**Transportation Impact Study Technical Working Group (TISTWG)**
**Wednesday, January 18, 2017 Meeting #18**
**MRO Auditorium**
**1:30-3:30 PM**

Agenda

1) Introductions (10 min)
2) LATR Guidelines Status (30 min)
    a) Overall organization
    b) Draft materials by chapter and highlights
        i) Transit proximity
        ii) Retail mixed use
        iii) Work in progress (tripgen refinements, trip distribution)
3) Related initiatives (20 min)
    a) White Oak Science Gateway
    b) SHA TIS Guidelines
    c) TDM/TMAg review status
    d) Update on Related ITE and TRB Annual Meeting items
    e) Tripgen examples
4) Flowcharting exercise (50 minutes)
    a) Review of prior guidelines
    b) Identifying flowchart priorities
    c) Overall process
    d) Modal chapters
    e) Report out
5) Next steps and tentative meetings schedule (10 min)

**2017 LATR Guidelines**
**January 16, 2017 DRAFT Outline**

Objectives: Reorganize/rewrite from scratch without tracking prior changes to include needed information. Provide brief executive summary for general public. Organize body of guidelines for LATR practitioners/reviewers.

1) Executive Summary

2) Introduction
   a) LATR principles
   b) Applicability
   c) How to use these guidelines
   d) Relationship to guiding documents (SSP, zoning, master plans)
   e) Policy Area definitions
   f) Mitigation priorities
   g) Definitions of modal adequacy

3) LATR Study submission
   a) Scheduling process
   b) Scoping process
   c) Contents required for completeness
      i) Adequacy determination
      ii) Pedestrian and bicycle impact statement
      iii) TDM strategy statement
   d) Review process

4) Roadway system adequacy
   a) Analysis procedures and tools
      i) Vehicular delay
      ii) CLV
      iii) Isolated intersection delay
      iv) Network delay
   b) Determining baseline and total future conditions
   c) Mitigation objectives and approaches

5) Pedestrian system adequacy
   a) Analysis procedures and tools
      i) ADA compliance
      ii) Pedestrian crosswalk delay
   b) Determining baseline and total future conditions

    c) Mitigation objectives and approaches

6) Bicycle system adequacy
    a) Analysis procedures and tools
        i) Level of traffic stress
    b) Determining baseline and total future conditions
    c) Mitigation objectives and approaches

7) Transit system adequacy
    a) Analysis procedures and tools
        i) Local bus service capacity
    b) Determining baseline and total future conditions
    c) Mitigation objectives and approaches

8) Appendices
    a) Person Trip Generation
        i) Tables
        ii) Examples
    b) Vehicle Trip Distribution
    c) Glossary
    d) References

# Local Area Transportation Review Guidelines

## I. Executive Summary

The Local Area Transportation Review and Policy Area Transportation Review Guidelines were updated by the Planning Board on May 13, 2010, June 17, 2011 and February 9, 2012. The Local Area Transportation Review and Transportation Policy Area Review Guidelines were updated by the Planning Board on January 24, 2013.

On November 15, 2016 the County Council adopted changes to the Subdivision Staging Policy eliminating the Transportation Policy Area Review as an area-wide test for transportation adequacy. The Planning Board approved these revised Guidelines to incorporate the Council's action on (Date TBD, 2017). This document reflects that action.

These Local Area Transportation Review (LATR) Guidelines are to be used for preparation and review of transportation impact studies for development in Montgomery County. This document should be used by transportation engineers, planners, public agency reviewers, and community members participating in the development review process.

These Guidelines specify the more context-sensitive and multi-modal procedures and analysis methods reflected in the 2016-2020 Subdivision Staging Policy as they relate to the determination of adequacy of local intersection performance in the context of the development review process. These Guidelines contain many new ideas that essentially rethink how the County approaches the evaluation of local transportation system performance. The following highlights key changes, each of which is reflected in this document.

- Recognizing that there is not a "one size fits all" set of rules that applies Countywide but rather that the expectations for transportation system adequacy and the types of appropriate mitigation need to be applied in a context-sensitive manner.
- Organizing policy areas into four groups (i.e., Red, Orange, Green and Yellow) that recognize current land use patterns, the prevalence of modes of travel other than the single occupant vehicle, and the planning vision for different parts of the County.
- Updating vehicle trip generation rates and developing person-trip generation rates that reflect the diversity of land use patterns and travel behavior across the County.
- Creating an ability to adjust trip generation rates based on reduced parking where such reductions are supported by the zoning code.

- Creating a new system for evaluating local area transportation conditions that emphasizes the application of delay-based measures that reflect the experience of travelers, rather than focusing on Critical Lane Volume.
- Expanding LATR to include a set of multi-modal (i.e., bicycle, pedestrian and transit) transportation tests beyond those that focus on motor vehicle travel.

