Transportation Appendix

Contents

Figures:

Tables:

Introduction

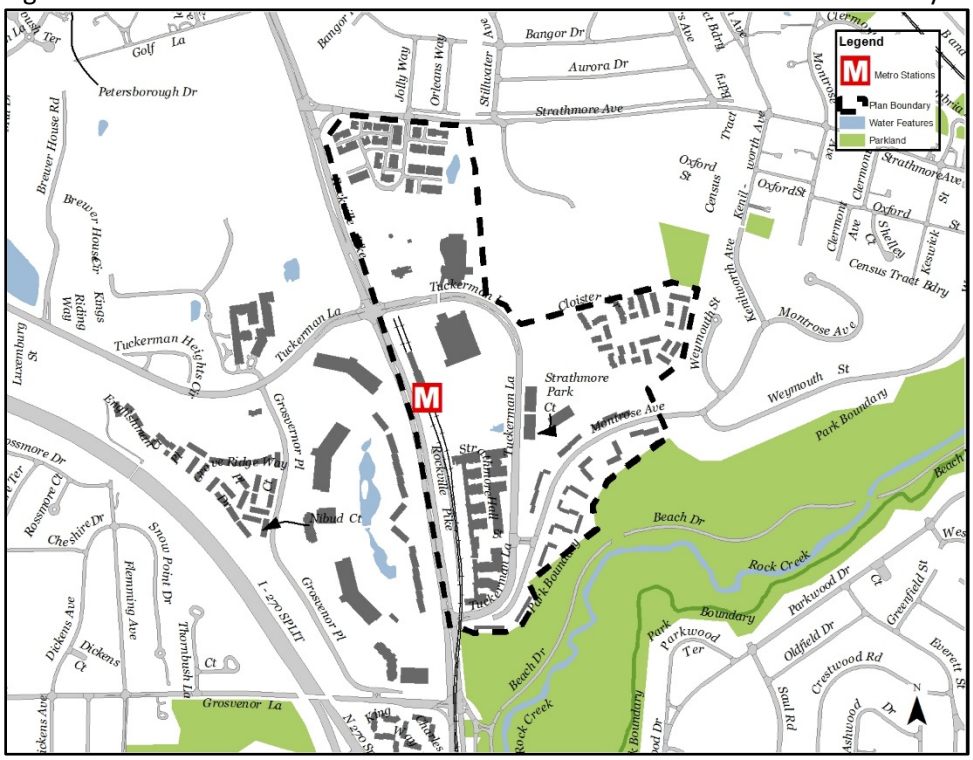
This appendix summarizes the transportation methodology and analysis behind the transportation recommendations included in the Mobility Chapter of the Grosvenor-Strathmore Metro Area Minor Master Plan. The Plan recommends improved access and overall connectivity through the horizon year (2040) to promote a safe and efficient multimodal transportation system that will serve the Plan area and connect to the White Flint, Rock Spring and Downtown Bethesda areas.

The Plan Area

The Grosvenor-Strathmore area is an unincorporated community in Montgomery County, Maryland, typically associated with Strathmore Music Center and the Grosvenor-Strathmore Metro Station on the Washington Metropolitan Area Transit Authority (WMATA) Red Line Metrorail. The Red Line connects the Plan area to major employment centers in the Washington, DC region. The area is also serviced by buses operated by WMATA (Metrobus) and Montgomery County (Ride On Bus). It is well connected to freeways, major highways, and local streets. The Plan area includes the neighborhoods surrounding the Grosvenor-Strathmore Metro Station.

The Grosvenor-Strathmore area is well served by highways and local roads. Access to the Plan area is provided by the eastern looping segment of Tuckerman Lane, which has two intersections with Rockville Pike. Within the Plan area, there is a network of residential streets, which connect to the Garrett Park and Kensington neighborhoods by bicycle and pedestrian pathways.

Figure 1. Grosvenor-Strathmore Metro Area Minor Master Plan Area Boundary



Transportation Analysis

The transportation analysis informs the Master Plan recommendations by assessing whether the transportation network can support future development. The analysis includes traffic forecasting from recent and concurrent master plans in the area as well as input from residents.

Planning staff met with residents to identify local issues and concerns. A list of local issues, as well as a report on existing conditions and traffic counts, were compiled in advance of the traffic analysis.

Traffic Counts

Residents identified several intersections where they experienced significant traffic congestion, especially during events at the Strathmore Music Center. Traffic counts were performed during weekday morning and evening peak hours as well as on Saturday and Sunday around Strathmore events.

1. Rockville Pike at Tuckerman Lane (northern)
2. Rockville Pike at Strathmore Avenue
3. Rockville Pike at Tuckerman Lane (southern)
4. Grosvenor Lane at Rockville Pike
5. Tuckerman Lane at Cloister Drive
6. Tuckerman Lane at Strathmore Hall Street
7. Tuckerman Lane at Strathmore Hall Entrance
8. Montrose Avenue at Strathmore Hall Street

The counts showed that traffic was not at or near the capacity of the roadway. The intersections were not experiencing levels of delay that reach the thresholds that trigger intersection improvements.

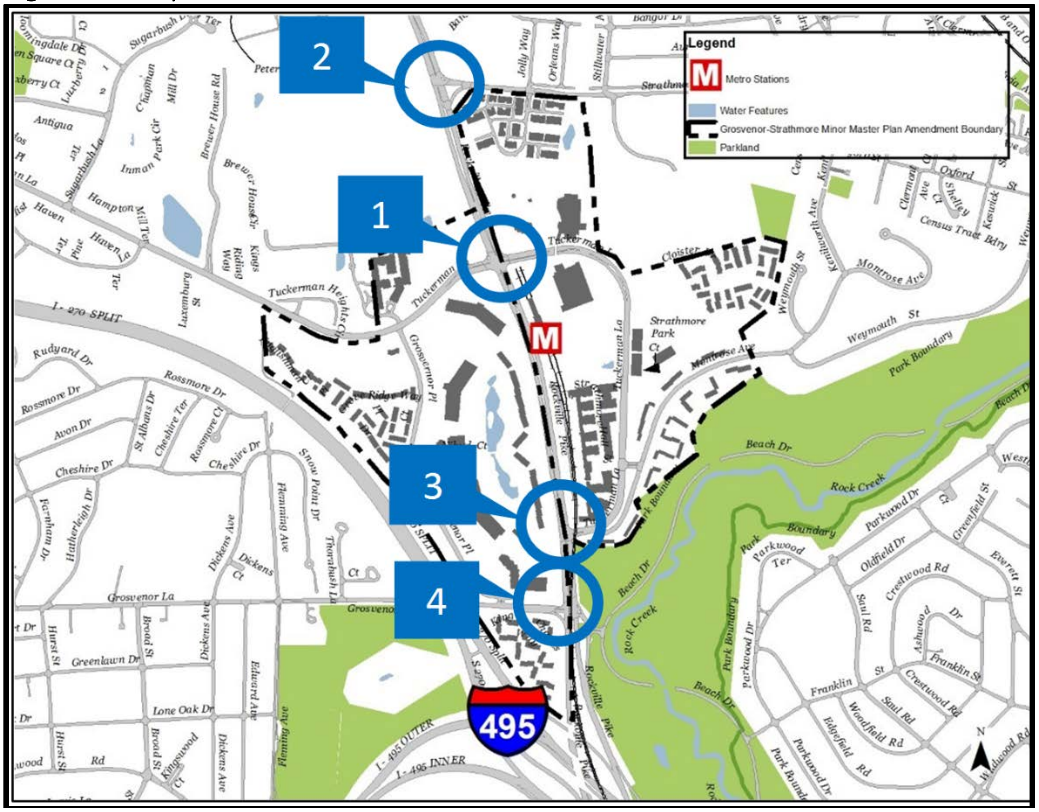
Traffic Analysis

The Plan's traffic analysis assesses the traffic impacts of potential new development and suggests potential mitigation strategies to determine what level of development the transportation network can accommodate. The traffic analysis examined current traffic conditions and forecasted impacts on traffic for various development scenarios in the year 2040.

The analysis assessed intersection system performance for the year 2040 using the Department's regional travel demand model (referred to as Travel/4, a Montgomery County-focused adaptation of MWCOG's regional travel demand modeling tool), NCHRP 765 post-processing assessments, and delay-based Highway Capacity Manual (HCM) techniques as generally used to implement the County's Subdivision Staging Policy (SSP) as described in the Planning Board's 2017 Local Area Transportation Review Guidelines (LATR).

The methodology used to evaluate transportation system network performance is established by the County's SSP. The Plan area is in the Grosvenor Metro Station Policy Area (MSPA), and the North Bethesda Policy Area. The intersection congestion standards for signalized intersections in these policy areas are a volume/capacity (V/C) ratio of 1.13 and 0.97, respectively (using the Highway Capacity Manual method), which translates to an average vehicle delay of 120 and 71 seconds per vehicle,

Figure 2. Study Intersections



respectively. Figure 2 shows the four intersections adjacent to the Plan area along Rockville Pike (MD-355) that were analyzed for future traffic conditions.

Transportation Analysis Summary

- The transportation analysis for the Plan is predicated on the Grosvenor MSPA congestion standard.
- Highway Capacity Manual (HCM) analysis was performed at four intersections with selected land use density scenarios ranging between 2.0 and 3.0 FAR.
- FAR 2.5 and FAR 3.0 land use scenarios were evaluated in depth using the HCM analysis process. As appropriate, mitigation strategies were applied in order achieve adequate level of service at the four intersections under study.
- Intersections 1, 2, 3 and 4 achieved an adequate level of service in the context of the FAR 2.5 and FAR 3.0 land use scenarios with the application of selected mitigation strategies.

