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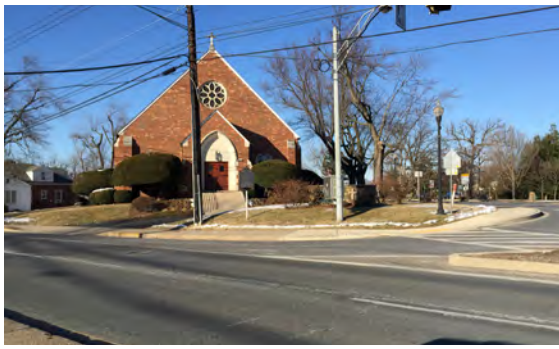
City of Gaithersburg

DRAFT MD 355 Bus Rapid Transit Study



Gaithersburg
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Table of Contents

List of Figures

List of Tables

1

Existing Conditions

1.1 Introduction

The City of Gaithersburg is one the Maryland's largest cities, located in Montgomery County. The City is home to approximately 66,000 residents and is comprised of a mixture of small-scale urban and suburban residential, commercial, and office uses.[1] Gaithersburg is home to the National Institute of Standards and Technology (NIST) as well as a number of biotech firms.[2]

In response to growing traffic congestion, Montgomery County has proposed the development of a Rapid Transit System (RTS) also known as BRT, along key corridors. The proposed BRT system provides dedicated lanes for premium bus service along all or a portion of identified corridors. Two of the proposed corridors would travel through the City. The Corridor Cities Transitway (CCT), A Maryland Transit Administration (MTA) project, would connect Clarksburg to the Shady Grove Metro Station. The route would travel through the City, connecting the Metropolitan Grove MARC station, NIST, and the Kentlands. This project is in the design phase. The second BRT line in the City is the MD 355, Frederick Avenue, corridor, which would connect Clarksburg to Bethesda. This project would introduce BRT to the 5-mile segment of MD 355 within the City of Gaithersburg. The entire 23 mile corridor is currently being studied by the Maryland State Highway Administration (SHA). The County's planning for the MD 355 BRT envisions it operating within a busway.

A Montgomery County Department of Transportation (MCDOT) study determined that the MD 355 corridor had the second highest concentration of transit trips within the County. These were focused on the approaches to Metro stations, and around Lakeforest Mall.[3] This

[1] Source: City of Gaithersburg. *Profile and History*. Retrieved on May 7th, 2015, from http://www.gaithersburgmd.gov/about-gaithersburg/profile-and-history.
[2] Source: City of Gaithersburg Office of Economic Development. *Major Employers*. Retrieved on May 7th, 2015, from http://www.growgaithersburg.com/business-community/major-employers.
[3] Source: *Demand and Service Planning Report to Montgomery County DOT*, Institute for Transportation and Development Policy, December 2012.

finding highlights the importance of providing high quality transit along the MD 355 corridor and the concentration of transit trips within the City of Gaithersburg

The Montgomery County Council approved and adopted the *Countywide Transit Corridors Functional Master Plan* (CTCFMP) in December 2013. The plan recommends an 11 corridor, 102-mile bus rapid transit network. The plan is focused on increasing person throughput within the proposed master plan right-of-way (ROW) to reduce the impact to property owners. The plan recognizes that in order to create a rapid transit network that improves person throughput and shifts people away from driving, the transitways need to be exclusive to transit. The plan does not go so far as to prescribe specific treatments to any segment, leaving those decisions instead to later study effort. The ROW within the City was not prescribed by the County planning report, but the segments to the north was listed at 250 feet and 150 feet to the south.[4]

Previous planning efforts have proposed multiple station locations along MD 355 in the City of Gaithersburg. Locations that have been proposed include: Watkins Mill Road, MD 124, Odendhal Avenue, Brookes Avenue, and Education Boulevard. These locations are potential locations and must be in agreement with the City's master plan.

This study will focus on the placement of BRT along the MD 355 corridor within the City of Gaithersburg. While most of the corridor has the available ROW to accommodate a dual-lane dedicated guideway for BRT buses, the segment from Odendhal Avenue to South Summit Avenue is constrained by a narrower right-of-way. This study will examine the one-mile segment from Odendhal to South Summit to determine what level of guideway treatment can be accommodated within the available ROW, and the associated impacts to traffic and transit operations. The entire corridor within the City will also be examined to identify the preferred location for stops and station platforms. The study will also assist the City in determining the appropriate right-of-way necessary for providing BRT along the entire five mile stretch of MD 355 in the City.