In summary, these Guidelines provide for the application of a more robust and multi-modal set of local transportation system performance evaluation procedures. The Subdivision Staging Policy recommends that the County further evolve over time by the incremental implementation of proportional cost-sharing (pro-rata) share transportation districts, in addition to those established in White Flint and White Oak. In areas where such pro-rata share districts are established, development will proceed conditioned on the payment of a fee to the County commensurate with the applicant's proportion of the cost of a Unified Mobility Program[1] (UMP). In this context, the components of the UMP and the fee per peak hour vehicle (or person) trip will be established by Council resolution after a public hearing.



[1] A Unified Mobility Program reflects a selected set of master-planned transportation projects (including the associated costs of design, land acquisition, construction and site improvements and utility relocation) ) needed to achieve LATR adequacy at the master plan planning horizon.

# II. Introduction

### A. LATR PRINCIPLES

Section 50-35(k) of the County Code directs the Montgomery County Planning Board to find that public facilities will be adequate to serve proposed development. This Adequate Public Facilities (APF) finding requires forecasting travel demand generated by proposed development and comparing it to the capacity of existing and programmed roads and transit. An applicant for proposed development must show that adequate transportation facilities will be in place within a specified period of time. Alternatively, the applicant must provide those facilities or make a Traffic Mitigation Payment toward area-wide transportation needs. These guidelines show the methodology for determining adequacy, specify mitigation for projected traffic generated by proposed development projects, and describe how Traffic Mitigation Payments are determined.

There is a set of multi-modal tests (applied to auto, transit, bike and pedestrian travel) for determining transportation adequacy — the Local Area Transportation Review (LATR). These tests, described in the subsequent sections of these Guidelines, are required by the 2016-2020 Subdivision Staging Policy adopted by the County Council on November 15, 2016.

These Guidelines explain the methodology for documenting and analyzing the likely impact of proposed development on intersection performance. The criteria in these Guidelines determine whether a development can satisfy the requirements for transportation adequacy. Following the standards of the Subdivision Staging Policy, the Planning Board must not approve a development if local area transportation conditions are deemed inadequate. The Planning Department staff's review and the Planning Board's decision is based on existing and programmed roads, available and programmed mass transportation, and physical improvements or trip mitigation measures to be provided by the applicant.

### B. APPLICABILITY

LATR is applied to development projects that will generate more than 50 total weekday peak hour person trips. Projects that generate fewer than 50 total weekday peak person hour trips must prepare a traffic exemption statement describing the basis for any exemption from LATR.

The LATR test is applied by policy area (see Map ?). Detailed maps, with streets shown, can be found at:
www.montgomeryplanning.org/research/growth_policy/subdivision_staging_policy/2012/documents/SSPappendix5.pdf.

LATR compliance is not required for developments in the White Flint Policy Area if applicants agree to participate in the White Flint Special Taxing District for transportation infrastructure improvements in lieu of satisfying the transportation APF tests for LATR. Similarly, LATR compliance is not required for developments in the White Oak Policy Area if applicants pay mitigation payments specified by the White Oak Local Area Transportation Improvement Program for transportation infrastructure improvements in lieu of satisfying the transportation

APF tests for LATR.

LATR mitigation and/or payments are not required for public facility project mandatory referrals, in which the Planning Board's comments are advisory. Mandatory referrals are often unique uses, such as schools or other public services, and their traffic review follows Mandatory Referral Guidelines, which requires a pedestrian and bicycle safety statement, pedestrian and vehicular circulation plan, and a traffic exemption statement or transportation study as applicable.

### C. HOW TO USE THESE GUIDELINES

These Guidelines are to be used by applicants to prepare traffic studies for Planning Board approval and by staff when reviewing those studies.

The following chart illustrates the steps needed to arrive at a recommendation for approval of the transportation test for the Adequate Public Facilities Ordinance. These Guidelines describe the information needed from the applicant to determine the answer at each step of the process and the considerations staff must evaluate when reviewing the document.

Project applications requiring LATR studies:

- preliminary plan (as part of a subdivision application)
- site plans not requiring subdivision
- special exception and zoning cases before the Board of Appeals and County Council

These Guidelines may also apply to building permit review cases requiring an APF finding, though in some cases (less than 12 months vacancy, no increase in square footage, fewer than 50 new weekday peak hour person trips) the APF test may be approved administratively by Planning Department staff.

**Figure 1: Montgomery County Local Area Transportation Review Process**

INSERT LATR PROCESS FLOWCHART HERE.

When a proposed development is projected by the LATR process to contribute to inadequate transportation conditions, the applicant should consult with Planning Department staff, the Montgomery County Department of Transportation (MCDOT), the Maryland State Highway Administration (SHA), and the municipalities of Rockville and Gaithersburg (when applicable) to develop recommendations that can mitigate the project's impact and thereby gain Planning Board approval. A description and prioritization of these mitigation approaches is provided in Section II. F of these Guidelines.

The Guideline procedures outlined in this document are intended to provide a snapshot of estimated future traffic conditions for proposed development. These procedures are not intended to establish delay-free travel conditions.

### D. RELATIONSHIP TO GUIDING DOCUMENTS

These Guidelines are a key element of a set of policy tools called the Subdivision Staging Policy (SSP) that guide the timely delivery of public facilities (schools, transportation, water, sewer, and other infrastructure) to serve existing and future development. These policy tools are the guidelines for the administration of the Adequate Public Facility Ordinance, or APFO.

