

Staff Draft

Countywide Transit Corridors Functional Master Plan

March 2013



Montgomery County Planning Department
M-NCPPC
MontgomeryPlanning.org

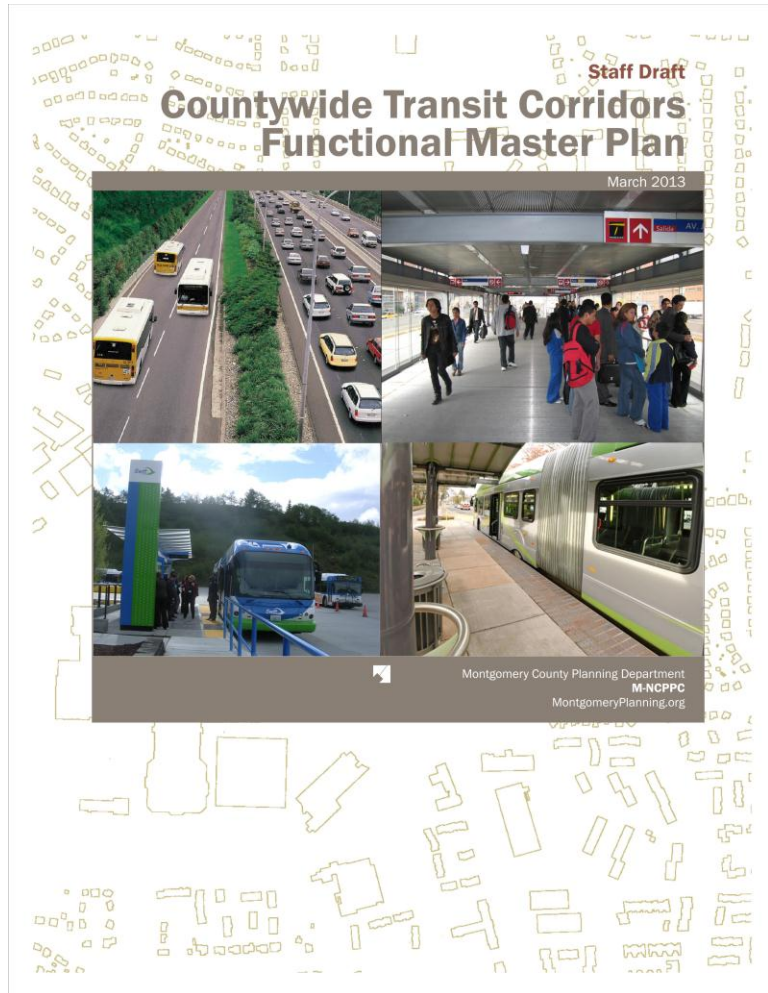
Abstract

This document contains an examination of and recommendations for transit, bicycle, and pedestrian infrastructure that will help create complete transportation options. With the approval and adoption of this functional plan, the *Master Plan of Highways* will become the *Master Plan of Highways and Transitways*.

Source of Copies

The Maryland-National Capital Park and Planning Commission
8787 Georgia Avenue
Silver Spring, MD 20910

Online at: MontgomeryPlanning.org/transportation/highways/brt



Staff Draft
Countywide Transit Corridors Functional Master Plan

Prepared by the Montgomery County Planning Department
March 2013

MontgomeryPlanning.org

Contents

Introduction	7
Summary Recommendations	10
Background	13
Vision	15
Why Bus Rapid Transit?	15
Fitting BRT into the County’s Transportation Network	15
Guiding Principles	17
Determining BRT Treatments	18
Dedicated Lanes	18
Median vs. Curb Lanes	18
Lane Repurposing	20
Master Plan Phasing	21
Recommended Corridors	24
Corridor 1: Georgia Avenue North	27
Corridor 2: Georgia Avenue South	30
Corridor 3: MD 355 North	33
Corridor 4: MD 355 South	36
Corridor 5: New Hampshire Avenue	39
Corridor 6: North Bethesda Transitway	41
Corridor 7: Randolph Road	45
Corridor 8: University Boulevard	48
Corridor 9: US 29	51
Corridor 10: Veirs Mill Road	54
Setting Implementation Priorities for Transit Corridor Improvements	57
Bicycle Pedestrian Priority Areas	58
Ensuring Pedestrian Safety and Accessibility	59
Bike Accommodation	60
MARC Brunswick Line Expansion	65

Maps and Figures

Map 1	Recommended BRT Corridors	11
Map 2	Phase 1 Transit Network	22
Map 3	Phase 2 Transit Network	23
Map 4	Georgia Avenue North Corridor	28
Map 5	Georgia Avenue South Corridor	31
Map 6	MD 355 North Corridor	34
Map 7	MD 355 South Corridor	37
Map 8	New Hampshire Avenue Corridor	40
Map 9	North Bethesda Transitway	43
Map 10	Randolph Road Corridor	46
Map 11	University Boulevard Corridor	49
Map 12	US 29 Corridor	52
Map 13	Veirs Mill Road Corridor	55
Map 14	Bicycle-Pedestrian Priority Areas	58
Map 15	Montgomery Mall/Rock Spring BPPA	60
Map 16	Piney Branch/University Boulevard Purple Line Station Area BPPA	61
Map 17	Medical Center Metro Station Area BPPA	61
Map 18	Veirs Mill Road/Randolph Road BPPA	62
Map 19	Aspen Hill BPPA	62
Map 20	Colesville BPPA	63
Map 21	Forest Glen Metro Station Area BPPA	63
Map 22	Silver Spring CBD West BPPA	64
Map 23	Four Corners BPPA	64
Map 24	MARC Brunswick Line Expansion	66

Figure 1	Master Plan of Highways, 1955	13
Figure 2	Proposed White Flint Street Grid	19
Figure 3	Recommended Corridor Segment Treatment: Two-Lane Median Busway	25
Figure 4	Recommended Corridor Segment Treatment: Two-Lane Side Busway	25
Figure 5	Recommended Corridor Segment Treatment: One-Lane Median Busway	25
Figure 6	Recommended Corridor Segment Treatment: Managed Lanes	26
Figure 7	Recommended Corridor Segment Treatment: Curb Lanes	26
Figure 8	Recommended Corridor Segment Treatment: Mixed Traffic	26

Tables

Table 1	Montgomery County Demographic and Travel Forecast	7
Table 2	Transit Service Typology	9
Table 3	Corridor Recommendations, Georgia Avenue North	29
Table 4	Corridor Recommendations, Georgia Avenue North Cycle Track	29
Table 5	Corridor Recommendations, Georgia Avenue South	32
Table 6	Corridor Recommendations, MD 355 North	35

Table 7 Corridor Recommendations, MD 355 South	38
Table 8 Corridor Recommendations, New Hampshire Avenue	41
Table 9 Corridor Recommendations, North Bethesda Transitway	44
Table 10 Corridor Recommendations, Randolph Road	47
Table 11 Corridor Recommendations, University Boulevard	50
Table 12 Corridor Recommendations, US 29	53
Table 13 Corridor Recommendations, Veirs Mill Road	56

Appendix

(available online at MontgomeryPlanning.org/transportation)

Appendix 1: Decision Approaches

Travel Demand Forecasting Model

Ridership Assessment

Appendix 2: Findings

Regionwide Assessment

Countywide Assessment

Corridor Assessment

Link Assessment

Appendix 3: Lane Repurposing Analysis

Appendix 4: Corridor Analysis and Recommendations

Appendix 5: Bikeway Recommendations

Appendix 6: Recommended Elements of a Plan of Improvements for Bicycle-Pedestrian Priority Areas

Appendix 7: Potential Impacts to County-Listed Historic Resources

Appendix 8: Potential Impacts to M-NCPPC Parks

Consultant Memoranda

Appendix 9: Travel Demand Forecasting Model Documentation

Appendix 10: Initial Draft Recommendations

Appendix 11: Typical Sections

Appendix 12: Corridor Function Assessment

Appendix 13: Station Typology Assessment

Appendix 14: Stormwater Management

Introduction

The Washington, D.C. region is consistently rated among the most congested in the nation, with average commute times exceeding 35 minutes.

Growth is expected to continue in Montgomery County largely within the geographic area already developed. Most new growth is expected to occur through redevelopment, so options for building new roads or expanding existing ones are limited. Population and employment are forecast to grow significantly, while lane-miles of roadway will not. Even as the County urbanizes, the growth in vehicle trips will outpace the growth in transit trips for commuters. An expansion of high-quality transit service will be needed to move greater numbers of people to and from jobs, homes, shopping, and entertainment areas, reducing the gap between transportation demand and supply and providing a reliable alternative to congested roadways.

Insert as table sidebar

Table 1

Montgomery County Demographic and Travel Forecast

(based on the 2012 CLRP)

	2013	2040	Difference	Percent Difference
Population	997,884	1,203,643	205,759	21%
Employment	529,267	737,364	208,097	39%
Transit work trips	165,121	198,513	33,392	20%
Vehicle work trips	376,269	461,248	84,979	23%
Truck trips	83,024	100,344	17,320	21%
VMT	21,952,932	26,795,176	4,842,244	22%
VMT per capita	22.0	22.3	0.3	1%
Lane-miles*	2,592	2,721	129	5%
Lane-miles of congestion	376	639	263	70%

* Modeled lane miles include freeways, arterials, and many collectors, but few local roads

with text caption:

By 2040, the Metropolitan Washington Council of Governments (MWCOG) projects the region's population to increase by 30 percent and employment to grow by 39 percent.¹ Within Montgomery County, significant changes at the Walter Reed National Military Medical Center, White Flint, U.S. Food and Drug Administration (FDA), the Life Sciences Center, and other commercial and employment centers are expected to impact travel conditions for many.

¹ *Growth Trends to 2040: Cooperative Forecasting in the Washington Region, 2010*

More efficient use of our public rights-of-way is essential to support our economic development in an environmentally sustainable way and in a way that preserves our existing communities. This update to the County's Master Plan of Highways is an expanded approach to our transportation needs, addressing primarily a bus rapid transit system as well as bicycle-pedestrian priority areas and MARC commuter rail service. This Plan used as its starting point for evaluation the 150-mile BRT network described in the *MCDOT Feasibility Study Report*, completed in August 2011, as well as the later recommendations of the County Executive's Transit Task Force, whose final recommendations were delivered in May 2012.

Insert as sidebar:

Task Force report:

<http://www.montgomeryplanning.org/viewer.shtm#http://www.montgomerycountymd.gov/content/dot/MCBRTStudyfinalreport110728.pdf>

MCDOT report:

<http://www6.montgomerycountymd.gov/Apps/cex/transit/reportfinal.asp>

As in many jurisdictions, travelers in Montgomery County often face the choice between high-speed/high-capacity heavy rail systems (Metrorail or MARC) largely built for commuters, local and regional bus services that connect commuters from residential areas to employment centers via express buses along the interstates (MTA express bus), or local buses that move slowly along increasingly congested roadways and make frequent stops (Metrobus and Ride On).

Plans are underway to create two additional high-capacity transit corridors—the Purple Line and Corridor Cities Transitway (CCT)—where high development densities and a mix of land uses that can support transit are either present or planned. But there is a notable gap in the transit services between dense redeveloping areas inside the Beltway, emerging mixed-use activity centers, and commuter corridors not served by Metrorail. Much of the County will still lack reliable, high-quality transit service that provides a viable alternative to driving an automobile and that provides connectivity in and between these areas.

To address these underserved areas, the transit corridors recommended in this Plan are intended to facilitate the following BRT services:

- BRT—Activity Center Corridor, defined by moderate-speed, high-frequency, all-day transit service. It is most appropriate on activity center corridors that connect multiple dense, mixed-use areas.
- BRT—Express Corridor, defined by high-speed, moderate-frequency, peak-period service. It is most appropriate on access-controlled express corridors that connect commuters at park-and-ride lots to employment centers.
- BRT—Commuter Corridor, defined by moderate-speed, moderate-frequency, limited-stop transit service during peak periods. It is most appropriate on commuter corridors that connect moderate density residential areas to employment centers.

Table 2
Transit Service Typology

Service	Market	Examples	Speed	Frequency	Span	Stop Spacing
Commuter rail	commuters	MARC Brunswick Line	very high	low	peak period	very high
Metrorail	all trips	Red Line	high	high	all day	high
Light rail	all trips	Purple Line	moderate	high	all day	moderate
BRT—Activity Center Corridor	all trips	Corridor Cities Transitway	moderate	high	all day	moderate
BRT—Express Corridor	commuters	US 29	high	moderate	peak period	high
BRT—Commuter Corridor	all trips	K9	moderate	moderate	peak period	moderate
Local bus	all trips	Metrobus, Ride On	low	low	varies	low

A transit corridor network that supports these high-quality bus services will improve accessibility and mobility to serve the development envisioned by the County’s adopted land use plans. Implementing this Functional Plan will help further General Plan’s transportation goal, which is to:

“Enhance mobility by providing a safe and efficient transportation system offering a wide range of alternatives that serve the environmental, economic, social, and land use needs of the County and provide a framework for development.” (page 63)

The facilities recommended by this Plan will improve transit service through the following enhancements:

- Implementing treatments such as exclusive or dedicated lanes, queue-jumpers, and/or transit signal priority to improve the vehicle’s operating speeds along selected segments of the network.
- Providing express and limited stop service to and from key activity centers.
- Providing off-board fare collection and level boarding to reduce the time it takes passengers to enter and exit a bus.

The County is focusing future development in compact, mixed-use areas that reduce the need for driving and enhancing its pedestrian, bicycle, and transit network with sustainable, cost-effective solutions. A key support for this development pattern is a high-quality, reliable transit system that enables people to leave their cars at home. While light rail is an appropriate system to connect high-density activity centers, such as the Purple Line between Bethesda and Silver Spring, it is not cost-effective for most of the County’s transit corridors.

BRT works where development densities may be lower than those that warrant light rail, but where greater speed and efficiency for transit services is needed. This Plan recommends a network of additional BRT transit corridors that will be integrated with the Corridor Cities Transitway CCT, now in preliminary design as a BRT facility. This transit network can also be adapted to meet the particular transit needs and operating characteristics of each corridor segment and activity center.

To support this changing land use policy direction transportation success must be measured differently. For example, rather than focusing on the number of cars that can move through an intersection, a typical transportation system performance assessment, the County should focus on providing as many people as possible with reliable travel options along its major transportation corridors and where feasible, providing a greater travel advantage to those who use transit.

Nationwide, BRT systems have proved to be beneficial for travelers, reducing travel time and increasing service reliability. The experience of those systems was used to determine where additional right-of-way should be identified and protected for the construction of future transitways and transit stations.

Insert text sidebar:

person-throughput: the number of persons that can be carried in a particular lane or roadway in one hour

corridor: a public right-of-way for transportation that contains one or more of the following: a roadway, transitway, bikeway, or pedestrian facilities

transit corridor treatment: the physical space in the public right-of-way intended to be used by BRT service

bus route: a designated set of roadway segments used by a regularly scheduled bus service

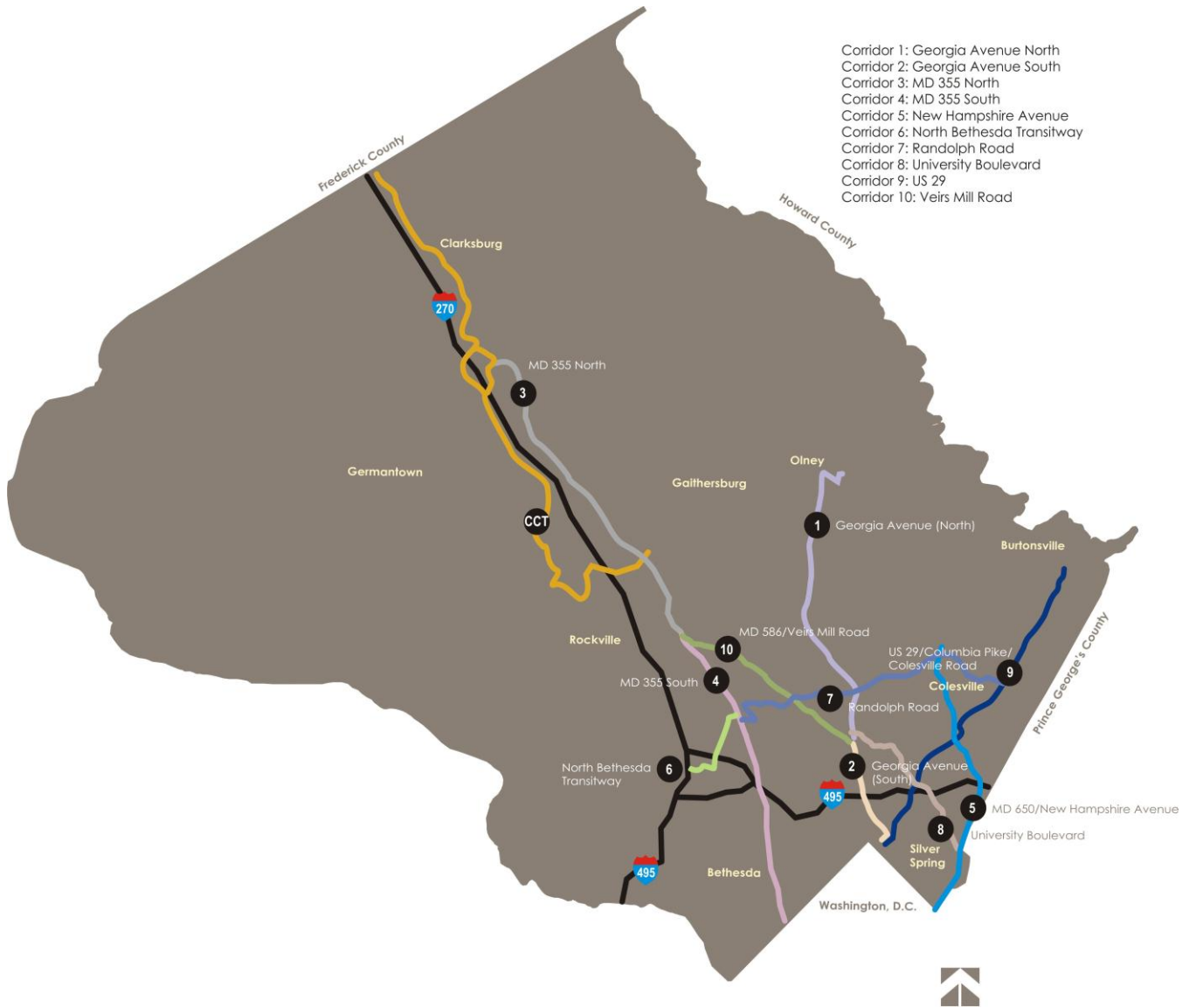
Summary Recommendations

Functional plans provide the intermediate level of planning detail between the General Plan and area master plans, in this case, providing the legal basis for securing adequate rights-of-way to accommodate the desired facilities. The focus of this Plan is to:

- identify the rights-of-way needed to accommodate a BRT network, facilitating superior transit service along the county's major roadways
- recommend a minimum public right-of-way of each affected roadway and any changes to the planned number of travel lanes
- identify recommended station locations.

This Plan recommends a network of ten transit corridors, with specified rights-of-way and treatments, as well as direction for more extensive transit treatments that may be warranted in the future.

Map 1 Recommended BRT Corridors



The Plan also recommends:

- designating Bicycle-Pedestrian Priority Areas around major stations to promote safe, convenient access for transit patrons
- adding a third track on a portion of the MARC Brunswick Line to promote regional transit service improvements.