Regional Travel Demand Model Background Analysis Assumptions

The Master Plan traffic analysis took into account the following background assumptions:

- *White Flint Sector Plan* area – Year 2030 land use forecast (developed by the White Flint Partnership) used in support of the White Flint traffic impact studies performed by MCDOT and the White Flint Partnership after the adoption of the Sector Plan in 2010.

- White Flint 2 Sector Plan area – Planning Board Draft Plan (July 2017) recommended land use scenario.

- Rock Spring Master Plan area – Planning Board Draft Plan (March 2017) recommended land use (including the 309 residential units proposed at the WMAL site located south of the Plan area).

- Metropolitan Washington Region - Year 2040 MWCOG Round 8.3 Cooperative land use forecast for the areas beyond those referenced above.
  - For the Washington DC region, the Round 8.3 forecast assumes an increase from 3.9 million employees and 2.5 million households in 2010 to 5.6 million employees and 3.4 million households in 2040.
  - For Montgomery County (including the cities of Rockville and Gaithersburg), the Round 8.3 forecast assumes and increase from 666,100 employees and 408,200 households in 2010 to 895,300 employees and 527,900 households in 2040.

- Transportation improvements in the region's Constrained Long Range Plan (CLRP).

Traffic Analysis Results

The results of the traffic analysis pertaining to four land use/transportation scenarios are summarized in Table 1. These scenarios are briefly described as follows:

- 2016 Existing Conditions – Year 2016 existing land use in combination with the existing regional transportation network.

- 2040 FAR 2.0 without Mitigation – "Low" level Plan area development (generally reflecting the land use recommendation in the 1992 *North Bethesda-Garrett Park Master Plan*) in combination with regional development and a transportation network reflecting a year 2040 planning horizon (with no Plan area transportation mitigation strategies assumed).

- 2040 FAR 2.5 with Mitigation – "Moderate" level Plan area development in combination with regional development and a transportation network reflecting a year 2040 planning horizon (with Plan area transportation mitigation strategies assumed).

- 2040 FAR 3.0 with Mitigation - "Higher" level Plan area development in combination with regional development and a transportation network reflecting a year 2040 planning horizon (with Plan area transportation mitigation strategies assumed).

The results of the analysis indicate that all four intersections evaluated are projected to operate adequately in the context of the FAR 2.5 or FAR 3.0 land use scenarios with the application of the appropriate combination of the following mitigation strategies:
Additional dedicated turn lanes;

- Turn lane pockets;
- Extension of turn lanes;
- Modification of right turn lane curvature for pedestrians and/or;
- Redistribution of turn lane traffic.

Table 1. Highway Capacity Manual (HCM) Delay Analysis

AM	2016 Existing	2040 FAR 2.0 with no Mitigation	2040 FAR 2.5 with Mitigation	2040 FAR 3.0 with Mitigation*
Intersection	Delay in Seconds			
Strathmore & MD355	73.4	136.8	67.5	70.8
Tuckerman Lane (north) & MD 355	51.7	93.0	86.6	92.1
Tuckerman Lane (south) & MD 355	8.4	10.9	20.0	19.5
Grosvenor Lane & MD355	79.2	119.6	57.1	42.6
PM				
Strathmore & MD355	76.9	161.8	73.6	72.2
Tuckerman Lane (north) & MD 355	96.7	162.7	116	118.7
Tuckerman Lane (south) & MD 355	10.5	16.2	22.2	23.2
Grosvenor Lane & MD355	57.3	63.8	29.1	29.2

* Reflects the results of the HCM analysis performed independently by private development interests in the Plan area.

The application of these potential mitigation strategies is described and depicted in Figures 3 through 5 below.

Non-Auto Driver Mode Share (NADMS)

The NADMS is a measure of the percentage of travelers in the Grosvenor-Strathmore Master Plan area who use modes of travel other than the single-occupant motor vehicle (i.e., transit, carpooling, walking and biking). The Plan assumes the NADMS for peak period trips to work in the planning area will increase from 39% to 45% at buildout with the implementation of single-occupant motor vehicle travel reduction mitigation strategies.

