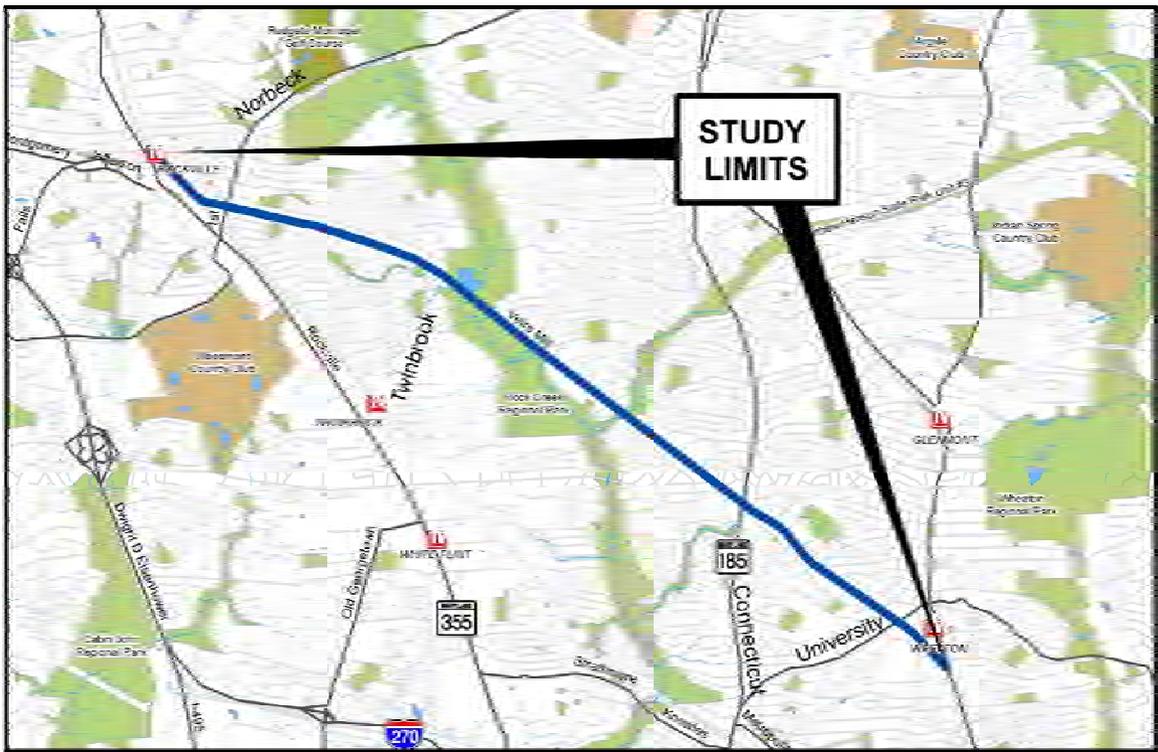


**MD 586 – VEIRS MILL ROAD
BUS RAPID TRANSIT STUDY
FROM ROCKVILLE METRORAIL STATION
TO WHEATON METRORAIL STATION
PURPOSE AND NEED STATEMENT**



**Montgomery County, Maryland
Project No. MO244M11
NOVEMBER 2012**

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1.0 Introduction

The Montgomery County Department of Transportation (MCDOT), in cooperation with the Maryland State Highway Administration (SHA), the Maryland Transit Administration (MTA), the Federal Transit Administration (FTA), and the Federal Highway Administration (FHWA), is proposing a new Bus Rapid Transit (BRT) line along Veirs Mill Road between the Wheaton Metrorail Station and the Rockville Metrorail Station in Montgomery County, Maryland. MD 586 – Veirs Mill Road (Veirs Mill Road) connects the two major activity centers of the City of Rockville and the Wheaton Central Business District (CBD). This corridor has one of the highest levels of existing Metrobus transit ridership in Maryland.

BRT is an integrated, bus-based, rapid transit system typically utilizing highly flexible service and advanced technologies to improve customer convenience and reduce delays. BRT combines running ways, specialized buses, stations, and automated information systems into an integrated system with a unique brand identity. BRT stations typically include passenger shelters and loading platforms; level bus boarding; real-time bus arrival information; automated fare purchase with off-board fare collection; and station site treatments such as access, landscaping, and lighting. BRT vehicles are typically specialized buses with low-floors, multiple doors on both sides of the bus, higher capacity through use of articulated buses, increased passenger circulation and bicycle provisions, and brand identity.

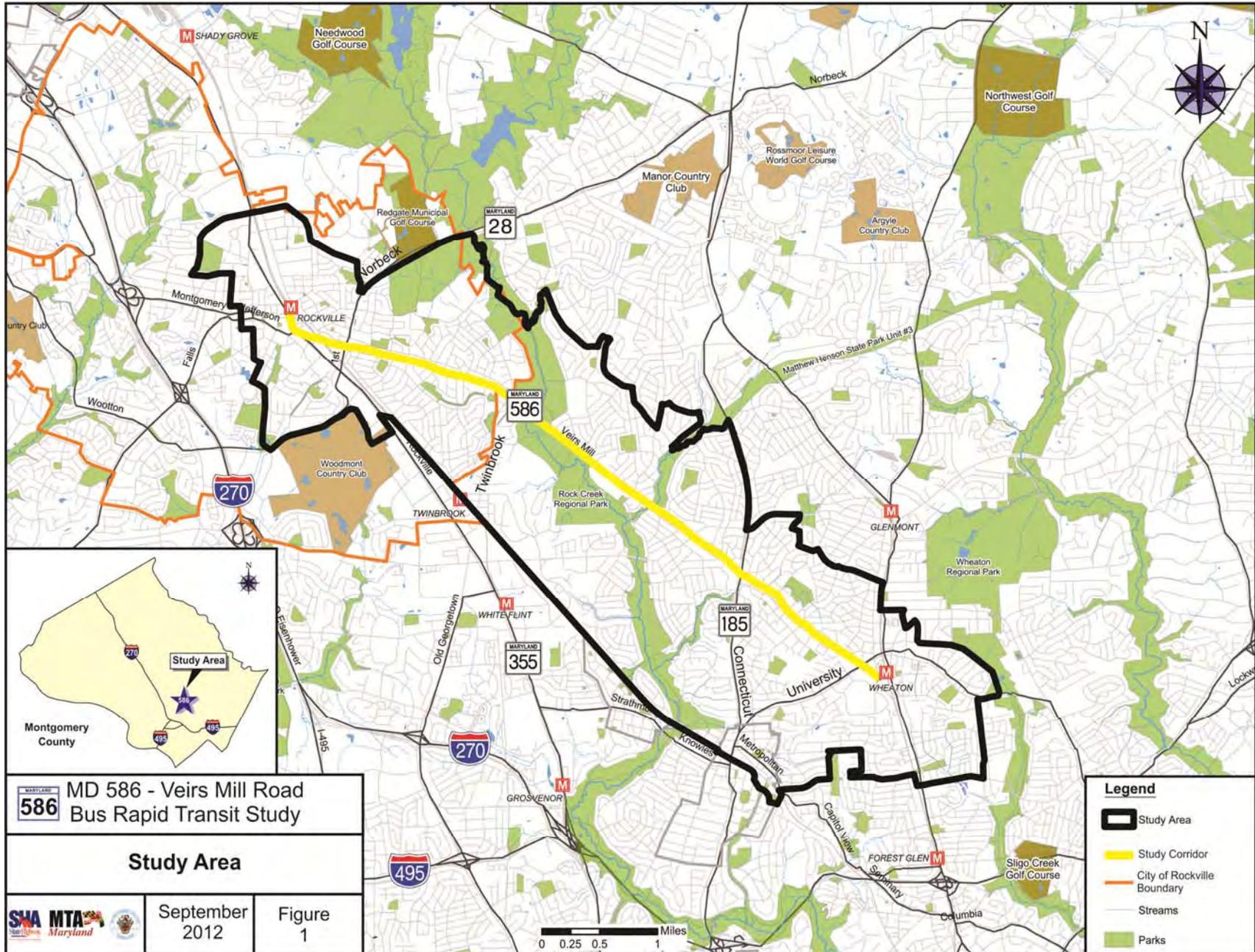
BRT service features stations that are spaced farther apart than local bus stops. Buses may operate in dedicated lanes reserved exclusively for BRT or in shared travel lanes used by BRT buses and other traffic. Traffic signal priority, queue jumpers, and station pull-outs may be used in combination with shared traffic lanes and dedicated BRT lanes to improve speed and operations. In cities where BRT has been implemented, it has been described as a bus that offers the convenience of rail transit with a lower capital cost, because it does not require an investment in trains, track, or catenaries.

This Purpose and Need Statement presents the existing and future transportation needs in the study corridor that the project is proposing to address.

1.1 Description of Study Corridor

The proposed MD 586 – Veirs Mill Road BRT study corridor is approximately 6.7 miles long, between the Rockville Metrorail Station and the Wheaton Metrorail Station in Montgomery County, Maryland. The study corridor includes of Veirs Mill Road, service roads, and adjacent properties as shown in **Figure 1**.

