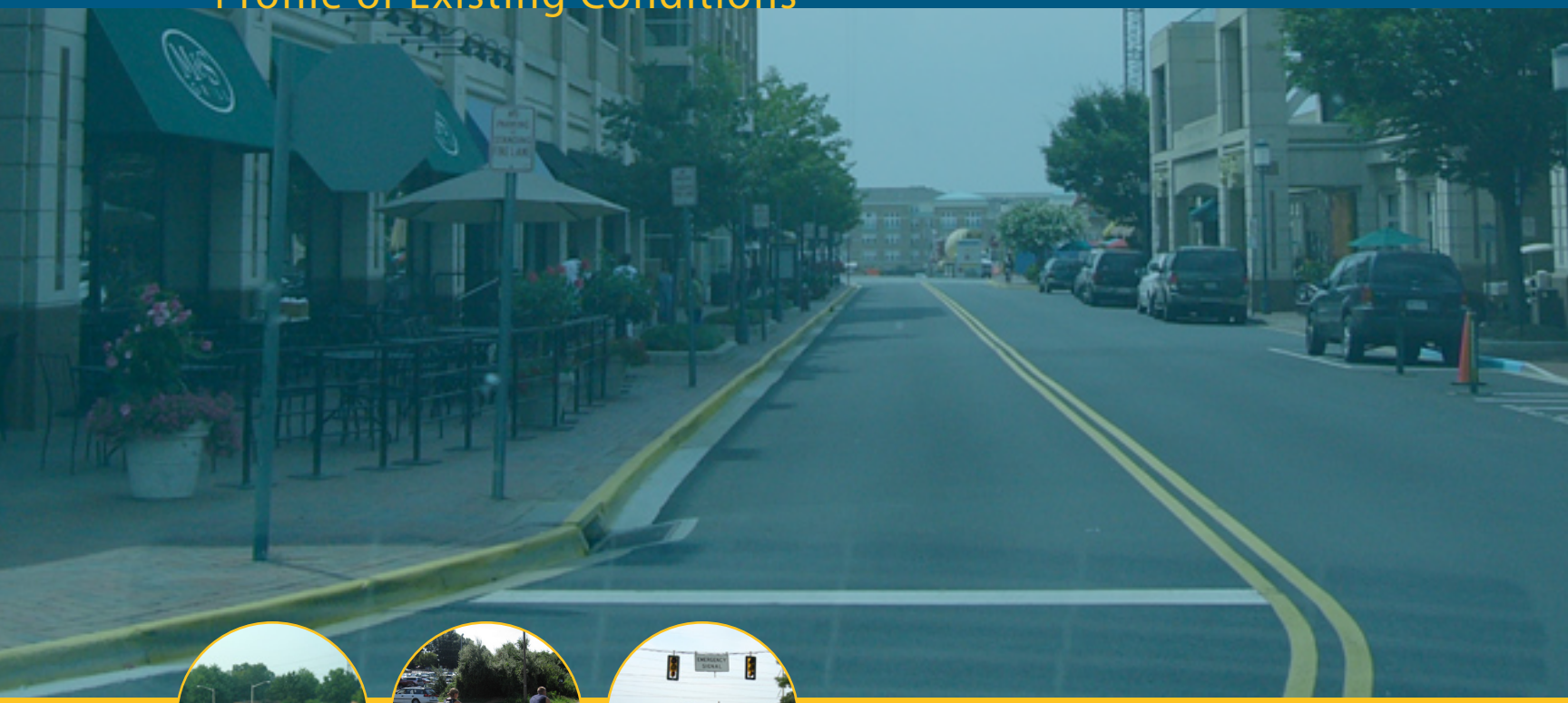
Wiehle Avenue/Reston Parkway

Station Access Management Plans

Profile of Existing Conditions



Submitted to
Fairfax County,
Department of Transportation

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1.0 Introduction

The Wiehle Avenue/Reston Parkway Station Access Management Plans are being developed to identify the actions that will be required to adequately serve both persons traveling to and from the new Metrorail stations and those traveling through the areas served by these stations. Travel by all modes – walking, bicycle, bus and auto – is being considered in these studies. The first step in the analysis is developing a full understanding of existing travel markets and the facilities in place to serve these markets. Only when current conditions are understood and facilities inventoried can needs be identified arising from the changes in travel patterns resulting from the availability of Metrorail service and the new stations.

A study area for these analyses has been defined. The study area, illustrated in Figure 1, extends roughly from Hunter Mil Road on the east to the Fairfax County Parkway on the west, and from roughly Lawyers Road/Fox Mill Road on the south to just south of Route 7 on the north.

This report presents a profile of existing roadway, transit, bicycle and pedestrian conditions in the project study area. Roadway and transit system assessments were performed for the entire study area; however, the bicycle and pedestrian system assessments were more focused on what will be the market sheds for bicyclists and pedestrians accessing the new Metrorail stations. The bicycle system assessment included major facilities within 2 miles of the new stations, while the pedestrian system assessment focused on areas within one-half mile of each station[1] (denoted by red contour lines in Figure 1).

Chapter 2 of this report reviews the transportation "market" in the study area, including data on existing residential and commercial development levels, commuting patterns and usage of the various modes.

Chapter 3 presents an assessment of roadway system volumes, classifications and peak hour traffic operations.

Chapter 4 presents an overview of existing transit service and usage.

Chapter 5 presents an assessment of the existing bicycle and pedestrian systems.

The findings of this existing conditions assessment will serve as the basis for future analyses and recommended improvements.

[1] It is recognized that some bike and pedestrian access will be from distances greater than 2 and 0.5 miles, respectively. However, as the majority of trips will occur within the defined travel sheds, we want to pay particular attention to required infrastructure within these bounds.

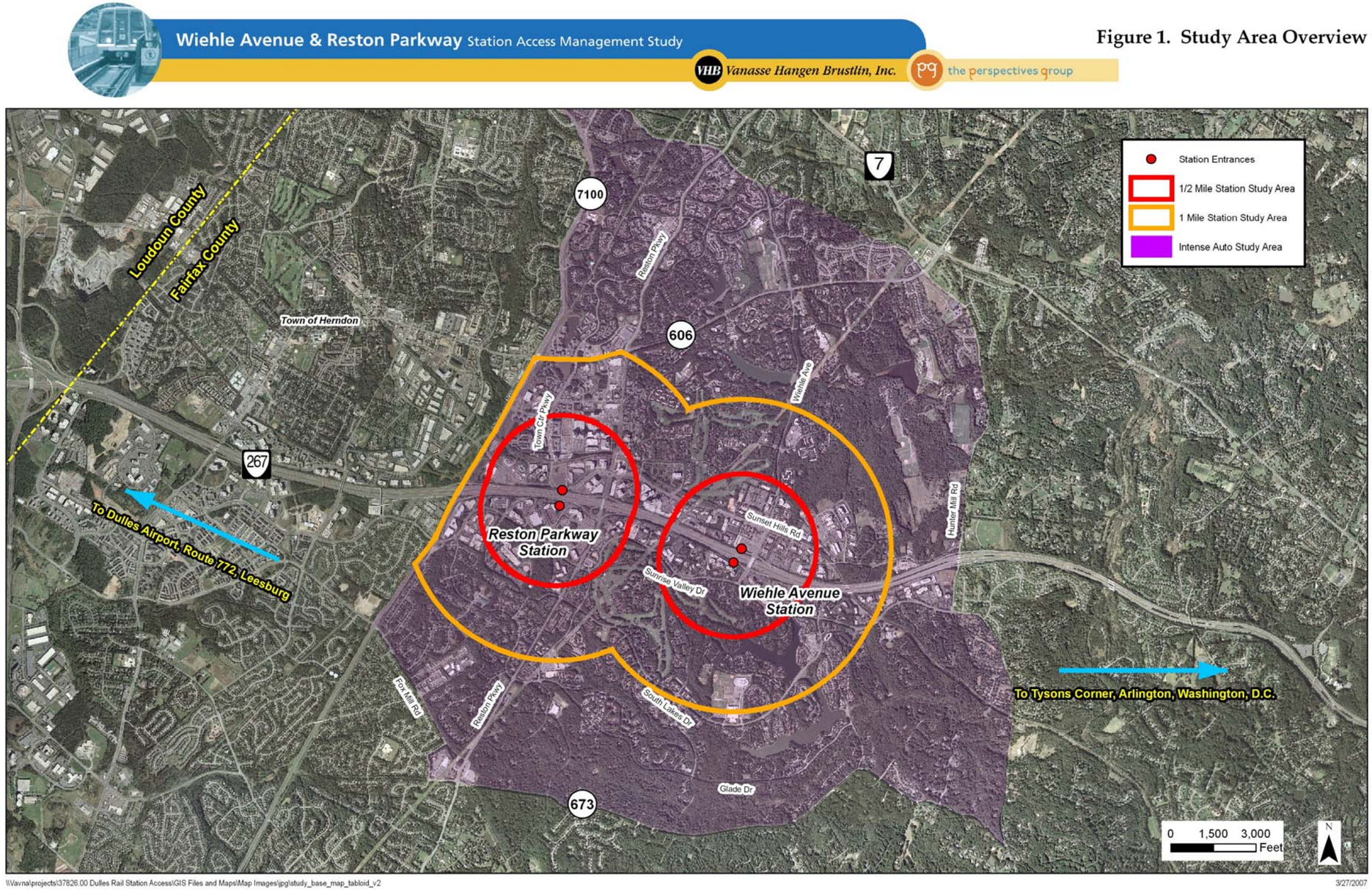


Figure 1. Study Area Overview

2.0 Transportation Market

The Reston/Wiehle area serves as both a major residential area with a diverse mix of housing types and supporting retail and other services, and as a major regional employment center. Accordingly, significant travel flows into and out of the study area, as well as within the study area, define the transportation market. Reston/Wiehle area residents create trip origins traveling to employment destinations outside the study area, primarily to the Route 28 corridor, Tysons Corner, Arlington, and the District of Columbia. People residing outside the study area commute in each day to employment destinations within the study area; most of these worker in-flows originate in Loudoun County and western Fairfax County, as well as "reverse commuters" traveling from homes inside the Capital Beltway (I-495).

2.1 Residential and Employment Levels

Figure 2 shows the 2005 estimated population around the proposed station locations. Darker areas indicate higher population. There are just over 61,000 people living in the residential portions of the study area shown in Figure 2. The average population density of the residential study area is 5.7 persons per acre. More of these residents tend to live outside the area immediately surrounding the proposed stations; more of the close-in area currently supports office and retail uses.

Figure 1. 2005 Study Area Population

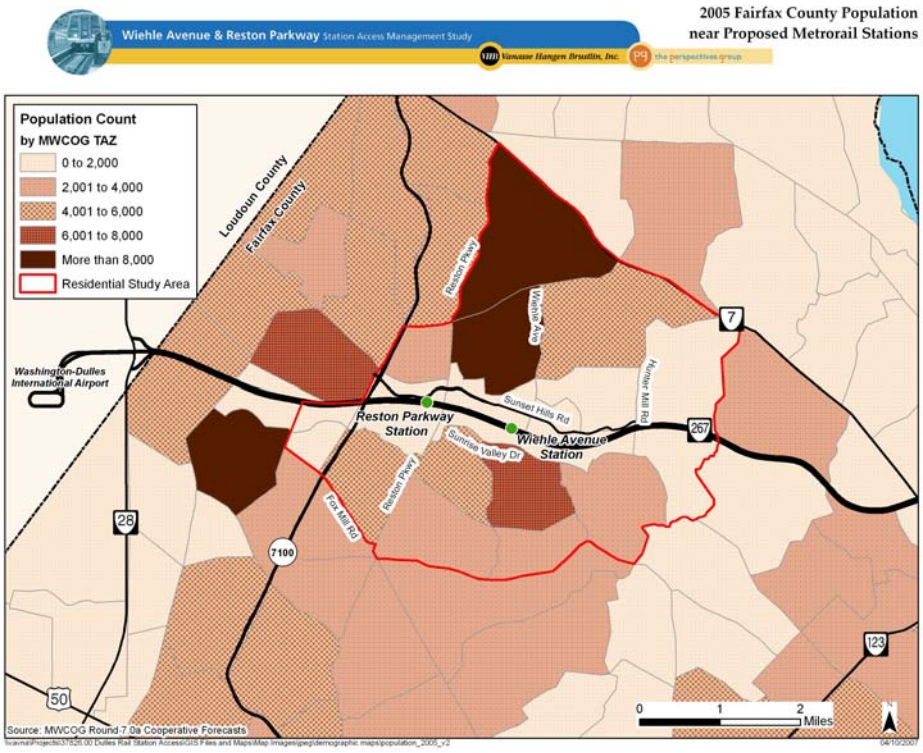
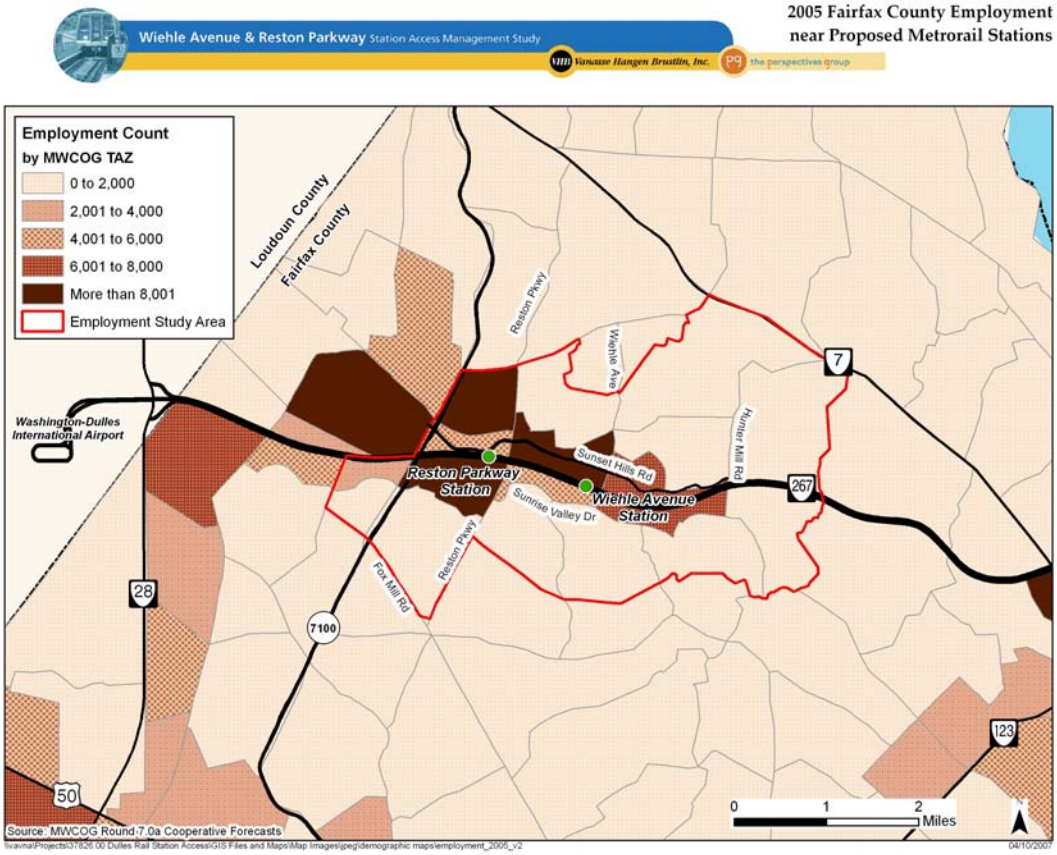


Figure 3 illustrates the concentration of employment in the areas immediately surrounding the proposed stations. Darker areas indicate more job locations. There are just over 62,000 people working in the employment study area shown in Figure 3. The employment density of this area is 8.3 jobs per acre.

Figure 2. 2005 Study Area Employment



2.2 Commuting Patterns

The year 2000 Census Transportation Planning Package (CTPP) tracks journey-to-work data, which is a special tabulation of home-based work (HBW) trips from the US Census long form. Analysis of the CTPP data was conducted for the residential and employment study areas shown in Figures 2 and 3. Although these data are for the year 2000, while the population and employment data in Section 2.1 are from the year 2005, it is reasonable to assume that the commuting patterns are generally consistent over this five-year time span.

Figure 4 shows the geographic distribution of commute origins of Reston workers; that is, where people who work in Reston live (i.e., where their home is located). Over 90% of people that work in the station areas commute from Virginia. Of those workers who live in Virginia, nearly 60% live in Fairfax County, nearly 17% live in Loudoun County, and less than 10% live in Prince William County. Maryland residents constitute 6% of workers commuting to Reston.

Figure 4 also shows that the greatest concentration of Reston-area workers commute from nearby areas within Reston, as well as the Town of Herndon and neighborhoods along Route 28 and the Fairfax County Parkway (VA 7100).

