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Gaithersburg West Master Plan Transportation Appendix

Gaithersburg West Master Plan Transportation Appendix

Draft as of 3/11/09

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1. Purpose

The Public Hearing Draft of the Gaithersburg West Master Plan proposes a conversion of the Life Sciences Center (LSC) area from auto-oriented suburbia to a transit-oriented, mixed-use, community. This Appendix provides the technical basis and details for the transportation system recommendations in the Gaithersburg West Master Plan.

The Plan proposes several innovative changes designed to promote the orderly implementation of a transit-oriented and sustainable center for the LSC, including:

- Realignment of the Corridor Cities Transitway (CCT) with line-haul service between the three proposed LSC CCT stations.
- Acceptance of congestion levels that reflect the Planning staff and Planning Board approach to adequacy.
- A proposed local street network that will create a finer grid than exists today and improve vehicular and pedestrian connections between districts.
- An implementation plan that relies on proportional participation by all developments, and a staging plan to coordinate areawide 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 areawide 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 the LSC area from a largely auto-oriented community to a transit-oriented community. The transportation system needed to accommodate these levels of development must achieve a 30% Non-Auto Driver Mode Share (NADMS) for LSC employees, an objective that can be met through a combination of strategies, including:

- Improved access to transit, including the realignment of the CCT through the LSC and improved transit circulator services in combination with the concentration of future development within walking distance of transit.
- Implementation of a finer local street network with prevailing block lengths of 350 feet or less that promotes walking and bicycling.
- Management of the long-term parking supply through coordination of both zoning requirements and public parking provisions.

- Commencement of proactive travel demand management services through the establishment of the Greater Shady Grove Transportation Management District (TMD).

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 document:

- The balance between long-term land use and transportation systems needed to provide sufficient mobility in the developing LSC 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 two 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.

This Draft Appendix is being released during the second week of March 2009 to provide technical information prior to the public hearing scheduled for March 26. The materials in this Appendix, plus supplementary analysis, will be incorporated into a complete set of Plan Appendices.

2. Transportation Plan Recommendations

The Gaithersburg West Master Plan recommends a multimodal transportation system that recognizes the prior planning for the CCT system to create a transit-oriented community of walkable blocks with multimodal transportation options for residents, employees, and visitors.

Figure 1 shows the range of transportation system strategies examined in the Gaithersburg West Master Plan, including:

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

Figure 1 indicates the likelihood that the Plan would incorporate the different strategies based on analyses and coordination performed to date. The cells shaded in light blue indicate those strategies with high potential. In general, those strategies with high potential were incorporated into the Plan as described in the following paragraphs.

	Strategy	Opportunities	Constraints	Potential
Demand Management	Reduce Single Occupant Vehicle mode share	Flexible, low capital cost	Operational costs, monitoring	High
	Increase parking charges	Reduce traffic, provide revenue	Parking Lot District establishment, garage locations	Moderate
Transit Services	Construct CCT through LSC area	Serve planned development near LSC stations, reduce traffic	Capital costs, operational costs	High
	Express bus service using value-priced lanes from I-270	Capture long-distance riders	Operating cost	Moderate
	Shuttle services	Low capital cost	Operating cost	Moderate
Local Street Network	Add local "midblock" streets	Provide alternate routes, reduce walking distances	Capital costs, 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	Increase pedestrian crossing distances, capital cost	High (for selected locations)
	Grade-separated interchanges	Reduce congestion	Capital cost, attractiveness, inhibits pedestrian crossings, public acceptance	Moderate (for selected locations)
	CCT bridging over roadways	Reduce congestion	Capital cost, attractiveness, public acceptance	Moderate (for selected locations)
Polices	Accept higher congestion levels	Consistent with urbanizing area, no capital cost	Operating costs, public acceptance	Moderate
	Increase residential uses	Create mixed use centers, provide housing near jobs, lower trip generation rates	Economic and market feasibility	Moderate
	Staging Plan	Provide services at time of development	None	High

Figure 1: Transportation Management Strategies

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 High Occupancy Vehicle 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., Greater Shady Grove Management District and the Metropolitan Washington Council of Government Commuter Connections).
- 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 Vehicle Miles of Travel 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 development review and approval (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 **public sector** contributions include the activities of the area Transportation Management District (TMD). The proposed Greater Shady Grove Transportation Management District will provide services to employers and employees in the commercial areas of the LSC to promote adoption of commuter benefits programs by employers and to inform employees of alternative commuting options. The Greater Shady Grove Transportation Management District will also work 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, summarizes the different types of TDM techniques commonly applied nationally to reduce vehicle traffic generation by their target market and trip reduction focus.

Figure 2: Travel Demand Management Techniques and Target Markets

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 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 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 encourage 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 Gaithersburg West Master Plan is on commuters who work in the LSC area, for three reasons:

- Recurring vehicular travel demand is most constrained by traffic leaving the LSC area during the evening peak period.
- For the types of housing envisioned in the LSC (predominantly multifamily mid-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 the LSC recommends that the mode share and transportation system performance be monitored periodically 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 so that the responsibility for success of the LSC trip reduction efforts are distributed across all plan area owners and tenants.

Employees working in the LSC

The Plan recommends a 30% Non-Auto Driver Mode Share (NADMS) goal for the LSC. The current NADMS for this area is 16%. The NADMS measures the percentage of travelers who drive to and from work in the LSC as opposed to taking other modes.

The Local Area Modeling performed for the LSC analysis presumed that the 30% NADMS would be achieved over time for all commercial employees within the LSC located north of Darnestown Road. For monitoring purposes, the NADMS has been defined as follows:

- Employees who normally arrive at their workplace in the LSC 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 the LSC but telecommute on the day of surveys.

The last Master Plan for the LSC area, the 1990 *Shady Grove Study Area Master Plan* estimated, on average, approximately 12% of the home-to-work trips originating outside

the Study Area which are bound for Shady Grove would arrive at work via transit. As noted previously, the NADMS goal for this Plan in the LSC is 30%. When comparing these two mode shares it should be noted that the land area in the 1990 *Shady Grove Study Area Master Plan* is roughly twice as large as the LSC and reflects a relatively dispersed land use pattern located both east and west of I-270. Also, the 30% NADMS goal for the LSC includes transit use, as well as other sub-mode shares such as ridesharing and walking/biking. The Plan considers a 30% NADMS goal in the LSC area achievable for several reasons, including: (1) the realignment of the CCT through the LSC; (2) the concentration of planned development within walking distance of the three proposed CCT stations in the LSC; (3) complementary feeder-bus service to the proposed CTT stations; and (4) implementation of an active TDM program in the LSC (including employer-sponsored subsidized transit fares, parking management strategies and staggered work hours).

Residents living in the LSC

The 1990 *Shady Grove West Study Area Plan* identified a 75% auto-driver goal for the journey-to-work for Study Area residents. The 2005 Census Update Survey noted that this goal has very nearly been achieved in the R & D Village Policy Area, with a 73% auto-driver mode share reported for residents in that area.

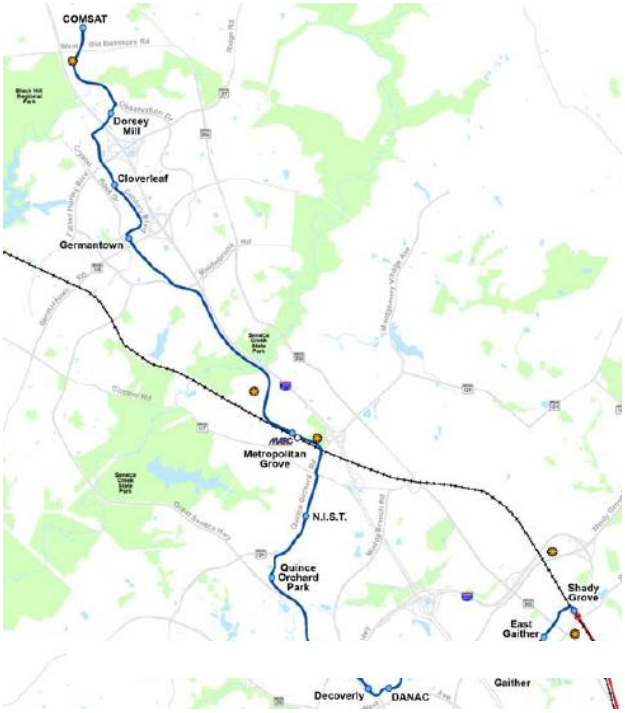
B. Corridor Cities Transitway (CCT) and Local Transit System

To serve the LSC area, this Plan recommends the realignment of the CCT with line-haul service between the three proposed LSC CCT stations. To reduce delays for transit and vehicles, this realignment may require CCT bridges over Key West Avenue (MD 28) and Great Seneca Highway (MD 119). Project planning for the CCT takes into account the potential need to reconfigure existing bus service to avoid duplication and ensure the most efficient allocation of vehicles and personnel. There are currently six Ride On routes from the Shady Grove Metro Station, three of which provide service to the LSC area, including Shady Grove Adventist Hospital and the Traville Transit Center. When the CCT is in place, these routes may need to be readjusted to ensure the most efficient service. This Plan also recommends the development of express bus service using value-priced lanes from I-270 and the Intercounty Connector (ICC), as well as shuttle bus routes to serve the LSC area.

As densities increase in the LSC area 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.

Corridor Cities Transitway

Figure 3: Current CCT alignment



Background

The Corridor Cities Transitway (CCT) has been included in County master plans in one form or another for over 20 years. The CCT is envisioned to be either a bus rapid transit (BRT) or light rail transit (LRT) system providing frequent (5-10 minute) service between the Shady Grove Metrorail Station and Clarksburg (i.e., the COMSAT site). [1] Figure 1 shows the Current CCT alignment.

Purpose

The primary purpose of the CCT is to provide improved mobility options within the corridor as well as improved access to the Metrorail system. The CCT is viewed as central to the establishment of active pedestrian oriented mixed use centers along the entire corridor – not just in the Gaithersburg West area. As such, the respective visions for the centers and the CCT are co-dependent.

Station Locations and Functions

The major corridor cities or activity centers served by the CCT stations include Shady Grove, King Farm, Crown Farm, Quince Orchard Park, Metropolitan Grove, Germantown and the southern edge of Clarksburg. One overriding objective in recent past (Shady Grove and Twinbrook) and current (Germantown and Gaithersburg West) planning efforts is to establish a vision for pedestrian oriented mixed use communities with transit supportive

[1] While adopted master plans envision the CCT extending into Frederick County, the current Environment Assessment underway by the Maryland Transit Administration (MTA) includes only the segment between Shady Grove and the COMSAT site in Clarksburg. Any eventual first phase of actual construction of the CCT would likely involve a segment that began at the Shady Grove Metrorail station and ended at some location south of the COMSAT site (e.g., Metropolitan Grove or Germantown).

densities within one-half mile of most station areas. It is the combination of a mix of activities coupled with high quality of transit service that reduces the growth rate of single occupant auto trips – sometimes significantly. There are 14 planned station locations along the alignment between Shady Grove and COMSAT. The current plan is for 7 of the 14 stations to have parking for transit riders, including the Washingtonian (Crown Farm) and Decoverly stations.

Current CCT Study Underway

The Maryland Transit Administration is currently nearing completion of an updated Alternatives Analysis/Environmental Assessment (AA/EA of the CCT. It is anticipated that the study will be completed during May 2009. The purpose of the study is to update information from the 2002 Environmental Impact Statement on the impacts of the CCT and to help in the selection of a preferred mode (bus rapid transit or light rail).

Alternative Alignment Recommended by Gaithersburg West Master Plan t

At its southern end, the CCT current master planned alignment (the blue line on Figure 4) goes over I-270 heading west after leaving King Farm and serves the Crown Farm development in the City of Gaithersburg before entering the Gaithersburg West study
area as it runs along the south side of Decoverly Drive. The proposed DANAC station is located on Decoverly Drive just before the alignment goes over Great Seneca Highway. The Decoverly Station is located on the west side of Great Seneca Highway.

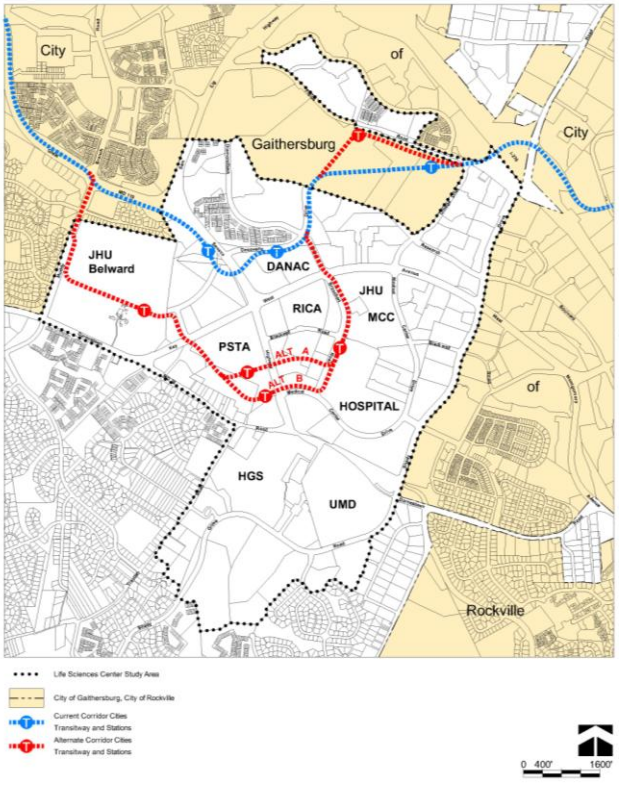


Figure 4: Draft Plan CCT alignment and stations

The red line represents potential modifications to the CCT alignment in this area. The modified alignment within Crown Farm is a result of the local review of the development carried out by the City of Gaithersburg and has been closely coordinated with the Maryland Transit Administration (MTA).