1.2 Study Area Location and Character

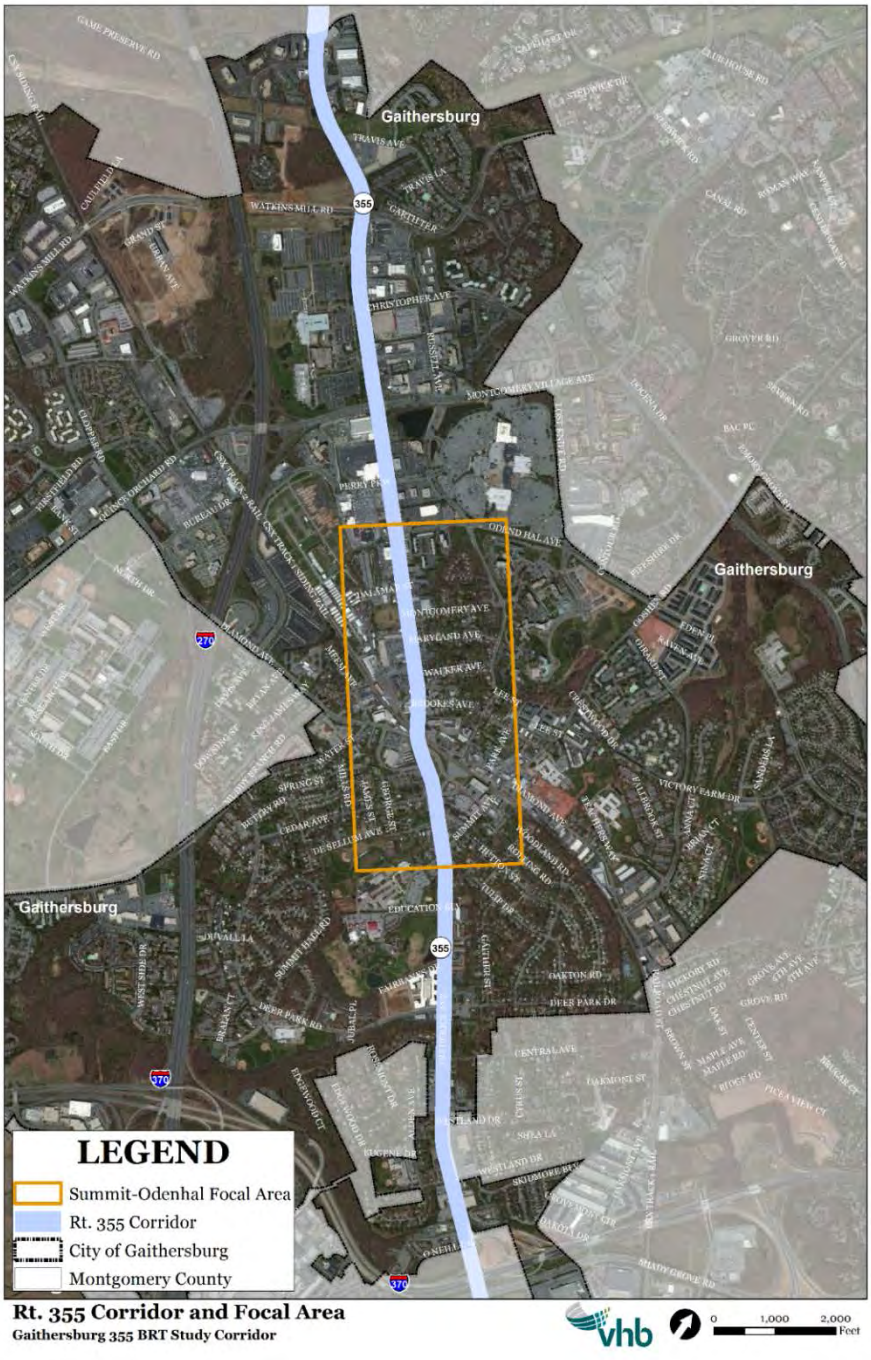
Maryland State Route 355 (MD 355), also known as Frederick Avenue, is the major arterial non-freeway, north-south route through the City of Gaithersburg. MD 355 is generally a conventional suburban roadway, lined by strip malls and office parks in the northern part of the City, and residential neighborhoods to the south. MD 355 carries mainly local traffic; however it is sometimes used as an alternative to I-270 during periods of heavy traffic associated with recurring congestion or traffic incidents. In the City of Gaithersburg, MD 355 contains numerous traffic signals and has a posted speed that ranges from 30 to 45 miles per hour.