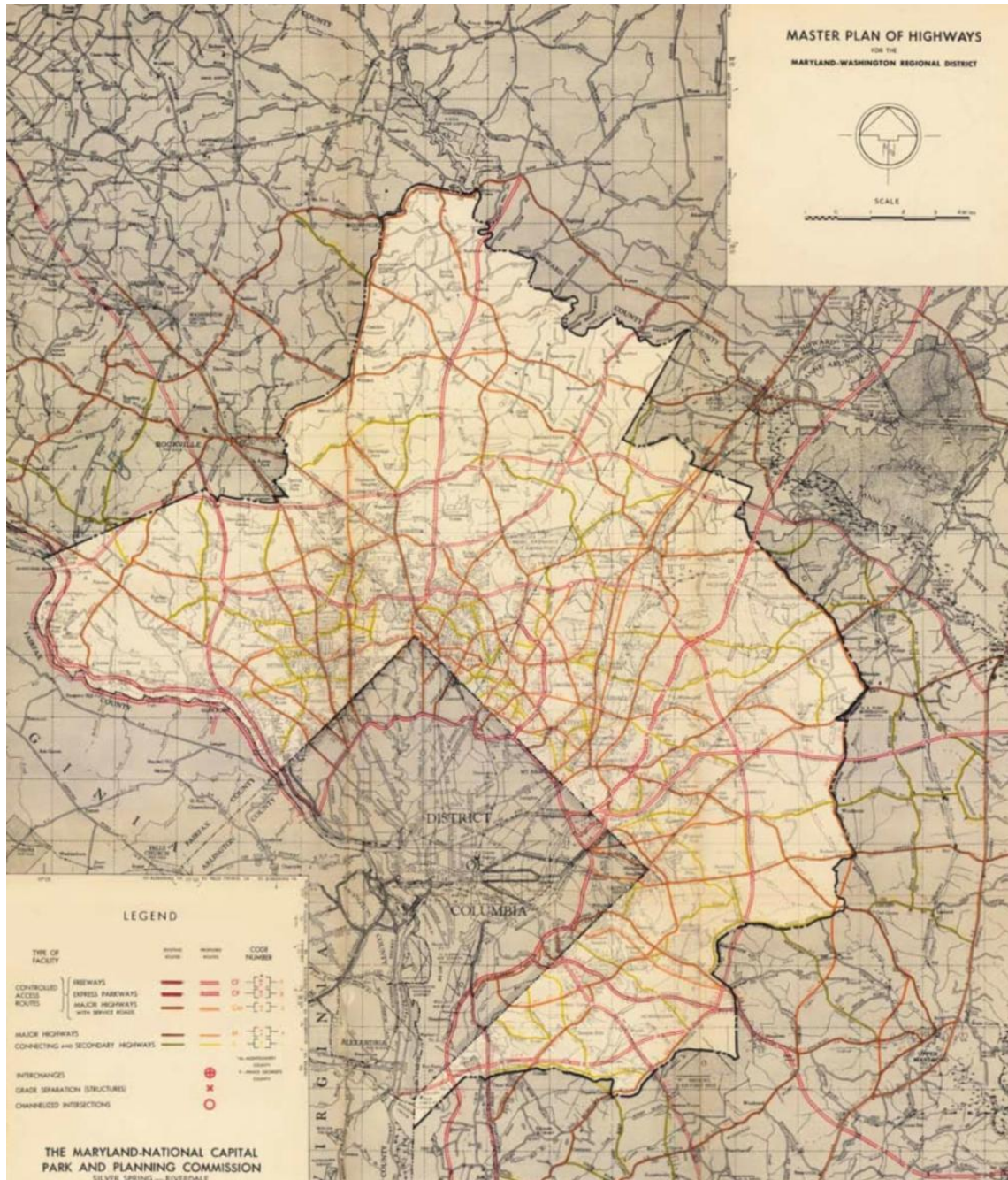
This Plan's recommended transit network is intended to serve current and planned land use in adopted master and sector plans. No changes to land use or zoning are recommended in this Functional Plan.

This Plan establishes the direction for more detailed work to be done in project planning along individual transit corridors; it also recommends that a greater level of transit treatments be considered for these corridors as part of future master or sector plan updates (see page 21). The segment treatment, length, and station locations are all subject to modification during these more detailed planning and engineering phases of project development and implementation.

Background

The first *Master Plan of Highways* (MPOH) was approved and adopted in 1931, shortly after the creation of the Maryland-National Capital Park and Planning Commission in 1927. The last comprehensive update to the MPOH was approved and adopted in 1955. It covered Montgomery County's portion of the Maryland-Washington Regional District as it existed at the time, which was about one-third of the County's current area—east of Georgia Avenue, east and south of the City of Rockville, and the southeast portion of Potomac.

Figure 1 *Master Plan of Highways, 1955*



Rather than a comprehensive update, the MPOH has been updated periodically, focusing on specific projects or geographic areas. Area master plans were revised in the 1970s to include the Metrorail Red Line, but the MPOH map was not revised to include transitways until 1986. Transitways now included in the MPOH are:

- Purple Line Transitway
- Corridor Cities Transitway
- North Bethesda Transitway
- Georgia Avenue Busway.

Since 1955, there have been updates and amendments to the MPOH through various approved and adopted functional, master, and sector plans. The most significant countywide update since 1955 was the creation of the *Rustic Roads Functional Master Plan* (RRFMP) in 1996, which sought to preserve many of the roads in the rural area of the County to reflect and further the goals of the 1980 *Functional Master Plan for the Preservation of Agricultural and Rural Open Space*.

This Plan complements the RRFMP by reflecting the growing urbanization of the I-270 corridor and the down-County area. It will provide the mobility needed to accommodate that growth while minimizing the adverse impacts on quality of life for those who live, work, and patronize the businesses along major roadways.

The General Plan recommends "an interconnected transportation system that provides choices in the modes and routes of travel." Creating a BRT network that allows transit riders to get between any two points with few transfers and with reliable service is a prerequisite for being perceived by the public as a true system rather than simply a group of unrelated bus routes.

Vision

This Plan will greatly increase the extent of high-quality transit service to serve the County's most densely developed areas, areas planned for redevelopment, and areas planned for new dense development. As the County urbanizes, BRT will provide the transit service needed to move more people to and from jobs, homes, shopping, and entertainment areas. Transit's more efficient use of public rights-of-way will support economic development in an environmentally sustainable way and in a way that preserves existing communities.

Why Bus Rapid Transit?

With exclusive or dedicated lanes, signal priority, and a greater spacing between stops, BRT will:

- provide better service to existing transit passengers whose travel time would be reduced
- provide a fast, convenient, reliable alternative to the single-occupant vehicle and increasingly congested roads
- move more people in the same space as a general purpose lane at a higher level of service
- act as a bridge between rail transit and extensive local bus service
- intercept non-County residents before they reach the County's more heavily developed areas, allowing roadway capacity to serve planned development within the County.

BRT can be implemented more easily and quickly than light rail, at a fraction of the cost, and is far more flexible. BRT routes can use a single transit corridor or parts of multiple corridors, which can also accommodate local buses that are included in the County's bus service plan for the network.

Finally, BRT can be implemented in phases, integrating improvements in vehicles, stations, and runningways as operating and capital funds become available.

Fitting BRT into the County's Transportation Network

Metrorail is the backbone of the County's transit network, providing transit service via the Red Line within the County and to downtown Washington, D.C. The Purple Line, planned as Light Rail Transit (LRT) will provide the next layer of transit service, connecting down-County activity centers, the two Red Line corridors, and Montgomery County with Prince George's County. Bus rapid transit would form the next layer of transit service. Local, circulator or shuttle, limited-stop, and commuter/express bus routes and MARC commuter rail complete the network.

BRT service on the recommended transit corridors will serve as feeders to Metrorail and MARC stations and local bus service and shuttles will feed into the recommended corridors. Montgomery County has one of the largest suburban bus services in the country, providing thirty million trips per year. Ride On's extensive network of local routes will continue to provide access to both the BRT and Metrorail systems, as will the Metrobus network.

The introduction of extensive high-quality transit service on the County's roadways will provide an attractive alternative to private automobiles. In addition to recommendations in the General Plan and many master plans to increase the percentage of residents using transit, specific mode share goals of up to 50 percent non-single-occupant vehicle travel are already in place in several areas of the County. The

recommended transit network would provide the superior transit facilities necessary to achieve these goals.

This Plan makes no recommendations for adding park-and-ride facilities, so BRT access would be via existing parking facilities, biking, and walking. While adding park-and-ride lots could increase ridership, the locations of these lots should be carefully considered to match the function of each recommended BRT corridor:

- BRT—Activity Center: because these corridors connect multiple dense, mixed-use areas, all station areas should prioritize pedestrian, bicycle, and transit access; park-and-ride lots should be discouraged.
- BRT—Express Corridors: because these corridors connect park-and-ride lots to employment centers, park-and-ride BRT stations should prioritize vehicular and transit access, though pedestrian, bicycle, and transit access should be the focus at all other stations.
- BRT—Commuter Corridors: because these corridors connect moderate density residential areas to employment centers, most station areas should prioritize pedestrian, bicycle, and transit access. Park-and-ride lots may be appropriate at some locations, especially end-of-the-line stations and connections to interstates and expressways, but multi-modal access should be provided.

This Plan recommends that park-and-ride lots be considered in future area master plans wherever feasible as an interim use, with the long-term objective of transit-oriented redevelopment.

The Plan recommends sufficient rights-of-way for safe, adequate access along the transit corridors, improvements to existing bicycle and pedestrian facilities in the areas around recommended stations, and the designation of Bicycle-Pedestrian Priority Areas at major transit stations.

Guiding Principles

One important conceptual change in the transportation goal in the 1993 General Plan Refinement was “the movement away from accommodating travel demand and towards managing travel demand and encouraging the availability of alternatives to the single-occupant vehicle.”

To further that goal, this Plan recommends:

- designating exclusive or dedicated bus lanes, wherever there is sufficient forecast demand to support their use, to promote optimal transit speeds in urban areas and surrounding suburban areas
- giving priority to transit facilities and operations where it is the more efficient mode
- expanding regional rail transit service
- supporting policies and programs that increase the comfort and safety of pedestrians and bicyclists traveling to and from transit facilities.

The 1993 General Plan also advocated “increased intensity of development in the Urban Ring and the I-270 Corridor to accommodate growth, while preserving the Wedge areas, reducing traffic congestion, and protecting the environment. To achieve this greater intensity, the Refinement supports the development of multi-family housing, higher density employment locations, and *alternatives to the single-occupant automobile.*” (emphasis added)

A strong transit network is essential to support economic development in planned growth areas. The recommended transit corridors will facilitate BRT and other high-quality transit services as an important part of the County’s transit network. These corridors can also potentially accommodate other bus services such as Metrobus and Ride On and provide connections to Metrorail, the Purple Line, and MARC.

Where the forecast demand from both transit riders and single-occupant drivers cannot be met without adversely affecting adjacent communities, transit should be accommodated first where it is the more efficient mode. Converting existing travel lanes is the preferred choice to achieve the recommended bus lanes to minimize:

- impacts on adjacent communities
- environmental impacts
- construction and maintenance costs.

This Plan recommends the transit network needed to serve planned land use, balancing County policies (shown in descending order of importance):

- General Plan
- existing area master plans, sector plans, and functional plans
- other County and Planning Board goals and policies, such as traffic level-of-service (LOS) guidelines and on-road bike accommodation beyond what is specifically recommended in the above documents.

Determining BRT Treatments

The transit corridors in MCDOT's Feasibility Study Report and those recommended by the County Executive's Transit Task Force were analyzed to consider:

- forecast transit ridership (see Appendixes 1 and 2)
- general traffic volumes and patterns
- existing roadside development
- planned land use.

This Plan's corridor treatment recommendations are tailored to reflect the specific conditions for each corridor segment and include the following decisions.

- Are dedicated lanes warranted?
- Should the dedicated lanes be at the curb or in the median?
- Can existing travel lanes be repurposed as dedicated bus lanes?
- What segments of the recommended transit network can be implemented without adversely affecting current planned land use or general traffic operations? What segments require further study as part of an area master plan effort?

Dedicated Lanes

The ridership used to determine when a dedicated bus lane is warranted can vary nationally depending on the jurisdiction but are typically around 1,200 passengers per peak hour in the peak direction (pphpd). This Plan's recommendations are based on a lower threshold of 1,000 pphpd to reflect the:

- the high level of analysis of the large network studied
- the long time frame of the Functional Plan
- hard-to-measure model attributes that may significantly increase forecast ridership.

Where forecast BRT ridership was less than the 1,000 pphpd threshold, it was combined with forecast local bus ridership to identify corridor segments where dedicated lanes could improve bus travel for all transit users. Corridor segments that fell below 1,000 pphpd in combined BRT and local bus ridership were generally not recommended for inclusion in the Plan. In select cases, largely because of network integrity considerations, some lower-ridership segments were retained, most often as mixed traffic operations.

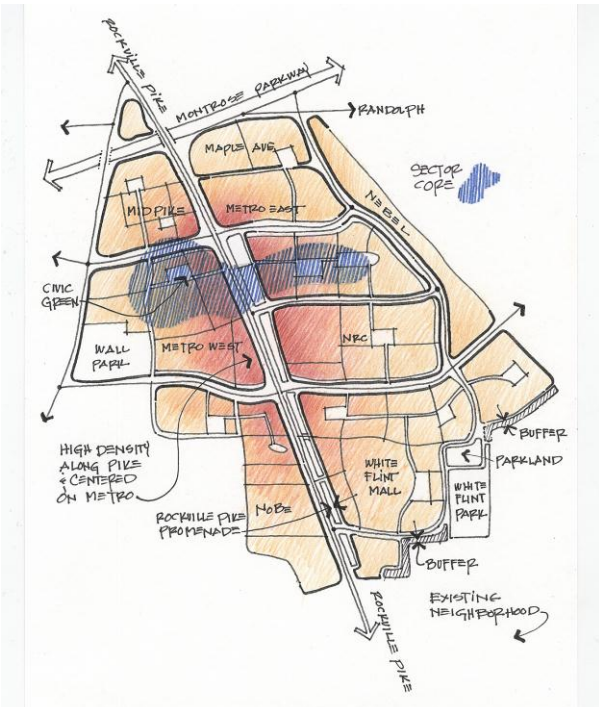
Median vs. Curb Lanes

Median busways have exclusive rights-of-way and provide the highest level of BRT accommodation. They are recommended where the peak hour forecast ridership is very high. For example, the *Transit Capacity and Quality of Service Manual* sets consideration of a median busway at 2,400 people in the peak hour in the peak direction (pphpd), however some jurisdictions have set that threshold between 1,500-1,700 pphpd for policy reasons. This is a reasonable approach for Montgomery County to consider as well and this Plan uses a threshold of 1,600 pphpd to determine where median busways are desirable.

Higher bus ridership forecasts make a median busway more desirable since it provides the highest level of service for riders, even though it requires a wider right-of-way and makes left-turns for general traffic

more difficult. A supporting street grid however, makes accommodating a median busway easier by giving options for parallel routes and turning movements, e.g. the White Flint Sector Plan area.

Figure 2 Proposed White Flint Street Grid



The existing and proposed street grid in White Flint provides alternative routes to MD 355. Proposed redevelopment will add mixed-uses, open spaces, and travel options.

Future area master plan updates, particularly in station areas, should consider ways to enhance the street grid at critical locations. More detailed planning will be required during implementation to determine location-specific solutions to the traffic challenges posed by a median busway.

Corridors with lower forecast BRT ridership but with high combined BRT and local bus ridership are better suited to curb lane operations. Dedicated curb lanes may be shared with express and limited-stop bus services to provide faster, more dependable bus service for all corridor transit patrons in the corridor. Dedicated curb lanes may also be the best interim treatment where a median busway is desired but where obtaining sufficient right-of-way is not possible in the near term without excessively adverse impacts.

Insert as text sidebar:

The treatments recommended in this Plan are intended to determine the rights-of-way necessary to facilitate the development of a network of dedicated transit lanes. This Plan recognizes however, that the final decision on treatment in each transit corridor must be made at the time of implementation when a transit service plan is in place and:

- the benefits of accommodating BRT and/or other bus services in the dedicated lanes can be quantified
- the traffic impacts of implementing curb lanes vs. a median busway can be more closely studied
- the impacts on adjacent properties can be determined.

This Plan is intended to provide flexibility for the implementing agency to make the choice of a curb or median busway as the best way to achieve dedicated lanes.

Lane Repurposing

After determining whether dedicated median or curb lanes are warranted on a corridor, the next step is to determine how to achieve them, whether to repurpose existing travel lanes, use the median where it's wide enough to accommodate the desired treatment, or identify additional right-of-way.

This Plan gives priority to using the public right-of-way for transit as the mode that can provide the greatest person-throughput, the ability to move the most people through a corridor. Lane-repurposing—designating an existing travel lane for bus use only—provides the most efficient use of available transportation facilities. In addition to Central Business District areas where constructing additional lanes is most often not practical, lane repurposing is recommended where the number of forecast transit riders exceeds the general purpose lane capacity and/or where general traffic demand would not exceed capacity.

In many segments of the proposed BRT corridors, the 2040 forecast bus ridership surpasses, and in some cases far surpasses, the person-throughput of a single general purpose traffic lane. Implementing necessary and more efficient transit facilities should take precedence over meeting the demand from single-occupant vehicles.

Where bus rapid transit would move people most efficiently in a corridor, the space needed to accommodate transit should be dedicated first to those bus lanes; the remaining lanes would then be available for general traffic. If congestion is too high in the remaining lanes, providing additional general traffic lanes should be considered. The impacts associated with constructing the additional pavement—construction costs, environmental impacts, community impacts, etc.—should be weighed against the benefits of providing more accommodation for the less efficient mode. More detailed planning will be required during implementation to determine location-specific impacts on traffic in areas where lane-repurposing is recommended.

The desire to reduce congestion by providing more roadway capacity must be weighed against the benefits of increasing transit ridership. However, the transportation modeling performed for this Plan forecasts an overall improvement in traffic speeds with the introduction of BRT over the no-build condition.

In addition to the person-throughput measure of whether a bus lane or a general traffic lane can move the most people, lane-repurposing should also be considered where it would result in the greatest improvement in level-of-service for all users of the roadway. Where the forecast BRT ridership on a congested roadway is greater than the capacity of a general traffic lane, the lane-repurposing test is met. But while the general traffic lanes may experience the same poor level of service, the bus lane carries a greater number of people in fewer vehicles with a far higher level of service, significantly increasing the average level of service for all users of the roadway.

This Plan recommends that facility planning should consider improvements in the weighted average level of service for all users of the roadway when evaluating the costs and benefits of constructing additional pavement to achieve the recommended transit facilities.

Master Plan Phasing

This Plan makes recommendations for a network of 79 miles of transit corridors based on the following phasing.

Phase 1 – corridors and treatments warranted by current zoning and related 2040 forecast bus ridership that can be accomplished without major impacts on existing development. Only Phase 1 transit corridor segments have recommended rights-of-way that should be used to pursue BRT implementation in the near term.

