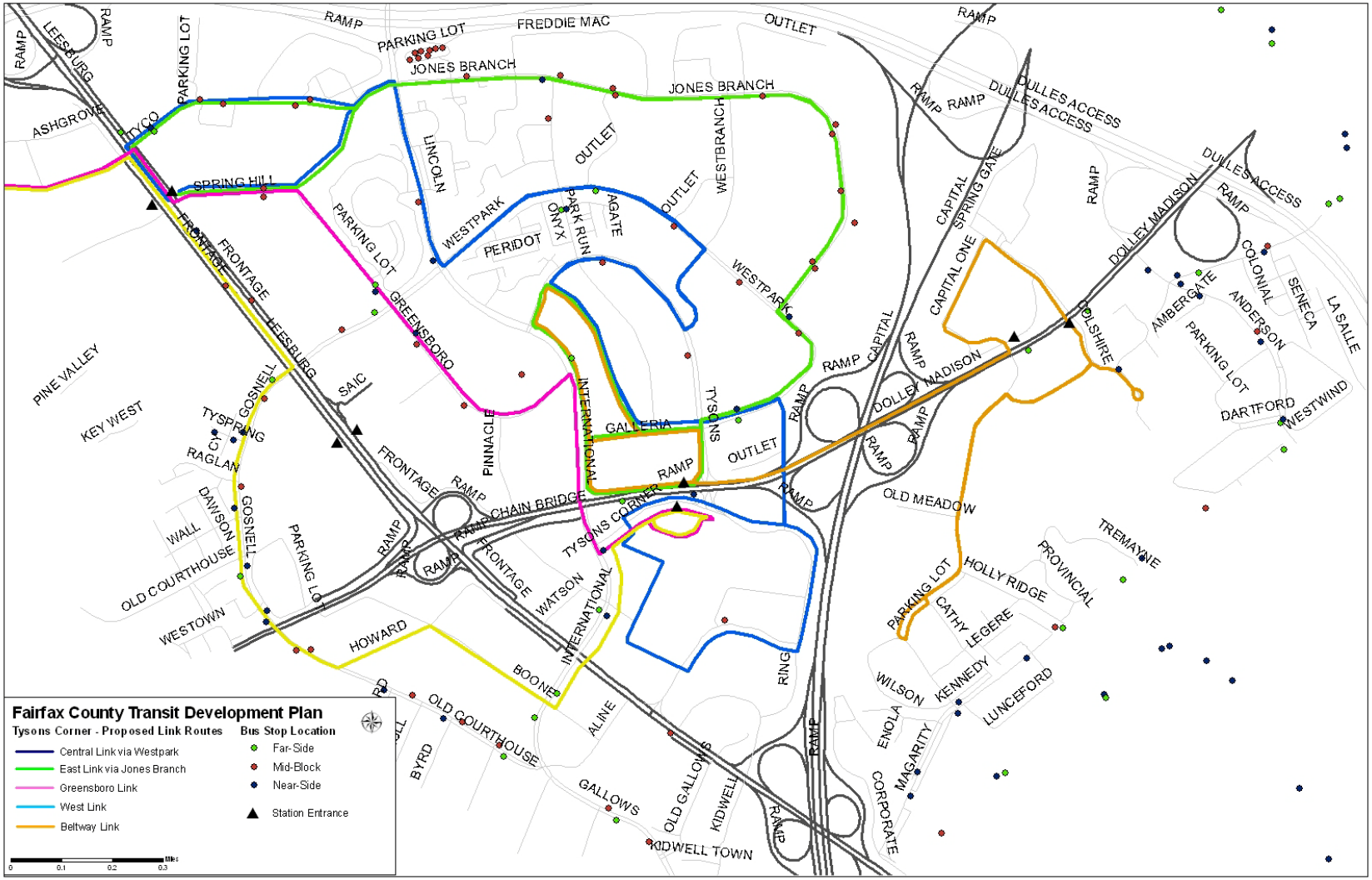
As part of the Tysons analysis for the Transit Development Plan, an analysis of bus stop placement was conducted. Because Tysons Corner is a much more urban locale than most of the rest of the County, particularly as it is envisioned to develop over the next thirty years, it is important to determine how best to address the unique challenges that the urban form within Tysons Corner presents with regard to provision of bus stops.