Although commonly referred to as a separate ordinance, the APFO is actually part of Montgomery County's subdivision regulations: Section 50-35 (k) of the County Code. The introductory sentence of the APFO states, "A preliminary plan of subdivision must not be approved unless the Planning Board determines that public facilities will be adequate to support and service the area of the proposed subdivision." How, exactly, the Planning Board makes that determination is the focus of the Subdivision Staging Policy.

These Guidelines focus on the timing or staging of development in combination with transportation-related public facilities and comes into play primarily during the regulatory process. The County's General Plan, as amended by approved and adopted master, sector and functional plans, determines the amount, pattern, location, and type of development within the County. The master planning process is aspirational, creating a long-term vision for our communities. These Guidelines have a more focused, shorter term view. Their purpose is to evaluate individual proposals for development, determining if the County's transportation network has sufficient capacity to accommodate the additional demand.

County master plans identify where growth is appropriate and at what levels or densities this growth should occur. They provide a vision for the future of the County – from the very conceptual level with the General Plan to much more detailed recommendations with small

area plans. For each master plan, some high-level analysis is done regarding infrastructure needed to accommodate the vision outlined in the master plan. This analysis utilizes methods and procedures described in these Guidelines to determine the balance between land use and transportation capacity at the master planning horizon and may result in recommended capital improvements that could be implemented by either the County government or the private sector.

Local Area Transportation Review must at all times be consistent with the standards and staging mechanisms of adopted master and sector plans.

The Capital Improvements Program (CIP) and the Consolidated Transportation Program (CTP) are the vehicles through which the County and State respectively increase the capacity of public transportation facilities to support existing development and future growth. For the Local Area Transportation Review procedures described in these Guidelines, the programmed transportation projects to be considered are those fully funded for construction in the first 6 years of the current approved Capital Improvements Program, the State's Consolidated Transportation Program, or any municipal capital improvements program. For these purposes, any road required under Section 302 of the County Charter to be authorized by law is not programmed until the time for petition to referendum has expired without a valid petition or the authorizing law has been approved by referendum.

These Guidelines are also recognized as the standard for reports to the Board of Appeals and Hearing Examiner for special exception and zoning cases, respectively.

### E. POLICY AREA DEFINITIONS

For the purposes of these Guidelines, County policy areas are organized into four (4) categories described as follows and depicted in the map below:

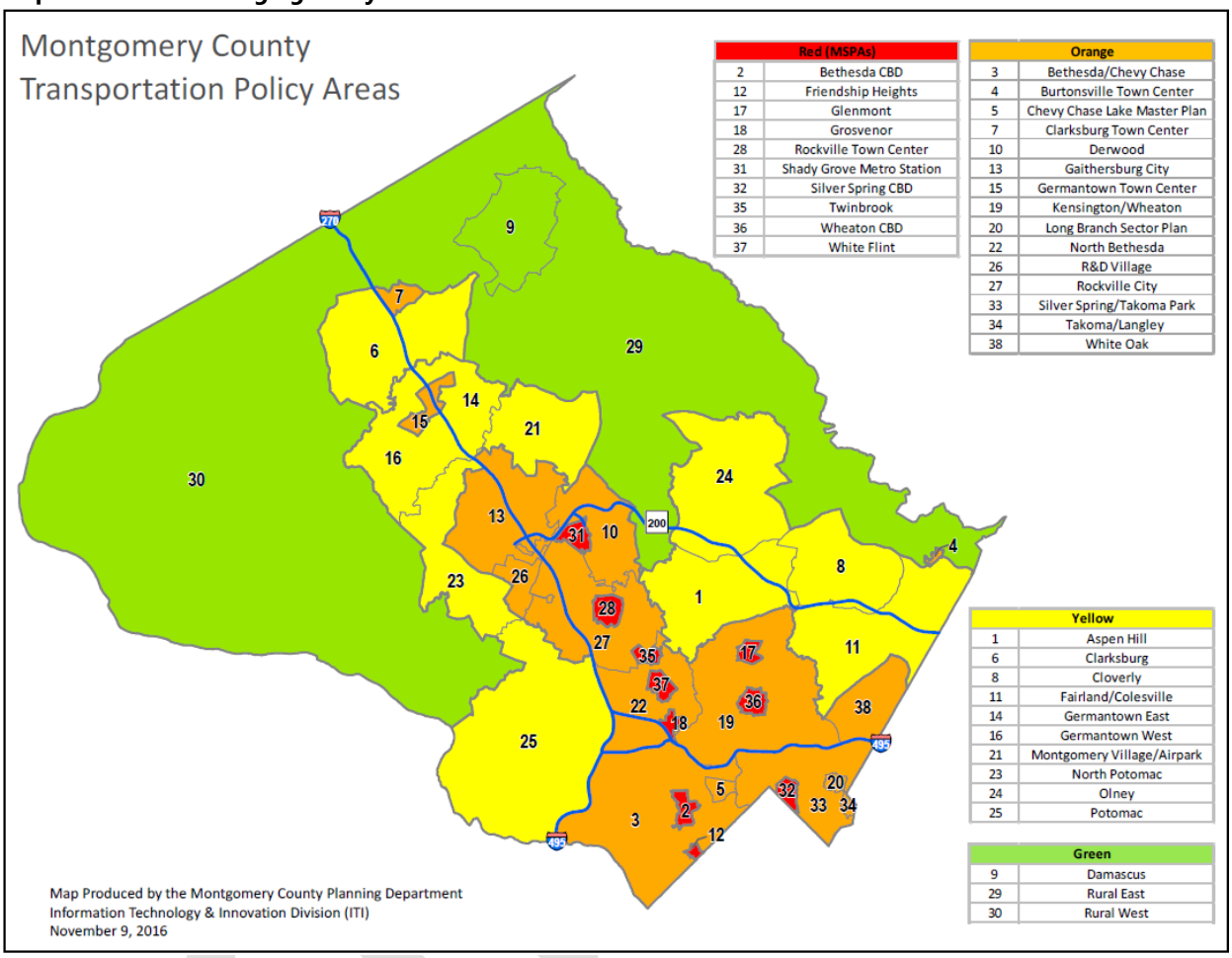
- Red (MSPAs): Down County Central Business Districts and Metro Station Policy Areas characterized by high-density development and the availability of premium transit service (i.e., Metrorail/MARC).