The Plan recommends the CCT alignment be extended south along Broschart Road to better serve the Shady Grove Life Sciences Center, the land where the Public Service Training Academy is currently located, and the Johns Hopkins University (JHU) Belward

Research Campus with stations at each of these locations. Commuter parking would likely be available at no more than two of the stations and more likely, just one of the three stations.

The analysis of this proposed change to the alignment of the CCT is being carried out by the MTA using updated land use forecasts provided by teh Planning Department. [2]It is not anticipated that the analysis will be completed until sometime after the release of the Alternatives Analysis / Environmental Assessment in May 2009. Once completed, the analysis is expected to inform the selection of a Locally Preferred Alternative – scheduled to occur sometime in Fall 2009.[3]

The staff believes the proposed alignment shift through the LSC area will both better support the vision for the area, complement the other planning efforts along the I-270 corridor, and better fulfill the potential of the CCT. As a result, it is recommended that the CCT planning move ahead under the assumption that the concept of the proposed modification of the alignment south to serve the LSC area better fulfills the Plan vision – even it results in the need for additional environmental impact analysis.

It should also be noted that some communities near the proposed change in the alignment have recently requested that other modifications to the alignment on the Belward campus be considered. While potential additional modifications are not currently being studied by the MTA, the staff feels that the dialogue should continue so as not to preclude further consideration at a later date.

CCT Staging Considerations

It is possible the CCT will involve a staged or phased implementation – regardless of mode or alignment. Some key factors to consider in the staging plan include the following:

- The service should be frequent (ten minutes or less)
- The average scheduled speed needs to be faster than conventional local bus service – a minimum of 15 mph.
- The vehicles should be new, low floor, hybrid electric or other clean technology, and branded.
- Station boarding areas should be distinctive, well-lit, and far enough apart to maintain an attractive average scheduled speed.

[2] The forecast provided MTA include updated estimates for Germantown, Twinbrook, and White Flint as well.

[3] Note that the analysis of the alternative alignment effectively expands the scope of the LPA decision to include alignment (master plan or new alignment through LSC area) as well as mode (bus rapid transit or light rail). If the new alignment is chosen as part of the LPA, it is possible the Federal Transit Administration will require the MTA to conduct another supplemental environmental assessment, which could delay the project entering the FTA's New Start pipeline.

Existing Ride-On Service

There are nine Ride-On routes that serve the general Gaithersburg West planning area. The extent to which they operate in the planning area varies so the daily ridership shown in the table to the right includes passengers boarding outside the planning area.

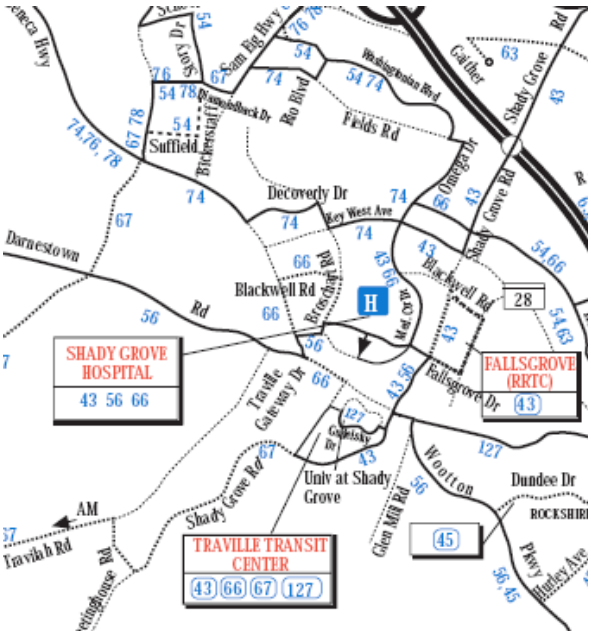


Figure 5: Ride-On Routes and Average Ridership

Route No.	From	To	Peak Period Frequency	Average Weekday Ridership
43	Shady Grove Metrorail	Shady Grove Hospital	15	900
54	Rockville	Lake Forest	20	2,200
55	Rockville	Germantown Transit Center	15	6,900
56	Rockville	Lake Forest	20	2,500
66	Shady Grove Metrorail	Traville Transit Center	30	110
67	Shady Grove Metrorail	Traville Transit Center	30	130
74	Shady Grove Metrorail	Germantown Transit Center	30	750
76	Shady Grove Metrorail	Poolesville	30	600
78	Shady Grove Metrorail	Kingsview Park & Ride	30	230

Ride – On Strategic Plan

The September 2008 Draft Strategic Plan for Ride-On indicated Travilah as an underserved area of the County. Additional service in that area would likely result in additional service in the Gaithersburg West area.

Potential Bus Service Changes In Response To Introduction of CCT

Project planning for the CCT takes into account the need to re-configure the existing bus service in order to avoid duplication and insure the most efficient allocation of vehicles and personnel. Preliminary concept level planning of how a route network might evolve if the CCT were in place has been conducted by the MTA – in consultation with the County's Ride-On staff as well as WMATA's Metrobus staff.

As of this writing, the operating plan for the bus service envisioned under the BRT alternative for the CCT calls for improved service frequencies on the above routes and does not call for any route terminals to change. Under the LRT alternative, the Rockville

routes and Route 43 would have improved service frequencies with no change in where these routes begin or end. The balance of the routes (those more oriented to the LSC area) would be shorter, operate more frequently, and be designed as feeder routes for the CCT.

Preliminary Ridership, Cost, and Cost-Effectiveness Estimates for the CCT

The MTA project team has released the following preliminary ridership (year 2030) estimates for the CCT using Round 6.4 demographic projectiojns. The average weekday ridership is estimated to range from 21,000 to 30,000. The estimates reflect Round 6.4 demographic forecasts and the current CCT alignment.

Figure 6: Round 6.4 Ridership for existing CCT alignment

CCT Alternatives Preliminary Travel Demand Forecasts & Cost Estimates				
Transit Alternative	Travel Time Shady Grove to COMSAT (minutes)	Ridership (Daily Boardings)	Capital Cost (millions-2007$)	Annual Operations and Maintenance Costs (millions-2007$)
Hwy 1 and Trans. TSM	60	6,000 - 7,000	$86.9	$14.8
Hwy 1 and Light Rail	36	24,000 - 30,000	$777.5	$28.1
Hwy 1 and Bus Rapid	38	21,000 - 27,000	$449.9	$26.8
Hwy 2 and Light Rail	36	24,000 - 30,000	$777.5	$28.1
Hwy 2 and Bus Rapid	38	21,000 - 27,000	$449.9	$26.8

Both Hwy 1 and Hwy 2 have four general purpose and two express toll lanes on I-270 in each direction in Montgomery County north of I-370 to the future interchange with Newcut Road (between MD 121 and West Old Baltimore Road). Both have two general purpose lanes on I-270 in each direction from the future Newcut Road interchange to I-70. Hwy 1 has two express toll lanes in this segment while Hwy 2 has one express toll lane.

In addition, the MTA has released estimates of the cost effectiveness of the alternatives under consideration (see table below).

Figure 7: Cost Effectiveness of the Existing CCT alignment.

		A	B	C	D
	Total Capital Costs (2007 dollars)	Annualized Capital Costs (2007 dollars)	Annual Operating Costs (2007 dollars)	Annual User Benefit (Hours)	Annualized Cost per Hour of User Benefit
TSM	86,860,000	7,440,700	14,793,000	1,890,000	--
Build Alternatives					
Alternative 6A (LRT)	777,530,000	62,202,400	28,129,000	3,960,000	$32.90
Alternative 6B (BRT)	449,920,000	36,443,500	26,859,000	4,110,000	$18.50
Alternative 7A (LRT)	777,530,000	62,202,400	28,129,000	3,990,000	$32.43
Alternative 7B (BRT)	449,920,000	36,443,500	26,859,000	4,140,000	$18.25

The "Annualized Cost Per Hour of User Benefit" (column "D" in the table) is a variable that takes into account the annualized costs of the respective alternatives and the extent to which travel time benefits occur when compared to the "TSM" or Transportation System Management alternative.[4] This variable is used by the Federal Transit Administration (FTA) to evaluate projects across the country that are competing for federal funds to help construct the project. Under the current guidelines used by the FTA, the cost per hour for the Light Rail Transit (LRT) alternatives exceeds the amount that the FTA would consider competitive for funding. The BRT alternatives are well below the FY 2009 threshold cost of $23.99 per hour, indicating greater funding potential for BRT. The cost estimates are not expected to change prior to the availability of the AA/EA document in May 2009 but are expected to change when the alignment through the Life Sciences Center area is examined by the MTA project team.

Transit Supportive Density Considerations

There is a considerable amount of existing and evolving research on station area densities, pedestrian accessibility and connectivity, transit mode share, and other issues related to transit oriented development

[4] The TSM alternative is an alternative that includes improved bus service operating over existing roadways. There is no transitway that would be constructed under this alternative.

The Planning Department has reviewed available current material on this issue and provides the following examples as representative.

The Federal Transit Administration has sponsored a report by Reconnecting America, "Station Area Planning: How to Make Great Transit-oriented Places," that identifies different types of activity centers in the context of function, density and level of transit service as shown in the following tables.

Figure 8: Characteristics of Transit Oriented Development

DISTRICTS			CORRIDOR
Urban Neighborhood	**Transit Neighborhood**	**Special Use/ Employment District**	**Mixed-Use Corridor**
Predominantly residential district with good access to regional and subregional centers	Predominantly residential district organized around transit station	Local focus of economic and community activity without distinct center	Local focus of economic and community activity without distinct center
Heavy rail, LRT/streetcar, BRT, commuter rail, local bus	LRT/streetcar, BRT, commuter rail, local bus	LRT/streetcar, BRT, potentially heavy rail	LRT/streetcar, BRT, local bus
5-15 minutes	15-30 minutes	15-30 minutes	5-15 minutes
Moderate- to high-density residential uses with supporting commercial and employment uses	Low- to moderate-density residential uses with supporting commercial and employment uses	Concentrations of commercial, employment and civic/cultural uses, potentially with some residential	Moderate-density mix of residential, commercial, employment and civic/cultural uses
Primarily local-serving retail opportunity; need for some community-serving retail	Primarily local-serving retail opportunity	Potential for community- and regional-serving retail but need to balance demands for access	Primarily local-serving retail opportunity; need for some community-serving retail
Expanding local-serving retail opportunities and increasing high-density housing	Integrating moderate-density housing and supporting local-serving retail	Creating sustainable off-peak uses and accommodating peak travel demand	Expanding local-serving retail opportunities and high-density housing opportunities
Fruitvale in Oakland, Greenwich Village in New York City, the Pearl District in Portland, University City in Philadelphia	Ohlone-Chynoweth outside San Jose; Plano, Texas; Barrio Logan in San Diego; Capitol Hill in Washington D.C.	South of Market in San Francisco, Camden Station in Baltimore, South Waterfront in Portland	International Boulevard in Oakland, Washington Street in Boston, University Avenue in St. Paul, Minnesota