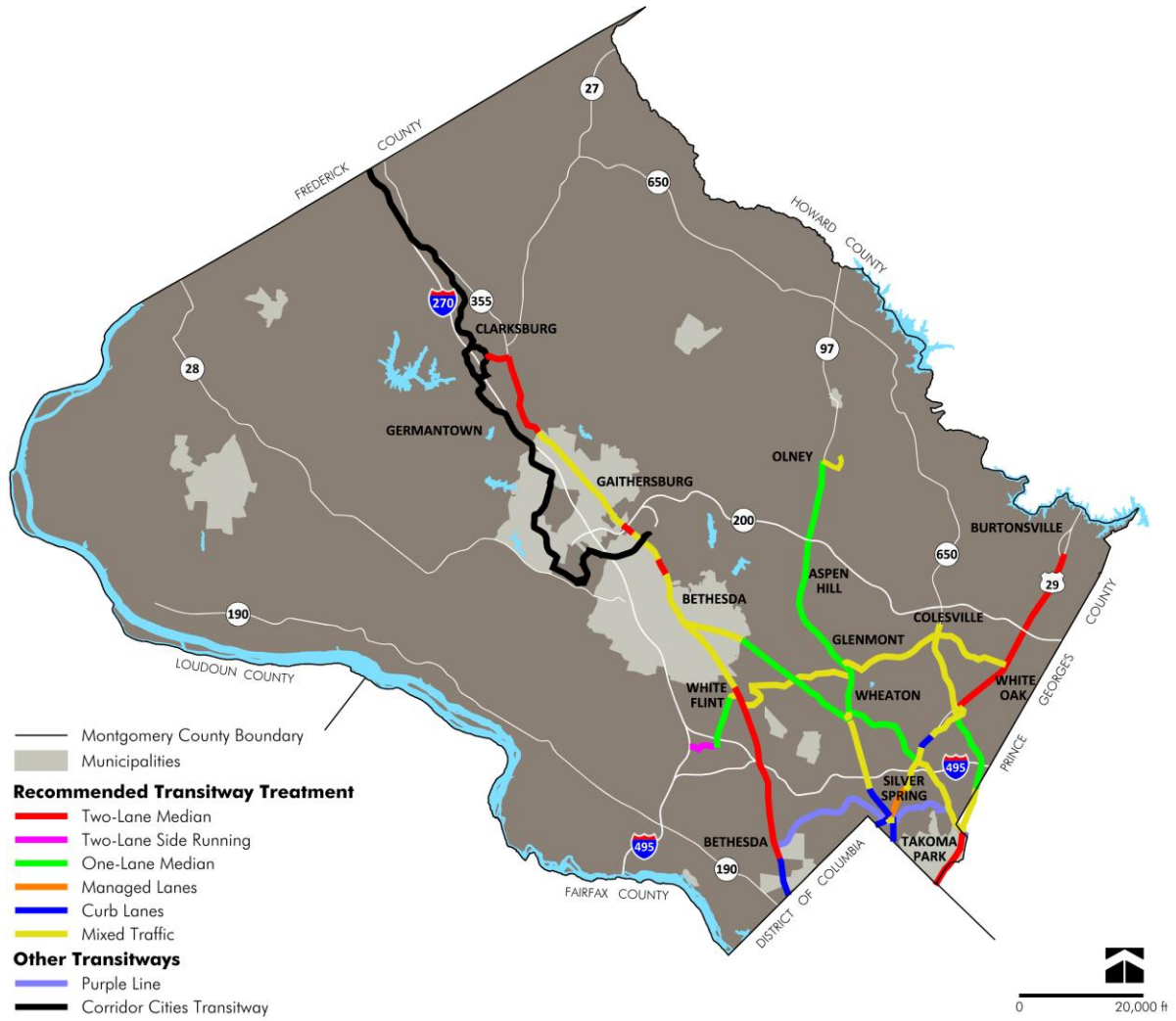
Phase 2 – greater corridor treatments warranted if pursued in conjunction with potential land use changes in future area master or sector plans. These treatments require additional study to confirm the recommended treatment and right-of-way.

Phase 2 recommendations are intended as policy direction for upgraded treatments to be pursued after further study in conjunction with expected changes in planned land use, based on the policy of concentrating density in transit-served centers. Phase 2 also includes transit corridor segments within the Cities of Rockville and Gaithersburg and within Prince George’s County, jurisdictions that must pursue their own master plan processes to determine the ultimate recommended rights-of-way.

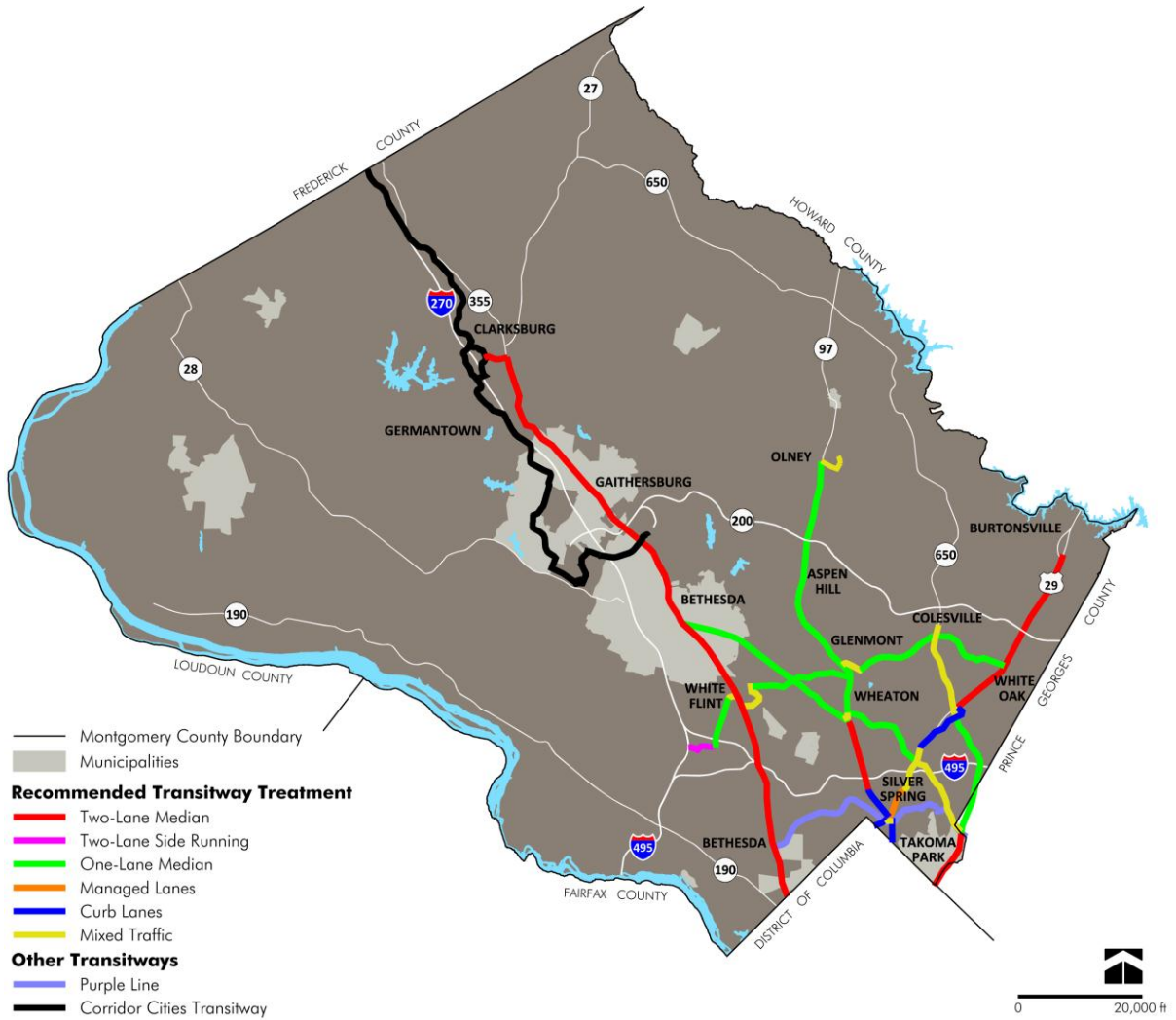
Insert as text sidebar:

Future area master or sector plan updates should consider the relationship of building locations and heights to the ultimate roadway width to ensure a transit-oriented development pattern that promotes pedestrian safety. The concurrent creation of urban design guidelines should be considered for all recommended transit corridors with greater than six lanes to establish minimum building heights and build-to requirements.

Map 2 Recommended Phase 1 Transit Network



Map 3 Recommended Phase 2 Transit Network



Recommended Corridors

This Plan recommends:

- dedicating public rights-of-way for several transit corridors
- specific treatments for each corridor segment
- changes in the number of master planned travel lanes
- intersections at which transit stations should be located.

Stations are identified by the station type and right-of-way, but the specific location of the station and associated right-of-way should be determined during facility planning. Additional right-of-way will also be required at some intersections to accommodate turn lanes. The typical rights-of-way associated with stations and turn lanes at intersections are shown in Consultant Memoranda in Appendix 13.

Appendix 4 contains a summary of the changes in recommended rights-of-way and number of travel lanes from the current master plan as well as the forecast ridership for each recommended corridor.

Figures 3 through 8 depict the application of various BRT treatments on a six-lane roadway.

Figure 3 Recommended Corridor Segment Treatment: Two-Lane Median Busway

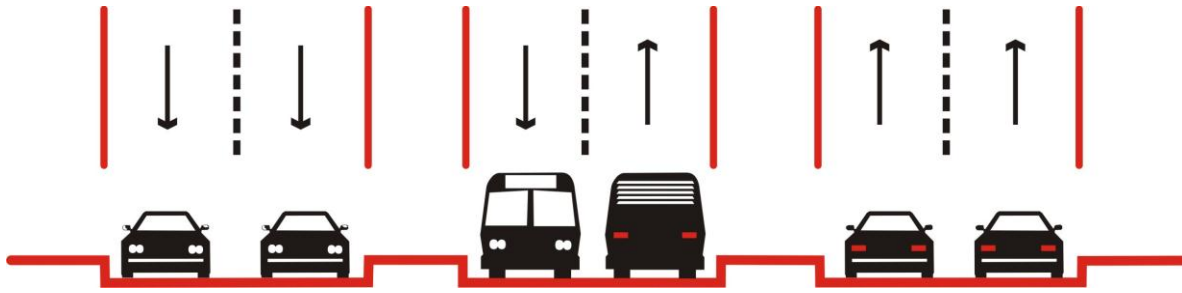


Figure 4 Recommended Corridor Segment Treatment: Two-Lane Side Busway

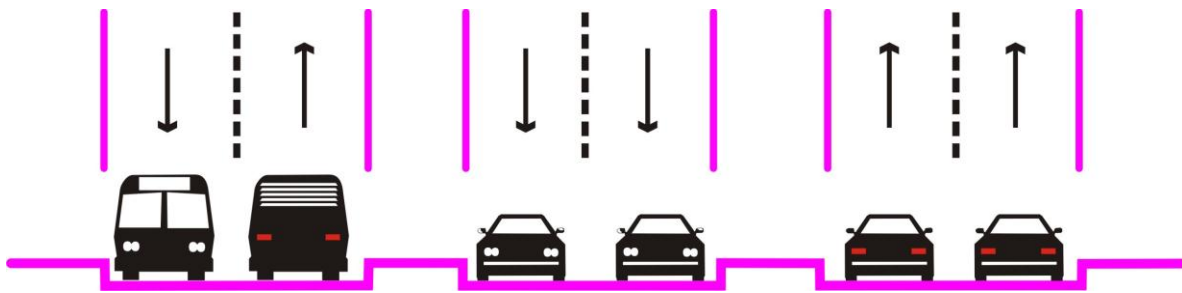


Figure 5 Recommended Corridor Segment Treatment: One-Lane Median Busway

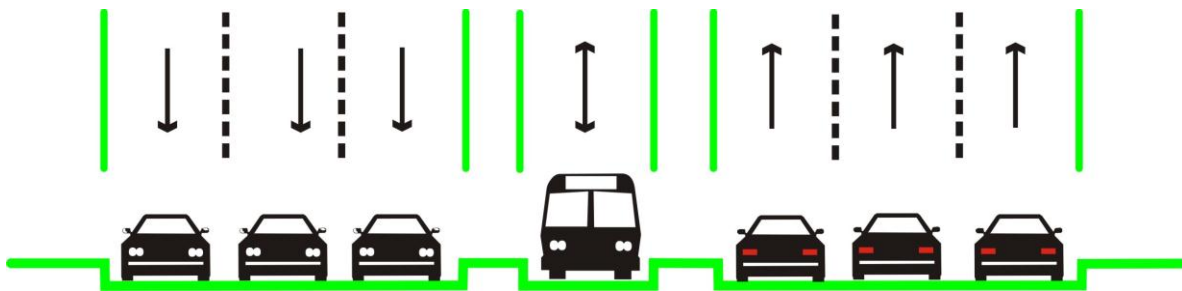


Figure 6 Recommended Corridor Segment Treatment: Managed Lanes

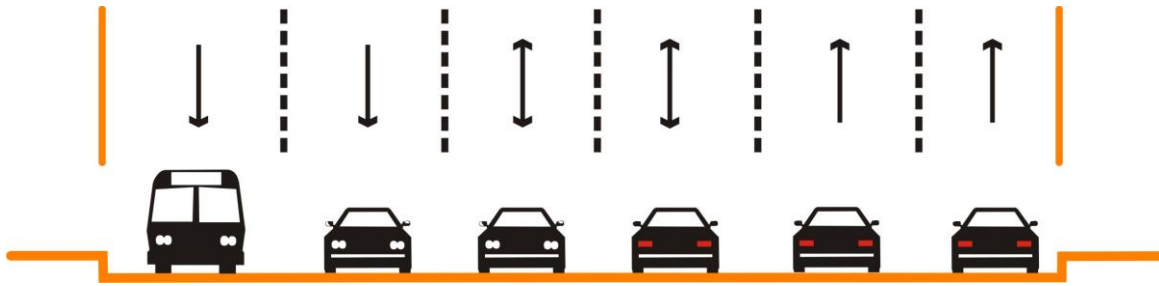


Figure 7 Recommended Corridor Segment Treatment: Curb Lanes

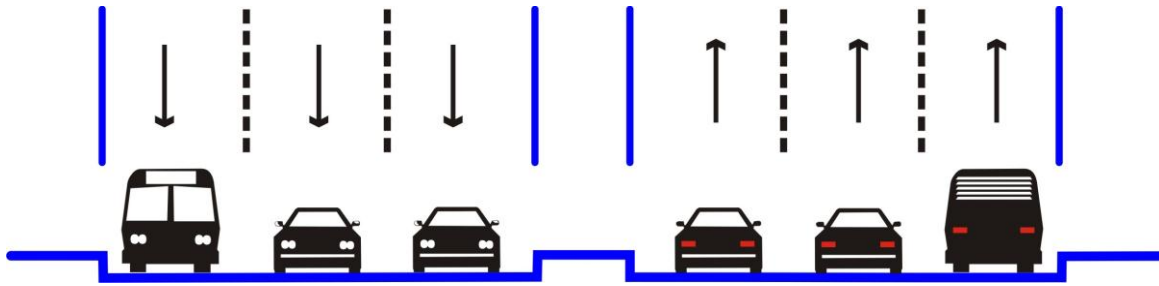
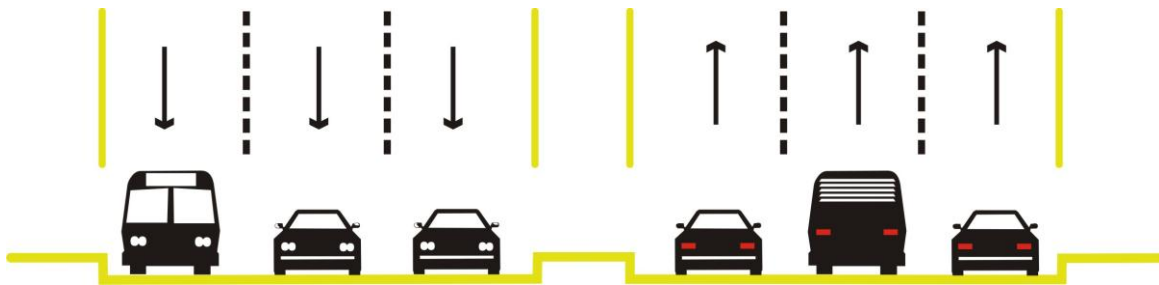


Figure 8 Recommended Corridor Segment Treatment: Mixed Traffic



Corridor 1: Georgia Avenue North

Georgia Avenue North is a commuter corridor, with most traffic flowing southbound in the morning and northbound in the evening. The corridor has several activity nodes, notably the commercial centers at Wheaton and Glenmont, and their respective Metrorail stations. Aspen Hill and Olney are at the northern end, with residential uses in between.

The corridor includes the Georgia Avenue Busway, a long-planned transitway in the wide median between Glenmont and Olney recommended in the 1997 *Glenmont Sector Plan*, 1994 *Aspen Hill Master Plan*, and 2005 *Olney Master Plan*.

Since congestion tends to occur in the peak direction of traffic, a single dedicated transit lane is sufficient for achieving a travel speed consistent with commuter BRT service.

Phase 1 recommendations:

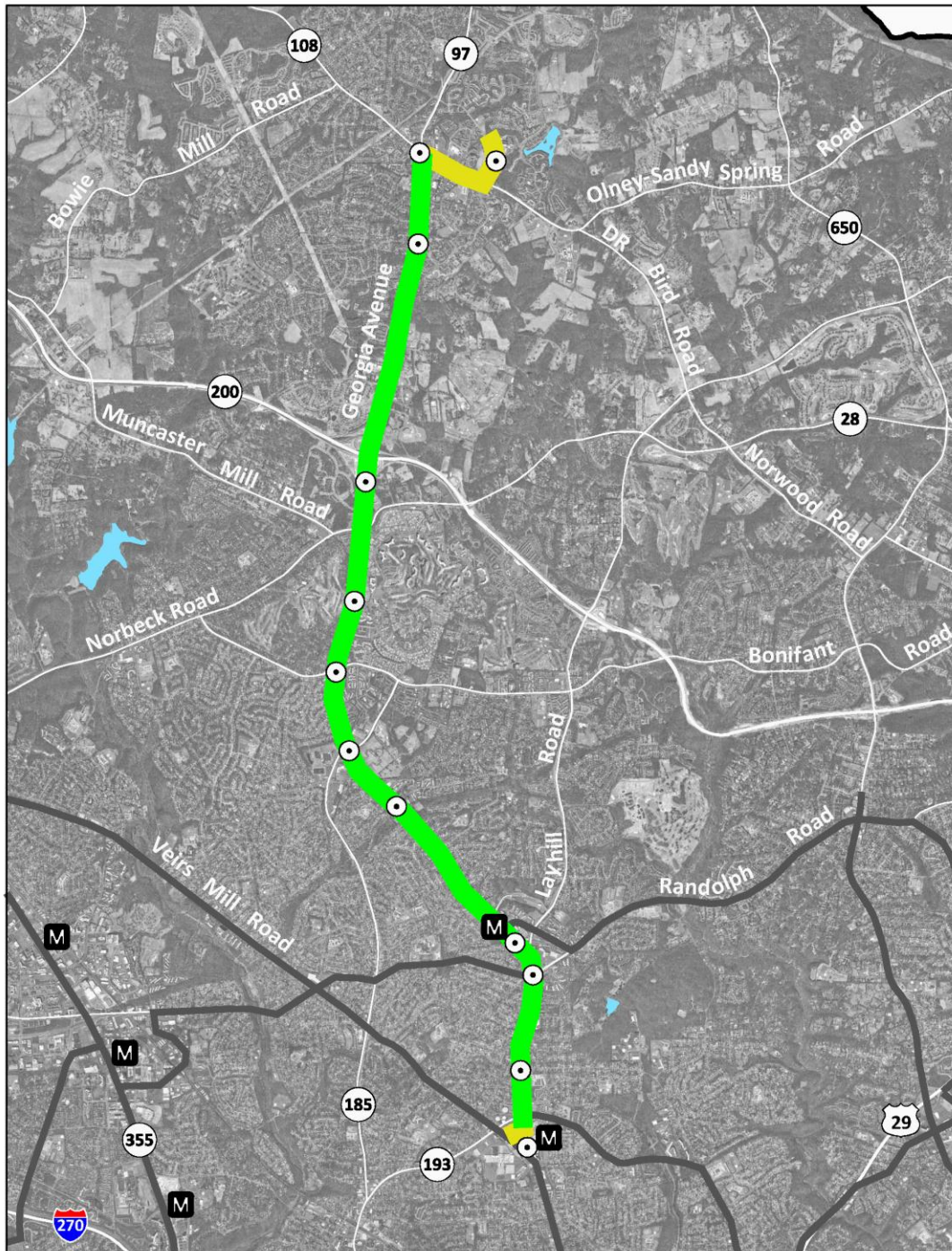
- Along Prince Phillip Drive from the planned Olney Transit Center to Olney-Sandy Spring Road, a mixed traffic transitway.
- Along Olney-Sandy Spring Road from Prince Phillip Drive to Georgia Avenue, a mixed traffic transitway.
- Along Georgia Avenue from Olney-Sandy Spring Road in Olney to Reedie Road in Wheaton, a reversible one-lane median transitway.
- Along Reedie Road from Georgia Ave to Veirs Mill Road, a mixed traffic transitway.