- Orange: Corridor cities, town centers, and emerging Transit-Oriented Development (TOD) areas where premium transit service (i.e., Corridor Cities Transitway, Purple Line/Bus Rapid Transit) is planned.

- Yellow: Lower density areas of the County characterized by mainly residential neighborhoods with community-serving commercial areas.

- Green: The County's agricultural reserve and rural areas.

**Map 1: Subdivision Staging Policy Areas**




## F. MITIGATION PRIORITIES

These Guidelines prioritize the application of modal mitigation approaches as follows:

- Transportation Demand Management (TDM) approaches to reduce vehicular demand
- Pedestrian or bicycle improvements
- Transit facility or service improvements
- Intersection operational improvements
- Roadway capacity improvements

A mitigation approach may be elevated in the priority list if it is explicitly identified in an area master plan or sector plan.

In Road Code Urban Areas (RCUAs) and Bicycle Pedestrian Priority Areas (BPPAs) adjustment of the prioritization of mitigation approaches listed above may be made to allow for mitigation payment in lieu of construction as described below.

The consideration of land use context in defining appropriate transportation solutions extends beyond the Policy Area geography. For example, the implementation of transportation facilities is governed by Section 49 of the County Code, also known as the "Road Code." As with Policy Areas, the Road Code also defines portions of the County as urban, suburban or rural, and these definitions are also adopted by County resolution (while being more finely-grained than the Policy Area definitions).

The RCUAs, such as the Olney Town Center or Damascus Town Center, reflect nuances within a Policy Area where the land use is expected to generate a higher proportion of walking and bicycling. Accordingly, there should be slower speed limits, wider sidewalks and similar design elements associated with a walkable town center. The County has also designated BPPAs that are locations where the enhancement of bicycle and pedestrian traffic is a priority. Maps depicting the boundaries of RCUAs and BPPAs are provided as Map ? and Map ?, respectively.

These RCUA and BPPA designations describe places within the County where the right-of-ways are busiest; not only due to the concentration of pedestrian activity, but also due to smaller parcels with multiple connections to utility lines, more closely spaced driveways and intersections, and more overlapping activities for capital improvements and maintenance within both public and private realms.

The identification and implementation of transportation solutions in these RCUAs and BPPAs therefore tend to be the most complex. It is more efficient in these areas for the public sector to implement transportation solutions in a coordinated fashion. Therefore, in RCUAs and BPPAs where an applicant needs to mitigate an LATR impact, a mitigation payment in lieu of construction will be allowed in cases where construction of needed mitigation requires coordination among multiple projects or acquisition of offsite right-of-way, or results in a disproportionate cost burden for the applicant, rather than held out as only a measure of last resort.

### G. DEFINITIONS OF MODAL ADEQUACY

To achieve an approximately equivalent transportation level of service in all areas of the County, greater vehicular traffic congestion is permitted in policy areas with greater transit accessibility and usage and non-motorized quality of service is prioritized in areas where higher pedestrian and bicyclist volumes are expected.

**Motor vehicle adequacy** is defined by the intersection level of service standards by policy area depicted in **Table 1**. For intersections located within Red or Orange policy areas, the Highway Capacity Manual operational (delay-based) level of service standard applies to all study intersections. For intersections located within Yellow or Green policy areas, the Critical Lane Volume (CLV) level of service standard applies to study intersections with a CLV of 1,350 or less and the Highway Capacity Manual delay-based level of service standard applies to study intersections with a CLV of more than 1,350.