Figure 3. Commute Origins of Reston Workers by Census Tract

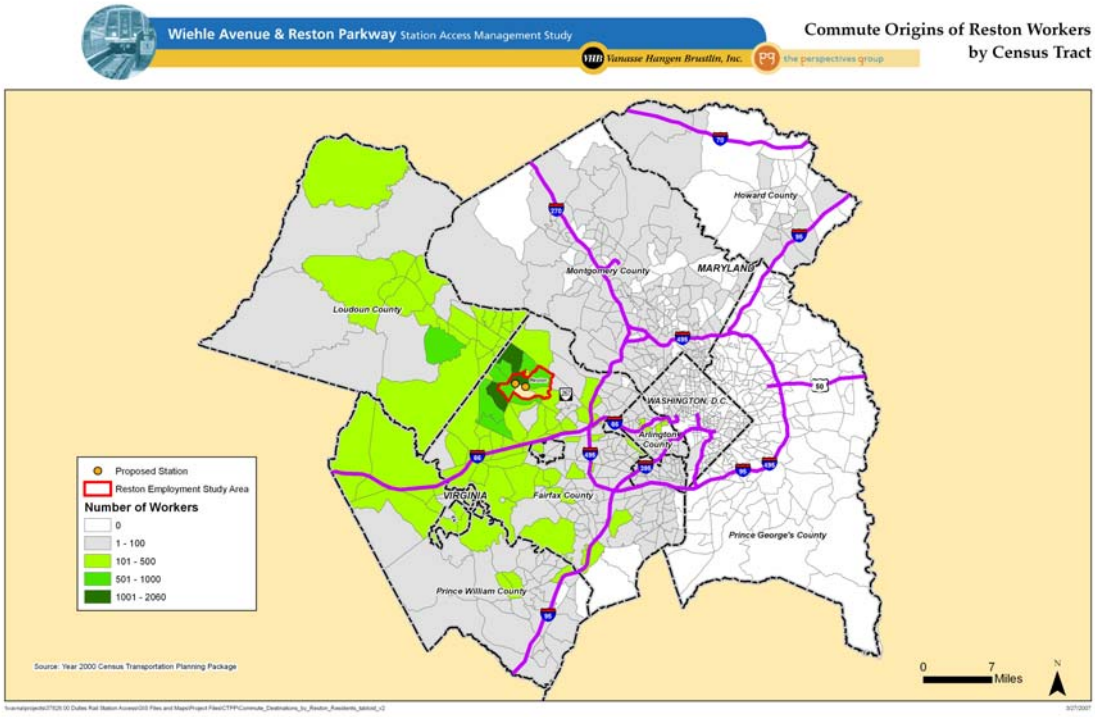
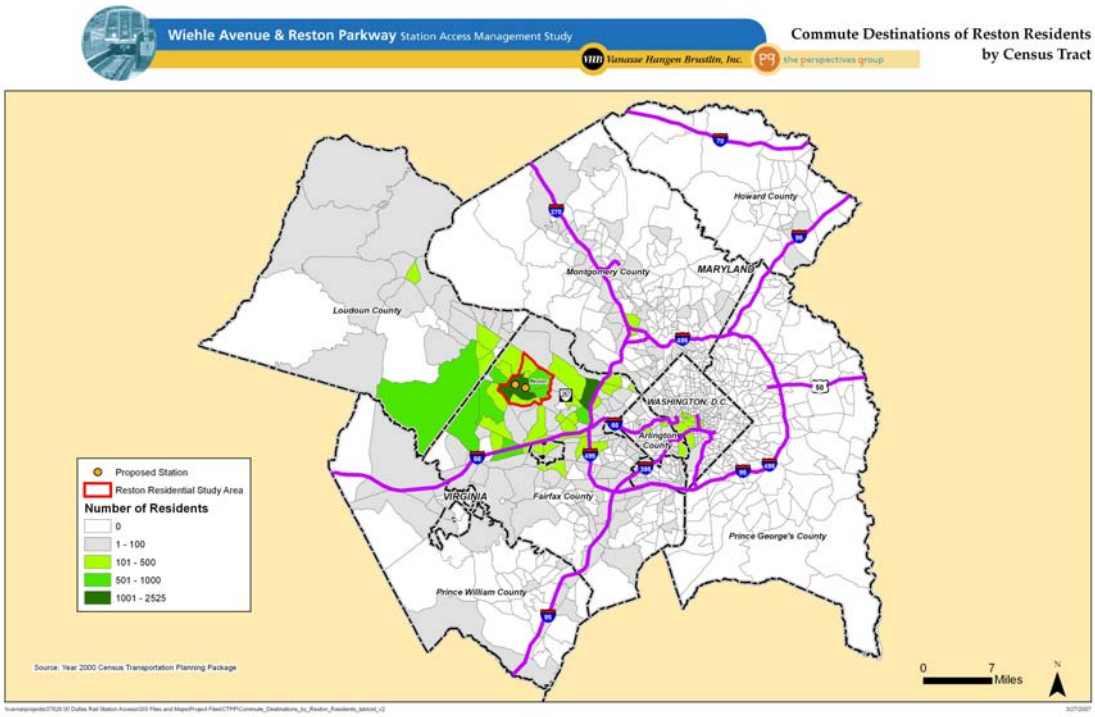


Figure 5 shows the commute (work) destinations of Reston residents. Nearly 87% of people that live in the station areas work in Virginia, including 70% that work in Fairfax County, 8% in Loudoun County, and 4% in Arlington County. An additional 9% work in the District of Columbia, and just over 4% work in Maryland. Figure 5 also shows that many Reston-area residents work in Reston; for those commuting out of Reston, the greatest concentration of employment destinations occur around Tysons Corner, followed by the Route 28 corridor, Rosslyn, Pentagon City, and Crystal City sections of Arlington, and downtown Washington, DC.

Figure 4. Commute Destinations of Reston Residents by Census Tract



2.3 Mode Choice

The vast majority of people traveling both into and out of the study area each day are driving alone rather than carpooling or riding the bus. Figure 6 shows the reported journey-to-work travel mode of Reston-area workers. Eighty-seven percent of these workers drive alone; 8% of the workers commute via carpool; only 1% used transit (bus) in 2000.

Figure 5. Commute Mode of Reston Workers (Source: CTPP Part 2)

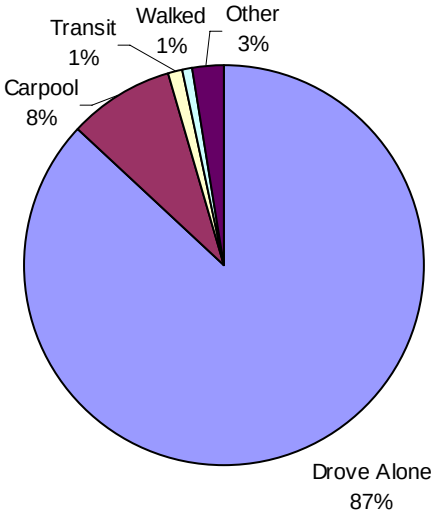
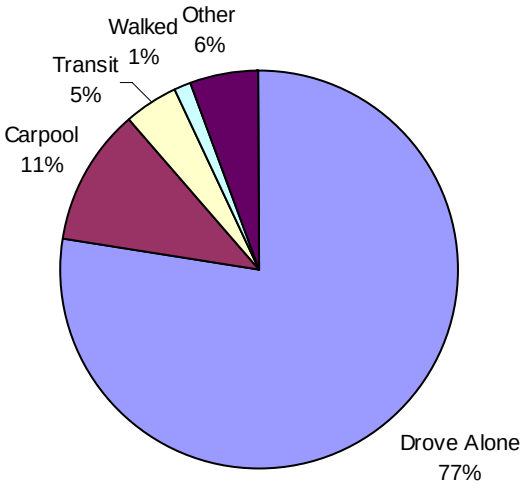


Figure 7 shows the mode of travel that Reston area residents reported using to commute to work. Seventy-seven percent of the population commuted by driving alone, though 11% carpool and

5% take transit. Since regional employment locations tend to be clustered while residents are spread throughout the area, Reston area workers come from a wide area while the employment locations of Reston area residents are more concentrated and potentially more accessible by transit.

Figure 6. Commute Mode for Reston Area Residents (Source: CTPP Part 1)



3.0 Roadway System

3.1 System Typologies

This section describes two separate organizing typologies that are available for discussing the existing roadway system: 1) administrative and 2) functional.

Administrative Classification

Almost all public streets in Fairfax County are administered and maintained by the Virginia Department of Transportation (VDOT). VDOT has established four administrative system classifications for roadway facilities, as follows:

- **Interstate System:** American Association of State Highway and Transportation Officials (AASHTO)-designated Interstate highway facilities. Fairfax County examples include: I-66, I-395, and I-495.

- **Primary State System:** Non-Interstate system facilities generally serving more than one jurisdiction and therefore of relatively more statewide significance. These include U.S. Routes and Virginia Routes with numbers less than 600, such as U.S. Route 1, U.S. Route 50, VA Route 7, VA Route 123, and VA Route 267.

- **Secondary State System:** Non-Interstate System and Non-Primary System roads generally serving only a single county. These consist of VA Routes with numbers of 600 or greater.

- **Urban System:** Major streets in cities and towns of over 3,500 population, and therefore not applicable to Fairfax County.

Functional Classification

The development of a functional classification system is a concept addressed in the County's Comprehensive Transportation Plan (source: Fairfax County). This concept groups facilities according to the character of service that they are intended to provide. Functional classification is very useful in considering the dual role of the transportation network in providing both travel mobility and access to property. These road classifications represent a continuum whereby the full-range of mobility and access is provided, and each has an associated range of roadway design cross sections that define how local traffic, pedestrian movements and through travel may be served. The following functional categories describe the roadway network in Fairfax County:

- **Freeways and expressways** are controlled access facilities providing for high-volume travel. The concept of service to abutting land is subordinate to accommodating the through movement of vehicles. An example of this type of facility in the study area is the Dulles Toll Road (VA Route 267).

- **Principal arterials** also serve as main travel corridors. Some access is provided to abutting land, but the primary function of the roadway, particularly during peak periods, is to carry through traffic. An example in this study area is the Fairfax County Parkway (VA Route 7100).

- **Minor arterials** usually carry an even mix of local and through traffic. They link collectors, and sometimes local streets, with principal (major) arterials. Minor arterials are lower service level roadways with partial control of access. In Fairfax County, minor arterials are further subdivided into two categories to better identify their function:

  - **Type A** minor arterials are those which perform a particularly significant function in the transportation network due to their length and/ or their design. These facilities closely approach principal arterials in terms of their traffic characteristics and role in the network. They carry both local and through traffic and serve as links to collectors, local streets and principal arterials. Study Area examples include Reston Parkway (VA Route 602) and Baron Cameron Avenue.

  - **Type B** minor arterials represent the remaining minor arterials, which are somewhat shorter in length, traverse a less densely developed area, or are

located in more mature areas and consequently were built to a somewhat older design standard. Examples of this facility in the study area include Hunter Mill Road, Sunrise Valley Drive, Sunset Hills Road, and Wiehle Avenue.

- **Collector Streets** provide direct service to and from local areas, routing traffic to the arterial street system. Generally, these roadways are not used for through trips. Collector streets are very important for the collection and distribution functions of transit service. As such, they should be designed in conjunction with the arterial system to permit boarding and alighting, and allow buses to safely enter, exit and turn around if necessary.

- **Local Streets** provide access to properties abutting the roadway within the immediate vicinity. Traffic speed and volume should be low. Sidewalks and the provision of curb parking are desirable.

The functional classification system is an element in the development of recommendations to accommodate the vehicle trips generated in or traveling through the study area. Facilities intended to serve a certain type and magnitude of travel will require improvements consistent with their function.

3.2 Study Area Facilities

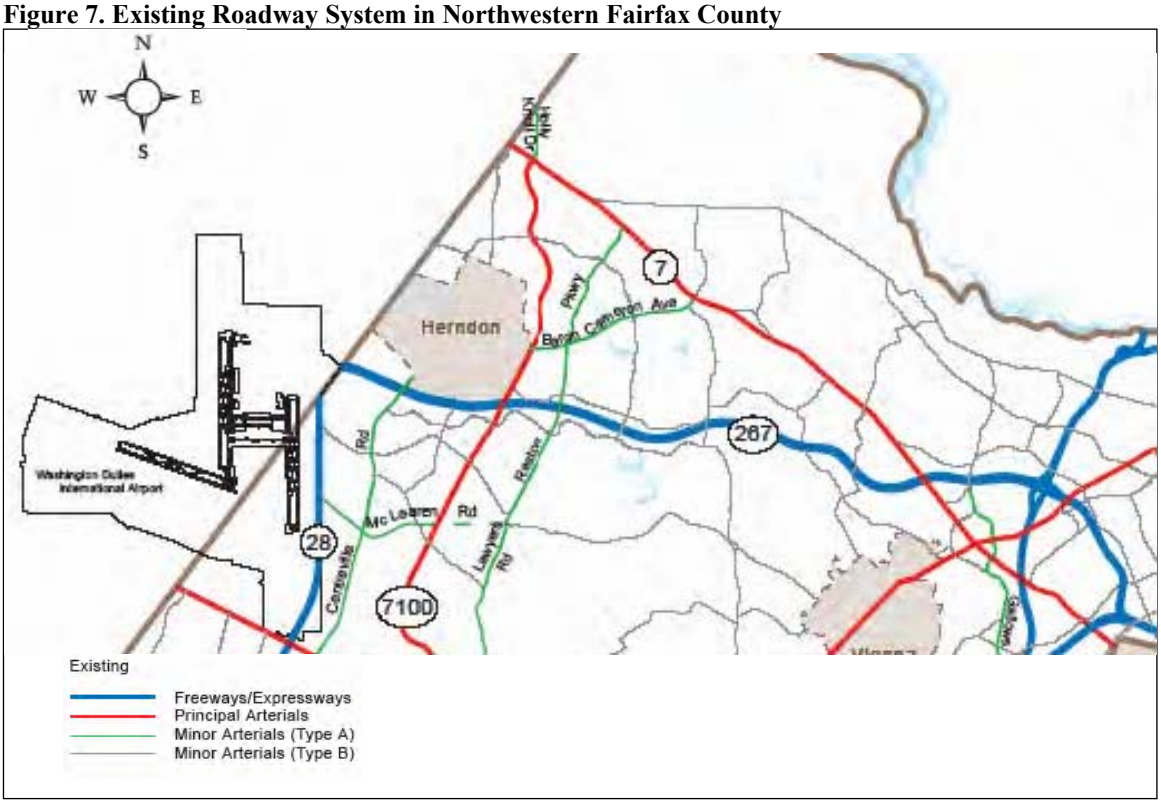
This section describes the general characteristics of the major roadway facilities in the study area. Figure 8 shows the current functional classification of roadways and the number of mainline travel lanes available.

Freeways/Expressways

The Dulles Toll Road (VA Route 267) is the main portal of access to the study area for longer-distance travel to employment and retail centers.

Dulles Toll Road (VA Route 267) is an eight-lane (four mainline travel lanes each way), tolled, fully access-controlled facility. It extends 14 miles from the I-495 Caital Beltway interchange to Dulles Airport and the beginning of the privately-operated Dulles Greenway. The Dulles Toll Road provides access to the study area at four interechanges: 1) Fairfax County Parkway (VA Route 7100), 2) Reston Parkway, 3) Wiehle Avenue and 4) Hunter Mill Road.

Figure 7. Existing Roadway System in Northwestern Fairfax County



Toll rate schedule is illustrated on Table 1. A portion of the revenue from the tolls is to be dedicated to the capital cost of the extension of Metrorail service.

Table 1. Dulles Toll Rate Schedule

	Main Toll Plaza	On/Off Ramps	VA Route 28 On/Off Ramps
Vehicle Type	**Rate**	**Rate**	**Rate**
Two-Axles	75¢	50¢	50¢
Each Additional Axle	25¢	25¢	25¢
Maximum Toll	$1.75	$1.50	$1.50

Source: VDOT

Dulles International Airport Access Highway (DIAAH) is a four lane (two lanes each way) freeway facility located within the median of VA Route 267 (Dulles Toll Road), which exclusively serves traffic to and from Dulles International Airport. There is one access point to the DIAAH within the study area.

Principal Arterials

The principal arterial in the study area is a high volume facility with direct connections to the freeway system that serves a relatively high percentage of traffic bound for local destinations:

Fairfax County Parkway (VA Route 7100) is a four-lane to six-lane, median divided facility that passes through the study area linking VA 7 (Leesburg Pike) in the northern part of Fairfax County to US 1 (Richmond Highway) in the southeastern part of the County.

Minor Arterials (Type A)

The following roads belong to this category within the study area:

Reston Parkway (VA Route 602) is an important north-south road in Fairfax County. It is a four-lane arterial. The road generally parallels the Fairfax County Parkway (VA Route 7100) and connects VA 7 (Leesburg Pike) and West Ox Road.

Baron Cameron Avenue is an important four-lane (two lanes in each direction), median divided east- west road in Fairfax County. In the study area, Baron Cameron Avenue runs between the Fairfax County Parkway (VA Route 7100) and Hunter Mill Road.

Minor Arterials (Type B)

"Type B" Minor Arterials are generally shorter in length than "Type A" Minor Arterials. They typically serve less densely developed areas, or were built under older design standards. Within the study area, the following roads belong to this category:

Hunter Mill Road is a two lane north-south road connecting Baron Cameron Avenue and Chain Bridge Road (VA Route 123). The road provides access to residential areas.

Wiehle Avenue is a four lane road that connects Dranesville Road and Sunrise Valley Drive. Wiehle Avenue generally parallels Hunter Mill Road south of Baron Cameron Road Avenue. Within the study area west of Baron Cameron Avenue, Wiehle Avenue connects to Herndon..

Sunset Hills Road is a four-to-six lane, east-west road connecting the Fairfax County Parkway (VA Route 7100) and Hunter Mill Road. Sunset Hills Road runs parallel to the Dulles Toll Road (VA Route 267).

Sunrise Valley Drive is a four lane road connecting Frying Pan Road and Hunter Mill Road. Within the study area, Sunrise Valley Drive runs parallel to the Dulles Toll Road (VA Route 267).

3.3 Traffic Volumes

This section describes the traffic volumes in the study area for the Year 2005 as well as the recent growth in the past decade. The study team conducted a thorough analysis of traffic on the key roadway segments proceeding north-south and west-east in Reston with the purpose of gaining an understanding of existing traffic patterns and whether or not the current roadway system is adequate to meet travel demands.