Twenty signalized intersections, 26 unsignalized intersections, and numerous driveways are located within the study corridor. In April 2009, SHA designated the right lane of eastbound Veirs Mill Road from Ferrara Avenue to University Boulevard as a bus lane with the signing denoting “Right Lane Must Turn Right Except Buses.”



The Veirs Mill Road cross section varies between four-lane, five-lane, and six-lane segments. Some segments of the roadway include shoulders, and many segments include service roads that separate the main travel lanes of Veirs Mill Road from residential properties. The service roads provide access control along Veirs Mill Road and allow on-street parking for the adjacent properties. There is no parking on Veirs Mill Road except within the Wheaton Central Business District (CBD).

Sidewalks are typically present throughout the Veirs Mill Road study corridor, with a few exceptions. Sidewalk gaps occur at the following locations:

- eastbound and westbound Veirs Mill Road between Aspen Hill Road and Havard Street;
- eastbound and westbound Veirs Mill Road between Newport Mill Road and College View Drive;
- eastbound Veirs Mill Road between Twinbrook Parkway and Aspen Hill Road; and
- eastbound Veirs Mill Road between Pendleton Drive and Newport Mill Road.

A pedestrian bridge carries the Rock Creek Trail over Veirs Mill Road immediately west of Aspen Hill Road. A second pedestrian bridge crosses Veirs Mill Road at the Wheaton Metrorail Station. Marked crosswalks are located at 20 signalized intersections and at six unsignalized intersections throughout the corridor. There are no dedicated bicycle lanes or shared use lanes along Veirs Mill Road.

1.2 Existing Roadway and Transit Operations

1.2.1 Roadway Operations

Veirs Mill Road is classified as a Principal Arterial and carries approximately 24,000 to 37,600 vehicles per day within the study corridor. It is one of the most heavily used transportation and transit corridors in Montgomery County that does not have existing rail transit and experiences traffic congestion problems.

Existing (2011) and future (2040) levels of service (LOS) were determined for the intersections and arterial segments of Veirs Mill Road. The intersection LOS is based on critical lane volume (CLV) methodology and the arterial LOS is based on the 2010 Highway Capacity Manual (HCM) methodology from a calibrated Synchro model. Under 2011 existing conditions, four intersections operate at LOS E during the AM peak; two intersections operate at LOS E and one intersection operates at LOS F during the PM peak. Under 2040 “no-build” conditions, which include no improvements to the Veirs Mill Road corridor; four intersections operate at LOS E and seven intersections operate at LOS F during the AM peak while two intersections operate at LOS E and 12 intersections operate at LOS F during the PM peak. In summary, nearly all study area intersections deteriorate by one letter grade or more during both AM and PM peaks under 2040 No-Build as compared to 2011 Existing.

Arterial LOS was also generated under 2011 Existing and 2040 No-Build using SimTraffic for Veirs Mill Road in both directions between key intersections. Along Veirs Mill Road eastbound,

segments between MD 355 and Twinbrook Parkway deteriorate from LOS E in 2011 to LOS F in 2040, while segments between Twinbrook Parkway and Randolph Road deteriorate from an acceptable LOS D or better in 2011 to LOS F in 2040. Similarly, along Veirs Mill Road westbound, segments between MD 185 and MD 28 deteriorate from an acceptable LOS D or better in 2011 to LOS F in 2040. **Appendix A** includes the LOS for the signalized intersections and arterial segments.

The system-wide performance measures (for Veirs Mill Road and all intersecting streets) such as total delay, delay per vehicle, travel time, average speed, fuel consumed, and unserved vehicles were generated under 2011 Existing and 2040 No-Build using SimTraffic. The demand that is unable to pass through the intersection during that time period are the "unserved vehicles." During the AM peak, the total delay is almost tripled and the unserved vehicles are almost seven times greater in 2040 than in 2011. Similarly, during the PM peak, the total delay is almost tripled and the unserved vehicles are almost five times greater in 2040 than in 2011.

During the three-year study period from January 1, 2009 to December 31, 2011, 686 crashes were reported along the Veirs Mill Road corridor. Although the number of reported crashes decreased annually between 2009 and 2011, the rate is significantly higher than the statewide average rate. The crash rates for fatalities, injuries, opposite-direction, rear-end, sideswipe, and pedestrian crashes along the study corridor are also significantly higher than the statewide average. A summary of the crash data, including corridor and state-wide crash rates, is provided in **Appendix B**.

Over this three-year period, there were 36 crashes involving pedestrians or bicycles, which represented 5 percent of all crashes in the corridor. The crash rate for these pedestrian and bicycle-related crashes was 10 crashes per million vehicle-miles-travelled (VMT), which was significantly higher than the statewide average rate of 6.3 crashes per million VMT.

1.2.2 Rail Operations

Veirs Mill Road serves as an important link between two branches of the Washington Metropolitan Area Transit Authority's (WMATA) Metrorail Red Line. Existing rail connections within the study corridor also include the MARC Brunswick Line and Amtrak's Capitol Limited Line, both accessible at the Rockville Metrorail Station.

The Red Line is a U-shaped route that travels into and out of the District of Columbia along two north-south branches: Rockville Pike/Wisconsin Avenue and Georgia Avenue/B&O Railroad. The Rockville and Wheaton Metrorail stations are on opposite branches of the Metrorail Red Line.

Metrorail Red Line service from the Rockville Station connects to Shady Grove to the north and Twinbrook, White Flint, Grosvenor-Strathmore, Medical Center, Bethesda, Friendship Heights, and District of Columbia destinations to the south. In Fiscal Year 2012 (July 2011 through June 2012), the average weekday Metrorail ridership for the Rockville Station was approximately 9,700 passengers with half of the passengers entering the station and half exiting the station.

Red Line service to and from the Wheaton Station includes Glenmont to the north and Forest Glen, Silver Spring, and District of Columbia destinations to the south. In Fiscal Year 2012 (July 2011 through June 2012), the average weekday Metrorail ridership for the Wheaton Station was approximately 8,770 passengers, with half of those passengers entering the station and half exiting the station.

The Rockville and Wheaton Metrorail stations provide connections to other WMATA Metrobus and Montgomery County Ride On buses. The MARC Brunswick Line provides service between Washington, DC, and Martinsburg, West Virginia. Nine inbound trains stop at the Rockville Station in the morning and nine outbound trains stop at the Rockville Station in the afternoon and evening, Monday through Thursday. On Friday, 10 outbound trains stop at the Rockville Station in the afternoon and evening. Changes in service are now implemented. If implemented, they would result in nine inbound trains in the morning and 11 outbound trains in the afternoon and evening.

The Amtrak Station in Rockville is the next-to-last southbound stop on the Capitol Limited Line, which connects Chicago, Cleveland, and Pittsburgh to Washington, DC. One daily southbound train leaves Rockville Station at 11:40 AM and one daily northbound train leaves Rockville Station at 4:29 PM.

All Metrorail stations in Montgomery County include bicycle racks and lockers. According to the 2012 Metrorail Station Bicycle Census and the Metro Office of Parking, 124 bicycle racks and 38 lockers are available at the Rockville Metrorail Station, and 52 bicycle racks and 15 lockers are available at the Wheaton Metrorail Station. On an average day at the Rockville Metrorail Station, approximately 30 percent of the bicycle racks are used and 15 percent of the lockers are used. On an average day at the Wheaton Metrorail Station, approximately 60 percent of the bicycle racks are used and less than ten percent of the lockers are used.

At the Rockville Metrorail Station, WMATA offers 524 all-day parking spaces in the parking lot on the east side of the tracks, 22 short-term metered spaces on the west side of the tracks, and an additional 121 metered spaces at a lot immediately north of Park Road, which serves as the northern boundary of the station property. The parking lot with 524 all-day spaces has nearly 100 percent occupancy throughout the day, based on data from Smart Trip users at the parking gates. The short-term spaces have a peak occupancy rate of approximately 50 percent in the middle of the day. The parking lot with 121 metered spaces operates has a peak occupancy of approximately 17 percent in the middle of the day.

At the Wheaton Metrorail Station, WMATA offers 977 all-day garage parking spaces and no short-term spaces. The parking garage operates at approximately 50 percent occupancy, based on data from Smart Trip users at the parking gates.

Montgomery County operates a parking lot with 42 short-term and 22 long-term parking spaces at the Wheaton Metrorail Station and an adjacent parking garage with 615 long-term parking spaces. The parking lot operates at approximately 20 percent to 58 percent occupancy,

depending on the time of year, and the garage operates at approximately 47 percent to 58 percent occupancy.