The study area for the BRT evaluation includes all of MD 355 within the City of Gaithersburg, with a more detailed focus on a one-mile segment from Odendhal Avenue to South Summit Avenue (Figure 1-1). This segment of MD 355 contains a variety of land uses which exist within several different zoning categories. Opportunities for future redevelopment, including Lakeforest Mall, parcels around Olde Towne, and the Montgomery County Fairgrounds, are

[4] Source: *Approved and Adopted Countywide Transit Corridors Functional Master Plan*, Montgomery County Planning Department M-NCPPC, December 2013.

located near the study area. Redevelopment of Lakeforest Mall and/or the Fairgrounds would significantly increase traffic levels on MD 355. According to the Maryland State Highway Administration's Annual Average Daily Traffic (AADT) Locator, an average of 35,000 vehicles per day, and an average of 37,500 per weekday, drove on this stretch of MD 355 in 2014.[5]

Figure 1-1: MD 355 Corridor and Focal Study Area



The focal study area contains the most constrained segment of MD 355 in the City of Gaithersburg (Figure 1-2). North and south of the study area, MD 355 has a much wider street

[5] Source: http://shagbhisdadt.mdot.state.md.us/AADT_Locator_Public/

section with a more generous public ROW. Between Odendhal Avenue and South Summit Avenue, MD 355 is more constrained with a narrower ROW, buildings closer to the road edge, and fewer sections of median. The study area includes the Father Cuddy Bridge, a major bridge over the Amtrak/Brunswick MARC/CSX railroad. The bridge is approximately 90 feet wide, with a small median separation and narrow sidewalks on both sides of MD 355.

Figure 1-2: MD 355 Focal Study Area Parcels and Setbacks

Montgomery County has recommended a ROW of 150 feet for MD 355 both north and south of the City of Gaithersburg and assumed a 120 foot ROW in the City based on an initial planning study for bus rapid transit in the County. The study area corridor has many existing buildings and historic resources located close to, and in many places within, the recommended 120 foot ROW.

1.3 Historic Development Trends

Historically, the development along MD 355 in the study area consists of single parcels that were developed separately, each requiring direct access to MD 355 with little to no physical interconnectivity between parcels. Each parcel supports individual uses, with most commercial and office uses existing in isolation from one another or adjacent residential uses.

There are numerous curb-cuts on MD 355 servicing the various parcels' driveways. The many curb-cuts coupled with narrow, frequently-obstructed sidewalks increase the possibility of likely vehicle-bicycle/pedestrian conflicts. This, combined with the number of small parcels make it challenging to create a unified streetscape, and potentially acquire additional ROW.

There are very limited building setbacks along the focal area, with many buildings extremely close to the road edge. These include an apartment building at 439 North Frederick Avenue, a carpet and tile store at 435 North Frederick Avenue, and an apartment building at 302 North Frederick Avenue. There are several establishments that are directly adjacent to the road/sidewalk edge, including 309 North Frederick Avenue, a bank at 209 North Frederick Avenue, an insurance agency at 201 North Frederick Avenue, and a jewelry shop at 117 North Frederick Avenue. These buildings further limit the available ROW in the study area.

The Historic Preservation Element of the City Master Plan has identified many possible historic resources along this segment of MD 355, including a cemetery in the 300 block and the historic structure on the Wilson Property near the corner of DeSellum Avenue and South Frederick Avenue. These properties create additional challenges in achieving a desirable ROW for expanded transit.