Figure 3. Intersection 2: MD355 at Strathmore Avenue

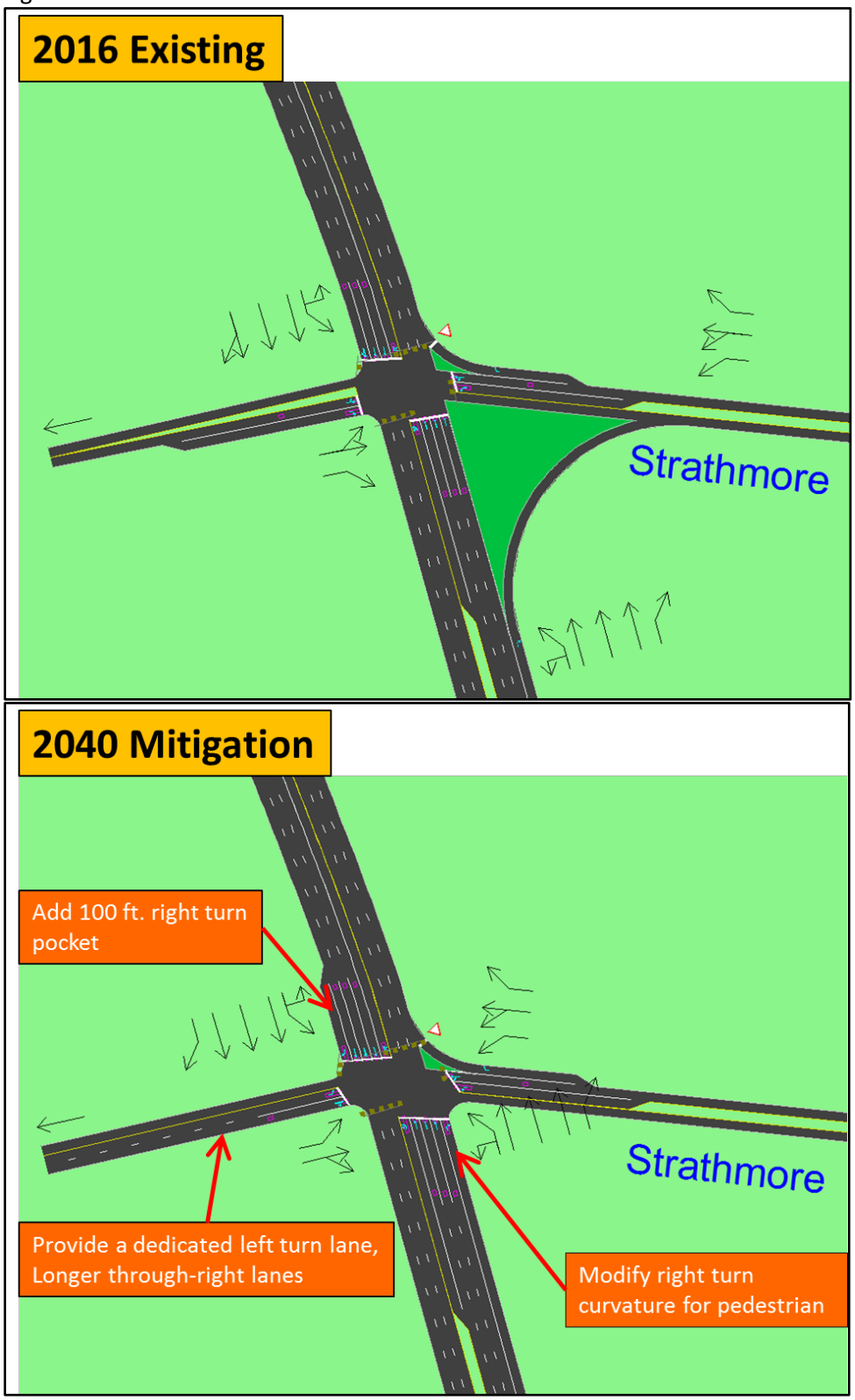


Figure 4. Intersection 1: MD355 at Tuckerman Lane North

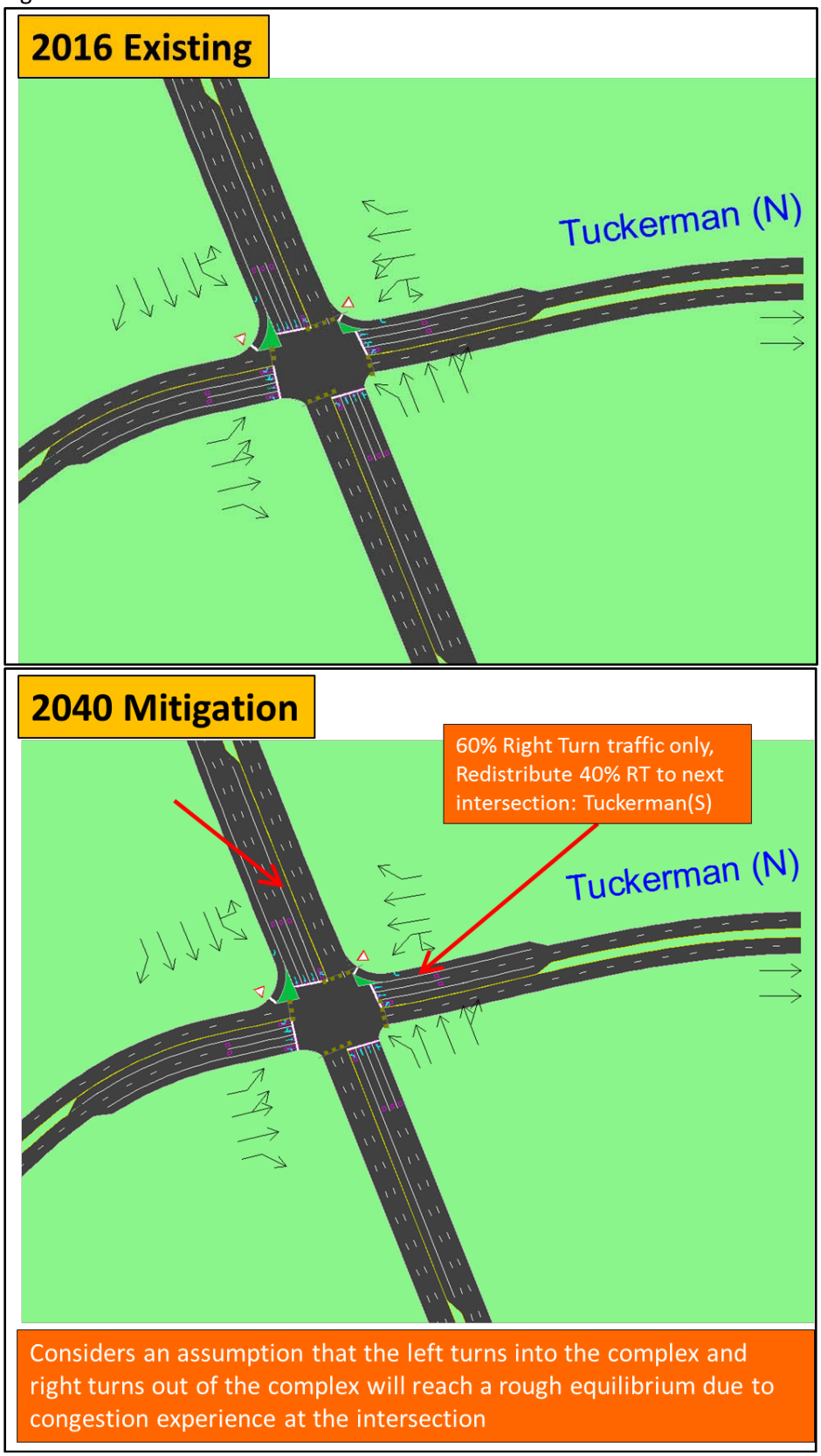
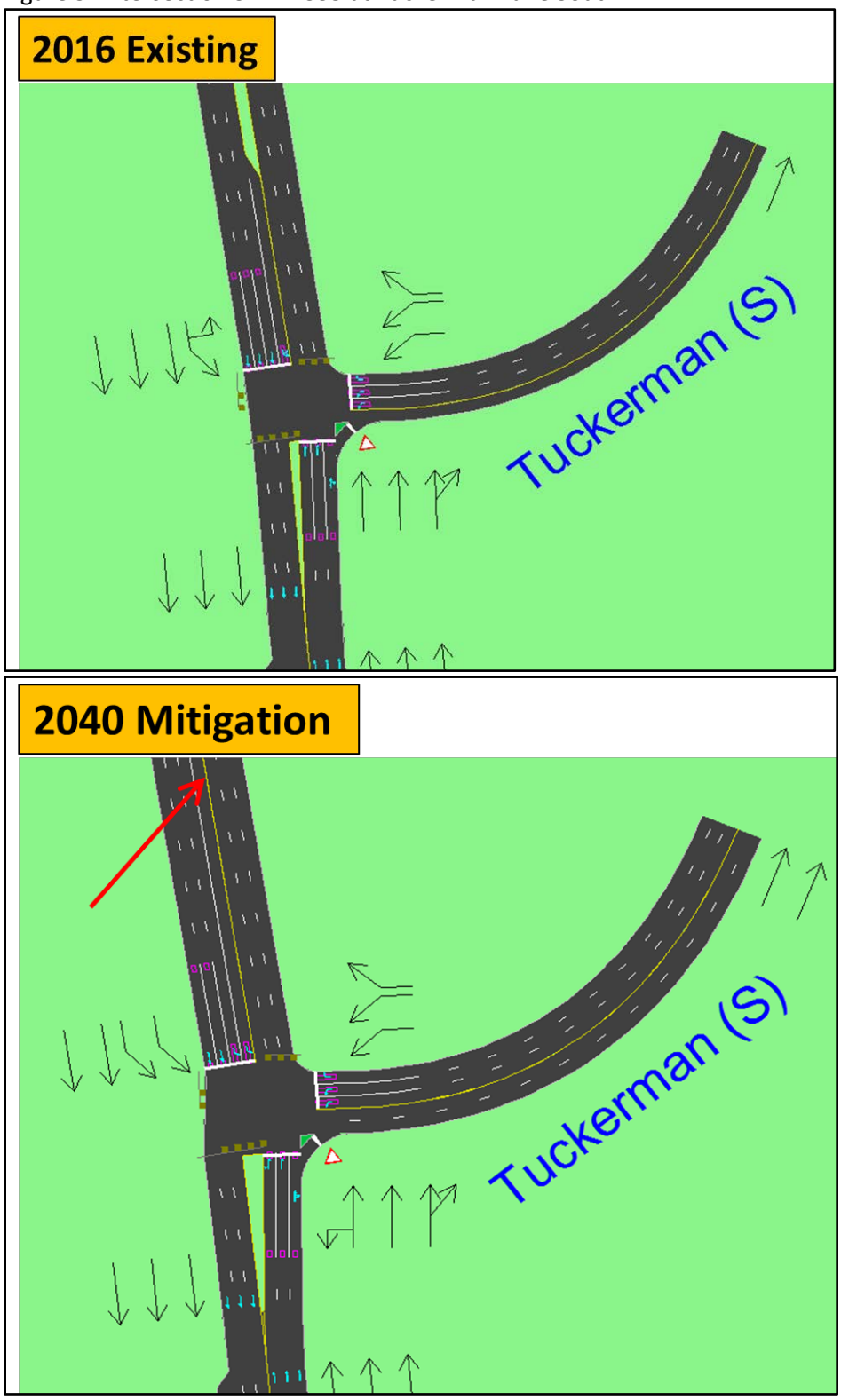


Figure 5: Intersection 3: MD355 at Tuckerman Lane South



Multi-Modal Transportation Adequacy Test

The 2016-2020 SSP changed the LATR test of new subdivisions and created a multi-modal transportation adequacy test. The new process expands the application of delay-based Highway Capacity Manual (HCM) methodology to evaluate the performance of local intersections. In addition, the new procedures have been introduced to evaluate the adequacy of transit, pedestrian, and bike facilities for new development. For regulatory purposes, the planning staff uses the LATR guidelines to help ensure that development in Montgomery County is accompanied by appropriate and sufficient transportation facilities. The Planning Board and planning staff use the guidelines to estimate the impacts of development on the transportation network and determine effective ways to mitigate that impact.

The Master Plan requires that a new traffic study analyze the adequacy of the road network before the full build out of the recommended growth in the Plan. An additional traffic study must be submitted for construction of any development on the Metro site in excess of 1.6 million square feet.

Transit

Bus Transit

The 6, 37, 46 and 96 Ride On Bus Routes serve the Plan area. The WMATA Metrobus J-5 route has been discontinued.

Figure 6. Bus Routes (Source: WMATA)