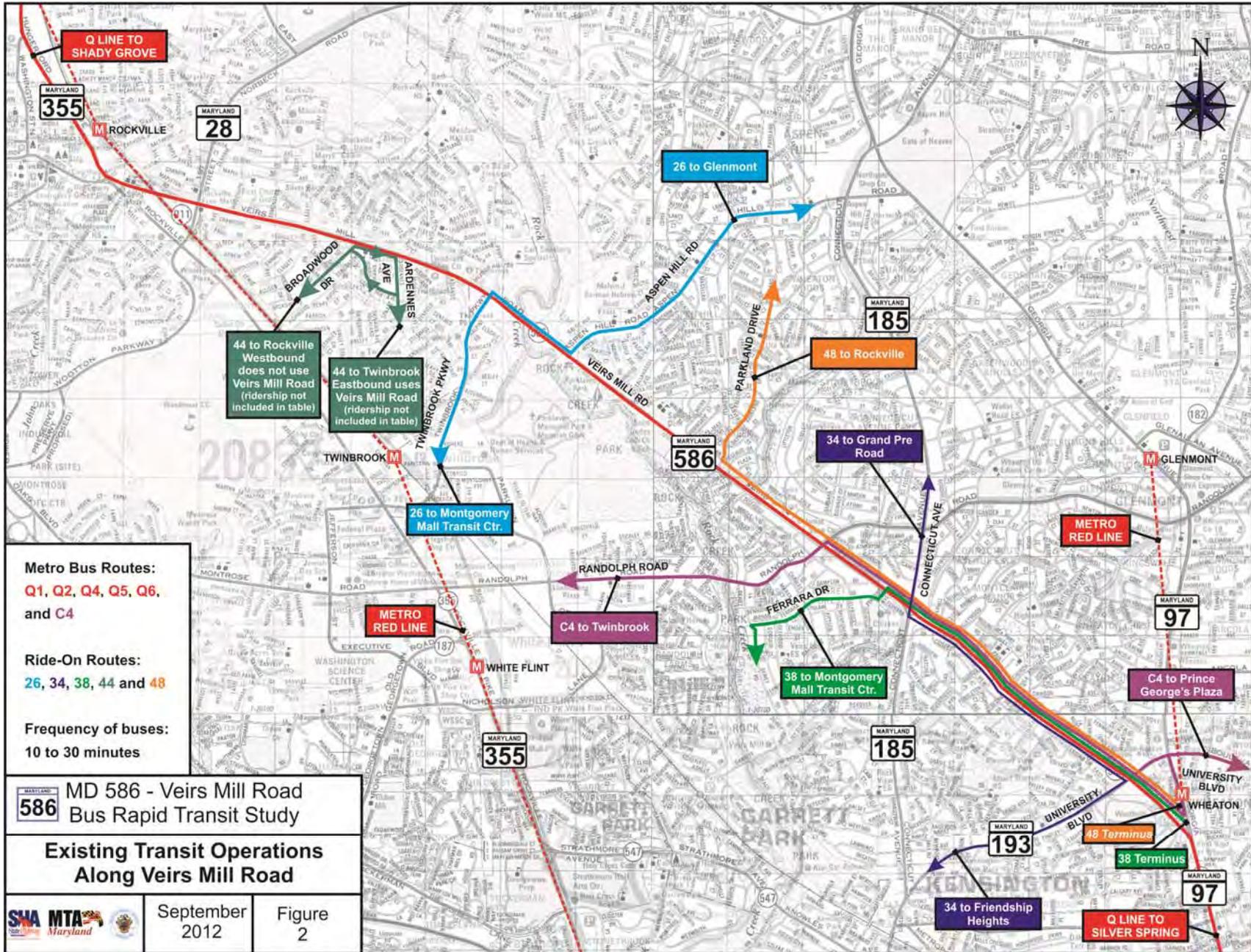
1.2.3 Bus Operations

Local bus service along the Veirs Mill Road corridor is currently provided by WMATA's Metrobus and Montgomery County's Ride On. Eleven bus routes operate within the Veirs Mill Road study corridor; six are operated by WMATA and five by Montgomery County. WMATA's Q lines travel the entire corridor between the Rockville and Wheaton Metrorail stations. All other bus routes enter and exit the corridor at various points. Approximately 60 percent of the buses that serve the corridor are provided by WMATA, and 40 percent are provided by Montgomery County. **Figure 2** presents the bus routes along the study limits.

Metrobus routes Q1, Q2, Q4, Q5, and Q6 incorporate Veirs Mill Road from the Rockville Metrorail Station to the Wheaton Metrorail Station into their routes. Metrobus route C4 connects the Wheaton Metrorail Station to the Twinbrook Metrorail Station and incorporates the portion of Veirs Mill Road from the Wheaton Metrorail Station to Randolph Road. Approximately 11,300 to 12,200 passengers ride these bus routes within the Veirs Mill Road corridor daily. According to the current Q Line schedule, the one-way travel time between the Rockville and Wheaton Metrorail stations is approximately 27 to 34 minutes during peak hours, depending upon the direction in which the bus is traveling. The bus schedule indicates that the trip between the Wheaton and Twinbrook Metrorail stations on the C4 route generally takes 20 to 25 minutes during peak hours. FTA recommends an On-Time Performance (OTP) goal of 85 percent for a bus system. From October 2011 through September 2012, Metrobus routes in the Veirs Mill study corridor had an OTP of 79 percent, six percent below the OTP goal of 85 percent.

Ride On bus routes 26, 34, 38, 44, and 48 each travel on a segment of Veirs Mill Road within the study area, and serve approximately 4,600 to 6,000 passengers within the study corridor each day. With the exception of Route 48, these routes do not serve the full length of the Veirs Mill Road corridor. Route 26 connects the two branches of the Red Line (Twinbrook Metrorail Station to Glenmont Metrorail Station), the route is circuitous and, according to the current schedule, the one-way travel time is approximately 34 minutes in the eastbound direction and 41 minutes in the westbound direction during the AM peak hour. Router 38 connects the two branches of the Red Line at the Wheaton Metrorail Station and the White Flint Metrorail Station. It operates with a travel time that varies from 21 to 24 minutes in the peak hours, depending upon the direction in which the bus is traveling.

The Ride On Route 48 bus connects the Wheaton Metrorail Station to the Rockville Metrorail Station and travels along Veirs Mill Road for a portion of the trip. The bus schedule indicates that the travel time between Metrorail stations ranges from 34 to 40 minutes during the peak hours. Headways range from 20 to 25 minutes during peak hours. From December 2011 through August 2012, Ride On routes in the Veirs Mill study corridor had an OTP of 70 percent, 15 percent below the OTP goal. All Metrobuses and most Ride On buses can transport bicycles on racks mounted to the outside of the bus.



1.2.4 Project Background

Montgomery County has recognized the need for increasing bus transit speed and ridership within the highly congested Veirs Mill Road corridor since the early 1990s. Various studies, which are described in this section, identified conditions on Veirs Mill Road which create an ideal environment for establishment of a BRT service. The conditions include:

- 1) Heavily used existing bus services (Metrobus and Ride On);
- 2) Close, frequent stops along a short (seven-mile) corridor;
- 3) A well defined intra-corridor link between the Wheaton and Rockville stations, which are both located on the Metrorail Red Line;
- 4) Numerous commercial and residential properties adjacent to Veirs Mill Road which limit space for roadway expansion; and
- 5) Public desire for a premium, high quality yet local transit service.

Other transit modes, such as light rail, would not be suitable for these conditions and therefore were not the focus of County studies. For instance, light rail would require additional right-of-way and stops that are further apart. Light rail would also not be practicable for a short corridor with no connection to a larger network, especially given the requirements for a yard and shop facility. Thus, Montgomery County first proposed BRT as the most appropriate mode for improving transit in the corridor in the 1993 Strategic Transit Plan. Subsequent County Strategic Plans in 1997 and 2004 reiterated the vision for BRT in the County and along Veirs Mill Road.

As early as 1999, the Veirs Mill Road BRT project was formally endorsed by Montgomery County and the City of Rockville in an application for FTA assistance. In 2002, the County initiated the multi-billion-dollar Go Montgomery! program that endeavored to address worsening congestion and mobility problems throughout the County by undertaking a broad range of roadway, transit, and pedestrian/bicycle infrastructure improvement projects. The Program specifically adopted the Veirs Mill Road BRT project by incorporating it into the County Council's 10-Year Transportation Plan (2009). In 2003, the WMATA Regional Bus Study recommended the Veirs Mill Road BRT project as an organizational near-term priority, although the study intended to extend the limits farther on both ends of the corridor than currently proposed.

In addition to being included in the plans and program described above, the Veirs Mill Road BRT Project has been the specific subject of four studies. MCDOT completed a study in 1999 in conjunction with its application to become part of the FTA BRT Demonstration Program. In 2003, a cost/benefit study was completed to assess the degree to which BRT is likely to impact traffic flow on Veirs Mill Road. The study concluded that BRT service could provide time savings and increased reliability to transit users without increasing congestion on existing transit routes. In August 2005, MCDOT completed its Veirs Mill Road Bus Rapid Transit Facility Planning – Phase 1 Report that addressed project purpose and need, consideration of alternatives, costs and benefits, and public relations.

In July 2011, MCDOT completed the Countywide Bus Rapid Transit Study. This study found that a BRT network could operate effectively and substantially increase transit use within the County. The study also promoted the Veirs Mill Road corridor as a suitable location for BRT services, provided an overview of the proposed route, described the route cross-section, and identified possible locations for BRT stations along the corridor. BRT along Veirs Mill Road could potentially serve the Rockville CBD, County and City offices, Westfield Wheaton Shopping Center, and the Wheaton CBD.