This Plan also recommends implementing a cycle track in the median to achieve a bicycle facility that avoids the driveway interruptions of the more typical location at the side of the roadway and permit cyclists to travel safely at a higher speed. The higher quality of such a path negates the need for on-road bike lanes. The cycle track will end at Glenallan Avenue where users can transfer to the Wheaton Metro Station or the Glenmont Greenway.

Station Locations

Montgomery General Hospital
MD 108 and MD 97
MD 97 and Hines Road
ICC park-and-ride
MD 97 and Norbeck Road park-and-ride
MD 97 and Rossmoor Boulevard
MD 97 and MD 185
MD 97 and Hewitt Avenue
Glenmont Metro Station
MD 197 and Randolph Road
MD 97 and Arcola Avenue
Wheaton Metro Station

Map 4 Georgia Avenue North Corridor



Recommended BRT Treatment

- County Line
- One-Lane Median
- Mixed Traffic
- Other BRT Corridors
- ⊙ BRT Station
- M Metro Station



Table 3: Corridor Recommendations, Georgia Avenue North

Road	From	To	Existing # of Lanes	Existing Master Plan		Phase 1		
				r.o.w.	Lanes	Treatment	r.o.w.	Lanes
Prince Phillip Drive	Brooke Farm Dr	MD 108	2	80	4	Mixed Traffic	80	4
Olney Sandy Spring Road	Prince Phillip Dr	Spartan Rd	4	150	4		150	4
Olney Sandy Spring Road	Spartan Rd	Georgia Ave	4	150	4		150	4
Georgia Avenue	MD 108	Spartan Rd	4	120	4	Reversible One-Lane Median	121	4 + 1 bus
Georgia Avenue	Spartan Rd	200 ft south of Queen Mary Dr	4	150	4 + 2 bus		150	4 + 1 bus
Georgia Avenue	200 ft south of Queen Mary Dr	Old Baltimore Rd	4	150	4 + 2 bus	Reversible One-Lane Median	150	4 + 1 bus
Georgia Avenue	Old Baltimore Rd	Emory Ln	4 to 5	150	4 + 2 bus		150	4 + 1 bus
Georgia Avenue	Emory Ln	MD 28	5 to 6	150	6 + 2 bus		150	6 + 1 bus
Georgia Avenue	MD 28	Matthew Henson State Park	6	150	6 + 1 bus		150	6 + 1 bus
Georgia Avenue	Matthew Henson State Park	Weller Rd	6	120	6		130	6 + 1 bus
Georgia Avenue	Weller Rd	Denley Rd	6	135	6 + 1 bus		135	6 + 1 bus
Georgia Avenue	Denley Rd	Layhill Rd	6	145	6 + 1 bus		145	6 + 1 bus
Georgia Avenue	Layhill Rd	Randolph Rd	6	170	6		170	6 + 1 bus
Georgia Avenue	Randolph Rd	500 ft south of Randolph Rd	6	170	6		170	6 + 1 bus
Georgia Avenue	500 ft south of Randolph Rd	Mason St	6	120	6		124	6 + 1 bus
Georgia Avenue	Mason St	400 ft north of Blueridge Ave	6	120	6		120	6 + 1 bus
Georgia Avenue	400 ft north of Blueridge Ave	Reedie Rd	6	120	6		129	6 + 1 bus
Reedie Road	Georgia Ave	Veirs Mill Rd	2	70	2		Mixed Traffic	70

Table 4: Corridor Recommendations, Georgia Avenue North Cycle Track

Route Number	Name	Type	Limits
CT-2	Georgia Ave	Cycle Track	Queen Mary Dr to Glenallen Ave

Corridor 2: Georgia Avenue South

Like its partner to the north, the Georgia Avenue South is a commuter corridor, with most traffic (and congestion) flowing southbound in the morning and northbound in the evening. The corridor has several activity nodes, notably the Wheaton and Silver Spring CBDs with their respective Metrorail stations, the Forest Glen Metrorail station, and the Montgomery Hills commercial center, with residential uses in between.

Phase 1 recommendations:

- Along Georgia Avenue from Veirs Mill Road to 16th Street, a mixed traffic transitway.
- Along Georgia Avenue from 16th Street to Colesville Road, dedicated curbs lanes.
- Along Wayne Avenue from Georgia Avenue to Colesville Road, a mixed traffic transitway.
- Along Georgia Avenue from Wayne Avenue to the DC line, a two-lane median transitway. This transitway could accommodate BRT and/or an extension of the DC streetcar line planned for Georgia Avenue.

Phase 2 recommendation:

- Upgrade Georgia Avenue from Veirs Mill Road to 16th Street to a two-way median transitway.

Station Locations

Wheaton Metro Station

MD 97 and Dexter Avenue

Forest Glen Metro Station

MD 97 and Seminary Road

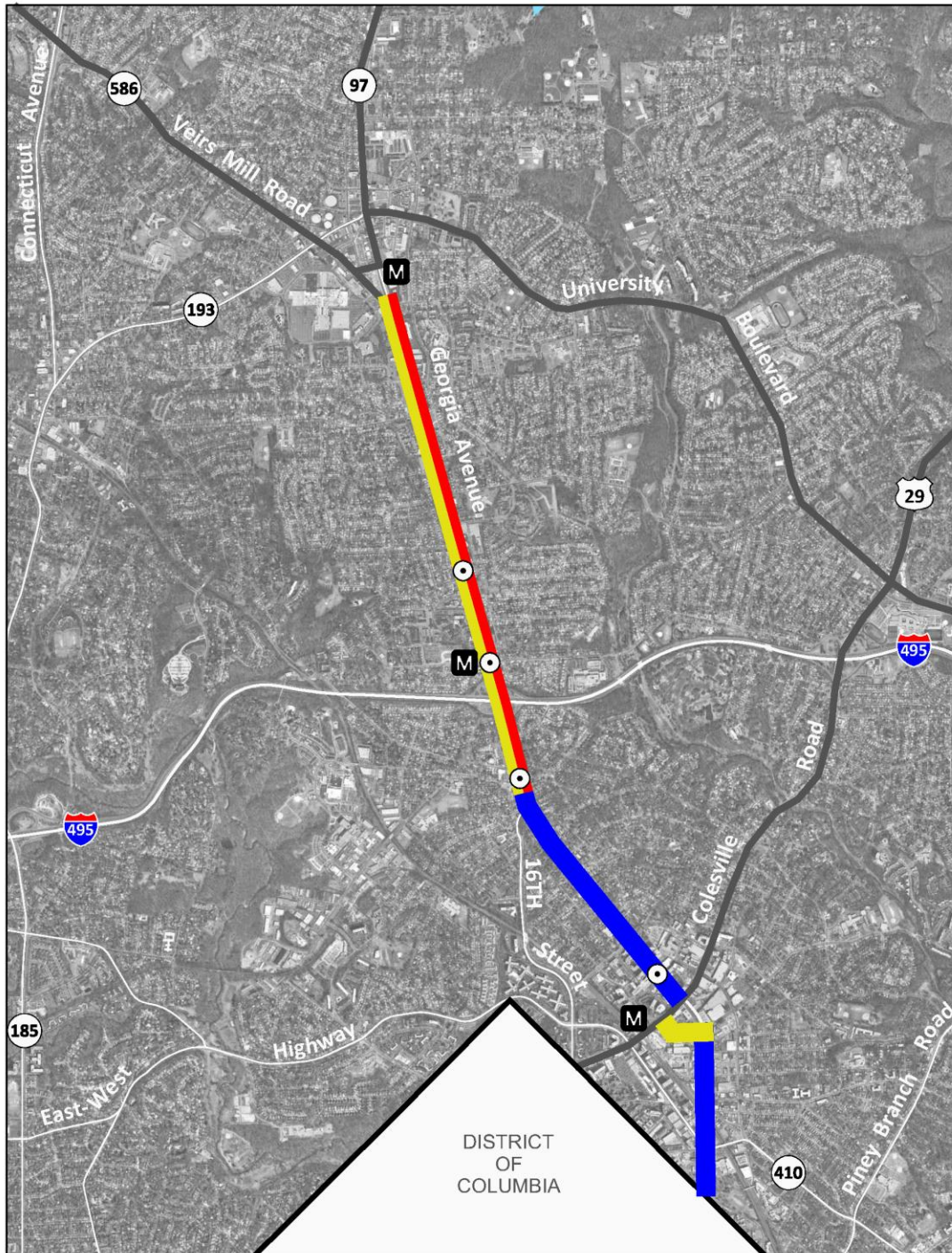
MD 97 and Cameron Street

Silver Spring Transit Center

MD 97 and East West Highway

MD 97 and Eastern Avenue

Map 5 Georgia Avenue South Corridor



Recommended BRT Treatment

- | | |
|--|---|
|  County Line |  Other BRT Corridors |
|  Curb Lanes |  BRT Station |
|  Mixed Traffic |  Metro Station |
|  Phase 1: Mixed Traffic | |
|  Phase 2: Two-Lane Median | |



Table 5: Corridor Recommendations, Georgia Avenue South

Road	From	To	Existing # of Lanes	Existing Master Plan		Phase 1			Phase 2		
				ROW	Lanes	Treatment	ROW	Lanes	Treatment	ROW	Lanes
Georgia Avenue	Veirs Mill Rd	Windham Ln	6	120	6	Mixed Traffic	120	6	Two-Lane Median	163	6 + 2 bus
Georgia Avenue	Windham Ln	Dennis Ave	6	120	6		120	6		161	6 + 2 bus
Georgia Avenue	Dennis Ave	Forest Glen Rd	6	110	6		110	6		161	6 + 2 bus
Georgia Avenue	Forest Glen Rd	I-495	6	110	6		110	6		161	6 + 2 bus
Georgia Avenue	I-495	Flora Ln	7	120	6		120	6		161	6 + 2 bus
Georgia Avenue	Flora Ln	16th St	7	120	7		120	7		163	6 + 2 bus
Georgia Avenue	16th St	Spring St	6	120	6	Curb Lanes	122	4 + 2 bus			
Georgia Avenue	Spring St	Colesville Rd	6	126	6		126	4 + 2 bus			
Wayne Avenue	Colesville Rd	Georgia Ave	2	120	4	Mixed Traffic	120	4			
Georgia Avenue	Wayne Ave	Blair Mill Rd	6	120-140	6	Curb Lanes	125-140	4 + 2 bus			
Georgia Avenue	Blair Mill Rd	DC Line	6	125	6		125	4 + 2 bus			

Corridor 3: MD 355 North

MD 355 North is an activity center corridor planned for a high level of development that will support all-day travel throughout the corridor. The corridor has several major existing and planned activity nodes, including Rockville and Gaithersburg. It is also characterized by heavy congestion and high transit ridership potential.

Phase 1 recommendations:

- Along Seneca Meadows Parkway from the Corridor Cities Transitway to Observation Drive, a two-way median transitway
- Along Shakespeare Boulevard from Observation Drive to MD 355, a two-way median transitway.

Phase 1 recommendations, transitway treatments along MD 355:

- From Shakespeare Boulevard to Game Preserve Road, a two-lane median transitway.
- From Game Preserve Road to just south of O'Neil Drive in the City of Gaithersburg, a mixed traffic transitway.
- From just south of O'Neil Drive to 1,250 feet south of Shady Grove Road, a two-lane median transitway.
- From 1,250 feet south of Shady Grove Road to 1,000 feet south of Indianola Road in the City of Rockville, a mixed traffic transitway.
- From 1,000 feet south of Indianola Road to 270 ft north of North Campus Drive, a two-lane median transitway.
- From North Campus Drive to Church Street to 270 ft north in the City of Rockville, a mixed traffic transitway.

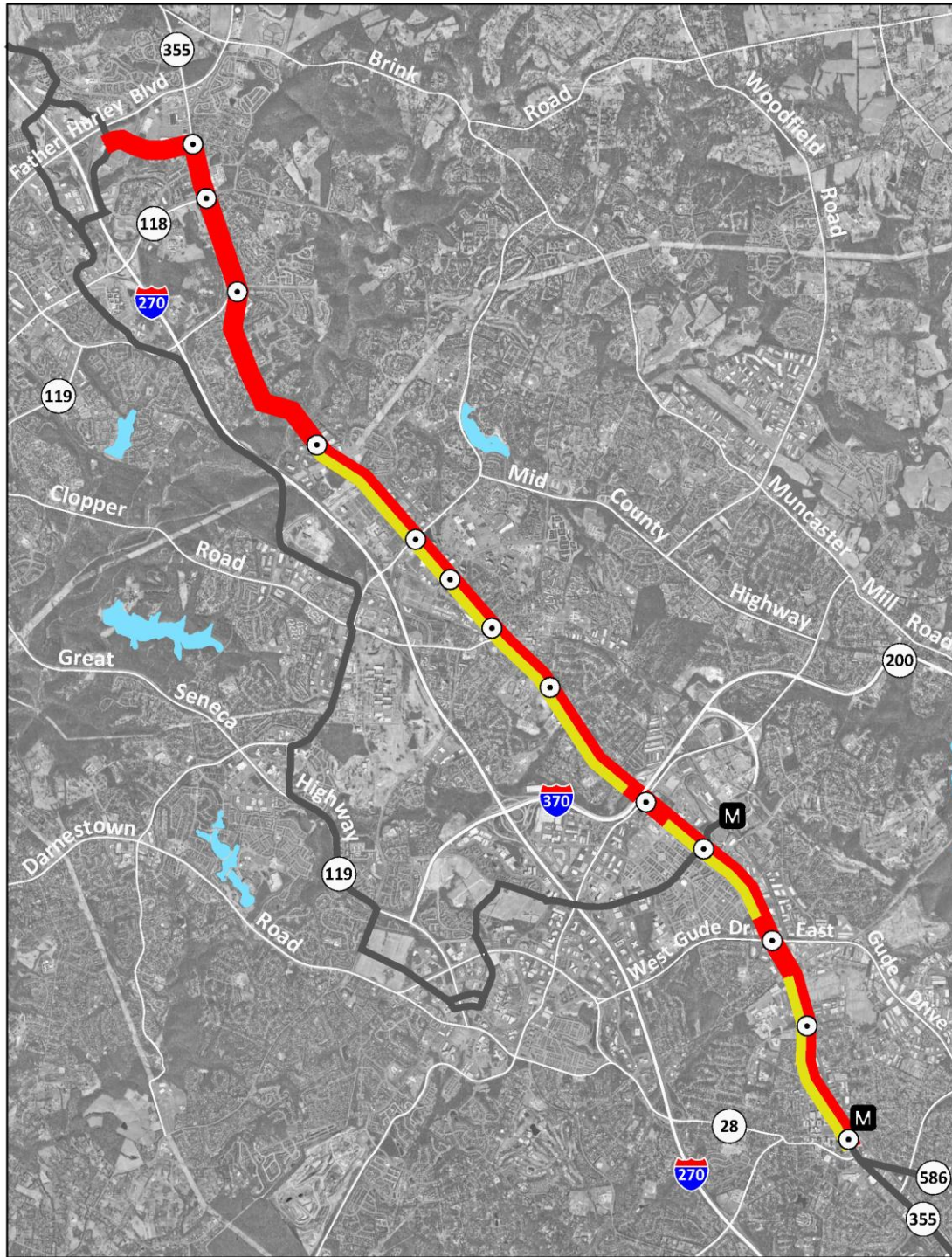
Phase 2 recommendation:

- Two-way median transitways on MD 355 in the City of Rockville and the City of Gaithersburg.

Station Locations

MD 355 and Shakespeare Boulevard
MD 355 and MD 118
MD 355 and Middlebrook Road
MD 355 and Professional Drive
MD 355 and MD 124
MD 355 and Odendhal Avenue
MD 355 and Brookes Avnue
MD 355 and Education Boulevard
MD 355 and Shady Grove Road
MD 355 and King Farm Boulevard
MD 355 and Gude Drive
MD 355 and Mannakee Street
Rockville Metro Station

Map 6 MD 355 North Corridor



Recommended BRT Treatment

- Two-Lane Median
- Phase 1: Mixed Traffic
- Phase 2: Two-Lane Median
- Other BRT Corridors
- BRT Station
- M Metro Station



Table 6: Corridor Recommendations, MD 355 North

Road	From	To	Existing # of Lanes	Existing Master Plan		Phase 1			Phase 2		
				ROW	Lanes	Treatment	ROW	Lanes	Treatment	ROW	Lanes
Seneca Meadows Parkway	Corridor Cities Transitway	Observation Dr	4	130	4	Two-Lane Median	130	4 + 2 bus			
Shakespeare Boulevard	Observation Dr	MD 355	4	100	4		123	4 + 2 bus			
MD 355	Shakespeare Blvd	Game Preserve Rd	6	250	6		250	4 + 2 bus			
MD 355	Game Preserve Rd	Just south of O'Neil Dr	6	Gaithersburg		Mixed Traffic			Two-Lane Median	250	6 + 2 bus
MD 355	just south of O'Neil Dr	1,250 ft south of Shady Grove Rd	6	150	6	Two-Lane Median	150	4 + 2 bus		163	6 + 2 bus
MD 355	1,250 ft south of Shady Grove Rd	Ridgemont Ave	6	Rockville		Mixed Traffic	Rockville			161	6 + 2 bus
MD 355	Ridgemont Ave	Indianola Rd	6							163	6 + 2 bus
MD 355	Indianola Rd	1,000 ft south of Indianola Rd	6							163	6 + 2 bus
MD 355	1,000 ft south of Indianola Rd	270 ft north of N. Campus Dr	6	150	6	Two-Lane Median	150	4 + 2 bus		161	6 + 2 bus
MD 355	270 ft north of N. Campus Dr	Church St	6	Rockville		Mixed Traffic				163	6 + 2 bus

Corridor 4: MD 355 South

MD 355 South is an activity center corridor planned for a high level of development that will support all-day travel throughout the corridor. It is characterized by shorter trips representing a wide variety of travel purposes (shopping and recreation, in addition to commuting). The corridor has several planned or existing activity nodes, including Rockville, Twinbrook, White Flint, NIH/WRNMMC, Bethesda CBD, and Friendship Heights CBD. It is also characterized by very heavy congestion and high transit ridership potential.