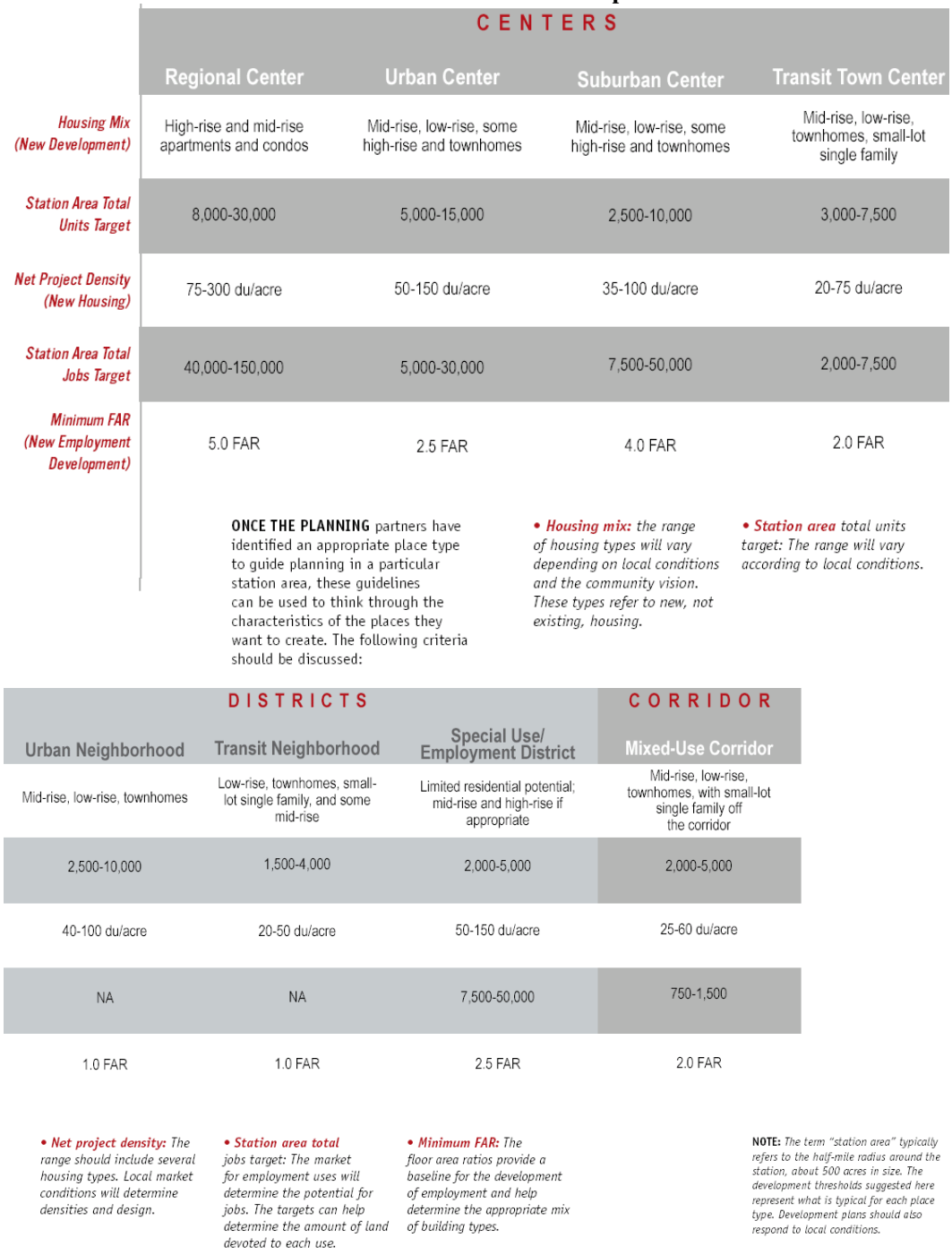
QUESTIONS ARE POSED in this table to help all the station area planning partners identify the areas they are planning within the place typology. The place types in the typology are generalized so as to highlight similarities and differences as well as the parameters that tend to define their land use mix, housing densities, and transit service. Because of this a particular place may not fit exactly into one of these types. All of the characteristics that are identified, defined and quantified are intended to be descriptive and not prescriptive, in the recognition that all places are unique.

Note: *The term "station area" typically refers to the half-mile radius around the station, about 500 acres in size. The term "primary transit mode" refers to the transit types that typically support the place type.*

Source: Station Area Planning, Reconnecting America and the Center for Transit-Oriented Development, February 2008, page 8.

Some representative or general TOD residential categories include the following:

Figure 9: Characteristics of Residential Transit Oriented Development



	CENTERS			
	Regional Center	Urban Center	Suburban Center	Transit Town Center
Housing Mix (New Development)	High-rise and mid-rise apartments and condos	Mid-rise, low-rise, some high-rise and townhomes	Mid-rise, low-rise, some high-rise and townhomes	Mid-rise, low-rise, townhomes, small-lot single family
Station Area Total Units Target	8,000-30,000	5,000-15,000	2,500-10,000	3,000-7,500
Net Project Density (New Housing)	75-300 du/acre	50-150 du/acre	35-100 du/acre	20-75 du/acre
Station Area Total Jobs Target	40,000-150,000	5,000-30,000	7,500-50,000	2,000-7,500
Minimum FAR (New Employment Development)	5.0 FAR	2.5 FAR	4.0 FAR	2.0 FAR

ONCE THE PLANNING partners have identified an appropriate place type to guide planning in a particular station area, these guidelines can be used to think through the characteristics of the places they want to create. The following criteria should be discussed:

- ***Housing mix:*** *the range of housing types will vary depending on local conditions and the community vision. These types refer to new, not existing, housing.*
- ***Station area*** *total units target: The range will vary according to local conditions.*

DISTRICTS			CORRIDOR
Urban Neighborhood	Transit Neighborhood	Special Use/ Employment District	Mixed-Use Corridor
Mid-rise, low-rise, townhomes	Low-rise, townhomes, small-lot single family, and some mid-rise	Limited residential potential; mid-rise and high-rise if appropriate	Mid-rise, low-rise, townhomes, with small-lot single family off the corridor
2,500-10,000	1,500-4,000	2,000-5,000	2,000-5,000
40-100 du/acre	20-50 du/acre	50-150 du/acre	25-60 du/acre
NA	NA	7,500-50,000	750-1,500
1.0 FAR	1.0 FAR	2.5 FAR	2.0 FAR

- ***Net project density:*** *The range should include several housing types. Local market conditions will determine densities and design.*
- ***Station area total*** *jobs target: The market for employment uses will determine the potential for jobs. The targets can help determine the amount of land devoted to each use.*
- ***Minimum FAR:*** *The floor area ratios provide a baseline for the development of employment and help determine the appropriate mix of building types.*

NOTE: *The term "station area" typically refers to the half-mile radius around the station, about 500 acres in size. The development thresholds suggested here represent what is typical for each place type. Development plans should also respond to local conditions.*

Source: Station Area Planning, Reconnecting America and the Center for Transit-Oriented Development, February 2008, page 12.

An example of a similar typology for mixed use sites is presented below:

Figure 10: Characteristics of Mixed Use Transit Oriented Development

		Net Density	Characteristics	Construction Type	Parking Configuration	
Mid-Rise Residential Over Commercial	MIXED USE TYPES	40-90 du/acre	3-6 stories with apartments, single- or double-loaded corridors with lobby entrance, off-street parking in structure or below grade	Type I/III (max 6 stories with building code modification/65 feet)	Groundfloor podium/ subgrade or elevated structure	
High-Rise Residential Over Commercial	MIXED USE TYPES	60+ du/acre	7+ stories, usually with base and point tower, single- or double-loaded corridors with lobby entrance, off-street parking in structure or below grade	Type I/II (max 12 stories/120 feet/no limits on Type 1)	Off-street parking in structure or below grade	
Low-Rise Office/Commercial	EMPLOYMENT TYPES	0.5-2.5 FAR	1-3 stories with lobby entrance to upper floors; retail, office or mixed-use with mix of tenant types, including limited large-footprint retail uses; parking in surface lots or structures	Type III/IV/V (max 4 stories/65 feet)	Off-street parking in groundfloor podium or surface	
Mid-Rise Office/Commercial	EMPLOYMENT TYPES	2.0-5.0 FAR	3-7 stories, with lobby entrance to upper floors, office with potential groundfloor retail, parking in structure or below grade	Type I/II (max 12 stories/160 feet)	Off-street parking in structure or below grade	
High-Rise Office/Commercial	EMPLOYMENT TYPES	4.0+ FAR	6+ stories with lobby entrance to upper floors sometimes with point tower over base, office with potential groundfloor retail, parking in structure or below grade	Type 1 (no limits)	Off-street parking in structure or below grade	
Institutional/Other Employment	EMPLOYMENT TYPES	varies	schools, civic uses, stadiums, hospitals, other entertainment uses; range of densities and sizes; parking often in structures or below grade	Varies	Parking often in structures or below grade	

Source: Station Area Planning, Reconnecting America and the Center for Transit-Oriented Development, February 2008, page 13.

Non –Auto Mode Share

The available research indicates that the percent of work trips by residents in a Transit Oriented Development environment made by either taking transit, walking, or by bike varies but in general, is much higher than for the region overall. This is especially the case in maturing regions with heavy rail systems as noted in the tables below from the Transit Cooperative Research Program (TCRP) Report 128: "Effects of TOD on Housing, Parking, and Travel."

Figure 11: Transit Trends for Journey to work trips for selected TODs

Region	Transit Share 1970 (%)	Transit Share 1980 (%)	Transit Share 1990 (%)	Transit Share 2000 (%)	% Change 1970-2000 (%)
Older and Redeveloping Regions					
Chicago TOD Average (n=8)	24.0	21.7	18.7	16.7	-30.0
Chicago MSA Average	22.1	16.6	13.7	11.5	-48.0
NY/NJ TOD Average (n=26)	15.7	13.1	13.6	16.4	4.0
NY/NJ MSA Average	35.5	26.7	25.4	24.9	-30.0
TOD Average	**19.8**	**17.4**	**16.1**	**16.5**	**-17.0**
MSA Average	**28.8**	**21.6**	**19.5**	**18.2**	**-37.0**
Maturing - Heavy Rail Regions					
Atlanta TOD Average (n=4)	20.9	22.5	24.9	19.3	-8.0
Atlanta MSA Average	9.2	7.7	4.6	3.7	-60.0
Miami TOD Average (n=2)	0.5	2.7	5.4	6.5	1094.0
Miami MSA Average	7.1	5.0	4.4	3.9	-45.0
San Francisco TOD Average (n=18)	17.8	22.3	20.1	21.0	18.0
San Francicsco MSA Average	11.6	11.4	9.6	9.5	-18.0
Washington DC TOD Average (n=16)	19.0	27.4	32.5	30.0	58.0
Washington DC MSA Average	15.4	13.1	11.3	9.4	-39.0
TOD Average	**14.6**	**18.8**	**20.7**	**19.2**	**32.0**
MSA Average	**10.8**	**9.3**	**7.5**	**6.6**	**-39.0**
New Start - Light Rail Regions					
Portland TOD Average (n=5)	9.2	13.4	11.8	14.6	58.0
Portland MSA Average	5.5	7.6	5.0	5.7	3.0
San Diego TOD Average (n=6)	8.3	11.2	6.5	6.7	-19.0
San Diego MSA Average	3.7	3.4	3.5	3.4	-7.0
Los Angeles TOD Average (n=6)	6.2	11.5	10.2	8.4	37.0
Los Angeles MSA Average	4.2	5.2	4.7	4.7	11.0
Dallas TOD Average (n=6)	14.5	9.1	9.2	3.2	-78.0
Dallas MSA Average	5.2	3.5	2.3	1.8	-66.0
Denver TOD Average (n=2)	9.4	8.6	8.4	7.5	-20.0
Denver MSA Average	4.3	6.0	4.2	4.3	0.0
Salt Lake City TOD Average (n=4)	2.4	5.8	3.2	5.0	108.0
Salt Lake City MSA Average	2.2	5.0	3.1	3.0	36.0
TOD Average	**8.3**	**9.9**	**8.2**	**7.6**	**-9.0**
MSA Average	**4.2**	**5.1**	**3.8**	**3.8**	**-9.0**
Total TOD Average (n=103)	**15.1**	**17.0**	**16.9**	**16.7**	**11.0**
Total MSA Average (n=12)	**19.0**	**14.1**	**12.0**	**7.1**	**-63.0**

Source: Transit Cooperative Research Program Report 128, Transportation Research Board, 2008, page 9.

Figure 12: Walk/bike trends for Journey to work trips for selected TODs

Region	Walk Share 1970 (%)	Walk/Bike Share 1980 (%)	Walk/Bike Share 1990 (%)	Walk/Bike Share 2000 (%)	% Change 1970-2000 (%)
Older and Redeveloping Regions					
Chicago TOD Average (n=8)	13.6	14.1	9.8	8.9	-34.0
Chicago MSA Average	9.6	7.9	5.7	3.4	-64.0
NY/NJ TOD Average (n=26)	16.9	14.3	8.6	8.2	-51.0
NY/NJ MSA Average	10.0	10.2	7.3	5.8	-42.0
TOD Average	**15.2**	**14.2**	**9.2**	**8.6**	**-44.0**
MSA Average	**9.8**	**9.0**	**6.5**	**4.6**	**-53.0**
Maturing - Heavy Rail Regions					
Atlanta TOD Average (n=4)	13.1	16.1	7.9	7.4	-43.0
Atlanta MSA Average	4.4	3.2	3.1	1.4	-68.0
Miami TOD Average (n=2)	3.3	3.6	3.0	2.8	-15.0
Miami MSA Average	7.3	5.5	4.1	2.2	-70.0
San Francisco TOD Average (n=18)	19.8	19.1	14.9	16.1	-19.0
San Francicsco MSA Average	8.6	9.1	6.4	4.4	-49.0
Washington DC TOD Average (n=16)	17.3	18.3	14.9	14.2	-18.0
Washington DC MSA Average	8.4	7.0	5.4	3.2	-62.0
TOD Average	**13.4**	**14.3**	**10.2**	**10.1**	**-24.0**
MSA Average	**7.2**	**6.2**	**4.8**	**2.8**	**-61.0**
New Start - Light Rail Regions					
Portland TOD Average (n=5)	23.2	23.4	19.5	20.4	-12.0
Portland MSA Average	7.8	7.4	5.4	3.7	-52.0
San Diego TOD Average (n=6)	13.2	22.6	9.4	7.7	-42.0
San Diego MSA Average	9.5	9.1	6.1	4.0	-58.0
Los Angeles TOD Average (n=6)	15.2	13.5	10.7	9.5	-37.0
Los Angeles MSA Average	7.7	7.6	5.1	3.2	-58.0
Dallas TOD Average (n=6)	31.9	9.4	26.1	11.2	-65.0
Dallas MSA Average	5.8	3.4	3.2	1.6	-72.0
Denver TOD Average (n=2)	13.4	6.3	7.9	5.5	-59.0
Denver MSA Average	7.8	6.4	4.9	3.1	-60.0
Salt Lake City TOD Average (n=4)	12.9	8.0	6.9	7.1	-45.0
Salt Lake City MSA Average	6.5	5.7	4.5	2.3	-65.0
TOD Average	**18.3**	**13.9**	**13.4**	**10.2**	**-44.0**
MSA Average	**7.5**	**6.6**	**4.8**	**3.0**	**-60.0**
Total TOD Average (n=103)	**17.4**	**15.8**	**12.3**	**11.2**	**-36.0**
Total MSA Average (n=12)	**7.8**	**6.9**	**5.1**	**3.2**	**-59.0**

Source: Transit Cooperative Research Program Report 128, Transportation Research Board, 2008, page 10.