In February 2011, the County Executive appointed a Transit Task Force including community leaders, elected and appointed officials, and agency transportation and planning professionals. The Transit Task Force was directed to develop a plan for the implementation of a comprehensive and effective rapid transit system for Montgomery County. Released in May 2012, the Transit Task Force's report identified the Veirs Mill Road corridor from the Rockville Metrorail Station to the Wheaton Metrorail Station to be included in the first of three phases for implementation of Countrywide BRT service.

WMATA conducted the Metrobus Q Line Study in 2009. The study identified several key issues requiring improvement: passenger crowding, bus bunching, poor schedule adherence, and long travel times. A first phase of service improvements was implemented the same year and included new routes along the Veirs Mill Road corridor, increased communication with bus drivers to help prevent bus bunching due to roadway closures and other issues, greater parking enforcement, and enhanced bus driver training. A second phase of improvements is scheduled for implementation in late 2012.

2.0 Purpose and Need

2.1 Purpose of the Project

The purpose of the MD 586 – Veirs Mill Road BRT Study is to provide a new high-speed, high-efficiency bus line along Veirs Mill Road between the Rockville Metrorail Station and the Wheaton Metrorail Station that will:

- enhance transit connectivity along the corridor and within the regional system;
- improve the ability for buses to move along the corridor (bus mobility) with improved operational efficiency and travel times;
- address current and future bus ridership demands;
- integrate service with rail and other bus services;
- attract new riders who do not use existing bus services;
- provide safe multi-modal access to transit;
- continue previous Montgomery County studies which recommend Bus Rapid Transit along Veirs Mill Road;

- support the growth generated from development within the study limits and the County; and
- improve person throughput throughout the Veirs Mill Road corridor.

2.2 Need for the Project

Four specific needs for the project are described in the following sections: system connectivity, mobility, transit demand/attractiveness, and livability.

2.2.1 System Connectivity

A high-quality east-west transit connection is currently lacking between the Rockville Metrorail Station and the Wheaton Metrorail Station. Although both stations are served by the Metrorail Red Line, they are near opposite ends of the rail corridor, and the average Red Line travel time between the two stations is 59 minutes. During peak hours, the average bus travel time between the two stations on the Metrobus Q line is 27 to 34 minutes.

The Metrobus Q Line provides service from the Shady Grove Metrorail Station to the Silver Spring Metrorail Station, and is the most heavily used Metrobus route in Montgomery County. The most heavily traveled segment of the Q Line is the section along Veirs Mill Road between the Rockville and Wheaton Metrorail stations, as demonstrated by ridership information provided in Section 1.2.3.

2.2.2 Mobility

The Veirs Mill Road corridor between the Rockville and Wheaton Metrorail stations is characterized by traffic congestion that hinders bus mobility and results in unpredictable service and travel times (see Section 1.2.1 and **Appendix A**). This congestion also frequently causes Metrobus and Ride On bus service on Veirs Mill Road to fall behind schedule.

The high vehicular traffic volumes cause congestion that disrupts bus schedules and eventually causes the buses to bunch together and arrive in rapid succession followed by long periods without buses. The volumes along MD 586 in 2011 were in the range of 700 to 900 vehicles per hour per lane (vphpl) and they are projected to increase to 1,500 to 1,700 vphpl in the 2040 No-Build. This substantial increase in volumes will further contribute to the disruption of traffic flow that will impact the flow of buses. In addition to the lane volumes, other factors that contribute to the congestion, today and in the future, include the number of turn lanes, entering and exiting traffic, lane drops, pedestrian crossings, frequently spaced bus stops, and the number of signalized intersections. The combination of traffic congestion along the arterial and delay at the signalized intersections causes delays in bus schedules by as much as 15 minutes, resulting in an OTP that is six to 15 percent below FTA's recommended level.

As described in Section 1.2.1 and **Appendix A**, over the next 20 to 30 years growth in regional travel will cause traffic conditions throughout the corridor to worsen. The Capital Beltway, I-270, and other regional facilities will experience demand well above their design capacity.

Because of the lack of capacity for regional demand on existing facilities, the County's major arterials will absorb more traffic. Ten of 20 signalized intersections along the Veirs Mill Road corridor are projected to deteriorate to LOS E or F by 2040, resulting in substantial peak-period traffic problems. Four of seven arterial segments are projected to deteriorate to LOS F. **Appendix A** provides detailed LOS by intersection and arterial segment. Under these current and projected traffic conditions, bus performance, including speed, reliability, and passenger comfort, is expected to decline in conjunction with these deteriorating traffic conditions.

When buses are delayed due to the congestion, the bus headways increase and passengers are inconvenienced by excessively long waits for the next bus. As delays increase, the number of passengers waiting at a bus stop also increases. When a delayed bus arrives, it may fill to capacity within a few stops, and buses filled to capacity do not stop to take on additional passengers. Therefore, passengers waiting at later stops are bypassed, further increasing passenger waiting and travel times.

Onboard fare collection is another major source of delay. Longer wait times cause a greater number of passengers to gather at a bus stop. When a large group of passengers boards a bus at one time, fare collection takes longer, buses are further delayed, and on-time performance is affected due to the increased dwell time at these stops.

WMATA conducted a rider survey of approximately 3,500 Q Line passengers between December 2008 and January 2009 to identify mobility issues. Among the nearly 300 riders who responded to the survey, "bus bunching" was considered the biggest problem on the Q line. Fourteen percent of Q-line riders noted schedule adherence as an issue needing improvement, and most respondents to the survey do not trust the Q-line schedules. Other concerns identified by Q Line passengers included bus overcrowding, long headways, schedule delays, long travel times, too many stops, and poor-quality bus shelters.

2.2.3 Transit Demand and Attractiveness

Transit demand and ridership in the Veirs Mill Road corridor is continuing to grow. Currently, over 9,500 rail passengers enter and exit the Rockville Metrorail Station on a typical weekday. There are 2,340 daily boardings/alightings on Metrobus and 7,700 boardings/alightings on Ride On bus at this station. By 2040, the Metropolitan Washington Council of Governments (MWCOG) regional travel demand model estimates a 30 percent increase in Metro ridership at the Rockville Metrorail station.

Over 9,200 rail passengers enter and exit the Wheaton Metrorail Station on a typical weekday; approximately 9,100 daily Metrobus boardings/alightings and 3,300 Ride On boardings/alightings occur at this station. By 2040, the MWCOG model estimates a 36 percent increase in Metro ridership at the Wheaton Metrorail Station. Additionally, by 2040, the MWCOG model estimates an average of 54 percent growth in bus ridership on the bus lines that travel along Veirs Mill Road within the study corridor.

Proposed Transit-Oriented Development (TOD) at the Rockville and Wheaton Metrorail stations

would increase the number of potential transit commuters living within walking distance of the stations (see **Section 3.0**). For example, according to an MWCOG document, *Regional Activity Centers and Clusters*, the Rockville Town Center is projected to result in 9,000 new jobs and 1,850 new households between 2005 and 2030.

The Veirs Mill Road study corridor is unique in transit demand characteristics; passenger demand remains relatively steady throughout the day, without marked changes in ridership volumes during weekday peak periods or other times of the day. Similarly, ridership levels remain relatively unchanged from weekdays to weekends. As demonstrated by the Q Line Survey, bus crowding in this corridor is already an issue. According to the WMATA 2011-2020 Capital Needs Inventory, transit ridership is expected to increase over the next 20 to 30 years, and the Metrorail system will experience demand approaching its design capacity. More transit users will shift to other modes of transportation, including buses. As bus ridership increases, bus overcrowding will remain a significant issue in the Veirs Mill Road corridor. Based on the Q Line Survey, buses that are full will skip stops because there is no room for new passengers, which further contributes to the long waits. Respondents also expressed safety concerns associated with the bus crowding such as standing in front of the yellow line and in the steps of the boarding areas.

The growing demand for transit in the region, coupled with the reliability issues (adherence to schedule, bus bunching, slow travel times), creates an unacceptable level of service for those individuals who rely on public transit as their primary mode of transportation (i.e., transit-dependent riders). Furthermore, the issues associated with the current bus service do not make it attractive to those individuals with access to alternate transportation modes who could elect to take the bus if it offered comfort and convenience. A higher-quality transit service is needed to attract these new riders from other modes.

As identified in the Countywide Bus Rapid Transit Study (2011), Montgomery County seeks to enhance the existing and planned transit and transportation options throughout the County. In order to maintain or improve transit modal share, a higher level of transit service is needed to attract new transit riders, including those who would regularly drive between points along the study corridor, or those who would benefit from longer trips and fewer stops, as offered by BRT. Generally, riders are attracted to transit service when travel times are reduced, reliability is increased, and they feel comfortable and safe.

2.2.4 Livability

Transit improvements are needed throughout the Veirs Mill Road corridor in order to create a more reliable, integrated, and accessible transportation network that enhances choices for transportation users; provides easy access to affordable housing, employment, and other destinations; and promotes positive effects on the surrounding community.

