White Flint Sector Plan

Transportation Appendix

January 2009

Table of Contents

List of Figures

1. Purpose

The Public Hearing Draft of the White Flint Sector Plan proposes a conversion of the White Flint Metrorail station area from an auto-oriented suburbia to a transit-oriented, mixed-use, urban community. This Appendix provides the technical basis and details for the transportation system recommendations in the White Flint Sector Plan.

The White Flint Sector Plan Public Hearing Draft is a document that reflects approximately two years of stakeholder coordination and staff analysis. The Sector Plan proposes several innovative changes designed to promote the orderly implementation of a transit-oriented and sustainable urban center for North Bethesda, including:

- Expansion of the White Flint Metro Station Policy Area to reflect transit-oriented policies within walking distance of the White Flint Metrorail station.
- Acceptance of congestion levels that reflect the Planning staff and Planning Board approach to adequacy
- An implementation plan that relies on a redevelopment authority, proportional participation by all developments, and a staging plan to coordinate area wide transportation system implementation in lieu of assigning piecemeal transportation exaction requirements to individual development applications.

Since the early 1980s, the "balance" between land use and transportation system recommendations in master plans and sector plans has applied the procedures and general policies contained in the County's Growth Policy. The current Growth Policy applies an area wide measure of mobility, called Policy Area Mobility Review, and a localized measure of congestion called Local Area Transportation Review. These measures, used to define adequacy for development review cases, are adapted for master plan analysis through application of the Department's TRAVEL/3 regional travel demand model and Local Area Model as described in detail in Chapter 3 of this Appendix.

The land use and transportation system are balanced to promote an end-state level of development that provides zoning density levels needed to facilitate the redevelopment of White Flint from a largely auto-oriented community to a transit-oriented community. The transportation system needed to accommodate these levels of development must achieve a 39% Non-Auto Driver Mode Share (NADMS) for White Flint employees, an objective that can be met through:

- Improved access to transit, including a second Metrorail station entrance, a MARC station, bus-priority treatments along Rockville Pike and improved transit circulator services
- Implementation of a robust local street network with prevailing block lengths of 350' or less that promotes walking and bicycling
- Management of the long-term parking supply through coordination of both zoning requirements and public parking provisions
- Continuation of proactive travel demand management services through the North Bethesda Transportation Center (NBTC)

The establishment of this balance between land use and transportation required an iterative review of alternative land use and transportation concepts, as described in this Appendix. These Appendix materials, developed over time as alternatives were evaluated in an iterative process, contributed to the development of the White Flint Sector Plan recommendations by documenting:

- The balance between long-term land use and transportation systems needed to provide sufficient mobility the urbanizing White Flint Sector Plan area and surrounding communities, using appropriate evaluation tools and measures of effectiveness
- The staging, implementation, and monitoring mechanisms that manage land use and transportation implementation details over two to three decades as the plan is implemented.

The Appendix covers three areas of substance:

- Chapter 2 describes the recommendations at a greater level of detail than described in the Plan.
- Chapter 3 demonstrates that the end-state conditions in the Plan will result in an appropriate balance between land use and transportation
- Chapter 4 describes alternative land use and transportation system recommendations that were considered but ultimately not included in the Plan.

2. Transportation Plan Recommendations

The White Flint Sector Plan recommends a multimodal transportation system that leverages the prior public investment in the Metrorail system to create a transit-oriented community of walkable blocks with multimodal transportation options for residents, employees, and visitors.

Figure1 shows the range of transportation system strategies examined in the White Flint Sector Plan, including:

- Travel demand management
- Transit services
- Local street network
- Transportation system policies

Figure 1 was used in public presentations during summer 2007 and indicated the likelihood that the Plan would incorporate the different strategies based on analyses and coordination performed to date. The cells shaded in light blue indicated those with high potential. In general, those strategies with high potential were incorporated into the Plan as described in the following paragraphs. Those strategies with low potential that are not incorporated in the plan are described in Chapter 4.

Figure 1: Transportation Management Strategies

	Strategy	Opportunities	Constraints	Potential
Demand Management	Reduce SOV mode share	Flexible, low capital cost	Operational costs, monitoring	High
	Increase parking charges	Reduce traffic, provide revenue	PLD establishment, garage locations	Moderate
Transit Services	Metrorail Station North Entrance	Adds capacity, reduces walk access times	Capital cost	High
	Shuttle services	Low capital cost	Operating cost	High
	New MARC station	Capture long-distance riders	Coordination with CSX, Garrett Park	Moderate
	Re-orient North Bethesda Transitway	Direct connection to Rock Spring Park activity center	Capital cost, particularly relative to current planned transitway	Low
	Add light rail to MD 355	High capacity service for moderate length trips	Right-of-way needs, capital cost/funding, competition with Metrorail	Low
Local street network	Add local "midblock" streets	Provide alternate routes, reduce walking distances	Capital cost, definition of final alignment and implementation responsibilities	High
	Left turn prohibitions	Reduce congestion	Circuitous trips (cars and buses), public acceptance	Moderate
	Add turn lanes	Reduce congestion	Increased pedestrian crossing distances, capital cost	High (for selected uses)
	Grade separated interchanges	Reduce congestion	Capital cost, attractiveness, public acceptance	Moderate (for selected uses)
	One-way streets	Reduce congestion, improve pedestrian crossing	Circuitous trips (cars and buses), public acceptance	Moderate
	Roundabouts	Urban design	Operations, right-of-way	Moderate
	Reversible lanes	Address peak period congestion	Attractiveness, pedestrian crossing lengths, public acceptance	Low
	New CSX track crossing	Provide alternate routes, Reduce walking distances	Capital cost, right-of-way	Low
Policies	Accept higher congestion levels	Consistent with urbanizing area, no capital cost	Operating costs, public acceptance as part of quality of life	Moderate
	Increase residential land use proportion	Addresses housing shortages, lower trip generation rates, 24-hour activity center	Economic feasibility	Moderate
	Staging Plan	Provide services at time of development	None	High

A. Travel Demand Management

Travel Demand Management (TDM) describes a wide range of programs and services designed to reduce the use of single-occupant vehicle trips. Simply put, TDM is the set of public policy strategies to provide travel options that reduce and spread demand by travel destination, mode, route, and time of day to most efficiently utilize transportation system infrastructure and resources. TDM strategies can be implemented by both public and private sector activities.

TDM strategies include:

- Infrastructure such as high quality pedestrian environments, bus or HOV facilities or preferential treatments, telework centers, commuter information stores, car-sharing (i.e., Zipcar) and bike-sharing stations, and well-located transit stations or stops with real-time transit information,
- Services such as transit services, vanpools, ride-matching, Guaranteed Ride Home services, alternative commute option information (i.e., NBTC and the MWCOG Commuter Connections), and
- Policies that affect the use of infrastructure and services, including parking supply management, preferential parking treatments for carpools/vanpools, transit subsidies, flexible work schedules, tax incentives, congestion pricing, and distance-based or VMT pricing.

Montgomery County Travel Demand Management Applications

Current TDM strategies in Montgomery County include a variety of programs and services integrated between the private and public sectors. The Office of Legislative Oversight has summarized the County's existing TDM activities in their December 2008 report 2009-6, titled *Transportation Demand Management Implementation, Funding, and Governance*.

The **private sector** contributions include requirements of Planning Board conditions determined at the time of subdivision, often through a Traffic Mitigation Agreement (TMAg) to either provide a specified set of services or to achieve a specific performance objective. Traffic Mitigation Agreements are described in the Planning Board's Local Area Transportation Review / Policy Area Mobility Review (LATR/PAMR) Guidelines.

The 1991 development of the Nuclear Regulatory Commission site in 1991 is an example of a private sector contribution with a specified set of services which included a parking reduction agreement and a Traffic Mitigation Agreement. The parking reduction agreement continues to have a permanent effect on limiting employee parking to encourage alternative modes of travel. The Traffic Mitigation Agreement included provision of the free White Flint Shuttle service from 1991 through 2004. The subdivision approval of the North Bethesda Town Center (LCOR site) is an example of a private sector contribution with a specified performance measure. Under the growth policy's Alternative Review Procedure for Metro Station Policy Areas, the LCOR approval is conditioned upon a payment of twice the applicable transportation impact tax and a monitoring program to reduce peak hour vehicle trips by 50% of that otherwise attributable to the development.

The **public sector** contributions include the activities of the area Transportation Management District (TMD). The North Bethesda TMD is operated by the Transportation Action Partnership (TAP) under the name North Bethesda Transportation Center (NBTC). NBTC was formed in 1995 to provide services to employers and employees in the commercial areas of North Bethesda to promote adoption of commuter

benefits programs by employers and to inform employees of alternative commuting options. NBTC now provides services to office and multi-family residential properties. The NBTC also works to improve transit service in the area, to increase ridership, and to provide transit-friendly amenities.

In 2002, the County Council adopted Bill 32-02, an important link between the public and private sector TDM programs. This TDM law requires employers with more than 25 employees located in one of the County's four Transportation Management Districts to implement a Traffic Management Plan (TMP), participate in an annual commuter survey, and submit an annual report of TMP activities.

Target TDM Markets

TDM strategies can be customized by target markets, including consideration of the type of land use (i.e., residential, commercial, or special event) and time of day (i.e., peak period, midday, or all day). Figure 2, from the Institute of Transportation Engineers *Transportation Impact Analyses for Site Development* proposed Recommended Practice, summaries the different types of TDM techniques commonly applied to reduce vehicle traffic generation by their target market and trip reduction focus.

Figure 2:Travel Demand Management Techniques and Target Markets

Table 7-11. Sample TDM Techniques With Potential to Reduce Site Traffic Generation

Technique[a]	Types of Trips Affected					
	Office	Retail	Industrial	Residential	Lodging	Event
Physical Actions						
Parking availability reduced below normal demand level or substantial increase in parking costs	T, P	-	T, P	T, P	T, P	T, P
Quality pedestrian environment on-site (mixed-use developments only)	T, P, M	T, P, M	T, M	T, P, M	T, P, M	T, P, M
Building amenities (bicycle lockers, showers, ATM, parking garage dimensions to accommodate vanpools, wiring for ease of telework)	T, P, M	-	T, P, M	T, P, M	-	-
Non-Physical Actions						
Transit service to areas of trip origins	T, P	T, PM	T, P	T, P	T, P	T, P
Carpool, vanpool programs (ridematching, preferential parking, subsidies, promotion)	T, P	T, PM	T, P	T, P	-	T, P
Modified work schedules (4/40, staggered, flex)	P	-	P	P	-	-
Telecommute options	T, P	-	-	T, P	-	-
Internal shuttle transportation to/within development site	T, M	T, M	-	T, M	T, P	-
Transit subsidy	T, P	-	T, P	T, P	-	-
On-site transportation coordinator or information center	T, P	T, P	T, P	T, P	T, P	T, P

T = daily trips, P = peak hour trips, PM = p.m. peak hour trips, M = midday trips.
[a]Other techniques may be applicable either separately or in combination with others. To be effective, each measure must be designed to generate and sustain use of alternatives to the single-occupant automobile.

Many TDM techniques are effective in reducing auto travel at all times of day, others are specifically targeted toward peak period conditions. The draft Sector Plan recommends continuation of a focus on weekday peak period modal shifts to optimize transportation system performance when congestion is greatest. As Montgomery County begins to consider climate change and energy requirements identified in the 2009 Climate Protection Plan the emphasis of travel demand management can be expected to shift somewhat from managing traffic congestion to also reducing greenhouse gas emissions. The two objectives (peak period mobility versus daily or annual carbon footprint) are often, but not always, in synch. Shifting travel modes from auto to walking or biking will serve both objectives and TDM policies should encouraged this type of shift as the highest priority. On the other hand, shifting an auto trip from the peak period to the off-peak period will serve the historic TDM objective of managing peak period performance, but has a smaller effect on greenhouse gas emissions (the difference between travel speeds and emissions during peak and off-peak periods).

The focus of active TDM strategies in the White Flint Sector Plan is on commuters who work in the Sector Plan area, for three reasons:

- Recurring vehicular travel demand is most constrained by traffic leaving the White Flint Sector Plan during the evening peak period.
- For the types of housing envisioned in the Sector Plan (predominantly multifamily high-rise units), the location and market provide high levels of transit use without the application of external TDM actions.
- TDM strategies applied at the workplace are often more effective than those applied at the residential level, due to both economies of scale and the fact that the employer/employee relationship can often be more productively applied than the residential owner/tenant relationship.

The staging plan for White Flint recommends that the mode share and transportation system performance be monitored biennially to track planned progress in targeted modal shifts and a reduction in per-unit vehicle trip generation rates. The implementation plan relies on a strong linkage between public and private TDM efforts, similar to that achieved in the Bethesda CBD staging plan, so that the responsibility for success of the Sector Plan trip reduction efforts are distributed across all plan area owners and tenants.

Employees working in White Flint

The Sector Plan recommends retaining the 39% Non-Auto Driver Mode Share (NADMS) goal from the 1994 North Bethesda / Garrett Park Master Plan. The NADMS measures the percentage of travelers who drive to a workplace in White Flint as opposed to taking other modes.

The Local Area Modeling performed for the Sector Plan analysis presumed that the 39% NADMS would be achieved for all commercial employees within those portions of the North Bethesda TMD north of I-270. For monitoring purposes, the NADMS has been defined as follows:

- Employees who normally arrive at their workplace in White Flint during the busiest two hours of the morning peak period from 7:00 to 9:00 AM.
- Auto drivers include those in single-occupant vehicles (SOV) and those driving carpools and vanpools.
- Non-auto drivers include transit riders, carpool/vanpool passengers, walkers, bicyclists, as well as those who have a workplace in White Flint but telecommute on the day of surveys.

The 1992 Plan identified one possible set of sub-mode share outcomes for ridesharing (21%), transit use (16%), and walking/biking (2%) that would achieve the 39% NADMS mode share. The draft Sector Plan does not develop specific sub-modal shares, as travel trends and technologies evolve over time. The 2005 surveyed mode share breakdown in White Flint includes a higher amount of transit use (20%) but a lower amount of ridesharing (4%) and walking/biking (2%), reflecting the fact that the White Flint sector

is better served by transit but further from I-270 HOV lanes than the Rock Spring Park portion of the North Bethesda TMD.

Current estimates of the build-out sub-modal shares incorporate telecommuting technologies (about 2% on a typical weekday), and a significant increase in the amount of walking/biking (about 6%) due to the fact that higher levels of housing in the Sector Plan area will increase the number of White Flint employees who also live in the community. Transit mode shares should also increase (to about 26%), while ridesharing is estimated to remain a fairly small component (about 5%).

Residents living in White Flint

The 1992 Plan identified a 70% auto-driver goal for the journey-to-work for North Bethesda residents. The 2005 Census Update Survey noted that this goal has very nearly been achieved, with a 72% auto-driver mode share for residents throughout the North Bethesda/Garrett Park planning area. Dwelling units in the White Flint Sector Plan area will be predominantly high-rise units, and the 2005 Census Update Survey indicates that the auto-driver mode share for the journey to work from North Bethesda is 58%, better than the 1992 Plan goal.

Roadway congestion in White Flint is influenced most heavily by commercial activities rather than residential activities. The plan recommends a mixed-use TMX zone that could encourage a higher percentage of residential development than explicitly tested in the travel forecasting process to date, at which point a more stringent residential mode share objective might be explored. The residential traffic would become "critical" if the total end-state floor area of development exceeds 80% of the total development, a ratio that staff does not view as practical given market conditions.

B. Transit System

The Sector Plan recommends expanding all three modes of transit available in the I-270 corridor to serve White Flint: Metrorail, MARC, and local bus services.

Metrorail

The Sector Plan recommends developing a new northern entrance to the station in the southeast quadrant of the Rockville Pike / Old Georgetown Road intersection to both:

- minimize circuitous travel for pedestrians whose local destinations are north of the station, and
- reduce pedestrian delays by dispersing demand for station elements such as faregates and escalators.

Staff estimates that the White Flint Metrorail station will require 10 bus bays for Metrobus and Ride-On bus loading, based on an extrapolation of transit system needs and the local transit service concept described below. Continued coordination with the North Bethesda Town Center development will be needed to establish bus bay locations within the LCOR site and along the reconstructed Rockville Pike.

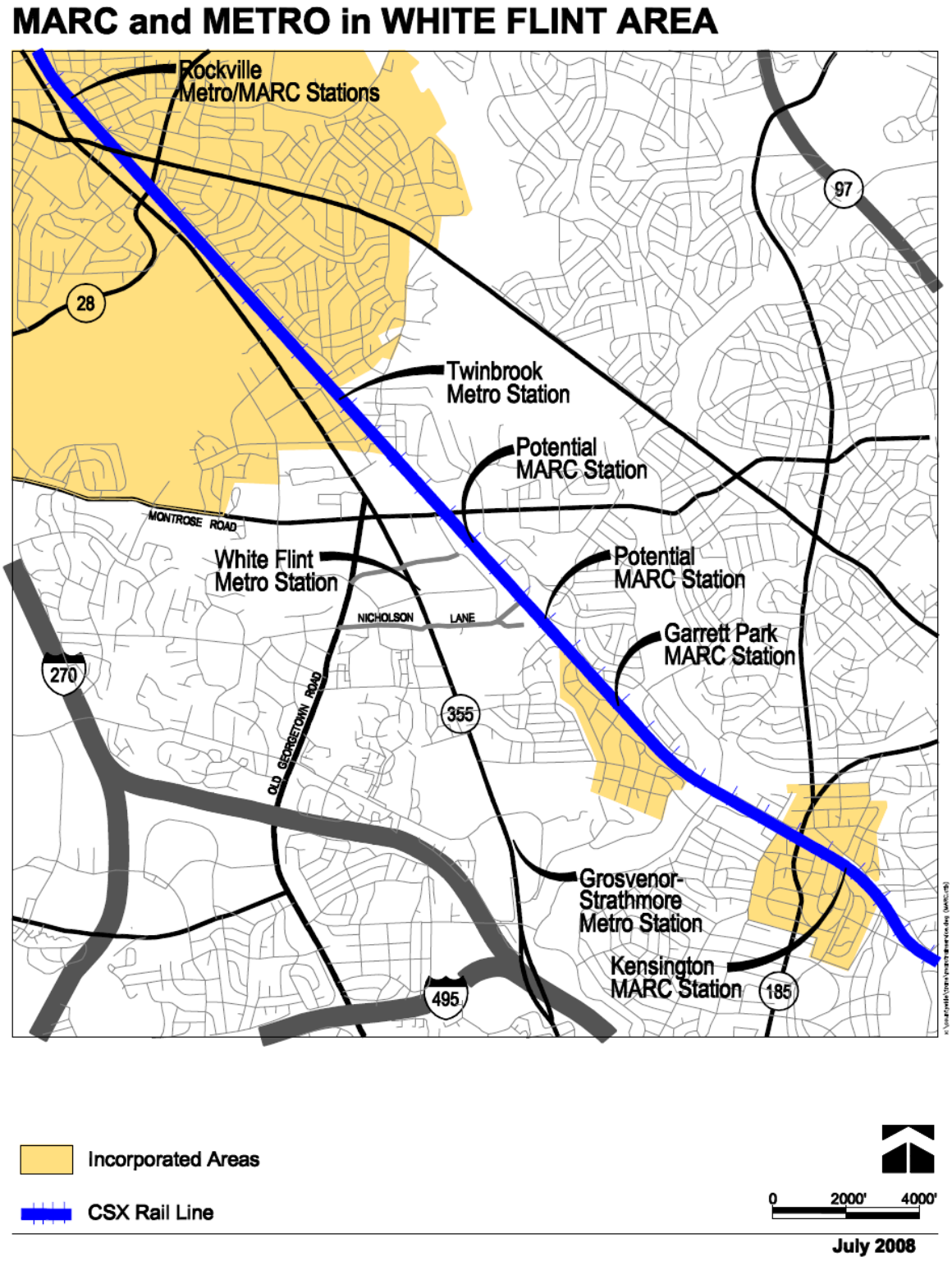
MARC

The 1992 North Bethesda / Garrett Park Master Plan recommends that a new MARC station be established at Montrose Crossing (at the northern end of Nebel Street Extended). The White Flint Sector Plan recommends relocating this new MARC station into the White Flint Sector Plan. Two potential sites are identified as indicated in Figure 3. The northern site is at the Montourri property at the east end of Old Georgetown Road and the southern site at the Nicholson Court properties south of Nicholson Lane / CSX overpass. Staff estimates that the MARC station access will require two bus bays for Ride-On and shuttle services and approximately 10 kiss-and-ride spaces.

The Montourri property site is recommended because it maximizes the potential development within walking distance to the MARC station, as the land use plan focuses development toward the Metrorail Station site. The primary advantage to the Nicholson Court property site is that site access on both sides of the CSX tracks is generally cleared of forest and includes properties with active redevelopment interests.

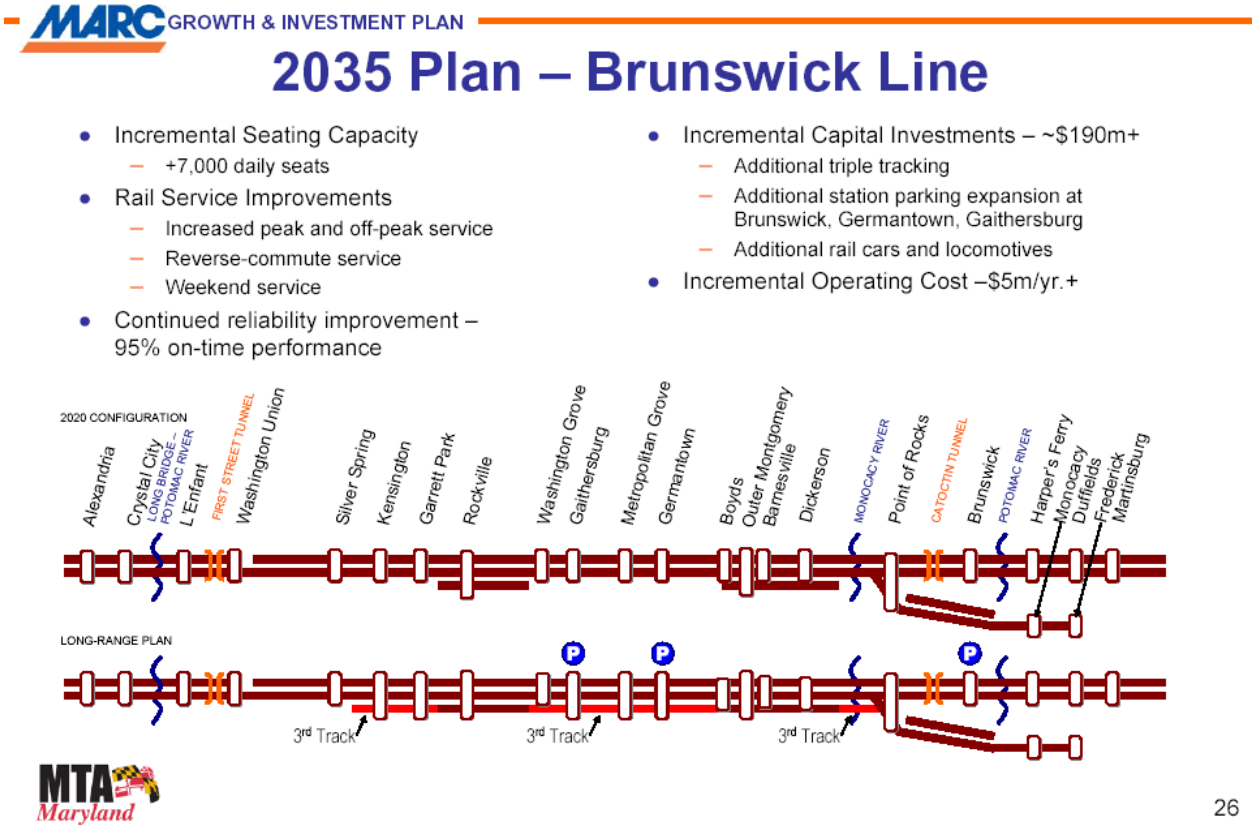
The expansion of MARC transit services to Montgomery County communities along the Red Line requires extensive coordination with both the Maryland Transit Administration (MTA) and the CSX Corporation. The CSX owns the tracks used by the MTA and their primary transportation objective is the efficient movement of freight. The MTA provides commuter rail services and their primary transportation objective for the MARC Brunswick line is efficient service for long-distance commuters between job centers in both Washington and Baltimore and distant residential communities.