TOD Density Thresholds and the CCT

In general, minimum job densities that are "transit-supportive" for fixed-guideway line-haul services – i.e., establish a ridership base for peak period service that is frequent and reasonably competitive with the auto trip is thought to be in the 25-50 jobs/acre range. The corresponding minimum number for residential development is in the 10-35 dwelling units/acre range. The ranges and mix can vary by station but these are the minimum densities to support transit. The area over which the density threshold is typically applied is the area within one-half mile of the station with the higher densities nearer the station (within ¼ mile of the station).

The staff has examined the station area densities along the CCT alignment using the COG Round 6.4 land use forecasts, for all stations except the LSC area. The Round 6.4 forecasts were developed in 2003 as the Department began analyzing I-270 corridor master plans. In the LSC area, jobs and housing were estimated for year 2030 and were provided to the MTA for their evaluation of the proposed alignment in August 2008.

A summary of the estimate of jobs and housing in the August 2008 forecasts used by MTA is presented below:

Figure 13: Staff's August 2008 Forecast for 2030 Development

PROGRAM /TAZ/VARIABLE	SGLSC CLUSTER	PSTA CLUSTER	BELWARD CLUSTER	TOTAL/AVERAGE
	TAZ 218	TAZ 219	TAZ 220	
Research/Office/Lab SF	2,105,750	89,750	1,250,500	3,446,000
Residential SF & DU's	1,980,000	1,607,000	352,000	3,939,000
Retail SF	37,600	156,000	23,600	217,200
Industrial	760,950	56,700	1,678,950	2,496,600
Other (Cultural/Rec) SF	2,218,500	11,500	750,000	2,980,000
Subtotal	7,102,800	1,920,950	4,055,050	13,078,800
Land Area	9,458,223	2,223,447	6,941,704	18,623,374
FAR	0.75	0.86	0.58	0.70
HH/Acre	9.12	31.48	2.21	9.21
Jobs /Acre	67.45	17.59	64.58	60.43
Jobs Per DU	7.40	0.56	29.24	6.56
Total Jobs	14,645	898	10,292	25,835
Total Residents	3,445	3,551	778	7,775
Total DU's	1,980	1,607	352	3,939
Non Residential SF				**9,139,800**
Residential SF				**3,939,000**
Total				**13,078,800**

Figure 14 shows how these densities compare with other station area densities – both along the CCT and along Metrorail – where we are reasonably comfortable making those estimates.[5]

Figure 14: Round 6.4 Forecast for 2030 Development Comparisons

CCT Stations - Sub Zones Are Round 6.4	2030 HH/Acre	2030 Jobs/Acre
	Within First Half Mile	Within First Half Mile
Clarksburg Town Center	3	6
Shawnee Lane	2	13
COMSAT	4	15
Dorsey Mill	3	14
Manekin	4	21
Cloverleaf	3	14
Germantown Transit Center	6	13
Middlebrook Road	2	10
Metropolitan Grove	5	10
First Field	4	19
NIST	3	9
Quince Orchard	4	5
Decoverly	6	7
DANAC	4	15
Crown Farm	4	33
West Gaither	2	35
East Gaither	11	2
Shady Grove	10	22
Metrorail Stations - Round 7.0		
Shady Grove	13	15
Rockville	7	33
Twinbrook	8	31
White Flint	16	63
Grosvenor	14	11
Medical Center	1	41
Bethesda Metro	34	110
Freindship Heights	27	73

[5] The estimates of station area densities are based upon traffic zones and in some cases, the traffic zones may extend slightly beyond one-half mile from the station in question. Nevertheless, the staff believes this approach or methodology provides a good relative comparison of the densities currently planned for the various station areas. It should be noted that Round 6.4 does not include the land use assumptions in the Germantown Draft Plan now before County Council and that Round 7.0 does not include land use assumptions in the White Flint Draft Plan.

Figure 15: Forecast for 2030 LSC Development Comparisons for TOD

Other Activity Centers - Round 7.0					
Milestone Center	2	2			
Lakeforest Mall	7	6			
Rock Spring Park	2	21			
Washingtonian Center	6	11			
Life Science 2030 Using CCT August 2008 Forecast					
SGLSC Cluster	**9**	**67**			
PSTA Cluster	**31**	**18**			
Belward Cluster	**2**	**65**			
Life Science 2030 Average	**9**	**60**			
Density Threshold Minimums From Literature					
Heavy Rail	12	50			
Light Rail	9	25-50			
BRT	5-15	25-50			
Express Bus	3-15	10			
Local Bus	3-8	5-10			
TOD Guidelines - Station Area Planning	Urban Center	Suburban Center	**SGLSC CLUSTER**	**PSTA CLUSTER**	**BELWARD CLUSTER**
Peak Transit Frequency	5-15	5-15	6	6	6
Station Area Total Housing Units Target	5,000 - 15,000	2,000 - 10,000	1,980	1,607	352
New Housing Density	50-150 du/acre	35-100 du/acre	9	31	2
Station Area Total Jobs Target	5,000-30,000	7,500 - 50,000	14,645	898	10,292
Minimum FAR - New Employment Development	2.5	4.0	N/A	N/A	N/A

The examination of the station area densities indicates that the initial 2030 land use forwarded to the MTA exceeds the generally accepted minimum densities for TOD station areas and is approximately double the station area job density planned for Crown Farm and the west side of King Farm. In general, the station area densities along the CCT at some other stations (excluding Germantown, Shady Grove, Crown Farm, King Farm – the more recently planned station areas) are below the minimum densities.[6]

In summary, the staff analysis of station area densities in Round 6.4 led to the conclusion that additional density should be concentrated at selected CCT stations where redevelopment potential is highest to improve CCT competitiveness for federal funding.

[6] Again, it important to note that not all stations should necessarily meet the generally accepted density thresholds. The guidelines are intended to be applied along the entire corridor so that there is an indication of whether the land use in the corridor overall is dense enough to be "transit supportive".

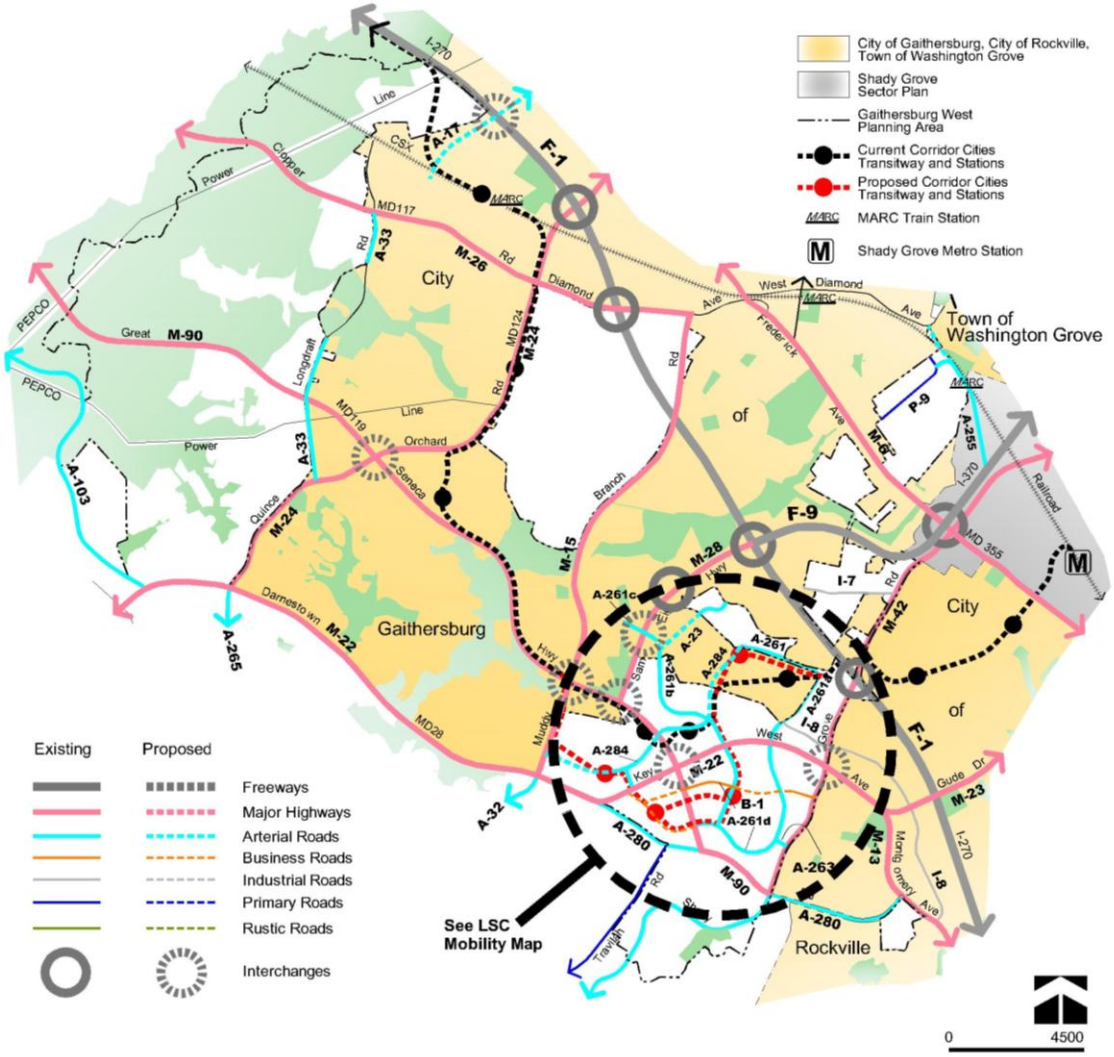
C. Street Network

Figures 16 and 18 replicates figures on pages 37 and 65 of the Gaithersburg West Master Plan, which present the proposed overall street network for the plan area and a closer view of the LSC district. The proposed road network has the following elements:

- A network of traffic-carrying, master-planned, business district streets (shown as fuschia lines for major highways and blue lines for arterials in both figures) designed to reflect the County's new Road Code emphasis on multimodal access and stormwater management.

- A secondary network of business district streets (shown as orange lines in the figure on page 37) will provide internal site accessibility to the LSC with a focus on enhancing pedestrian connectivity by reducing block size.

Figure 16: Gaithersburg West Street Network

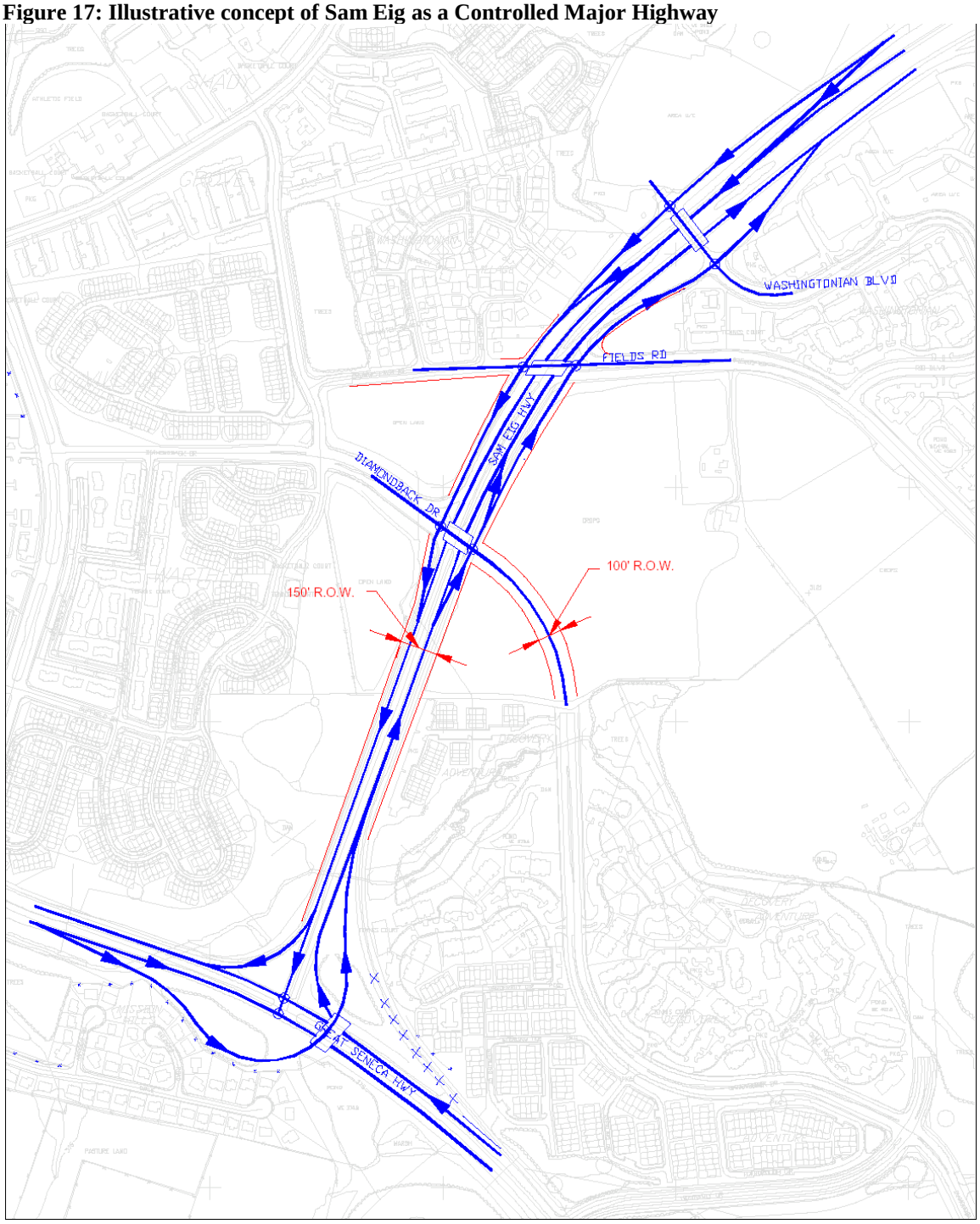


Specific streets described in the Plan and this Appendix include:

Sam Eig Highway

To support proposed development levels while maintaining a suburban level of mobility for automobile users, this Plan sees the need to reconstruct Sam Eig Highway as a grade-separated boulevard within a 250’ wide right-of-way with three through lanes in each direction, shoulders suitable for peak-period, peak-direction use by BRT, and two-lane, one-way, frontage roads providing connections to Fields Road and Diamondback Drive and a flyover ramp connection from eastbound Great Seneca Highway to northbound Sam Eig Highway. A concept plan was developed to illustrate how this would function, and the minimum right-of-way expansion needed to accommodate improvements, shown in Figure 17.

Figure 17: Illustrative concept of Sam Eig as a Controlled Major Highway



Key West Avenue (MD 28)

This Plan shows the need to accommodate buildout levels of development on an expanded roadway network. The predominant east-west vehicle movement in the Plan area is accommodated on Key West Avenue, following construction efforts to expand that roadway and reroute through traffic to it, as evidenced by its designation as MD Route 28.

Were buildout levels of proposed land uses to occur, in order to proceed to that level of development in accordance with the staging plan, this plan sees the need to ultimately reconstruct Key West Avenue (MD 28) within a 200' wide right-of-way between Great Seneca Highway and Shady Grove Road to provide a consistent design treatment including a wide landscaped median, four through travel lanes (in each direction), and a separate curb lane that can provide multiple functions. During peak periods, the curb lane should serve as a through lane for transit vehicles only and a right turn lane for other vehicles.

The staging recommendations in the Plan require a decision on the ultimate configuration for Key West Avenue prior to Stage 3 of development (buildout). The recommended 200' wide right-of-way would facilitate the development of urban-diamond interchanges at Great Seneca Highway and Shady Grove Road with Key West Avenue elevated above the cross streets. The roadway would need to be reconstructed as an urban boulevard between the two interchanges, and the distance between existing building faces would accommodate the wider right-of-way.

Longdraft Road (A-33)

Longdraft Road forms the boundary between the City of Gaithersburg and the Gaithersburg West Master Plan. The east side of Longdraft Road is in the City of Gaithersburg and the west side is part of this Master Plan. The 1985 Master Plan classified Longdraft Road from Pheasant Run Drive (in the City of Gaithersburg) to the railroad as an arterial (A-33). The 1985 Plan also identified sections of Longdraft Road and Watkins Mill Road as an arterial route (A-17) that would extend from Quince Orchard Road to Great Seneca Creek with a recommended right-of-way of 80 feet and 4 travel lanes. This proposed route assumed that Watkins Mill Road would be extended from its current terminus at Route 355, across I-270. At Clopper Road, Pheasant Run Drive would connect Watkins Mill Road with Longdraft Road.

At the request of the City of Gaithersburg, the County Department of Transportation (DOT) studied this route and recommended using Clopper Road, rather that Pheasant Run Drive, as a link between Watkins Mill Road extended and Longdraft Road. This Plan recommends that Longdraft Road and Watkins Mill Road be classified separately as A-33 and A-17, respectively. This Plan recommends that the arterial designation for the northernmost portion of Longdraft Road, from Clopper Road to the railroad, be removed.

In 2004, DOT initiated a facility planning study for Longdraft Road from Quince Orchard Road to Clopper Road. The study examined whether this 2-lane, 1 1/2 mile section of Longdraft Road should be widened to accommodate existing and future traffic projections. In addition to potential roadway improvements, the study examined bicycle and pedestrian enhancements. In July, 2008 the County Council T&E Committee determined the Longdraft Road facility planning study should not proceed to Phase II, referring the elements recommended by the Planning Board and resident Coalition to other programs within DOT's capital and operating budgets to move forward. By doing so these elements likely will be implemented sooner than if they remained within a project planning study.

- Renumber Longdraft Road as A-33 (from A-17) from Quince Orchard Road to Clopper Road (excluding the section from Longdraft Court to Golden Post Lane, which is completely within the City of Gaithersburg).
- Remove the arterial designation of Longdraft Road north of Clopper Road to the railroad.

Watkins Mill Road (A-17)

As discussed above, Watkins Mill Road and Longdraft Road were recommended in the 1985 Master Plan as an arterial route (A-17) from Quince Orchard Road on the south to Great Seneca Creek on the north. This Plan recommends that the two roads continue to be designated as arterials, but considered as separate routes with individual numbers. A portion of Watkins Mill Road (from Route 355 to just north of Windbrooke Drive) is in the City of Gaithersburg and is designated as an arterial. The City of Gaithersburg has planned an extension of Watkins Mill Road south of Route 355 to Clopper Road, with a new interchange at I-270. The extension of Watkins Mill Road and the new I-270 interchange are funded for planning and engineering in the State's 2004 Comprehensive Transportation Program. This Plan supports the City's efforts to complete this connection.

Watkins Mill Road from Windbrooke Drive to Great Seneca Creek is within the boundaries of this Master Plan and the Montgomery Village community. There are four public schools along this section of Watkins Mill Road and the community has raised concerns about traffic safety. The 2004 CIP included a traffic calming project to analyze options to reduce travel speed and improve safety on this road. This project is required by the County Council before construction of a new interchange at I-270 and Watkins Mill Road extended.

- Classify Watkins Mill Road (A-17) from Great Seneca Creek to 400 feet north of Windbrooke Drive as an arterial with an 80-foot right-of-way and 4 lanes.
- List the right-of-way requirements for Watkins Mill Road from Clopper Road to 400 feet north of Windbrooke Drive as "not applicable," since this section is in the City of Gaithersburg.
- Support further study to address traffic safety and the potential for traffic calming measures along Watkins Mill Road in Montgomery Village.
- Support the extension of Watkins Mill Road from Route 355 to Clopper Road in the City of Gaithersburg.

The Plan recommendations also include:

- Removal of the proposed grade-separated interchange between Darnestown Road and Shady Grove Road, as the intersection is forecast to operate near capacity with an at-grade solution. Land use and travel demand distribution will focus east-west travel along Key West Avenue (MD 28), requiring a higher infrastructure investment at plan build-out, including a grade-separated interchange at Key West Avenue junction with Shady Grove Road.
- Retention of Darnestown Road as a four-lane arterial, recognizing adjacent community interest in a down-classification of the roadway but also the need for four lanes of capacity and an arterial function
- Retention of Game Preserve Road as an unclassified master plan roadway, recognizing adjacent community and Rustic Road Advisory Committee interest in a rustic road classification. Analysis performed during plan development indicates that the roadway currently has safety concerns that do not support rustic road classification. The interest in

reclassification is prompted in part by concerns regarding through traffic that will be reduced by the completion of the parallel arterial Watkins Mill Road between MD 355 and MD 117.

- Reduction in the number of through travel lanes on Oakmont Avenue from four lanes to two lanes, but retention of a reconstructed Deer Park Bridge over the CSX tracks, recognizing the need to retain a grade-separated arterial roadway function for the adjacent commercial area and neighboring communities.

Master Planned Business Streets

The Gaithersburg West Master Plan has a street network that includes major highways, arterials, and master-planned business streets. These streets are required elements of the Master 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.

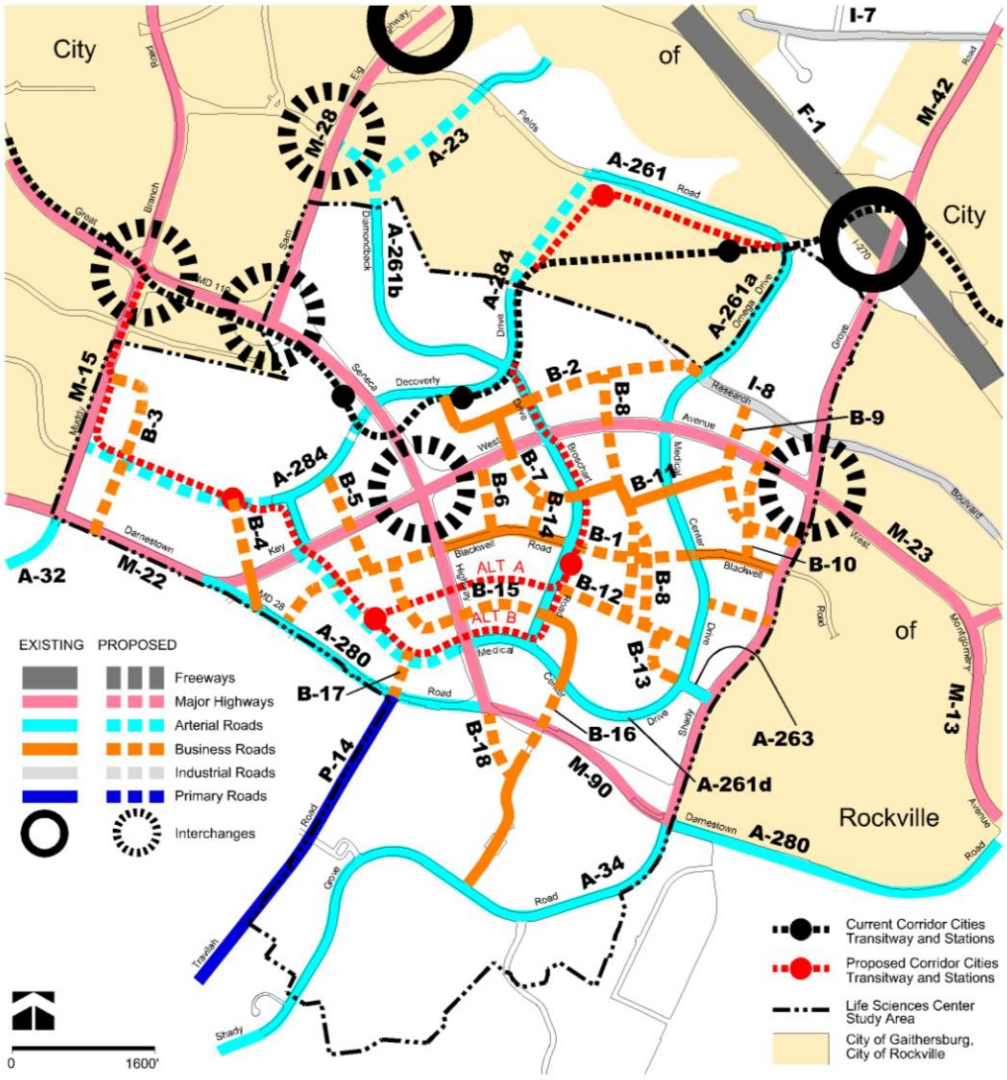
Section 49-31 of the County Code defines the functional classification system for roadways, including:

- 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 Gaithersburg West Master Plan takes into consideration the County's Road Code (Chapter 49) developed in 2006 and design standards (Executive Regulation 31-08) developed 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 that while the County formally has rural, suburban, and urban areas, a continuum exists both across and within those three designations.

The business street system is therefore intended to be a slow-speed environment, with both the public and private realms designed to emphasize a 30 MPH target speed.

Figure 18: LSC Street Network



Secondary Grid of Local Streets

The Figure on page 37 of the Plan describes a secondary street system that will be developed to nest within the Major Highway and Arterial street system. These streets are designed to facilitate site access (particularly for the larger development sites) and improve the granularity and permeability of the network to enhance pedestrian and bicycle mobility.

In addition to pedestrian connectivity, the tighter grid of roads can extend operational flexibility options such as left turn restrictions at major congested intersections and access management along major roads. These business streets are predominantly two lanes, with parking on one (60' wide ROW) or both sides (70' or 100' ROW). They should include curb extensions at crosswalks to further reduce pedestrian exposure to vehicular traffic.