Phase 1 recommendations:

- From Church Street to just south of Hubbard Drive in the City of Rockville, a mixed traffic transitway.
- From just south of Hubbard Drive to Bradley Boulevard, a two-way median transitway.
- From Bradley Boulevard to Western Avenue, a curbed lane transitway.

Phase 2 recommendations, transitway treatments:

- From Church Street to just south of Hubbard Drive in the City of Rockville, a two-way median transitway.
- From Bradley Boulevard to Western Avenue, a two-way median transitway.

Station Locations

Rockville Metro Station

MD 355 and Edmonston Drive

MD 355 and Halpine Road

MD 355 and Hubbard Drive

White Flint Metro Station

MD 355 and Security Lane

Grosvenor Metro Station

MD 355 and Pooks Hill Road

MD 355 and Cedar Lane

Medical Center Metro Station

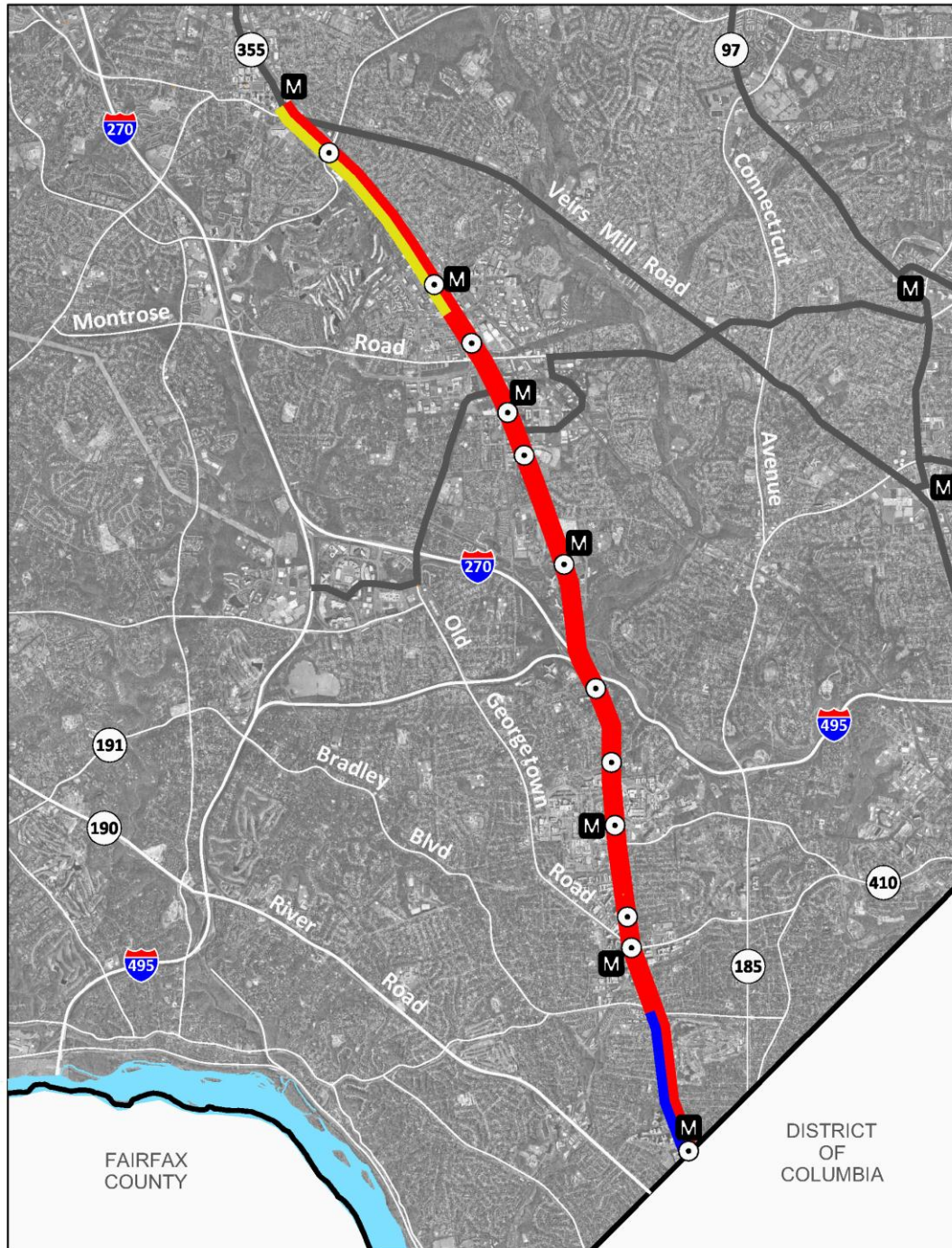
MD 355 and Cordell Avenue

Bethesda Metro Station

Bradley Boulevard and MD 355

Friendship Heights Metro

Map 7 MD 355 South Corridor



Recommended BRT Treatment

-  County Line
-  Two-Lane Median
-  Phase 1: Mixed Traffic
Phase 2: Two-Lane Median
-  Phase 1: Curb Lanes
Phase 2: Two-Lane Median
-  Other BRT Corridors
-  BRT Station
-  Metro Station



Table 7: Corridor Recommendations, MD 355 South

Road	To	From	Existing # of Lanes	Existing Master Plan		Phase 1			Phase 2				
				ROW	Lanes	Treatment	ROW	Lanes	Treatment	ROW	Lanes		
MD 355	Church Str	Halpine Rd	6	Rockville		Mixed Traffic	Rockville		Two-Lane Median	163	6 + 2 bus		
MD 355	Halpine Rd	Twinbrook Pkwy	6							163	6 + 2 bus		
MD 355	Twinbrook Pkwy	Bou Ave	6							134	6	163	6 + 2 bus
MD 355	Bou Ave	Just south of Hubbard Dr	6							134	6	163	6 + 2 bus
MD 355	Just south of Hubbard Dr	Edson Ln	6	150 (162)*	6 + 2 bus	Two-Lane Median	150 (162)*	6 + 2 bus					
MD 355	Edson Ln	Hillery Wy	6	150 (162)*	6 + 2 bus		150 (162)*	6 + 2 bus					
MD 355	Hillery Wy	600 ft north of Tuckerman Ln (north)	6	150	6		150	6 + 2 bus					
MD 355	600 ft north of Tuckerman Ln (north)	Tuckerman Ln (south)	6	150	6		150	6 + 2 bus					
MD 355	Tuckerman Ln (south)	Grosvenor Ln	6	150	6		150	6 + 2 bus					
MD 355	Grosvenor Ln	I-495	6	200	6		200	6 + 2 bus					
MD 355	I-495	Cedar Ln	6	120	6		120	4 + 2 bus					
MD 355	Cedar Ln	Woodmont Ave	6	120	6		123	4 + 2 bus					
MD 355	Woodmont Aven	Chestnut St	6	120	6		120	4 + 2 bus					
MD 355	Chestnut Stn	Bradley Blvd	6	120	6		122	4 + 2 bus					
MD 355	Bradley Blvd	Nottingham Dr	6	120	6		122	4 + 2 bus			Two-Lane Median	122	4 + 2 bus
MD 355	Nottingham Dr	Drummond Ave	6	120	6		120	4 + 2 bus				120	4 + 2 bus
MD 355	Drummond Ave	Oliver St	6	120	6	120	4 + 2 bus	120	4 + 2 bus				
MD 355	Oliver St	Somerset Ter	6	120	6	122	4 + 2 bus	122	4 + 2 bus				
MD 355	Somerset Ter	Western Ave	6	120	6	122	4 + 2 bus	122	4 + 2 bus				

* The Rockville Pike 150-foot right-of-way can be expanded to 162 feet (additional feet to be obtained through reservation).

Corridor 5: New Hampshire Avenue

New Hampshire Avenue is a commuter corridor, with most traffic flowing southbound in the morning and northbound in the evening. Activity centers are located at Takoma / Langley Crossroads and the emerging mixed-use center at White Oak.

Phase 1 recommendations, BRT runningway treatments on New Hampshire Avenue:

- From Colesville park-and-ride to Lockwood Drive, a mixed traffic transitway.
- From Lockwood Drive to Northampton Drive, a reversible one-lane median transitway.
- From University Boulevard to the District line, a two-lane median transitway.

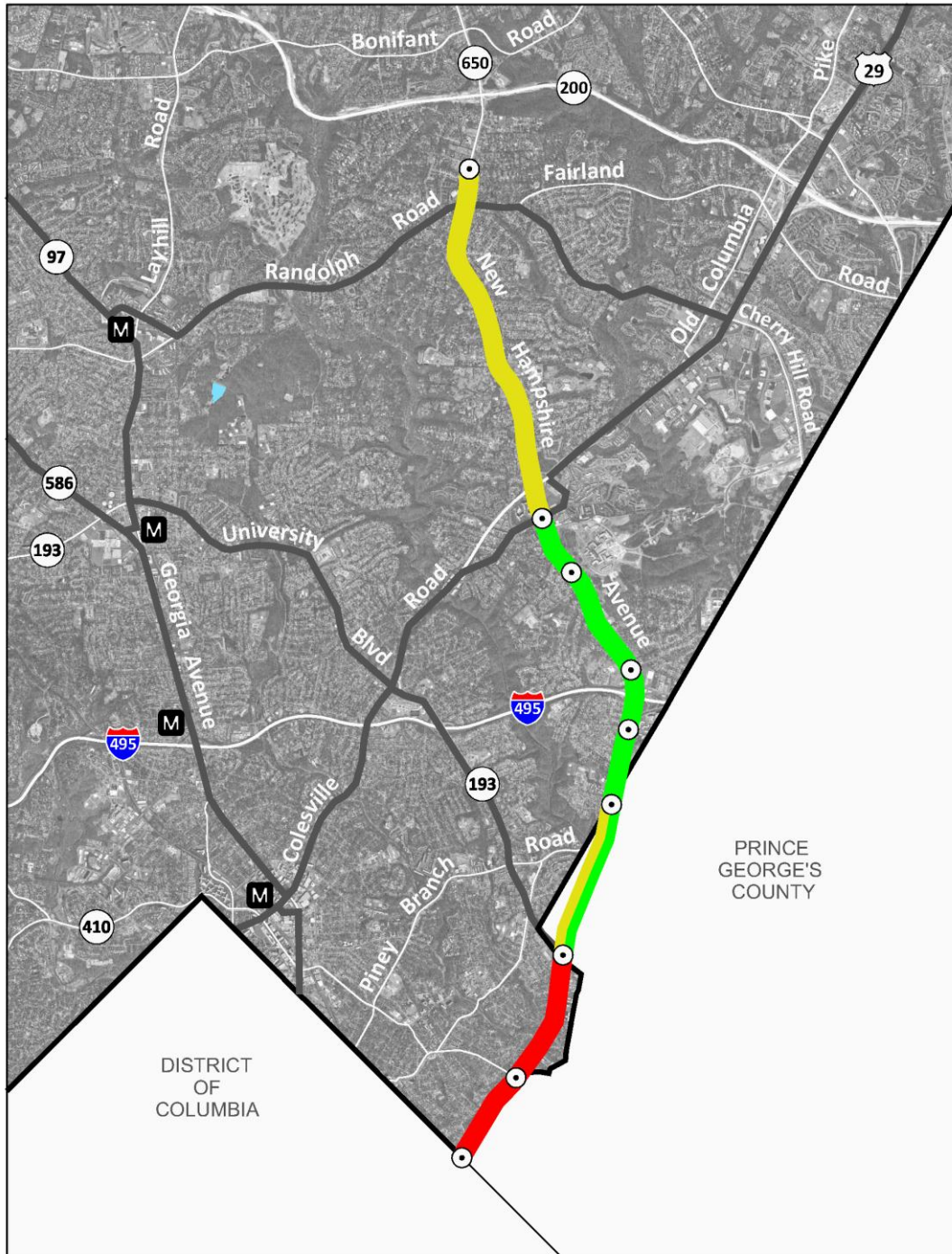
Phase 2 recommendation:

- A reversible one-lane median on New Hampshire Avenue between University Boulevard and Northampton Drive in Prince George's County.

Station Locations

Colesville park-and-ride
MD 650 and Randolph Road
MD 650 and Valleybrook Drive
MD 650 and Jackson Road
White Oak Transit Center
FDA White Oak Campus
MD 650 and Powder Mill Road
MD 650 and Oakview Drive
MD 650 and Northampton Drive
Takoma/Langely Park Transit Center
MD 650 and MD 410
MD 650 and Eastern Avenue

Map 8 New Hampshire Avenue Corridor



Recommended BRT Treatment

- County Line
 - Two-Lane Median
 - One-Lane Median
 - Mixed Traffic
 - Other BRT Corridors
 - BRT Station
 - M Metro Station
- 

0 5000 ft

Table 8: Corridor Recommendations, New Hampshire Avenue

Road	From	To	Existing # of Lanes	Existing Master Plan		Phase 1			Phase 2		
				ROW	Lanes	Treatment	ROW	Lanes	Treatment	ROW	Lanes
New Hampshire Ave	Colesville park-and-ride	Randolph Rd	6	120	6	Mixed Traffic	120	6			
New Hampshire Ave	Randolph Rd	Lockwood Dr	6	120	6		120	6			
New Hampshire Ave	Lockwood Dr	I-495	6	120	6	Reversible One-Lane Median	130	6 + 1 bus			
New Hampshire Ave	I-495	Northampton Dr	6	150	6-8		150	6 + 1 bus			
New Hampshire Ave	Northampton Dr	University Blvd	6	Prince George's County		Mixed Traffic			Reversible One-Lane Median	141	6 + 1 bus
New Hampshire Ave	University Blvd	D.C. Line	6	150	6-8	Two-Lane Median	150	4 to 6, + 2 bus			

Corridor 6: North Bethesda Transitway

The North Bethesda Transitway was originally conceived of as a spur from the Metrorail Red Line to the Rock Spring office park area and to Montgomery Mall in the 1992 North Bethesda / Garrett Park Master Plan. At its eastern end, the transitway terminates at the Grosvenor Metrorail station. At its western end, it terminates at a planned transit center at Montgomery Mall. Much of the right-of-way along Rock Spring Drive, Fernwood Road, and Tuckerman Lane is currently available through easements and dedications provided in the development review process.

The transfer point to the Red Line at the Grosvenor Metrorail station is in many ways similar to the Fort Totten Metrorail Station. It creates a major transfer at a rail station with relatively little land use and little opportunity for growth. Since the alignment of the transitway was originally identified, much has changed on the MD 355 corridor. White Flint has emerged as a major planned mixed use center, and to serve the travel demand emanating from this activity center and points to the north, the alignment of the North Bethesda Transitway should terminate at the White Flint Metrorail station instead of the Grosvenor Metrorail station.

Phase 1 recommendations:

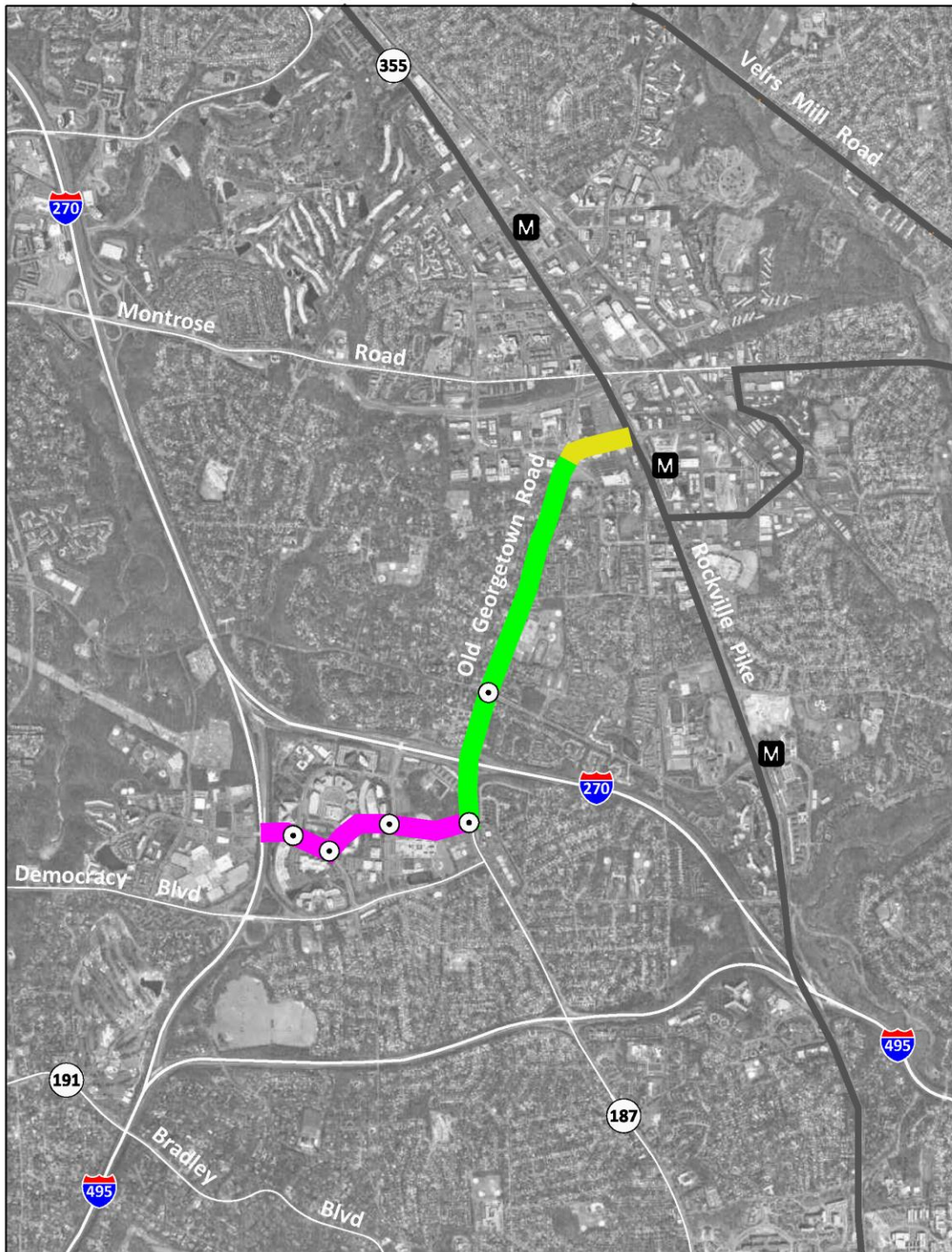
- Along Old Georgetown Road between Rockville Pike and Executive Boulevard, a mixed traffic transitway.
- Along Old Georgetown Road between Executive Boulevard and Rock Spring Drive, a reversible one-lane median transitway.
- Along Rock Spring Drive, Fernwood Road, and Westlake Terrace, between Old Georgetown Road and I-270, a two-lane side running transitway.

While previous attempts at providing a transit service between the I-270 corridor and Tysons Corner were unsuccessful, a freeway-based BRT corridor now appears more feasible due to the changing land use in Tysons Corner and the opening of the High Occupancy Toll (HOT) lanes on I-495 in northern Virginia. The North Bethesda Transitway could become part of a significant transit link between Tysons Corner and White Flint. This link should be studied as part of any new HOV or HOT lane project on I-270 and I-495 in Maryland.