Figure 7. Existing Bus Stops

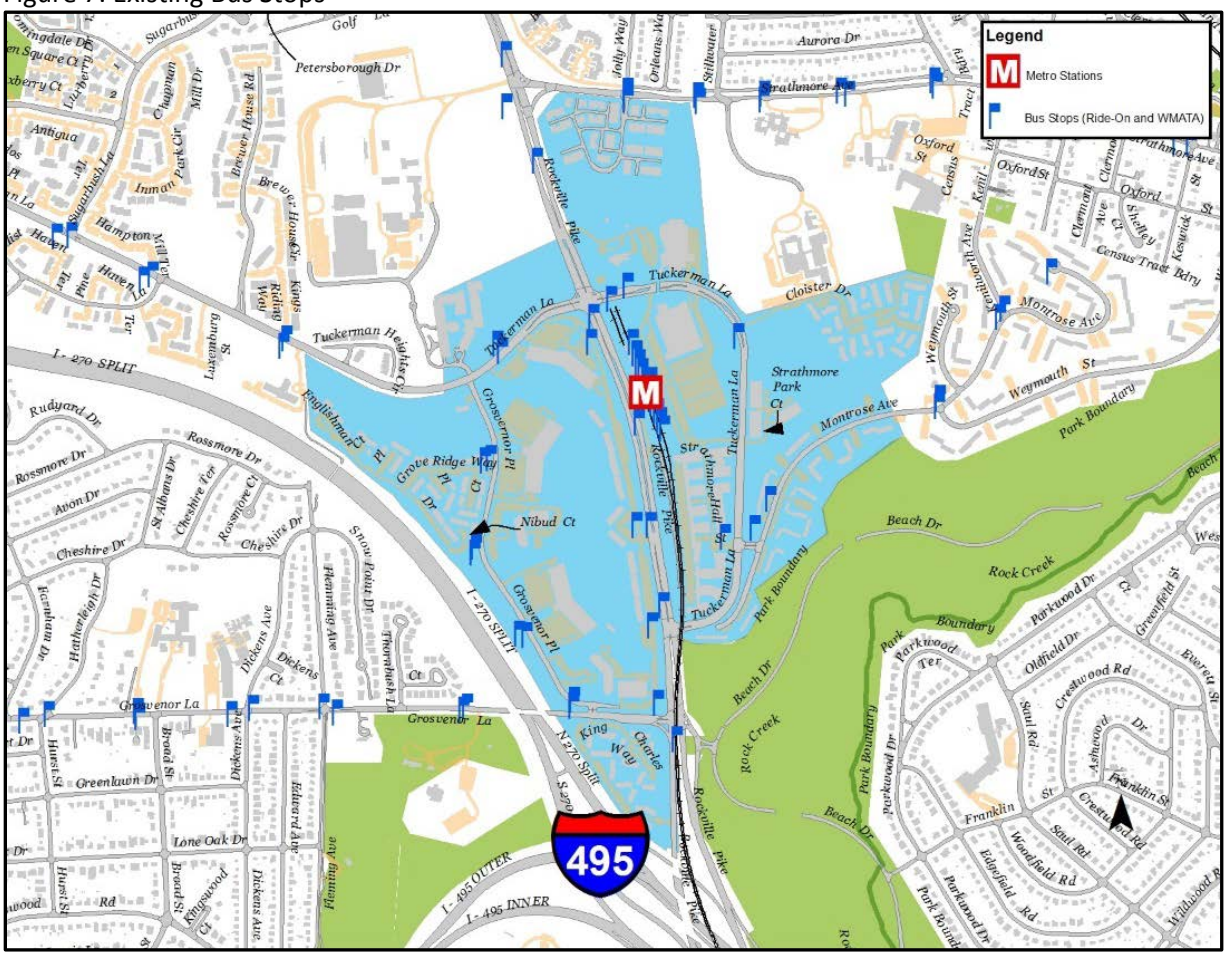


Table 2. Transit Routes by Ridership

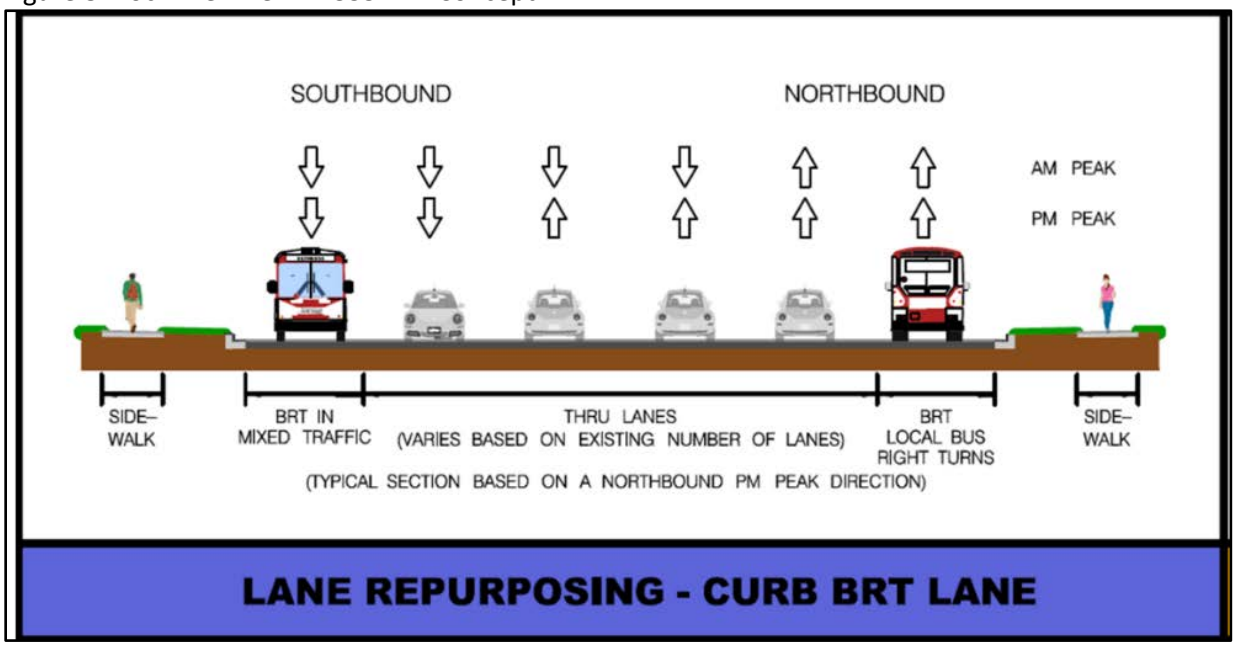
Rank	Route	Average Weekday Ridership (2015)	Name	Destination	Peak Hour Headways
1	Grosvenor-Strathmore Metrorail	5,557	Metrorail Redline	Shady Grove/Glenmont via Downtown DC	6 min
2	Ride-On – 46	3,812	46	Shady Grove/Montgomery College/ Rockville Pike/Medical center	20 min
3	Ride-On – 96	599	96	Montgomery Mall/Rock Spring/Grosvenor	10 min
5	Ride-On – 37	295	37	Potomac /Tuckerman La /Grosvenor/Wheaton	25 min
6	Ride-On – 6	253	6	Grosvenor/Parkside/Montgomery Mall Loop	30 min
7	Rock Spring Park Express	200+	Rock Spring Park Express	Grosvenor-Strathmore Metro Station/Rock Spring Office Park	10 min

Bus Rapid Transit

The 2013 *Countywide Transit Corridors Functional Master Plan* recommends a bus rapid transit (BRT) facility on Rockville Pike (MD-355 South Corridor) with a maximum of two transit lanes within a minimum right-of-way of 162 feet. The proposed BRT is not expected to be operational in the near future. When implemented, the BRT system is expected to improve travel time for transit users and it may attract new riders that would otherwise drive. Over half of the projected riders of the BRT network are anticipated to be new transit users.

The 2013 *Countywide Transit Corridors Functional Master Plan* amended the Master Plan of Highways, and renamed it the Master Plan of Highways and Transitways (Resolution No.: 17-952).

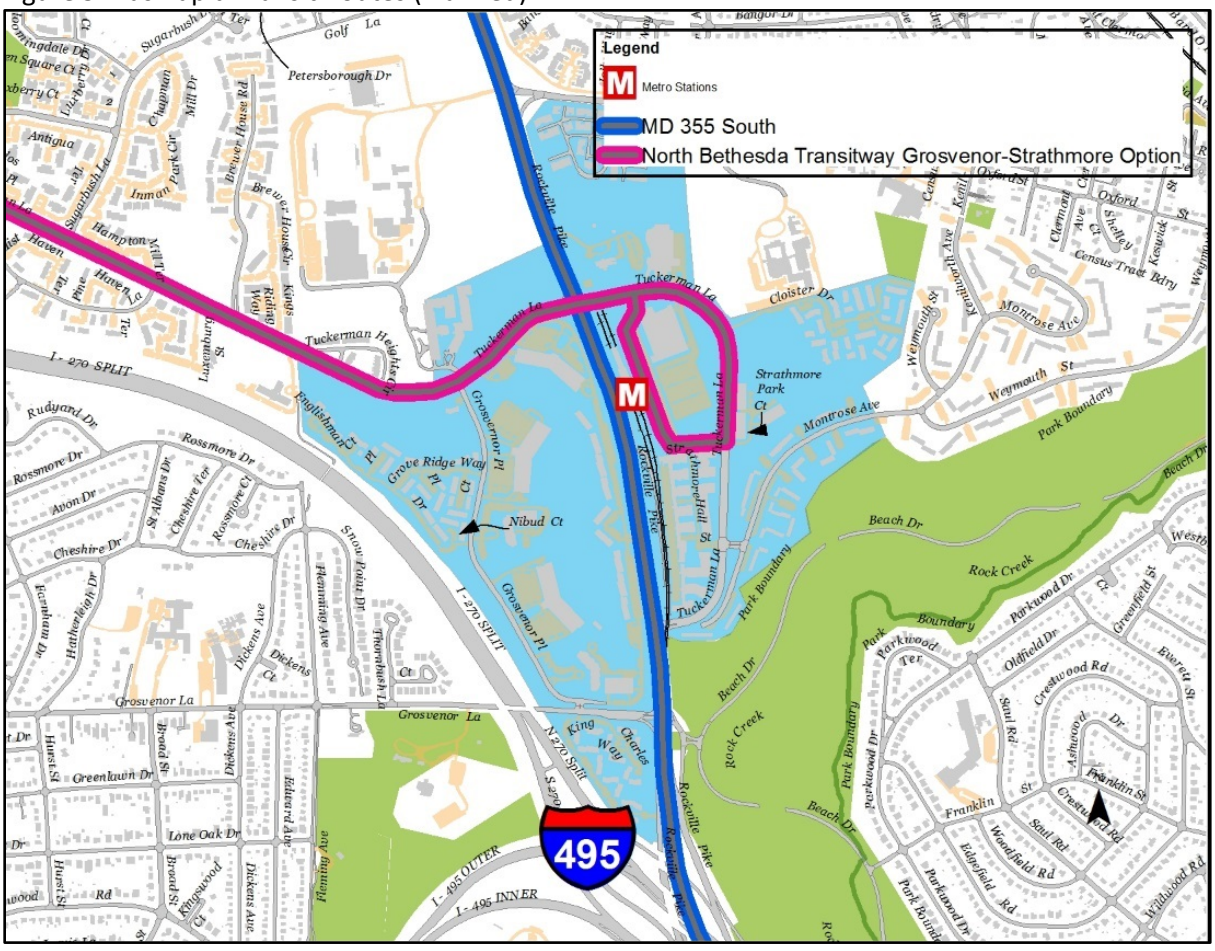
Figure 8. Rockville Pike MD-355 BRT Concept



North Bethesda Transitway

The 1992 *North Bethesda-Garrett Park Master Plan* recommended the creation of a high capacity and high-quality transit connection, known as the North Bethesda Transitway, from the Westfield Montgomery Mall Transit Center through the Rock Spring office park to the Grosvenor-Strathmore Metrorail Station. There are two alternative routes in the easternmost portion of the corridor. One alternative is dedicated lanes following Tuckerman Lane to the Grosvenor-Strathmore Metro Station. The other alternative would be on Old Georgetown Road in a dedicated lane to the western leg of Executive Boulevard, and then east on Old Georgetown Road in mixed traffic to Rockville Pike and the White Flint Metro Station.