Figure 3: Metrorail and MARC Station Locations



The MTA prepared a MARC Growth and Investment Plan in September 2007 that identifies their planned system expansion statewide through the year 2035, as shown in Figure 4. The Planning Board discussed this plan with MTA in worksessions on March 27 and July 24, 2008. The MTA plan does not include a station in North Bethesda (or at Shady Grove, per the 2006 Shady Grove Sector Plan) but does include an "Outer Montgomery Station", a third track along portions of the line, a new parking garage at the Germantown station and parking expansion at Metropolitan Grove, Rockville, and Kensington. Further coordination with MTA is needed to align the state goals for MARC station planning with local land use plans. Both MTA and M-NCPPC, however, are interested in expanding MARC services to include midday, weekend, and off-peak direction service.

Figure 4: MARC Brunswick Line Plan



The Maryland Transit Administration (MTA) conducted an initial feasibility assessment in summer 2008 and found that neither the Montourri or Nicholson Court property was definitively superior to the other from a feasibility perspective, but that either site would disrupt service at the Garrett Park MARC station (which is already limited to skip-stop services), potentially requiring station closure.

The addition of the MARC station is expected to improve the transit market for long-distance commuters working in White Flint by providing a one-seat ride from Frederick County and points west (rather than requiring a transfer from MARC to Metrorail at Rockville). The White Flint market would also benefit from the more direct rail connection to Union Station.

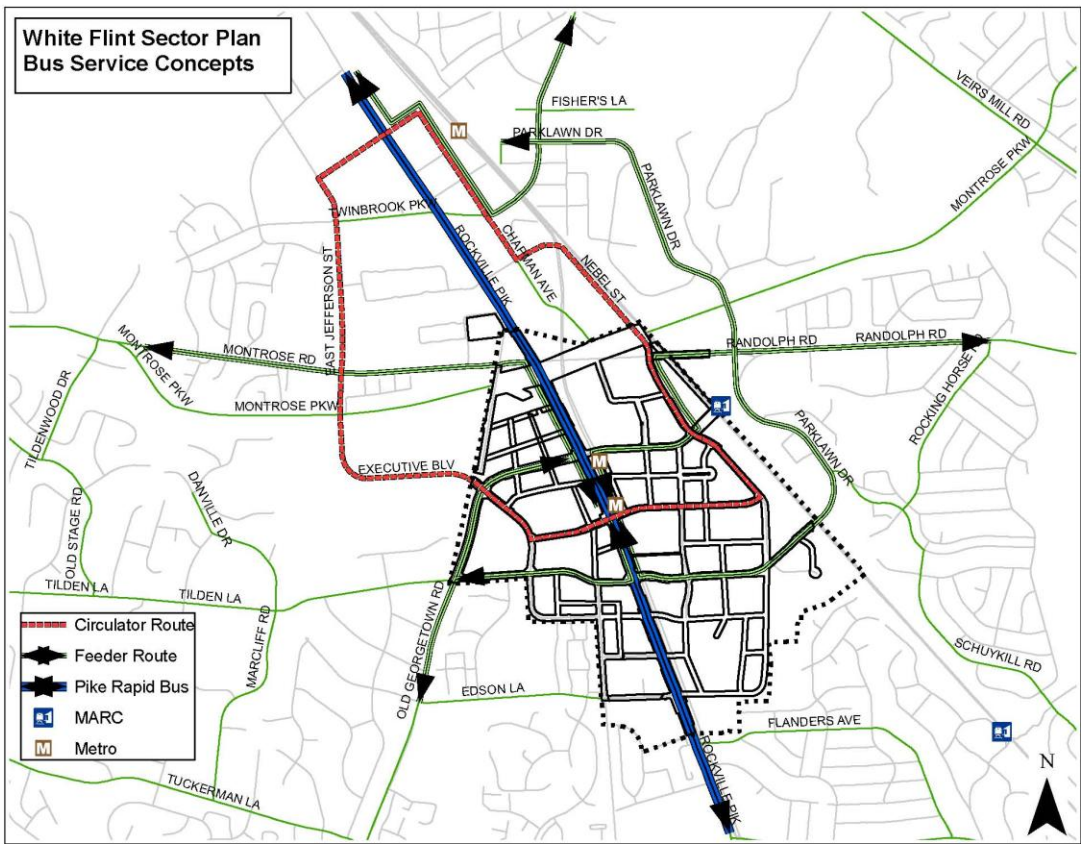
Local Bus Transit Service

Local bus transit services need to be developed and augmented over time to support the line-haul services provided by the Metrorail and MARC rail transit systems. These transit services will be integral to achieving the planned 39% NADMS.

Bus transit services are operational elements that require flexibility below the level of detail explicitly recommended in master plans. The Public Hearing Draft Sector Plan recommendations for facilitating bus transit service are limited to providing sufficient intermodal transfer spaces at the Metrorail and MARC stations and preserving right-of-way for bus priority treatments along Rockville Pike. The conceptual local bus transit services, however, should include three distinct elements, shown conceptually in Figure 5:

- feeder services to Metrorail,
- circulator services throughout the North Bethesda commercial core area
- shuttle services along Rockville Pike, and

Figure 5: Planned Transit Service Concept



The current bus transit system (described in greater detail in Chapter 3), including Metrobus, Ride-On, and private shuttle services, focus primarily on the first two elements. Routes such as the 10, 38, and 45 provide **feeder services** to Metrorail from residential communities several miles away. For the purpose of Metrorail feeder services, the Twinbrook and White Flint Metrorail stations are equally valuable destinations in the North Bethesda commercial core area.

Future feeder services should have the following characteristics:

- Service area focus within three miles of the Metrorail stations served
- Peak period headways of 20 minutes or less
- Primary service along arterial roadways such as Nicholson Lane, Twinbrook Parkway, Montrose Road, and Randolph Road, with scheduled speeds of 12-13 miles per hour

Currently, Ride-On routes such as the 5 and 26 provide a function that could be described as including **circulator services** throughout the North Bethesda commercial core area, linking land uses in North Bethesda to both the White Flint and Twinbrook Metrorail stations.

A future circulator route could have the following characteristics:

- High frequency during peak commuting and lunch periods with headways of 10 minutes or less
- Coverage area within 1.25 miles of either White Flint or Twinbrook Metrorail stations with stops at both stations

This service profile would likely require six shuttle buses.

Currently, Ride-On route 46 provides **shuttle services along Rockville Pike**, connecting the Medical Center, Grosvenor, White Flint, Twinbrook, Rockville, and Shady Grove Metrorail stations.

A future shuttle service along Rockville Pike could have the following characteristics:

- High frequency during peak periods with headways of 15 minutes or less
- Skip-stop or overlay of local service to maintain schedule speed of 15 miles per hour

As White Flint develops into an urban area, expanded services will be needed for all three types of local bus service. The relative importance of getting riders to land uses in White Flint (and the greater North Bethesda commercial core area) will increase relative to the importance of getting riders to the nearest Metrorail station. Routing and scheduling for feeder services will therefore need to consider local land uses in North Bethesda as well as the fastest routes to Metrorail.

The recommended White Flint land use plans and design guidelines will facilitate good feeder, circulator, and Pike rapid bus services. Prior efforts to establish shuttle services in White Flint, such as the free White Flint Shuttle established through the White Flint Commuter Service Center, have not yet been sustainable, in part due to the challenges of connecting auto-oriented development with local transit services. As densities increase in White Flint with zoning requirements and design guidelines that require buildings to be street-oriented rather than parking-lot oriented, the number of potential transit riders and the attractiveness of transit will both increase.

C. Street Network

Figure 6 replicates Figure 33 of the White Flint Sector Plan, which presents the proposed street network with the following elements:

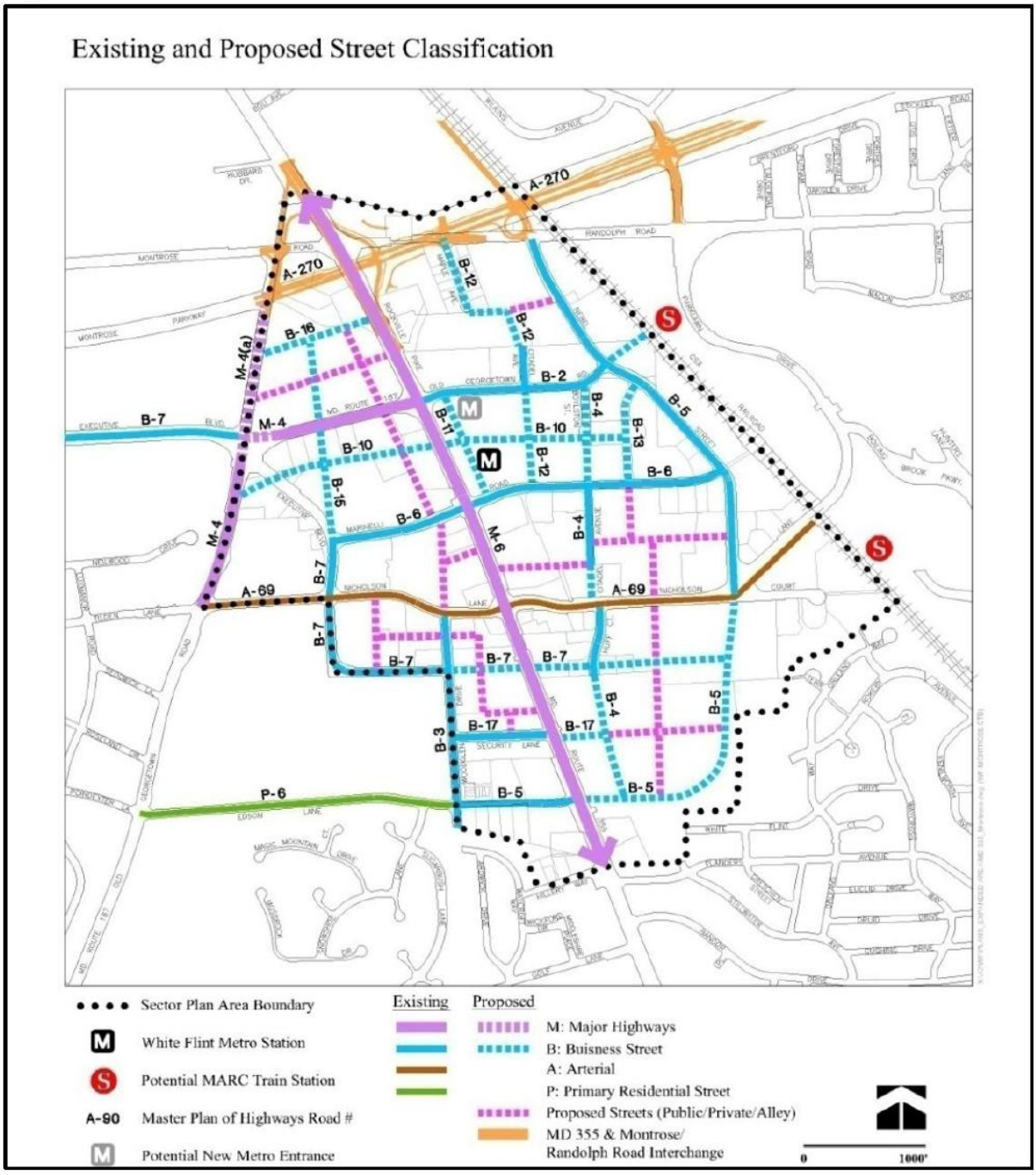
- A network of traffic-carrying, master-planned, business district streets (shown as blue lines on Figure 33 of the Plan) designed to reflect the County's new Road Code emphasis on multimodal access and stormwater management. Special attention is paid, and will continue to be needed during implementation, to the construction of new street connections in the White Flint Mall and Mid Pike Plaza / Metro West districts.
- A secondary network of conceptual business district street connections (shown as fuschia lines on Figure 33 of the Plan) that will provide internal site accessibility with a focus on enhancing pedestrian connectivity by reducing block size. These streets also provide opportunities to establish shared streets with a greater emphasis on public realm objectives beyond the transportation function. Some of these streets and alleys may, like Ellsworth Avenue in Silver Spring, be privately owned and operated and therefore may not conform to County design standards. These streets are therefore not included in Table 5 of the Public Hearing Draft Plan identifying required functions, number of through travel lanes, and rights-of-way.

Specific streets described in the Plan and this Appendix includes:

- A reconstructed, pedestrian-friendly Rockville Pike that will incorporate Bus Rapid Transit (BRT) treatments,
- a reconstruction of Old Georgetown Road (MD 187) and Executive Boulevard to facilitate north-south traffic movement along the western Plan boundary (as opposed to the existing pattern directing MD 187 traffic to MD 355 at the Metrorail Station),
- a Town Center area focused around a new east-west Main Street (B-10), and
- networks of master planned local streets within the White Flint Mall, Mid-Pike Plaza, and Metro West districts

Figure 6: Sector Plan Street Network

Figure 33



Master Planned Business Streets

The White Flint Sector Plan has a primary street network that includes major highways, arterials, and master-planned business streets. These streets are required elements of the sector plan and associated development; these streets should be built according to County design standards to accommodate both regional (for major highways and arterials) and local (for business streets) travel needs.

Section 49-31 of the County Code defines the functional classification system for roadways, including:

- A Major Highway is a road meant nearly exclusively for through movement of vehicles at a moderate speed. Access must be primarily from grade-separated interchanges and at-grade intersections with public roads, although driveway access is acceptable in urban and denser suburban settings.
- An Arterial is a road meant primarily for through movement of vehicles at a moderate speed, although some access to abutting property is expected.
- A Business District Street is a road meant for circulation in commercial and mixed-use zones.
- A Primary Residential Street is a road meant primarily for circulation in residential zones, although some through traffic is expected.

The White Flint Sector Plan development proceeded in tandem with the development of the County's Road Code (Chapter 49) in 2006 and design standards (Executive Regulation 31-08) in 2007 and 2008. Executive Regulation 31-08 stresses the need to develop context-sensitive solutions; street designs that reflect and emphasize the planned adjacent land uses. The design guidance reflects the facts that while the County formally have rural, suburban, and urban areas, a continuum exists both across and within those three designations.

The Sector Plan proposes that White Flint become as urban as any location in the County, with allowable Floor Area Ratios (FAR) of 2.5 to 4.0 throughout the Plan area, as indicated in Figure 17 in the Public Hearing Draft Plan. The White Flint street network of the future will both appear and function more like those in Bethesda and Silver Spring do today. The business street system is therefore intended to be a slow-speed environment, with both the public and private realms designed to emphasize a 25 MPH target speed.

The exception to the 25 MPH target speed designation is Montrose Parkway. Montrose Parkway has an arterial function much broader than the White Flint Sector Plan area. The I-270 corridor in general is a jobs-intensive corridor, and both Rock Creek and the CSX tracks are barriers (one natural and one man-made) between the jobs in the I-270 corridor and the housing-rich communities of Olney, Aspen Hill and Kensington/Wheaton.

High-quality connections for both autos and transit across these barriers are limited to a few key routes:

- Montrose Parkway
- Norbeck Road / Gude Drive
- Intercounty Connector

The target speed for Montrose Parkway is set at 35 MPH, recognizing that this facility will pass through a heavily developed commercial area, but that primary access to the adjacent land uses will not be to and from Montrose Parkway.

Secondary Grid of Local Streets and Alleys

Figure 33 of the Plan describes a secondary street system of streets and alleys that will be developed to nest within the master planned business street system. These streets are designed to facilitate site access (particularly for the larger development sites), improve the granularity and permeability of the network to enhance pedestrian and bicycle mobility, and provide flexibility for private street treatments such as festival streets, shared streets, and streets located above underground parking structures. Notable considerations include:

- Extension of Woodglen Drive north from Nicholson Lane to the Mid-Pike Plaza district as a service access roadway parallel to Rockville Pike,
- development of a grid of streets in the NRC district. Due to security concerns and space constraints, the proposed east-west connection between Rockville Pike and Citadel Avenue would likely be limited to a 20' wide alley for non-motorized vehicles only; this is the only street on Figure 33 of the Plan for which vehicular access is not anticipated, and
- development of a grid of streets serving White Flint Mall that would be implemented at such time that the mall structure itself is redeveloped.

These streets are not explicit elements of the master planned street network. They are, however, needed for pedestrian connectivity purposes. Maximum block lengths of 350' should be considered an element of master plan consistency in the site plan review process.

MD 355 / Rockville Pike

The Plan proposes a reconstruction of MD 355 to improve pedestrian access and comfort, increase pervious area, and facilitate transit priority treatments.

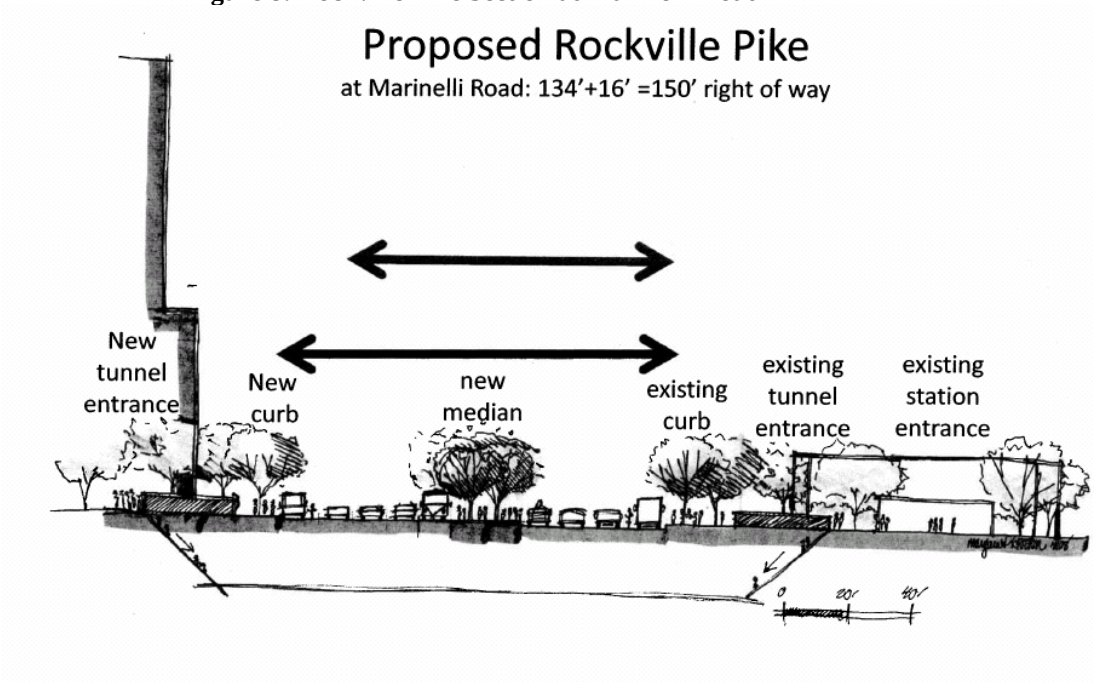
Figures 7 and 8 show the boulevard concept for the Pike, including:

- Maintenance of the three continuous through travel lanes,
- expansion of the median allowing development of separate left turn lanes with sufficient space remaining for landscaping and pedestrian refuge, and

- development of a curb lane designed for bus-priority treatment and bicycle use during peak periods and the potential for considering off-peak period parking should adjacent land uses require parking.

Figure 7: Rockville Pike Boulevard Concept

Figure 8: Rockville Pike Section at Marinelli Road



The plan for the Pike reflects the fact that expansion on the east side is constrained by the proximity to the Metrorail Red Line tunnel and security requirements for the Nuclear Regulatory Commission. The Sector Plan recommends a 150' wide right-of-way for the Pike which would require 75' of dedication on each side of the current centerline. Staff studies for the Pike indicate that a westerly realignment of the roadway centerline may be

needed to accomplish the plan goals; such a realignment that held the roadway eastern curb line constant would result in right-of-way needs along the roadway's western edge.

The Sector Plan recommends two new local street crossings of Rockville Pike at full-movement, signalized intersections; Main Street (B-10) and Executive Boulevard Extended (B-7). The Plan also recommends converting driveway access points into full-movement signalized intersections at Mid-Pike Plaza (B-16), and the White Flint Mall access points at Security Lane (B-17) and Nebel Street Extended (B-5). These full-movement crossings will improve vehicular and pedestrian access across Rockville Pike.

Maryland State Highway Administration (SHA) staff have participated in both White Flint Sector Plan meetings and the Rockville Pike Corridor Master Plan being developed by the City of Rockville. Both plans envision a reconstruction of Rockville Pike, although with slightly different typical sections (the City of Rockville is contemplating retaining the current narrow median and implementing continuous service roadways in a multiway boulevard concept). The Montrose Parkway interchange, currently under construction, provides a logical pivot point from which the two different typical sections might be developed so there is no need to develop a single, consistent section for the two plan efforts.

The SHA would need to lead the development and evaluation of any substantial reconstruction of Rockville Pike in White Flint, including the proposed concept shown in Figure6. This development and evaluation process would begin with a Project Planning study that considers the Sector Plan concept and possible modifications to it and the process would continue with Preliminary Engineering. This process requires the inclusion of the Pike reconstruction in the County's priority list to the state delegation. The project planning and preliminary engineering processes combined typically require three to five years for a project such as the proposed Pike reconstruction, assuming that the project remains at the top of the County's priority list. The White Flint Sector Plan recommends the establishment of a White Flint Redevelopment Implementation Authority, in part to infuse the property owner and community stakeholder interests into the County's priority setting process with an independent funding source to sponsor a quick rise to the top of the priority list.

Old Georgetown Road and Executive Boulevard Realignment

The Sector Plan recommends the realignment of Old Georgetown Road and Executive Boulevard to form a more regular grid of streets, thereby increasing redevelopment potential by creating more efficient block shapes. Three related roadway system improvements are needed to straighten and realign the roadway grid in this area:

- The abandonment of existing Executive Boulevard between Old Georgetown Road and Marinelli Road,
- the establishment of a new alignment for a north-south business street (B-15) from the Executive Boulevard/Marinelli Road intersection extending north into the Mid-Pike Plaza development, and
- the establishment of a new alignment for an east-west business street (B-10, or Main Street) from Rockville Pike to Old Georgetown Road.

This realignment also facilitates the movement of traffic along Old Georgetown Road from I-270 toward the Montrose Parkway and points north and east. Currently, this traffic follows Old Georgetown Road to meet Rockville Pike in the center of the Sector Plan area.