Station Locations

Montgomery Mall Transit Center
Rock Spring Drive and Fernwood Road
Rockledge Drive and Rock Spring Drive
Rock Spring Drive and MD 187
MD 187 and Tuckerman Lane
MD 187 and Edson Lane/Poindexter Lane
White Flint Metro Station

Map 9 North Bethesda Transitway



Recommended BRT Treatment

- Two-Lane Side Running
- One-Lane Median
- Mixed Traffic
- Other BRT Corridors
- BRT Station
- M Metro Station



Table 9: Corridor Recommendations, North Bethesda Transitway

Road	From	To	Existing # of Lanes	Existing Master Plan		Phase 1		
				ROW	Lanes	Treatment	ROW	Lanes
Old Georgetown Road	Rockville Pike	Executive Blvd	6	120	4	Mixed Traffic	120	4
Old Georgetown Road	Executive Blvd	Nicholson Ln	6	150	6	Reversible One-Lane Median	150	6 + 1 bus
Old Georgetown Road	Nicholson Ln	Tuckerman Ln	6	120	6		126	6 + 1 bus
Old Georgetown Road	Tuckerman Ln	I-270	6	120	6		130	6 + 1 bus
Old Georgetown Road	I-270	Rock Spring Dr	6	120	6		126	6 + 1 bus
Rock Spring Drive	Old Georgetown Rd	Fernwood Rd	4	80*	4 + 2 bus	Two-Lane Side Running	80*	4 + 2 bus
Fernwood Road	Rock Spring Dr	Rockledge Dr	4	80*	4 + 2 bus		80*	4 + 2 bus
Westlake Terrace	Rockledge Dr	I-270	4	80*	4 + 2 bus		80*	4 + 2 bus

* Plus additional 40-foot-wide easement for side-running transitway

Corridor 7: Randolph Road

Randolph Road is a commuter corridor with traffic and congestion in the westbound direction in the morning and the eastbound direction in the evening. Major activity centers include White Flint, Glenmont, and the emerging mixed-use center at White Oak. Residential uses fill in the gaps between these areas.

While ridership forecasts are low for the corridor, it does provide important linkages to other BRT corridors. Therefore, because this corridor is important for the integrity of the BRT network, the ridership potential is limited, and the potential impacts to residential properties are high, Phase 1 of this Plan recommends a mixed traffic transitway.

The westernmost corridor segment would serve the planning White Flint MARC commuter rail station in addition to the Metrorail station. During project planning, an alternative alignment along Nebel Street rather than Parklawn Drive should be considered if the at-grade Randolph Road crossing of the CSX tracks is retained.

This corridor has greater ridership potential if land use intensity at Glenmont and White Oak increases.

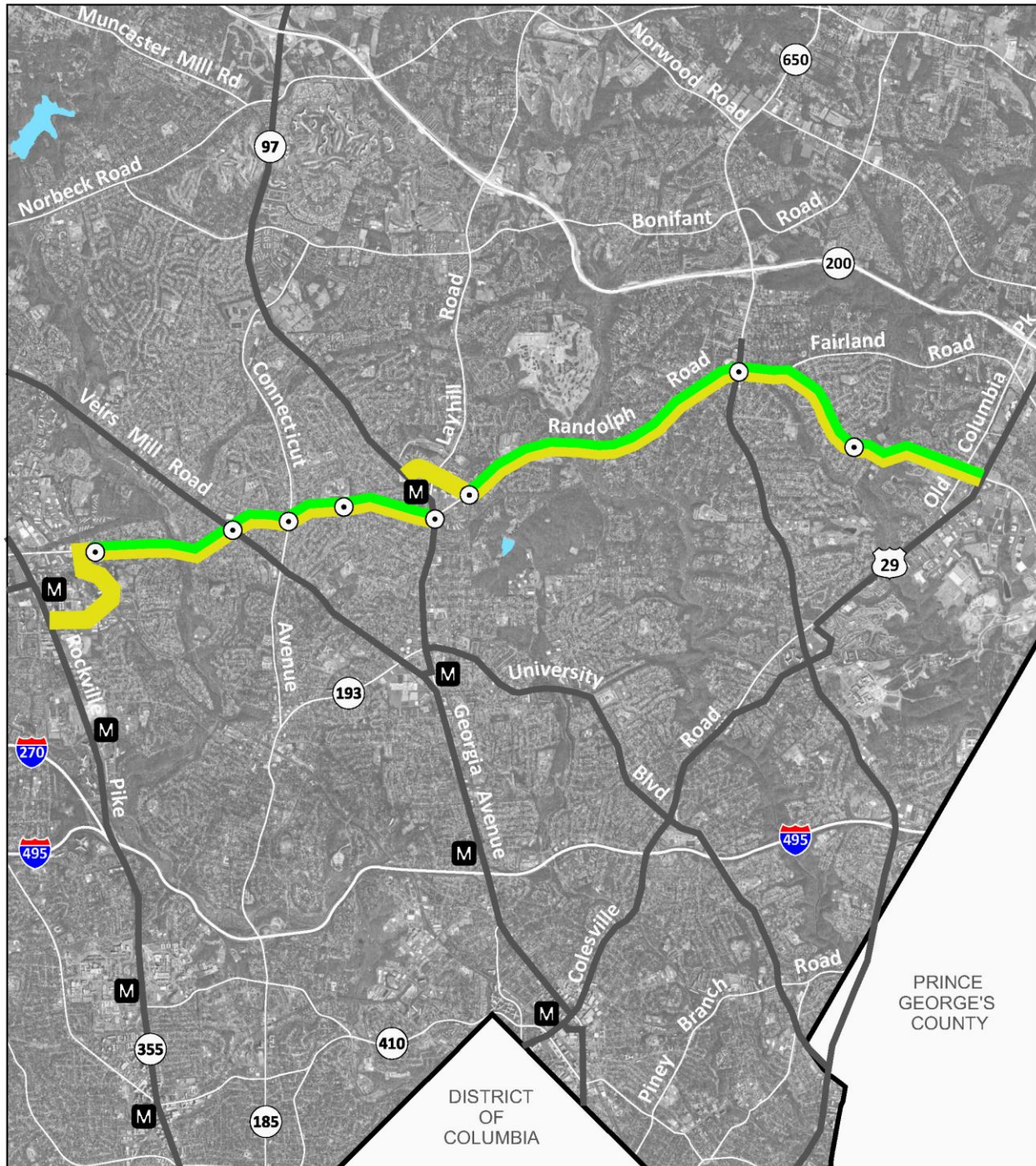
Phase 2 recommendations:

- Along Randolph Road from US 29 to Glenallen Avenue, a reversible one-lane median transitway.
- Along Randolph Road from Georgia Avenue to Parklawn Drive, a reversible one-lane median transitway.

Station Locations

White Flint Metro Station
Randolph Road and Lauderdale Drive
MD 586 and Randolph Road
MD 185 and Randolph Road
Randolph Rd and Bluhill Road
MD 97 and Randolph Road
Glenallen Avenue and Randolph Road
MD 650 and Randolph Road
MD 650 and Fairland Road
US 29 and Tech Road

Map 10 Randolph Road Corridor



Recommended BRT Treatment

-  County Line
-  Mixed Traffic
-  Phase 1: Mixed Traffic
-  Phase 2: One-Lane Median
-  Other BRT Corridors
-  BRT Station
-  Metro Station



Table 10: Corridor Recommendations, Randolph Road

Road	From	To	Existing # of Lanes	Existing Master Plan		Phase 1			Phase 2		
				ROW	Lanes	Treatment	ROW	Lanes	Treatment	ROW	Lanes
Randolph Road	US 29	Paint Branch	4 / 5	80	4-5	Mixed Traffic	80	4-5	Reversible One-Lane Median	100	4 + 1 bus
Randolph Road	Paint Branch	Fairland Rd	4 / 5	80	4-5		80	4-5		100	4 + 1 bus
Randolph Road	Fairland Rd	Glenallen Ave	6	120	6		120	6		141	6 + 1 bus
Glenallen Avenue	Randolph Rd	Layhill Rd	2	80	2		80	2			
Glenallen Avenue	Layhill Rd	Georgia Ave	4	90	2		90	2			
Randolph Road	Georgia Ave	Judson Rd	6	140	6		140	6	Reversible One-Lane Median	143	6 + 1 bus
Randolph Road	Judson Rd	Lindell St	6	120	6		120	6		143	6 + 1 bus
Randolph Road	Lindell St	Veirs Mill Rd	6	120	6		120	6		141	6 + 1 bus
Randolph Road	Veirs Mill Rd	Dewey Rd	5 / 6	120	6		120	6		141	6 + 1 bus
Randolph Road	Dewey Rd	Parklawn Dr	4 / 5	100	4		100	4		119	4 + 1 bus
Parklawn Drive	Randolph Rd	Nebel St	4 / 5	80	4		80	4			
Nicholson Lane	Nebel Str	MD 355	4	90	4		90	4			

Corridor 8: University Boulevard

University Boulevard is a commuter corridor, with traffic flowing westbound in the morning and eastbound in the evening. It has activity centers in Wheaton, Four Corners, Long Branch, and Takoma/Langley Crossroads.

While University Boulevard does not have a very strong ridership, this corridor provides east-west connectivity that is important to the integrity of a network that has many corridors converging in Wheaton. Its duplication with the Purple Line between Piney Branch Road and New Hampshire Avenue is reasonable given the connection to a New Hampshire Avenue transitway and the location of the Takoma/Langley Transit Center at the intersection of New Hampshire Avenue and University Boulevard. Buses will likely not be permitted to share the Purple Line transitway since the benefits for the relatively low ridership on this corridor would likely not outweigh the adverse operational impacts on the Purple Line.

Phase 1 recommendations:

- Along University Boulevard from Georgia Avenue to Colesville Road, a one-lane median reversible transitway.
- Along University Boulevard from Colesville Road to New Hampshire Avenue, a mixed traffic transitway.

Station Locations

Wheaton Metro Station

MD 193 and Amherst Avenue

MD 193 and Inwood Avenue

MD 193 and Arcola Avenue

MD 193 and Dennis Avenue

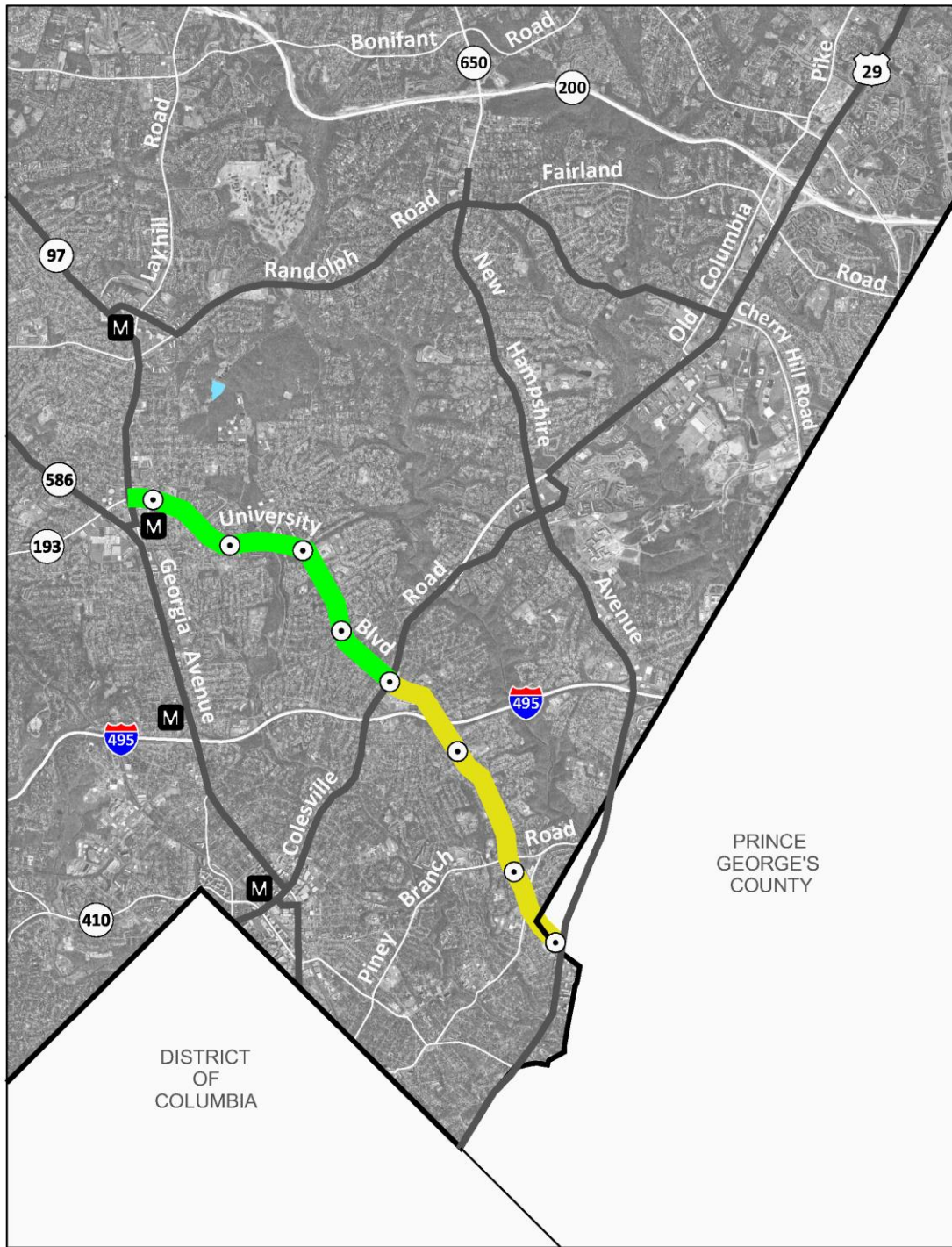
US 29 and MD 193

MD 193 and E Franklin Avenue

MD 193 and Gilbert Street

Takoma/Langley Park Transit Center

Map 11 University Boulevard Corridor



Recommended BRT Treatment

-  County Line
-  One-Lane Median
-  Mixed Traffic
-  Other BRT Corridors
-  BRT Station
-  Metro Station



Table 11: Corridor Recommendations, University Boulevard

Road	From	To	Existing # of Lanes	Existing Master Plan		Phase 1		
				ROW	Lanes	Treatment	ROW	Lanes
University Boulevard	Georgia Ave	Amherst Ave	6	120	6	Reversible One-Lane Median	129	6 + 1 bus
University Boulevard	Amherst Ave	Dayton St	6	150	6		150	6 + 1 bus
University Boulevard	Dayton St	Easecrest Dr	6	120	6		124	6 + 1 bus
University Boulevard	Easecrest Dr	US 29	6	120	6		124	6 + 1 bus
University Boulevard	US 29	Piney Branch Rd	6	120	6	Mixed Traffic	120	6
University Boulevard	Piney Branch Rd	New Hampshire Ave	6	125-140	6 + 2 LRT		125-140	6 + 2 LRT

Corridor 9: US 29

The US 29 corridor is an express corridor north of New Hampshire Avenue and a commuter corridor south of New Hampshire Avenue, with most traffic flowing southbound in the morning and northbound in the evening. Much of the traffic is long distance trips, passing through the corridor on the way to other places. For many people it is an alternative to I- 95, drawing people from northern Montgomery County and Howard County to jobs in the I-270 corridor, the District of Columbia, and Northern Virginia.

US 29 north of the New Hampshire Avenue interchange is classified as a controlled major highway, with interchanges ultimately replacing all existing at-grade intersections. It has a wide median that can accommodate a busway, and the three interchanges —at Randolph Road/Cherry Hill Road, Briggs Chaney Road, and Spencerville Road (MD198)—can all accommodate a median busway. Activity centers in this corridor segment are located in Burtonsville and White Oak.

South of New Hampshire Avenue, US 29 is classified as a major highway and has a very different character, passing through very congested areas in Four Corners and the Silver Spring CBD with very limited opportunities to expand the right-of-way.

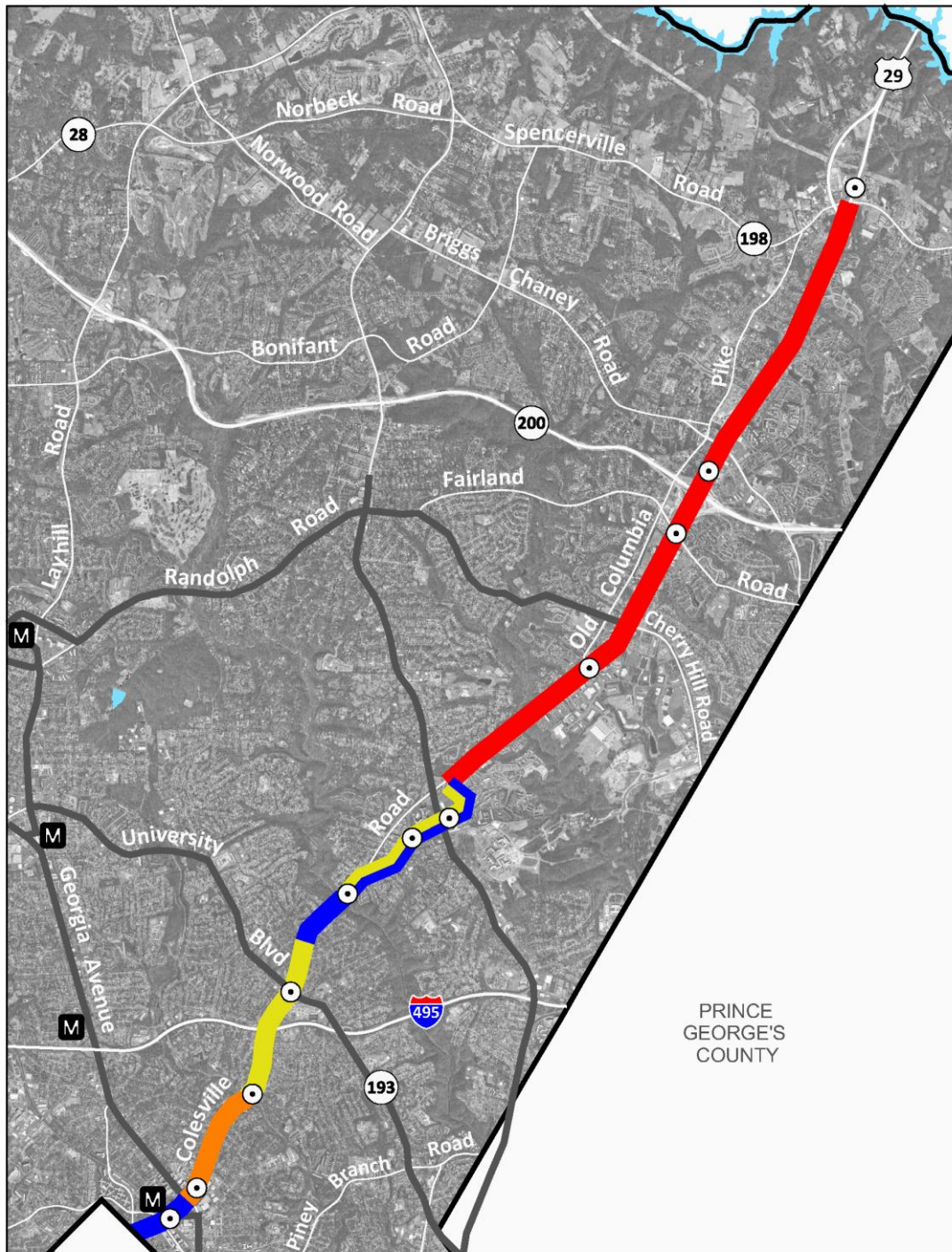
Phase 1 recommendations:

- Along US 29 from MD198 to Stewart Lane, a two-lane median busway.
- Along Stewart Lane and Lockwood Drive, a mixed traffic operation (A mixed traffic operation is recommended along Stewart Lane and Lockwood Drive, but a continuous alignment along US29 should be considered during facility planning.).
- Along US 29 from Lockwood Drive to Southwood Avenue, curb lanes via lane-repurposing (A mixed traffic operation is recommended along US29 from Lockwood Drive to Southwood Avenue because of potential operational problems with curb bus lanes in the vicinity of the I-495 interchange, however the extension of dedicated lanes through this segment should be considered during facility planning.).
- Along US 29 from Southwood Avenue to Sligo Creek Parkway, a mixed traffic operation.
- Along US 29 from Sligo Creek Parkway to Georgia Avenue, managed lanes via lane-repurposing in the peak-hour peak-direction.
- Along US 29 from Georgia Avenue to Sixteenth Street, curb lanes via lane-repurposing.