The US Department of Transportation (US DOT) has developed a policy of transportation planning and programs as a way of improving community quality of life, enhancing

environmental performance, and increasing transportation and housing choice while lowering costs and supporting economic vitality. US DOT's six principles of livability strive to:

- Provide more transportation choices to decrease household transportation costs, reduce our dependence on oil, improve air quality and promote public health.
- Expand location- and energy-efficient housing choices for people of all ages, incomes, races and ethnicities to increase mobility and lower the combined cost of housing and transportation.
- Improve economic competitiveness of neighborhoods by giving people reliable access to employment centers, educational opportunities, services and other basic needs.
- Target federal funding toward existing communities – through transit-oriented and land recycling – to revitalize communities, reduce public works costs, and safeguard rural landscapes.
- Align federal policies and funding to remove barriers to collaboration, leverage funding and increase the effectiveness of programs to plan for future growth.
- Enhance the unique characteristics of all communities by investing in healthy, safe and walkable neighborhoods, whether rural, urban or suburban.

The Veirs Mill Road corridor has become one of Montgomery County's foci for providing BRT service as a transit option and supporting these livability concepts.

The fundamental principles of livability are derived from the place-based needs and desires of the community. The past, existing, and future characteristics of each community are therefore used to identify how livability is defined for that specific community. The Montgomery County General Plan (1993), Aspen Hill Master Plan (1994), Twinbrook Neighborhood Plan (2009) and the Wheaton CBD Master Plan (2012) all support the important interrelationship between compact, mixed use development and efficient transportation. These plans support BRT along the Veirs Mill Road corridor as a means to reduce automobile dependency and facilitating mixed use development objectives. Livability principles expressed by the communities in these plans include continued integration of transportation and land use planning; an efficient transit system; improved access to housing, jobs, and services, particularly for low-income individuals; and conservation of environmental resources.

An element supporting livability within the corridor is TOD, defined as compact, mixed-use development near transit facilities and high-quality walking environments. The goal of TOD is to create sustainable communities where people of all ages and incomes have transportation and housing choices, increasing location efficiency where people can walk, bike, and take transit. In addition, TOD projects have demonstrated an increase in local transit ridership and a reduction in automobile congestion, providing value for both the public and private sector.

A December 2008 report from the Task Force on the Future for Growth and Development in Maryland, *Where Do We Grow From Here?*, advised that, by 2030, the state of Maryland could lose 650,000 acres of rural land to development unless growth policies change to encourage more-compact, walkable communities that are easily accessible and in close proximity to

employment, retail, and services. BRT along Veirs Mill Road would support the planned development and growth around the Rockville and Wheaton Metrorail stations, thus capitalizing on public investments in transit by producing local and regional benefits. Direct benefits of this TOD could include increased ridership, revitalization of neighborhoods, financial gains for joint development opportunities, increases in the supply of affordable housing, and profits to those who own land and businesses near transit stops. Secondary benefits include congestion relief, land conservation, reduced outlays for roads, and improved safety for pedestrians and cyclists (US DOT, 2012).

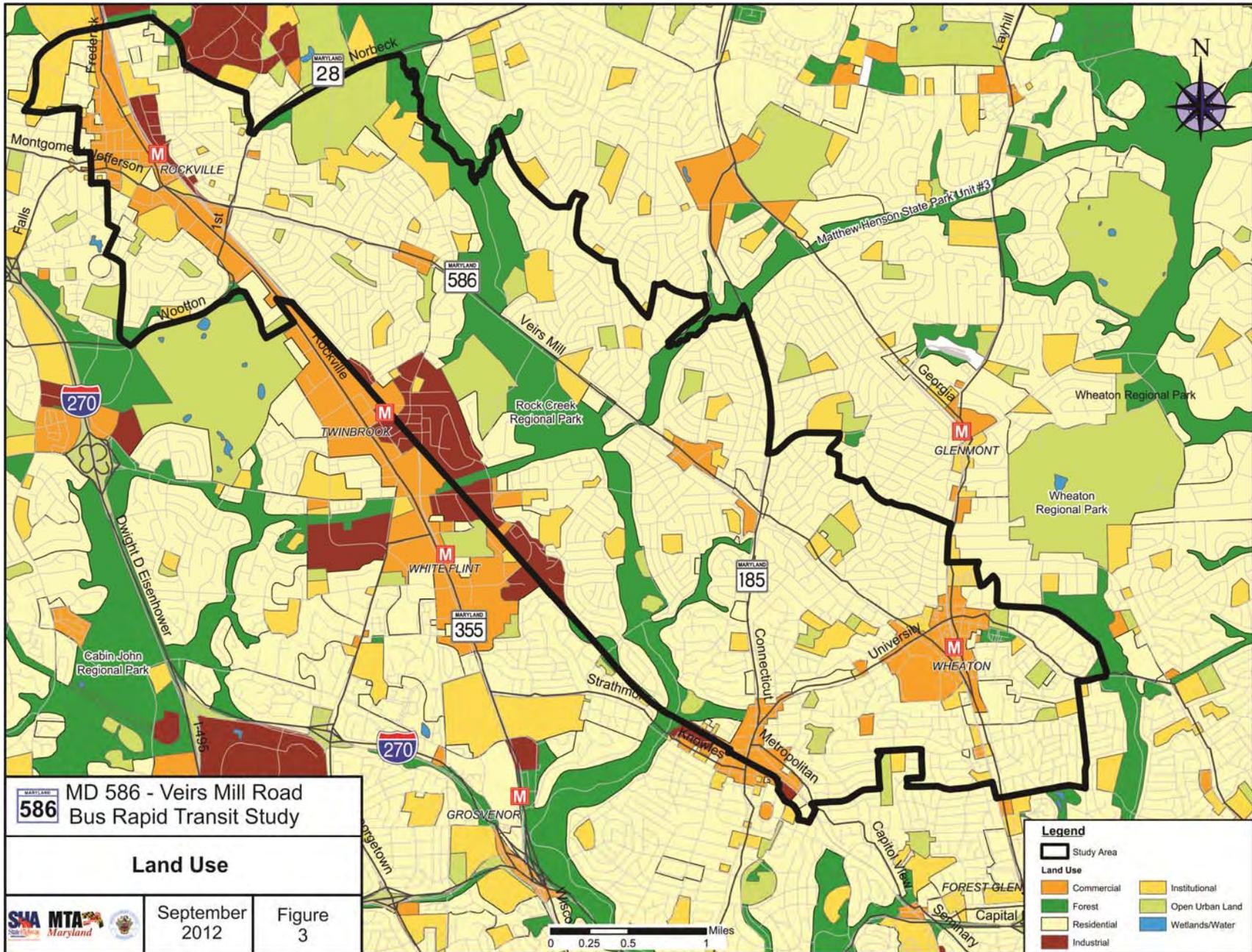
BRT along this corridor could benefit low-income families by offering additional public transit choices and generally support the potential for proximate affordable housing. This could translate to improved access to healthcare, education, and employment opportunities, as well as greater mobility and reduced commuting costs. According to the 2006-2010 US Census Bureau data, residents of approximately 8.84 percent of households within the study area live below the poverty level. While the percentage of households below the poverty level was on par with the state average, it was almost 50 percent higher than the Montgomery County average. According to the May 2007 FTA and U.S. Department of Housing and Urban Development publication, *Realizing the Potential: Expanding Housing Opportunities Near Transit*, families that live near transit spend just 9 percent of their household income on transportation compared to 25 percent of income for families who live in auto-dependent neighborhoods, thereby reserving more of the family income for other costs. Both the Rockville Metrorail Station and the Wheaton Metrorail Station have, or are planned to have, affordable housing within walking distance of the stations.

Transit, including BRT, also has numerous societal and environmental benefits. It can reduce traffic congestion, fuel consumption, and air pollution. Transit increases mobility, reduces time spent in congestion, and increases foot traffic and customers for area businesses.

3.0 Land Use and Development

Veirs Mill Road is dominated by urban and suburban land uses. Most of the study corridor consists of residential areas, with a few pockets of commercial and industrial areas. The corridor also passes through a portion of Rock Creek Regional Park. The City of Rockville and the Wheaton CBD, located at opposite ends of the study corridor, have the largest commercial zones in the study area (**Figure 3, Land Use**). The entire Veirs Mill Road corridor between Rockville and Wheaton CBD is located within a Priority Funding Area (PFA) (**Appendix C, Priority Funding Areas**).

High-density transit-oriented development (TOD) is being implemented in the vicinity of the Rockville and Wheaton Metrorail stations. In October 2001, the City of Rockville adopted the Rockville Town Center Master Plan, a mixed-use commercial, residential, retail, and entertainment development that will create a pedestrian-oriented downtown. The Rockville Metrorail Station is located southeast of the Town Center. One of the goals of the Town Center Master Plan is to give the Rockville Metrorail Station a recognizable presence in the Town



Center by favoring mixed-use, transit-oriented development on both sides of the station, which would be connected to the Town Center by a pedestrian promenade.

Phase I of the Town Center includes the 12.5-acre Rockville Town Square, which opened in 2007. The Town Square development features a broad town plaza, a state-of-the-art library, an arts center, a business innovation center, and pedestrian-oriented shops and restaurants with 644 condominiums and apartments located above. Fifteen percent of the residential units are affordable and moderately-priced dwellings. Town Center includes construction of office buildings that will ultimately accommodate 600,000 square feet of office space. A total of 851 acres is available for development within the planned Town Center.