Figure 9. Bus Rapid Transit Routes (Planned)

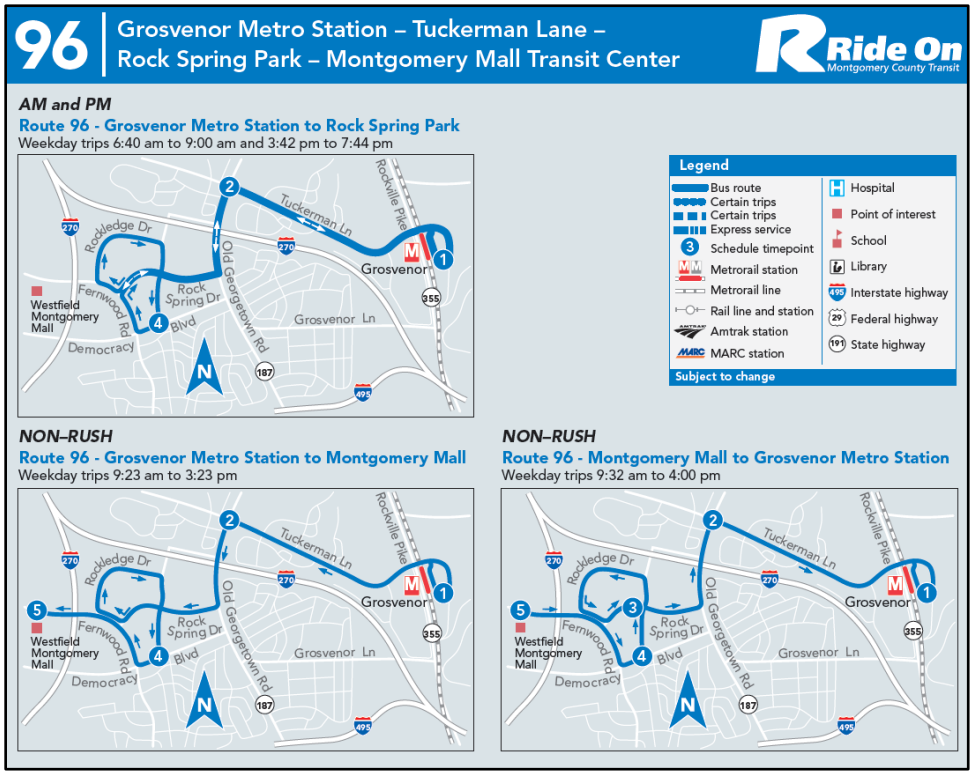


Rock Spring Park Express

The Grosvenor-Strathmore Metro Station is located approximately two and one-half miles from Rock Spring via Old Georgetown Road and Tuckerman Lane. The free Rock Spring Park Express bus connects the Grosvenor-Strathmore Metro Station to Rock Spring during a.m. and p.m. rush hours and is timed to complement existing Ride On Route 96 between the Metro Station and Rock Spring Park. It is part of an effort to improve accessibility and connectivity. The average wait for a rider is about 5 minutes for either transit option during peak hours. The Rock Spring Park Express runs on 10-minute intervals from 6-9 a.m. and from 4-7 p.m. with no stops between the Metro and Rock Spring. Approximately 200 riders per day have been using the Rock Spring Express.

Figure 10. Rock Spring Express

Figure 11. Ride On Bus Route 96



Streets, Roads and Highways

Rockville Pike (MD 355) is designated as a six-lane divided major highway, with a recommended 162-foot-wide right-of-way traversing in a north-south direction along the western frontage of the Plan area. Traffic signals exist at the intersections with Tuckerman Lane north and south, Strathmore Avenue and Grosvenor Lane/Beach Drive. The posted speed limit on Rockville Pike is 45 miles per hour (mph). The annual average daily traffic (AADT) on Rockville Pike in 2016, as reported by the State Highway Administration, was approximately 58,980 vehicles per day between I-495 and Strathmore Avenue (MD 547).

Sidewalks are present on the entire length of the eastern side (western boundary of the Plan area) of Rockville Pike. The sidewalk at this location is approximately three feet wide and it leads to the Metro station. The sidewalk on the western side of Rockville Pike is approximately four feet wide and there are significant gaps between Tuckerman Lane and Grosvenor Lane.

Strathmore Avenue (MD 547) is a two-lane arterial traversing in an east-west direction along the northern boundary of the Plan area. The intersection of Strathmore Avenue and Rockville Pike is the only studied intersection that is outside the Grosvenor Policy Area. Strathmore Avenue connects the Plan area with Georgetown Preparatory School on the west and Garrett Park/Kensington to the east. The presence and design of sidewalks along Strathmore Avenue are inconsistent. The posted speed limit on Strathmore Avenue is 30 mph. There is also a 25 mph school posted speed limit section adjacent to the Plan area. The AADT on Strathmore Avenue in 2016, as reported by the State Highway

Administration, was is approximately 17,963 vehicles per day between Rockville Pike and Old Georgetown Road.

Tuckerman Lane (west of Rockville Pike) is a four-lane divided arterial west of Rockville Pike. The posted speed limit is 40 mph and the AADT on Tuckerman Lane in 2016, as reported by the State Highway Administration, was approximately 19,594 vehicles per day between Rockville Pike (North entrance) and Old Georgetown Road.

Sidewalks are present on both sides of this segment of Tuckerman Lane. The sidewalks along the southern side are four feet wide with a 15-foot grass buffer. A wider 8-foot width was applied to the sidewalk on northern side. Due to the relatively high traffic volumes and posted speed limit on the roadway, bicyclists are encouraged to share the sidewalk with pedestrians on the northern side of Tuckerman Lane.

This segment of Tuckerman Lane is included in a planned bus rapid transit route (the North Bethesda Transitway) intended to connect Montgomery Mall with the Grosvenor-Strathmore Metro Station. Recommendations for this transitway route date back to the 1992 *North Bethesda-Garrett Park Master Plan* and it was also included in the 2013 *Countywide Transit Corridors Functional Master Plan*.

Tuckerman Lane (east of Rockville Pike) east of Rockville Pike is completely within the Plan area. The road contains 4 travel lanes with parking and turn lanes adjacent to Strathmore Hall and the Metro station. The road narrows to two travel lanes with parking on the approach to Strathmore Park Court. South of Strathmore Park Court, the road widens to three travel lanes with parking on its approach to the southern intersection with Rockville Pike. Previous master plans have not identified the functional classification of this road. Based on measurements of recorded plats, the road appears to be a minor arterial. Segments of Tuckerman Lane have metered, on-street parking lanes on both sides. On the northern half, the maximum parking time allowed is three hours, and on the southern half, the maximum parking time is 12 hours. Buffered sidewalks are present on both sides, but the sidewalk on the southern half of the western side is significantly wider than the rest of Tuckerman Lane. Traffic signals manage access, ingress, and turning movements at both intersections with Rockville Pike, and at the intersection with the Metro parking garage driveway/ Strathmore Mansion parking lot. The remaining intersections along Tuckerman Lane are managed by stop signs. The posted speed limit is 30 mph, and the AADT on Tuckerman Lane in 2016, as reported by the State Highway Administration, was is approximately 11,544 vehicles per day between Rockville Pike South and Rockville Pike North.

Grosvenor Lane is a two-lane primary residential road traversing in the east-west direction. While not in the Minor Amendment area, it intersects with Rockville Pike, the area's western boundary. The posted speed limit is 30 mph and the AADT on Grosvenor Lane in 2016, as reported by the State Highway Administration, is approximately 9,234 vehicles per day between Rockville Pike and Cheshire Drive.

Montrose Avenue is a two-lane primary residential road. On-street parking is permitted, but a residential parking permit is required from 8:00 am to 5:00 pm. The State Highway Administration does not provide daily traffic counts for this roadway.