Figure 8 shows the Year 2005 Annual Average Daily Traffic (AADT) volumes available from VDOT for the key roadway links in the study area. The major routes that serve the area are listed as follows:

- North-south roads: Fairfax County Parkway, Reston Parkway, Wiehle Avenue, Hunter Mill Road
- East-west roads: Dulles Toll Road, Baron Cameron Avenue, Sunrise Valley Drive, Sunset Hills Road

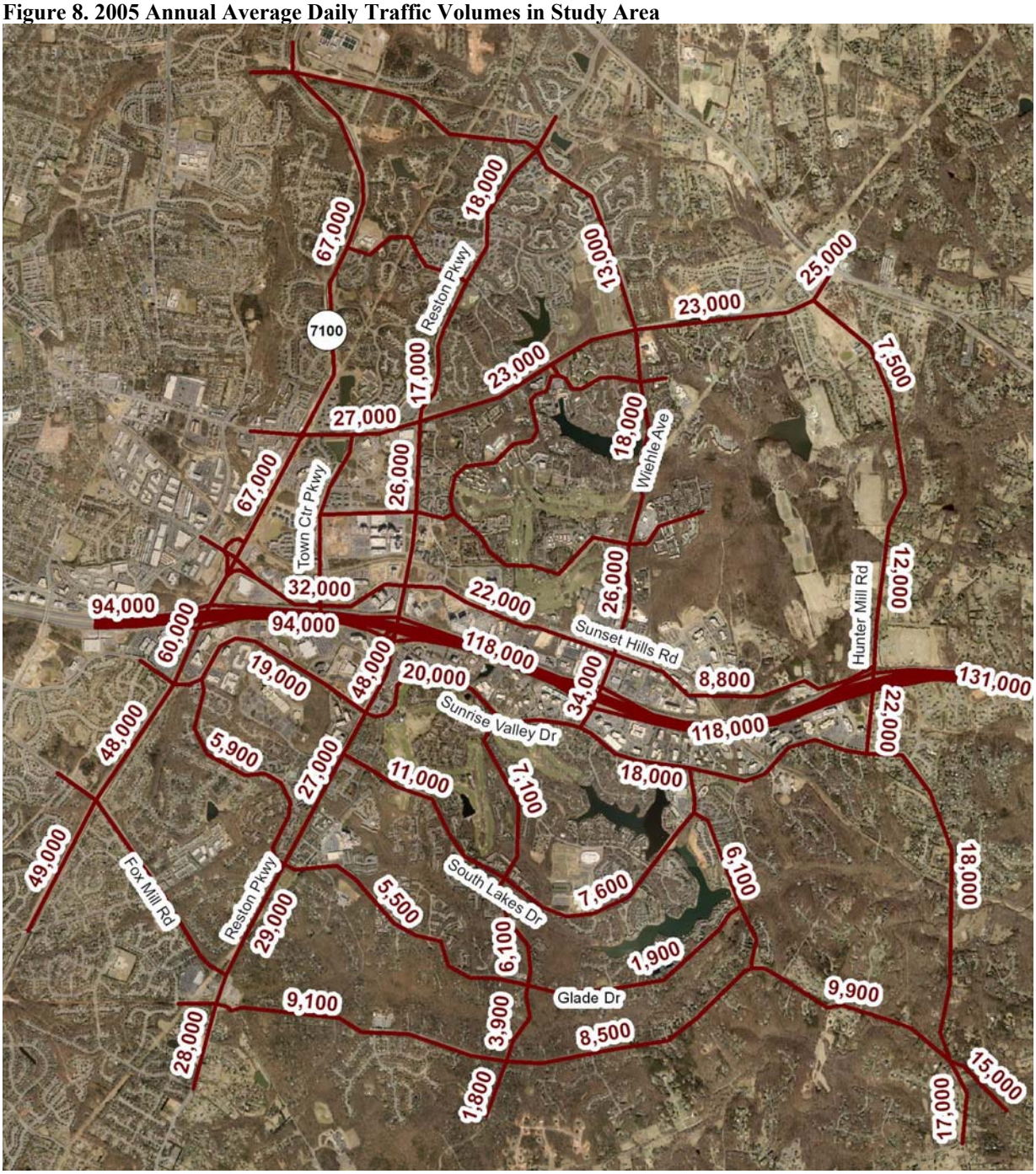
Reston has experienced traffic growth as both a residential and employment center in the last decade. Table 1 shows the derived annual growth rates according to the VDOT count data. As expected, all the major routes have experienced different level of growths to serve the increasing local travel demand. For the north-to-south direction, Fairfax County Parkway has the fastest growth in traffic. The major construction project on the parkway, which started in 2001 and ended in 2002, included a four-lane divided roadway from Walnut Branch Road South to Sunset Hills Road/Spring Street and a grade-separated diamond interchange at Baron Cameron Avenue. It has greatly improved the connectivity of travelers north of the Dulles Toll Road and attracted many north-south trips. Reston Parkway also has a high annual growth rate due to its direct access to the Reston Town Center and major employment centers. For the west-to-east direction, the Dulles Toll Road and all the parallel roadways have experienced rapid growth in traffic, at around or higher than 3%.

Table 2. Traffic Growth in the Study Area

North-South Road	Annual Growth 1995-2005
Fairfax County Parkway	2.9%
Reston Parkway	2.1%
Wiehle Avenue	1.7%
Hunter Mill Road	1.6%

West-East Road	Annual Growth 1995-2005
Dulles Toll Road	3.0%
Baron Cameron Avenue	3.2%
Sunrise Valley Drive	3.3%
Sunset Hills Road	3.2%

Figure 8. 2005 Annual Average Daily Traffic Volumes in Study Area



Source: VDOT Traffic Data (http://www.virginiadot.org/info/ct-TrafficCounts.asp)

A closer observation was made of traffic volumes in the vicinity of the two future Metrorail stations. Figures 9 and 10 illustrate the peak hour traffic volumes for the base year, 2005. The data were obtained directly from Synchro computer program files provided by VDOT. Synchro is a widely used traffic operational analysis software tool, which provides a graphic representation of the roadway network and implements the methods of the 2000 Highway Capacity Manual (HCM) for streets and intersections analyses.

Figure 9. AM Peak Hour Traffic Volumes in Station Areas

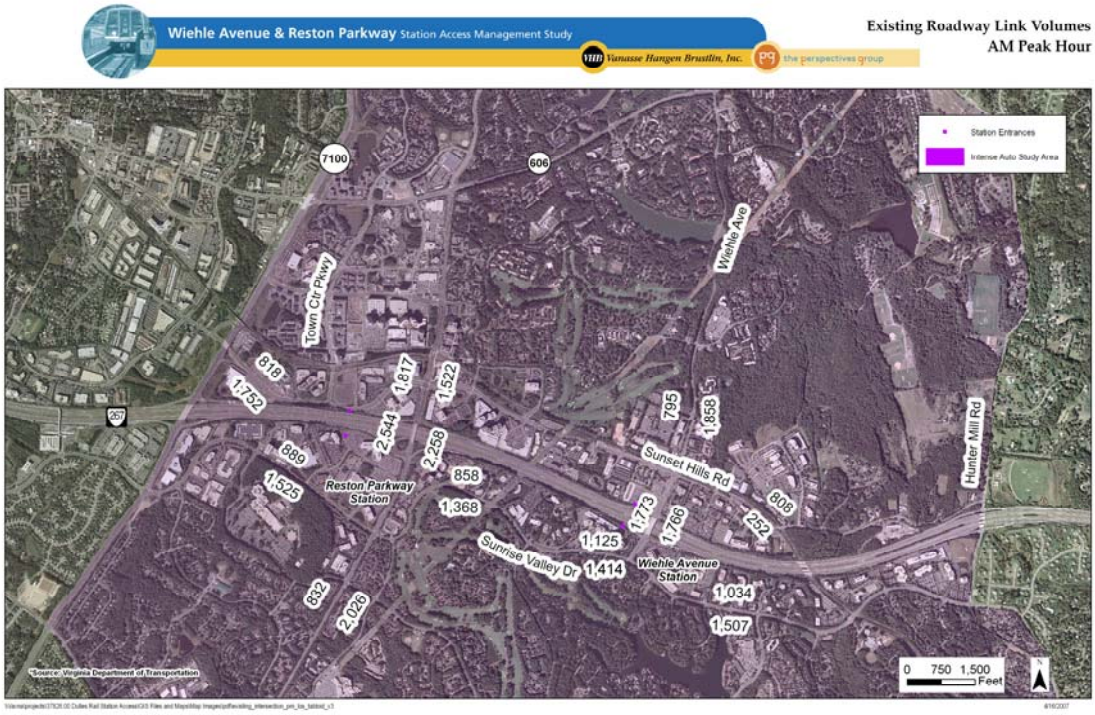
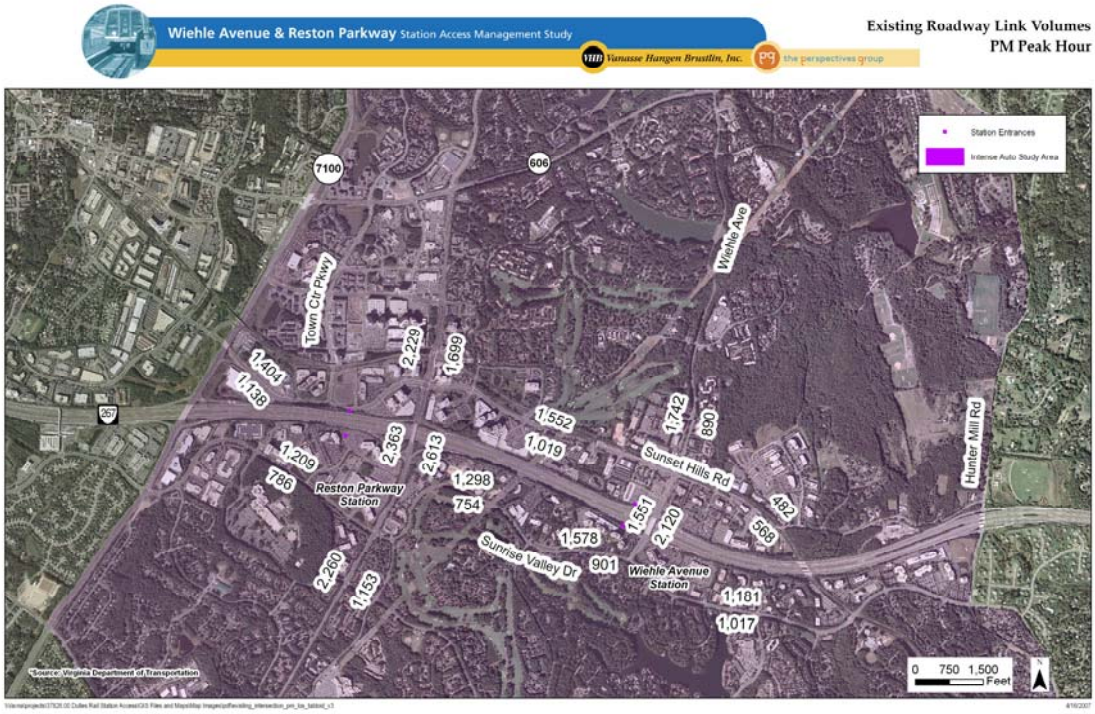


Figure 10. PM Peak Hour Traffic Volumes in Station Areas



3.4 Base Year Level of Service

In traffic operational studies of arterials and roadways, delay is used to measure the effectiveness of signalized intersections since delay indicates frustration and discomfort of travelers, lost travel time and fuel consumption. According to the 2000 edition of the Highway Capacity Manual, level of service (LOS) at signalized intersections is defined in terms of the average control delay per vehicle, typically for a 15-minute analysis period. Control or signal delay is the portion of total delay that is the difference between the travel time actually experienced and the reference travel time that would result during ideal free flow conditions.

Six levels of service ratings ranging from "A" to "F", with "A" representing the best operating conditions and "F" the worst, are prescribed. The quantitative delay criterion for each LOS level are provided in Table 3.

Table 3. LOS Criteria for Signalized Intersection

LOS	Control Delay per Vehicle (s/veh)
A	≤ 10
B	> 10, ≤ 20
C	> 20, ≤ 35
D	> 35, ≤ 55
E	> 55 ≤ 80
F	> 80

Source: HCM, 2000.

LOS A describes operations with very low delay, up to 10 seconds per vehicle. This level of service occurs when traffic flow is extremely favorable and most vehicles do not stop at all.

LOS B describes operations with delay greater than 10 and up to 20 seconds per vehicle. This level generally occurs with good progression between successive traffic signals, short cycle lengths, or both. Some vehicles stop, causing slight delay.

LOS C describes operations with delay greater than 20 and up to 35 seconds per vehicle. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures in which some vehicles must wait more than one signal cycle to clear the intersection may begin to appear at this level.

LOS D describes operations with delay greater than 35 and up to 55 seconds per vehicle. At LOS D, the influence of congestion becomes more noticeable. Many vehicles stop, and the proportion of vehicles not stopping declines.

LOS E describes operations with delay greater than 55 and up to 80 seconds per vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression and long cycle lengths. Users experience poor progression and long delays.

LOS F describes operations with delay greater than 80 seconds per vehicle. This level is considered to be unacceptable to most drivers. At this level, an intersection's capacity is oversaturated, causing poor progression and unusually long delays.

VDOT maintains Synchro networks with updated traffic volumes, geometries and signal timings for the major signalized intersections in the study area. Synchro provides a full implementation of the HCM 2000 Signalized Operations method. Based on the delays computed, Synchro produces signal reports in the HCM format, which computes the level of service for each turning movement as well as the intersection as a whole. Synchro 7.0 was used to evaluate and report the existing AM and PM peak hour level of services at the 77 signalized intersections in the study area for the year 2005.

The study team has also made field trips to observe roadway operating performance. The most severe congestion levels were observed along Fairfax County Parkway, Reston Parkway and Wiehle Avenue in the evening peak hour. However, as illustrated in Figure 11 and 12, the majority of the signalized intersections in the study area currently operate at LOS A to C during both AM and PM peak hours. The main reason is that as a deterministic package, Synchro is good for analyzing the performance of isolated or small-scale transportation facilities, but is limited in its ability to analyze network or system effects. For example, at a highly congested roadway segment, because of queue spillback to the upstream intersections, the number of vehicles that actually arrive at a downstream intersection is small. Without considering the queue effect, Synchro reports a low delay and good level of service for the downstream intersection, when in fact, traffic is congested along the roadway.

To offset this deficiency in the Synchro program algorithm, the study team will be applying a much more sophisticated traffic operations analysis software program for future conditions, VISSIM. This program will account for queue spillback effects and will produce more accurate measures of system delay.

The intersections that are currently experiencing high delays, operating at either LOS E or F, during both AM and PM peak hours are as follows:

- Fairfax County Parkway at Sunrise Valley Drive
- Fairfax County Parkway at Fox Mill Road
- Reston Parkway at Baron Cameron Avenue
- Reston Parkway at Sunset Hills Road
- Reston Parkway at Southbound Dulles Toll Road On-Ramp
- Reston Parkway at Sunrise Valley Drive

Figure 11. AM Peak Hour Level of Service

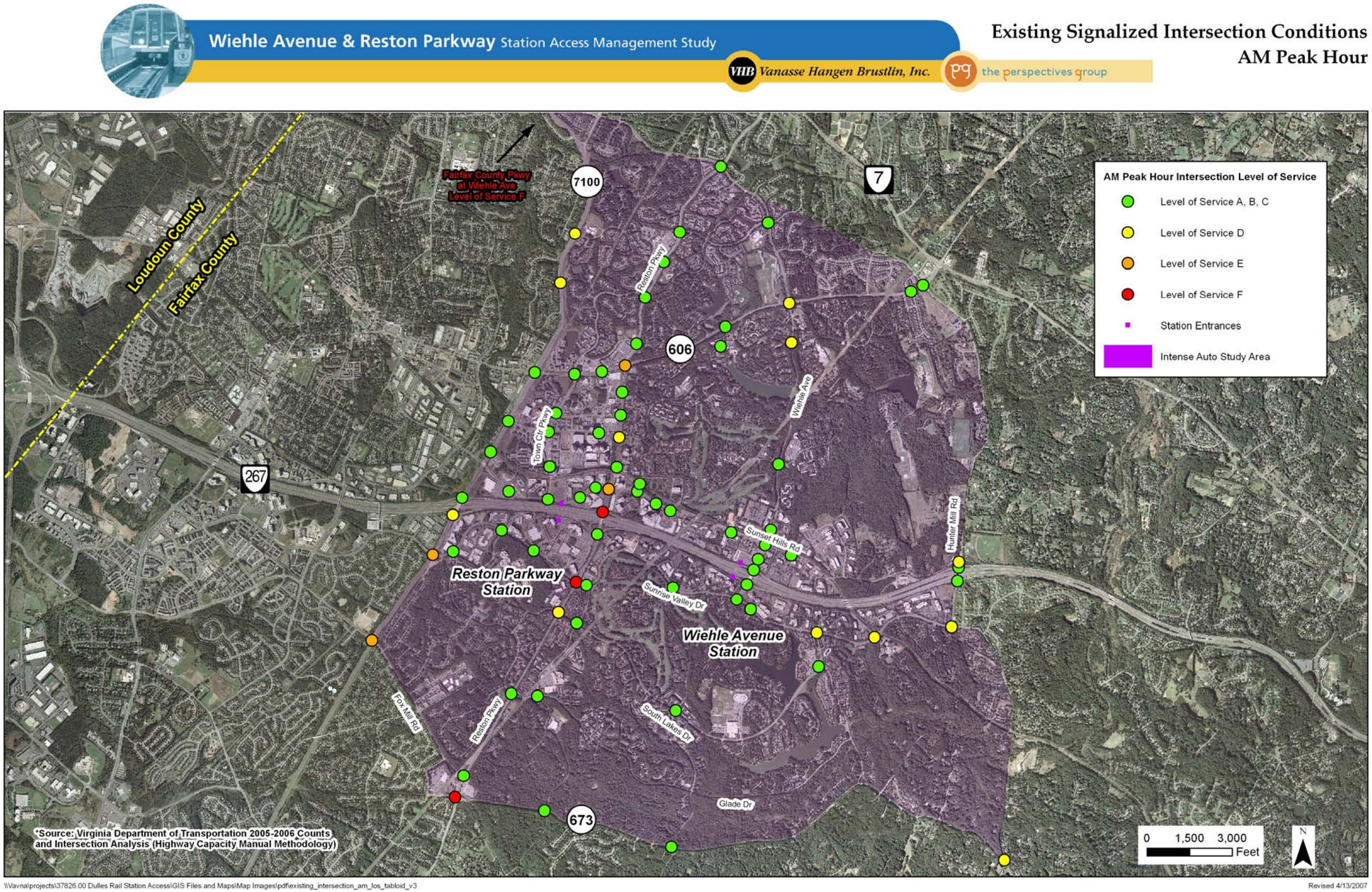
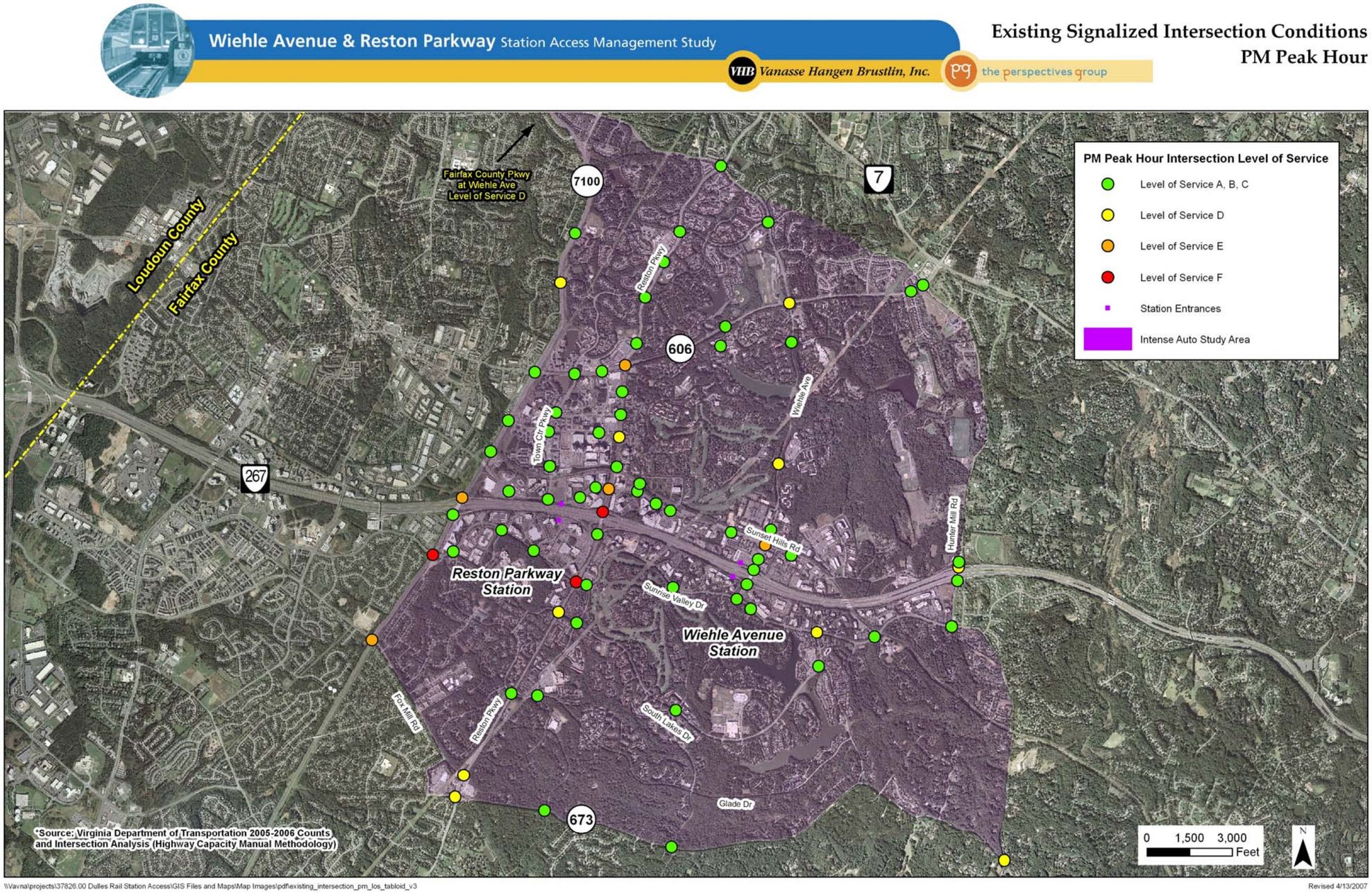