Transit-oriented development is also proposed through a public/private partnership on 8.2 acres of WMATA- and County-owned property at the Wheaton Metrorail Station. The property over the eastern entrance to the station has already been developed as Metro Pointe, a mixed-use development featuring 173 residential units and 3,500 square feet of retail space in four and five story buildings.

Near the Wheaton Metrorail Station, at Georgia Avenue and University Boulevard, a new 32,000 square foot low-rise retail and office development, Georgia Crossing, was completed in 2009. According to the Wheaton CBD and Vicinity Sector Plan (2011), the Wheaton CBD has 10 publicly owned properties with development potential that are held by Montgomery County, WMATA, and the Maryland-National Capital Park and Planning Commission (M-NCPPC). The sites total 11.70 acres and are all within a 1,200-foot radius of the Metrorail station.

4.0 Related Plans and Projects

The Veirs Mill Road BRT study is consistent with the Montgomery County Strategic Transit Plans completed in 1993, 1997, and 2004, and with the County's current 10-Year Transportation Plan. The study is also consistent with local master plans throughout the corridor, including the Kensington-Wheaton Master Plan (1989), Aspen Hill Master Plan (1994), Town Center (Rockville) Master Plan (2001), Rockville Comprehensive Master Plan (2002), Twinbrook Sector Plan (2009), and Wheaton CBD and Vicinity Sector Plan (2011).

In 2011, M-NCPPC began developing a Countywide Transit Corridors Functional Master Plan. The purpose of the plan is to develop a BRT network throughout the County, recommend rights-of-way for individual transit corridors to accommodate bus lanes, queue jumpers to assist bus operations at intersections, station locations for the proposed transit network, and additional turn lanes at intersections as necessary. The Master Plan will also make recommendations on the allocation of roadway space for traffic, transit, pedestrians, and bicycles. One of the corridors under study for inclusion in the Master Plan is Veirs Mill Road from the Rockville Metrorail Station to the Wheaton Metrorail Station.

Several current or recently completed studies and projects have addressed the need for transportation improvements within and proximate to the Veirs Mill Road BRT study corridor.

Specifically, BRT projects connecting to the Rockville Metrorail Station vicinity are being considered in the West Montgomery Avenue and MD 355 corridors. BRT projects connecting to the Wheaton Metrorail Station vicinity are being studied in the MD 97/Georgia Avenue and MD 193/University Boulevard corridors, located at the eastern limit of the Veirs Mill Road BRT study corridor. Two proposed BRT projects would cross the Veirs Mill Road BRT study corridor along Randolph Road and MD 185/Connecticut Avenue.

The Corridor Cities Transitway would provide transit on a dedicated right-of-way from Shady Grove Metrorail Station to the former COMSAT facility just south of Clarksburg, Maryland. The 15-mile transitway would include the creation of 16 transit stations. BRT was identified as the preferred alternative for this project.

The Purple Line is a proposed 16-mile rapid transit line extending from Bethesda in Montgomery County to New Carrollton in Prince George's County. It would provide a direct connection to the Metrorail Red, Green, and Orange lines at Bethesda, Silver Spring, College Park, and New Carrollton. The Purple Line would also connect to MARC, AMTRAK, and local bus services. Light rail was identified as the preferred alternative for this project.

MCDOT is planning an eastward extension of Montrose Parkway, which would intersect Veirs Mill Road at Gaynor Avenue. This Veirs Mill Road BRT study is being closely coordinated with the extension project to ensure compatibility of the two studies.

5.0 Environmental Inventory

The Veirs Mill Road BRT corridor is dominated by residential land use with commercial zones located at opposite ends of the study corridor. The corridor is governed by numerous master plans, as detailed in Section 4.0. The county anticipates that future land use within the Veirs Mill BRT corridor will include enhanced transit improvements throughout the area to accommodate TOD in the vicinity of the Rockville and Wheaton Metrorail Stations.

Based on 2010 census tract data, minority and low-income populations have been identified throughout the project/study area. Public outreach will be conducted to ensure that the project would not disproportionately or adversely affect any minority or low-income populations.

Natural areas abutting the Veirs Mill Road BRT corridor are concentrated within the M-NCPPC-managed Rock Creek Regional Park and Matthew Henson State Park and trail. Rock Creek Trail crosses over Veirs Mill Road by way of a pedestrian bridge approximately 250 feet north of Aspen Hill Road. Matthew Henson Trail crosses Veirs Mill Road by way of an at-grade pedestrian crosswalk in proximity to the intersections of Turkey Branch Parkway and Edgebrook Road. Coordination with M-NCPPC reveals the presence of numerous parks in the study area with two local parks in the project area known as Aspen Hill and Parklawn. Both local parks are surrounded on three sides by Rock Creek Regional Park. Coordination with the City of Rockville reveals the presence of numerous parks within the study area including one local park,

Twinbrook, located along the Veirs Mill Road corridor. Coordination with park officials is ongoing to identify additional park resources.

An assessment of historic resources and archeological potential was completed for the Veirs Mill Road BRT corridor based on review of the SHA-GIS Cultural Resources Database, soil survey data, aerial photography, and historic maps.

Historic standing structures or districts included in the Maryland Inventory of Historic Properties have been identified within the Veirs Mill Road BRT corridor. These include National Register of Historic Places (NRHP) listed sites: the Third Addition to Rockville, including Old St. Mary's Church and Cemetery; the B&O Railroad Station; and the Hammond Woods Historic District. The Rockville Park Historic District is eligible for listing in the NRHP. The Area of Potential Effects (APE) has not been defined due to the preliminary nature of the project scope; however, a number of buildings along Veirs Mill Road are at least 50 years old.

Portions of the Veirs Mill Road BRT corridor have been included in prior archeological surveys. Eight known historic archeological sites were previously identified; however, none of these sites were recommended as eligible for the NRHP. SHA conducted a site visit in October 2011, and determined that there is low potential for unknown historic archeological sites due to large areas of previous disturbance. Depending on the extent of the project, additional archeological investigations may need to be conducted within the project area.

Any transportation use of a publicly-owned public park, recreation area or significant historic site will require evaluation under Section 4(f) of the US DOT Act of 1966, as federal funds are being used for this project.

Rock Creek is the primary aquatic resource within the Veirs Mill Road BRT corridor. Beginning near the Rock Creek Regional Park entrance road, a small incised channel with steep banks parallels the south side of Veirs Mill Road for a distance of 530 feet before entering Rock Creek. Farther east along Veirs Mill Road, Turkey Branch flows adjacent to the street of the same name and crosses Veirs Mill Road near Edgebrook Road. Farther eastward, between Connecticut Avenue and Huggins Road, concrete-lined channels convey intermittent drainage parallel to Veirs Mill Road. A review of National Wetland Inventory (NWI) and Maryland Department of Natural Resources (DNR) non-tidal wetland mapping indicates that palustrine wetlands are located within the Veirs Mill Road BRT corridor. On August 8th, 2012, wetland corridor identification was conducted to verify and supplement wetland and stream data within the Veirs Mill Road BRT corridor. Features identified included perennial streams (Rock Creek, and unnamed tributaries to Rock Creek), intermittent/ephemeral streams, and potential PEM and PFO wetlands per the Cowardin Classification System. A few roadside ditches within the corridor included wetland vegetation; a formal delineation will be required to determine if these areas are wetlands or roadside ditches. No wetlands of special state concern have been identified within the Veirs Mill Road BRT corridor.

Federal Emergency Management Agency (FEMA) floodplain mapping defines the 100 and 500-year floodplain for Rock Creek and Turkey Branch within the project area. Additional streams within the project area do not have FEMA-designated floodplains. Should there be any disturbance to wetlands or waterways, including modifications to existing drainage structures, or disturbance within the FEMA designated floodplain, permits will be required from Maryland Department of the Environment (MDE) and U.S. Army Corps of Engineers (USACE). Coordination with DNR Environmental Review Unit indicated that Rock Creek and unnamed tributaries, Old Farm Creek, and an unnamed tributary to Cabin John Creek that cross the study area are all classified as Use I (protection of fish and aquatic life and contact recreation) streams. Use I streams are subject to an in-stream construction closure period from March 1 to June 15. Fish species commonly found in Rock Creek and these tributaries include the Blacknose Dace, Green Sunfish, and Longnose Dace. DNR Environmental Review Unit stated that these species would be adequately protected by the Use I instream work prohibition time-of-year restriction, through sediment and erosion control measures, and other best management practices.

Throughout the Veirs Mill Road BRT corridor, developed areas contain small clusters of trees. Thick forests border the Rock Creek on both sides of Veirs Mill Road. Woody vegetation is also present at the Turkey Branch crossing of Veirs Mill Road. A formal forest stand delineation and/or roadside tree survey will be required to fully assess the potential for impacts on trees and vegetation within the Veirs Mill Road BRT corridor.

Coordination with U.S. Fish and Wildlife Service (FWS) and DNR indicates that except for the occasional transient individual, there are no records of federal- or state-listed rare, threatened, or endangered species within the Veirs Mill Road BRT corridor. DNR Wildlife and Heritage Service identified forested area adjacent to Veirs Mill Road containing Forest Interior Dwelling Species (FIDS) bird habitat and indicated that potential disturbance to FIDS habitat should be minimized from April through August. An environmental overview map is provided in **Appendix D**.