1.4 MD 355, Frederick Avenue, Corridor Conditions and Roadway Characteristics

North and south of the focal study area, MD 355 is a six-lane divided roadway with separate left turn lanes at major intersections. Some signalized intersections on MD 355 in the City of Gaithersburg have enough ROW for multiple exclusive left turn lanes.

Within the focal area, several discrete segments of the MD 355 corridor can be characterized separately. Figure 1-3 identifies four separate regions of the corridor with similar characteristics, and highlights a variety of segment attributes and issues. These segments are from Odendhal to Chestnut, Chestnut to the Father Cuddy Bridge, the Father Cuddy Bridge,

and the Father Cuddy Bridge to South Summit. Three key intersections are the signalized intersections at Odendhal, Chestnut, and South Summit.

Signalized Intersection
- Existing turn lanes
- Pedestrian crossing
- Major access to shopping centers

Road Segment
- Limited Right-of-Way
- Frequent congestion
- Cemetery adjacent to ROW
- Minimum setbacks
- Existing utilities at edge of street/sidewalk
- Multiple parcel access drives

Signalized Intersection
- Existing turn lanes
- Pedestrian crossing
- Cut through route to 117 and Muddy Branch Road

Road Segment
- Only 2 northbound lanes with frequent congestion
- Limited Right-of-Way
- Minimum setbacks
- Existing utilities at edge of street/sidewalk
- Multiple parcel access drives

Existing Bridge
- Existing width of 90 feet would not allow for dual dedicated lanes
- Bridge widening is feasible but expensive

Planned Redevelopment

Road Segment
- Less Constrained Right-of-Way
- Existing utilities at edge of street/sidewalk

Signalized Intersection
- Existing turn lanes
- Pedestrian crossing
- Potential historic properties
- Primary connection between Old Town