Figure 12. PM Peak Hour Level of Service



4.0 Transit System Overview

The area surrounding the future Wiehle Avenue and the Reston Parkway metro stations is currently served by several bus services. The purpose of these routes varies. Fairfax Connector provides both circulator routes that provide service in and around Reston and Herndon, as well as feeder routes that connect with the West Falls Church, Pentagon and Crystal City Metrorail stations. In addition, both Washington Metropolitan Area Transit Authority (WMATA) and Loudoun County provide express regional routes that travel from points in Loudoun and Fairfax counties to Washington, DC.

With the planned completion of Phase I of the Dulles Corridor Rapid Transit Project in 2013, which will terminate at the Wiehle Avenue Metrorail station and of Phase II in 2015, which terminates at Route 772 in Loudoun County, existing regional routes, feeder rail services and other bus routes will need to be modified. This report describes existing conditions only.

4.1 Fairfax Connector

Fairfax Connector provides public transportation in Fairfax County. It currently operates 54 bus routes throughout the county, providing connections to Arlington County, Alexandria, Falls Church, Vienna, Fairfax City and Herndon. Routes serving Reston are numbered in the 500s, while routes serving Herndon are in the 900s while four RIBS routes circulate through the Reston-Herndon area. Of the 54 routes, 25 operate within the Wiehle Avenue and Reston Parkway areas. These routes are divided into Reston-based routes and Herndon-based routes. The standard fare is $1.00 for local routes and $3.00 for express routes, though discounts or complimentary service are provided for passengers with rail-to-bus transfers, seniors, persons with disabilities, MetroAccess customers and young children. Details of the existing routes serving the study area are provided below:

FXC 505
Existing: This route provides high frequency service, seven days a week from the Reston Town Center Transit Station and the Reston East Park-and-Ride to the West Falls Church Metrorail station.

- Service days: Sunday – Saturday
- Service hours:
    - Weekdays: 5:05 am – 11:58 pm
    - Saturday: 7:30 am – 1:15 am
    - Sunday: 7:30 am – 11:10 pm
- Headway:
    - Weekdays: 15-minutes (mid-day); 30-minutes (all other times)
    - Saturday: 30-minutes
    - Sunday: 30-minutes

- Direction: both directions
- Average Daily Ridership (FY 2006)
    - Weekdays: 973
    - Saturday: 330
    - Sunday: 272
- Average Riders per Trip (FY 2006)
    - Weekdays: 9.7
    - Saturday: 4.7
    - Sunday: 4.5

FXC 551

Existing: FXC 551 provides service during peak weekday periods from the Reston East Park-and-Ride, the Herndon-Monroe Park-and-Ride and residential neighborhoods south of the Dulles Access Road, including those along South Lakes Drive to the West Falls Church Metrorail station.

- Service days: Monday – Friday
- Service hours: 4:50 am – 9:21 am (morning); 3:05 pm – 8:55 pm (evening/afternoon)
- Headway: 30-minutes
- Direction: both directions
- Average Daily Ridership (FY 2006)
    - Weekdays: 797
- Average Riders per Trip (FY 2006)
    - Weekdays: 26.6

FXC 552

Existing: FXC 552 provides service to and from the West Falls Church Metrorail station and the high-density residential neighborhoods along North Shore Drive and the Reston East Park-and-Ride lot.

- Service days: Monday – Friday
- Service hours: 5:44 am – 9:15 am (morning); 3:12 pm – 8:18 pm (afternoon/evening)
- Headway: 30-minutes
- Direction: peak direction
- Average Daily Ridership (FY 2006)
    - Weekdays: 420
- Average Riders per Trip (FY 2006)
    - Weekdays: 24.7

FXC 553

Existing: Route operates between Reston South Park-and-Ride and West Falls Church Metrorail station, providing service to Glade Drive.

- Service days: Monday – Friday
- Service hours: 5:42 am – 9:25 am (morning); 3:25 pm – 8:50 pm (afternoon/evening)
- Headway: 30-minutes
- Direction: peak direction (eastbound in morning, westbound in afternoon/evening)
- Average Daily Ridership (FY 2006)
    - Weekdays: 206
- Average Riders per Trip (FY 2006)
    - Weekdays: 12.9

FXC 554

Existing: FXC 554 provides service to and from the West Falls Church Metrorail station, making stops along Wiehle Avenue including the Reston East Park-and-Ride and the high-density neighborhoods in the vicinity of Center Harbor Road.

- Service days: Monday – Friday
- Service hours: 5:40 am – 8:59 am (morning); 4:01 pm – 7:34 pm (afternoon/evening)
- Headway: 30-minutes
- Direction: peak direction (eastbound during morning; westbound during afternoon/evening)
- Average Daily Ridership (FY 2006)
    - Weekdays: 470
- Average Riders per Trip (FY 2006)
    - Weekdays: 33.6

FXC 556

Existing: FXC 556 provides service between residential neighborhoods north of the Reston Town Center, points along the Town Center Parkway and the Reston Town Center Transit Station. By interlining with the FXC 505, which begins at the Transit Station, a seamless ride is provided to the West Falls Church Metro Station.

- Service days: Weekdays only
- Service hours:
    - Morning: 5:13 am – 10:00 am
    - Afternoon/evening: 3:05 pm – 8:47 pm
- Headway: 30-minutes
- Direction: peak direction (eastbound during morning; westbound during afternoon/evening)
- Average Daily Ridership (FY 2006)
    - Weekdays: 123
- Average Riders per Trip (FY 2006)
    - Weekdays: 6.2

FXC 557

Existing: Service is operated between the Reston South Park-and-Ride and the West Falls Church Metrorail station, stopping at the Reston East Park-and-Ride lot and residential neighborhoods along Lawyers Road and Soapstone Drive.

- Service days: Monday – Friday
- Service hours: 5:52 am – 9:39 am (morning); 3:54 pm – 8:35 pm (afternoon/evening)
- Headway: 30-minutes
- Direction: peak direction (eastbound in morning; westbound in afternoon/evening)
- Average Daily Ridership (FY 2006)
    - Weekdays: 381
- Average Riders per Trip (FY 2006)
    - Weekdays: 25.4

FXC 574

Existing: FXC 574 provides service between the Reston Town Center and Tysons Corner, seven days a week. The route circulates through Reston Town Center, with stops along North Shore Drive, Wiehle Avenue, Baron Cameron Avenue and Leesburg Pike (VA 7) and the Tysons West*Park Transit Center, before circulating through Tysons Corner.

- Service days: Sunday – Saturday
- Service hours:
    - Weekdays: 5:10 am – 11:55 pm
    - Saturday: 6:10 am – 10:00 pm
    - Sunday: 6:10 am – 8:00 pm
- Headway: 60-minutes
- Direction: both directions
- Average Daily Ridership (FY 2006)
    - Weekdays: 184
- Average Riders per Trip (FY 2006)
    - Weekdays: 5.9

FXC 585

Existing: FXC 585 is largely a peak period route that provides service between the Reston South Park-and-Ride and the West Falls Church Metrorail station, traveling along the Reston Parkway and the Dulles International Airport Access Highway (DIAAH). One exception is that three trips are provided in the eastbound direction during the afternoon along Sunrise Valley Drive.

- Service days: Monday – Friday
- Service hours: 5:35 am – 9:36 am (morning); 1:15 pm – 8:15 pm (afternoon/evening)
- Headway: 20-minutes (peak); 60-minutes (midday)

- Direction: peak direction (eastbound in morning; westbound in afternoon/evening)
- Average Daily Ridership (FY 2006)
    - Weekdays: 357
- Average Riders per Trip (FY 2006)
    - Weekdays: 14.9

FXC 595

Existing: FXC 595 provides express service from the Reston East Park-and-Ride to the Pentagon Metrorail Station.

- Service days: Monday – Friday
- Service hours: 5:35 am – 8:40 am (morning); 3:50 pm – 7:32 pm (afternoon/evening)
- Headway: 30-minutes
- Direction: peak direction (eastbound in morning; westbound in afternoon/evening)

FXC 597

Existing: FXC 597 provides express service between the Reston East Park-and-Ride around Pentagon City and Crystal City, making a stop near the Crystal City Metrorail Station.

- Service days: Monday – Friday
- Service hours: 5:58 am – 8:20 am (morning); 3:30 pm – 6:38 pm (afternoon/evening)
- Headway: 30-minutes
- Direction: peak direction (eastbound in morning; westbound in afternoon/evening)

FXC 605

Existing: FXC 605 provides service from Reston Town Center to the Fairfax Government Center, making stops at Fair Oaks Hospital, Fair Lakes Shopping Center and Fair Oaks Mall.

- Service days: Sunday – Saturday
- Service hours:
    - Weekdays: 6:05 am – 10:20 pm
    - Saturday: 7:10 am – 8:03 pm
    - Sunday: 8:10 am – 7:02 pm
- Headway: 60-minutes
- Direction: both directions
- Average Daily Ridership (FY 2006)
    - Weekdays: 370
    - Saturday: 262

    - Sunday: 209
- Average Riders per Trip (FY 2006)
    - Weekdays: 12.3
    - Saturday: 10.1
    - Sunday: 9.5

RIBS 1

Existing: RIBS 1 provides circulator service in a loop around Reston in the clockwise direction, through the Town Center and along the Reston Parkway, Sunrise Valley Drive, Wiehle Avenue and North Shore Drive. Stops are made at Reston Town Center, Tall Oaks Village Center and the Reston East Park-and-Ride.

- Service days: Sunday – Saturday
- Service hours:
    - Weekdays: 5:05 am – 12:53 am
    - Saturday: 6:10 am – 11:58 pm
    - Sunday: 6:05 am – 8:56 pm
- Headway:
    - Weekdays: 30-minutes (peak and midday); 60-minutes (evening)
    - Saturday: 30-minutes (peak and midday); 60-minutes (evening)
    - Sunday: 60-minutes
- Direction: clockwise
- Average Daily Ridership (FY 2006)
    - Weekdays: 674
    - Saturday: 296
    - Sunday: 210
- Average Riders per Trip (FY 2006)
    - Weekdays: 19.8
    - Saturday: 9.6
    - Sunday: 14.0

RIBS 2

Existing: RIBS 2 provides circulator service around Reston seven days a week, connecting the Reston Town Center with the single-family residential neighborhoods south of the Dulles Access Road, along Sunrise Valley Drive, South Lakes Drive and Glade Drive. This route makes stops at the Reston Town Center Transit Station, Reston East Park-and-Ride and the Herndon-Monroe Park-and-Ride.

- Service days: Sunday – Saturday
- Service hours:
    - Weekdays: 5:05 am – 12:52 am
    - Saturday: 6:10 am – 11:58 pm
    - Sunday: 6:05 am – 8:58 pm
- Headway:
    - Weekdays: 30-minutes (peak and midday); 60-minutes (evening)
    - Saturday: 30-minutes (peak and midday); 60-minutes (evening)

    - Sunday: 60-minutes
- Direction: clockwise
- Average Daily Ridership (FY 2006)
    - Weekdays: 810
    - Saturday: 527
    - Sunday: 324
- Average Riders per Trip (FY 2006)
    - Weekdays: 23.8
    - Saturday: 17.0
    - Sunday: 21.6

RIBS 3

Existing: RIBS 3 provide circulator service in a loop around Reston along the same route as RIBS 1. However, while RIBS 1 travels in the clockwise direction, RIBS 3 travels in the counterclockwise direction through the Town Center and along the Reston Parkway, Sunrise Valley Drive, Wiehle Avenue and North Shore Drive. Stops are made at Reston Town Center, Reston East Park-and-Ride and Talls Oaks Village Center.

- Service days: Sunday – Saturday
- Service hours:
    - Weekdays: 5:05 am – 12:51 am
    - Saturday: 6:10 am – 11:55 pm
    - Sunday: 6:10 am – 8:55 pm
- Headway:
    - Weekdays: 30-minutes (peak and midday); 60-minutes (evening)
    - Saturday: 30-minutes (peak and midday); 60-minutes (evening)
    - Sunday: 60-minutes
- Direction: counterclockwise
- Average Daily Ridership (FY 2006)
    - Weekdays: 617
    - Saturday: 397
    - Sunday: 258
- Average Riders per Trip (FY 2006)
    - Weekdays: 18.1
    - Saturday: 12.8
    - Sunday: 17.2

RIBS 4

Existing: RIBS 4 provides circulator service from the Reston Town Center to neighborhoods to the north and east of the town center and to Herndon.

- Service days: Sunday – Saturday
- Service hours:
    - Weekdays: 6:05 am – 10:59 pm
    - Saturday: 6:00 am – 10:59 pm
    - Sunday: 6:00 am – 8:59 pm

- Headway:
    - Weekdays: 30-minutes (peak and midday); 60-minutes (evening)
    - Saturday: 30-minutes (peak and midday); 60-minutes (evening)
    - Sunday: 60-minutes
- Average Daily Ridership (FY 2006)
    - Weekdays: 323
    - Saturday: 296
    - Sunday: 150
- Average Riders per Trip (FY 2006)
    - Weekdays: 10.4
    - Saturday: 9.8
    - Sunday: 10.1

FXC 922

Existing: This route loops around Herndon and stopping at the Herndon-Monroe Park-and-Ride.

- Service days: Monday – Friday
- Service hours: 4:45 am – 9:53 am (morning); 12:40 pm – 8:33 pm (afternoon/evening)
- Headway: 24-minutes (peak); 60-minutes (midday)
- Direction: peak direction (counterclockwise in morning; clockwise in afternoon/evening)
- Average Daily Ridership (FY 2006)
    - Weekdays: 138
- Average Riders per Trip (FY 2006)
    - Weekdays: 4.9

FXC 924

Existing: FXC 924 provides service from the Herndon-Monroe Park-and-Ride to Leesburg Pike (VA 7), circulating the town of Herndon on the western half of the Herndon Parkway.

- Service days: Monday – Friday
- Service hours: 5:35 am – 10:06 am (morning); 3:49 pm – 7:48 pm (afternoon/evening)
- Headway: 24-minutes (peak)
- Direction: peak direction (southbound in morning; northbound in afternoon/evening)
- Average Daily Ridership (FY 2006)
    - Weekdays: 182
- Average Riders per Trip (FY 2006)
    - Weekdays: 8.6

FXC 926

Existing: FXC 926 travels from the Herndon-Monroe Park-and-Ride to Route 7, bisecting Herndon via Elden Street and Park Avenue. This route operates from 6:00 a.m. to 9:41 a.m. and from 4:12 p.m. to 8:15 p.m. Headway is 25 minutes during peak periods.