6.0 References

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APPENDIX A

INTERSECTION AND ARTERIAL LEVEL OF SERVICE

Existing (2011) and future (2040) levels of service (LOS) were determined for the intersections and arterial segments of Veirs Mill Road. The intersection LOS was based on critical lane volume (CLV) methodology and the arterial LOS was based on 2010 Highway Capacity Manual (HCM) calculations from a calibrated Synchro model. The intersection LOS based on CLV is shown in Table A-1.

**Table A-1. Signalized Intersections LOS (v/c)
Based on CLV Analyses Results**

Int. #	Intersection	2011 Existing		2040 No-Build	
		AM	PM	AM	PM
1	MD 355 at MD 28	D (0.83)	D (0.87)	F (1.32)	F (1.31)
2	MD 586 at MD 28	C (0.78)	D (0.89)	E (0.94)	F (1.16)
3	MD 586 at Edmonston Drive (West)	C (0.73)	B (0.66)	E (0.95)	E (0.92)
4	MD 586 at Edmonston Drive (East)	B (0.71)	C (0.81)	E (0.96)	F(1.11)
5	MD 586 at Broadwood Drive	B (0.65)	B (0.64)	D (0.86)	D (0.89)
6	MD 586 at Atlantic Avenue	B (0.65)	B (0.72)	D (0.87)	F (1.04)
7	MD 586 at Twinbrook Parkway	E (0.97)	E (0.95)	F (1.17)	F (1.29)
8	MD 586 at Aspen Hill Road	C (0.78)	C (0.76)	F (1.10)	F (1.04)
9	MD 586 at Robindale Drive	A (0.58)	B (0.70)	D (0.86)	D (0.89)
10	MD 586 at Parkland Drive*	D (0.85)	C (0.75)	F (1.19)	F (1.23)
11	MD 586 at Gridley Road	B (0.64)	D (0.85)	E (0.95)	F (1.13)
12	MD 586 at Randolph Road	E (0.99)	D (0.87)	F (1.37)	F (1.34)
13	MD 586 at Ferrara Avenue	A (0.56)	A (0.61)	D (0.82)	D (0.89)
14	MD 586 at MD 185	E (0.97)	E (0.96)	F (1.28)	F (1.26)
15	MD 586 at Claridge Road	A (0.51)	A (0.54)	B (0.68)	C (0.72)
16	MD 586 at Newport Mill Road	A (0.61)	B (0.69)	C (0.79)	E (0.91)
17	MD 586 at MD 193	B (0.69)	D (0.82)	D (0.89)	F (1.04)
18	MD 586 at Reedie Drive	A (0.47)	A (0.61)	A (0.60)	D (0.82)
19	MD 586 at Wheaton Plaza	A (0.39)	A (0.62)	A (0.53)	D (0.84)
20	MD 586 at MD 97	E (0.96)	F (1.08)	F (1.26)	F (1.45)
21	Stonestreet Ave at Rockville Metro Entrance/Exit	A (0.21)	A (0.24)	A (0.24)	A (0.28)
22	Stonestreet Ave at Park Road (East)	A (0.49)	A (0.56)	A (0.57)	B (0.65)
23	Stonestreet Ave at Park Road (West)	A (0.37)	A (0.30)	A (0.42)	A (0.35)

*The MD 586 intersection with Parkland Drive has been upgraded under 2040 No-Build to accommodate a heavy increase in traffic at this location from the construction of a new 4-lane divided roadway (Montrose Parkway East) intended for the near future. The results shown reflect an assumed capacity upgrade with new lane use characteristics at the intersection.

The systemwide performance measures, such as total delay, delay per vehicle, travel time, average speed, fuel consumed, and unserved vehicles, were generated under 2011 Existing and 2040 No-Build using SimTraffic. The systemwide MOEs are shown in Table A-2.

Table A-2. Systemwide Measures of Effectiveness per Peak Hour

System	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
	Existing		2040 No-Build	
Total Delay (hrs)	1,625	2,202	5,158	6,539
Delay/vehicle (secs)	224	285	690	849
Travel Time (hrs)	2,517	3,153	6,159	7,498
Average Speed (mph)	15	15	11	10
Fuel consumed (gal)	1,437	1,643	2,355	2,623
Unserved Vehicles (veh)	973	1,968	6,499	9,022

Note: The system includes Veirs Mill Road and all intersecting streets within the study limits.

Arterial analysis was completed for MD 586 in both directions between key intersections based on a calibrated Synchro model for 2011 Existing and 2040 No-Build conditions. The arterial LOS was then generated using 2010 HCM methodology and output from SimTraffic, is shown in Table A-3.

Table A-3. Arterial Level of Service (Based on HCM Methodology)

Arterial LOS - MD 586 Eastbound	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
	Existing		2040 No-Build	
MD 355 to MD 28	E	E	F	F
MD 28 to Twinbrook Pkwy	C	E	F	F
Twinbrook Pkwy to Aspen Hill Rd	B	C	D	F
Aspen Hill Rd to Randolph Rd	C	C	F	F
Randolph Rd to MD 185	C	C	C	C
MD 185 to MD 193	B	C	C	C
MD 193 to MD 97	D	E	D	E

Arterial LOS - MD 586 Westbound	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
	Existing		2040 No-Build	
MD 97 to MD 193	C	C	D	D
MD 193 to MD 185	C	C	D	D
MD 185 to Randolph Rd	D	C	F	F
Randolph Rd to Aspen Hill Rd	C	D	E	E
Aspen Hill Rd to Twinbrook Pkwy	C	C	E	D
Twinbrook Pkwy to MD 28	C	D	E	F
MD 28 to MD 355	D	C	D	C

APPENDIX B

CRASH DATA SUMMARY

SHA provided the crash data reported during a three-year period from January 1, 2009 to December 31, 2011 along the study corridor. A summary of the data is shown in Tables B-1 and B-2.

Table B-1. Reported Crash Summary (2009-2011)

Year	Light		Severity			Surface		Driver		Time		Day	
	Day	Night	Property	Injury	Fatal	Wet / Snow / Ice	Dry	Non-Alcohol	Alcohol	Peak*	Off-Peak	Weekday (Mon - Fri)	Weekend (Sat - Sun)
2009	174	66	143	95	2	54	186	219	21	92	148	167	73
2010	181	74	129	123	3	42	213	236	19	98	157	188	67
2011	137	54	96	91	4	39	152	174	17	76	115	145	46
Total	492	194	368	309	9	135	551	629	57	266	420	500	186

*Peak period defined as 7:00 AM – 9:00 AM and 4:00 – 6:00 PM.

Table B-2. Reported Crash Types Summary (2009-2011)

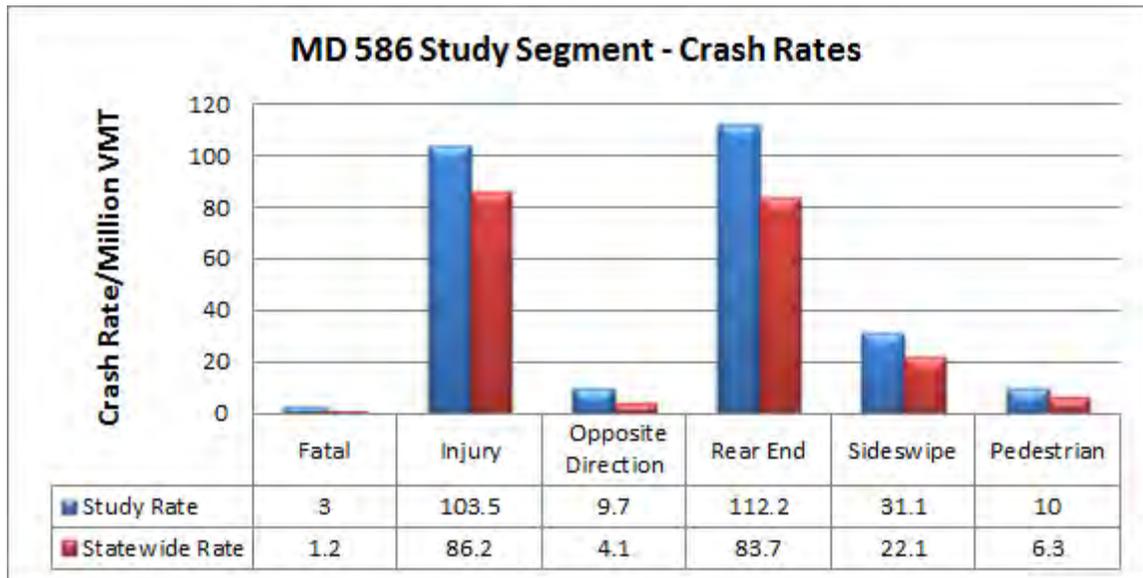
Year	Collision Type									Total
	Rear-end	Angle	Sideswipe	Left-Turn	Opposite Direction	Fixed- Object	Pedestrian	Parked Vehicle	Others	
2009	126	29	31	10	11	14	9	1	9	240
2010	125	40	34	8	10	12	18	2	6	255
2011	84	31	28	15	5	12	9	0	7	191
Total	335	100	93	33	26	38	36	3	22	686