The following section presents an analysis of the possible placement and configuration of bus stops in Tysons Corner. The concepts discussed here were developed first by conducting a literature review to identify best practices, and secondarily by field visits to both provide real-world examples of existing stops within Tysons Corner and to identify conceptual options for placement of future stops. The challenge for FCDOT as its ridership grows will be how to modify its existing bus stop network, where to add new stops, and what configurations they should have. This review provides a framework for future development of FCDOT's bus stop network in Tysons, assisting in identifying where stops can best be located and how they should be configured to suit both riders and land uses.

8.9.1 Existing Conditions: Current Bus Stop Network

Fairfax County already offers an extensive bus stop network in Tysons Corner. As shown in Figure 8.15, existing stops already support the proposed Link routes in most locations through a combination of designs. With the opening of the Silver Line in 2013, coinciding with the higher level of development expected to result, the existing bus stop network offers an excellent starting point for the provision of enhanced transit services needed to support the more transit and pedestrian-oriented environment.

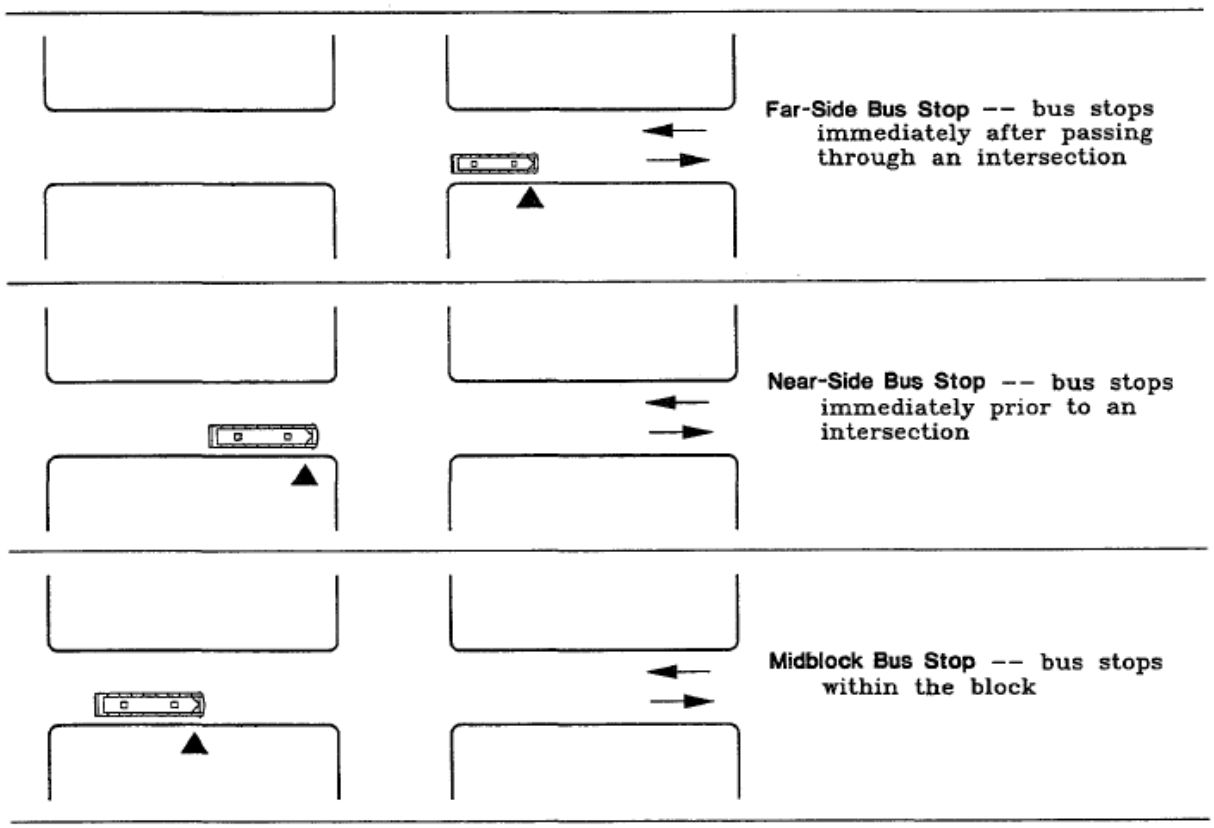
Figure 8.15 Existing Tysons Corner Area Bus Stops