Figure 12. Recommended Roadway Classifications

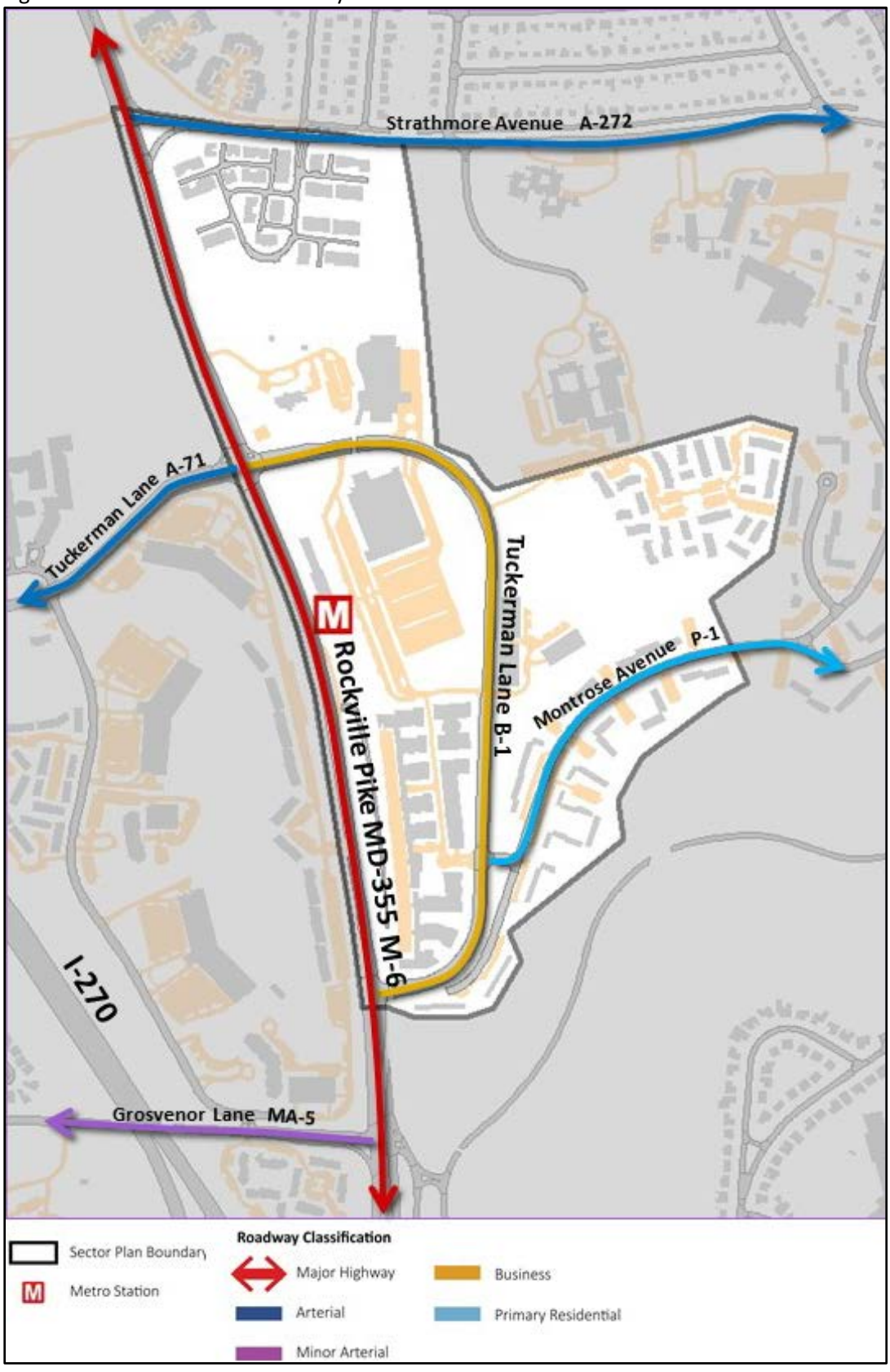


Table 3. Roadway Classification and Right of Way Recommendations

Street	From	To	Road Number	ROW Minimum (feet)	Travel Through Lanes*
Major Highway					
Rockville Pike (MD-355)	Strathmore Avenue	Grosvenor Lane	M-6	150 (162**)	6, divided
Rockville Pike (MD-355)	Grosvenor Lane	I-495	M-6	200	6, divided
Arterial					
Tuckerman Lane	Old Georgetown Road	Rockville Pike (MD-355)	A-71	80	4
Strathmore Avenue (MD-547)	Rockville Pike (MD-355)	Beach Drive	A-272	80	2
Minor Arterial					
Grosvenor Lane	Cheshire Drive	Rockville Pike (MD-355)	MA-5	70	2
Business District					
Tuckerman Lane	Rockville Pike (MD-355)	Rockville Pike (MD-355)	B-1	80	2
Primary					
Montrose Avenue	Tuckerman Lane	Weymouth Street	P-1	60	2

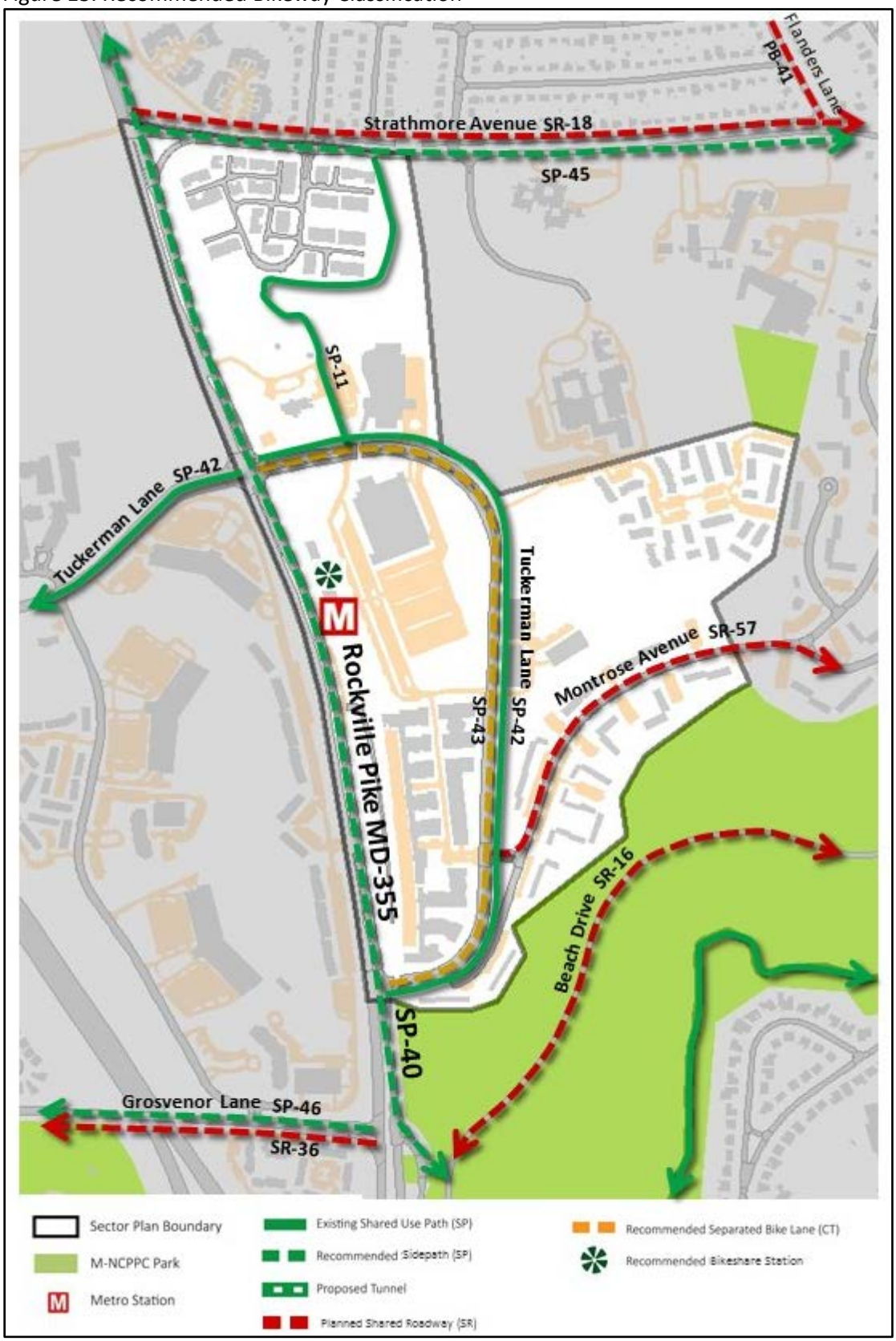
Bikeways

With the overall goal to improve bicycle infrastructure, the Plan includes several new bikeway proposals and supports planned bikeway recommendations.