Analysis of the crash data for the intersection revealed the following trends during the three-year study period from 2009 through 2011:

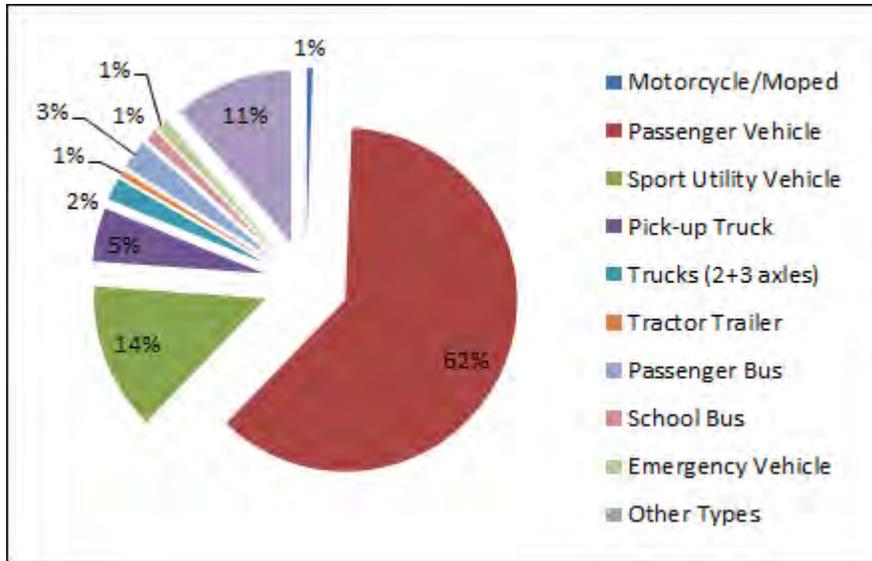
- 686 crashes were reported along the corridor during the study period. Overall the number of reported crashes from 2009 to 2011 decreased.

- The total number of crashes reported along the corridor is significantly higher than the statewide average.
- Nine fatalities were reported during the study period. Three out of nine were reported in the vicinity of the signalized intersection at MD 97 and Randolph Road/Veirs Mill Road.
- Forty-five percent of the crashes resulted in an injury.
- Twenty-eight percent of the crashes reported during the study period occurred at night.
- Twenty percent of the crashes occurred on wet pavement surface.
- Rear-end collisions were the most predominant collision type reported during the study period that accounted for 49 percent (335 crashes) of the total crashes.
- Thirty-nine percent of the crashes occurred during peak hours (7am to 9am and 4pm to 6pm).
- The most probable cause reported during the entire study period was “Failed to give full attention” (193 crashes) followed by “Followed too closely” (104 crashes).
- The month with the highest number of reported crashes was September (87 crashes).
- Eight percent of the crashes reported were related to the use of alcohol.

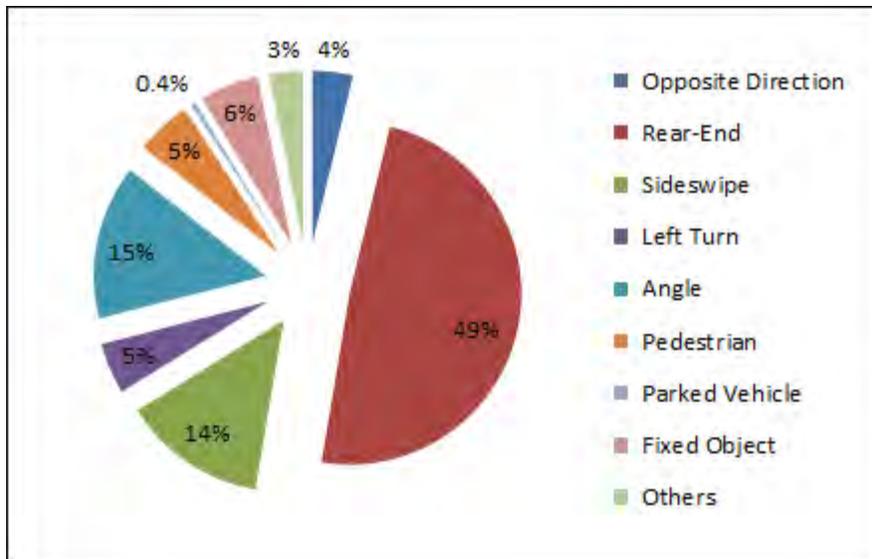
The following chart shows the crash rates along the study corridor as compared to the statewide average. As seen in the chart below, the crash rate for fatalities, injuries, opposite-direction, rear-end, sideswipe, and pedestrian crashes along the study corridor is significantly higher than the statewide average.



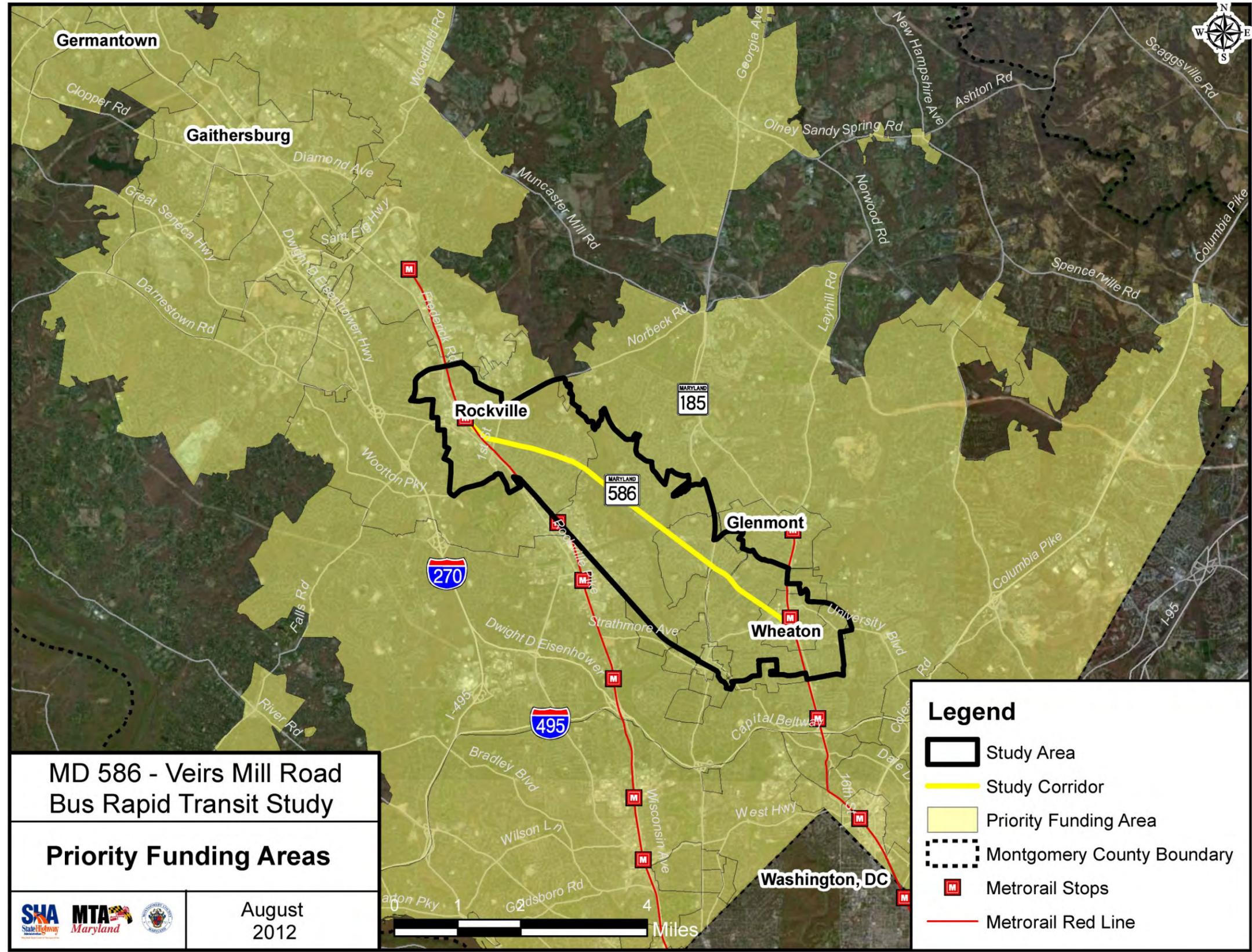
The following chart shows the percent distribution of *vehicle types* that were involved in crashes through the study period along the corridor. As seen in the chart below, 3 percent (39 passenger buses) and 1 percent (16 school buses) were the transit-related vehicle types that were involved in crashes reported during the study period. Passenger cars are the dominant vehicle type involved in crashes along the study corridor (62 percent).



The following chart shows the percent distribution of *crash types* through the study period along the corridor. As seen in the chart below, five percent were reported as pedestrian or bicycle-related crashes. The severity rate of pedestrian crashes (10 percent) is significantly higher than the statewide average (6.3 percent). Rear-end crashes are the dominant crash type along the study corridor (49 percent).



**APPENDIX C
PRIORITY FUNDING AREAS MAP**



APPENDIX D
ENVIRONMENTAL OVERVIEW MAP