- Service days: Monday – Friday
- Service hours: 6:00 am – 9:41 am (morning); 4:12 pm – 8:15 pm
- Headway: 24-minutes (peak)
- Direction: reverse peak direction (northbound during morning, southbound during afternoon/evening)
- Average Daily Ridership (FY 2006)
    - Weekdays: 46
- Average Riders per Trip (FY 2006)
    - Weekdays: 2.4

FXC 927

Existing: FXC 927 provides service to the Herndon-Monroe Park-and-Ride on Sunrise Valley Road and Frying Pan Road.

- Service days: Monday – Friday
- Service hours: 5:25 am – 8:51 pm
- Headway: 30-minutes
- Direction: peak direction (counterclockwise in morning; clockwise in afternoon/evening)
- Average Daily Ridership (FY 2006)
    - Weekdays: 193
- Average Riders per Trip (FY 2006)
    - Weekdays: 6.4

FXC 929

Existing: FXC 929 provides service to and from the Herndon-Monroe Park-and-Ride to points south of Herndon. The route makes stops along several residential neighborhoods, including Centreville Road, McLearen Road, Route 28, Kinross Circle, Franklin Farm Road, the Fairfax County Parkway and the Renaissance Park commercial development.

- Service days: Monday – Friday
- Service hours: 5:17 am – 9:40 am (morning); 3:33 pm – 8:14 pm (afternoon/evening)
- Headway: 30-minutes
- Direction: both directions
- Average Daily Ridership (FY 2006)
    - Weekdays: 112
- Average Riders per Trip (FY 2006)
    - Weekdays: 6.2

FXC 950

Existing: FXC 950 operates on an east-west axis, providing service from the Reston Town Center Transit Station, through Herndon to the Herndon-Monroe Park-and-Ride to the West Falls Church Metrorail station, traveling largely on Elden Street, Sunrise Valley Drive and the Dulles Access Road. This is an express bus route between Herndon and the West Falls Church Metrorail station.

- Service days: Sunday – Saturday
- Service hours:
    - Weekdays: 4:35 am – 12:55 am
    - Saturday: 5:56 am – 1:59 am
    - Sunday: 5:56 am – 12:05 am
- Headway: 30-minutes
- Direction: both directions
- Average Daily Ridership (FY 2006)
    - Weekdays: 3,077
    - Saturday: 1,693
    - Sunday: 1,472
- Average Riders per Trip (FY 2006)
    - Weekdays: 38.4
    - Saturday: 21.7
    - Sunday: 21.0

FXC 951

Existing: FXC 951 provides reverse commute service between West Falls Church Metrorail station and the Herndon-Monroe Park-and-Ride along Sunrise Valley Drive.

- Service days: Monday – Friday
- Service hours: 5:01 am – 10:01 am (morning); 3:07 pm – 7:35 pm (afternoon/evening)
- Headway: 30-minutes
- Direction: reverse peak direction (westbound during morning; eastbound during afternoon/evening)
- Average Daily Ridership (FY 2006)
    - Weekdays: 510
- Average Riders per Trip (FY 2006)
    - Weekdays: 14.2

FXC 952

Existing: FXC 951 provides reverse commute service between West Falls Church Metrorail station and the Herndon-Monroe Park-and-Ride along Sunset Hills Road.

- Service days: Monday – Friday
- Service hours: 5:07 am – 9:26 am (morning); 3:03 pm – 742 pm (afternoon/evening)
- Headway: 30-minutes

- Direction: reverse peak direction (westbound during morning; eastbound during afternoon/evening)
- Average Daily Ridership (FY 2006)
    - Weekdays: 286
- Average Riders per Trip (FY 2006)
    - Weekdays: 7.95

FXC 980
Existing: FXC 980 provides express service between the Herndon-Monroe Park-and-Ride and the West Falls Church Metrorail station.

- Service days: Monday – Friday
- Service hours:
    - Morning: 4:38 am – 9:57 am
    - Afternoon/evening: 2:47 pm –8:55 pm
- Service frequency: 6-minutes
- Direction: peak direction (eastbound during morning; westbound during afternoon/evening)
- Average Daily Ridership (FY 2006)
    - Weekdays: 2,641
- Average Riders per Trip (FY 2006)
    - Weekdays: 36.2

4.2 Loudoun County

Loudoun County operates several routes that are traverse the Herndon-Reston area on the DIAAH.

Cascades Route
Existing: The Cascades Route travels from Broad Run Farms to West Falls Church rail station.

- Service days: Monday – Friday
- Service hours: 5:08 am – 8:50 am (morning); 2:30 pm – 8:00 pm (afternoon/evening)
- Headway: varies
- Direction: peak direction (westbound during morning; eastbound during afternoon/evening)

Verizon/AOL Reverse Commute
Existing: The Reverse Commute Route travels between the West Falls Church rail station and Leesburg.

- Service days: Monday – Friday

- Service hours: 6:05 am – 9:44 am (morning); 3:25 pm – 7:20 pm (afternoon/evening)
- Headway: varies
- Direction: peak direction (westbound during morning; eastbound during afternoon/evening)

4.3 WMATA

Route 5A

Existing: WMATA operates one route in the Herndon-Reston area. Route 5A provides express service between L'Enfant Plaza in Washington, DC and Washington Dulles International Airport, making stops at the Herndon-Monroe Park-and-Ride, Tysons West Park Transit Station and Rosslyn Metro Station.

- Service days: Sunday – Saturday
- Service hours:
    - Weekdays: 4:50 am – 12:29 am
    - Weekend: 5:30 am – 12:25 am
- Headway:
    - Weekdays: 40-minutes
    - Weekend: 60-minutes
- Direction: both directions

4.4 Summary of Existing Bus Service

Table 4 presents a tabular summary of existing bus service in the study area in terms of routing and service characteristics. Figures 14 and 15 shows the various bus routes. Figure 16 shows the Fairfax Connector bus stops in the study area.

Table 4. Summary of Existing Bus Service

Route	Existing	
	Route	**Headway (peak/off-peak)**
FXC 505	RTC – Reston East Park-and-Ride – West Falls Church Metro – Reston East – RTC	30 (peak & evening)/15 midday
FXC 551	Herndon-Monroe Park-and-Ride – South Lakes Dr – Reston East Park-and-Ride – West Falls Church Metrorail Station – Reston East Park-and-Ride – South Lakes Dr – Herndon-Monroe Park-and-Ride	30 (both directions)
FXC 552	North Shore Dr – Reston East Park-and-Ride – West Falls Church Metrorail Station	30 (peak service, peak direction only)
FXC 553	Reston South Park-and-Ride – Glade Dr – West Falls Church Metrorail Station	30 (peak service, peak direction only)
FXC 554	Wiehle Ave – Reston East Park-and-Ride – West Falls Church Metrorail Station	30 (peak service, peak direction only)
FXC 556	North Reston – RTC	30 (peak service, peak direction only)

Route	Existing	
	Route	**Headway (peak/off-peak)**
FXC 557	Franklin Farm Rd – Reston South Park-and-Ride – Lawyers Rd – Soapstone Dr - Reston East Park-and-Ride – West Falls Church Metrorail Station	30 (peak service, peak direction only)
FXC 574	RTC – Tysons West*Park Transit Ctr – Tysons Corner – Tysons West*Park Transit Ctr – RTC	60/60
FXC 585	Reston South Park-and-Ride – Reston Pkwy – DIAAH – West Falls Church Metrorail Station	20 (peak direction) / 60 (both directions)
FXC 595	Reston East Park-and-Ride – Pentagon Metrorail Station	30 (peak service, peak direction only)
FXC 597	Reston East Park-and-Ride – Pentagon City / Crystal City – Crystal City Metrorail Station	30 (peak service, peak direction only)
FXC 605	RTC – Fair Lakes Pkwy – FFX Govt Ctr – Fair Lakes Pkwy – RTC	60/60
RIBS 1	RTC – North Shore Dr – Wiehle Ave – Reston East Park-and-Ride – Sunrise Valley Dr – Reston Pkwy – RTC	30/60
RIBS 2	RTC – Reston East Park-and-Ride – South Lakes Dr – Glade Dr – Herndon-Monroe Park-and-Ride – RTC	30/60
RIBS 3	Reverse of RIBS 1	30/60
RIBS 4	RTC – North Point Village Ctr – Harbor House – North Shore Dr – RTC	30/60
FXC 922	Herndon-Monroe Park-and-Ride – Herndon Pkwy Loop – Herndon-Monroe Park-and-Ride (counter-clockwise AM; clockwise PM)	24/60
FXC 924	Herndon-Monroe Park-and-Ride – Herndon Pkwy (Westside) – Route 7	24 (peak service, peak direction only)
FXC 926	Herndon-Monroe Park-and-Ride – Central Herndon – Dranesville	24 (peak service, peak direction only)
FXC 927	Herndon-Monroe Park-and-Ride – Sunrise Valley Dr – Frying Pan Rd – Herndon-Monroe Park-and-Ride (counter-clockwise AM; clockwise PM)	30/30
FXC 929	Herndon-Monroe Park-and-Ride – Centerville Rd – Franklin Farm Rd – Route 28 – Centerville Rd – Herndon-Monroe Park-and-Ride – (one direction loop)	30 (peak service only)
FXC 950	RTC – Herndon-Monroe Park-and-Ride – West Falls Church Metrorail Station – Herndon-Monroe Park-and-Ride – RTC	30/30
FXC 951	Herndon-Monroe Park-and-Ride – Sunrise Valley Dr – West Falls Church Metrorail Station	30 (reverse peak direction only)
FXC 952	Herndon-Monroe Park-and-Ride – Sunset Hills Rd – West Falls Church Metrorail Station	30 (reverse peak direction only)
FXC 980	Herndon-Monroe Park-and-Ride – West Falls Church Metrorail Station	6 (peak direction only)
LC Cascades	Broad Run Farms – Cascades – West Falls Church Metrorail Station	varies
LC Reverse (MCI/AOL)	West Falls Church Metrorail Station – Verizon – AOL – Dulles North – Leesburg	varies
WMATA 5a	Dulles Airport – Herndon-Monroe Park-and-Ride – Tysons Westpark Transit Station – DC	40/60

Figure 13. Existing Local (Non-DIAAH) Bus Routes

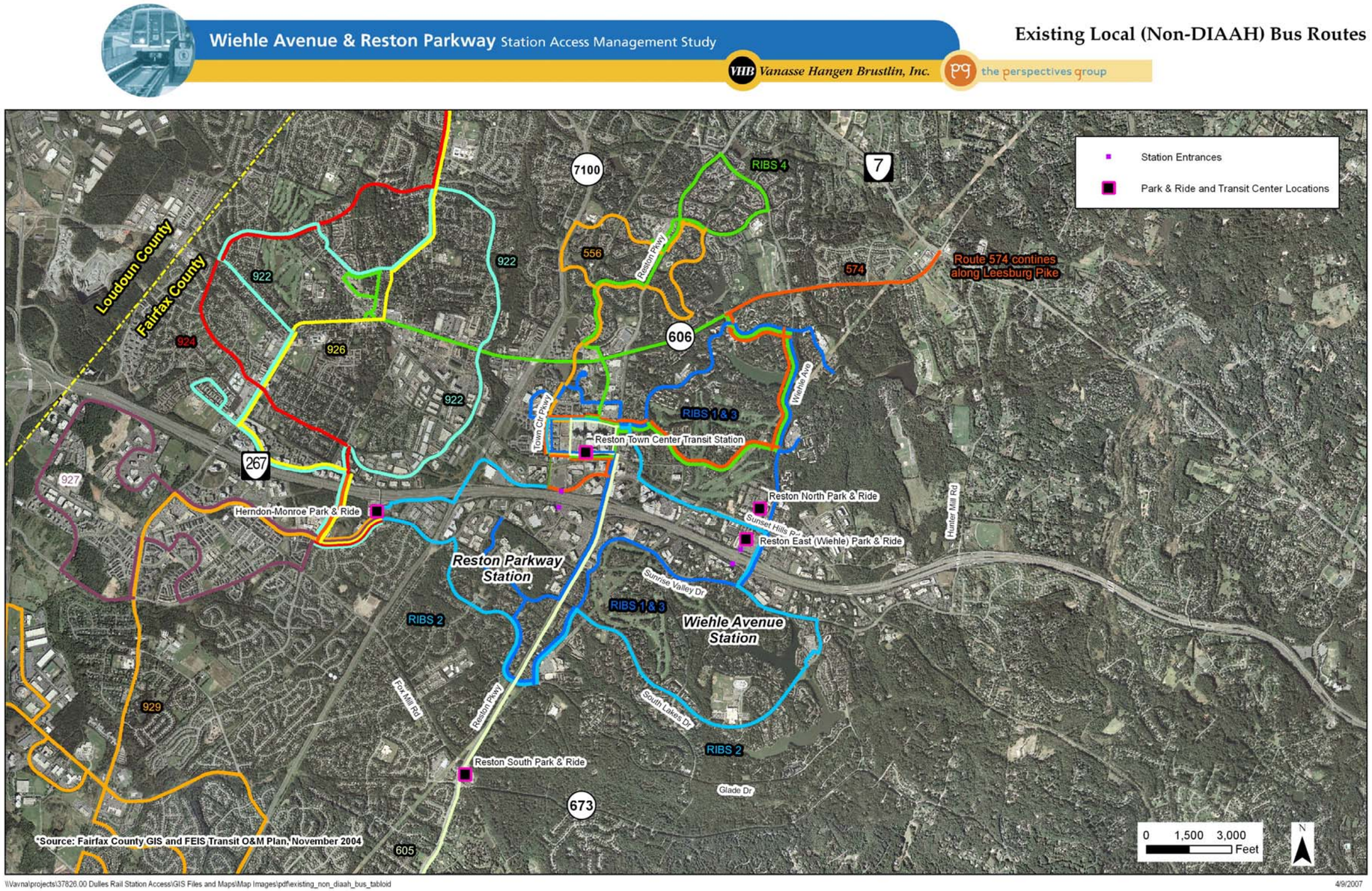


Figure 14. Existing Bus Routes Using Dulles International Airport Access Highway (DIAAH)

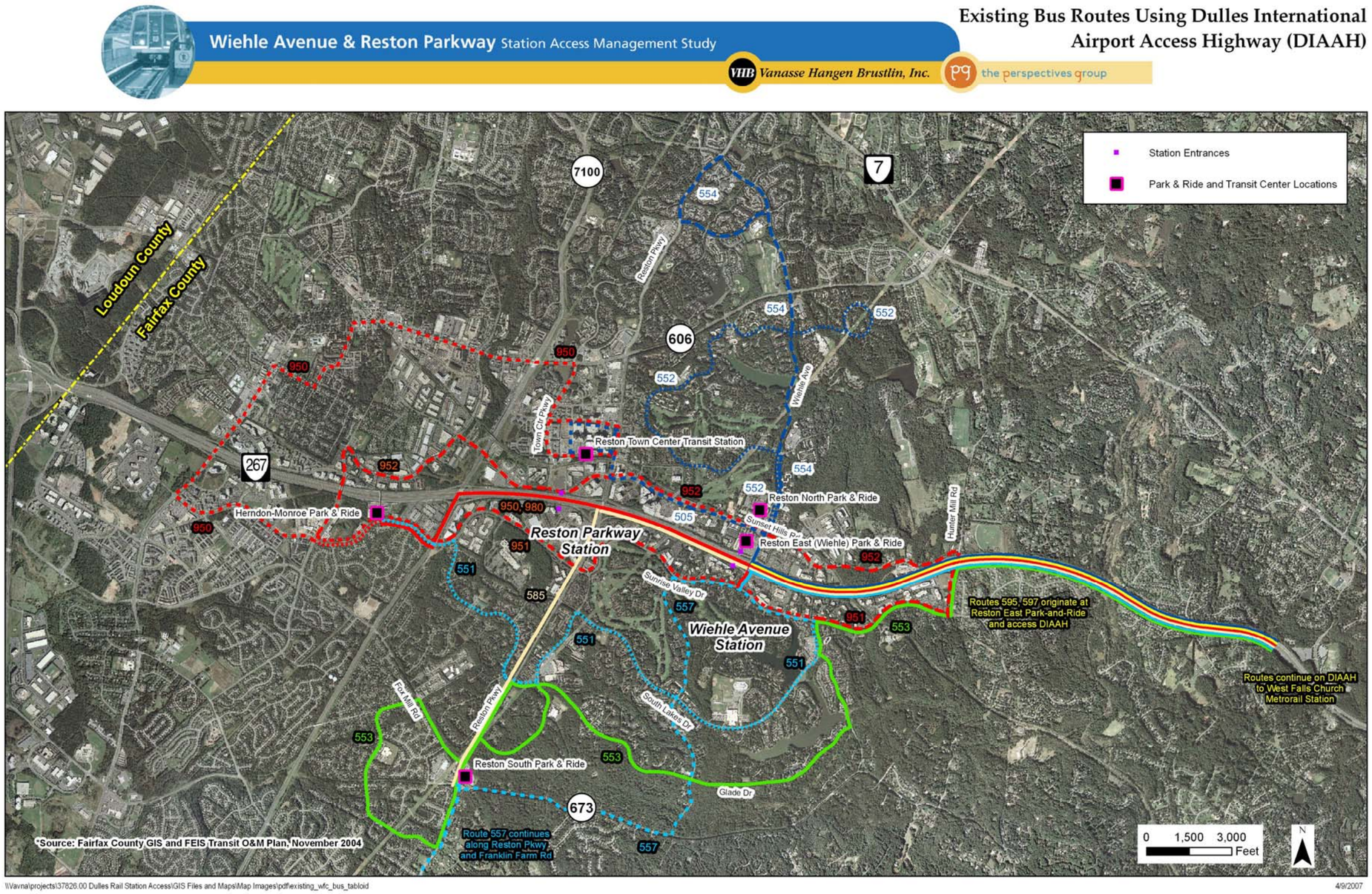
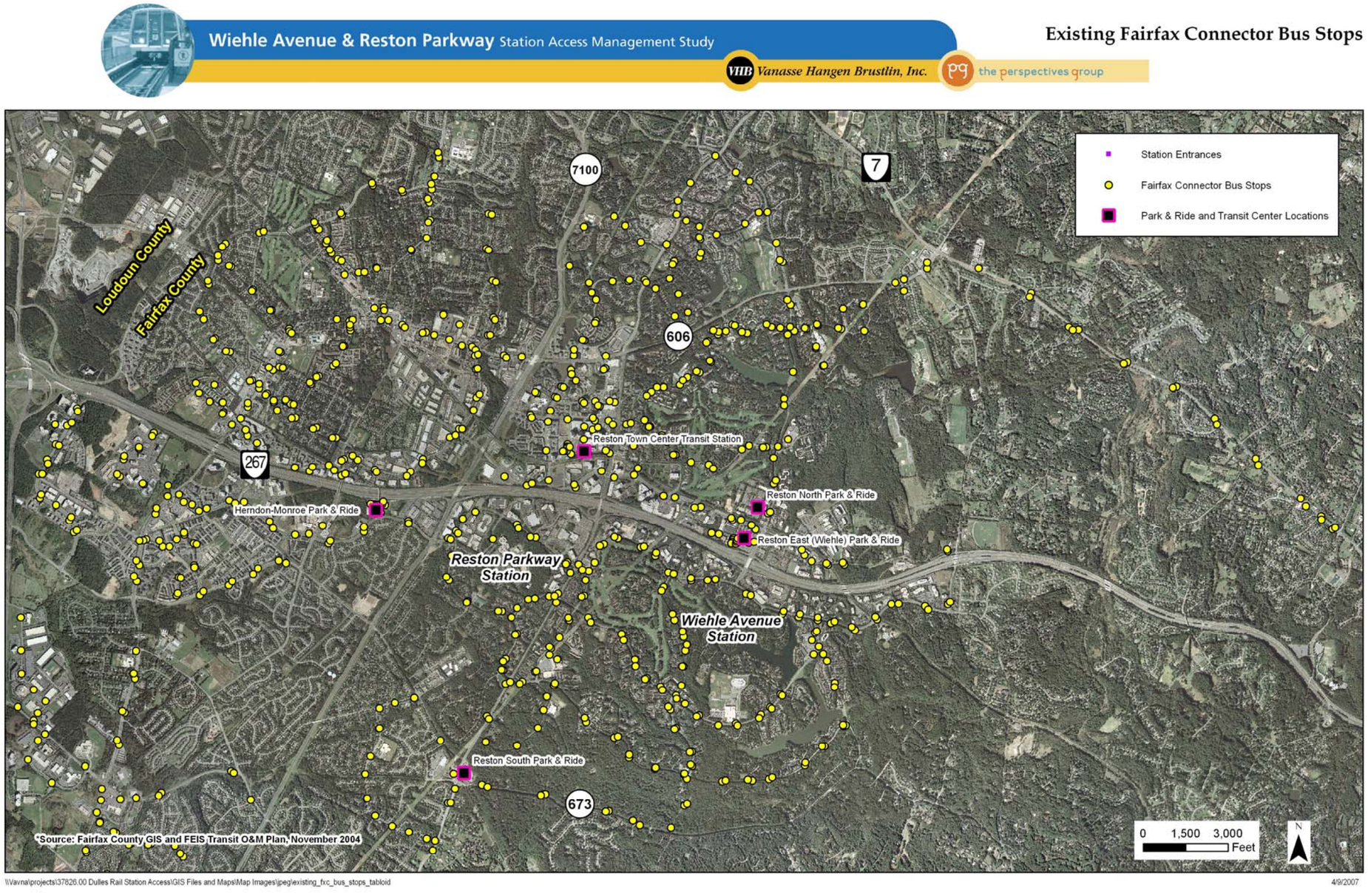