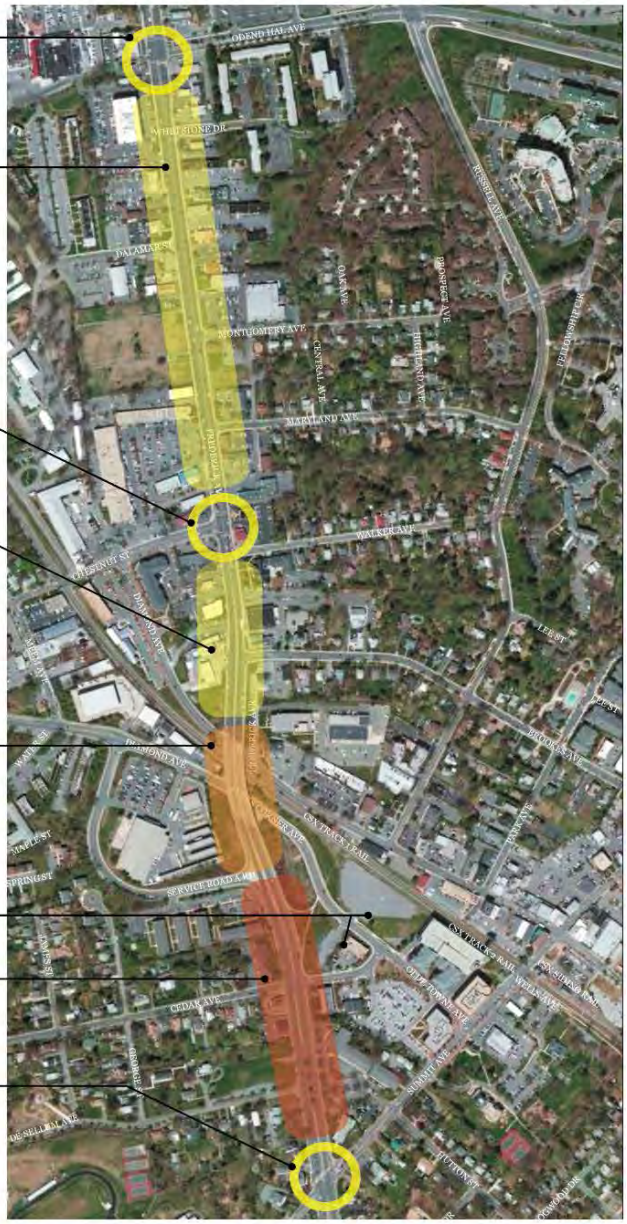


Figure 1-3: Focal Study Area and Summary of Issues

MD 355 from Odendhal Avenue to Chestnut Street

The MD 355 roadway layout between Odendhal Avenue and Chestnut Street is characterized by its relatively narrow cross-section and the presence of numerous commercial/private driveways. The roadway is approximately 60 feet wide in this section, providing two northbound lanes, three southbound lanes, and a continuous two-way left-turn lane (TWLTL), sometimes referred to as a shared left-turn lane. The constrained cross-section and active commercial activity contribute to greater traffic congestion in this segment relative to other parts of the corridor. The roadway maintains a very straight alignment and ascends gently from north to south through this section. Relatively narrow sidewalks are provided immediately adjacent to the roadway on both sides of the street. Marked pedestrian crossings of MD 355 are only provided at the intersections of Odendhal Avenue and Chestnut Street. Utility poles are located directly beside the sidewalk on both sides of the street. In some instances, utility and traffic signal poles are located within the sidewalk.

(Above) Looking south along MD 355 south of Odendhal Avenue

(Left) Looking south along MD 355 showing utility poles in the sidewalk

MD 355 from Chestnut Street to Father Cuddy Bridge

MD 355 between Chestnut Street and the Father Cuddy Bridge is a transitional section of the roadway, emerging from the heavily commercial area to the north and curving to accommodate the bridge alignment. The roadway is approximately 65 feet wide in this section, providing two northbound lanes and two southbound lanes with an approximately six-foot wide raised median extending to just north of Brooks Avenue. The roadway begins to widen to the south, providing an additional southbound right-turn lane over the Father Cuddy Bridge. Sidewalks are provided immediately adjacent to the roadway on both sides of the street. The effective width of the sidewalks in this segment are still impacted by utilities, planting strips, and other street furniture. Overhead utility poles transition away from the roadway as they approach the Father Cuddy Bridge.

(Top-left) Looking north along MD 355 south of Chestnut Avenue

(Bottom-left) Looking north along MD 355 showing the effective width of the sidewalk

Father Cuddy Bridge (MD 355)

On the Father Cuddy Bridge, MD 355 maintains an approximately 76 foot wide curb-to-curb width. The bridge accommodates three northbound lanes and three southbound lanes and a four-foot wide median. The outside lanes in both directions are designated as right turn lanes, with the northbound right lane terminating at Brookes Avenue and the southbound right lane providing access to MD 117, West Diamond Avenue. Sidewalks are provided immediately adjacent to the roadway on both sides of the street. The sidewalks along the bridge are narrow at five feet wide. The bridge was designed with a curved alignment and a super-elevated cross-slope, resulting in the west edge of the bridge being elevated several feet higher than the east edge of the bridge to minimize the potential for drivers to lose control along the curved roadway section.

(Above) Looking north along MD 355 at the Father Cuddy Bridge

(Left) Looking south along MD 355 showing the five foot sidewalks along the bridge

MD 355 from Father Cuddy Bridge to South Summit Avenue

South of the Father Cuddy Bridge, MD 355 transitions into a more traditional suburban major arterial roadway, with a six-lane median-divided roadway with three through lanes per direction. The roadway width is approximately 92 feet and exclusive left turn lanes are provided in the median south of the bridge. Here, the sidewalk on the northbound side of MD 355 is separated from the roadway edge by a two-foot landscape buffer. The southern end of this road segment is immediately adjacent to Olde Towne Gaithersburg and close to Gaithersburg High School.

(Top-left) Looking south along MD 355 at the intersection with Cedar Avenue

(Bottom-left) Looking north along MD 355 showing utilities in the sidewalk near South Summit Avenue

1.5 Key Intersections

MD 355 at Montgomery Village Avenue

The intersection of MD 355 at Montgomery Village Avenue (MD 124), just to the north of the focal study area, is regularly identified as one of the most congested in Montgomery County. Although this intersection is outside of the focal area, this intersection plays a significant role in the traffic patterns of MD 355 in the City of Gaithersburg. The planned construction of the Watkins Mill Road interchange on Interstate 270 by SHA, just to the north of this intersection, will have a major impact on local area traffic patterns, including the focal area, and may provide added flexibility for traffic movement. Although the future interchange is north of the focal area, the City of Gaithersburg and the MD 355 corridor, as a whole, should benefit from additional access to Interstate 270.