8.9.2 Bus Stop Placement

Research into best practices suggest that bus stops be installed in one of three locations: near-side (located immediately before an intersection); far-side (located immediately after an intersection); and mid-block (located between intersections). Figure 8.16 illustrates these potential bus stop locations. Each offers advantages and disadvantages to bus drivers, to general traffic operations and to pedestrians, as summarized in Table 8.11. However, the final decision on bus stop location depends on the physical limitations of the site, ease of operation (including both access and safety), transfer situations and traffic volumes. Each individual site needs to be evaluated to determine which of the three locations would be best suited for the site while considering the city's or region's goal on transit policies.

Figure 8.16 Schematic of Bus Stop Location Options



Source: TCRP Report 19: Guidelines for Location and Design of Bus Stops

<u>Near-Side</u>

Near-side location is a common approach that provides stops immediately prior to an intersection. This strategy offers two key features to pedestrians and vehicle drivers: (1) it allows pedestrians to cross in front of the bus; and (2) it allows transit users to access buses close to crosswalks and intersections, thereby minimizing walking distances to connecting transit service. Figure 8.17 below show examples of near-side bus stops in the Tysons Corner area. The bus stop at Tysons Corner Center near Nordstrom has

a bus bay for buses to pull out of traffic to pick up passengers. This stop has shelters for patrons waiting for the bus and sidewalks that connect the bus stop to the Tysons Corner mall.

Figure 8.17 Near-Side Bus Stop Examples in Tysons Corner
Jones Branch Drive before Park Run Drive and Tysons Corner Center Next to Nordstrom

Some of the disadvantages of this location strategy are: (1) buses may conflict with right turning vehicles; (2) buses may obscure traffic control devices; and (3) buses may hinder sight distances for other drivers.

Another potential difficulty is that during peak hours, when many buses may be arriving at a stop at one time, this location might block the through lanes with queuing buses. Figure 8.18 illustrates near-side bus stops that illustrate some of the challenges posed by near-side stops. The left-hand photograph shows a bus stop at a right turn lane which means the right turning vehicles would have to wait until a bus pulls out of the stop.

Figure 8.18 Near-Side Bus Stop Challenges
Chain Bridge Road and Old Courthouse Road and Greensboro Drive before Spring Hill Road

Mid-Block

Mid-block location is where the bus stops within the block. A mid-block location is generally less congested than an intersection. Bus bays, where the bus pulls out of the traffic lane, are most effectively located in a mid-block bus stop zone. Mid-block stops are applicable at T-intersections or locations generating a larger passenger volume. Some of the advantages of the mid-block location are that it minimizes sight distance problems for pedestrians and vehicles; it also minimizes the impact on pedestrian and vehicle traffic. Some disadvantages of mid-block stops are that they increase the walking distance for users to access the bus from buildings located at intersections and they might encourage pedestrians to cross streets at midblock. Good examples of mid-block bus stops are shown in Figure 8.19. Both of these bus stops have sidewalks that connect to the adjacent office buildings.