Figure 15. Existing Fairfax Connector Bus Stops



5.0 Bicycle and Pedestrian System

Safe, adequate pedestrian and bicycle access to the stations will not only increase station use, but will reduce congestion in and out of the stations, making transit a more attractive alternative. People living or working within the surrounding areas should be offered a choice of different modes to the stations, whether it be walking, biking, driving, or taking the bus. This means that in addition to adequate facilities being provided for each of those modes, those facilities must also be "safe." Often, the impression that intended routes for bicyclists or pedestrians are unsafe is enough to deter people from biking and walking. An example of an undesirable facility for a bicyclist or pedestrian is a complex intersection where there is conflicting traffic traveling at high speeds.

In an effort to determine if such undesirable conditions exist, we conducted an assessment of potential safety problems which may increase the risk to pedestrians and/or bicyclists, discourage use, or cause pedestrians and bicyclists to take alternate paths that put them into conflict with vehicular traffic. Intersections typically have the highest number of conflicts and are a good starting point for evaluating safety. Areas of highest importance can be determined through a quantitative assessment of the potential exposure of bicyclists to vehicular traffic. In essence, this is a surrogate measure for identifying intersections with a high crash potential. One tool that can be applied to estimate the crash potential of an intersection for pedestrians and bicyclists is intersection safety indices (ISIs). Development of these measures has just been completed by the Highway Safety Research Center and the final report should be available from the Federal Highway Administration (FHWA) in the coming months. The indices are determined by calculating a separate value for pedestrian and bicycle crash potential on each approach to an intersection. (The model and input specifications can be found in Appendix A.) The data required to calculate these indices is typically readily available, making it an ideal assessment tool. Each index is a function of traffic speed, traffic volume, roadway width, traffic control, and other intersection conditions. There are no values that serve as warrants for making improvements, rather, the indices are to be used to help provide a relative assessment of safety and help prioritize intersections that need improvement. The higher the ISI, the greater the safety concern.

Based on the ISI methodology, intersections with the highest risk assessment were evaluated in more detail to determine conditions that contribute to increasing the risk of the crossing and potentially the desirability for pedestrian and bicycle use. Approaches to intersections and connecting links were also evaluated. Based on the field review, potential issues were identified, which may be addressed through a routine fix or may require a longer term solution.

Another metric, Bicycle Level of Service (BLOS) was used to determine the "suitability" or "compatibility" of cycling on roadways that are shared with other modes. The model provides a ranking similar to the vehicular LOS that is frequently calculated for intersections by traffic engineers. The major factors contributing to a BLOS rating for a specific roadway segment include:

- Daily vehicular traffic;
- Number of through lanes;
- Speed of vehicular through traffic;
- Pavement condition;
- Prevalence of heavy vehicles; and
- Width of bike lanes or outside vehicular travel lane.

The following sections describe in detail the inventories and assessments conducted on the existing pedestrian and bicycle networks.

5.1 Bicycle Facilities

Existing trail facilities for biking were inventoried within two miles of the proposed future station entrances. Quantitative safety assessments of the potential for on-street bicycle facilities at intersections using the Bicycle Intersection Safety Index (Bike ISI) for each approach to all intersections of major streets within two miles of the proposed station entrances were also conducted (263 approaches). For the purposes of describing the assessment conducted on these facilities, bike facilities were divided into two categories, those that are separated (See Trails) and those that share the roadway with vehicular traffic (See On-Street Bike Lanes).

Trails

Figure 17 shows the existing trails and walkways. All trails, with the exception of the Washington & Old Dominion Railroad Regional Park (W&OD) Trail, function similar to sidewalks and therefore were evaluated as sidewalks. Further discussion of these facilities is included in the section on pedestrian facilities.

The W&OD Trail runs parallel and north of the Dulles Toll Road and serves both pedestrians and bicyclists. The trail crosses major streets at three at grade intersections in the vicinity of the future Wiehle Avenue Station. The routes that it crosses from east to west are Sunrise Valley Drive, Sunset Hills Road, and Wiehle Avenue. Pedestrian ISIs were calculated for each of these crossings, as shown in Table 5 and described in the section about pedestrian facilities. In the vicinity of the future Reston Parkway Station entrance, the trail crossings with major streets are grade-separated. While this creates a much safer condition for pedestrians and bicyclists using the trail, connectivity to the surrounding street network is less direct and potentially more confusing. These issues can deter commuters from using the W&OD Trail to reach the Metro stations and transit centers or cause them to travel on unintended paths, where they may potentially conflict with other traffic.

Street	Pedestrian ISI
Wiehle Ave	5.0
Sunset Hills	4.3
Sunrise Valley	4.7

Table 5: W&OD Trail Pedestrian ISI values

On- Street Bike Lanes

There are no on-street marked bike lanes within two miles of the future station entrances. The suitability of the roadway network to accommodate future bicycle traffic for this reason is important to assess connecting to the future station entrances.

The W&OD Trail crossing on Wiehle Avenue is near a signalized intersection, but the crossing itself is not signalized.

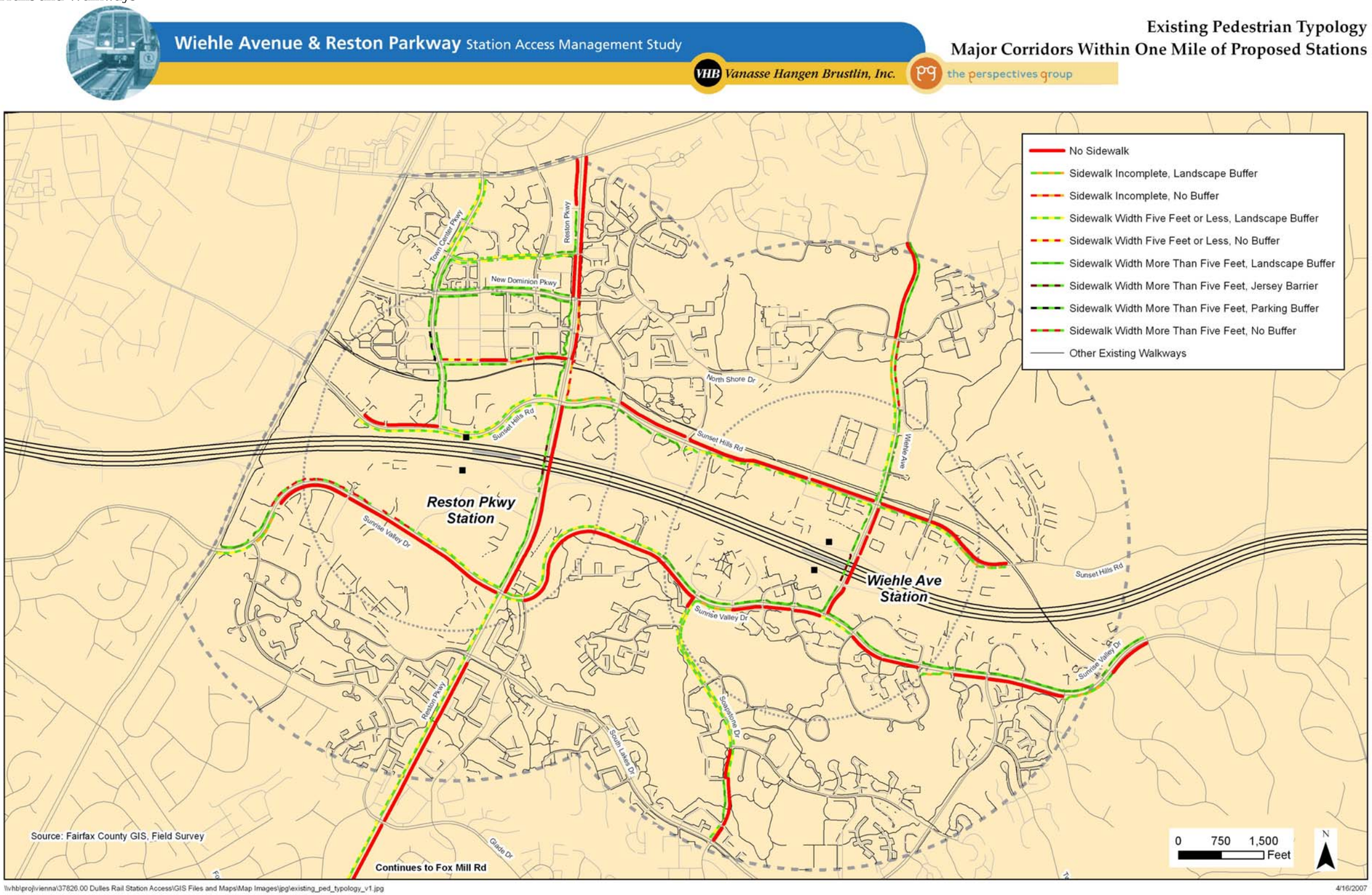
Despite a lack of designated on-street facilities, BLOS values were calculated for the major routes in the Reston area as shown in Table 6 below.

Table 6: Bicycle Level of Service for major roadways in Reston

Street	From	To	Level of Service
N Wiehle Ave	Sunrise Valley Dr	Park-N-Ride Lot Entrance	E
S Wiehle Ave	Park-N-Ride Lot Entrance	Fairway Dr	D
S Reston Pkwy	Fox Mill Rd	EB DIAAH Ramps	D
Mid Reston Pkwy	EB DIAAH Ramps	Bowman Towne Dr	D
N Reston Pkwy	Bowman Towne Dr	Baron Cameron Ave	D
W Sunset Hills	Fairfax County Pkwy	Reston Pkwy	D
Mid Sunset Hills	Reston Pkwy	Wiehle Ave	D
E Sunset Hills	Wiehle Ave	Hunter Mill Rd	D
Sunrise Valley	Fairfax County Pkwy	Hunter Mill Rd	D

All of the segments that were included in this analysis had a BLOS of D or worse. The conditions indicate narrow right lanes, high levels of vehicular traffic and relatively high vehicle speeds.

Figure 16. Existing Trails and Walkways



In order to assess the suitability of streets in the vicinity of the future stations to accommodate bicycle travel, Bicycle ISIs were calculated. These are shown in Figure 18.

The median Bike ISI for the area around the two proposed stations is 2.5. This value is indicative of an approach to an intersection with medium to high levels of vehicle traffic, a traffic signal and approximately two travel lanes in all directions. Approaches with Bike ISI values over 2.5 are more critical and may require other treatments to make them safer and more attractive paths for cyclists.

The "safer" approaches for bicyclists have an ISI value of less than 1.5. These approaches have low traffic levels traveling on only a few lanes and have no traffic signals. 'T'-style or 3-way intersections are also likely to be safer for cyclists because there are fewer possible vehicle movements at these types of intersections for cyclists to contend with.

Only two intersections have approaches with Bicycle Intersection Safety Indices over 4.25: Sunset Hills Rd & Reston Parkway and Sunrise Valley Drive & Reston Parkway. The critical approaches at these intersections have very high traffic volumes, permit high vehicular speeds, and require cyclists to deal with many lanes of traffic to maneuver. Future bike routes that provide access to the stations will consider these safety indices in selecting routes and determining needed improvements.

5.2 Pedestrian Facilities

Intersections and Crossings

An adequate number of crossings should be provided for all pedestrians. Crossings should take into account the abilities, speeds, and other behavioral characteristics of pedestrians and should meet pedestrian demands and desire lines.

Existing pedestrian facilities at intersections and midblock crossings were inventoried at all intersections of major streets within one mile of the proposed station entrances. The results of the inventory are illustrated in Figures 19, 20, 21 and 22. The inventory of pedestrian crossing facilities included 83 intersections, 42 of which are signalized intersections, another 37 are stop-controlled intersections, and 4 are mid-block crossings. At each of these intersections, each leg was examined for the presence of crosswalks, pedestrian signals and Americans with Disabilities Act (ADA) compliant ramps at each corner. At locations with pedestrian signals, the presence of countdowns and the location of push-buttons were also noted.

Two-hundred ninety-eight potential crossing locations were identified in the field survey, 116 of which are equipped with crosswalks (less than 40%). Only 82 crossing locations are equipped with any type of pedestrian signal, and only 14 of these have countdown displays. Three-hundred twenty-four corners are associated with these potential crossings and each would require an ADA compliant