**Pedestrian system adequacy** is defined as providing level of service (LOS) D service or better for any signalized crosswalk. Any site that generates more than 50 pedestrian peak hour trips (including trips to transit) must:

- Fix (or fund) Americans with Disabilities Act (ADA) non-compliance issues within a 500' radius of site boundaries, and

- Ensure LOS D for crosswalk pedestrian delay (or no more delay than existing) at LATR study intersections within 500' of site boundaries or within a Road Code Urban Area/Bicycle Pedestrian Priority Area (RCUA/BPPA).

Regardless of the development size and location, if an intersection operational analysis is triggered for any intersections within a RCUA/BPPA, mitigation must not increase average pedestrian crossing time at the intersection.

**Bicycle system adequacy** is defined as providing a low Level of Traffic Stress (LTS) for bicyclists. For any proposed development generating at least 50 peak hour non-motorized trips and located within a quarter mile of an educational institution or existing/planned bikeshare station, the applicant must make improvements needed to provide low Level of Traffic Stress (LTS-2) conditions that link the site to or otherwise extend an LTS-2 facility within 750 feet of a development site boundary or implement a master-planned improvement that provides an equivalent improvement in LTS.

**Transit system adequac**y for LATR is defined as providing a peak load of LOS D for bus transit service routes (1.25 transit riders per seat) during the peak period (in the peak direction). For any development generating at least 50 peak hour transit riders the applicant must inventory bus routes at stations/stops within 1,000 feet of the site and identify the peak load for each route at that station. The applicant must coordinate with the transit service provider to identify and implement (or fund) improvements that would be needed to address conditions worse than LOS D due to additional patrons generated by the development.

# III. LATR Study Submission

### A. SCHEDULING PROCESS

If an applicant is uncertain whether a transportation study is required, a transportation exemption statement must be filed as a part of an applicant's development submittal. The transportation exemption statement must show that the number of peak hour **person** trips generated by the project's proposed land use is fewer than 50 trips.

Planning Department staff will review the initial transportation exemption statement and determine if a transportation study is necessary.

If a transportation study is necessary, Planning Department staff has 15 working days to develop a study scope after receiving a written request and working with the applicant. As part of the scope, staff will supply the applicant with information on approved but unbuilt developments, relevant pending applications, nearby intersections to study, trip distribution and traffic assignment guidelines, and other information required to complete the study.

When determined to be complete and adequate, the applicant can return the study with the complete development application. Planning Department staff has 15 working days to let the applicant know if the study is complete and adequate.

Two copies of the transportation study must be submitted with the development application. Once Planning Department staff confirms that the transportation study is complete and adequate, 13 copies must be submitted within five working days of notification, along with a PDF copy for inclusion in the application file and available for public view via the Planning Department website's Development Activity Information Center (DAIC).

### B. SCOPING PROCESS

Applicants should use the following general criteria and analytical techniques to demonstrate the expected impact on public roadway intersections by the proposed development. The analysis should consider existing traffic, background traffic generated by developments approved and not yet built, and projected traffic generated by the applicant's project. Planning Department staff may require that traffic from nearby pending applications is included in the transportation study if those applications are likely to be approved by the Planning Board before the subject application's projected Planning Board hearing date. Otherwise, the transportation study would have to be updated to include the pending applications that were approved between the transportation study's scoping and the Planning Board hearing date. Transportation studies should also reflect any transportation improvements that will be made by nearby projects.

These Guidelines expand upon the application of the state-of-the-practice in traffic analysis tools to provide measures that are more readily correlated with traveler experience than the Critical Lane Volume (CLV) approach. In so doing, these Guidelines also introduce three new quantitative measures of adequacy for pedestrians, bicyclists, and transit. These proposed adequacy measures are described in subsequent sections of this document. Other multimodal elements of the LATR process, notably the requirement for all LATR studies to incorporate a qualitative pedestrian-bicycle impact statement, are retained. LATR for each mode of travel must be completed for any subdivision that would generate a significant number of at least 50 peak-hour person trips by that mode.

These Guidelines prescribe the use of context-sensitive trip generation and mode split analyses to determine the need for an LATR Study (as contrasted with a Transportation Study Exemption Statement) and the need for quantitative analysis of each of the four modes of travel. The LATR process utilizes the most recently published vehicle trip generation rates in the Institute of Transportation Engineers (ITE) Trip Generation Manual in concert with context-sensitive trip generation adjustment factors associated with each policy area to define site vehicle driver, vehicle passenger, transit patron, and non-motorized person trips, using information provided in Appendices 1A and 1B. Table ? below describes the application of this using a hypothetical 100,000 GSF office building in the Germantown East Policy Area:

**Table ?. LATR Guidelines Appendix References for Trip Generation**

| Appendix | Title/Purpose | Primary Use | Example Case |
|---|---|---|---|
| 1A | ITE Vehicle Trip Rate Adjustment Factors | Adjust ITE estimate of site-generated vehicle trips | Using the average rates from pages 1260 and 1261 of the 9th Edition of Trip Generation and Appendix 1, the site is estimated to generate 156*0.90=140 AM peak hour vehicle trips and 149*0.90=134 PM peak hour vehicle trips. |
| 1B | Mode Split Assumptions by Policy Area | Identify which modes require quantitative analysis. | The number of person trips exceeds the threshold of 50 so that a quantitative auto analysis is required.<br><br>The number of transit trips (140 * 2.8% / 68.0% = 6) is less than the threshold of 50 so that a quantitative transit analysis is not required.<br><br>The number of non-motorized trips (140 * 4.9% / 68.0% = 10) plus the number of transit trips (6, from above) totals 16, or less than the threshold |

| | | | |
|---|---|---|---|
| | | | of 50 so that quantitative pedestrian or bicycle analyses are not required. |

Once the context-sensitive number of person-trips generated by mode is established, certain sites may be eligible to conduct further mode shifts through the consideration of trip generation characteristics of retail land uses, transit proximity, parking management, and Transportation Demand Management (TDM) as noted in the following paragraphs.