Station Locations

Burtonsville park-and-ride
Briggs Chaney park-and-ride
US 29 and Fairland Road
US 29 and Tech Road
White Oak Transit Center
Lockwood Drive and Oak Leaf Drive
US 29 and Hillwood Drive
US 29 and MD 193
US 29 and Franklin Avenue
US 29 and Fenton Street
Silver Spring Transit Center

Map 12 US 29 Corridor



Recommended BRT Treatment

- | | | |
|---|---|---|
|  County Line |  Mixed Traffic |  Metro Station |
|  Two-Lane Median |  Phase 1: Mixed Traffic
Phase 2: Curb Lanes |  BRT Station |
|  Managed Lanes |  Other BRT Corridors |  |
|  Curb Lanes | | |

Table 12: Corridor Recommendations, US 29

Road	From	To	Existing # of Lanes	Existing Master Plan		Phase 1			Phase 2		
				r.o.w.	Lanes	Treatment	ROW	Lanes	Treatment	r.o.w.	Lanes
US 29	MD 198	Stewart Ln	6	100-200	6	Two-Lane Median	161-200	6 + 2 bus			
Stewart Lane	US 29	Lockwood Drn	2	80	2	Mixed Traffic	80	2	Curb Lanes	89	2 + 2 bus
Lockwood Drive	Stewart Ln	New Hampshire Ave	2	80	2		80	2		89	2 + 2 bus
Lockwood Drive	New Hampshire Ave	US 29	2	80	2		80	2		89	2 + 2 bus
US 29	Lockwood Dr	Southwood Ave	6	120	6	Curb Lanes	122	4 + 2 bus			
US 29	Southwood Ave	University Blvd	6	120	6	Mixed Traffic	120	6			
US 29	University Blvd (westbound)	University Blvd (eastbound)	6	120	6		120	6			
US 29	University Boulevard (eastbound)	I-495	6	120	6		120	6			
US 29	I-495	Sligo Creek Pkwy	6	120	6		120	6			
US 29	Sligo Creek Pkwy	Spring St	6	120	6	Managed Lanes	120	2 off-peak + 3 peak + 1 bus			
US 29	Spring St	Fenton St	6	120	6		120	2 off-peak + 3 peak + 1 bus			
US 29	Fenton St	Georgia Ave	6	100	6		100	2 off-peak + 3 peak + 1 bus			
Colesville Road	Georgia Ave	East West Hwy	6	124	6	Curb Lanes	125	4 + 2 bus			
Colesville Road	East West Hwy	16th St	6	125	6		125	4 + 2 bus			

* Dedicated lanes are desirable in these segments and the potential for lane-repurposing to achieve curb lanes should be considered during facility planning.

**The six existing general purpose lanes in these segments currently operate during peak hours as four in the peak direction and two in the off-peak direction; in off-peak hours, they operate as three lanes in each direction. This Plan recommends that the operation in peak hours be changed to one dedicated bus lane in the peak direction, three general purpose lanes in the peak direction, and two general purpose lanes in the off-peak direction.

Corridor 10: Veirs Mill Road

Veirs Mill Road is a commuter corridor, with the flow of traffic largely balanced in the eastbound and westbound directions between the two, large central business districts, Wheaton and Rockville. Smaller commercial districts exist at Randolph Road and just west of Twinbrook Parkway. Residential uses fill in much of the rest of the corridor. Service roads that provide access to residential properties exist along many sections of the roadway, consuming a significant part of the right-of-way.

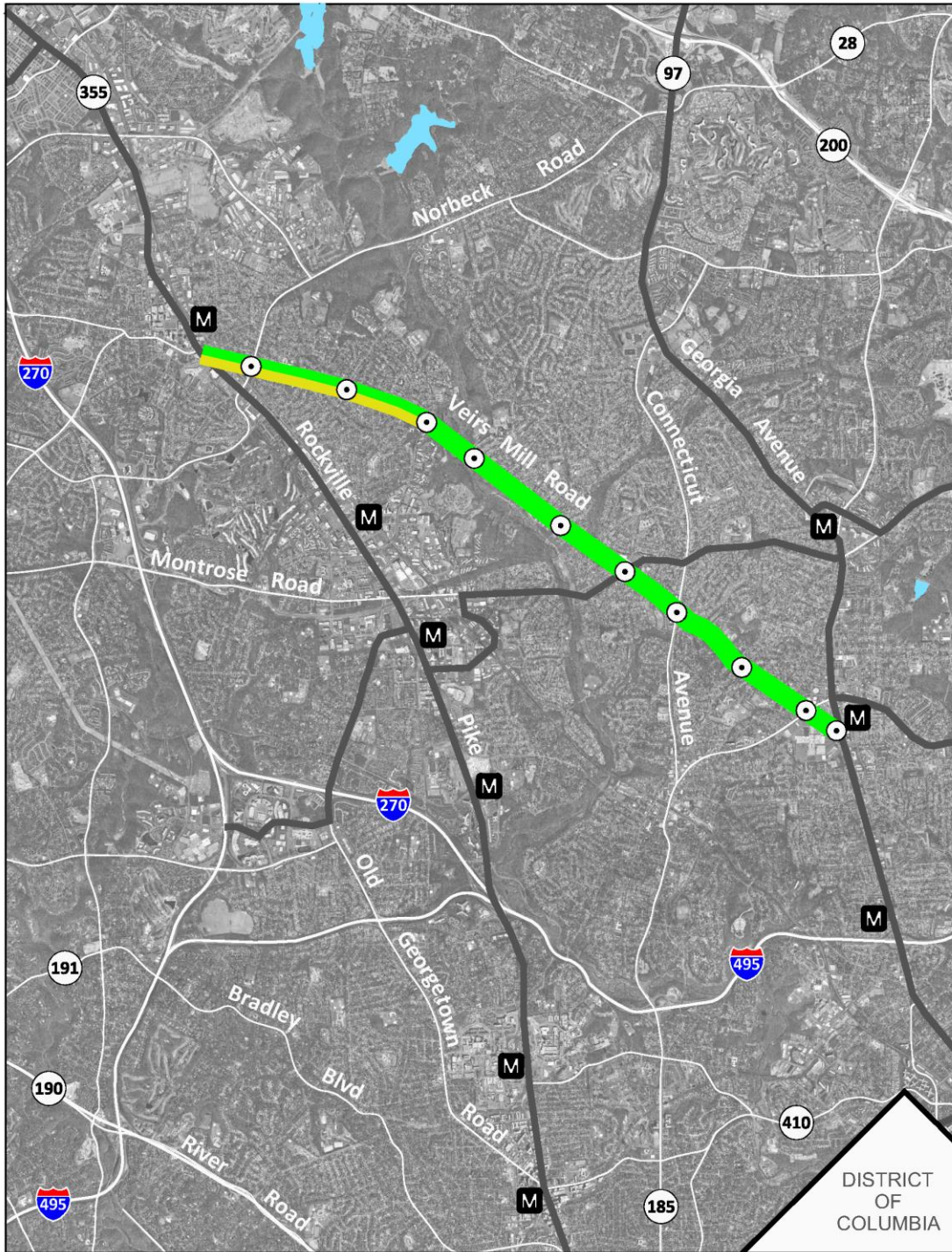
The Veirs Mill Road corridor experiences some of the highest existing transit volumes in Montgomery County and for that reason has long been considered for bus enhancements. However, opportunities to increase ridership are limited because development outside of the CBDs is constrained.

To accommodate a balanced flow of traffic in a constrained right-of-way, this Plan recommends a bi-directional one-lane median transitway. This recommended treatment is unique to this corridor, anticipating that bus travel will be accommodated in both directions in a single lane at the same time. Operational strategies must be determined by the implementing agency, but this plan envisions expanding to a two-way median transitway at stations and/or other designated areas where vehicles operating in opposite directions would be able to pass each other.

Station Locations

Rockville Metro Station
MD 586 and Norbeck Road
MD 586 and Broadwood Drive
MD 586 and Twinbrook Parkway
MD 586 and Aspen Hill Road
MD 586 and Parkland Drive
MD 586 and Randolph Road
MD 586 and MD 185
MD 586 and Newport Mill Road
MD 586 and MD 193
Wheaton Metro Station

Map 13 Veirs Mill Road Corridor



Recommended BRT Treatment

-  County Line
-  One-Lane Median
-  Phase 1: Mixed Traffic
-  Phase 2: One-Lane Median
-  Other BRT Corridors
-  BRT Station
-  Metro Station



Table 13: Corridor Recommendations, Veirs Mill Road

Road	From	To	Existing # of Lanes	Existing Master Plan		Phase 1			Phase 2		
				ROW	Lanes	Treatment	ROW	Lanes	Treatment	ROW	Lanes
Veirs Mill Road	MD 355	Meadow Hall Dr		Rockville		Mixed Traffic			Reversible One-Lane Median	129	6 + 1 bus
Veirs Mill Road	Meadow Hall Drive	Twinbrook Pkwy	5	150	4 to 6	Bi-directional One-Lane Median	150	4 to 6, + 1 bus			
Veirs Mill Road	Twinbrook Pkwy	Parkland Dr	4	150	4 to 6		150	4 to 6, + 1 bus			
Veirs Mill Road	Parkland Dr	Turkey Branch	5	150	4 to 6		150	4 to 6, + 1 bus			
Veirs Mill Road	Turkey Branch	Gridley Rd	5	120	4 to 6		120	4 to 6, + 1 bus			
Veirs Mill Road	Gridley Rd	Randolph Rd	6	120	4 to 6		120	4 to 6, + 1 bus			
Veirs Mill Road	Randolph Rd	Ferrara Ave	5	120	4 to 6		120	4 to 6, + 1 bus			
Veirs Mill Road	Ferrara Ave	Connecticut Ave	6	120	4 to 6		120	4 to 6, + 1 bus			
Veirs Mill Road	Connecticut Ave	Newport Mill Rd	5 + 1 bus	120	4 to 6		120	4 to 6, + 1 bus			
Veirs Mill Road	Newport Mill Rd	Galt Ave	4 + 1 bus	120	4 to 6		120	4 to 6, + 1 bus			
Veirs Mill Road	Galt Ave	Ennalls Ave	5 + 1 bus	120	6		129	4 to 6, + 1 bus			
Veirs Mill Road	Ennalls Ave	Wheaton Metro Station	4	120	6		129	4 to 6, + 1 bus			

Setting Implementation Priorities for Transit Corridor Improvements

This Plan does not change any recommended land uses and therefore does not include a staging amendment to set priorities for the public facilities needed to support them. Instead, this Plan recommends the following approach for prioritizing transit corridor improvements, as well as coordinating land use in future area master plans.

Existing bus ridership will provide the base for at least the initial phases of BRT service and is an important consideration in addition to future forecast ridership, achieving the mode share goals in area master plans and the availability of right-of-way. Therefore, the highest priority for implementation in the near-term should be given to corridors with the highest existing bus ridership, particularly those where lane repurposing is recommended and corridor improvements can be constructed most quickly. These corridors are generally within the Urban Ring and their high ridership will provide the greatest immediate benefit to existing transit riders and accommodate latent demand, thereby providing support for future improvements and extensions. The southern segments of US 29 and New Hampshire Avenue best meet these criteria.

The other high priority transit corridor is MD 355, which has a high level of planned development and which, along with the Corridor Cities Transitway, serves the other major growth area defined by the General Plan, the I-270 Corridor. The MD 355 corridor has the highest 2040 forecast peak-hour BRT ridership and also has the highest potential for all-day BRT service. Where additional bus lanes are recommended along MD 355, more extensive facility planning should begin as soon as possible to define detailed right-of-way needs and facilitate coordination with the affected property owners. The MD 355 corridor has the greatest long-term potential for the County's BRT network.

Where area master and sector plans are updated along the recommended transit corridors, consideration should be given to increasing the level of development density around station areas where employees and residents can most benefit from the BRT system and transit ridership. Close coordination between transit facilities and planned development will significantly reduce the transit subsidies needed to achieve high-quality transit service.

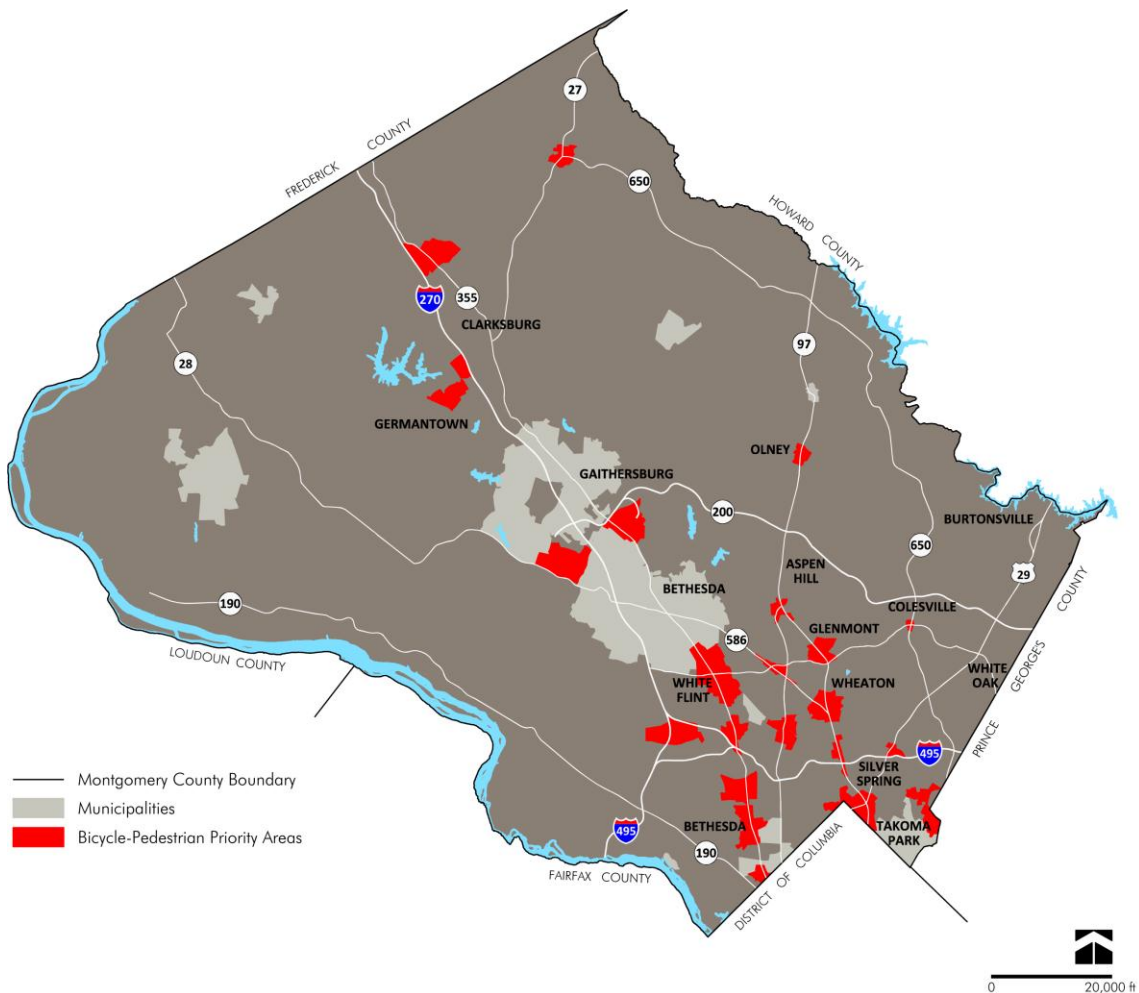
Bicycle Pedestrian Priority Areas

Good bicycle and pedestrian access is needed to all BRT stations. The highest level of accommodation for pedestrians and bicyclists is needed in the areas where pedestrians are most prevalent, such as transit-oriented development areas, established or developing activity centers, areas around Metro stations, and transfer points between BRT routes. This plan recommends designating new Bicycle-Pedestrian Priority Areas (BPPAs) to enhance the access to BRT.

Section 2-604 of the Annotated Code of Maryland allows the designation of Bicycle-Pedestrian Priority Areas (BPPAs) in the State's *Bicycle-Pedestrian Master Plan*, if jointly agreed to by the State and local jurisdiction. BPPAs are defined in Section 8-101(d): "Bicycle and pedestrian priority area" means a geographical area where the enhancement of bicycle and pedestrian traffic is a priority.

The legislation is intended to promote better pedestrian and bicyclist accommodation in these priority areas. Appendix 6 details what accommodation should be provided in BPPAs. The White Flint and Wheaton CBD Sector Plan areas have been designated in the Plans as BPPAs and White Flint has been confirmed by the State.

Map 14 Bicycle-Pedestrian Priority Areas



This Functional Plan designates all current Road Code-defined Urban areas as additional BPPAs:

- Silver Spring CBD Sector Plan area
- Twinbrook Sector Plan area
- Bethesda CBD Sector Plan area
- Friendship Heights Sector Plan area
- Glenmont Metro Station Policy area
- Grosvenor Metro Station Policy area
- Shady Grove Metro Station Policy area
- Olney Town Center
- Clarksburg Town Center
- Germantown Town Center
- Damascus Town Center
- Montgomery Hills
- Flower/Piney Branch
- Cloverleaf District
- LSC Central, LSC West, LSC North, and Belward Districts in the Great Seneca Science Corridor.

The Takoma/Langley Crossroads and Kensington Sector Plan areas are defined in their respective plans.

This Plan also designates proposed BRT station areas as BPPAs where there is sufficient planned density to generate significant pedestrian and bicyclist activity (see Maps 15 through 23):

- Montgomery Mall/Rock Spring
- Piney Branch/University Boulevard Purple Line Station area
- Medical Center Metro Station area, including the NIH and NNMC campuses
- Veirs Mill Road/Randolph Road
- Aspen Hill (Georgia Avenue/Connecticut Avenue)
- Colesville (Randolph/New Hampshire)
- Forest Glen Metro Station area (contiguous with Montgomery Hills)
- Silver Spring CBD West (west of 16th Street to Rosemary Hills Drive, plus Spring Center)
- Four Corners.

The designation of additional BPPAs should be considered as part of future master and sector plan updates.