Figure 17. Existing Intersections Bicycle ISIs

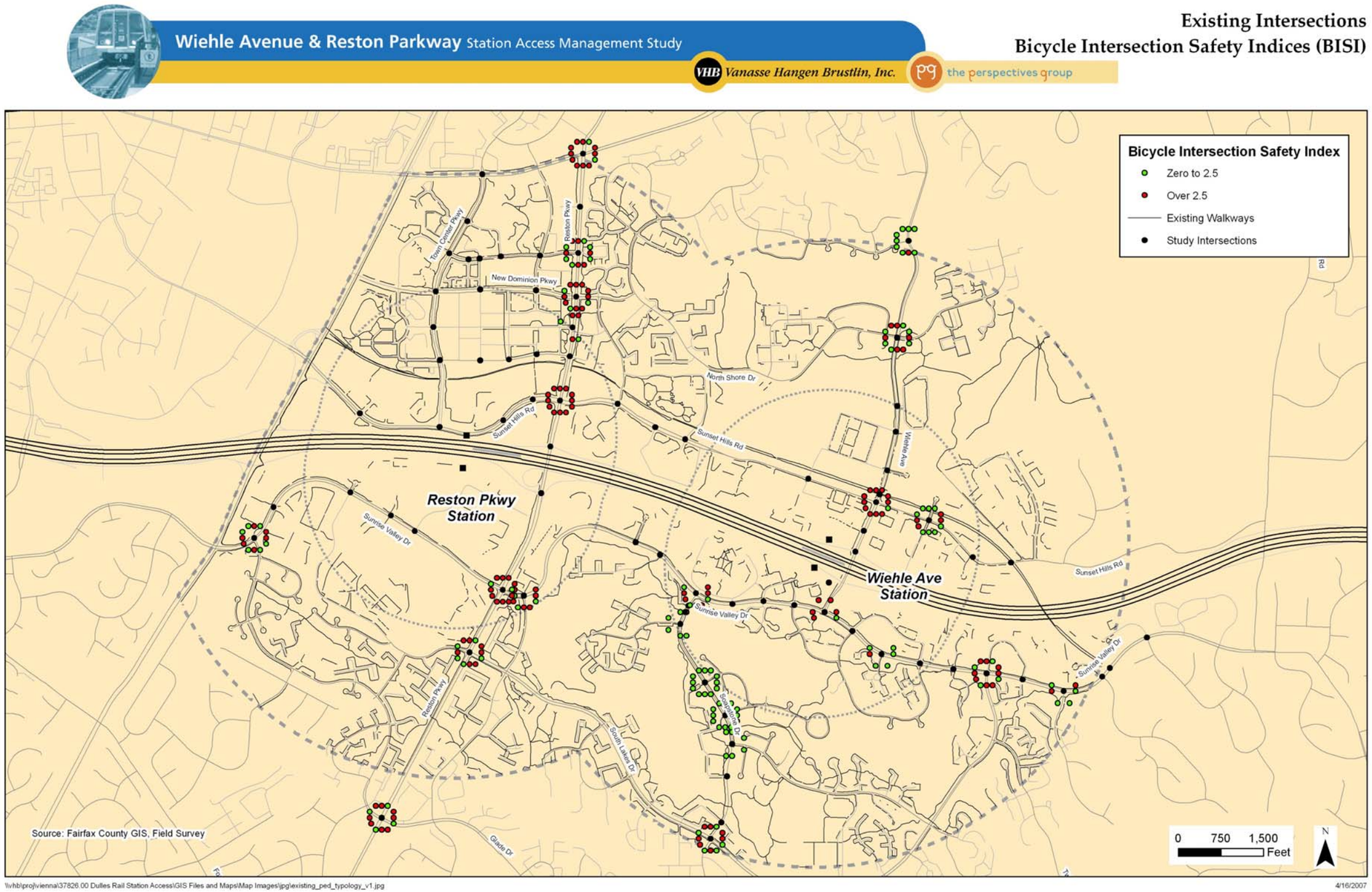


Figure 18. Existing Pedestrian Facilities – Crosswalks

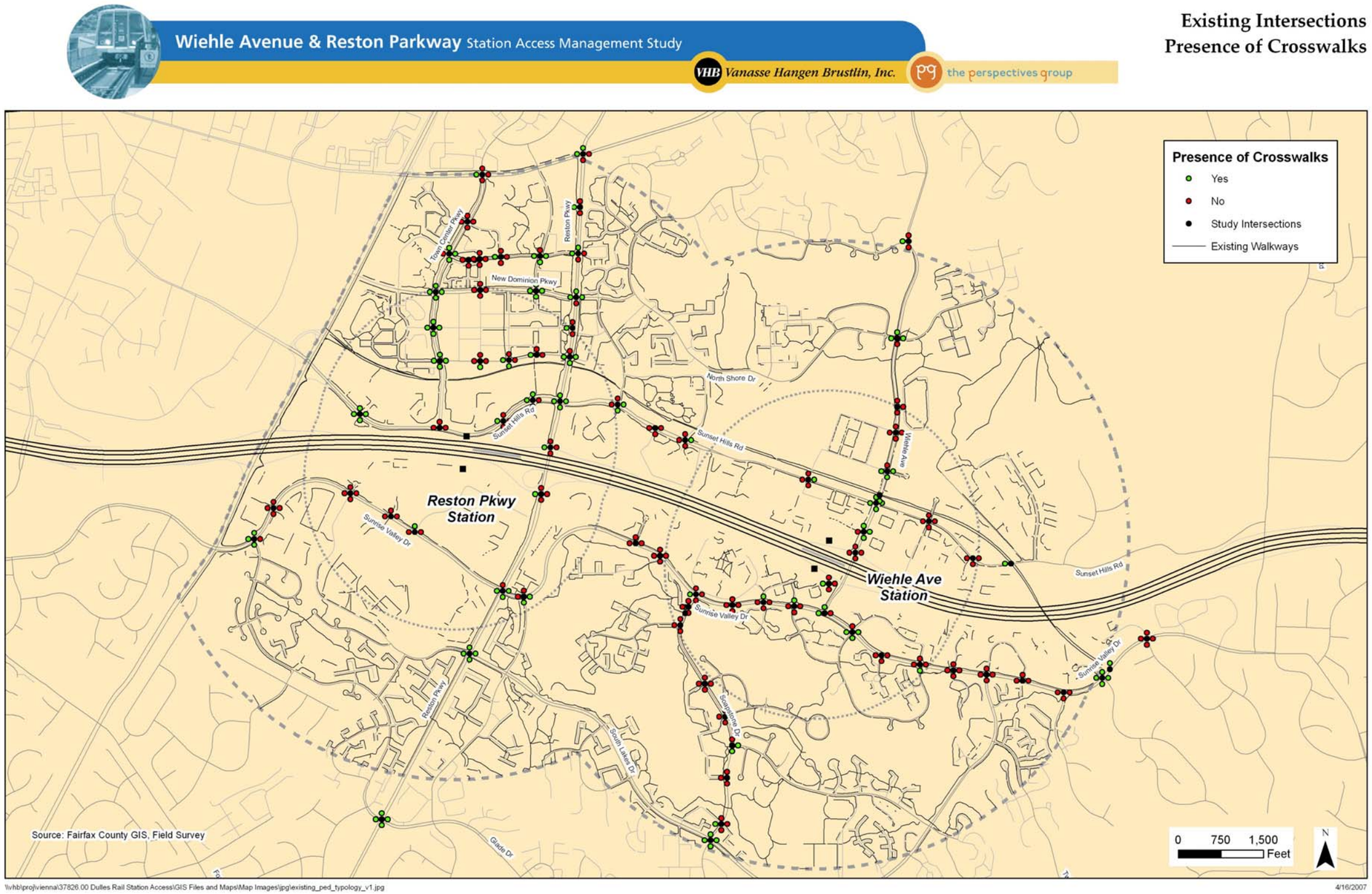


Figure 19. Existing Pedestrian Facilities – Pedestrian Signal Heads

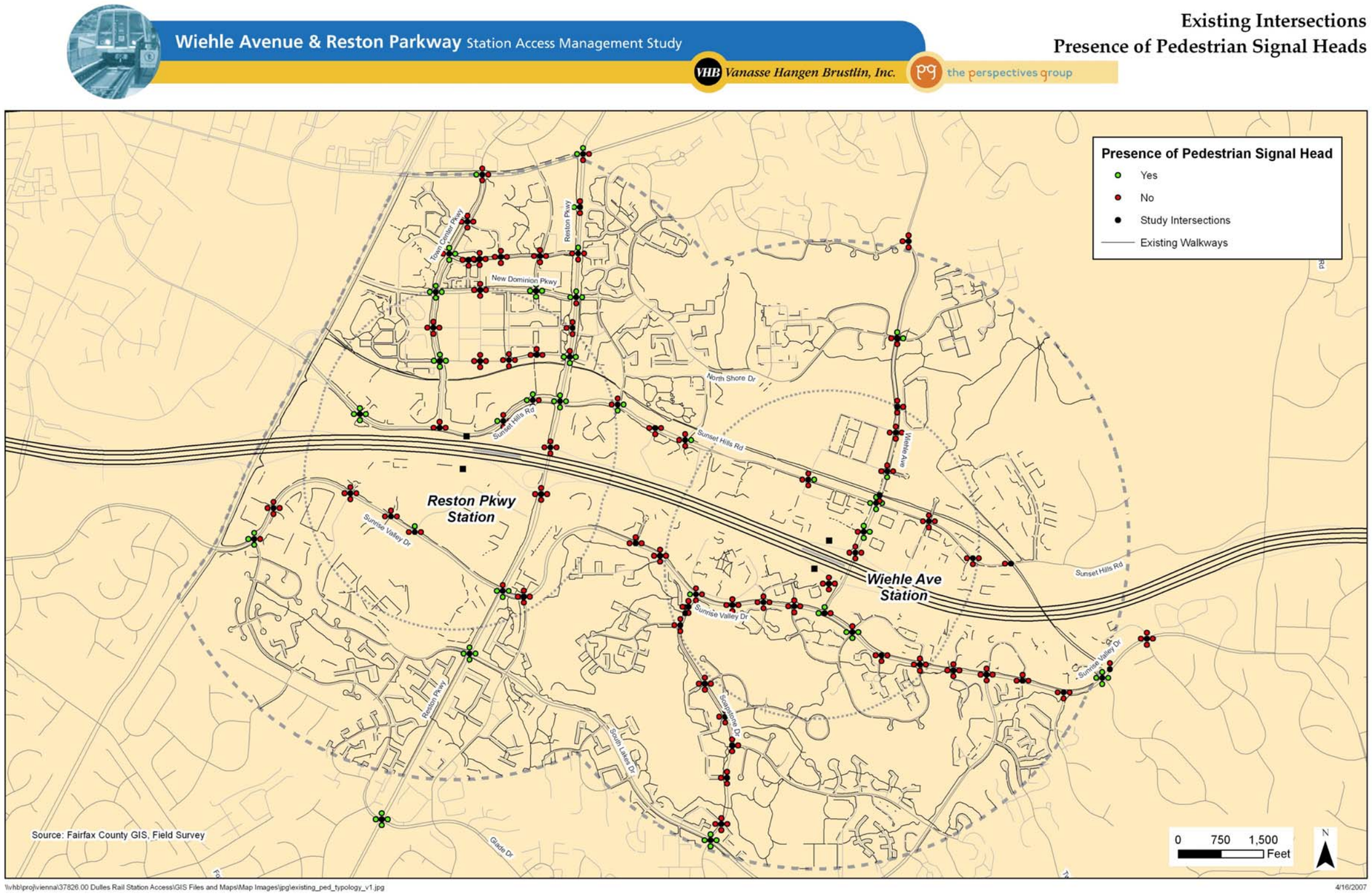


Figure 20. Existing Pedestrian Facilities – Countdown Pedestrian Signal Heads

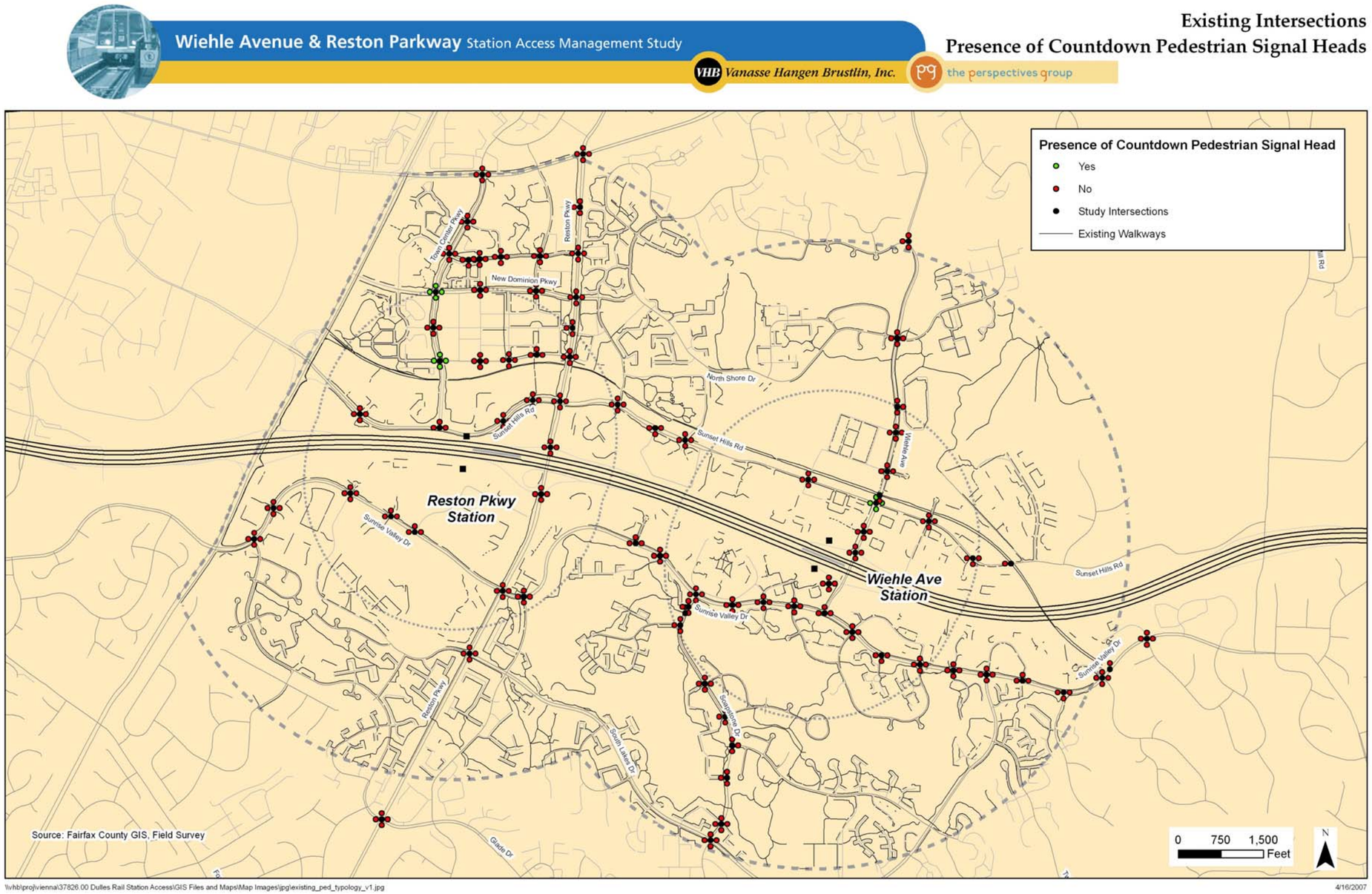
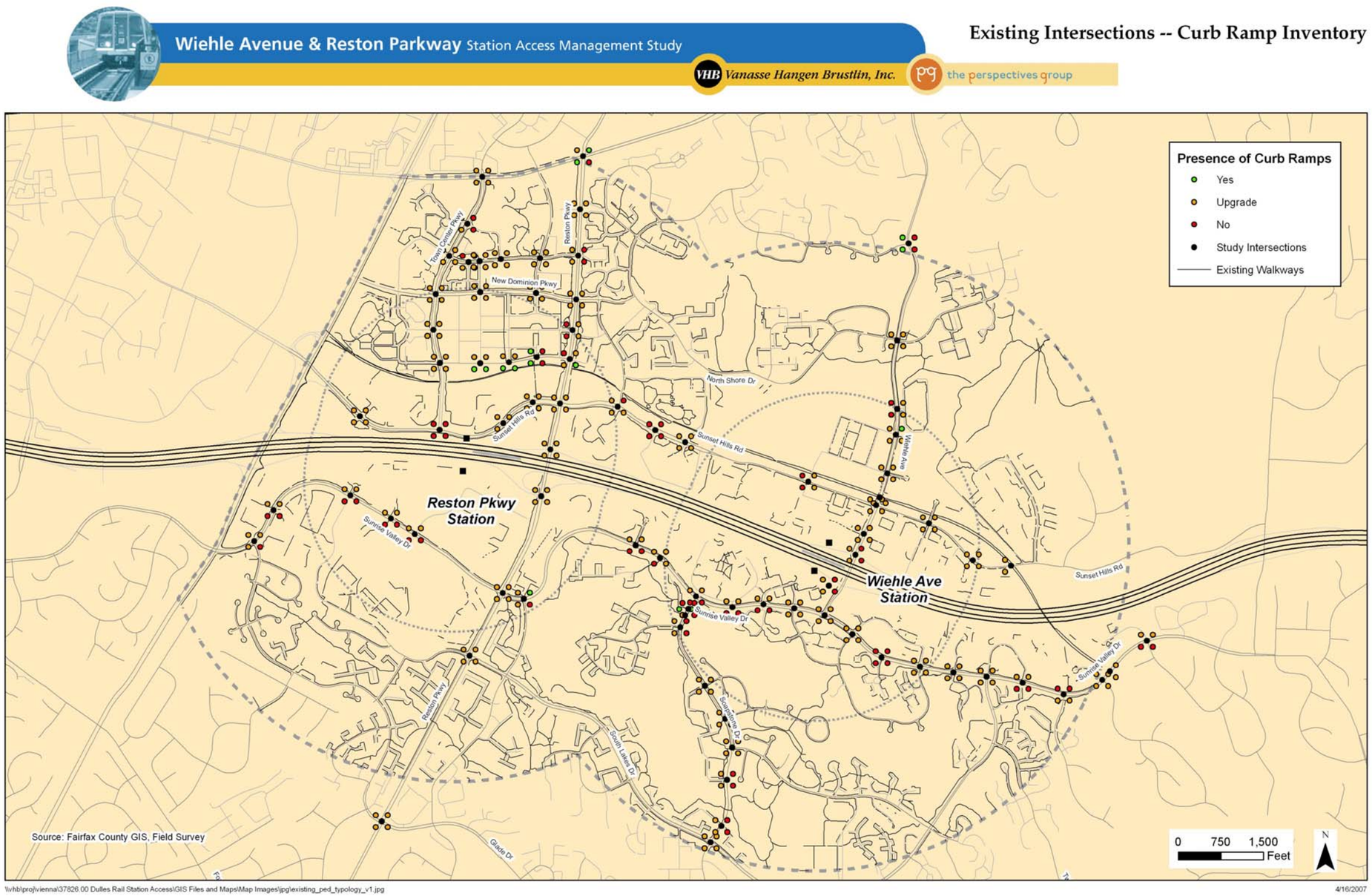


Figure 21. Existing Pedestrian Facilities – ADA Curb Ramps



ramps for pedestrians. Currently, ADA compliant ramps can be found at only 17 corners (only 5%), 75 corners have no ramps at all (23%) and the remaining 232 corners have ramps that should be upgraded with tactile warnings in order to meet ADA requirements (more than 71%). Additionally, 11 pedestrian signal push-buttons were placed at inaccessible locations and should be relocated in order to meet ADA requirements.

Quantitative safety assessments of pedestrian crossing facilities using the Pedestrian Intersection Safety Index (Ped ISI) for each approach to all intersections of major streets within half a mile of the proposed station entrances was also conducted (191 potential crossing locations). Ped ISIs are shown in Figure 23.

Ped ISIs ranged from just under 1.5 ("safer" intersection approaches) to over 5.5 ("less safe" intersection approaches). The median Ped ISI value for the study area was 3.8. Crossings with ISI values around or equal to this value are located at signalized intersections with fairly high traffic volumes, high traffic speed (around 45 mph) and require pedestrians to cross many lanes of traffic (approximately 7 lanes in both directions).

The "safest" crossings in the study area have a Ped ISI of less than two and typically require the crossing of a minor side street. These 18 crossings share many characteristics including low traffic speeds and volumes, a traffic control device at the intersection (often just a stop sign) and the need to cross only two lanes of traffic.

A dozen potential crossing locations were found to have a Ped ISI over five (see Table 7). All of these crossings had similar characteristics including no traffic control device (signal or stop signs), high travel speeds on the street to be crossed (over 35 mph), many lanes to cross (at least 6) and relatively high traffic volumes to contend with. These factors combine to create a potentially difficult crossing for a pedestrian and may require treatments in addition to high visibility crosswalks.