**Retail Land Uses**

The ITE vehicle trip generation rates, and the policy area factors in Appendices ? through ?, address retail site driveway traffic. In most cases, a significant amount of driveway traffic is "pass-by" or "diverted link" traffic; in other words, few of those vehicles are making a separate trip solely to or from the retail land use. The ITE trip generation processes are adept at addressing this characteristic of mixed use development for vehicle trips, but not so robust in considering trips made by other modes (particularly in the most urban settings when some of those trips may be made to or from other uses in the same building and may not even requiring traveling outdoors).

ITE vehicle trip generation rates typically presume a stand-alone retail building with customer parking provided on-site, a characteristic common throughout the County except in more urban areas. Where retail uses are incorporated within a mixed use building, these Guidelines presume no new person trips are generated where a nominal amount of ancillary ground floor retail exists in a mixed use building that is predominantly residential or office. The presumption that no new person trips are generated applies for up to 15,000 GSF of retail space in a building that has least 90% of its FAR devoted to non-retail uses as long as no parking spaces for retail customers are included in the site plan.

**Transit Proximity**

Based on table S-2 in the 2005 WMATA Development Related Ridership Survey report, sites that are outside a Red Policy Area but located within 1,000' of a light-rail transit (LRT) or bus-rapid transit (BRT) station may shift additional trips from auto driver to transit patron based on the actual walking distance from the site's main entrance to the transit station, with a value of:

- 1 percentage point of mode share for every 50 feet closer than 1,000 feet for office development

- 1 percentage point of mode share for every 100 feet closer than 1,000 feet for residential development.

**Parking Management**

Research indicates that there is a correlation between parking supply and vehicle trip generation, particularly when applied in a supportive parking-pricing environment with alternative transportation options. Applicants may further reduce trip generation rates if, per Section 59.6.2.4 of the County Code, they propose parking ratios lower than the baseline minimums that include specific supportive actions identified to reduce parking demand.

For residential uses, each 2 percent reduction in parking below the minimum number of spaces yields a 1 percent reduction in vehicle trip generation rates for that use. This relationship is based on the equation in Table 2-9 of the Transportation Research Board's TCRP Report 128, "Effects of TOD on Housing, Parking, and Travel". Applying this equation to a prototypical TOD site with 10 DU/acre, a ratio of 1 parking space per dwelling unit would yield 0.24 peak hour vehicle trips and a ratio of 0.5 parking spaces per dwelling units would yield 0.18 peak hour vehicle trips (in other words, a 50% reduction in parking yields a 25% reduction in vehicle trips).

For office uses, each 3 percent reduction in parking below the minimum number of spaces yields a 1 percent reduction in vehicle trip generation rates for that use. This relationship is based on the relationships shown in Figure 6-9 of a 2004 report by Lund, Cervero, and Willson for Caltrans "Travel Characteristics of Transit Oriented Development in California", which shows that in a transit/TDM rich environment a similar reduction from 1.0 to 0.5 parking spaces at an office site could be expected to increase transit mode share from 41% to 50% (which for simplicity sake is assumed to equal a reduction in auto mode share from 59% to 50%). In other words, in this case a reduction of 50% of parking spaces reduces auto trips by about 15%, or roughly a 3:1 ratio.

The parking management vehicle trip generation rate reduction would not be applicable in Parking Lot Districts where private sector contributions towards publicly managed shared parking is encouraged.

**Traffic Mitigation Agreements (TMAgs)**

Applicants wishing to further reduce vehicular impacts through Transportation Demand Management programs may propose additional TDM programs and services whose effectiveness will be negotiated with M-NCPPC staff, pivoting from the context-sensitive trip generation rates already incorporated above and with binding elements to be included in a Traffic Mitigation Agreement (TMAg).

**Transportation Exemption Statement**

Projects that are projected to generate less than 50 new weekday peak hour person trips for LATR may need to submit only a transportation exemption statement. This statement must demonstrate the conditions that justify the exemption.

Information to be included in a traffic exemption statement:

- development project location—Planning Area and policy area
- proposed nonresidential square footage
- proposed number of dwelling units (single-family or multifamily)
- proposed land uses (as defined by the Department of Permitting Services)
- estimated number of new and total peak hour trips generated by the proposed land uses
- rationale for exemption

If the project is not exempt, the applicant must prepare a transportation study. Depending on the project size, uses, and location, the contents of a transportation study will vary. The applicant and Planning Department staff, in a meeting or through correspondence, will establish a scope for the study using the elements described below. (For zoning and special exception cases, Planning Department staff may consult with the Hearing Examiner, and initiate a meeting with the applicant and interested groups or individuals to establish the scope of the traffic analysis.)