This connection would carry approximately 28,000 vehicles per day along "Old" Old Georgetown Road between Executive Boulevard and Montrose Parkway. Without this connection, this traffic would either be directed toward Rockville Pike (increasing pressure to widen the Rockville Pike / Old Georgetown Road intersection at the northern Metrorail station entrance where pedestrian mobility needs are highest) or to cut through the Mid-Pike Plaza development on local street B-15.

Substantial coordination with Maryland SHA, area property owners, and County Executive branch agencies is needed to implement this improvement. The Maryland SHA is establishing stormwater management for the Montrose Parkway interchange at the southern end of the existing "Old" Old Georgetown Road cul-de-sac, and this stormwater management will need to be relocated in conjunction with roadway realignment and property redevelopment. The network of local streets will need to be renamed in a manner that minimizes disruption and confusion. A through route for MD 187 will need to be established; staff recommends that MD 187 be re designated from the east-west portion of Old Georgetown Road (M-4) to the extension of "Old" Old Georgetown Road (M-4a).

Main Street (B-10) and Associated Promenade

The Sector Plan recommends the development of an east-west Main Street (B-10) in a 70' wide right-of-way connecting Old Georgetown Road at its west end with the North Bethesda Town Center grid of streets at its east end. LCOR development plans have shown this roadway labeled as McGrath Boulevard to the east of Rockville Pike. To the west of Rockville Pike, a separate promenade treatment will be developed outside the roadway right-of-way on the south side as described in the Plan.

White Flint Mall District

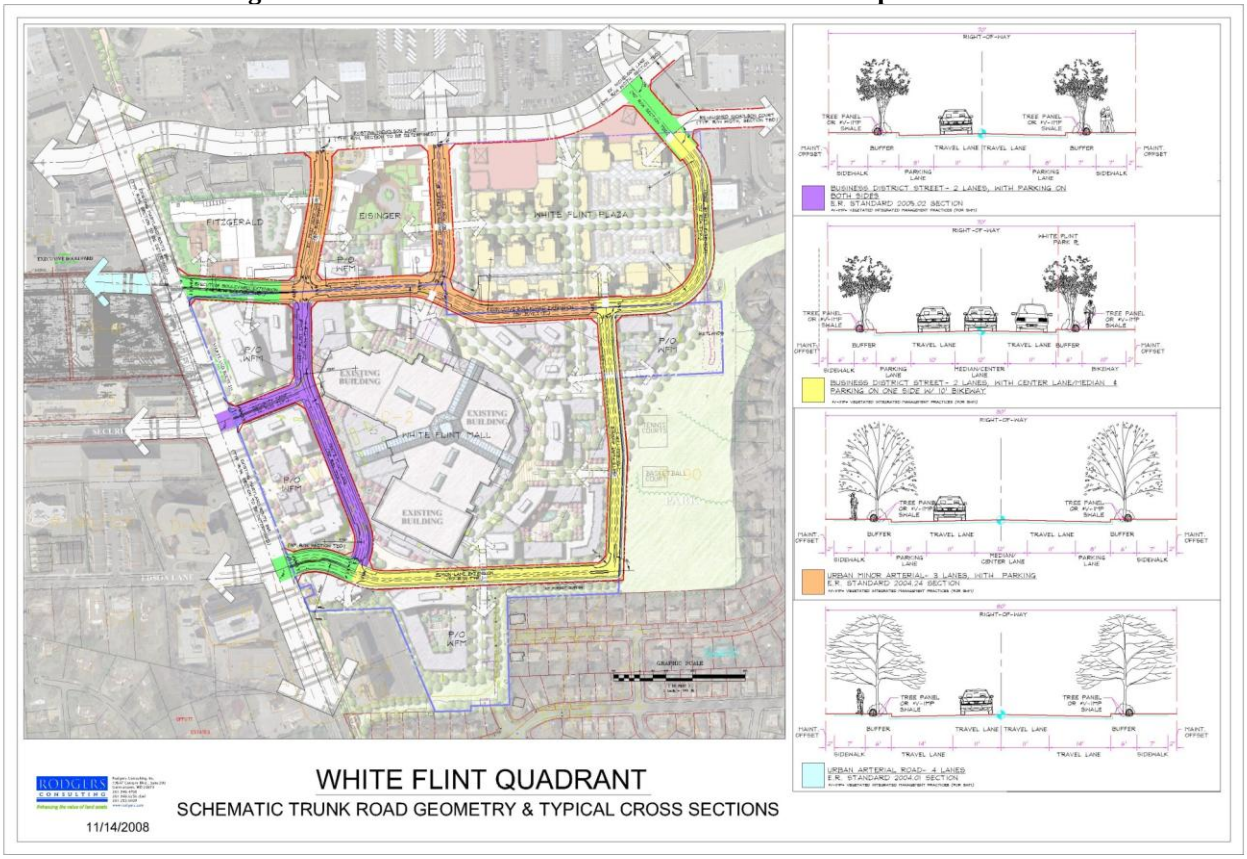
The establishment of a roadway network in the White Flint Mall District exemplifies the need for both master plan guidance and property owner coordination. One of the explicit purposes of the Plan is to develop details regarding the design and location of Executive Boulevard on the east side of Rockville Pike. Figure 9 shows a conceptual proposal for this street grid, developed November 14, 2008, which reflects the intent of the Public Hearing Draft Sector Plan to include:

- Establishment of Executive Boulevard Extended eastward from Rockville Pike with appropriate sharing of access by confronting redevelop able properties, yielding a slightly curvilinear alignment than suggested in the Sector Plan,
- establishment of Nebel Street Extended as a compound roadway with two 90-degree turns. The northern 90-degree turn is at the junction with Executive

Boulevard Extended in a standard T-intersection configuration and facilitates the development of the property in this intersection's southeast quadrant as a potential elementary school site. The southern 90-degree turn occurs at the southeast quadrant also facilitates site development better than a horizontal curve design would and facilitates future development of a potential eastern leg providing access to park property, and

- relocation of Nicholson Court at Nebel Street Extended to facilitate through movement along Nebel Street Extended and a 90-degree intersection configuration at Nicholson Lane.

Figure 9: White Flint Mall District Street Network Concept



The primary differences between the Sector Plan recommendations and the concept shown in Figure 9 are that the full grid of planned local streets across the White Flint Mall site are not incorporated in Figure 9 and that Nebel Street Extended is proposed as a 2-lane roadway in Figure 9 rather than the 4-lane roadway proposed in the Plan. The status of the Plan's bike lanes along Nebel Street Extended is not specifically identified in Figure 9. These differences will be addressed during Planning Board work sessions.

Mid-Pike Plaza and Metro West Districts

The Sector Plan recommends two key business streets (B-16 and B-17) to serve the Mid-Pike Plaza District and provide access to the major highways that form the District's

boundaries: Rockville Pike (M-6) to the east, Old Georgetown Road (M-4) to the south, and "Old" Old Georgetown Road (M-4a) to the west.

The street system shown in Sector Plan Figure 33 builds upon the existing driveway access plans, with the business district streets B-16 and B-17 intersecting the existing state highways MD 355 and MD 187 at existing signalized intersections and the secondary streets intersecting the state highways where Mid-Pike plaza currently has driveway access. Further analysis will be required to establish more precise centerlines in coordination with the Metro West district. Staff held meetings with property owners in this district to facilitate private sector development of a more coordinated concept for local streets as shown for the White Flint Mall district in Figure 9.

D. Bicycle and Pedestrian System

The bicycle and pedestrian system recommendations for White Flint will be implemented through a combination of land use and zoning policies, local street network implementation, and pedestrian access and safety improvements.

Bikeway Network

Figure 34 of the Public Hearing Draft Plan proposes a bikeway system with two key elements:

- An off-road, shared-use path system that connects White Flint to other areas of the County via the Montrose Parkway and North Bethesda Trolley Trail, and
- an emphasis on shared-road bikeways within the Plan area, considering the 25 MPH target speeds that facilitate shared space, rather than separated modal facilities and the Road Code emphasis on bike accommodation on all streets.

Off-road shared use paths and on-road bicycle accommodations serve different markets; most of the active bicyclist community is interested in quality on-road bike accommodation. The number of off-road paths in the Plan is therefore fairly minor; great pedestrian facilities are recommended in promenades and heart-smart trails, but space for off-road shared use paths are limited to those connections needed to the regional recreational trail system.

The need for striped bicycle lanes on urban roadways is a matter of agency and staff judgment, and is one of the items still to be resolved in developing design standards for the 2007 Road Construction Code.

In September 2007, the Planning Board supported the staff position on the Road Code that marked bike lanes should generally be provided as a matter of course on roads with daily traffic volumes of more than 20,000 vehicles per day or a posted speed of 45 MPH or greater. In the White Flint Sector Plan, the roadways are all recommended to have a

target speed at 25 MPH or 35 MPH. The state highways (MD 355, MD 187), Montrose Parkway, Nicholson Lane, and the northern portion of Nebel Street are the roadways with traffic volumes forecast higher than 20,000 vehicles per day.

The design for Rockville Pike will improve bicyclist accommodation as bicycles can share the curb lane with transit vehicles during peak periods. Still, the traffic volumes and number of lanes will still make on-road bike travel intimidating for a proportion of bike users.

Furthermore, the Plan contemplates off-peak period parking along portions of the Pike, and marked bike lanes are incompatible with off-peak period parking. Therefore, the Sector Plan recommends bicycle lanes along Nebel Street (and its southerly extension) to serve as a north-south bicycle arterial and an alternative to Rockville Pike. Nebel Street is a suitable location for bicycle lanes because it serves the eastern side of the Plan area where less intense land uses are expected and the number of cross street and driveway interruptions is relatively low.

In the east-west direction, the Plan recommends bike lanes along Marinelli Road to provide bike access to the Metro West, Metro East, and NRC districts and as an alternative to Nicholson Lane, where right-of-way is more constrained.

Property owners in the White Flint Mall District are interested in developing Nebel Street without the space required for separate bicycle lanes. During the Planning Board's work sessions, the desirability of separate bicycle lanes along Nebel Street compared to additional development footprint and context in the White Flint Mall District will be discussed.

Pedestrian and bicyclist access and safety

The Sector Plan recommends designating the White Flint Sector Plan area a Bicycle and Pedestrian Priority Area. Per the annotated Code of Maryland, this designation would facilitate targeting available state funds to areas of the state with the greatest needs (Section 2-604) and implement plans that increase safety and access for bicycle and pedestrian traffic (Section 8-204).

Pedestrian and bicyclist access and safety in the White Flint Sector Plan area will be pursued further through several initiatives, including:

- design standards to implement the County's Road Code,
- design guidelines for private sector development in the plan area,
- zoning requirements for bicycle parking and other amenities, and
- engineering, education, and enforcement programs under the County Executive's Pedestrian Safety Initiative.

In 2007, the County Council adopted several amendments to Chapter 49 of the County Code concerning streets and roads to improve pedestrian and bicycle accommodation, stormwater management, and context-sensitive design. In December 2008, the Council

approved Executive Regulation 31-08 AM, Context Sensitive Road Design Standards, which specify certain design standards and processes for implementing the revised road construction code, most notably the typical cross-section standards for many types of roads and streets, the required stormwater management criteria for capturing runoff within the right-of-way, and considerations for establishing target speeds and street tree placement. Continued effort is needed to complete the range of street design standards and intersection design standards that will be needed to promote pedestrian and bicyclist access and safety in new or reconstructed roadway design.

The Planning Board will adopt Design Guidelines within White Flint that will provide guidance for the pedestrian realm to improve access, comfort and safety, including:

- building orientation to maximize pedestrian accessibility
- street tree planting
- design treatments for sidewalks and driveways
- street lighting
- signing and marking

The draft Plan proposes application of the TMX zone for much of the White Flint Sector Plan area. This new zone is designed to facilitate pedestrian access and safety through several means:

- pedestrian-oriented activity at street level with uses such as storefront retail and restaurants,
- safety-oriented environmental design including clearly marked sidewalks and crosswalks,
- street trees providing canopy and landscaping on all streets, including street furniture such as benches, trash receptacles, and planters, and
- continuous, direct, and convenient connections to transit stations for pedestrians and bicyclists.

As both public and private sector projects are implemented, all agencies need to elevate pedestrian and bicycle access and safety considerations in the review of design and operational elements, including:

- maximum curb radii of 30',
- signal timing, including pedestrian countdown signals that provide the ability to complete roadway crossing at a speed of 2.5 feet per second or slower, including at least five seconds of startup time (and greater where pedestrian volumes result in platooning),
- maximum crosswalk lengths of 60' between pedestrian refuges
- accessible bus stop locations at or near marked crosswalks,
- signing and marking per the Manual on Uniform Traffic Control Devices, including marked crosswalks on all approaches to signalized intersections and elimination of lane markings across intersections,

- street lighting designed to improve the visibility of pedestrians at levels specified by the Illuminating Engineering Society of North America, and
- design of mixed-use streets and pedestrian walkways/alleys using Crime Prevention Through Environmental Design criteria.

E. Transportation System Policies

The Sector Plan contains two policy recommendations that are independent of implementation and staging proposals; expansion of the Metro Station Policy Area (MSPA) boundary and establishment of a proactive system to manage the supply of long-term parking spaces.

White Flint Metro Station Policy Area Boundary

The White Flint Sector Plan recommends that the boundaries of the White Flint Metro Station Policy Area (MSPA) be revised to be coterminous with the current Sector Plan boundaries. The proposal to revise the MSPA boundaries to incorporate both the Mid Pike Plaza and White Flint Mall properties predates the current Sector Plan and was recommended on page 4 of the 2005 Growth Policy proposal presented to the County Council on November 1 of that year.

In summary, the proposal to revise the Growth Policy boundaries reflects the fact that most of the County's MSPA boundaries are located about one-half mile away from the Metrorail station and revising the White Flint MSPA boundaries should similarly be revised to promote transit-oriented development within walking distance of the Metrorail station. The recommended revision increases the number of intersections at which the 1800 CLV intersection congestion standard applies, as discussed in Chapter 3 of this Appendix.

Parking Management

The Public Hearing Draft of the White Flint Sector Plan recommends establishing a Parking Lot District (PLD) to actively manage parking demand. This recommendation reflects an emphasis in the Planning Board and planning staff priorities in applying parking management strategies to help affect a modal shift from private auto to transit and non-motorized travel.

From a private-sector perspective, parking management is enhanced through reduced parking requirements specified in the proposed TMX zone, including one space per residential unit (and 0.5 spaces per moderately priced dwelling unit) and incorporation of the lower parking requirements in the southern area of the County (inside the Beltway).

Figure 10 shows that about 48,600 jobs in the Sector Plan area are expected to result from the land use assumptions in Scenario 12 (the recommended plan).

Figure 10: Weekday Long-Term Parking Space Demand

Commercial Land Use Type	Total Square Footage	Assumed Square Feet per Job	Number of Jobs	Demand for Weekday Long-Term Parking Spaces
Office	7.68M	225	34,100	20,800
Retail	3.80M	400	9,500	5,800
Industrial	0.93M	450	2,100	1,300
Other	1.45M	500	2,900	1,800
TOTAL	13.86M		48,600	29,700

With a Sector Plan NADMS goal of 39%, the 48,600 jobs translate to an expectation of approximately 29,700 employees that will need parking in the Sector Plan area. On a typical weekday, slightly more than 10% of employees are absent (on leave or business away from the office). Conversely, parking garage design typically requires consideration of peak daily and seasonal accumulation factors of about 10% to 15%, reflecting the fact that when parking space capacity becomes constrained, vehicle-miles of travel (VMT) may actually begin to increase as motorists hunt for spaces.

The County currently has four Parking Lot Districts, in Silver Spring, Bethesda, Wheaton, and Montgomery Hills. In these PLDs, whose establishment dates to the 1950s, the primary value was to leverage the value in County-owned land to spur economic development. In White Flint, there is not as much publicly owned land and the economic development needs are not as compelling. However, the need to efficiently manage parking supply and demand is of increasing importance throughout the County. Therefore, while the Public Hearing Draft Plan uses the term Parking Lot District, the objective is to create a mechanism that will, in conjunction with the White Flint Redevelopment Implementation Authority described on page 79 of the Public Hearing Draft Plan, manage the long-term commercial parking capacity for both public and private properties. During the Planning Board work sessions, the term "Parking Management Authority" may be determined to be more appropriate.

Based on experience in the Bethesda and Silver Spring CBDs, staff estimates that even with a mature Parking Lot District, about 70% of the long-term parking spaces for commercial properties might be expected to be provided by the private sector. Therefore, approximately 9,000 parking spaces might ultimately need to be provided in publicly accessed garages. The most recently constructed or proposed public parking garages include above-ground garages in Downtown Silver Spring with about 1,500 spaces per garage and the proposed below-grade Lot 31 garage in Bethesda with 1,100 public spaces and 300 privately controlled spaces.

Figure 35 of the Public Hearing Draft Plan identifies eight locations where public parking garages may be feasible. These sites include:

- Government-owned property such as the State Highway Administration land at the Montrose Parkway interchange and the County-owned Conference Center site,
- land controlled by the Washington Metropolitan Area Transit Authority WMATA, both in the North Bethesda Town Center and at the adjacent bus maintenance facility to the south; and the Washington Suburban Sanitary Commission (WSSC), and
- private sector redevelopment opportunities in the Mid-Pike Plaza and White Flint Mall Districts, where parking management opportunities may include private parking garages for general public use or condominium operational arrangements with the public sector.

F. Staging

The White Flint Sector Plan recommends a staged implementation that requires the completion of certain transportation infrastructure within each stage and a progressive achievement toward the planned NADMS in stages generally proportional to the assumed land use growth.

The staging plan recommends a biennial monitoring program of the Sector Plan area. This program would build upon the reporting process for the North Bethesda Transportation Management District (TMD). This reporting process includes the following elements:

- Employer-based surveys to establish the non-auto driver mode share (NADMS), and
- traffic data collection during weekday peak periods to establish intersection levels of service using the CLV process.

Public interest in monitoring transportation conditions suggest that additional resources might be valuable to conduct additional monitoring studies, listed below in generally increasing levels of effort:

- Measurement of peak period, midday and weekend traffic volumes along MD 355,
- measurement of peak period, midday and weekend travel speeds along MD 355,
- measurement of peak period cordon line traffic volumes, and
- transportation network analysis using a delay-based simulation tool such as Synchro to reflect both area wide travel conditions and short-term (i.e., 5-year) forecast conditions.

The White Flint Sector Plan recommends that the staging plan use the non-auto driver mode share for determining staging success. Other performance measures such as cordon line volumes or travel speeds could be developed as a staging mechanism, providing that

performance standards are defined and monitoring elements are funded through either the public sector or the proposed development authority.

G. Implementation

The White Flint Sector Plan proposes the establishment of the White Flint Redevelopment Implementation Authority, an innovative implementation program designed to accomplish three objectives:

- Ensure that the infrastructure required for the Plan is affordable and apportioned equitably among public and private stakeholders, and
- manage infrastructure prioritization and delivery to avoid "lumpy" infrastructure delivery typical of the development review exaction process

Figure 11 summarizes the transportation infrastructure costs by Sector Plan stage and expected responsibility. The capital cost estimates reflect the following assumptions:

- State projects include the Montrose Parkway interchange and the extension of Montrose Parkway east to the CSX tracks (Phase II of the SHA project for Rockville Pike / Montrose Road interchange improvements). The $20M estimated cost for the latter improvement is symbolic as there are no proposals to construct the roadway up to, but not across, the CSX tracks.
- Local projects include the portions of Nebel Street Extended (north of Randolph Road), Chapman Avenue, and Citadel Avenue already in the County's implementation program.
- Private projects include those portions of the public street system described in Table 5 of the Public Hearing Draft Plan that are in control of individual property owners and would be required for internal site access and design (such as Mid Pike Plaza, North Bethesda Town Center, and White Flint Mall).
- District projects are those assumed to be the responsibility of the White Flint Redevelopment Implementation Authority, including the construction or reconstruction of:
    - Rockville Pike ($66M),
    - Metrorail Station north entrance ($25M)
    - MARC station and supporting access ($13M)
    - Circulator shuttles ($5M)
    - Local streets not required for site access and design ($62M)
- Right-of-way costs are not included in the cost estimates. New streets in the network are located where redevelopment is expected to occur so that, in a typical development process, right-of-way dedication would generally be expected, with density calculated from the gross tract area prior to dedication. The White Flint Redevelopment Implementation Authority will have two options for addressing right-of-way acquisition:
    - establish an infrastructure delivery process by which right-of-way is acquired from its members without fee simple acquisition at a cost to the public sector, or

- revision of financing schema to include right-of-way acquisition costs, which staff estimates could increase capital costs by $130M, based on the extent of "district" street and roadway projects and the fact that right-of-way costs for new streets in urban areas often equal the remaining capital construction costs.

- Roadway capital costs are based on the following unit costs:
  - $50M per mile for Rockville Pike reconstruction based on cost estimates for similar portions of New York Avenue in Washington DC and US 1 in College Park, MD.
  - $25M per mile for local roadway construction, based on the County's four-lane Nebel Street Extended project (CIP project 500401) at $26M per mile and two-lane Citadel Avenue (CIP project 500310) at $24M per mile

Figure 11: Estimated Transportation Network Infrastructure Capital Costs

White Flint Sector Plan
Public Facilities Staging Plan

Staff Draft - September 22, 2008
Estimated Capital Cost by Stage

	State	Local	Private	District	TOTAL
Public Transit Elements					
Stage One	$ -	$ -	$ -	$ 26.50	$ 26.50
Stage Two	$ -	$ -	$ -	$ 3.00	$ 3.00
Stage Three	$ -	$ -	$ -	$ 13.00	$ 13.00
TOTAL	$ -	$ -	$ -	$ 42.50	$ 42.50
Streets and Bikeways					
Stage One	$ 47.20	$ 20.10	$ 7.50	$ 27.50	$ 102.30
Stage Two	$ 20.00	$ -	$ 43.75	$ 32.75	$ 96.50
Stage Three	$ -	$ -	$ 9.25	$ 68.50	$ 77.75
TOTAL	$ 67.20	$ 20.10	$ 60.50	$ 128.75	$ 276.55
Total Transportation Network Elements					
Stage One	$ 47.20	$ 20.10	$ 7.50	$ 54.00	$ 128.80
Stage Two	$ 20.00	$ -	$ 43.75	$ 35.75	$ 99.50
Stage Three	$ -	$ -	$ 9.25	$ 81.50	$ 90.75
TOTAL	$ 67.20	$ 20.10	$ 60.50	$ 171.25	$ 319.05

H. Summary of Changes to the 1994 Plan

This section summarizes the proposed changes to the transportation system in the 1994 North Bethesda-Garrett Park Master Plan and the 2000 Montrose Parkway Limited Master Plan Amendment that combined the function of the prior Montrose Parkway crossing of Rockville Pike with existing Montrose and Randolph Road:

- Establish a Parking Lot District or similar parking management authority.
- Move the proposed MARC station from Montrose Crossing to the Montourri property.

- Remove the Rockville Pike/Nicholson Lane interchange, replaced by a more robust network of local streets in the southeastern quadrant of the Sector Plan.
- Reconstruct Rockville Pike within a 150' right-of-way.
- Reorient the Old Georgetown Road intersection with Executive Boulevard.
- Establish a robust public business street network, with notable changes to the 1994 Plan including
    - the addition of Main Street (B-10), Nebel Street Extended (B-5), and street grid extensions within the Mid-Pike Plaza (B-15, B-16) and White Flint Mall (B-4, B-17) districts
    - the downgrading of the portion of Woodglen Drive (B-3) between Marinelli Road and Nicholson Lane from formal business street status to recognize the importance of the connection but the finding that dedication and construction of the roadway as a standard business street in the planned 70' right-of-way is not feasible.
- Establish a secondary grid of local streets and alleys.
- Expand the White Flint Metro Station Policy Area to match the Sector Plan boundary.
- Establish the White Flint Redevelopment Implementation Authority to manage transportation system implementation.