Ensuring Pedestrian Safety and Accessibility

The typical sections used to determine recommended rights-of-way:

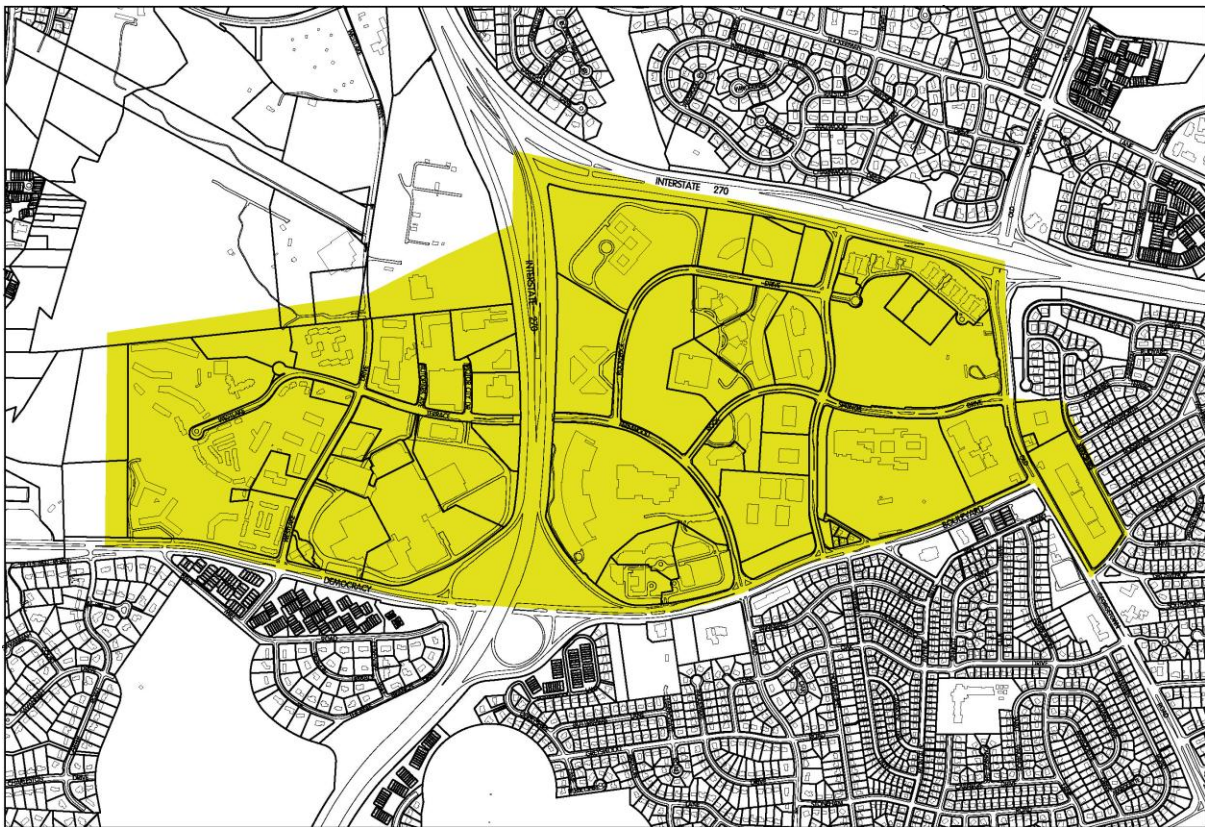
- include six-foot-wide minimum sidewalks to ensure good pedestrian accommodation to and from all stops along transit corridors
- include a six-foot-wide median to accommodate a pedestrian refuge to ensure that transit patrons can safely cross the roadway to and from transit stops and that the general public can safely cross the roadway at all intersections
- include landscape buffers of a sufficient width to achieve sidewalks and handicap ramps that can meet ADA Best Practices.

Bike Accommodation

This Plan supports the provision of on-road accommodation for bicyclists on all the recommended transit corridors, but right-of-way constraints limit the ability to achieve this goal on some corridor segments (see Appendix 5).

- Where a facility for bicyclists is already recommended in a master plan, the appropriate space is included in the recommended right-of-way recommendations.
- Where on-road bicyclists can reasonably be accommodated on additional corridors, this Plan includes the appropriate space in the recommended right-of-way.
- Where constraints limit the ability to achieve the on-road bike accommodation beyond what is recommended in current master plans, this Plan identifies the alternative recommended bike accommodation for each corridor segment.

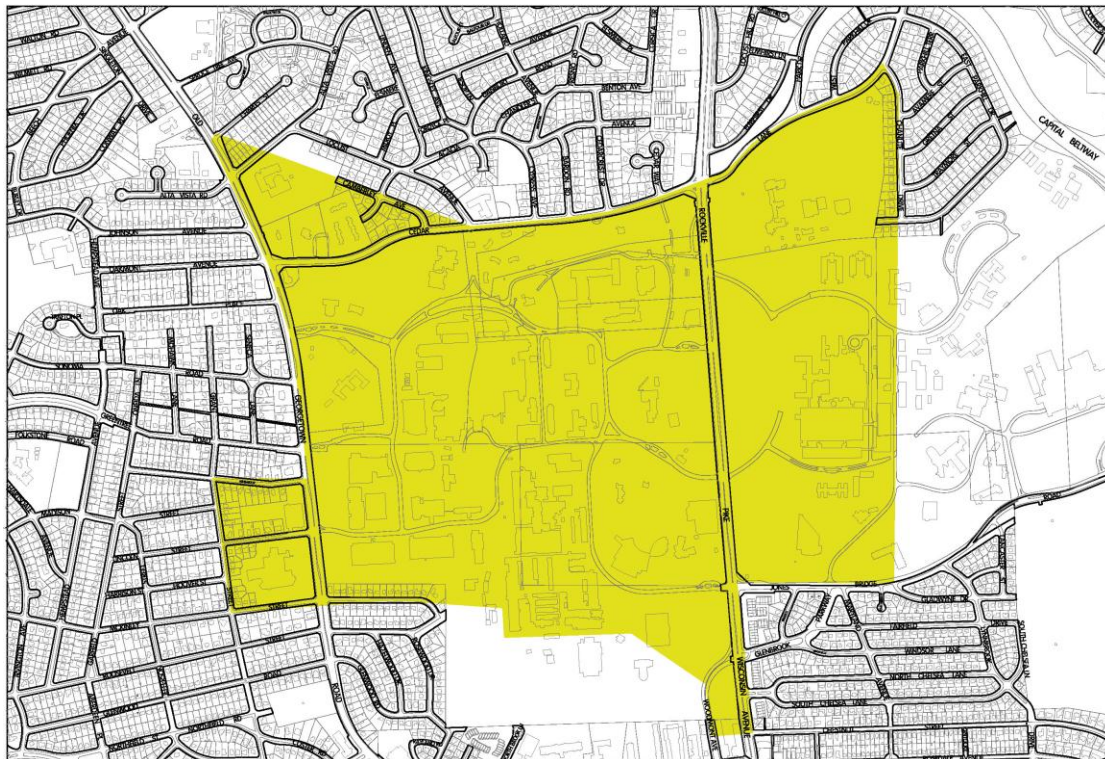
Map 15 Montgomery Mall/Rock Spring BPPA



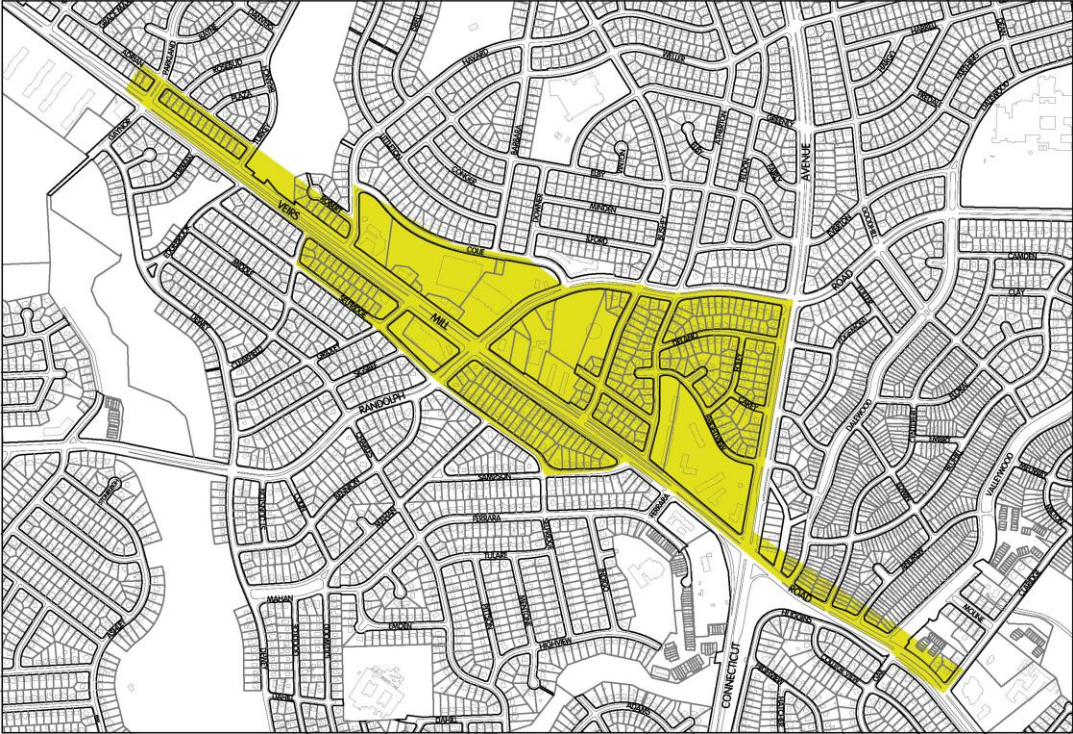
Map 16 Piney Branch/University Boulevard Purple Line Station Area BPPA



Map 17 Medical Center Metro Station Area BPPA
(includes NIH and NNMCC campuses)



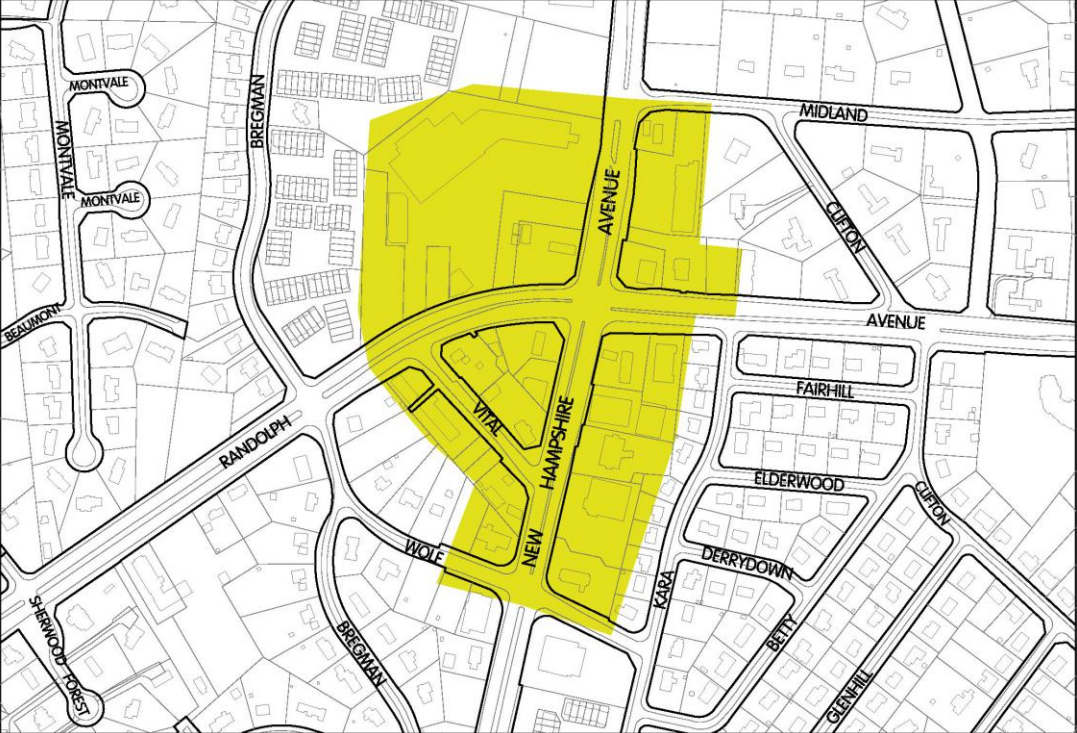
Map 18 Veirs Mill Road/Randolph Road BPPA



Map 19 Aspen Hill BPPA



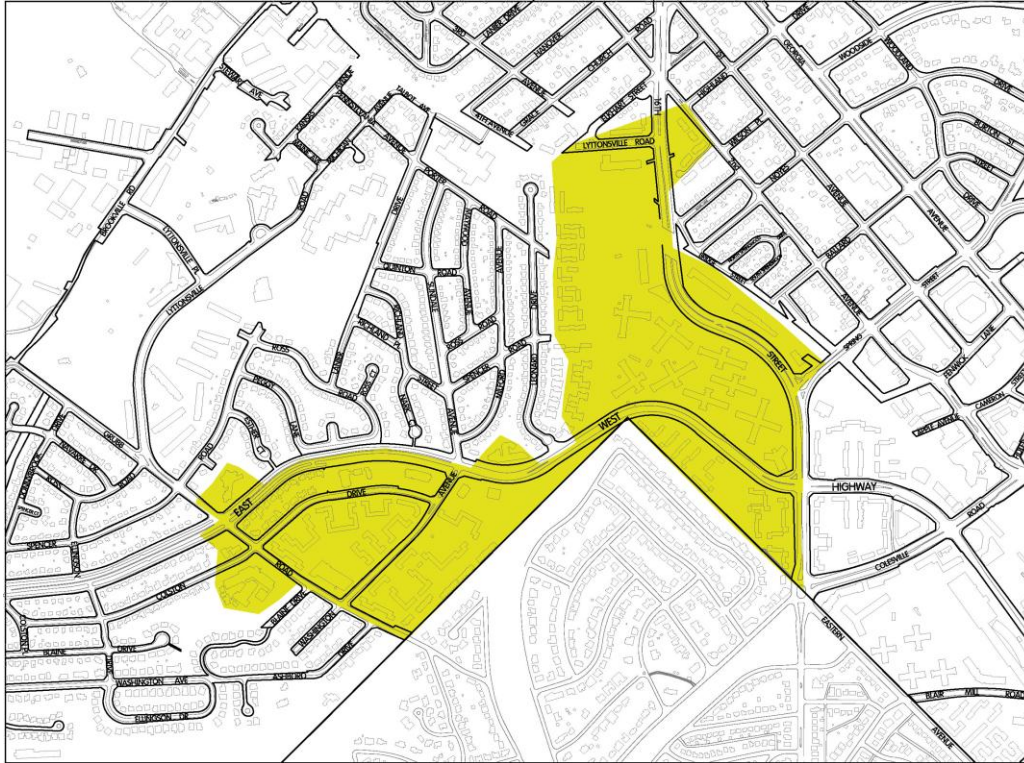
Map 20 Colesville BPPA



Map 21 Forest Glen Metro Station Area BPPA



Map 22 Silver Spring CBD West BPPA



Map 23 Four Corners BPPA



MARC Brunswick Line Expansion

MARC commuter rail's Brunswick Line serves the broadest regional transportation function of the County's transit network, performing a similar function as that of an interstate highway in the roadway network. It has 7,000 daily passengers and serves eleven stations in Montgomery County while connecting West Virginia and Frederick County, MD with Washington, D.C. The Brunswick Line also connects to five of the transit corridors recommended in this Plan—MD 355, Veirs Mill Road, Randolph Road, Georgia Avenue, and US29/Colesville Road—as well as to the Corridor Cities Transitway, Purple Line, and Metrorail Red Line.

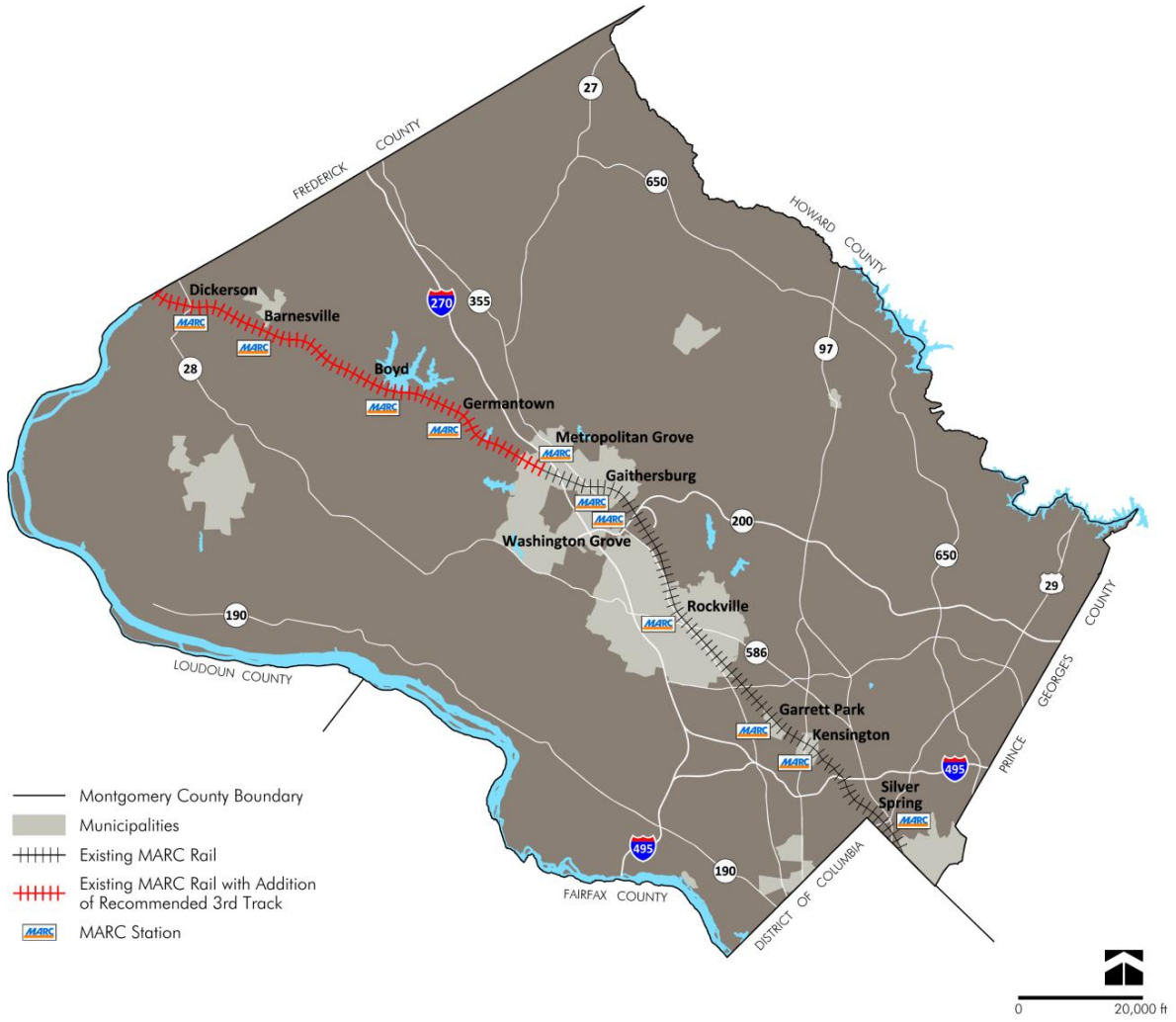
This Plan recommends that a third track be constructed on the Brunswick Line between the Frederick County line the Metropolitan Grove station to reduce conflicts with freight service and enabling the expansion of MARC service. This additional capacity would accommodate a tripling of ridership and include:

- more frequent service
- all-day service
- weekend service
- one-seat rides to Northern Virginia
- service to planned MARC stations at Shady Grove and White Flint.

This MARC expansion to full-time service will improve east-west connectivity across the County, connecting with the rest of the transit network recommended by this Plan and increasing its utility for County residents and commuters.

This Plan includes the third track as a Phase 1 recommendation, but the right-of-way necessary to accommodate this expansion should be determined during project planning and confirmed in future area master plan updates as a Phase 2 recommendation.

Map 24 MARC Brunswick Line Expansion



Countywide Transit Corridors Functional Master Plan

Staff Draft

March 2013

Logo

Montgomery County Planning Department

M-NCPPC

MontgomeryPlanning.org

Bar code: 0313000007