## C. CONTENTS REQUIRED FOR COMPLETENESS

### i. Adequacy Determination

A transportation study must consider adequacy of the following elements:

1. Quantitative auto analysis (if the 50 person trip threshold is exceeded)
2. Quantitative transit analysis (if the 50 transit trip threshold is exceeded)
3. Quantitative pedestrian or bicycle analysis (if the 50 non-motorized trip threshold is exceeded)

For each modal adequacy consideration required, the study must make a statement that the proposed development, with any required mitigation, will result in a finding of adequate operations for that mode, supported by the analytic processes and information described in the subsequent chapters of these Guidelines.

### ii. Pedestrian and Bicycle Impact Statement

To ensure safe and efficient pedestrian and bicycle access and circulation to and within the site, each transportation study, regardless of pedestrian and bicycle trip generation, must include a Pedestrian and Bicycle Impact Statement that describes:

- pedestrian and bicycle counts at each intersection: pedestrian counts will be recorded at each leg of the intersection; bicycle counts will be recorded as turn movements
- any capital or operating modifications required to maximize safe pedestrian and bicyclist access to the site and surrounding area
- inventory map of existing and proposed sidewalks, off-road shared-use paths, and bikeways near the site noting whether these facilities are generally consistent with the County's Road Code design standards for sidewalk, path, landscape panel width, and street trees
- existing and proposed bikeshare stations
- existing and proposed bus stops, shelters, and benches, including real time transit information
- pedestrian and bicycle accommodations at nearby intersections, including crosswalks, countdown pedestrian signals (CPS), push buttons, median refuges, and ADA-compliant ramps and accessible pedestrian siganls (APS)
- information on bus route numbers, service frequency, and end destinations of bus routes
- in CBDs and MSPAs, recognition of peak pedestrian and bicycle activity periods
- inventory of existing streetlighting and additional lighting needs in the vicinity of the site.

**iii. TDM Strategy Statement**

If an applicant is proposing trip reduction measures, the study must include:

- a description of proposed Traffic Mitigation Agreement (TMAg) elements that will be entered into by the Planning Board, the Board of Appeals (if applicable) and MCDOT. The description must include, at a minimum, the following elements:
  - the vehicle trip reduction goals, including the specific number of peak hour vehicles to be reduced in both the weekday morning and evening peak periods
  - the TMAg's actions and a quantitative assessment of how they will achieve the required vehicle trip reduction goal
  - the required duration of the TMAg, whether the TMAg will be enforced based on the provision of specified actions (regardless of outcome), the measured outcome (regardless of actions provided), or a combination of both
  - the measures to be used in enforcement
  - the suggested method of monitoring
  - a security instrument to fund the continuation of the traffic mitigation program for its remaining term if the applicant defaults
  - the penalties if the vehicle trip reduction goals are not met.
- written statements from both MCDOT and Planning Department staffs concurring with the proposed approach to traffic mitigation.

**D. Review Process**

Planning Department staff evaluates traffic studies considering the following elements, described here to ensure consistent review by staff and to provide applicants additional information about how their studies will be analyzed.

To warrant an LATR transportation study, a proposed development must have a measurable transportation impact on a local area. Measurable transportation impact is defined as a development that generates 50 or more total (i.e., existing, new, pass-by, and diverted) weekday peak hour **person** trips in the morning (6:30 a.m. to 9:30 a.m.) and/or evening (4:00 p.m. to 7:00 p.m.) peak periods. If the proposal generates less than 30 trips or is a renovation of an existing development that existed for at least 12 years and will generate no net increase in trips, a traffic exemption statement is required instead of a transportation study.

An LATR transportation study is not required for any expansion that generates five or fewer additional peak hour trips if use and occupancy permits for at least 75 percent of the originally approved development were issued more than 12 years before the LATR transportation study exemption request. If an LATR transportation study is required, the number of signalized intersections in the study will be based on the increased number of peak hour trips rather than the total number of peak hour trips.

To determine if a development will generate 50 or more peak hour weekday **person** trips, Planning Department staff uses the following criteria:

- For office or residential development, all peak hour trips are counted even if, as part of the analysis, some of the trips will be considered as existing, pass by, or diverted trips to the site from existing traffic.

- For retail development, pass-by and diverted trips are included in establishing the 50-**person** threshold for a transportation study and later, for designing site access and circulation. Pass-by and diverted trips are not added to site-generated trips because they are already on the network, but diverted turning movements are considered in evaluating delay or CLV measurement.

- Planning Department staff shall exercise their professional judgment in consultation with the applicant in determining the appropriate land area to consider. Parcels that will be separated by unbuilt roadways remain “land at one location” but parcels separated by business district streets, arterial roadways, major highways, or freeways may cease to be “land at one location” even if still in common ownership.