3. Transportation/Land Use Balance

The White Flint Sector Plan transportation analyses reflect the procedural guidance established by the County Council's growth policy. This guidance is described below, followed by additional description of regional transportation and land use assumptions and a brief summary of the alternative local land use scenarios analyzed.

The White Flint Sector Plan proposes a level and mix of development comparable to that included in the Bethesda CBD and Silver Spring CBD Sector Plans. As shown in Figure 12, all three sector plan areas are centered on a Metrorail station, are designated Metrorail Station Policy Areas (with a few very minor parcel-specific exceptions), and are of similar geographic size.

Figure 12: Land Use Comparison to Bethesda and Silver Spring

Sector Plan	Acres	Existing		Future	
		Jobs	HH	Jobs	HH
Bethesda	407	35,800	6,700	50,900	9,400
Silver Spring	367	30,400	5,600	45,700	8,100
White Flint	430	18,100	2,100	48,600	12,300

The Bethesda CBD forecasts shown above are from the April 2004 staging analysis prepared for the Planning Board in moving from Stage I to Stage 2 of the 1994 Bethesda CBD plan. The Silver Spring CBD forecast shown above are from the Silver Spring CBD 2001 Sector Plan. In both Bethesda and Silver Spring, subsequent demographic forecasts have reflected the policy interest to shift new development from jobs toward

housing to achieve a better jobs/housing balance, so the Round 7.1 forecasts for both Bethesda and Silver Spring have approximately 10,000 fewer jobs, but the 2030 housing forecasts for both plans are 13,100 and 14,300, respectively.

The primary difference in White Flint is that the change from existing to future is greater than for Bethesda and Silver Spring, a recognition that the transformational growth in the two CBDs inside the Beltway occurred ten to fifteen years ago, whereas that envisioned for White Flint is really just ready to begin.

A. Measures of Effectiveness

The analysis of alternative development scenarios considers three levels of transportation impacts:

- An area wide mobility analysis indicates the degree to which the alternative local land use and transportation scenarios provide an appropriate balance between land use and transportation per current County policies,
- an intersection congestion analysis indicates the degree to which alternative land use or transportation changes affect congestion hot-spots within the Sector Plan area, and
- a cordon line analysis demonstrates the relative effects of vehicles generated by alternative local land use scenarios as compared to through travel

The first two measures are elements of the County's Growth Policy, called Policy Area Mobility Review (PAMR) and Local Area Transportation Review (LATR). Both PAMR and LATR are summarized below and detailed background information is available on the Department's website.

Policy Area Mobility Review

Since the early 1980s, every master plan has considered the "balance" between land use and transportation using an assessment of area wide conditions forecast for end-state conditions for the plan. Policy Area Mobility Review is the current measure of area wide transportation adequacy, introduced into the County Growth Policy in 2007. It is similar in nature to the Policy Area Transportation Review measure that was an element of the Growth Policy since 1982.

PAMR provides a measure of transportation system adequacy considering Relative Transit Mobility and Relative Arterial Mobility for each of the County's policy areas. PAMR is used in the implementation of the Adequate Public Facilities Ordinance (APFO) to forecast conditions considering the County's pipeline of approved development and near-term transportation system improvements for which funding is committed for during the next four years.

PAMR continues a long-standing County policy that higher levels of roadway congestion are appropriate in areas with higher quality transit service. This policy provides

multimodal equity across the county and facilitates the development of pedestrian-oriented, rather than auto-oriented, improvements in Metro Station Policy Areas. Through PAMR, the County Council has established transit and arterial level of service (LOS) standards for each policy area by considering area wide adequacy on two scales:

- Transit LOS is established by considering **relative transit mobility**, defined as the relative speed by which journey to work trips can be made by transit as opposed to by auto, and
- arterial LOS is established by considering **relative arterial mobility**, defined as the relative speed by which auto trips move during peak congestion periods as compared to the free-flow speed.

Relative transit mobility is based on the Transit/Auto Travel Time level of service concept in the 2003 Transit Capacity and Quality of Service Manual published by the Transportation Research Board. It is defined as the relative speed by which journey to work trips can be made by transit, as opposed to by auto. This concept assigns letter grades to various levels of transit service, so that LOS A conditions exist for transit when a trip can be made more quickly by transit (including walk-access/drive-access and wait times) than by single-occupant auto. This LOS A condition exists in the Washington region for certain rail transit trips with short walk times at both ends of the trip and some bus trips in HOV corridors. LOS F conditions exist when a trip takes more than an hour longer to make by transit than by single-occupant auto.

Relative arterial mobility is a measure of congestion on the County's arterial roadway network. It is based on the urban street delay level of service in the 2000 Highway Capacity Manual, published by the Transportation Research Board. This concept measures congestion by comparing modeled (congested) speeds to free-flow speeds on arterial roadways. It then assigns letter grades to the various levels of roadway congestion, with letter A assigned to the best levels of service and letter F assigned to the worst levels of service. For a trip along an urban street that has a free-flow speed (generally akin to posted speed) of 40 MPH, LOS A conditions exist when the actual travel speed is at least 34 MPH, including delays experienced at traffic signals. At the other end of the spectrum, LOS F conditions exist when the actual travel speed is below 10 MPH.

This review of policy areas has been part of the Annual Growth Policy since 1982. During that time, the ACI has also been used in the development of Master Plans to determine whether or not the end-state land use and transportation recommendations of the Master Plan are "in balance". Sector Plan areas typically address roadway capacity needs by intersection improvements rather than roadway widening. Therefore, the AGP process has evaluated Sector Plans in conjunction with the master plan and policy area surrounding the Sector Plan.

The White Flint Sector Plan is located within the North Bethesda/Garrett Park Policy Area. Figure 13 shows the forecast Policy Area Mobility Review conditions for all Policy Areas in the County for 2030 with the White Flint Sector Plan recommendations.

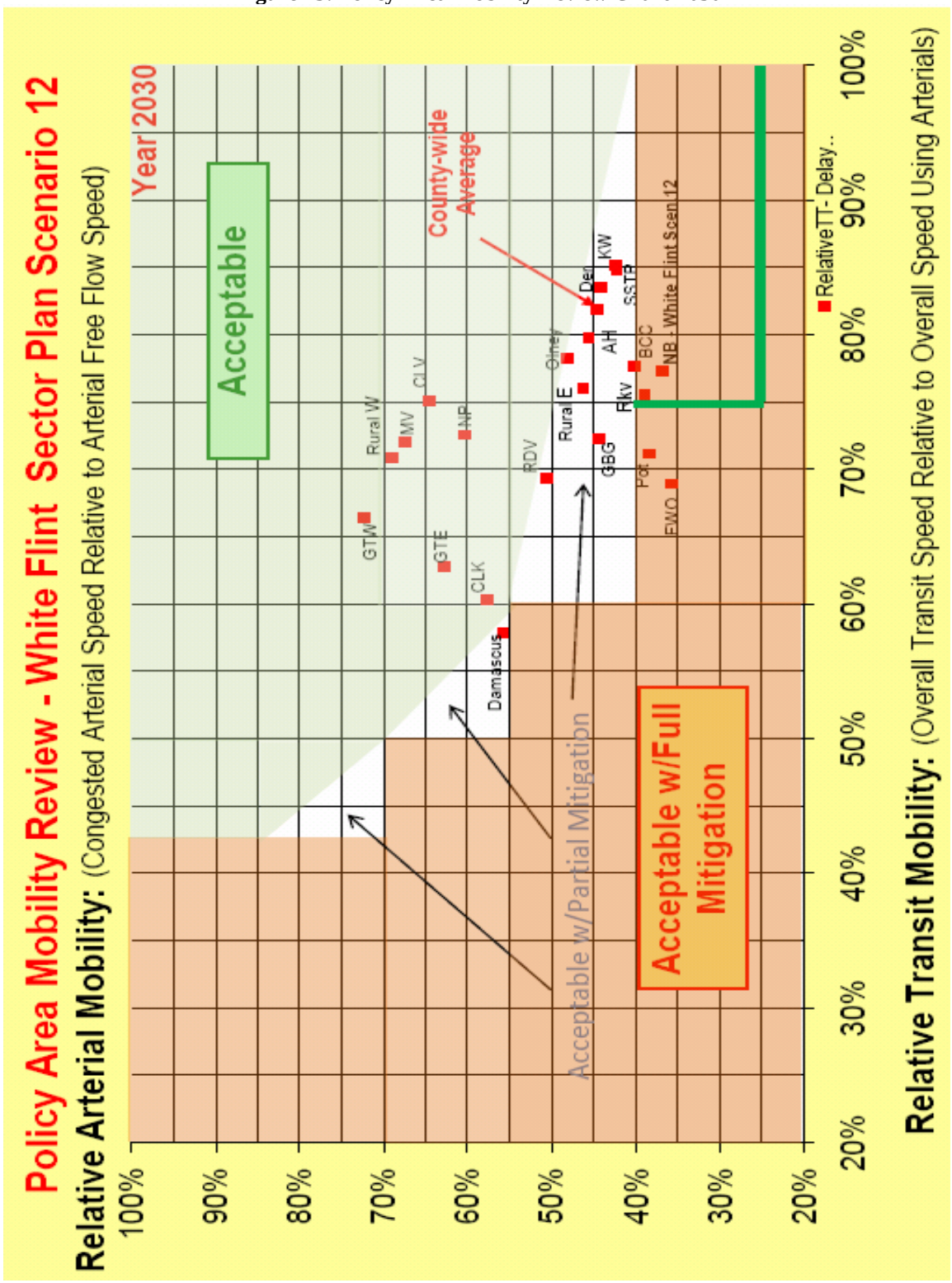
Figure 14 provides a tabular summary of the supporting travel data, including vehicle miles of travel (VMT) and vehicle hours of travel (VHT) for both free-flow and congested conditions. As indicated in Figure13, the North Bethesda Policy Area is forecast to operate at:

- Relative Transit Mobility of 77% (LOS B – between 75% and 100%)
- Relative Arterial Mobility of 37% (LOS E – between 25% and 40%)

The current Growth Policy requires that all Policy Areas have at Relative Arterial Mobility of at least 40%, or LOS D conditions, regardless of the level of transit service provided. Staff proposes that this requirement is too stringent and that higher levels of congestion should be supportable where the Relative Transit Mobility is LOS A or LOS B. Therefore, the Public Hearing Draft Plan results in congestion levels that would require additional mitigation from private development should full buildout occur as forecast and current growth policy standards still apply.

The Planning Board and County Council had several discussions regarding the level of arterial mobility appropriate in areas with excellent transit service as the PAMR process was developed and adopted during 2007. The Planning Board's May 2007 recommendation for PAMR was to allow LOS E arterial mobility in areas with LOS B transit mobility, a concept described by the green line on Figure 13. The Planning Board continues to support this concept.

Figure 13: Policy Area Mobility Review Chart-2030



Derivation of Year 2030 PAMR Results by Policy Area (White Flint Sector Plan Scenario 12 LU Scenario w/Rnd 7.1 Forecast)

			Relative Arterial Mobility				Relative Transit Mobility		
Policy Area	VMT	VHT (free-flow)	VHT (congested)	Free-Flow Speeds	Congested Speeds	Relative Arterial Mobility	Average Arterial Travel Time	Average Transit Travel Time	Relative Transit Mobility
Aspen Hill	192,405	5,874	12,882	32.8	14.9	46%	41.2	51.7	80%
Bethesda/Chevy Chase	399,731	15,688	39,110	25.5	10.2	40%	30.9	39.8	78%
Clarksburg	110,128	3,673	6,359	30.0	17.3	58%	38.1	63.2	60%
Cloverly	98,412	2,442	3,782	40.3	26.0	65%	44.1	58.8	75%
Damascus	92,166	2,284	4,093	40.4	22.5	56%	48.1	83.0	58%
Derwood/Shady Grove	142,859	5,086	11,518	28.1	12.4	44%	37.8	45.3	83%
Fairland/White Oak	389,527	10,282	28,736	37.9	13.6	36%	39.9	57.8	69%
Gaithersburg City	235,077	8,387	18,902	28.0	12.4	44%	35.1	48.6	72%
Germantown East	107,695	3,641	5,797	29.6	18.6	63%	36.8	58.5	63%
Germantown West	149,752	4,903	6,776	30.5	22.1	72%	37.3	56.1	66%
Kensington/Wheaton	478,759	15,069	35,598	31.8	13.4	42%	37.2	43.7	85%
Montgomery Village/Airpark	146,004	4,837	7,165	30.2	20.4	68%	41.6	57.7	72%
North Bethesda	255,117	11,282	30,693	22.6	8.3	37%	29.2	37.7	77%
North Potomac	65,971	2,364	3,919	27.9	16.8	60%	40.8	56.3	72%
Olney	170,857	4,844	10,047	35.3	17.0	48%	47.4	60.6	78%
Potomac	204,413	6,132	15,988	33.3	12.8	38%	38.4	53.9	71%
R & D Village	66,569	2,958	5,847	22.5	11.4	51%	32.0	46.1	69%
Rockville City	277,881	12,025	30,870	23.1	9.0	39%	31.9	42.3	75%
Silver Spring/Takoma Park	277,475	10,616	25,145	26.1	11.0	42%	33.3	39.3	85%
Rural East	612,620	15,620	33,717	39.2	18.2	46%	47.1	62.0	76%
Rural West	244,374	6,640	9,618	36.8	25.4	69%	47.8	67.4	71%
Montgomery County Total	4,717,792	154,649	346,562	30.5	13.6	45%	37.9	46.3	82%

Relative Arterial Mobility measures total PM Peak Period vehicular travel on arterial roadways within each policy area

Relative Transit Mobility measures AM Peak Period travel times for journey-to-work trips originating within each policy area

VMT = Vehicle Miles of Travel

VHT = Vehicle Hours of Travel

Figure 14: Policy Area Mobility Review Table-2030

The assessment of Policy Area conditions in Figures 13 and 14 reflect the recommended plan yield for White Flint and Round 7.1 demographic forecasts for all other areas in the Washington metropolitan region. Therefore, while the exhibits are appropriately labeled with a horizon year of 2030, staff does not expect that the full master plan yield for any of the Policy Areas will be achieved by the year 2030. Figure 15 provides a summary of 2005 PAMR conditions by policy area for comparison purposes. In both 2005 and 2030 conditions, the North Bethesda, Bethesda/Chevy Chase, and Silver Spring/Takoma Park are the three most urban areas in the County, reflected by:

- Shorter than average travel times for journey-to-work by both auto and transit, reflecting the proximity of both local and regional destinations, and
- lower than average roadway network travel speeds for both free flow and congested travel times

Local Area Transportation Review (LATR)

The White Flint Sector Plan supports redevelopment toward a transit-oriented community with an emphasis on pedestrian accessibility, connectivity, and safety. The degree by which additional development can be accommodated within the Sector Plan area by providing additional intersection capacity requires a value judgment regarding the tradeoffs between the level of service afforded to vehicles compared to that provided to pedestrians. Staff interest is in ensuring that no pedestrian crossings are more than 60' in length between curbs and refuge areas; generally equivalent to five travel lanes. Crossings of four lanes or fewer are desirable.

The intersection analysis applies the Critical Lane Volume (CLV) methodology from the Department's Local Area Transportation Review (LATR) guidelines. The CLV values are converted to a volume-to-capacity, or V/C ratio, by dividing the current or forecasted CLV values by the applicable congestion standard.

As shown in Figure 16, the County's Growth Policy establishes acceptable levels of congestion for different policy areas based on the degree to which alternative modes of transportation are available. In rural policy areas, where few alternatives to auto transport exist, the congestion standard is 1350 CLV (which equates to the middle range of LOS D). In Metro Station Policy Areas, where multiple alternatives to auto transport are provided, the congestion standard is 1800 CLV.

The Public Hearing Draft Plan recommends extending the White Flint Metro Station Policy Area to encompass the entire Sector Plan area, so that all intersections in the Sector Plan area would have a congestion standard of 1800 CLV. Currently, some of the intersections have a congestion standard of 1600 CLV.

Derivation of Year 2005 PAMR Results by Policy Area

			Relative Arterial Mobility					Relative Transit Mobility		
Policy Area	VMT	VHT (free-flow)	VHT (congested)	Free-Flow Speeds	Congested Speeds	Relative Arterial Mobility	Average Arterial Travel Time	Average Transit Travel Time	Relative Transit Mobility
Aspen Hill	166,975	4,992	11,141	33.4	15.0	45%	36.4	54.5	67%
Bethesda/Chevy Chase	370,936	14,148	31,264	26.2	11.9	45%	25.8	36.9	70%
Clarksburg	48,985	1,341	2,038	36.5	24.0	66%	38.6	69.9	55%
Cloverly	80,280	1,954	3,398	41.1	23.6	58%	39.8	59.6	67%
Damascus	57,419	1,350	1,749	42.5	32.8	77%	43.5	95.7	45%
Derwood/Shady Grove	128,774	4,337	8,851	29.7	14.5	49%	34.4	50.8	68%
Fairland/White Oak	332,420	9,478	18,794	35.1	17.7	50%	35.4	60.9	58%
Gaithersburg City	187,111	6,483	12,132	28.9	15.4	53%	31.5	56.4	56%
Germantown East	83,578	2,421	4,388	34.5	19.0	55%	35.4	65.6	54%
Germantown West	111,574	3,299	4,525	33.8	24.7	73%	35.7	61.5	58%
Kensington/Wheaton	410,368	12,896	26,052	31.8	15.8	50%	31.7	45.3	70%
Montgomery Village/Airpark	92,853	3,086	5,928	30.1	15.7	52%	38.3	64.9	59%
North Bethesda	194,168	7,893	17,069	24.6	11.4	46%	27.0	39.1	69%
North Potomac	53,299	1,811	2,989	29.4	17.8	61%	36.7	60.6	61%
Olney	136,864	3,972	7,727	34.5	17.7	51%	43.9	72.2	61%
Potomac	180,868	5,290	11,631	34.2	15.6	45%	33.7	54.5	62%
R & D Village	47,322	1,980	2,853	23.9	16.6	69%	30.7	52.2	59%
Rockville City	255,979	10,016	20,932	25.6	12.2	48%	29.1	47.3	62%
Silver Spring/Takoma Park	230,410	8,782	17,926	26.2	12.9	49%	27.7	40.2	69%
Rural East	449,002	11,427	20,928	39.3	21.5	55%	42.9	70.2	61%
Rural West	171,011	4,596	6,411	37.2	26.7	72%	42.7	75.6	56%
Montgomery County Total	3,790,196	121,552	238,726	31.2	15.9	51%	34.2	50.7	67%

Relative Arterial Mobility measures total PM Peak Period vehicular travel on arterial roadways within each policy area
Relative Transit Mobility measures AM Peak Period travel times for journey-to-work trips originating within each policy area
VMT = Vehicle Miles of Travel
VHT = Vehicle Hours of Travel

Figure 15: Policy Area Mobility Review Table-2005

Figure 16: Intersection Congestion Standards by Policy Area

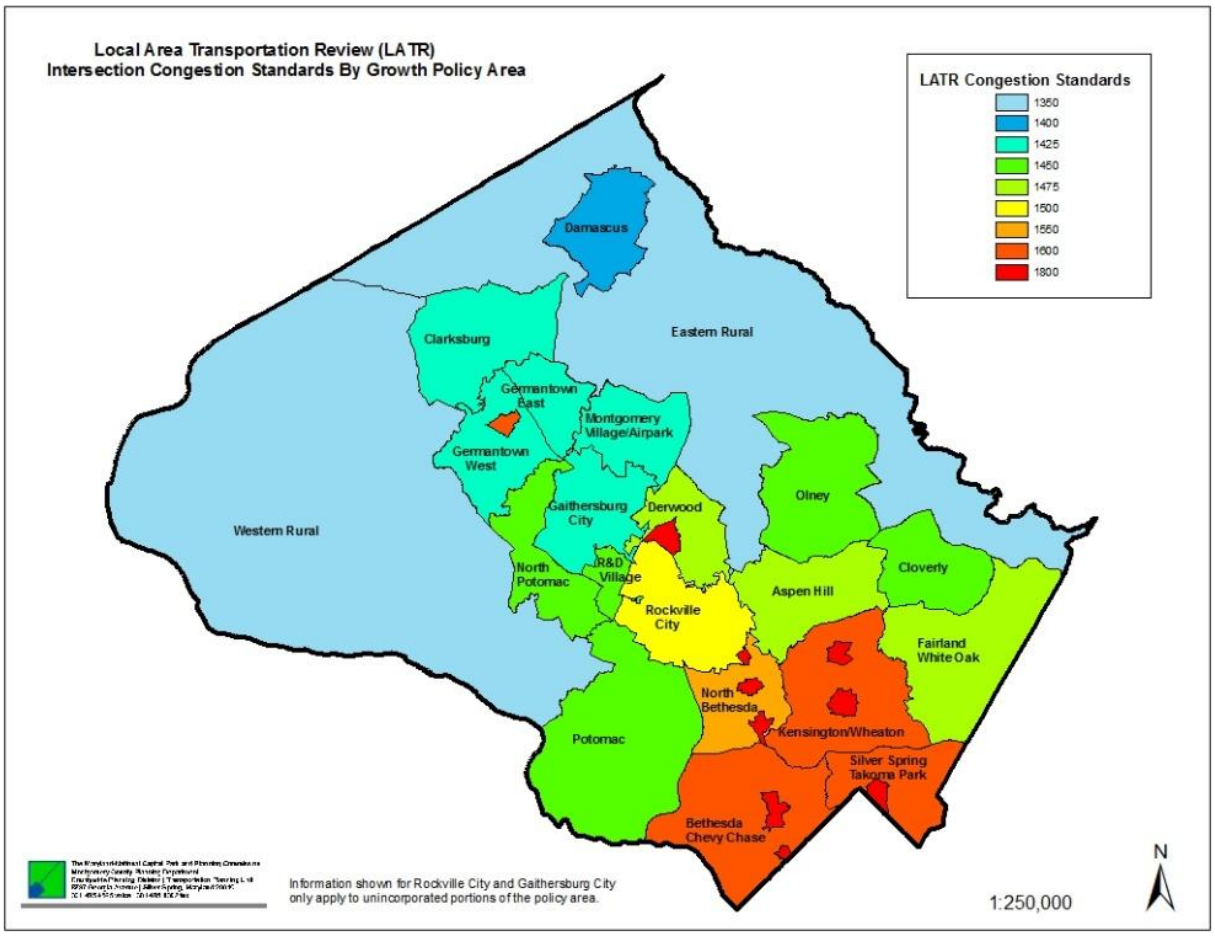


Figure 17 provides a tabular summary of the congested intersections under both existing conditions and the Public Hearing Draft Plan scenario. As indicated in Figure 17:

- None of the intersections in the Plan area currently exceed either the 1600 or 1800 congestion standards.
- Just two of the intersections (MD 355 at Old Georgetown Road and Old Georgetown Road at Executive Boulevard) are forecast to slightly exceed the 1800 CLV congestion standard at Plan buildout during the PM peak hour. Staff finds that the results in Figure 17 reflect an appropriate indicator of balance for 25-year forecasts.