MD 355 at Odendhal Avenue

Odendhal Avenue terminates at a signalized intersection with MD 355. Odendhal Avenue connects MD 355 to Lakeforest Mall, and the Lakeforest Transit Center. The intersection of MD 355 at Odendhal Avenue is the northern-most intersection in the focal study area. North of this intersection, MD 355 is a six lane roadway divided by a concrete median, with space for exclusive left turn lanes. South of this intersection, MD 355 is a six lane undivided roadway with three southbound through lanes, two northbound through lanes and a center continuous two-way left-turn lane. This intersection has a high volume of motorists making the left turn movement from Odendhal Avenue onto southbound MD 355 during both the morning peak period (529 vehicles) and evening peak period (332 vehicles). There is a gas station exit on the western side of the intersection that is controlled by the same traffic signal. This intersection experiences frequent congestion, especially in the northbound direction during the evening peak period. On westbound Odendhal Avenue, there is a bus stop with a shelter for Ride On bus routes 55 and 59.

(Left) Looking south along MD 355 at the intersection with Odendhal Avenue

MD 355 at Chestnut Street

Chestnut Street terminates at a signalized intersection with MD 355. This roadway connects the MD 355 Corridor to Muddy Branch Road and southwestern Gaithersburg and North Potomac. It also connects the corridor to Olde Towne Gaithersburg and nearby Washington Grove via East Diamond Avenue. Chestnut Street has an at-grade crossing of the Amtrak/Brunswick MARC/CSX railroad about 750 feet southwest of MD 355. The intersection of MD 355 at Chestnut Street has a high volume of motorists making the right turn movement from southbound MD 355 onto Chestnut Street during the morning peak period and the left-turn movement from Chestnut Street onto northbound MD 355 during the evening peak period, with vehicle stacking often extending back to East Diamond Avenue. The alignment of MD 355 shifts slightly to the west of this intersection.

(Left) Looking south along MD 355 at the intersection with Chestnut Avenue

MD 355 at South Summit Avenue

The intersection of MD 355 at South Summit Avenue is the southern-most intersection in the focal study area. At this intersection, MD 355 is a six-lane divided roadway with exclusive left turn lanes. There is a lane drop on the northbound MD 355 approach to the intersection as the right lane must turn right onto South Summit Avenue. Gaithersburg High School lies west of this intersection with access from South Summit Avenue. Summit Avenue connects MD 355 to Olde Towne Gaithersburg and Midcounty Highway. At this intersection, there are two exclusive left turn lanes and a shared through-left turn lane from South Summit Avenue onto southbound MD 355. Just north of this intersection on northbound MD 355, there is a bus stop with shelter for Ride On route 55.

(Left) Looking north along MD 355 at the intersection with South Summit Avenue

1.6 Traffic Operations

MD 355 in the City of Gaithersburg is a heavily-traveled commuter and commercial/office corridor. MD 355 is a major arterial roadway, providing a parallel and alternative commuter route to I-270 between upper Montgomery County and the District of Columbia. In the City of Gaithersburg, several other major regional roadways, including MD 124 (Quince Orchard Road/Montgomery Village Avenue) and MD 117 (West Diamond Avenue), as well as numerous local collector and minor collector roadways intersecting MD 355. The regional commuter activity contributes to elevated traffic volume traveling within the city during the typical weekday morning and evening commuter peak periods.

North of the Father Cuddy Bridge, MD 355 is lined by small and medium-sized commercial and office parcels. Additionally, the Lakeforest Mall is located just east of MD 355, at MD 124. The commercial and office land uses proximate to MD 355 contribute to significant localized trip activity during both weekday and weekend peak periods.

Traffic signals on MD 355 were designed to accommodate large volumes of through traffic and operate in a coordinated system. Operations at several major signalized intersections on MD 355 have historically been impacted by limited roadway capacity and significant turning movement traffic volumes during the peak travel periods. Signalized intersections on MD 355 typically provide separate left-turn lanes to minimize delay for through traffic, and several major signalized intersection provide either dual or triple left turn lanes (MD 124) on one or more approaches.