Figure 8.19 Mid-Block Bus Stop Examples in Tysons Corner
Greensboro Drive at WestPark Drive and Greensboro Drive at International Drive

Figure 8.20 shows examples of mid-block bus stops that were occupied by parked vehicles. These stops might also encourage pedestrians to illegally cross street, particularly problematic in poor sight conditions such as evening, dawn, and inclement weather. So while mid-block locations are a helpful option, their location must be carefully considered and may necessitate collocation of additional features such as crosswalks to enhance pedestrian safety and the installation of no-parking signs.

Figure 8.20 Mid-Block Bus Stop Challenges
Park Run Drive near West Park Drive

Far-Side

With far-side locations, the bus stops immediately after passing through an intersection. Far-side locations are recommended on routes in which buses make left turns at intersections and where dedicated right turn lanes are present. Some of the advantages of far-side stops are that they minimize conflicts between right-turning vehicles and buses, and reduce sight distance problems on approach to the intersection. Figure 8.21 shows examples of far-side bus stops at the intersection of Old Courthouse Road/Gosnell Road. This intersection has right-turn only lanes; the far-side stops minimize conflicts between this turning movement and buses. Far-side stops may facilitate easier bus re-entry into traffic due to gaps created by intersection traffic signals. Far side stops also support queue jumping and/or bus signal priority/preemption techniques that may be deployed along identified corridors, including Route 7, in the future.

Figure 8.21 Far-Side Bus Stop Examples in Tysons Corner
Chain Bridge Road at Old Courthouse Road and at Gosnell Road

Some of the disadvantages of far-side location are that stops may obscure sight distance for crossing vehicles and pedestrians. Stopped buses at far-side locations may also hinder intersection capacity thereby increasing congestion. Far-side locations tend to cause rear-end accidents since drivers do not expect buses to stop again after stopping at a red light. For these reasons, large intersections like those shown in Figure 8.22 are not good locations for placing a far-side stop.

Figure 8.22 Far-Side Bus Stop Challenges
International Drive and Leesburg Pike and Chain Bridge Road and Old Courthouse Road

Within this context, Figure 8.23 below shows the existing bus stop network color-coded based on location. This information is superimposed over existing and pending building footprints. Going forward, it is suggested that the Connector consider the strengths and weaknesses of stop locations, as discussed here, and to most effectively accommodate new developments and demand.

Figure 8.23 Tysons Corner Area Bus Stops by Placement Type with Existing and Planned Developments