Figure 17: Intersection Analysis

White Flint Sector Plan
Intersection Analyses
Critical Lane Volume and Volume / Capacity Ratios

	Existing Conditions Scenario 0			Public Hearing Draft Plan Scenario 12A7		
Intersection	AM	PM	Max V/C	AM	PM	Max V/C
25 Montrose @ Maple	861	1008	0.56	1559	1629	0.91
31 Nicholson @ Huff	579	758	0.42	1086	1343	0.75
33 Nicholson @ Nebel	832	1188	0.66	1529	1732	0.96
35 Rockville @ Marinelli	1067	998	0.59	1335	1541	0.86
36 Rockville @ Nicholson	1155	1385	0.77	1712	1794	1.00
37 Rockville @ Security	922	994	0.55	1314	1469	0.82
38 Rockville @ Edson	1013	1224	0.68	1493	1609	0.89
106 Rockville @ Montrose	1501	1452	0.83	Replaced by interchange		
107 Rockville @ Mid-Pike	992	1335	0.74	1223	1736	0.96
108 Rockville @ Old Georgetown	1179	1188	0.66	1694	**1830**	**1.02**
109 Executive @ Nicholson	755	751	0.42	935	1201	0.67
110 Old Georgetown @ Mid Pike	633	625	0.35	1261	1284	0.71
111 Old Georgetown @ Executive	1510	1241	0.84	1734	**1800**	**1.00**
112 Old Georgetown @ Tilden	1191	1222	0.68	1626	1442	0.90
147 Executive @ Marinelli	376	569	0.32	599	1073	0.60
398 Nicholson @ Woodglen	586	735	0.41	1227	1379	0.77
494 Old Georgetown @ Edson	976	1181	0.66	1374	1456	0.81
902 Old Old Georgetown @ Montrose Pkwy	713	926	0.51	1573	1505	0.87
904 SB 355 Ramp @ Montrose Road				1383	1421	0.79
905 NB 355 Ramp @ Montrose Pkwy				1269	1365	0.76
906 Nebel @ Randolph	757	1060	0.59	1582	1671	0.93
907 Randolph @ Parklawn				1097	776	0.61
910 MD 355 @ Executive				1167	1444	0.80
912 MD 355 @ Main				1517	1757	0.98
913 Nebel @ Old Georgetown				1470	1410	0.82
914 Woodglen @ Old Georgetown				1124	1580	0.88
917 Old Georgetown @ Main				1200	1724	0.96

In addition to the intersection congestion in the Sector Plan and around the cordon line, staff examined congestion at the southern and western portals where traffic volumes are expected to be the highest along Montrose Parkway and MD 355. At Montrose Parkway and Tildenwood Lane, the peak hour forecast CLV is 1943 and at MD 355 and Strathmore Avenue (MD 547) the peak hour forecast CLV is 1852. These forecasts are higher than the current CLV congestion standard of 1600 for the North Bethesda Policy Area. They are typical, however, of CLV forecasts for intersections on heavily traveled arterial routes in Sector Plans where smart growth development is being encouraged by County Policy, including the Silver Spring CBD Sector Plan in 2000, the Bethesda CBD Sector Plan staging analysis in 2004, and the Shady Grove Sector Plan in 2006. Staff finds that forecast CLV values of up to 2000 are indicative of some delay, but not such delay to induce diversion to residential streets.

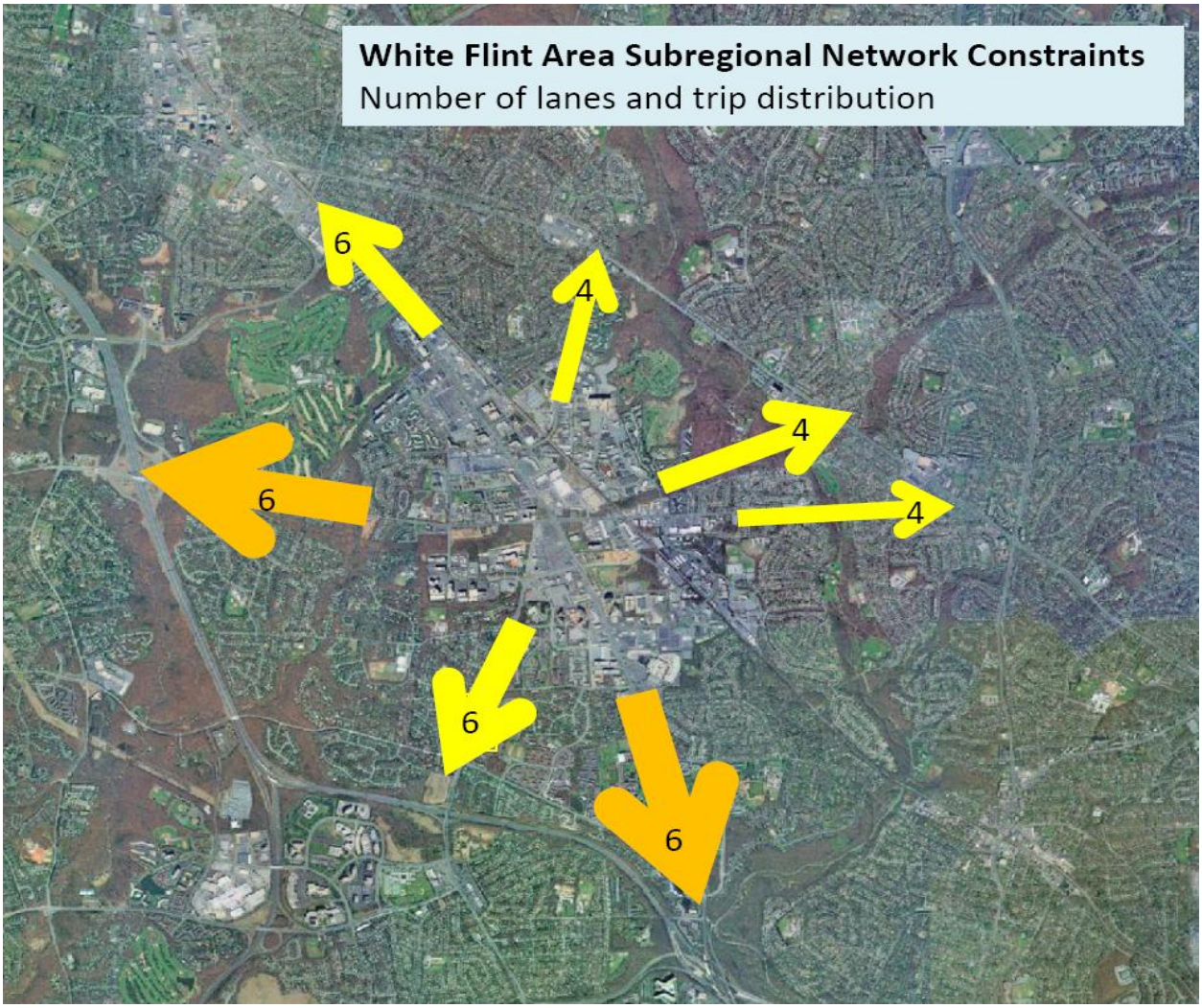
Cordon Line Analysis

A cordon line analysis is a tool to quickly gauge traffic levels by comparing total traffic volumes entering or leaving area. Over the course of the Sector Plan development process, three separate cordon line analyses were conducted for different purposes:

- A "subregional" cordon line was established, as indicated in Figure 18, to consider flows into and out of the broader North Bethesda commercial area. This cordon line generally reflects the boundary between analysis that applied the TRAVEL/3 system level model and analysis that applied the Local Area Model. Both model types are described in Chapter 3.
- A "Sector Plan boundary" cordon line was established to track vehicles entering and leaving the Sector Plan area.
- An "inner" cordon line was established that matches the "Sector Plan boundary" cordon line but is drawn south of Montrose Parkway rather than north of Montrose Parkway. This cordon line excludes Montrose Parkway from the analysis, which is appropriate for considering cordon line capacity constraints. For the same reason, it would have been desirable to treat Old Georgetown Road in the same manner (drawing a cordon line to the east, rather than to the west) but the number of network concepts that altered Old Georgetown Road and access options in the Mid Pike Plaza and Metro West Districts precluded consistent application of this cordon line concept.

Therefore, the inner cordon line has two different types of use. The assessment of forecast traffic volumes based on trip generation and a constant level of through traffic was applied for quick-response sensitivity tests to land use alternatives with a conceptual cordon line volume. These conceptual cordon line volumes are reflected in the bar chart comparisons of land use volumes and may differ slightly from the volumes shown on traffic assignments.

Figure 18: Subregional Network Constraints



Other Considerations

The development of the Sector Plan recommendations considered other transportation system performance measures as described below.

Metrorail System Capacity

About 4,000 people board Metrorail at the White Flint station on a typical weekday. The morning and evening peak periods account for a total of 73% of the boarding's. The number boarding in the morning peak period is very close (about 1,400 to 1,500) to the number boarding in the evening peak period, indicating that the use of Metrorail for residents in White Flint (who typically work in the morning) and workers in White Flint (who typically board during the evening) is about equal. There are more workers than residents in White Flint but the transit mode share for residents is higher than it is for workers, based primarily on White Flint's location in the region (and therefore housing affordability and parking availability characteristics that affect journey-to-work travel).

As of October 2006, about 41% of the spaces of the 1,158 spaces in parking garage at White Flint are filled its maximum utilization Mondays through Thursdays. On a Friday, about 31% of the spaces are filled.

The White Flint Sector Plan recommends the addition of a northern Metrorail station entrance to bring a greater number of jobs and dwelling units within walking distance of the station platform and disperse transit station pedestrian activity. WMATA is studying alternatives for the northern entrance. Staff finds, however, that the overall Metrorail system line-haul capacity is sufficient to accommodate Plan development.

Staff reviewed forecast transit line capacity for the western leg of the Metrorail Red Line during the development of the MD 355 Corridor Study in 2006. The Washington Area Metropolitan Transit Authority (WMATA) completed their Metrorail Station Access and Capacity Study in April 2008, which included an assessment of long-range system capacity. Both studies concluded that sufficient capacity exists along the western leg of the Metrorail Red Line to accommodate additional development in White Flint.

Figure 19 presents the M-NCPPC analysis of capacity increases along the Metrorail Red Line given certain analysis assumptions and constraints considered at the time. At the Washington, DC boundary, forecasts indicated a peak-hour, peak direction demand of approximately 19,000 riders, within the forecast 23,000 seat capacity (assuming 2.5 minute headways, 8 car trains, and 120 passengers per car). A similar relationship between demand and capacity existed at White Flint (with the capacity constrained by a then-assumed Grosvenor turnback).

Figure 19: Metrorail Red Line Capacity and Demand

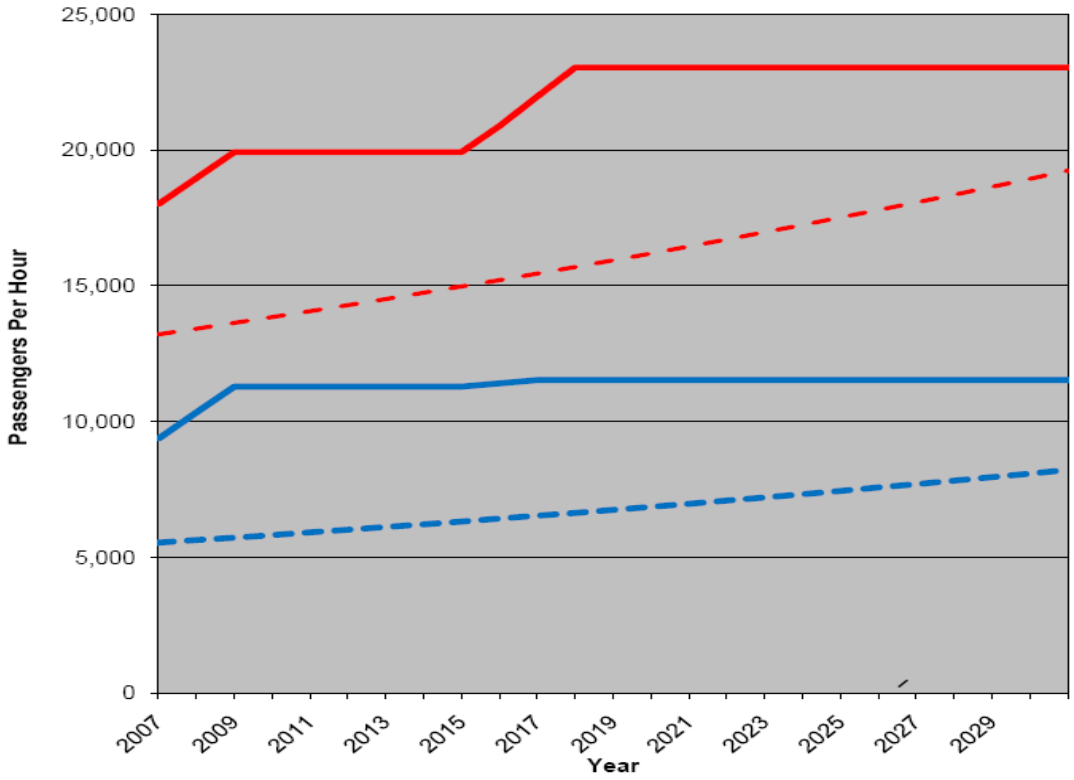


Figure 20 presents the WMATA summary of the forecast year 2030 AM peak hour flows in the WMATA analysis completed September 2008. The WMATA forecasts are slightly more conservative than the M-NCPPC numbers, with a peak load point of approximately 15,000 riders per hour occurring at DuPont Circle.

From a roadway system perspective, jobs contribute more to congestion than do households, as the volume-to-capacity constraint is greatest for vehicles leaving White Flint during the evening peak period. From a Metrorail system perspective, however, it is the households that potentially contribute to peak-load congestion, as White Flint employees are either traveling in the reverse-peak direction (i.e., northbound in the morning) or are traveling at the end of the line (i.e., from Shady Grove to White Flint in the morning) where demand is far below capacity. The addition of 10,100 new households, however, is not expected to constrain Metrorail operations on the Red Line in 2030 because:

- 4,300 of those households are already in the 1994 Plan and reflected in WMATA forecasts.
- The 5,800 additional households are expected to generate approximately 550 peak hour commuters, considering the forecast ratio of employed residents per dwelling unit (0.85, higher than the current 0.71) and the percent of employed residents traveling during the peak one hour within the peak period (0.28), and the transit mode share for residential work trips (40%).

Even if all transit users traveled on Metrorail in the peak direction as far as the peak load point at DuPont Circle, the 550 additional trips per hour would not cause the 2030 peak hour demand in Figure 20 to approach the 23,000 capacity mark.

Figure 20: WMATA Red Line Forecast Peak Hour Loads

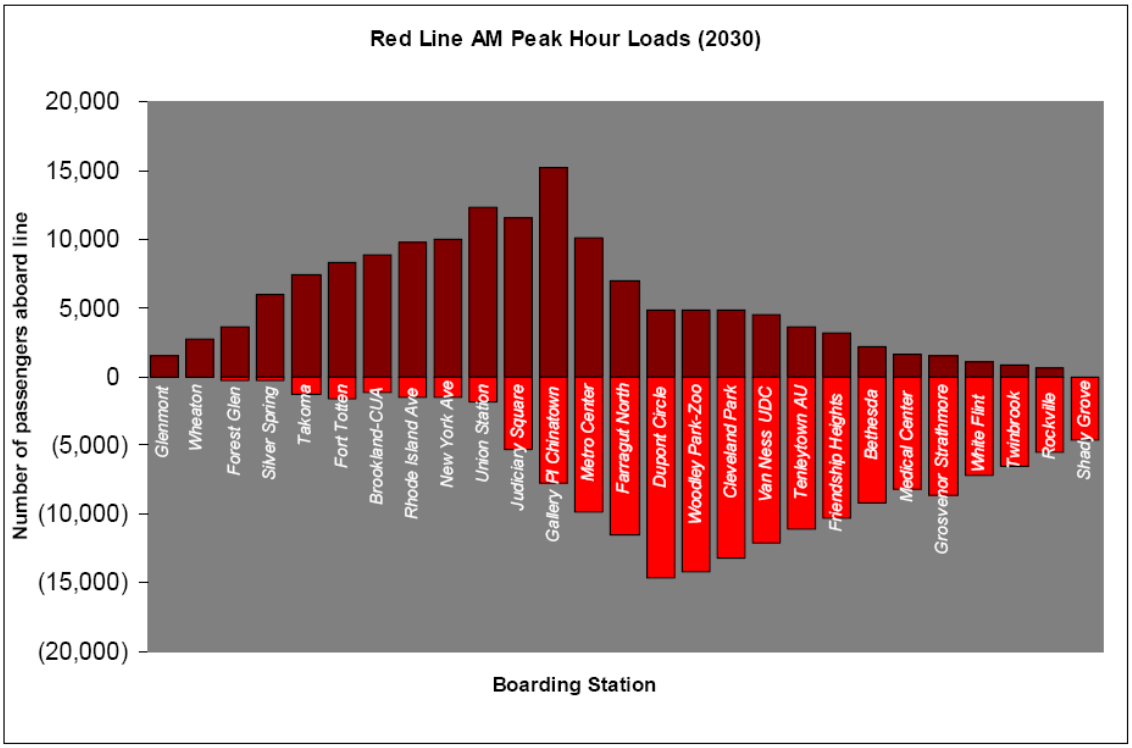


Figure 29. 2030 Red Line Load Profile (source: PB)

Vehicular Traffic Volumes

Figure 21 presents a comparison of existing and forecast traffic volumes at the Sector Plan cordon line. In general, the cordon line serves as the boundary between the robust network of local streets in the Sector Plan area and the more sparse network beyond the Sector Plan boundary, particularly to the south and west. Therefore, traffic volumes at these locations are substantially higher than in the interior of the Sector Plan.

At the cordon line, the total traffic volume will increase by about 80%, from 297,500 vehicles per day to 517,900 vehicles per day. The heaviest volumes will occur on the two state highways, Rockville Pike (MD 355) and Old Georgetown Road (MD 187), with between 65,000 and 80,000 vehicles per day. For comparison purposes, Wisconsin Avenue (MD 355) and Connecticut Avenue (MD 185) both currently carry 70,000 vehicles per weekday immediately south of the Capital Beltway (as does Arlington Boulevard in the vicinity of Glebe Road in Arlington County). The daily capacity of MD 355, however, is greater north of the Capital Beltway than south of the Beltway due to differences in directional traffic flows. To the south of the Capital Beltway, both localized and regional flows are southbound in the morning and northbound in the evening. Between the Capital Beltway and the White Flint Sector Plan, the flows will be more balanced, with forecast peak hour volumes of about 3,500 to 3,700 vehicles in each direction.

Traffic volumes and volume growth will be lower within the Sector Plan area due to the more robust roadway network. In general, traffic volumes along Rockville Pike today in the Sector Plan area range from 45,000 to 50,000 vehicles per day and are forecast to grow slightly to about 55,000 vehicles per day.

The Sector Plan analysis, like the Growth Policy, focuses on mobility considerations during weekday peak periods. The stakeholders in the White Flint Sector Plan are concerned that midday and weekend traffic congestion rivals that experienced during weekday peak periods. Staff found that while midday and weekend conditions are not substantially better than weekday peak period conditions, the weekday peak periods remain the critical time periods for which the transportation system should be designed.

Figure 21: Sector Plan Cordon Line Traffic Volumes

White Flint Sector Plan
Sector Plan Cordon Line Volumes

Current Conditions

Location	ADT	AM Peak Hour Inbound	AM Peak Hour Outbound	AM Peak Hour Total	PM Peak Hour Inbound	PM Peak Hour Outbound	PM Peak Hour Total
MD 355 south of Hubbard	59000	2850	1430	4280	2400	2910	5310
Chapman north of Randolph/MPE	9200	140	110	250	430	400	830
Nebel north of Randolph/MPE	0	0	0	0	0	0	0
Montrose Parkway East at CSX	0	0	0	0	0	0	0
Randolph at CSX	30800	1590	710	2300	1210	1560	2770
Nicholson at CSX	30900	1180	540	1720	1000	1790	2790
MD 355 south of Edson	55000	1800	2290	4090	2420	2530	4950
Edson west of Woodglen	8000	270	190	460	470	250	720
MD 187 south of Nicholson	44300	1540	2170	3710	2330	1650	3980
Tilden west of MD 187	7400	460	270	730	230	440	670
Executive west of MD 187	25400	900	1140	2040	1380	910	2290
Montrose Parkway West west of OOGR	0	0	0	0	0	0	0
Montrose west of OOGR	27500	1070	1130	2200	1140	1340	2480
TOTAL	297500	11800	9980	21780	13010	13780	26790

Public Hearing Draft Plan (Scenario 12) Conditions

Location	ADT	AM Peak Hour Inbound	AM Peak Hour Outbound	AM Peak Hour Total	PM Peak Hour Inbound	PM Peak Hour Outbound	PM Peak Hour Total
MD 355 south of Hubbard	77500	3560	2200	5760	3090	3890	6980
Chapman north of Randolph/MPE	19400	660	570	1230	820	930	1750
Nebel north of Randolph/MPE	33100	1270	910	2180	1480	1510	2990
Montrose Parkway East at CSX	52600	2560	1990	4550	1990	2740	4730
Randolph at CSX	21600	1190	680	1870	720	1230	1950
Nicholson at CSX	40400	2130	740	2870	1320	2320	3640
MD 355 south of Edson	80200	3150	3230	6380	3460	3760	7220
Edson west of Woodglen	13400	430	270	700	680	520	1200
MD 187 south of Nicholson	67600	2660	3340	6000	3230	2860	6090
Tilden west of MD 187	6800	440	250	690	230	390	620
Executive west of MD 187	43300	1920	1760	3680	1970	1920	3890
Montrose Parkway West west of OOGR	32600	1440	1370	2810	1410	1530	2940
Montrose west of OOGR	29400	990	1310	2300	1350	1300	2650
TOTAL	517900	22400	18620	41020	21750	24900	46650

Increase, 2005 to Public Hearing Draft Plan

Location	ADT	AM Peak Hour Inbound	AM Peak Hour Outbound	AM Peak Hour Total	PM Peak Hour Inbound	PM Peak Hour Outbound	PM Peak Hour Total
MD 355 south of Hubbard	18500	710	770	1480	690	980	1670
Chapman north of Randolph/MPE	10200	520	460	980	390	530	920
Nebel north of Randolph/MPE	33100	1270	910	2180	1480	1510	2990
Montrose Parkway East at CSX	52600	2560	1990	4550	1990	2740	4730
Randolph at CSX	-9200	-400	-30	-430	-490	-330	-820
Nicholson at CSX	9500	950	200	1150	320	530	850
MD 355 south of Edson	25200	1350	940	2290	1040	1230	2270
Edson west of Woodglen	5400	160	80	240	210	270	480
MD 187 south of Nicholson	23300	1120	1170	2290	900	1210	2110
Tilden west of MD 187	-600	-20	-20	-40	0	-50	-50
Executive west of MD 187	17900	1020	620	1640	590	1010	1600
Montrose Parkway West west of OOGR	32600	1440	1370	2810	1410	1530	2940
Montrose west of OOGR	1900	-80	180	100	210	-40	170
TOTAL	220400	10600	8640	19240	8740	11120	19860

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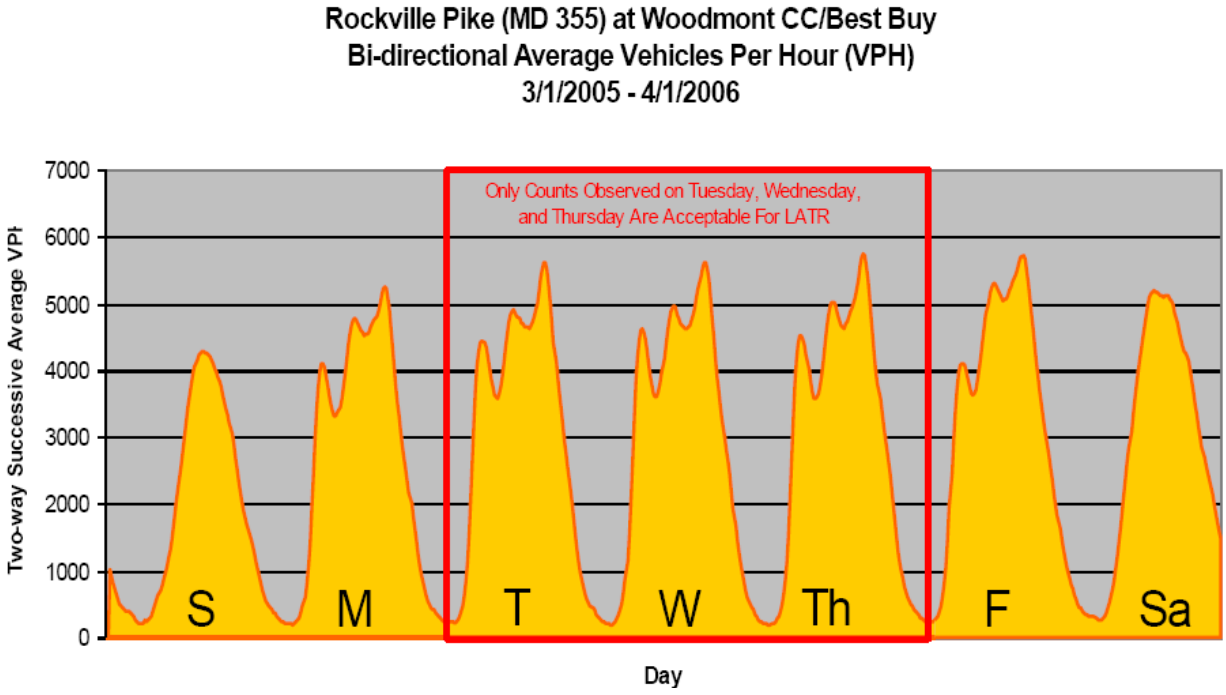
Figure 22 shows traffic volumes by time of day and day of week on Rockville Pike near Woodmont Country Club, aggregated by 15-minute time slices over a 13-month period and presented for a typical week running from Sunday through Saturday. Each of the weekdays shows a three-pronged peaking characteristic:

- A morning peak period with generally 4,000 to 4,500 vehicles per hour,
- a midday peak period with generally about 5,000 vehicles per hour, and
- an afternoon peak period with 5,500 to 6,000 vehicles per hour.