Table 4. Bikeway Recommendations

Street/Road	From	To	ID	Status
Sidepath				
Rockville Pike (MD-355)	Edson Lane	Beach Drive	SP-40	Proposed (East Side. Note: A portion of this sidepath exists between Tuckerman Lane and Beach Drive)
Grosvenor Lane	Old Georgetown Road (MD-187)	Rockville Pike (MD-355)	SP-46	Proposed (Side TBD)
Tuckerman Lane	Old Georgetown Road (MD 187)	Rockville Pike (MD-355)	SP-42	Existing
Strathmore Hall	Strathmore Avenue (MD-547)	Tuckerman Lane	SP-11	Existing
Strathmore Avenue (MD-547)	Rockville Pike (MD-355)	Kenilworth Avenue	SP-45	Proposed (South Side)
Separated Bike Lanes				
Tuckerman Lane	Rockville Pike (MD-355) at Tuckerman Lane (North)	Rockville Pike (MD-355) at Tuckerman Lane (South)	SP-43	Proposed
Shared Roadway				
Grosvenor Lane	Cheshire Drive	Rockville Pike (MD-355)	SR-36	Planned
Strathmore Avenue (MD-547)	Rockville Pike (MD-355)	Beach Drive	SR-18	Planned
Montrose Avenue	Tuckerman Lane	Weymouth Street	SR-57	Planned
Beach Drive	Grosvenor Lane	Town of Kensington	SR-16	Planned
Flanders Avenue	Rockville Pike (MD-355)	Strathmore Avenue (MD-547)	PB-41	Planned

Figure 13. Recommended Bikeway Classification

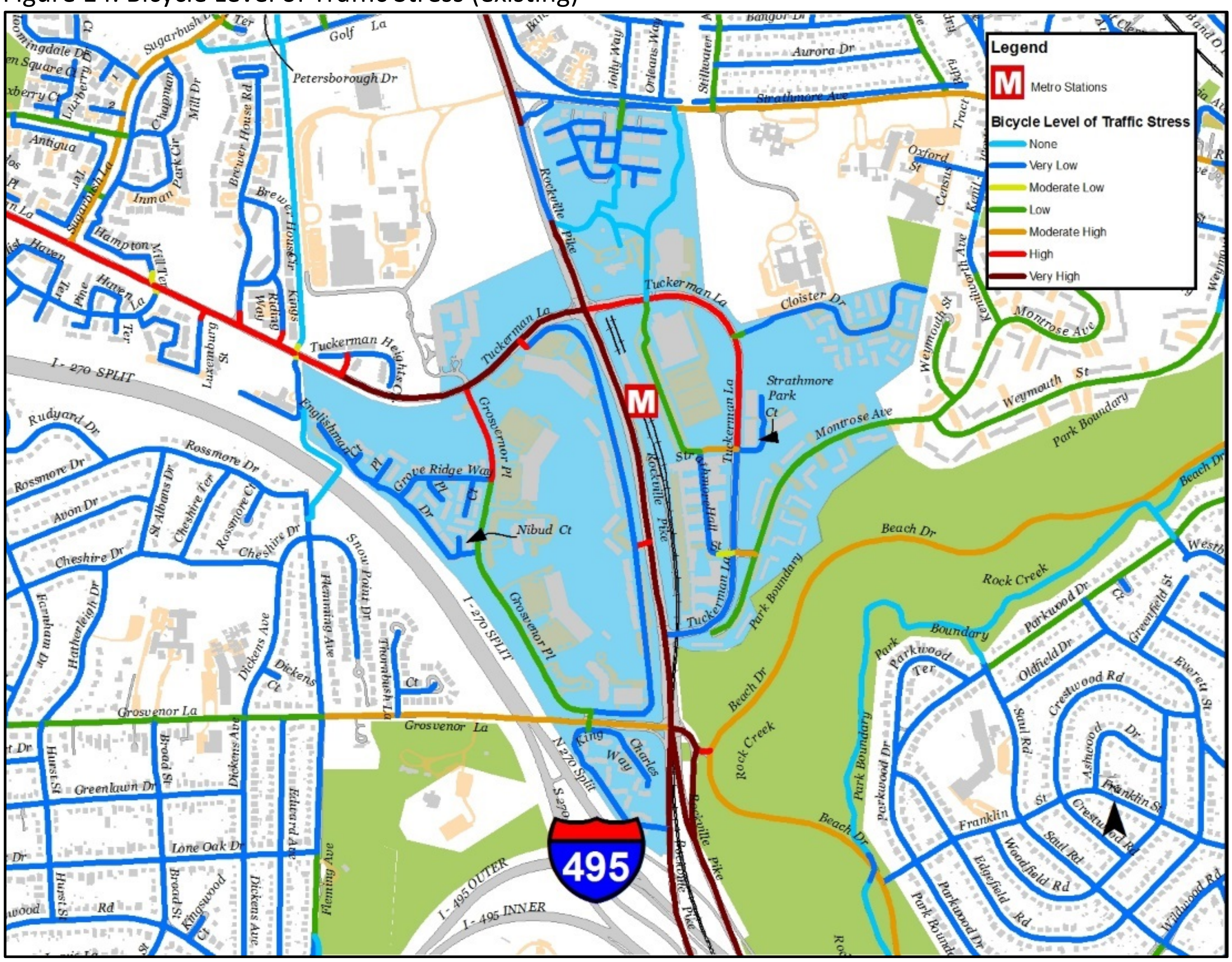


Bicycle Level of Stress

The Plan recommends a bicycle network that has a low level of traffic stress and is accessible to users of all abilities. The proposed network will connect to existing bikeways and trails by providing an interim and long-term bicycle improvements.

The Montgomery County Bicycle Planning Guidance, developed in July 2014, provides planning tools for determining the suitability of specific bicycle facilities and identifying alternate bicycle routes around streets with higher vehicular speed and volumes. The basic level of traffic stress methodology was utilized to evaluate existing road conditions that affect bicyclists in the Plan area. Each road evaluation is based on a traffic stress level for bicyclists that ranges from “1” (lowest stress), to “4” (highest stress). This approach is utilized to assess the level of traffic stress on each road segment based on the bicycle facility provided on or along the roadway, and the vehicular speed and volume of adjacent traffic on that roadway. A cursory review of the existing bicycle level of stress shows that some streets in the Plan area have various bicycle levels of stress, ranging from “very low” to “very high” stress.

Figure 14. Bicycle Level of Traffic Stress (existing)



Capital Bikeshare

Capital Bikeshare connects a network of bike stations across the Washington metropolitan area. Montgomery County Department of Transportation (MCDOT) plans and operates the system in Montgomery County. Currently, there are no Capital Bikeshare stations in the Plan area. The Plan recommends that the Capital Bikeshare program be expanded into the Plan area. More Bikeshare is expanding within Montgomery County; stations are planned in White Flint and Twinbrook, which would be easily accessible from Grosvenor-Strathmore via bicycle. MCDOT works with developers to identify bikeshare locations through new development and redevelopment projects. Along with an improved bikeway network, Capital Bikeshare could connect the Plan area to many other areas of the County and contribute to enhancing the Plan's mobility strategies and goals.

Bicycle Pedestrian Priority Area

A Bicycle and Pedestrian Priority Area (BiPPA) is a geographical area where the enhancement of bicycle or pedestrian traffic is a priority. Prior to formal recognition as a BiPPA by the State of Maryland, the Maryland State Highway Administration (SHA) must concur with the County's BiPPA designation. Once formal concurrence has been issued, Grosvenor-Strathmore would become eligible for State funding intended to enhance and prioritize bicycle and non-motorized travel within the transportation network.

The Grosvenor-Strathmore BiPPA boundary was designated by the M-NCPPC in 2013, in accordance with Section 2-604 of the Annotated Code of Maryland, which delegates this responsibility to local jurisdictions. The 0.44 square mile area is centered around the Grosvenor-Strathmore Metro station and is bounded by I-495 (Capital Beltway) to the south; Strathmore Avenue and Tuckerman Lane to the north; I-270 to the west; Rockville Pike and Montrose Avenue to the east. The area is bisected by Rockville Pike. The Grosvenor-Strathmore Metro Area Minor Master Plan area is entirely within a Bicycle-Pedestrian Priority Area (BiPPA).

Project Link:
https://www.montgomerycountymd.gov/dot-dte/Resources/Files/BiPPA/Grosvenor/BiPPA_Grosvenor_Final_Report.pdf

In 2015, the County developed a BiPPA report for Grosvenor-Strathmore that was prepared with the collaboration of agency officials, community stakeholders, planners, engineers, and specialists in geographic information systems (GIS). An initial summary of recommendations was reviewed by a project team, followed by field investigations, and the development of a report. Recommendations were then prioritized based on benefits, impacts, timeframe, and cost.

The existing bicycle and pedestrian network is summarized in the BiPPA on page 15:

> *"There are currently shared use paths on Tuckerman Lane and in the Symphony Park development. The shared use path on Tuckerman Lane is along the westbound side of Tuckerman Lane from the Bethesda Trolley Trail to MD 355 and along the eastbound side from MD 355 (north intersection) to MD 355 (south intersection). There are existing bicycle racks at the*

Grosvenor-Strathmore Metro Station; however, bicycle connectivity from the surrounding area to the station is poor. There is a lack of signing or pavement marking for cyclists in the area. Sidewalks are prevalent throughout the BiPPA boundary." – 2015 BiPPA

The Grosvenor-Strathmore BiPPA was evaluated for various bicycle and pedestrian improvement types by the County. Proposed improvements were developed and prioritized based on master or sector plan recommendations as of 2015, and public/stakeholder input.

To implement the 2015 BiPPA recommendations, Montgomery County has a program through its Capital Improvement Program (CIP) to plan, design, and construct improvements, including but not limited to bikeways, sidewalks, intersections, street lighting, relocation of utilities, and curb ramp reconstruction to meet ADA best practices.

The recommendations in the Grosvenor-Strathmore Metro Area Minor Master Plan were coordinated with the County staff who currently manage the Grosvenor-Strathmore BiPPA. In some cases, the Plan directly corresponds with BiPPA improvement recommendations or modifies the BiPPA improvement recommendations. A summary of the BiPPA improvement recommendations are provided below. Also see the Plan recommendations.