Table 7. Intersections with Ped ISI over 5.0

Main Street	Cross Street	Side	Ped ISI
Reston Parkway	Market St	North	5.5
Reston Parkway	Market St	South	5.5
Sunrise Valley	Driveways	West	5.3
Wiehle Ave	W&OD Trail	MidBlock	5.0
Wiehle Ave	Isaac Newton Sq N	North	5.0
Sunrise Valley	Driveways	East	5.0
Sunrise Valley	Campus Commons	East	5.0
Sunrise Valley	Lakeport Way	East	5.0
Sunrise Valley	Lakeport Way	West	5.0
Sunrise Valley	Preston White	East	5.0
Sunrise Valley	Barton Hill	East	5.0
Sunrise Valley	Barton Hill	West	5.0

Reston Parkway and Wiehle Avenue present major obstacles to the connectivity of the pedestrian network due to the distances required for pedestrians to cross the street and traffic speeds and volumes. This hazard potential can be expressed quantitatively

through the Ped ISI. Tables 8 and 9 show the computed ISI for crossings at intersections within one mile of the Metro entrances. Average ISI for each roadway is above the median for the area, indicating the difficulty pedestrians may face crossing these roadways.

Table 8. Pedestrian ISI for Reston Parkway Crossings

Cross Street	Side	ISI
Glade Dr	South	3.5
Glade Dr	North	3.8
South Lakes	South	3.8
South Lakes	North	3.8
Sunrise Valley	South	3.5
Sunrise Valley	North	4.3
EB DTR Ramps	South	3.3
EB DTR Ramps	North	3.3
WB DTR Ramps	South	3.6
WB DTR Ramps	North	4.0
Sunset Hills	South	4.8
Sunset Hills	North	4.6
Bluemont Way	South	4.3
Bluemont Way	North	4.3
Market St	South	5.5
Market St	North	5.5
New Dominion Pkwy	South	4.8
New Dominion Pkwy	North	4.2
Bowman Towne Dr	South	3.8
Bowman Towne Dr	North	3.8
Spectrum Ctr	South	3.5
Spectrum Ctr	North	3.2
Baron Cameron Ave	South	4.2
Baron Cameron Ave	North	3.8
Average		4.0

Table 9. Pedestrian ISI for Wiehle Avenue Crossings

Cross Street	Side	ISI
Sunrise Valley	North	3.4
EB DTR Ramps	South	4.4
EB DTR Ramps	North	4.7
WB DTR Ramps	South	4.7
WB DTR Ramps	North	4.4
PNR Lot Entrance	South	4.4
PNR Lot Entrance	North	4.0
Sunset Hills	South	4.0
Sunset Hills	North	3.3
W&OD Trail	MidBlo	5.0
Isaac Newton Sq S	South	3.0
Isaac Newton Sq S	North	3.0
Isaac Newton Sq N	South	4.7
Isaac Newton Sq N	North	5.0
Chestnut Grove Sq	South	4.7
Chestnut Grove Sq	North	4.7
North Shore Dr	South	2.9
North Shore Dr	North	2.9
Fairway Dr	South	4.3
Fairway Dr	North	4.3
Average		4.1

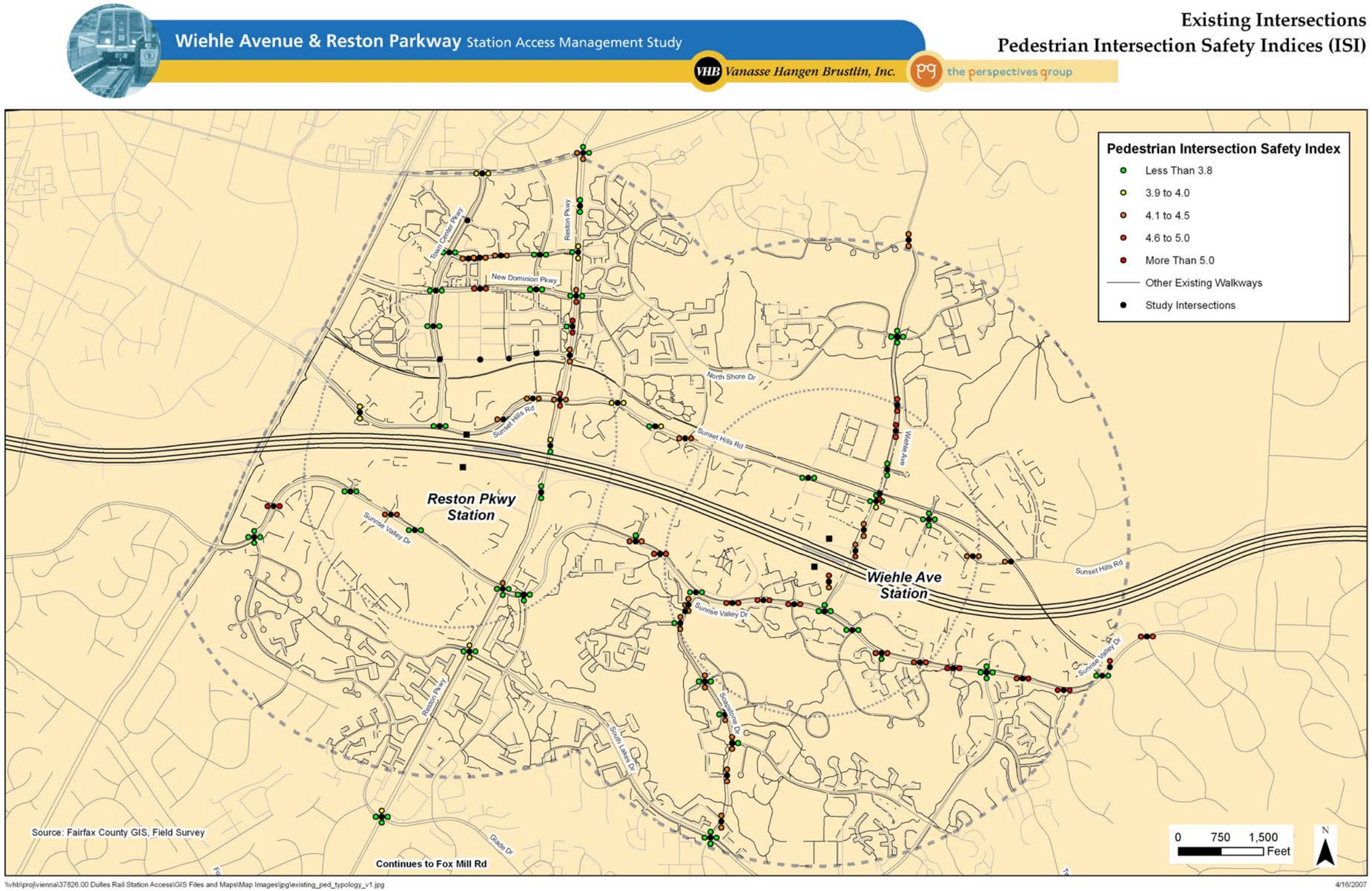
Table 8 also shows the W&OD Trail crossing with an ISI of 5.0. Other W&OD Trail crossings at Sunset Hills Road and at Sunrise Valley Drive have ISIs of 4.25 and 4.68, respectively. The high ISI is due in part to the fact that the crossings are unsignalized. Additional treatments may be needed at these crossings to improve the safety of both pedestrians and bicyclists crossing.

Sidewalks and Footpaths

Major Streets

Sidewalk presence, width, and the presence of buffers were inventoried within half a mile of the station entrances. Figure 24 shows the result of existing sidewalk and buffer inventory. The most critical areas are those shown in red and orange; red indicating

Figure 22. Examples of Ped ISIs



where a sidewalk is not present and orange indicating areas where there are gaps in the sidewalk. In most cases, a sidewalk is necessary on both sides of the street to provide proper connectivity for pedestrians. Gaps and missing segments in the pedestrian network can leave pedestrians stranded, cause pedestrians to travel in the street, and increase conflicts between pedestrians and other modes. Without a continuous and connected pedestrian network, pedestrians are more likely to walk in the street and cross the street at unexpected points, such as at midblock locations. Continuous sidewalks will also benefit transit riders who often are required to wait in landscaped areas that are not accessible to pedestrians with some mobility restrictions.

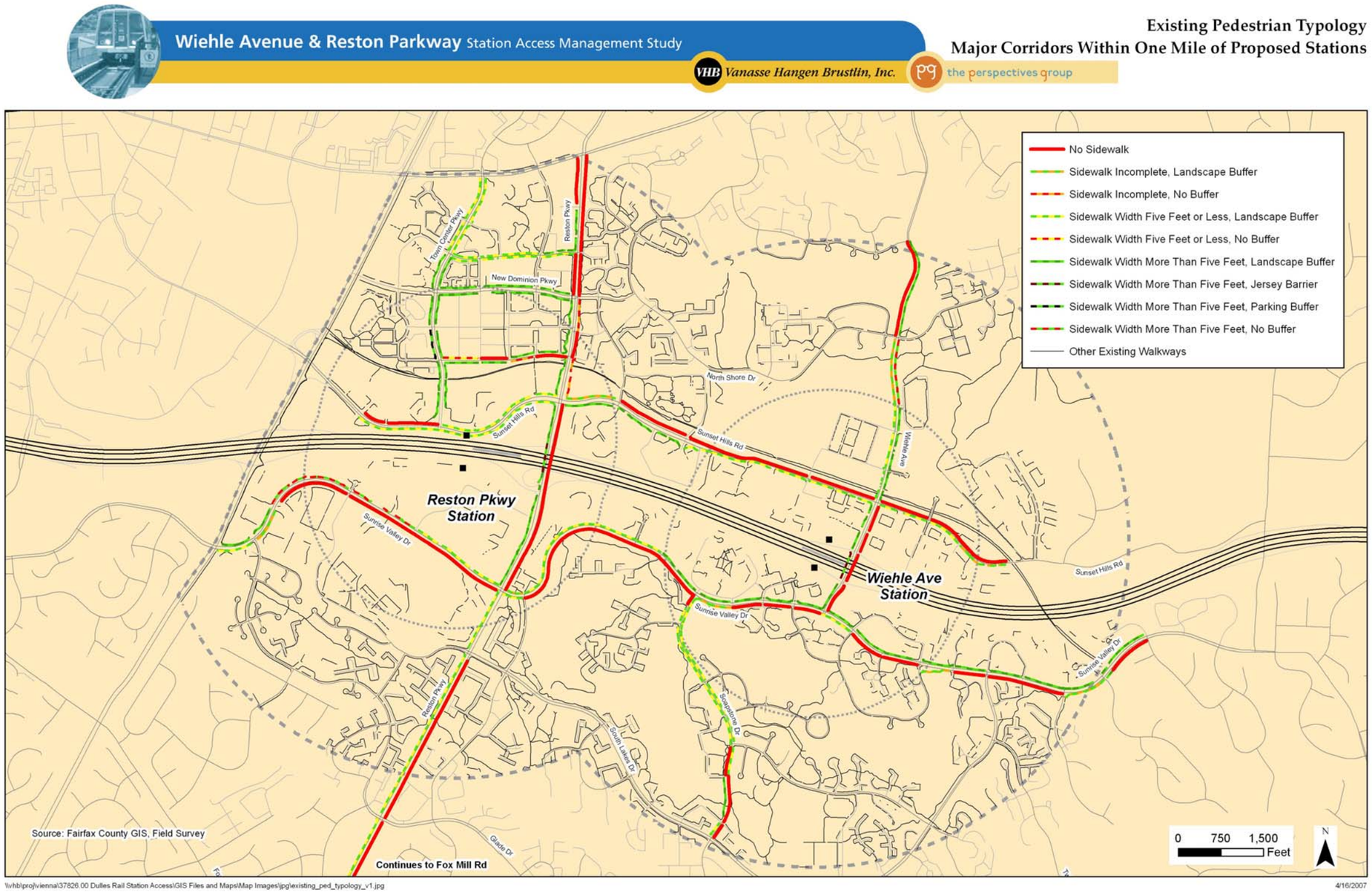
Sidewalk width and the presence of a buffer between the sidewalk and travel lanes are also indicated on the map. Buffers can positively enhance both the perceived and actual safety of sidewalks by providing lateral separation between pedestrians and vehicular traffic. Since pedestrians typically prefer to be separated from traffic as much as possible (this is especially true on high speed roadways), they may take alternate parallel paths when buffers are inadequate. Sometimes this results in pedestrians walking through landscaped areas where there is little danger to pedestrians. However, other times this results in pedestrians walking in parallel access roads and through parking areas. Buffers also help pedestrians with limited vision find the boundary between the sidewalk and travel lane, especially in cases where the sidewalk and the roadway are both made of the same material (e.g., portions of Sunrise Valley Drive where both sidewalk and roadway are asphalt).

Pedestrians wait at a bus stop on Sunrise Valley Drive that is not connected to the pedestrian network by crosswalks or sidewalks.

Minor Streets and Private Developments

In addition to sidewalks on the major streets, sidewalks largely on private developments and in residential communities were assessed. As a whole, private developments occupy large tracts of land, with buildings located far off of public roads and separated by large parking lots. Driveways into these developments are designed for vehicular access as few have sidewalks. One example of this type of development are the office buildings near the future southern Reston Parkway Station entrance. Sidewalks are provided close to building entrances, but there are no sidewalks or separated walkways to connect these facilities to sidewalks on adjacent streets (i.e., Reston Parkway and Sunrise Valley Drive). A pedestrian destined for the sidewalk on Reston Parkway would be required to walk through a parking lot about 500 feet wide from the closest building.

Figure 23. Existing Sidewalk and Buffer Inventory



A pedestrian destined for the sidewalk on Sunrise Valley Drive would have to walk down Edmund Halley Drive, which has no sidewalks. This example is typical of the connectivity issues for pedestrians and bicyclists on existing parcels.

There are no separated paths for pedestrians connecting to buildings in Reston on the south side of the Dulles Toll Road.

Pedestrian access through the large developments may continue to be a challenge in the future. In a public meeting held on March 27, 2007 an owner of multiple office properties in the Reston area indicated that due to contractual agreements with their tenants, many landowners will be forced to protect their parking supply by erecting gates and fences to prevent Metro riders from parking in these privately owned spaces, especially near the Reston Parkway Station where no dedicated Metro parking is proposed. These fences may make walking in the area less desirable as pedestrians will be required to use more circuitous routes in order to avoid these parcels. The ability to attract pedestrians to use the Metro and the safety of the pedestrian network are related to the directness of sidewalks and footpaths. Those built along pedestrian "desire" lines that provide direct access to major origin and destination points will not only attract pedestrian trips, but will also encourage proper use and promote pedestrian safety.

On the positive side, Reston Town Center provides a much more pedestrian and bike friendly environment. Blocks are short with wide sidewalks and good facilities for bicycle storage. The residential neighborhoods have sidewalks and footpaths that provide pedestrians with routes separated from vehicular traffic.

Appendix A: Intersection Safety Index

The model specifications used for the pedestrian and bicycle intersection safety indices are included in this section. The models are reproduced from the draft *Pedestrian and Bicyclist Intersection Safety Indices: User Guide* of February 2006.

A Pedestrian Intersection Safety Index (PISI) can be calculated for each potential crossing location. At a standard 4-legged intersection, four PISIs can be calculated. Mid-block PISIs are also possible.

Figure 24: Pedestrian ISI model and variable descriptions

Ped ISI = 2.372 – 1.867**SIGNAL** – 1.807**STOP** + 0.335**THRULNS** + 0.018**SPEED** + 0.006(**MAINADT*SIGNAL**) + 0.238**COMM**

where:

Ped ISI	*Safety index value (pedestrian)*	
SIGNAL	Signal controlled crossing	0 = no 1 = yes
STOP	Stop sign controlled crossing	0 = no 1 = yes
THRULNS	Number of through lanes on street being crossed (both directions)	1, 2, 3, …
SPEED	85th percentile speed of street being crossed	Speed in mph
MAINADT	Main street traffic volume	ADT in thousands
COMM	Predominant land use on surrounding area is commercial development (i.e., retail, restaurants, etc)	0 = not predominantly commercial area 1 = predominantly commercial area

Bicycle Intersection Safety Indices (BISI) are calculated by approach and movement. For an intersection with n approaches, each approach will have $(n – 1)$ BISIs, resulting in $n(n – 1)$ BISI values for the whole intersection. BISIs can only be calculated at the intersection of two vehicular roadways.

Figure 25: Bicycle ISI model and variable descriptions

Through	Bike ISI = 1.13 + 0.019**MAINADT** + 0.815**MAINHISPD** + 0.650**TURNVEH** + 0.470(**RTLANES***BL**) + 0.023(**CROSSADT***NOBL**) + 0.428(**SIGNAL***NOBL**) + 0.200**PARKING**
Right Turn	Bike ISI = 1.02 + 0.027**MAINADT** + 0.519**RTCROSS** + 0.151**CROSSLNS** + 0.200**PARKING**
Left Turn	Bike ISI = 1.100 + 0.025**MAINADT** + 0.836**BL** + 0.485**SIGNAL** + 0.736(**MAINHISPD***BL**) + 0.380(**LTCROSS***NOBL**) + 0.200**PARKING**

where:

Bike ISI	*Safety index values (through, right, left)*	
BL	Bike lane presence	0 = NONE or WCL 1 = BL or BLX
CROSSADT	Cross street traffic volume	ADT in thousands
CROSSLNS	Number of through lanes on cross street	1, 2, ...
LTCROSS	Number of traffic lanes for cyclists to cross to make a left turn	0, 1, 2, ...
MAINADT	Main street traffic volume	ADT in thousands
MAINHISPD	Main street speed limit ≥ 35 mph	0 = no 1 = yes
NOBL	No bike lane present	0 = BL or BLX 1 = NONE or WCL
PARKING	On-street parking on main street approach	0 = no 1 = yes
RTCROSS	Number of traffic lanes for cyclists to cross to make a right turn	0, 1, 2, ...
RTLANES	Number of right turn traffic lanes on main street approach	0, 1
SIGNAL	Traffic signal at intersection	0 = no 1 = yes
TURNVEH	Presence of turning vehicle traffic across the path of through cyclists	0 = no 1 = yes