By contrast, the Saturday volumes peak during the early afternoon with an average of just over 5,000 vehicles per hour. While both midday and weekend traffic volumes are higher than the weekday morning peak period, the weekday evening peak period remains the period with consistently highest traffic volumes.

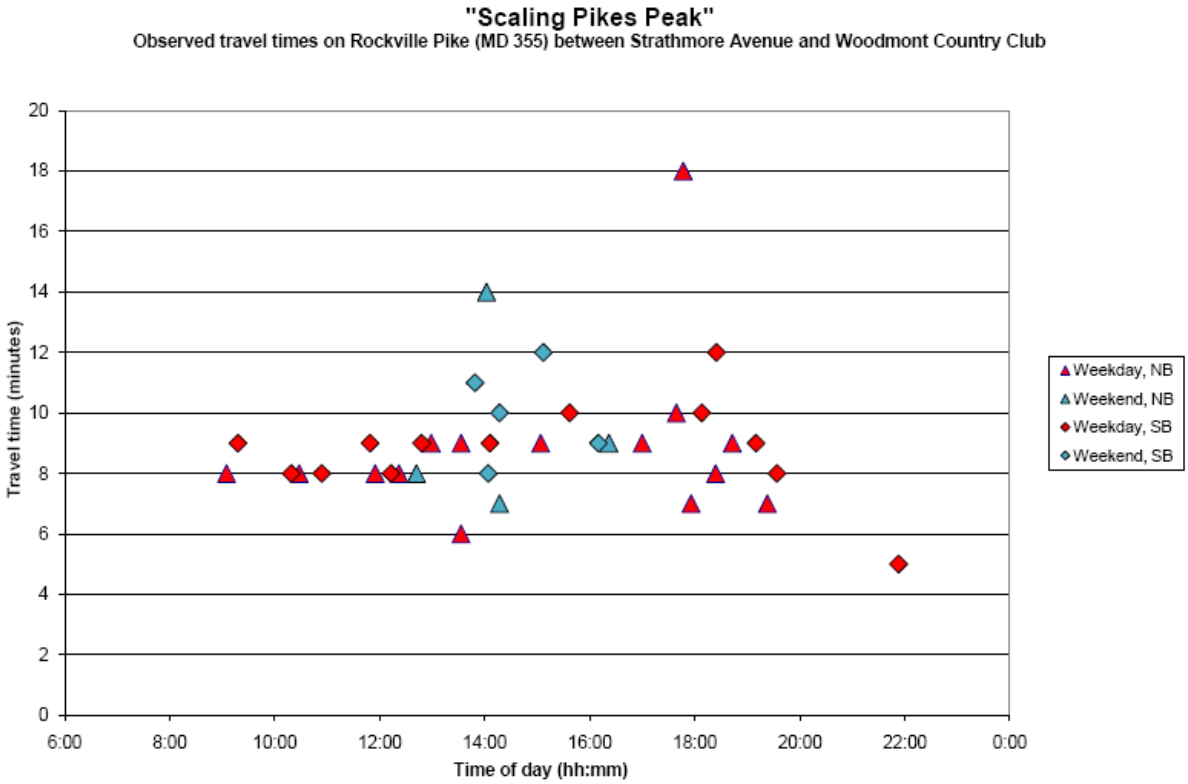
Figure 22: Rockville Pike Traffic Volumes by Time of Day



Vehicular Travel Times

Like traffic volumes, travel times on Rockville Pike are no worse during midday or weekends than they are during weekday peak periods. Figure 23 provides an analysis of the travel time along Rockville Pike between Strathmore Hall and Woodmont Country Club for various times of day using data collected during late fall 2006. At the posted speed of 40 MPH, the free-flow travel time speed for this 2.7 mile long segment of roadway would be about 4 minutes, if all the traffic signals were green. The fastest observed travel time was 5 minutes on a weekday evening at about 10 PM, and reflects about one minute of random delay at traffic signals along the route.

Figure 23: Rockville Pike Travel Times by Time of Day and Day of Week



Most of the 37 observed travel times fall into a band between 8 and 10 minutes. A travel time of 10 minutes means that the congested speed is twice as long as the uncongested speed. The same relationship can be stated to say that the congested speed is 50% of the free flow speed. This is the terminology used to describe the Relative Arterial Mobility metric in the Policy Area Mobility Review (PAMR) element of the County's Growth Policy. The 50% value is also the threshold between "LOS D" and "LOS E" conditions in the Transportation Research Board's Highway Capacity Manual. LOS E conditions are generally recognized to be those under which the person-throughput of a facility is optimized.

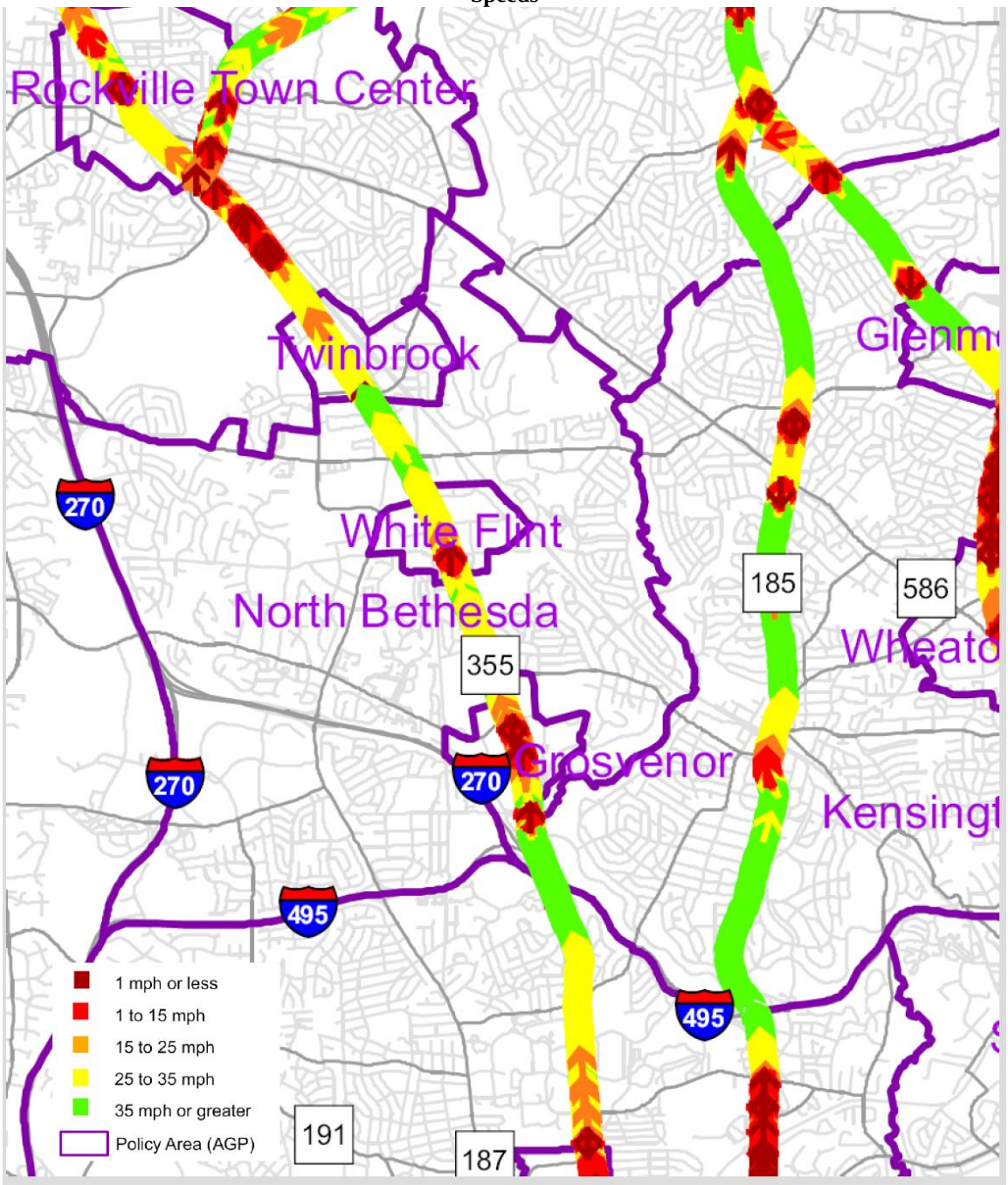
The reliability of the transportation system is also an element of concern. Two of the 37 travel time runs exceeded 12 minutes, one of them a Saturday in December (14 minutes) and the other a Tuesday in November (18 minutes). In neither case was there a notable cause for the delay, such as a special event or an observed or reported incident. These outliers indicate that as demand approaches true system capacity, the transportation system can become unstable so that relatively small variations or disturbances in flow can create fairly substantial delays. These delays are often memorable, since most travelers budget for expected (i.e., LOS D) conditions.

Figure 23 also shows that, like the midday and weekend traffic volumes, the midday and weekend travel times are generally about the same as, but not worse than, the weekday evening peak period travel times. Part of the perception regarding midday and weekend

traffic may relate again to budgetary expectations; travelers may have higher mobility expectations for midday or weekend travel so that a ten minute trip up the Pike at lunch feels more burdensome than the same trip up the Pike at 5:00 PM. From a system staging perspective, however, the planning objective is to gain the greatest efficiencies from the infrastructure, so the Plan is designed to accommodate the weekday peak period travel demands.

Figure 24 provides a different perspective of travel time northbound during the weekday evening peak period, showing the specific locations where delays occurred. Generally, traffic in the Sector Plan area moved at 25 to 35 MPH in this observation, with delay associated with a red traffic signal at Nicholson Lane.

Figure 24: Weekday Evening Peak Period Travel Speeds



Local Transit System Coverage and Use

The White Flint Sector Plan is served by a series of Ride-On and Metrobus routes as shown in Figure 25 and summarized below.

- Ride-On Route 5 (Twinbrook to Silver Spring) operates in a two way direction on Rockville Pike between Old Georgetown Road and Strathmore Avenue. It

operates as often as every ten minutes during peak hours and carries about 2,100 passengers on an average weekday.

- Ride-On Route 26 (Montgomery Mall to Glenmont) operates in a two way direction on Rockville Pile between Old Georgetown Road and Marinelli Road. It operates as often as every 20 minutes during peak hours and carries about 3,200 passengers on an average weekday.
- Ride-On Route 38 (Montgomery Mall to Wheaton) operates in a two way direction on Rockville Pike between Montrose Road and Nicholson Lane. It operates as often as every 20 minutes during peak hours and carries about 1,400 passengers on an average weekday.
- Ride On Route 46 (Montgomery College to Medical Center) operates in a two way direction along a large segment of Rockville Pike. It operates as often as every 15 minutes during peak hours and carries about 4,000 passengers per day.
- Ride-On Route 81 (Rockville to White Flint via Tower Oaks) ends at the White Flint Metrorail Station and uses Marinelli Road to access the station in both directions. This route provides service every 30 minutes and operates only during peak hours. It carries about 200 passengers per weekday.
- Metrobus Route C8 (College Park to White Flint) ends at the White Flint Metrorail Station and uses Marinelli Road to access the station in both directions. This route provides service every 35 minutes during peak hours.

Metrorail serves as the line-haul service in the corridor. The Metrobus and Ride-On bus services serve two purposes:

- A primary purpose to provide feeder service to the Metrorail system, and
- a secondary purpose to provide circulator services for the communities in the study area.

As the White Flint Sector Plan area develops, the secondary purpose will become more important, but will still be less important than the primary purpose, at least during peak commuting periods when bus transit system capacity is constrained.

Figure 25: Existing Public Transit Services

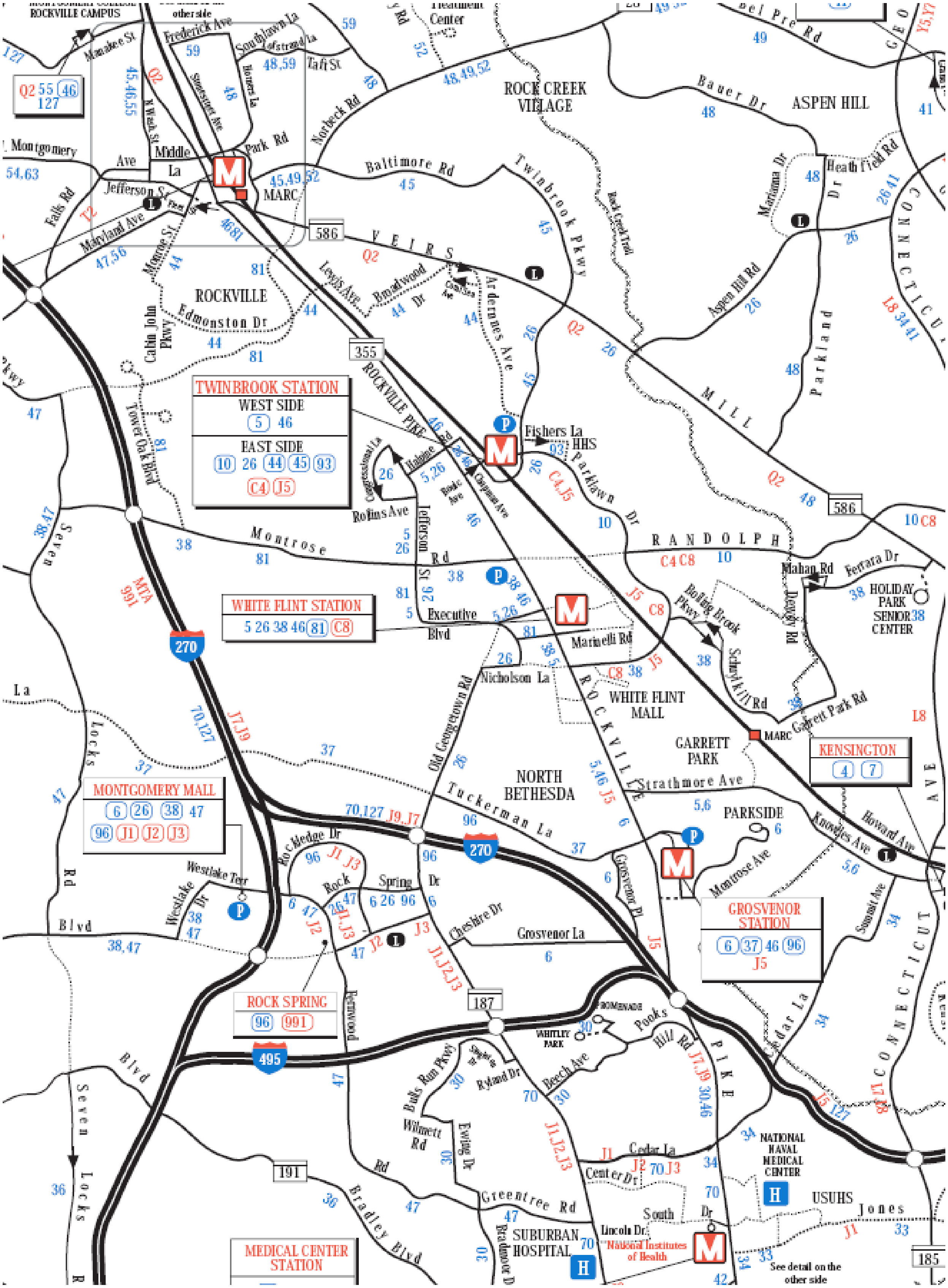
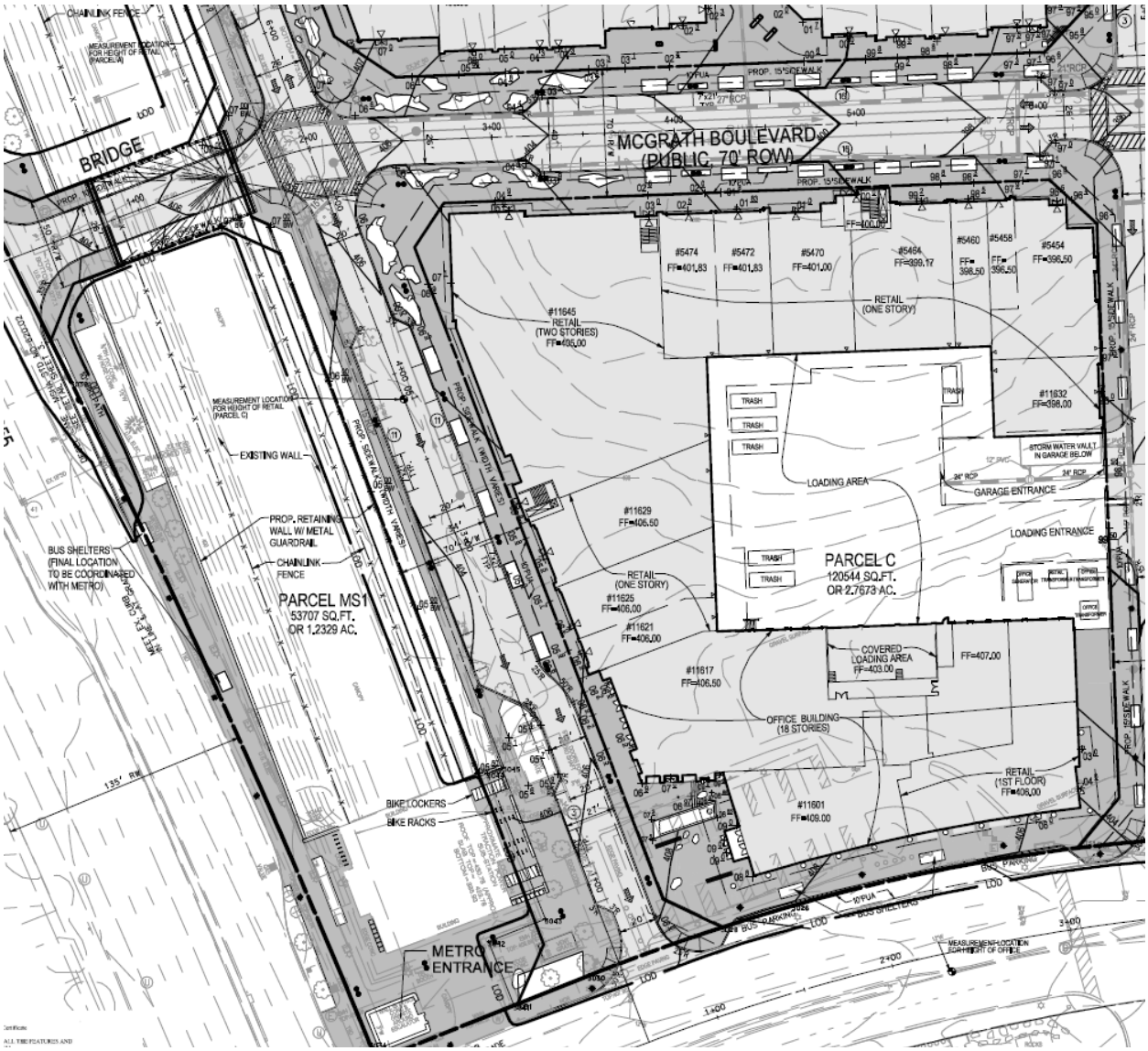


Figure 26 shows the current concept to provide 6 bus bays at the North Bethesda Town Center development at the LCOR property.