The locations of roads (in the Master Plan of Highways figure on page 37) where development is in place provide an opportunity to thread between existing buildings and environmental constraints while still providing a grid network for pedestrians and vehicles. Their final alignments will be subject to further engineering evaluation at the time of new development or redevelopment.

Notable new roads include:

- B-1, Blackwell Road should be extended on to the PSTA site to Medical Center Drive Extended (A-261d), or if possible, to Darnestown Road so as to provide a business district road parallel to Key West Avenue specific to the LSC.
- B-2, a new road connection of the Decoverly development access road to Research Boulevard.
- B-3, B-4, new roads to connect the LSC Belward District to the highway network. Connection to the existing signalized intersection with Darnestown Road helps preserve mobility for pedestrians as well as vehicles.
- B-8, a new road connecting the LSC Central District to Key West Avenue. The section south of Blackwell is shown as split into two one way pairs with a green, walkable space between to take advantage of the space between existing hospital buildings.
- B-16, a new road connection from Medical Center Drive to Travilah Gateway Drive. This connection, also constructed as a local business district street, would provide a direct pedestrian connection across Darnestown Road between the LSC Central District CCT stop, the Universities at Shady Grove site and the Traville development. It may also be necessary to realign the current Universities at Shady Grove entrance of Travilah Gateway Drive to better match a new road opposite Darnestown Road.
- B-18, would be a new road extending Great Seneca Highway south of Darnestown Road to connect to Travilah Gateway drive. The connection, constructed as a local business district street, would also provide a direct pedestrian connection across Darnestown Road into LSC South along the most direct path for persons walking from a future CCT stop on the PSTA site. This connection would provide an additional access point at an already signalized location.

D. Bicycle and Pedestrian System

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

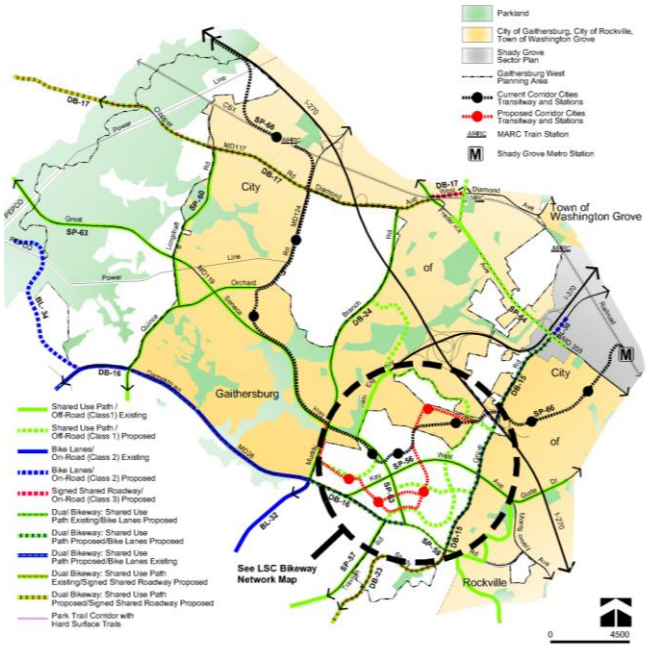


Figure 19: Gaithersburg West and LSC Bike Network

Bikeway Network

Figures on pages 70 and 73 of the Draft Master Plan propose a bikeway system with three key elements:

- An off-road, shared-use path system that connects Gaithersburg West to other areas of the County via bikeways adopted in the Countywide Bikeways Functional Master Plan (2005)
- Shared-use paths along major highways and arterial roadways, separating cyclists from higher speed vehicles
- An emphasis on slower, signed-shared bikeways on new roadways within the Life Sciences Center area. These roads would use a 30 MPH target speed to 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 users; where a majority of the avid cycling community is interested in quality on-road bike accommodation. However, the higher speeds of the highways and arterials in the plan area encourage separation of cyclists from vehicles on those roads. The number of off-road paths in the Plan is therefore significant; building on the adopted paths from the Countywide Bikeways Functional Master Plan.

In September 2007, the Planning Board supported the staff position on the Road Code that generally marked bike lanes should 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.

Pedestrian and bicyclist access and safety

Pedestrian and bicyclist access and safety in the LSC area will be pursued 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 the LSC 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 LSC zone for much of the LSC area. This 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, and at

least five seconds of startup time (and greater time 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. Staging

The Gaithersburg West Master 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. Approximately 3.7 million square feet of non-residential development is approved and un-built in the LSC pipeline of development. This increment of development is not subject to the Plans's staging requirements as long as a project's Preliminary Plan continues to be valid. The following staging requirements apply to the LSC Central, West, and Belward Districts.

Stage 1

Before Stage 1 begins, the following actions must take place:

- Fund and begin operating the Greater Shady Grove Transportation Management District (TMD);
- Create a LSC policy area with urban standards and characteristics;
- Document the baseline of non-auto driver mode share (estimated at 16%) through monitoring and traffic counts and;
- Include the entirety of the Rickman property, located along Travilah Road, into the new LSC Policy Area.

Stage 1 allows up to 6 million square feet (including existing and pipeline of development) of non-residential development recommended by this Plan. This increment of development is calculated at the low end of density that reasonably supports higher investment in transit such as Bus Rapid Transit, one of the modes being considered for the CCT. The initial review of this Plan's land use recommendations, facility needs, and staging is expected to occur during Stage 1.

Stage 2

Before Stage 2 begins, the following actions must take place:

- Relocate the Public Service Training Academy (PSTA);
- Fund the CCT from the Shady Grove Metro Station to Belward property in the County's six-year Capital Improvement Program (CIP) or State Consolidated Transportation Plan (CTP);
- Fund the LSC Loop trail in the County's six-year CIP;
- Construct and open to traffic a least one public street connection across both the Belward property and the PSTA to provide a direct connection between Key West Avenue, Muddy Branch Road, and Great Seneca Highway and;
- Document a five percentage point increase over the baseline for the non-auto driver mode share.

Stage 2 allows up to 12 million square feet (including existing and pipeline development) of non-residential development recommended by this Plan.

Stage 3

Before Stage 3 begins, the following actions must take place:

- Begin operating the CCT from the Shady Grove Metro to Clarksburg;
- Determine the need for an elementary school in LSC West (on the PSTA site);
- Document a 15 percentage point increase over the baseline for non-auto driver mode share and;
- Fully find the widening of Key West Avenue and the interchanges the LSC area, or transportation projects providing equivalent mobility, in the County's six-year CIP or the State CTP.

Stage 3 allows up to 15 million square feet (including existing and pipeline development) of non-residential development.

Plan Evaluation Six Years After Adoption

State law requires revisiting master plans every six years. This Plan's review will be particularly important in assessing how the area is developing, impacts on infrastructure delivery, and if the vision is being achieved. The review of the Plan should examine:

- the ratio of jobs to housing – are local workers occupying the housing?;
- the built form's evolution;
- absorption rates to determine the rate of needed infrastructure delivery;
- costs to the County;
- the CCT's delivery schedule;
- traffic generation and roadway performance and;
- the area institutions' investment in the Plan's vision.

3. Transportation/Land Use Balance

The Gaithersburg West Master 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.

This Plan establishes a new LSC Policy Area for the LSC Central, LSC West and LSC Belward transit station areas, with policy attributes the same as for the Germantown Town Center Policy area.

Figure 20 shows how the Plan's proposed level and mix of development in the LSC Policy Area.

Figure 20: LSC Policy Area Land Use

Area	Acres	Existing		Future	
		Jobs	HH	Jobs	HH
LSC	567	9,200	0	44,600	4,525

A. Measures of Effectiveness

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

- An areawide 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 LSC 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, www.montgomeryplanning.org
.

B. Policy Area Mobility Review

Since the early 1980s, every master plan has considered the "balance" between land use and transportation using an assessment of areawide conditions forecast for end-state conditions for the plan. Policy Area Mobility Review is the current measure of areawide 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 from 1982 to 2003.

PAMR provides a measure of transportation system adequacy considering Relative Transit Mobility and Relative Arterial Mobility for each of the County's 21 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 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 areawide 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 Average Congestion Index (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". Master Plan Study areas typically address roadway capacity needs by intersection improvements rather than roadway widening. Therefore, the AGP process has evaluated Master Plan Study Areas in conjunction with the master plan and policy area surrounding these areas.

The LSC area is located within and comprises a major portion of the R & D Village Policy Area. Figure 21 shows the forecast Policy Area Mobility Review conditions for all Policy Areas in the County for 2030 assuming the Gaithersburg West Master Plan "High" Scenario with a 32.5% NADMS. Figure 22 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. Given the assumptions of the "High" Scenario, as indicated in Figure 21, the R & D Village Policy Area is forecast to operate at:

- Relative Transit Mobility of 63% (LOS C – between 60% and 75%)
- Relative Arterial Mobility of 40% (LOS D – between 40% and 55%)

The current Growth Policy requires that all Policy Areas have a Relative Arterial Mobility of at least 40%, or LOS D conditions, regardless of the level of transit service provided. The PAMR results derived from the analysis of the scenario described above just meets this threshold.

It should be noted that the PAMR analyses performed thus far in support of the Plan has evaluated a **range** of scenarios . The demographics associated with the "High" Scenario reflect the **upper bound** of the demographic scenarios tested in terms of intensity of development and resultant travel demand. The level of development reflected in the **Plan-recommended** scenario is less intense than that assumed in the "High" Scenario. Therefore, staff is confident that the Plan-recommended scenario will be "in balance" from a Master Plan perspective.

Figure 21: Policy Area Mobility Review Chart-2030

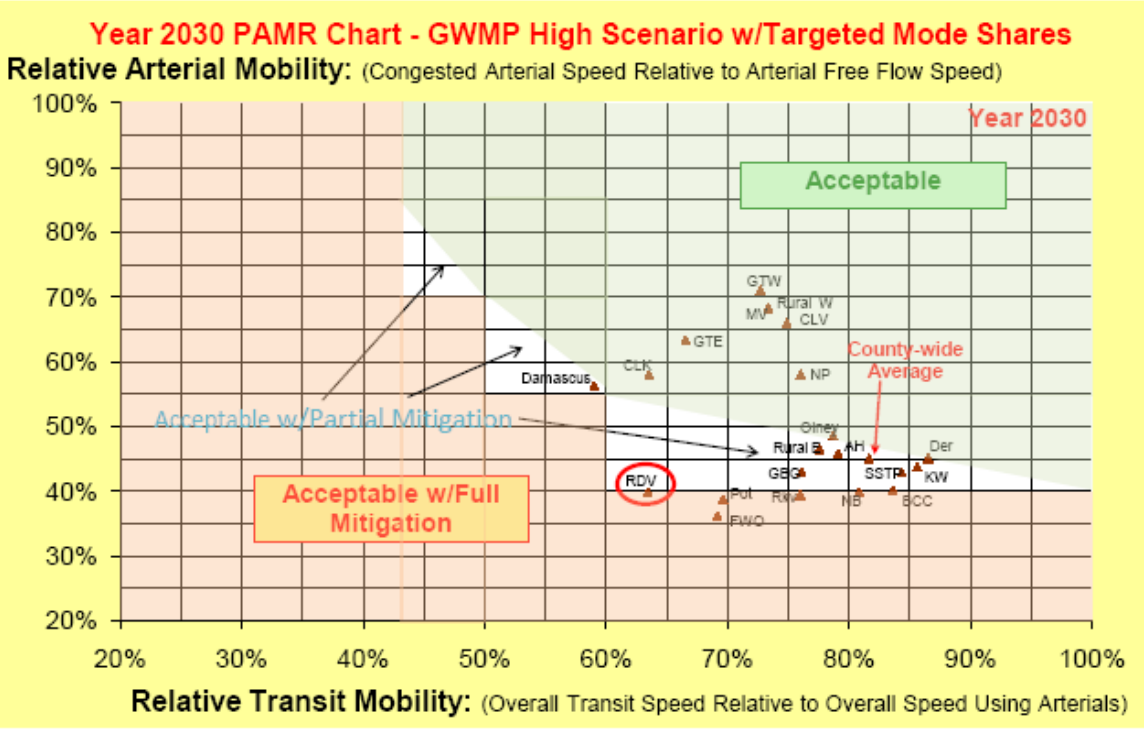


Figure 22: Policy Area Mobility Review Table-2030

Derivation of Year 2030 PAMR Results by Policy Area - Gaithersburg West Master Plan "High" LU Scenario w/TDM Mode Shares)

						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	189,868	5,783	12,626	32.8	15.0	46%	40.9	51.8	79%
Bethesda/Chevy Chase	396,854	15,574	38,863	25.5	10.2	40%	31.1	37.2	84%
Clarksburg	108,964	3,628	6,267	30.0	17.4	58%	38.1	59.9	64%
Cloverly	95,462	2,356	3,570	40.5	26.7	66%	44.0	58.8	75%
Damascus	90,837	2,255	4,009	40.3	22.7	56%	48.4	82.1	59%
Derwood/Shady Grove	140,087	4,982	11,055	28.1	12.7	45%	37.5	43.3	87%
Fairland/White Oak	384,192	10,126	28,073	37.9	13.7	36%	40.0	57.8	69%
Gaithersburg City	243,110	8,667	20,190	28.1	12.0	43%	34.5	45.4	76%
Germantown East	105,604	3,565	5,632	29.6	18.8	63%	36.5	54.8	67%
Germantown West	154,896	5,060	7,123	30.6	21.7	71%	36.5	50.2	73%
Kensington/Wheaton	465,588	14,581	33,389	31.9	13.9	44%	37.0	43.3	85%
Montgomery Village/Airpark	142,629	4,726	6,942	30.2	20.5	68%	41.3	56.3	73%
North Bethesda	237,712	9,980	25,052	23.8	9.5	40%	30.3	37.5	81%
North Potomac	66,824	2,391	4,119	27.9	16.2	58%	39.2	51.6	76%
Olney	168,213	4,749	9,777	35.4	17.2	49%	47.1	59.9	79%
Potomac	203,448	6,118	15,804	33.3	12.9	39%	38.1	54.7	70%
R & D Village	80,760	3,583	8,994	22.5	9.0	40%	26.6	42.0	63%
Rockville City	277,965	12,036	30,617	23.1	9.1	39%	31.5	41.5	76%
Silver Spring/Takoma Park	273,044	10,429	24,351	26.2	11.2	43%	33.4	39.6	84%
Rural East	608,504	15,513	33,414	39.2	18.2	46%	47.1	60.8	77%
Rural West	241,519	6,573	9,621	36.7	25.1	68%	46.5	63.4	73%
Montgomery County Total	**4,676,080**	**152,675**	**339,488**	**30.6**	**13.8**	**45%**	**37.5**	**46.0**	**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

The assessment of Policy Area conditions in Figures 21 and 22 reflect the upper bound of the demographic scenarios tested for the LSC in combination with 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 23 provides a summary of year 2005 PAMR conditions by policy area for comparison purposes.