Several recent traffic studies in the City of Gaithersburg, including the 2011 "*Midcounty Corridor Traffic Study*" and the 2013 "*Frederick Avenue Corridor and Vicinity Development Capacity Study*", have identified the level of service at signalized intersections on MD 355. These studies indicate that traffic operations on MD 355 are most congested during the weekday evening peak period, when regional commuter traffic traveling north overlaps localized commercial and office trips in the City of Gaithersburg. The MD 355 intersection with MD 124 (Montgomery Village Avenue/Quince Orchard Road) is considered to be one of the

busiest intersections in the entire county and operates at failing levels of service during all peak periods.

The focal area for the BRT feasbility evaluation is the portion of MD 355 between Odendhal Avenue and South Summit Avenue. Traffic operations results from recent traffic studies for signalized intersections in the focal area are summarized in Table 1-1. These results include the critical lane volume (CLV), which is a measure of capacity of an intersection, and the related level of service (LOS) results. The City's standard for CLV is 1,450, and none of the intersections in the table below exceed that standard.

Table 1-1: MD 355 Focal Area Existing Traffic Operations Summary

Location	Weekday AM Peak Hour		Weekday PM Peak Hour	
	CLV	LOS	CLV	LOS
MD 355 at Odendhal Avenue	1,088	B	927	A
MD 355 at Chestnut Street	931	A	825	A
MD 355 at South Summit Avenue	889	A	880	A

These results suggest the focal area intersections currently operate at generally acceptable levels of service during the critical weekday commuter peak periods. These results provide a baseline condition for comparison with traffic operations analyses accounting for future traffic projections and the proposed BRT system.

1.7 Public Transportation

Local Service

Public bus transit service in the City of Gaithersburg is provided by Ride On, operated by Montgomery County; and by Metrobus, operated by the Washington Metropolitan Area Transit Authority. Ride On maintains 13 routes within the City. Two Metrobus express lines operate in the City with direct connections from the regional transit center located at Lakeforest Mall to the Shady Grove Metro Station. The Lakeforest Regional Transit Center stop is located near the intersection of Lost Knife Road and Odendhal Avenue, approximately a half mile from the study area. The transit center supports seven Ride On routes and two Metrobus routes and provides 300 free parking spaces.

MD 355 between Odendhal Avenue and South Summit Avenue is currently served by Ride On Routes 55 and 59, with service to Lakeforest Transit Center, and Rockville and Shady Grove Metrorail stations. There are several bus stops with shelters along the corridor, including northbound and southbound MD 355 at Brooks Avenue, southbound MD 355 at Cedar Avenue and northbound MD 355 at South Summit Avenue.

1.8 Summary of Findings

A review of the existing roadway design and traffic operations for the MD 355 corridor in the City of Gaithersburg highlights some challenges that will require attention as the right approach to incorporating BRT into the corridor is considered. While the existing traffic operations within the focal study area from Odendhal to South Summit currently operate at acceptable levels of service, there are other intersections along MD 355 in the City that do not. The BRT design decisions that are made in the focal study area will likely have impacts that stretch beyond this one-mile stretch of MD 355. Understanding those impacts, as well as the potential impacts for nearby alternative routes, will be critical to choosing the right BRT treatment to meet the City's needs as well as the larger BRT corridor goals.

The existing suburban commercial development along the corridor present challenges to the range of BRT treatments that can be considered. The numerous business driveways along the corridor require the current two-way left turn lane. Considering those conditions when identifying potential BRT treatments is critical to limit adverse impacts to current businesses. However, the overriding goal of BRT is to provide a level of transit service that can promote future economic growth.

The initial BRT planning studies for bus rapid transit along the MD 355 corridor did not determine the type of transitway that could be accommodated within the City of Gaithersburg. A concept for exclusive guideway has been envisioned, but the impacts to traffic, property owners, and transit operations have not been evaluated. This study seeks to answer the question of what BRT design option for MD 355 provides the best balance between the overall BRT experience and traffic operations throughout the corridor.

The next chapters of this report will describe different guideway treatments for BRT; the benefits and impacts of each to existing traffic, properties along the corridor, and transit operations; and which option(s) is best suited for the City of Gaithersburg