Figure 26: Multimodal Connections at Metrorail Station



B. Travel Demand Forecasting Process and Assumptions

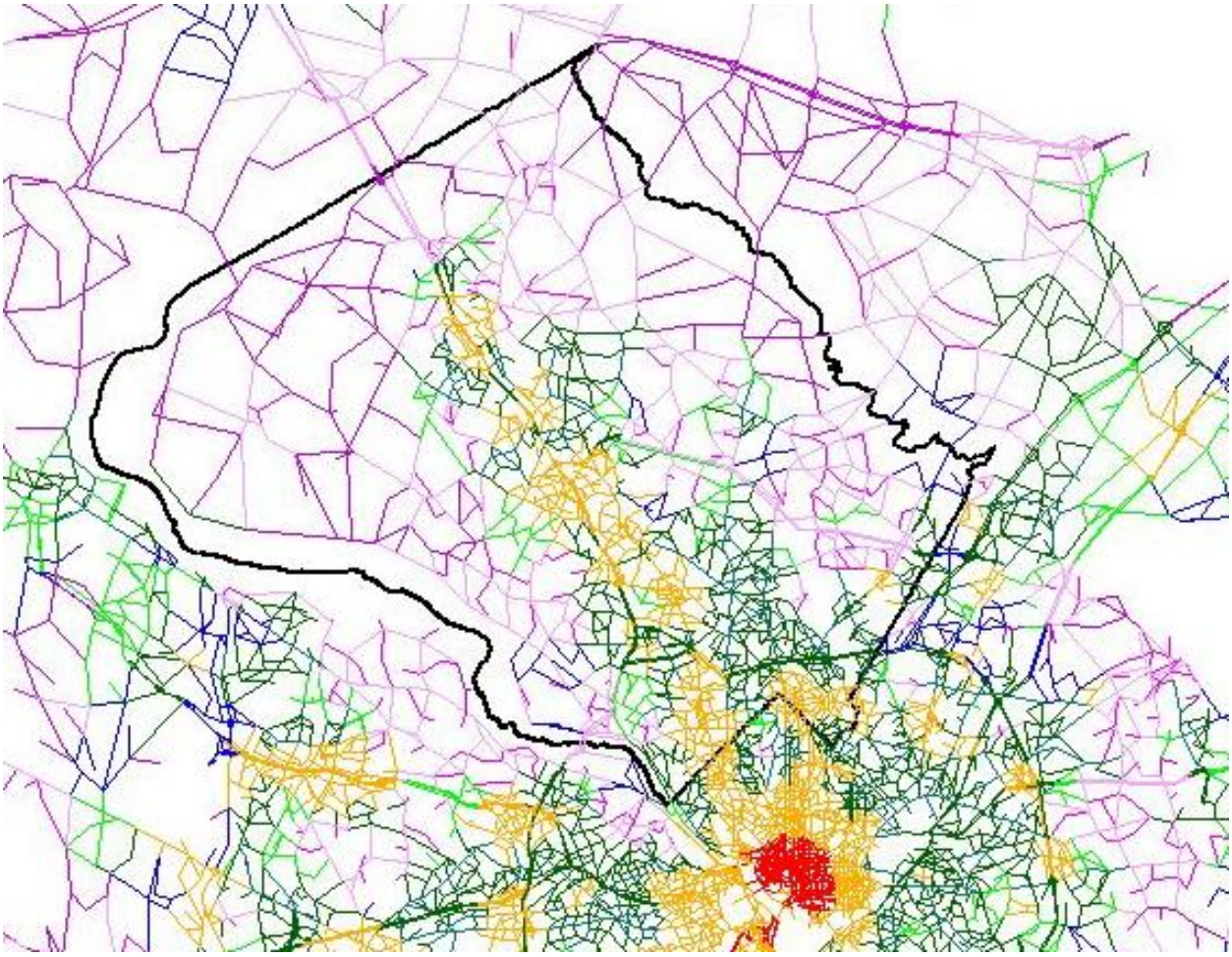
The travel demand forecasting process includes three levels of analysis. The Department's regional travel demand forecasting model, TRAVEL/3, is used to develop forecast travel demand results for weekday travel and PM peak periods. TRAVEL/3 is a four-step model, consisting of:

- Trip generation; the number of person trips that are generated by given types and densities of land uses within each TAZ,

- trip distribution; how many person trips generated by each TAZ will travel to each of the other TAZs within the metropolitan area,
- mode split; which mode of travel the person trips will use, including single-occupant auto, multiple-occupant auto, transit, or a non-motorized mode such as walking or bicycling, and
- traffic assignment; the roadways that will be used for vehicular travel between TAZs.

The TRAVEL/3 model incorporates land use and transportation assumptions for the Metropolitan Washington region, using the same algorithms as applied by the Metropolitan Washington Council of Governments (MWCOG) for air quality conformity analysis. Figure 27 shows the relationship of Montgomery County in the regional travel demand network, featuring the coding of street network characteristics to reflect the general level of adjacent development density.

Figure 27: Travel/3 Model Network Typology



The TRAVEL/3 provides system-level results that are used directly to obtain the Policy Area Mobility Review forecasts for the County's Policy Area Transportation Review. The system-level results are also used as inputs to the finer grain analytic tools described below.

The second level of analysis consists of post processing techniques applied to the TRAVEL/3 forecasts, as described in NCHRP Report 255. These techniques include refinement of the AM and PM peak hour forecasts to reflect a finer grain of land use and network assumptions than included in the regional model, such as the location of local streets and localized travel demand management assumptions. The NCHRP 255 analyses are used to produce the cordon line analyses.

The third level of analysis includes intersection congestion, using the Critical Lane Volume (CLV) methodology described in the Department's Policy Area Mobility Review / Local Area Transportation Review (PAMR / LATR) Guidelines.

Travel/3 Forecasting Assumptions

The White Flint Sector Plan forecasts assumed the following parameters:

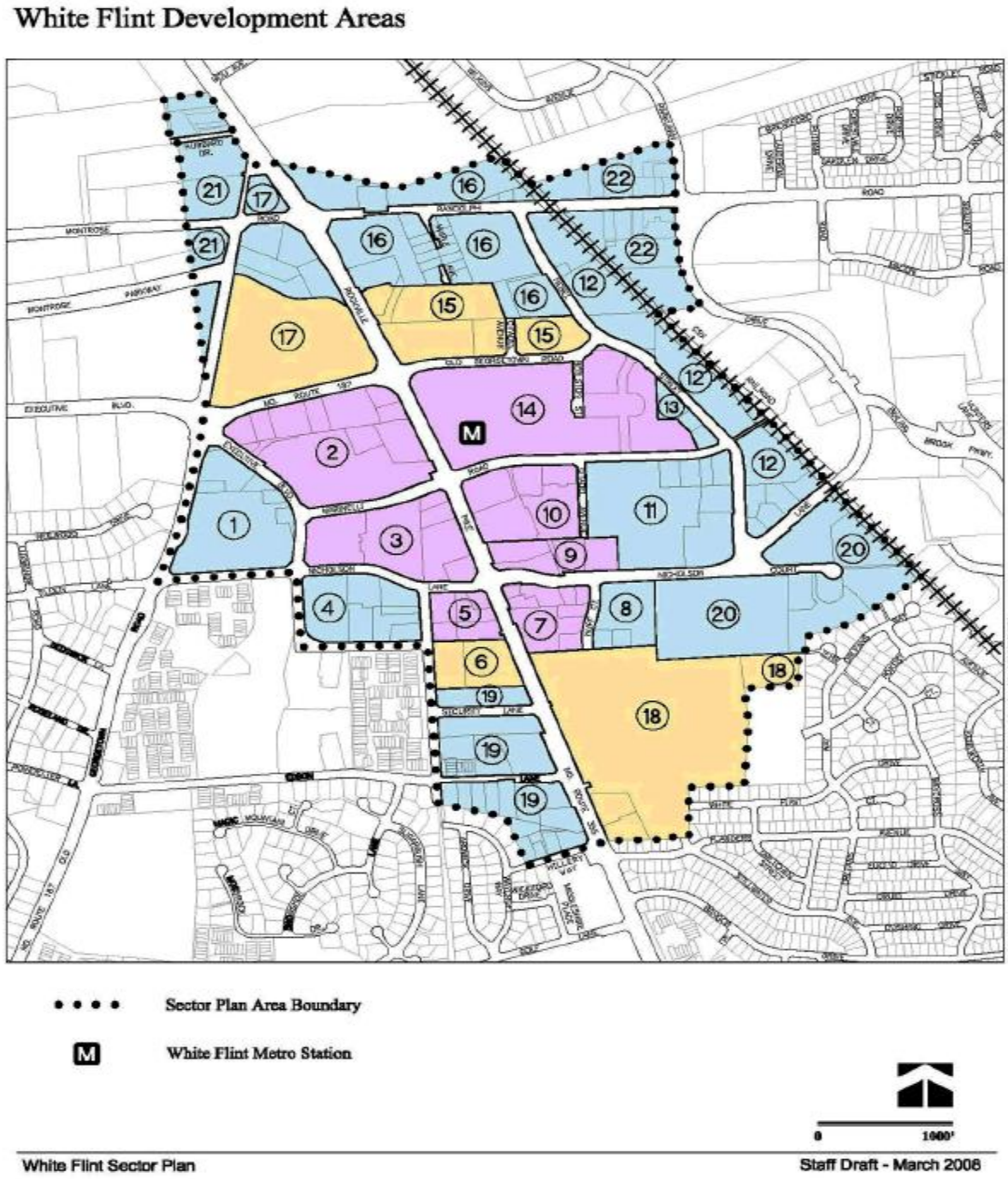
- A 2030 horizon year. This is currently the most distant horizon year for which forecast land use and transportation system development is available.
- Regional growth per the MWCOG Cooperative Forecasting Process. The most current round of Cooperative Forecasts were used (Round 7.0 for the initial forecasts in early 2007 and Round 7.1 for the remaining forecasts in fall 2007 and early 2008. The Round 7.1 forecasts reflect the recommendations of the Base Realignment and Closure (BRAC) Commission as of August 2007, including 2,500 new employees at the National Naval Medical Center.
    - For the Washington region, the Round 7.1 forecasts include an increase from 3.0 million jobs and 1.9 million households in 2005 to 4.2 million jobs and 2.5 million households in 2030
    - For Montgomery County, the Round 7.1 forecasts include an increase from 500,000 employees and 347,000 households in 2005 to 670,000 employees and 441,300 households in 2030
    - For the White Flint Sector Plan area, the Round 7.1 forecasts include an increase from 5.6M square feet of development and 2,100 households in 2005 to 7.9M square feet of development and 6,000 households in 2030.
- Transportation improvements in the region's Constrained Long Range Plan (CLRP), a fiscally constrained transportation network. Notable projects assumed to be in place for the buildout of the Sector Plan include:
    - Elimination of the WMATA turnback at Grosvenor
    - The Corridor Cities Transitway from Shady Grove to Clarksburg
    - The Purple Line between Bethesda and Silver Spring
    - The Montrose Parkway, including an interchange at Rockville Pike
    - The Intercounty Connector
    - Express Toll Lanes on I-270 from I-370 to the city of Frederick

Local Area Modeling Process and Assumptions

The Department's Local Area Modeling (LAM) process uses NCHRP Report 255 techniques to both convert the TRAVEL/3 system level forecasts to intersection-level forecasts. The LAM process is then used as a pivot-point technique to reflect changes to the localized land use or transportation network, providing both cordon line and network analysis results.

The TRAVEL/3 model represents the White Flint Metrorail Station Policy Area as two transportation analysis zones (TAZ). The White Flint LAM disaggregates these two TAZ into twelve subzones, and the Sector Plan area is represented by 20 subzones as indicated in Figure 28.

Figure 28: White Flint Local Area Model Subzones



The LAM process uses trip generation rates that are customized to reflect both existing conditions and future changes, considering both the land use types and changes in travel behavior. Figure 29 shows the trip generation rates used in the LAM.

Figure 29: Local Area Model Peak Hour Trip Generation

Land Use	Units	AM	PM
Office (at 26% NADMS)	1000 Square Feet	1.36	1.28
Office (at 39% NADMS)	1000 Square Feet	1.22	1.16
Retail (at 26% NADMS)	1000 Square Feet	0.70	1.75
Retail (at 39% NADMS)	1000 Square Feet	0.67	1.70
Industrial (at 26% NADMS)	1000 Square Feet	1.10	1.10
Industrial (at 39% NADMS)	1000 Square Feet	1.03	1.03
Other Commercial(at 26% NADMS)	1000 Square Feet	1.30	1.30
Other Commercial(at 39% NADMS)	1000 Square Feet	1.21	1.21
Multi-family residential	Dwelling unit	0.40	0.46

These trip generation rates reflect a combination of Local Area Transportation Review rates for typical development in Metro Station Policy Areas such as White Flint and were calibrated to match the observed traffic counts, considering the amount of through traffic in the roadway network so that the LAM volumes at the network cordon line are within 2% of observed count data for both AM and PM peak hours.

The trip generation rates shown in Figure 29 are generally lower than those found in the Institute of Transportation Engineers (ITE) Trip Generation report, particularly for commercial land uses. They are comparable with rates found in the LATR/PAMR Guidelines for the Silver Spring, Bethesda, and Friendship Heights CBDs. The trip generation rates reflect the fact that ITE rates for most commercial locations do not have the transit availability and usage found in White Flint. The difference for residential uses is not quite as high because ITE trip generation rates for multifamily housing do reflect the fact that most multifamily housing units have, almost by definition, sufficient density to support transit service. Finally, the retail trip generation rates in White Flint, similar to those in the Bethesda and Silver Spring CBD, incorporate a discount for pass-by and diverted-link trips.

4. Alternatives Considered

A. Timeline

The White Flint Sector Plan studies began in fall 2006. The analysis of alternative land use and transportation system scenarios followed an iterative process as summarized below. Additional details and presentation materials are available at the Plan website.

- Summer 2006: Development and evaluation of several alternative concepts for Rockville Pike as part of the MD 355 / I-270 Corridor Study, with a status report to the Planning Board on March 7, 2007.
- Spring 2007: Analysis of three levels of development characterized as "minimal", "moderate", and "great" change, and multiple local street networks, culminating in a status report to the Planning Board on October 8, 2007.
- Fall 2007: Refinement of the development proposals in the moderate land use scenario and review of an expanded local street system extending beyond the Sector Plan area, culminating in a recommended plan concept report to the Planning Board on January 31, 2008
- Spring 2008: Analysis of alternative land uses proposed by property owners and alternative implementation and financing proposals, culminating in preliminary recommendations to the Planning Board on September 11, 2008 and the December 2008 Public Hearing Draft Plan.

B. Land Use and Network Alternatives

Figure 30 shows the land use alternatives considered in the development of the White Flint Sector Plan.

Figure 30: Land Use Scenarios Considered During Plan Development

Date	Scenario Title in Presentations	Transportation Planning Nomenclature	Commercial SF	DU	Cordon line volume
10/2006	Existing	Scenario 0	5.6M	2,100	13,000
	MWCOG Forecast Level 2030	Scenario 1	7.9M	6,000	Not tested
2/2007	1992 Plan	Scenario 2	11.5M	6,400	17,900
4/2007	Minimal Change (Scenario 1)	Scenario 3	13.8M	10,900	20,800
4/2007	Moderate Change (Scenario 2A)	Scenario 4	14.0M	13,400	21,200
4/2007	Great Change (Scenario 3)	Scenario 5	20.1M	20,500	27,900
4/2007	Moderate Change with 80% Residential (Scenario 2B)	Scenario 6	9.7M	17,300	17,900
8/2007	August 2007	Scenario 7	11.4M	12,600	18,700
12/2007	Preferred January 2008	Scenario 8	11.6M	14,000	19,400
3/2008	Optional FAR 4	Scenario 9	17.6M	16,500	25,100
4/2008	April 15	Scenario 10	14.6M	16,300	22,100
6/2008	June 6	Scenario 11	13.0M	12,600	20,200
6/2008	June 13	Scenario 12	13.9M	12,299	20,900

There is a non-linear relationship between the amounts of residential and commercial development and the total conceptual cordon line trip generation volumes due to the different trip generation rates for each land use. Residential uses generate fewer vehicle trips per square foot than do commercial uses. Figure 31 shows this relationship graphically.

Scenario 12 has approximately 13.9M square feet of commercial space and about 14.8M square feet of residential space, a total nearly 29M square feet, of which about 52% is residential. This is one of the points located along the blue line in Figure30. If the development is more heavily oriented toward residential use, more total development can be accommodated with the same peak hour trip generation impact. For instance, at 55% residential, the Plan could accommodate 30M square feet of development and at 70% residential, the Plan could accommodate 40M square feet of development. At more than

80% residential, the congestion constraints would change as the Sector Plan would become more of a housing resource than a job resource and the peak load would be for traffic heading into the Plan area (or home) during the evening peak period.

Table 2 in the Sector Plan identifies a zoning development capacity of nearly 43M square feet, assuming that all properties build to the theoretical maximum of the proposed TMX zone. Full buildout, however, is not realistic for two reasons. First, market forces and site constraints rarely permit full buildout of a given theoretical zoning capacity; observed yields across a family of zones or a mature master plan area tend to be around two-thirds of the theoretical capacity. Second, the White Flint staging plan identifies caps for each of three stages beyond which the Planning Board will not approved additional development on an areawide basis. And finally, master plans are designed to have a twenty-year lifespan and countywide trends and forecasts suggest that the level of development in Scenario 12 will not be fully absorbed by the year 2030.

Figure 31: Job/Housing Ratio Effect on Plan Trip Generation

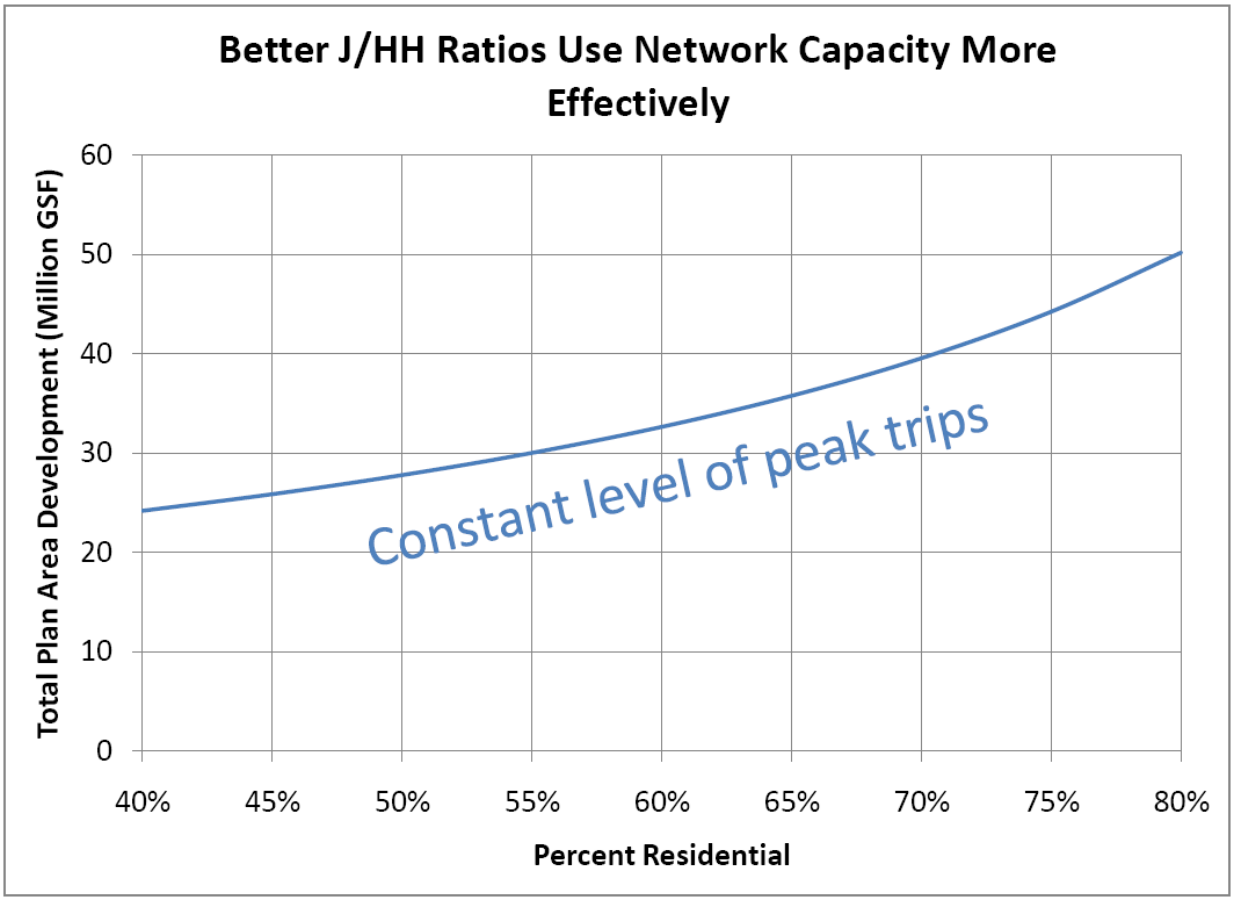


Figure 32 describes the street network concepts considered during Plan development.

Figure 32: Street Network Concepts Considered During Plan Development

Timeframe	Network Name	Concepts
Fall 2006	0	Existing conditions
Fall 2006	V1	Constrained Long Range Plan – includes Montrose Parkway, Nebel Street Extended, Chapman/Citadel Avenues
Summer 2007	A1 thru A7	New local streets – evolved according to local land uses
Summer 2007	B	New local streets plus Rockville/Woodglen one-way couplet
Summer 2007	C	New local streets plus Main/Marinelli and Nicholson/Executive one-way couplets
Summer 2007	D	New local streets plus Nicholson/Executive, Old Georgetown/Marinelli, and SB Old Old Georgetown one-way couplets
Summer 2007	E	New local streets plus Rockville/Woodglen one-way couplet
Fall 2007	F	New local streets plus Rockville/Woodglen and Old Georgetown/Main one-way couplets
Spring 2008	G	Glatting Jackson network (without Randolph crossing CSX at grade)
Spring 2008	H1 thru H2	Glatting Jackson network plus Montrose Parkway interchange

The Recommended Plan is exemplified by the combination of Scenario 12 and roadway network A7, shown in Figure 33. Current conditions are shown in Figure 34 for comparison purposes. The recommended Plan in Figure 33 contains several advantages as compared to the existing network in Figure 34:

- The street grid is far more robust, with a finer grain of streets providing walkable block lengths and continuity provided by the Nebel Street, Old Georgetown Road, and Executive Boulevard extensions
- The Montrose Parkway provides additional connectivity to I-270 and across the CSX tracks for both through and local traffic
- The number of vehicular travel lanes along Rockville Pike has been reduced, improving the pedestrian experience.