Figure 23: Policy Area Transportation Review Table - 2005

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

C. Local Area Transportation Review (LATR)

The Gaithersburg West Master Plan supports redevelopment toward a transit-oriented community with an emphasis on pedestrian accessibility, connectivity, and safety.

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 24, 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.

The Public Hearing Draft Plan recommends creating a Town Center policy area to encompass the entire LSC district, so that intersections within the district and served by the CCT would have a congestion standard of 1600 CLV. Currently, intersections in the LSC area have a congestion standard of 1450 CLV. Intersections along Shady Grove Road have a congestion standard of 1500 CLV where the Rockville Policy Area overlaps.

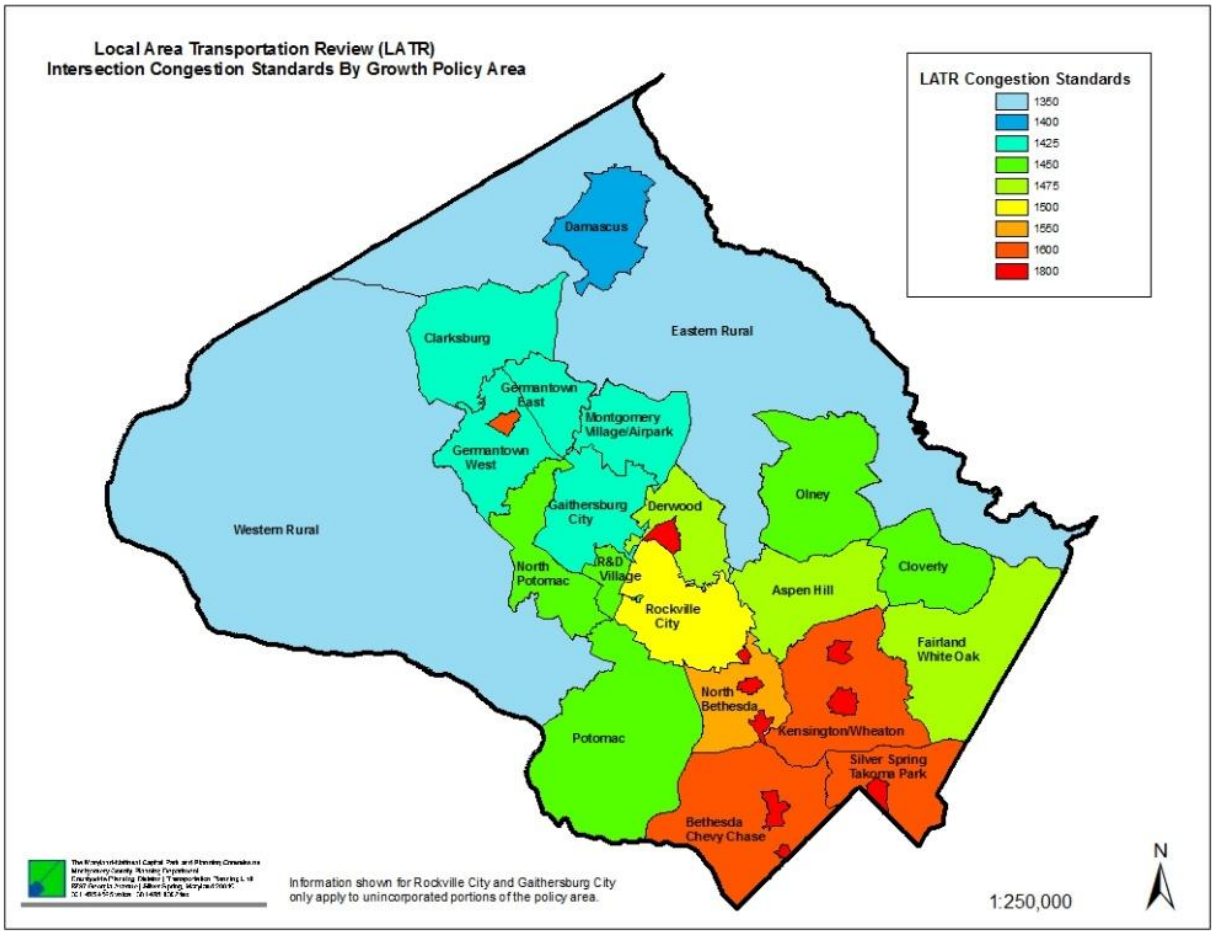


Figure 24: Intersection Congestion Standards by Policy Area

Figure 25 provides a tabular summary of the congested intersections under both existing conditions and the High land use scenario tested for the Draft Plan. (Note that the Draft Plan recommended land use contains approximately one million square feet less commercial use than the High land use scenario tested.) As indicated in Figure 25:

- Currently, all but three of the tested signalized intersections pass the congestion test. Shady Grove Road at Key West Avenue (MD 28), Great Seneca Highway at Muddy Branch Road, and Darnestown Road (MD 28) at Muddy Branch Road exceed either the 1450 or 1600 CLV congestion standards if full buildout of the High Scenario were to occur.
- Nine intersections tested under the "High" land use scenario would exceed the 1600 CLV standard. At four of these locations, forecast CLVs over 2000 (a v/c ratio of 1.25) warrant planning for grade-separated interchanges. This plan also retains the recommendation for an east bound left flyover ramp from Great Seneca Highway to Sam Eig Highway.
- Five of the at-grade intersections tested under the high land use scenario are forecast to exceed the 1600 CLV congestion standard at Plan buildout during either the AM or PM peak hour. Those intersections are Shady Grove Road at

Corporate Boulevard, Key West Avenue and Broschart Road, Darnestown Road and Muddy Branch, Key West Avenue and Omega Drive/Medical Center Drive, and Key West Avenue and Darnestown Road. At these locations, the forecast CLVs range from 1668 to 1721, indicative of delays associated with Metro Station Policy Area development. Grade separated interchanges are not warranted at this level of forecast congestion, but at-grade improvements will be required as development occurs.

At the time of Draft Appendix publication, analysis of the Draft Plan land use on intersection congestion remains in progress. The Draft Plan land use scenario generates about 10% fewer vehicle trips than does the High land use scenario represented in Figure 25. Considering the effect of through traffic, staff expects the CLVs for the Draft Plan scenario to generally be about 5% lower than those shown in Figure 25.

Figure 25: Intersection Analysis

Gaithersburg West Master Plan

Intersection Analyses

Critical Lane Volume and Volume/Capacity Ratios

"High" Land Use Scenario

		Existing Conditions			High Land Use Scenario Tested		
	Intersection	AM	PM	Max V/C	AM	PM	Max V/C
84	Shady Grove @ Corporate	1096	1467	0.92	1388	1668	**1.04**
85	Shady Grove @ Research	1074	1089	0.68	1418	1515	0.95
86	Shady Grove@ Key West	1391	1640	**1.03**	Replaced by Interchange		
87	Shady Grove@ Medical Center Way	744	868	0.54	1023	1086	0.68
88	Shady Grove@ Darnestown	1098	794	0.69	1382	1592	1.00
134	Darnestown @ Travilah	907	974	0.61	1076	1460	0.91
368	Great Seneca @ Darnestown	1028	1009	0.64	1548	1447	0.97
369	Great Seneca (MD 28) @ Key West (MD 28)	1227	1114	0.77	1568	1449	0.98
370	Great Seneca @ Muddy Branch	1654	2179	**1.36**	Replaced by Interchange		
415	Key West (MD28) @ Broschart/Diamondback	1563	1195	0.98	1306	1694	**1.06**
446	Darnestown @ Muddy Branch	1697	1250	**1.06**	1721	1431	**1.08**
466	Key West (MD28) @ Omega/Med Center	1313	1359	0.85	1591	1679	**1.05**
479	Key West (MD28) @ Darnestown	1085	1058	0.68	1521	1718	**1.07**
518	West Montgomery (MD 28) @ Hurley	830	998	0.62	830	998	0.62
519	West Montgomery (MD 28) @ Research	941	1307	0.82	1326	1514	0.95
567	Fields @ Washingtonian	455	747	0.47	482	1168	0.73
568	Fields @ Rio	440	1029	0.64	810	1476	0.92
569	Sam Eig @ Fields	1456	1297	0.91	Replaced by Interchange		
570	Sam Eig @ Diamondback	933	1217	0.76	Replaced by Interchange		
572	Great Seneca (MD 119) @ Sam Eig	1240	1348	0.84	1228	1189	0.77 *
700	West Montgomery (MD 28) @ Key West (MD 28)	942	1304	0.82	1196	1596	1.00
798	Darnestowne @ Gudelsky				1120	931	0.70
901	Great Seneca (MD 119) @ Decoverly				1168	1518	0.95
902	Key West (MD 28) @ JHU				1274	1489	0.93
903	Great Seneca (MD 119) @ Med Center				1201	1451	0.91
904	Shady Grove @ Blackwell				1262	1537	0.96
905	PSTA road @ Key West Avenue				1510	1489	0.94
906	Diamondback @ Decoverly				1145	1361	0.85
907	Muddy Branch @ JHU New				997	1501	0.94
908	Great Seneca (MD 119) @ Blackwell				1296	1548	0.97
909	Research Blvd @ W Gude				1582	1550	0.99

* Reflects planned flyover ramp for east bound left turns

D. Cordon Line Analysis

A cordon line analysis is a general tool to quickly compare total traffic volumes entering or leaving the Gaithersburg West Master Plan area. Over the course of the Master Plan development process, a "subregional" cordon line was established, as indicated in Figure 18, to consider flows into and out of the area surrounding but including the LSC. 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.

The 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.

Vehicular Traffic Volumes

Figure 26 presents a comparison of existing and forecast traffic volumes at the studied cordon line. In general, the cordon line serves as the boundary between the LSC area, where land uses are proposed to change as a result of this plan, and the area outside of the cordon, which is subject to other plans and/or is otherwise not forecast to change development densities. As a result, traffic volumes at these locations are substantially higher than in the interior of the Master Plan.

At the cordon line, the total traffic volume will increase by about 43%, from 392,000 vehicles per day to 561,000 vehicles per day. The heaviest volumes will occur on the Major highways where they meet I-270, Sam Eig Highway and Shady Grove, with between 79,900 and 88,000 vehicles per day.

Traffic volumes and volume growth will be slightly lower within the LSC area due to the expanded roadway network. In general, traffic volumes along Key West Avenue today in the Plan area are 52,000 vehicles per day and are forecast to grow to between 56,000 and 65,000 vehicles per day.