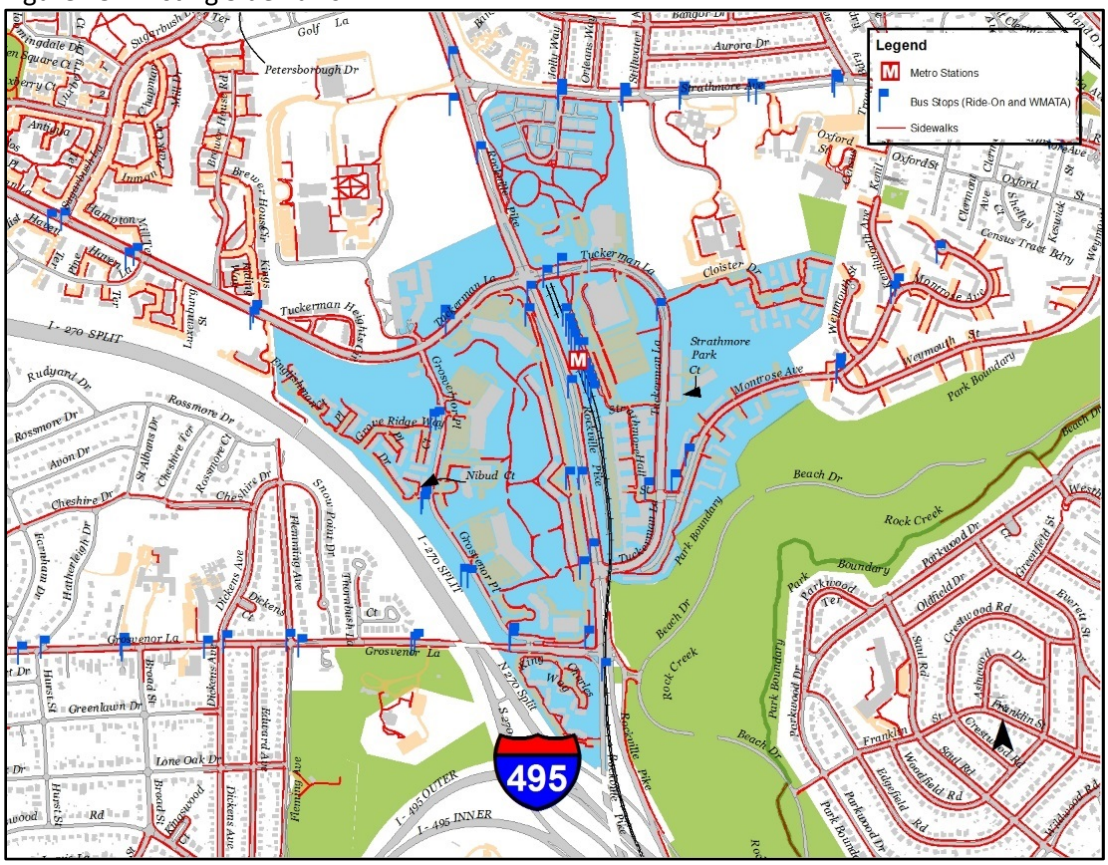
Table 5. Grosvenor-Strathmore BiPPA Improvements Summary

Table 4 – Improvement Type Summary	
Improvement	Applications and Benefits
Sidewalk	*Pedestrian connections to parks, schools, residents, businesses, or other sidewalk / trail sections*
Shared Use Paths	*Pedestrian connections to parks, schools, residents, businesses, or other sidewalk / trail sections*
Shared Roadway Markings	*Limited lane widths, on-street parking sections, wayfinding, or wherever correct bicycle positioning is vague*
Bike Lanes	*Higher-speed (greater than 25mph) streets to avoid some bicycle-car conflicts and create predictable movements*
Cycle Track	*Similar to bicycle lanes, also reduces some concerns from overtaking crashes and may reduce double-parking*
Curb Ramp	*Missing or non-ADA-compliant curb ramps*
Driveway Apron	*Deteriorated, missing, or non-ADA-compliant aprons*
Median Refuge	*Increases separation of pedestrians from car traffic to improve comfort levels and safety*
Curb Extension	*Shortens crossing distances, lowers speeds of turning vehicles, increases visibility of pedestrians entering an intersection*
Bike Box	*Reduces bicycle delay, increases bicycle convenience, and improves bicycle positioning in traffic in slow/start situations.*
Crosswalks	*Improves visibility of pedestrians in motorway (may be high-visibility markings), denotes best or preferred location for pedestrian crossings*
Accessible / Countdown Pedestrian Signal	*Replaces non-compliant signals, improves crossing safety for pedestrians, particularly on long crossing maneuvers*

Sidewalks

Most of the roads within the Plan area contain sidewalks. Many intersections pose challenges to pedestrians and bicyclists, and it is recommended that intersections be improved for pedestrian safety, connectivity and ADA access, where feasible.

Figure 15. Existing Sidewalks



Transportation Demand Management

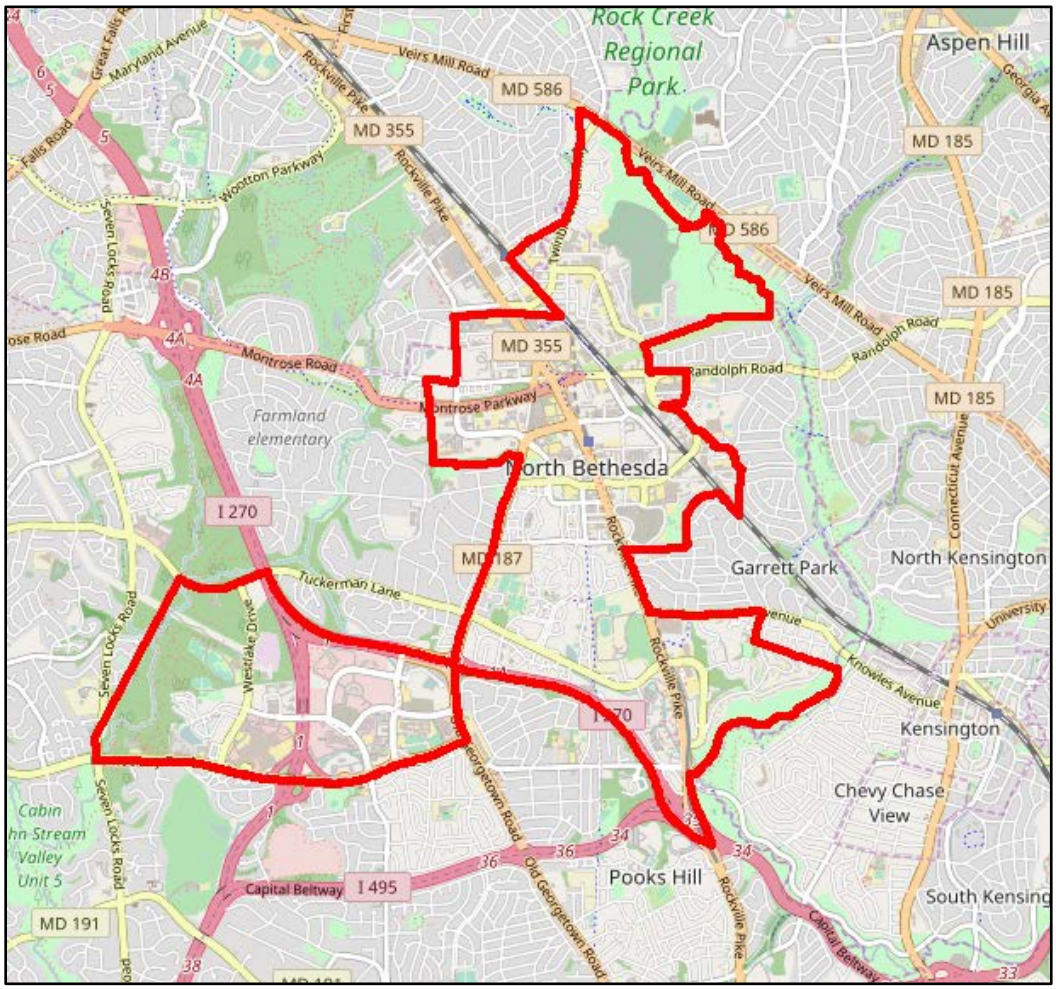
The Plan recommends Transportation Demand Management (TDM) strategies to augment the infrastructure and residential development recommendations. Several key infrastructure recommendations have been made, including an improved street grid, bikeways, bikeshare, transit options, and other recommendations. By reducing the use of single occupancy vehicles and by monitoring the phasing of development, the Plan seeks to minimize travel delay.

Transportation Management Districts (TMDs)

The purpose of the TMDs in Montgomery County is to reduce traffic congestion and encourage the use of alternative commuting options for employees in several business districts. Both the public and private sectors contribute to the success or failure of Montgomery County's TMD strategies.

The public sector contributions to TMD include the North Bethesda Transportation Management District (NBTMD), which covers the Plan area. The NBTMD is operated by the Transportation Action Partnership (TAP) under the name "North Bethesda Transportation Center" (NBTC). The NBTC provides free services to employers, employees, residents and visitors in Grosvenor, White Flint, Twinbrook, Executive Boulevard, and Rock Spring Park.

Figure 16. North Bethesda Transportation Management District (NBTMD)



The range of TDM strategies includes programs, services, activities and infrastructure improvements.

TDM strategies may include:

- Improved pedestrian and transit facilities with high-quality transit stops and stations.
- Enhanced access and circulation opportunities for bicyclists and pedestrians.
- High-quality digital, written, and signage information about travel options for commuters.
- Car sharing, van pools, ride-matching, and guaranteed ride home services.