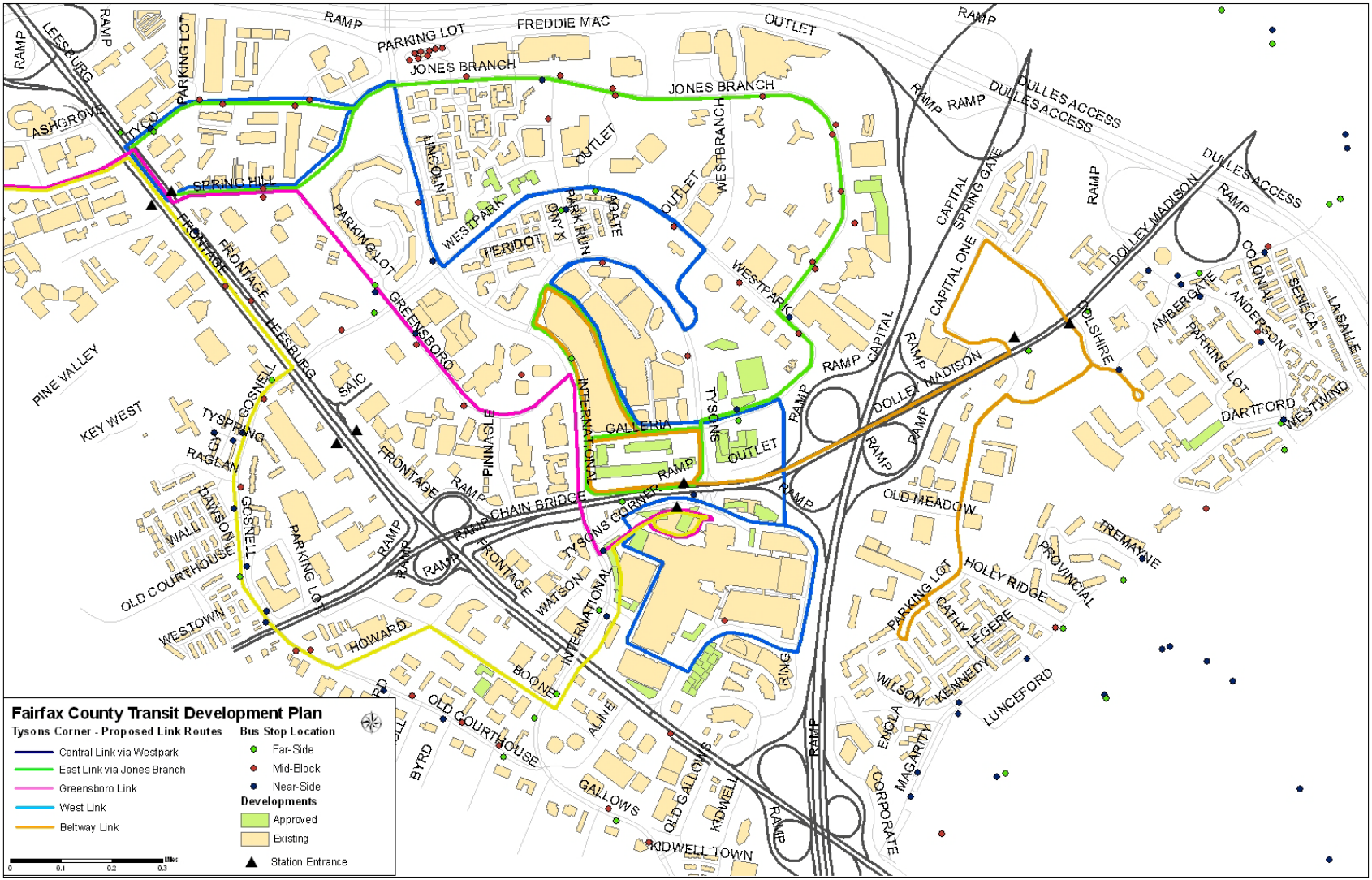


Table 8.11 Summary of Advantages and Disadvantages of Bus Stop Placements

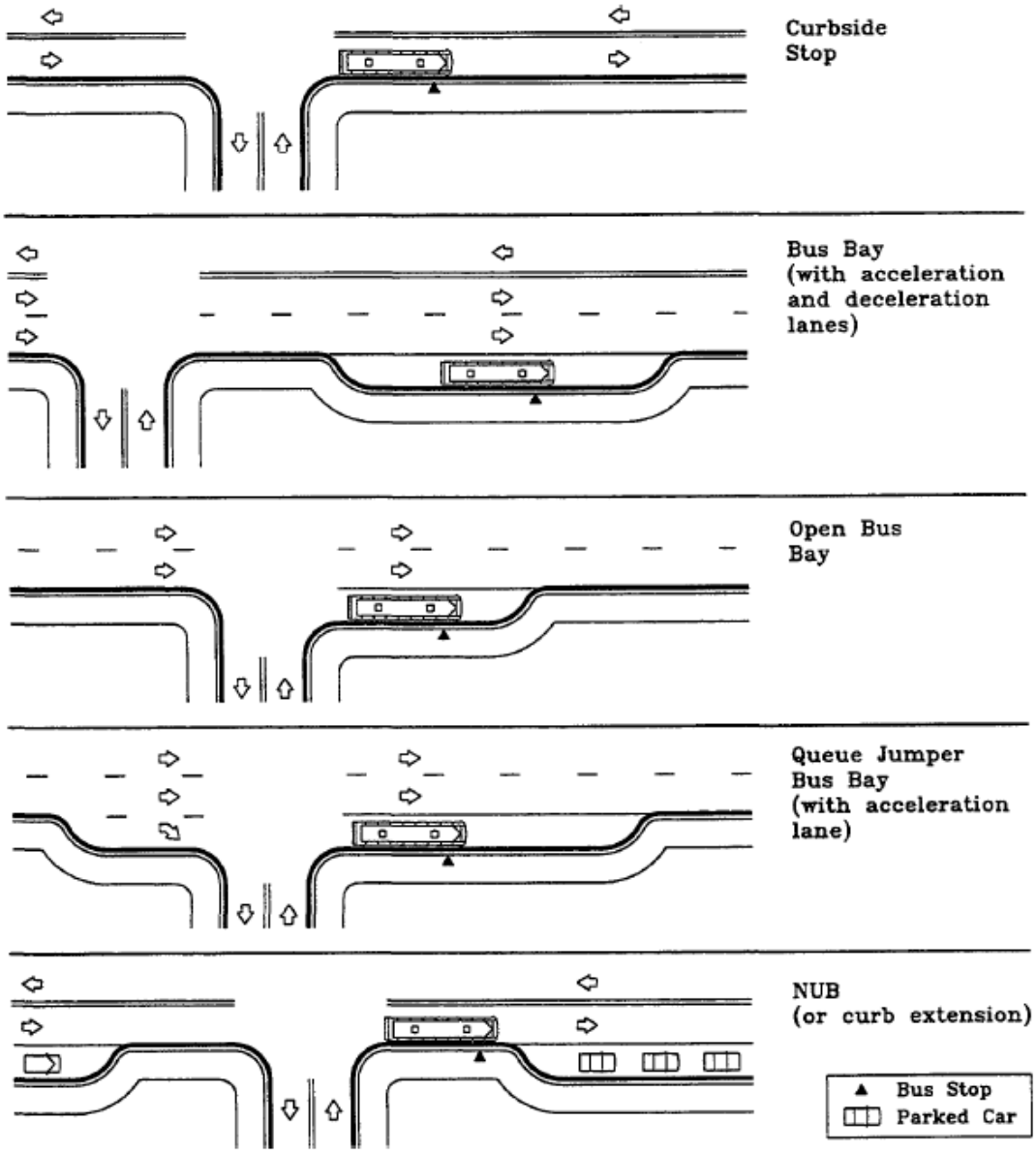
Placement	Advantages	Disadvantages
Near-side Stop	• Minimizes interferences when traffic is heavy on the far side of the intersection • Allows passengers to access buses closest to crosswalk • Results in the width of the intersection being available for the driver to pull away from curb • Eliminates the potential of double stopping • Allows passengers to board and alight while the bus is stopped at a red light • Provides driver with the opportunity to look for oncoming traffic, including other buses with potential passengers.	• Increase conflicts with right-turning vehicles • May result in stopped buses obscuring curbside traffic control devices and crossing pedestrians • May cause sight distance to be obscured for cross vehicles stopped to the right of the bus • May block the through lane during peak period with queuing buses • Increases sight distance problems for crossing pedestrians.
Mid-block Stop	• Minimizes sight distance problems for vehicles and pedestrians • May result in passenger waiting areas • Experiencing less pedestrian congestion	• Requires additional distance for no-parking restrictions • Encourage patrons to cross street at midblock(jaywalking) • Increases walking distance for patrons crossing at intersections
Far –Side Stop	• Minimizes conflicts between right turning vehicles and buses • Provides additional right turn capacity by making curb lane available for traffic • Minimizes sight distance problems on approaches to intersection • Encourages pedestrians to cross behind the bus • Creates shorter deceleration distances for buses since the bus can use the intersection to decelerate • Results in bus drivers being able to take advantage of the gaps in traffic flow that are created at signalized intersections	• May result in the intersections being blocked during peak periods by stopped buses • May obscure sight distance for crossing vehicles • May increase sight distance problems for crossing pedestrians • Can cause a bus to stop far side after stopping for a red light, which interferes with both bus operations and all other traffic • May increase number of rear-end accidents since drivers do not expect buses to stop again after stopping at a red light • Could result in traffic queued into intersection when a bus is stopped in travel lane

Source: TCRP Report 19: Guidelines for Location and Design of Bus Stops

8.9.3 Bus Stop Design

There are different street-side configurations to accommodate bus stops so that they can be accessible and safe for riders while maintaining traffic operations. Figure 8.24 illustrates these different bus stop design configurations. The advantages and disadvantages of each of the designs are summarized in Table 8.12.