Figure 26: Sector Plan Cordon Line Traffic Volumes

Gaithersburg West Plan
Study Area Cordon Line

2007 Conditions - Observed Peak Hour Totals

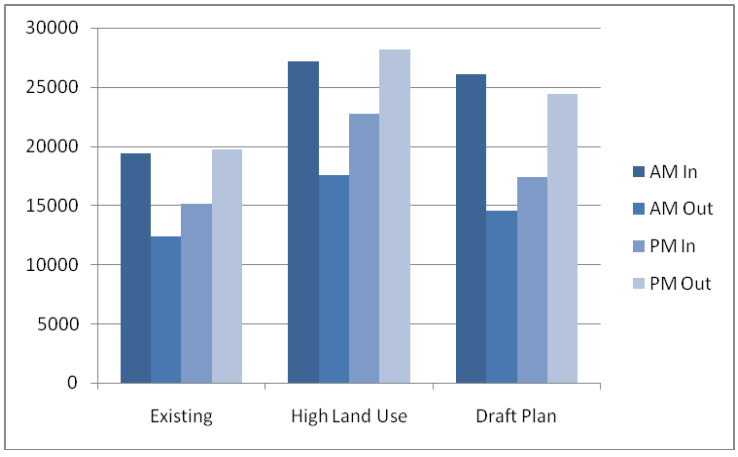
Location	ADT	AM Peak Hour Inbound	AM Peak Hour Outbound	AM Peak Hour Total	PM Peak Hour Inbound	PM Peak Hour Outbound	PM Peak Hour Total
10 DIAMONDBACK DR	15100	1000	330	1330	440	800	1240
12 TRAVILAH RD	10700	460	350	810	440	570	1010
13 MUDDY BRANCH/ Darnestown	18200	1230	270	1490	660	940	1600
15 DARNESTOWN RD (MD 28)	35900	2590	580	3170	940	1980	2930
16 GLEN MILL RD	17000	370	1120	1500	840	560	1400
17 MUDDY BRANCH/ Great Seneca	20600	850	670	1520	950	1030	1980
18 WEST MONTGOMERY AVE (MD 28)	52000	2110	2090	4200	2460	2190	4650
20 Shady Grove Road/270 + slip ramp	58700	3470	1520	4990	2010	2990	5000
21 Sam Eig Highway	66600	2160	2890	5040	2840	3440	6280
23 W Gude Drive	32500	1440	1220	2660	1190	1670	2860
24 Shady Grove Road/Traville	11900	610	450	1060	540	430	970
25 GREAT SENECA HWY (MD 119)	53100	3160	1070	4220	1650	3160	4810
TOTAL	392300	19440	12550	31990	14960	19750	34720

Modeled Draft Plan (High Scenario) 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
10 DIAMONDBACK DR	18400	1210	380	1590	560	980	1540
12 TRAVILAH RD	16300	770	510	1280	640	860	1500
13 MUDDY BRANCH/ Darnestown	26300	1580	550	2130	1040	1310	2350
15 DARNESTOWN RD (MD 28)	46900	2910	970	3880	1580	2510	4090
16 GLEN MILL RD	25000	690	1320	2000	1300	940	2240
17 MUDDY BRANCH/ Great Seneca	35200	1570	1080	2650	1690	1650	3340
18 WEST MONTGOMERY AVE (MD 28)	76800	3240	2870	6110	3140	3820	6950
20 Shady Grove Road/270 + slip ramp	79900	4230	2630	6870	2660	4050	6710
21 Sam Eig Highway	88000	3570	2890	6460	4190	4310	8500
23 W Gude Drive	49300	2280	1680	3960	1980	2450	4430
24 Shady Grove Road/Traville	31000	1210	1160	2370	1460	1450	2910
25 GREAT SENECA HWY (MD 119)	68000	3620	1780	5400	2380	3790	6170
TOTAL	561100	26860	17830	44690	22610	28110	50720

Draft Plan Trip Comparison

Figure 27: Draft Plan Trip Generation Comparison



The Recommendations in the Plan for transportation infrastructure and staging are based on the highest land use scenario tested, The High Land Use scenario. However, subsequent to development of the recommendations in the Plan, a slightly lower density was selected for the Draft Plan. A comparison of the High and Draft Plan trip

generation characteristics is included to show the difference.

The Existing land uses within the cordon studied generate about 31,700 vehicle trips in the AM peak hour and 34,900 trips in the PM peak hour.
The High Land Use tested generates 44,700 vehicle trips in the AM peak hour and 50,800 trips in the PM peak hour.
Comparatively, the Draft Plan generates 40,600 vehicle trips in the AM peak hour and 41,700 in the PM peak hour, a difference of about 10% between the two land use scenarios.

The Draft Plan also recommends a slightly lower Non-Auto Driver Mode Split (NADMS) of 30%, rather than the "High" Land Use scenario NADMS of 32.5%, resulting in slightly higher per-square foot trip rates per square foot of use modeled.

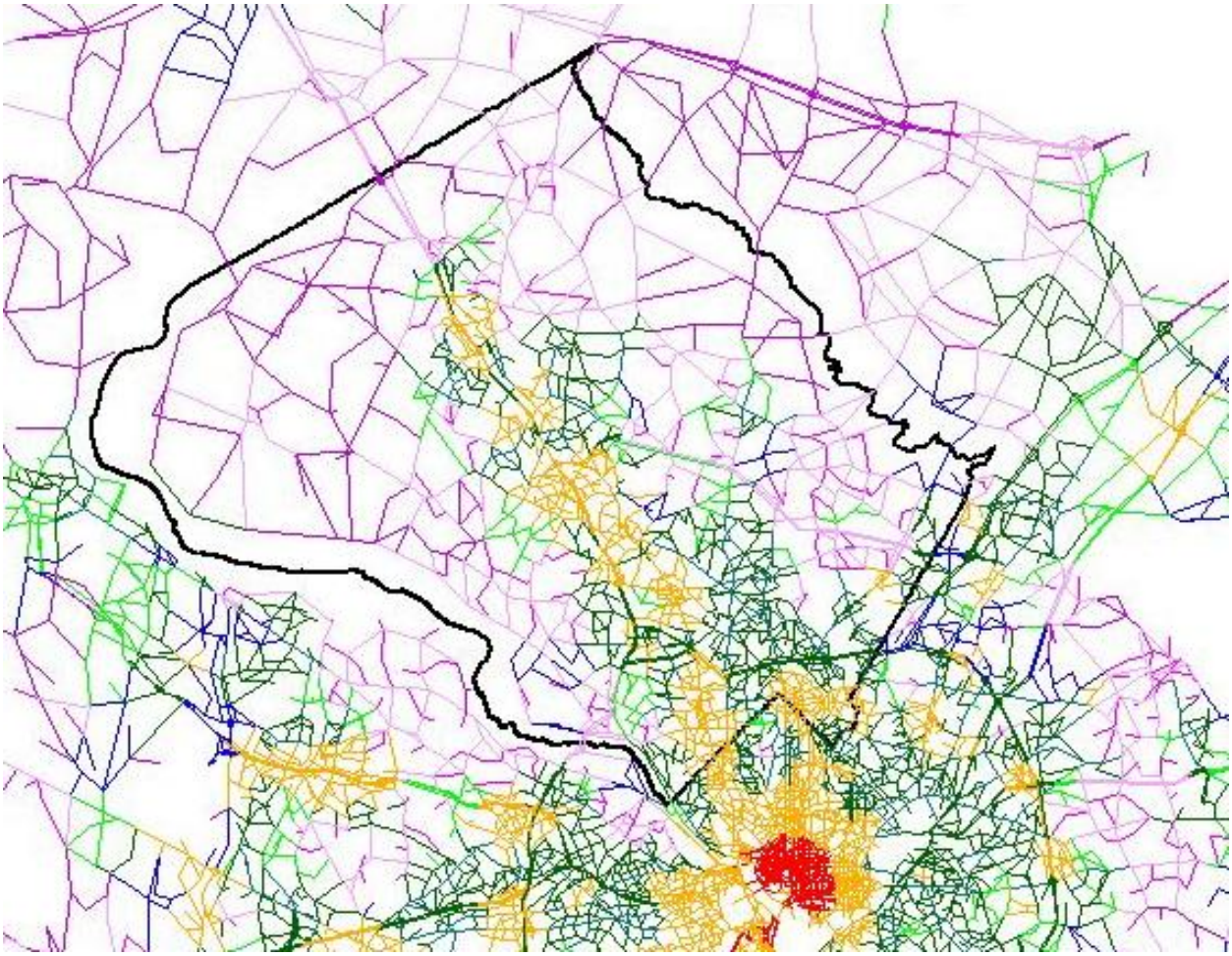
E. Travel Demand Forecasting Process and Assumptions

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 28 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 28: 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 Gaithersburg West Master Plan forecasts assumed the following parameters:

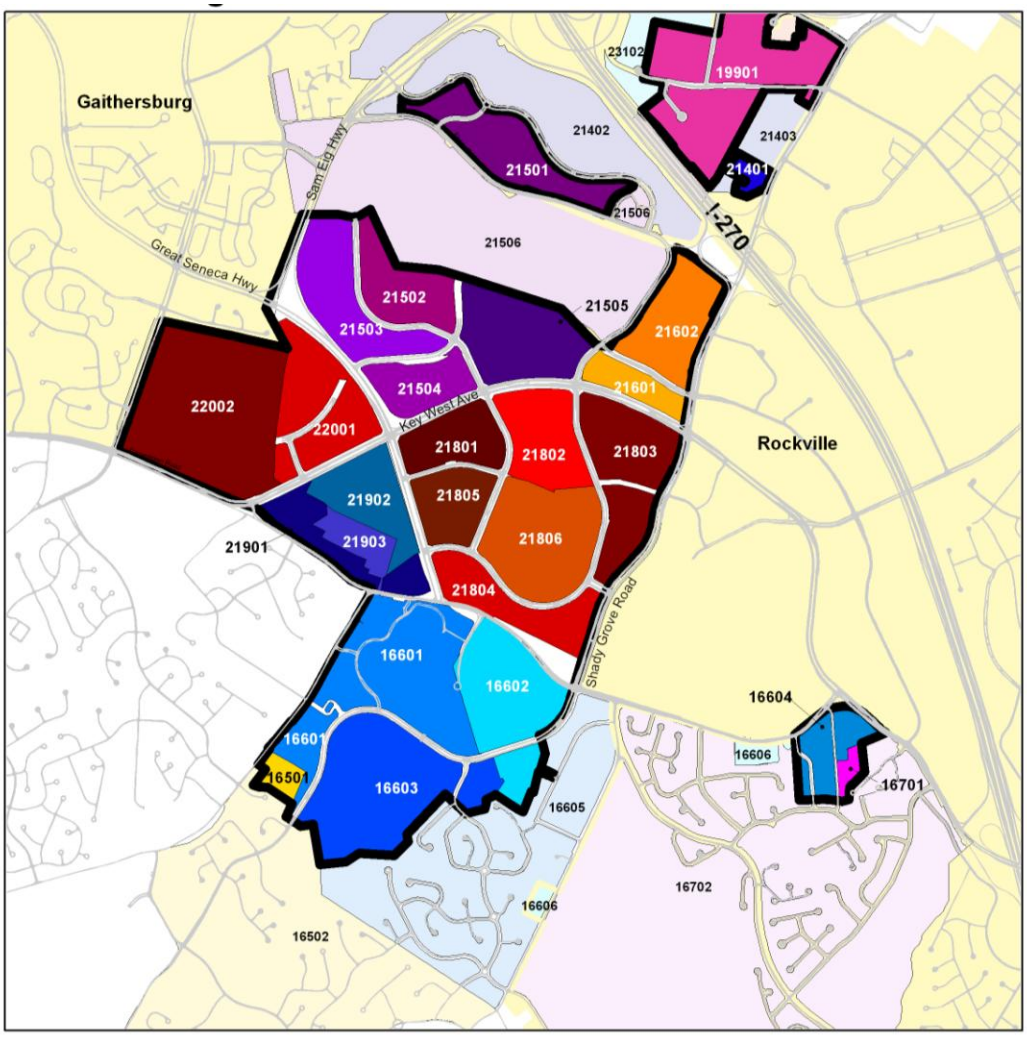
- A 2030 horizon year. This is currently the most distant horizon year for which forecast land use and transportation system development is available.
- Regional growth per the MWCOG Cooperative Forecasting Process. The most current round of Cooperative Forecasts was used.
    - For the Washington region, 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 LSC area, the Round 7.1 forecasts include an increase from 6.9M square feet of development and 3,300 households in 2005 to 12.9M square feet of development and 8,000 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 LSC area include:
    - Elimination of the WMATA turnback at Grosvenor
    - The Corridor Cities Transitway (realigned through the LSC) 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

F. 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 R & D Village Policy Area as six (6) transportation analysis zones (TAZs). The LSC LAM disaggregates these 6 TAZs into twenty three (23) subzones as indicated in Figure 29.

Figure 29: LSC Area 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 30 shows the trip generation rates used in the LAM.

Figure 30: Local Area Model Peak Hour Trip Generation

Land Use	Units	AM	PM
Office (at 30% NADMS)	1000 Square Feet	1.30	1.20
Retail (at 30% NADMS)	1000 Square Feet	1.00	3.00
Industrial (at 30% NADMS)	1000 Square Feet	1.00	1.00
Other Commercial(at 30% NADMS)	1000 Square Feet	1.00	1.00
Multi-family residential (Garden apartment)	Dwelling unit	0.48	0.83
Multi-family residential (Highrise)	Dwelling unit	0.44	0.48

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 30 are generally lower than those found in the Institute of Transportation Engineers (ITE) Trip Generation report, particularly for commercial land uses. The trip generation rates reflect the fact that ITE rates for most commercial locations do not have the transit availability and usage found in Gaithersburg West with the CCT. 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 the LSC zone also incorporate a discount for pass-by and diverted-link trips.

Land Use Alternatives Tested

Figure 31 shows the LSC Policy Area land use alternatives considered for the LAM in the development of the Gaithersburg West Master Plan.

Figure 31: LSC Policy Area Land Use Scenarios Considered During Plan Development (TAZs 218, 219 and 220)

Scenario Title in Presentations	Commercial SF	DU
Existing	3.5M	0
1990 Plan – "Low" Scenario	7.2M	500
"Medium" Scenario	12.4M	4,800
"High" Scenario	16.1M	9,700
"Recommended" Scenario	15.2M	4,525