Figure 33: Scenario 12 Roadway Network

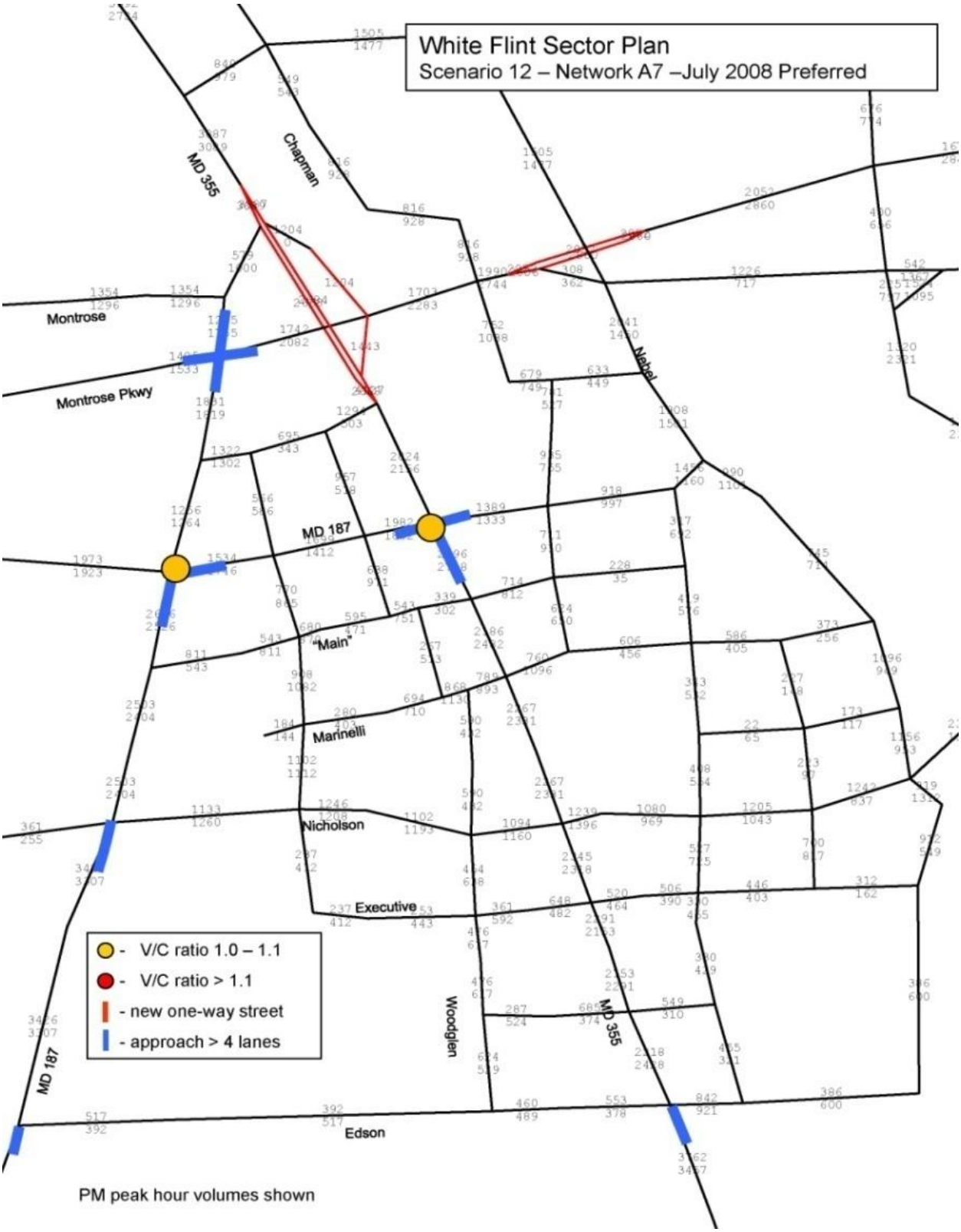
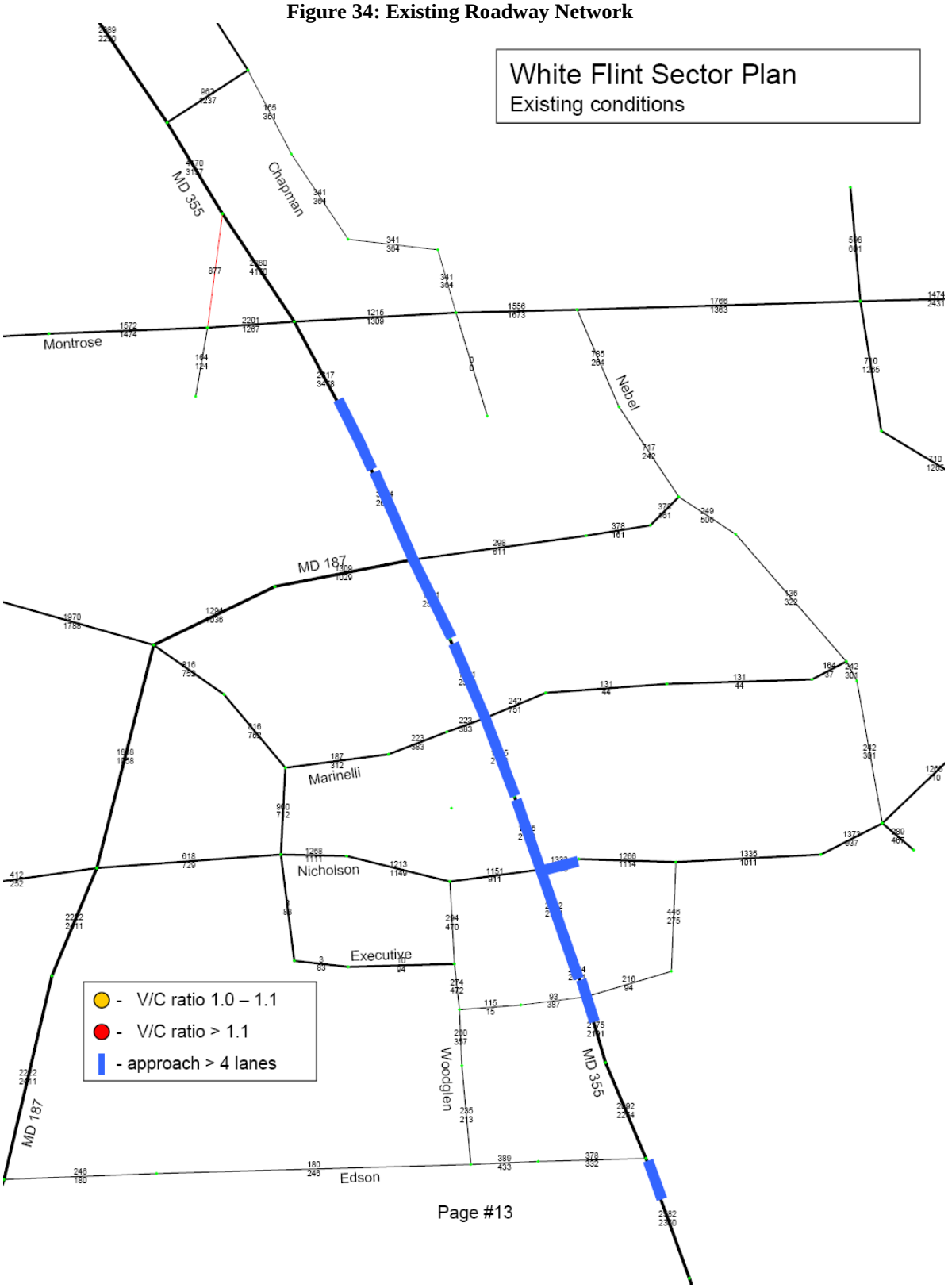


Figure 34: Existing Roadway Network



C. Concepts Tested But Not Incorporated

During the development of the Plan, several network concepts were evaluated as described in the following paragraphs.

Non-Auto Driver Mode Share of 50%

For a given level of development, the vehicular traffic burden can be reduced by reducing the percentage of trips made by auto drivers. Walkers, bikers, transit users, and carpool passengers are all "non-auto drivers".

Figure 35 provides a comparison of PM peak hour, outbound vehicle trips generated by White Flint development for three development scenarios:

- The 1992 Plan (Scenario 2 in Figure24)
- Alternative 2A (Scenario 4 in Figure24)
- Alternative 3 (Scenario 5 in Figure24)

And three levels of NADMS:

- The current level of 26%
- The recommended level of 39%
- The highest level achieved in the County (Silver Spring) of 50%

Figure 35: Trip Generation Sensitivity to Mode Share Assumptions

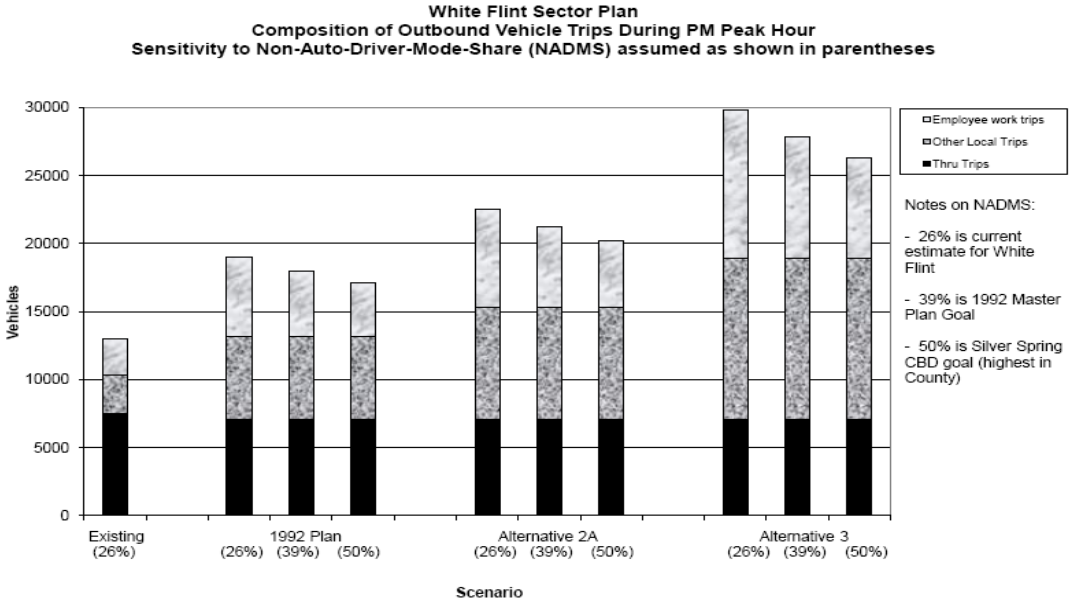


Figure 35 yields two primary conclusions:

- Adjusting employee mode shares in White Flint can take hundreds of peak hour, peak direction vehicles off the roadway network. Alternative 2A is similar to the Plan recommendation, and the difference between the current 26% NADMS (with a cordon line volume of 22,400 vehicles) and the 39% NADMS (with a cordon line volume of 21,200 vehicles) is that the higher NADMS has 1,200 fewer peak hour vehicles.
- Changing mode share goals by themselves, however, will not offset all the traffic growth by master planned development. For each of the three levels of development shown, the variation in traffic volumes generated by the different TDM levels is not as great as the variation in traffic generated by different land use scenarios themselves.

Staff believes that the 39% NADMS is achievable in White Flint given the range of parking management and TDM strategies noted in Figure 1. While the Silver Spring CBD is able to achieve a 50% NADMS, staff does not find this achievable in White Flint for three reasons:

- The Silver Spring CBD is currently served by express bus service along the US 29 corridor, and a high level of bus-to-bus transfer at the Silver Spring Transit Center, where 34 bus bays are planned to accommodate over 90,000 transit boarding's per day.
- The Silver Spring CBD is approximately three miles closer to the regional core
- The Silver Spring CBD has a greater amount of transit-dependent households, both within the adjacent policy areas and in nearby commuter sheds.

Realignment of North Bethesda Transitway

The North Bethesda Transitway is a master-planned transitway connection to link the Rock Spring Park activity center to the Metrorail system via the Grosvenor Metrorail station. The study team considered revising the North Bethesda Transitway alignment to connect to the White Flint Metrorail station rather than to the Grosvenor Metrorail station. This option was not recommended for two reasons.

- The White Flint Metrorail station is approximately one mile farther from Rock Spring Park than is the Grosvenor Metorail station. This additional distance would both reduce the effectiveness of the connection for Rock Spring Park users as well as increase the cost of the transitway alignment.
- An effective transitway connection would be more feasible at the Grosvenor Metrorail station based on the Metrorail location (aerial versus below grade) and the amount of immediately adjacent development.

Alternative Treatments Along Rockville Pike

During the initial development of transportation network concepts, staff explored a variety of concepts for Rockville Pike as shown in Figure 36. Several alternative concepts were evaluated based on their effect on transportation system performance, the pedestrian experience and character of the Pike, and the expected impacts (both to the adjacent communities and from a fiscal perspective.

Figure 36: Alternative Treatments for Rockville Pike

Comparison of Alternative Treatments for Rockville Pike
(prototype considering section from Old Georgetown to Nicholson) – June 25, 2007 DRAFT ver.3

Alternative	Description	Peak Capacity	Safety and Efficiency	Pedestrian Experience	Character	Community disruption	Cost[1]	Most applicable for
Do nothing	6 lanes	Fair	Good	Poor	Poor	None	$0	
Streetscape	Utilities, trees, bricks	Fair	Good	Fair	Fair	Minor	$20M/mi	
Boulevard	50' median for landscaping, perhaps future transit	Good	Good	Good	Good	Minor	$50M/mi	
Add a lane	8 lanes	Good	Fair	Poor	Poor	Moderate	$50M/mi	
One-way pair[2]	3 NB on Pike plus 3 SB on Woodglen	Good	Good	Good	Good	Substantial	$100M/mi	CBD land uses and densities with grid street availability
Multiway Boulevard	6 lanes +2 lanes and parking in local roadway	Good	Fair	Good	Good	Moderate	$100M/mi	Low density land uses requiring frontage/parking
Grade separate (Pike below)	Single intersection interchange	Good	Good	Excellent	Excellent	Moderate	$100M	High volume arterial "rungs" located between urban centers
Depress Pike below deckover	Old Georgetown - Marinelli	Good	Good	Excellent	Excellent	Moderate	$250M	

[1] Reflects judgment based on sampling of roughly comparable projects
[2] Cost estimated for three-block section but community disruption reflects southward terminus at Edson Lane.

Initial stakeholder participation confirmed the staff position that a "do nothing" alternative would not satisfy the need to improve the pedestrian experience and change the character of the Pike through good design.

One proposal incorporated line-haul light-rail transit (LRT) in a 50' wide median for Rockville Pike. This concept was not pursued further based on the fact that:

- Metrorail will provide line-haul services in the corridor with sufficient capacity to accommodate demand,
- the capital costs and space requirements associated with LRT would increase both the planned implementation costs and right-of-way requirements, and
- coordination would be needed with adjacent sections to develop an independent operating segment.

Staff found that an increase in vehicular capacity by adding a general purpose lane would exacerbate the pedestrian experience and character concerns with the do-nothing alternative.

Proposals to convert Rockville Pike and Woodglen Drive into either a one-way couplet or a multi-way boulevard (with continuous service roads) would increase capacity but be difficult to implement. Similarly, proposals for depressing the Pike below grade could greatly enhance the local character and experience, but at a prohibitively high cost.

The review of concepts shown in Figure 36 helped direct the Sector Plan recommendations toward the boulevard treatment included in the Public Hearing Draft of the Plan.

Transportation System Concepts Proposed by Glatting Jackson

In November 2007, a group of private sector interests hired the transportation consulting firm Glatting Jackson to assist in the conceptual development of local street networks. Glatting Jackson held a design charrette and produced the network shown in Figure 37. The Glatting Jackson network reflected many local street concepts already developed and incorporated the following new concepts that staff had not previously entertained:

- Stop construction of the Montrose Parkway interchange,
- raise Nebel Street to intersect Montrose Parkway at grade at the elevation of the Montrose Parkway bridge across the CSX tracks,
- extend the north/south portion of "Old" Old Georgetown Road northward across Montrose Road as a six-lane road to connect to Rockville Pike near Bou Avenue,
- extend the east/west portion of Old Georgetown Road eastward across the CSX tracks to intersect a realigned Randolph Road at Parklawn Drive, and
- widen Rockville Pike to incorporate back-in angled parking and a fourth travel lane that would provide parking maneuvering space.

Figure 37: Glatting Jackson Roadway Network Concept

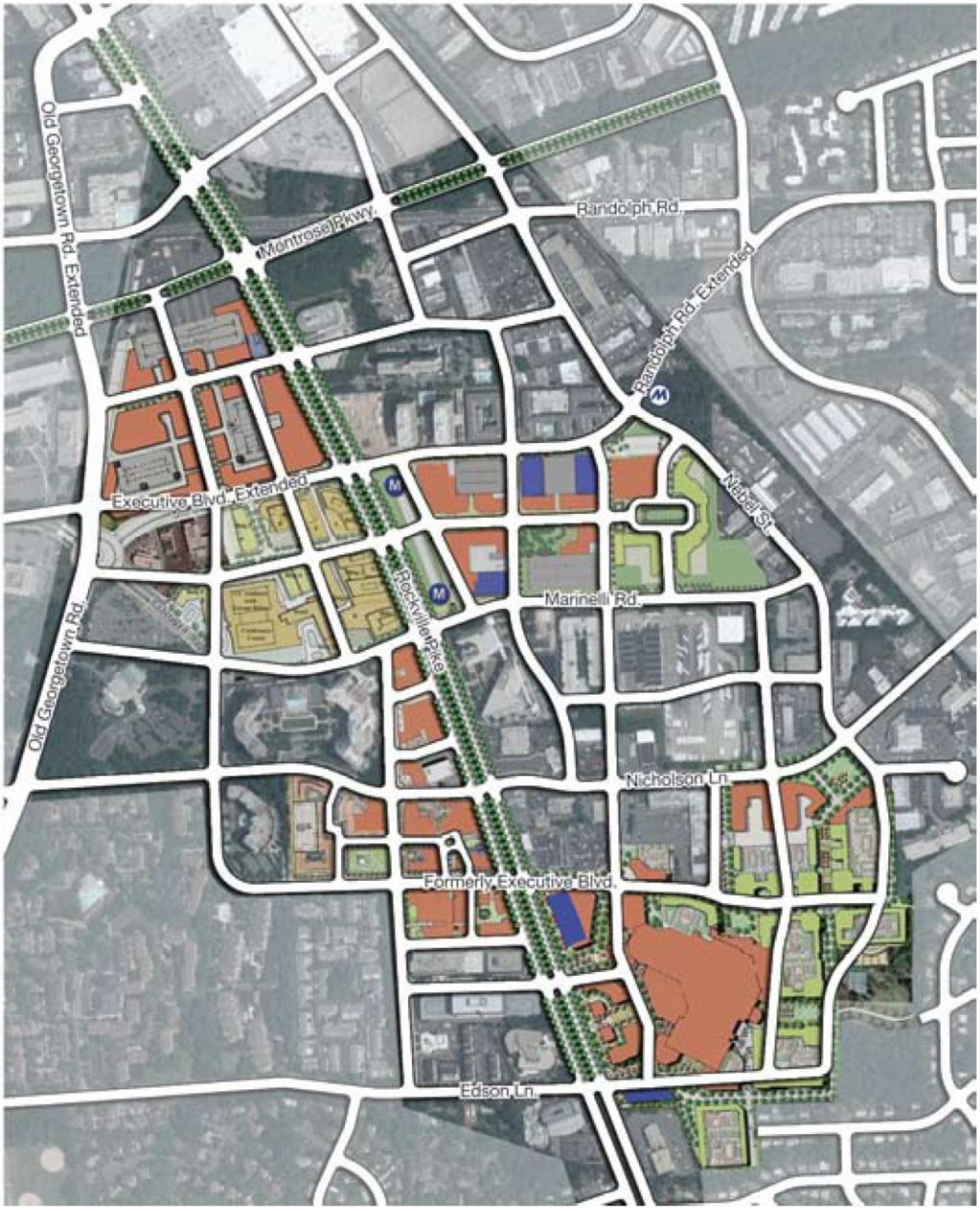


Figure 38 summarizes the staff evaluation of the removal of the Montrose Parkway interchange. The analysis showed that the at-grade system of roadways would achieve a superior urban design outcome, but that the at-grade system of streets would not provide superior mobility and would introduce substantial uncertainty into the planning process, take several years longer to implement, and have higher capital costs.

The primary limitation to the Glatting Jackson network was that the two new roadway extensions both had substantial implementation challenges:

- The northward extension of Old Old Georgetown Road would pass directly to the west of the Monterey high-rise condominium, removing off-street parking spaces and introducing through traffic into a residential enclave.
- The eastward extension of Old Georgetown Road would pass across, or adjacent to, the Pepco substation on Parklawn Drive.

Figure 38: Montrose Parkway Interchange Sensitivity Analysis

White Flint Sector Plan
MD 355 / Montrose Parkway interchange sensitivity analysis
March 13, 2008 DRAFT

The matrix below provides a comparison between the programmed MD 355 / Montrose Parkway interchange and the contemplated replacement of the interchange with a more robust network of urban streets in the vicinity. Mobility conclusions based on analysis of land use scenario recommended to Planning Board 1/31/08.

Objective	Interchange	Network of Streets	Objective better achieved by
Provide local mobility	Travel/congestion focused on major highway corridors; four intersections have wide (> 4 lane) approaches to meet demand	Travel and congestion dispersed across greater number of streets; six intersections have wide (>4 lane) approaches to meet demand	Neither; both achieve objective by different means
Provide regional access	East-west connection across White Flint encouraged within Montrose Parkway corridor with greenway treatment and access management	*Depends upon proposed land use changes and shared-use path treatment*	*Unknown*
Urban design	Reduced pedestrian connectivity at interchange; design may discourage walking	*Depends upon proposed land use changes and shared-use path treatment*	Network of Streets
Property removed from tax rolls	6 acres for interchange (at ~2 FAR on average)	18 acres for local streets (at ~1 FAR on average)	Interchange
Capital cost	$50M programmed by state, local cost ~$1M (two years interest on $14M)	$50M plus right-of-way, not programmed; local cost ~$40M+	Interchange
Approval process (feasibility, community acceptance, funding)	Completed	Not begun	Interchange
Completion date	2011	~2018	Interchange

The concept to realign Executive Boulevard and Old Georgetown Road, connecting Old Georgetown Road to Montrose Parkway via "Old" Old Georgetown Road, was incorporated into the Public Hearing Draft Plan recommendations.

Staff finds that while back-in angle parking can be an effective traffic and parking management solution on roadways with low traffic volumes, it is not appropriate to introduce backing maneuvers on a major highway with 50,000 vehicles per day. The concept to include an auxiliary lane which could, during off-peak times, be used for parallel parking was incorporated into the Public Hearing Draft Plan concept for Rockville Pike.

Roundabout at Old Georgetown Road and Executive Boulevard

In spring 2007, Master Plan Advisory Group advisory members proposed the consideration of a roundabout at the junction between Old Georgetown Road and Executive Boulevard that could potentially facilitate the re-connection of "Old" Old Georgetown Road as a fifth leg in the intersection. Staff evaluated the performance of the roundabout using FHWA planning guidelines and concluded that traffic volumes for Land Use Scenario 4 would exceed the capacity of a two-lane, at grade roundabout by approximately 50%. A roundabout that included both grade separation of Old Georgetown Road and right-turn channelization could accommodate forecast traffic flows but would require prohibitive amounts of right-of-way (for local access ramps) and capital cost.

Rockville Pike / Nicholson Lane Interchange

The 1994 Plan recommends two grade separated interchanges along Rockville Pike in the Sector Plan area, at Montrose Parkway and at Nicholson Lane. The Montrose Parkway interchange is currently under construction, located within a 300-foot wide right-of-way originally reserved for an Outer Beltway alignment, and following approximately ten years of planning and design studies by the State Highway Administration.

Conversely, the Nicholson Lane interchange has not yet been the subject of detailed study and does not benefit from previously reserved right-of-way. During 2006, staff considered alternative interchange concepts in a tight urban diamond concept. Due to the proximity of the WMATA tunnel easement, staff determined that below-grade depressions are not feasible for either Rockville Pike or Nicholson Lane.

More important, the travel demand forecasts prepared for end-state plan conditions include levels of congestion that do not warrant the physical space or capital expense for an interchange.

Widening of Montrose Parkway or Rockville Pike to Establish BRT/HOV Lanes

The examination of land use scenarios #5 and #9, as well as the Glatting Jackson network concepts that provided additional Sector Plan capacity demonstrated the need to consider broader network connectivity. As previously presented, the recommended 29M square feet of development and the proposed network will result in traffic conditions with noticeable congestion, but not so severe as to cause adverse impacts such as neighborhood cut-through traffic or economic impacts to White Flint businesses.

For alternative land use scenarios that included 40M square feet of development, however, staff found that additional capacity would be required to connect White Flint (and the broader North Bethesda commercial core) to the Interstate highway system. This capacity would need to be provided along both Montrose Parkway and Rockville Pike, and would likely consist of the conversion of these planned roadways from six-lane to eight-lane facilities, with the additional lanes possibly reserved for high-occupancy vehicles (HOV) and bus rapid transit (BRT). These potential improvements appear to be physically feasible, but would require additional right-of-way that would create community disruption, and add another $100M to $150M to the infrastructure costs associated with the Plan. These proposals are therefore not included in the Plan.

D. Alternatives Analysis Summary

The transportation and land use recommendations in the Public Hearing Draft of the White Flint Sector Plan were developed through an iterative process incorporating both stakeholder and Planning Board review and comments over a two-year period. The Plan proposes a practical, multimodal transportation system that provides appropriate levels of mobility for future White Flint and vicinity residents, employees, and visitors.