Figure 8.24 Schematic of Bus Stop Design Options



Source: TCRP Report 19: Guidelines for Location and Design of Bus Stops

Table 8.12 Advantages and Disadvantages of Bus Stop Configurations

Type of Stop	Advantages	Disadvantages
Curb-side	• Provides easy access for bus drivers and results in minimal delay to the bus • Is simple in design and easy and inexpensive for a transit agency to install • Is easy to relocate	• Can cause traffic to queue behind a stopped bus, thus causing traffic congestion • May cause drivers to make unsafe maneuvers when changing lanes in order to avoid a stopped bus
Bus Bay	• Allows patrons to board out of the travel lane • Provides a protected area away from moving vehicles for both the stopped bus and the bus patrons • Minimizes delay to through traffic	• May present problems to bus drivers when attempting to re-enter traffic, especially during periods of high roadway volumes • Is expensive to install compared with curbside stops • Is difficult and expensive to relocate
Open Bus Bay	• Allows the bus to decelerate as it moves through the intersection • See Bus bay advantages	• See Bus Bay disadvantages
Queue Jumper Bus Bay	• Allows buses to bypass queues at a signal • See Open Bus Bay advantage	• May cause delays to right-turning vehicles when a bus is at the start of the right turn lane • See Bus Bay disadvantages
Nub/Bus Bulb	• Removes fewer parking spaces for the bus stop • Decreases the walking distance(and time) for pedestrians crossing the street • Provides additional sidewalk area for bus patrons to wait • Results in minimal delay for bus	• Costs more to install compared with curbside stops • See curb-side disadvantages •

Source: TCRP Report 19: Guidelines for Location and Design of Bus Stops

8.9.4 Fairfax County Bus Stop Guidelines

Fairfax County has developed bus stop guidelines to assist in facility location and design. Bus stop location and design criteria are based on land use and density, roadway classifications such as arterial, major and minor collector and the type of road section such as shoulder or curb. The County would also have to comply with ADA requirements as discussed below. The County has developed some examples of best practices by classifying bus stops location and design based on ridership, land use and proximity to a major activity center. For example, a major activity center on an arterial or major collector with total daily passenger boardings of 100 or greater is considered “higher ridership” while a stop with total

daily boardings of less than 50 is considered "lower ridership." A bus stop should also have other amenities such as a shelter, bench, loading pad, sign, lighting, two "no stopping, standing or parking" signs and bus bays when appropriate.

The advantages and disadvantages of each type of bus stop location were presented in Table 8.11. Whether a bus stop should be located at the near side, mid block or far side however, depends on the bus stop site itself. The geometric design of the roadway, passenger volume, vehicle turning movements, bus signal priority, impact on the intersection and intersecting transit routes are factors that need to be considered when choosing a bus stop location. Therefore, many criteria for choosing a bus stop location are site-specific and should be evaluated in an individual basis. However, the primary objectives for the design and location of bus stops as identified by Fairfax County are customer safety, convenience and operational effectiveness. [10] This means that at all times – when accessing, waiting, alighting, boarding, street crossing – safety should be considered. A bus stop should be accessible from the adjacent neighborhood with a good network of sidewalks and crosswalks. A bus stop should also have a loading pad, waiting area, shelters that are well lit and also display information on bus schedules. Safety not only for the passengers but also for the vehicles is important such as providing enough sight distance, choosing an appropriate location and providing acceleration and deceleration lane. Along with all the safety features, a bus stop should also work operationally meaning it should minimize delay and should not conflict with the existing system of bus operations.

[10] Fairfax County Bus Stop Guidelines, July 2004