In certain circumstances, Planning Department staff may, in consultation with the applicant, require analysis of traffic conditions during a different three-hour weekday peak period for example, 6:00 a.m. to 9:00 a.m. (versus the standard 6:30 a.m. to 9:30 a.m.) or 3:30 p.m. to 6:30 p.m. (versus the standard 4:00 p.m. to 7:00 p.m.), to reflect the site’s location or trip-generation characteristics, existing conditions, or background traffic. For example, a school

where classes end before the start of the evening peak period may warrant analysis of an earlier peak period.

The applicant calculates the number of trips using the process described in Section III.C.4 of the Guidelines.

For some specialized land uses, trip-generation rates may not be available. In such cases, Planning Department staff may request that determining rates be a part of the transportation study, most likely by collecting existing driveway counts at similar land uses. If special rates are to be used, staff must approve them prior to submission of the transportation study.

An applicant shall not avoid the intent of this requirement by submitting piecemeal applications or approval requests. However, an applicant may submit a plan of subdivision for less than 50 peak hour person trips if agreeing in writing that, upon filing future applications, the applicant will comply with the requirements of these Guidelines when the total number of site-generated peak hour person trips at one location has reached 50 or more. Then, a transportation study will be required to evaluate the impact of the total number of site-generated trips in accordance with the Guidelines.

Planning Department staff may elect to waive the criteria described in this section if the development results in no net increase in weekday peak-hour trips.

The County Council establishes congestion standards throughout the County (stated in terms of delay levels), which depend on the character of development and the availability of transit options. These standards are developed by policy area and adopted in the Subdivision Staging Policy (see Map ?). Planning Department staff maintains an inventory of intersection traffic data based on traffic counts collected by MCDOT, SHA, and private traffic consultants to provide applicants with a preliminary assessment of conditions in the vicinity of a proposed development.

# IV. Roadway System Adequacy

## A. ANALYSIS PROCEDURES AND TOOLS

### *1. Vehicular Delay*

Each policy area has a particular congestion standard for intersections, which is applied to meet the LATR test. These standards and mitigation requirements are adopted by the County Council and specified in these Guidelines, which are updated as needed to reflect industry standards, local traffic conditions, and Council action.

To achieve an approximately equivalent transportation level of service in all areas of the County, greater vehicular traffic congestion is permitted in policy areas with greater transit accessibility and usage. For motor vehicle adequacy, **Table 1** shows the intersection level of service standards by policy area. For intersections located within Red or Orange policy areas, the Highway Capacity Manual (HCM) delay-based level of service standard applies to all study intersections. For intersections located within Yellow or Green policy areas, the Critical Lane Volume (CLV) level of standard applies to study intersections with a CLV of 1,350 or less and the Highway Capacity Manual delay-based level of service standard applies to study intersections with a CLV of more than 1,350. In those cases where a HCM analysis is required, the applicant should use a traffic flow model such as Synchro or CORSIM.

**Table 1: Subdivision Staging Policy Intersection Congestion Standards**

| HCM Volume-to-Capacity Standard | Policy Area | HCM Average Vehicle Delay Equivalent (seconds/vehicle) | Critical Lane Volume Congestion Standard |
|---|---|---|---|
| 0.84 | 29 Rural East<br>30 Rural West | 41 | 1350 |
| 0.88 | 9 Damascus | 48 | 1400 |
| 0.89 | 6 Clarksburg<br>14 Germantown East<br>16 Germantown West<br>13 Gaithersburg City<br>21 Montgomery Village/Airpark | 51 | 1425 |
| 0.91 | 8 Cloverly<br>23 North Potomac<br>25 Potomac<br>24 Olney<br>26 R&D Village | 55 | 1450 |
| 0.92 | 10 Derwood<br>1 Aspen Hill<br>11 Fairland/Colesville | 59 | 1475 |
| 0.94 | 7 Clarksburg Town Center<br>15 Germantown Town Center<br>27 Rockville City | 63 | N/A |
| 0.97 | 4 Burtonsville Town Center<br>22 North Bethesda | 71 | N/A |
| 1.00 | 3 Bethesda/Chevy Chase<br>5 Chevy Chase Lake<br>19 Kensington/Wheaton<br>20 Long Branch<br>33 Silver Spring/Takoma Park<br>34 Takoma/Langley<br>38 White Oak | 80 | N/A |
| 1.13 | 2 Bethesda CBD<br>32 Silver Spring CBD<br>36 Wheaton CBD<br>12 Friendship Heights CBD<br>37 White Flint<br>35 Twinbrook<br>18 Grosvenor<br>17 Glenmont<br>28 Rockville Town Center<br>31 Shady Grove | 120 | N/A |

These Guidelines describe operational analyses for intersections using delay-based performance standards to either reduce average peak hour delay per vehicle below the policy area delay standard identified in the SSP or maintain build condition average delay per vehicle below the total future (consisting of existing traffic plus traffic generated by approved but unbuilt development) average delay. These Guidelines describe whether the intersection analysis performance is to be made for an individual intersection or requires a network analysis to address closely spaced intersections operating in tandem. If an individual intersection is analyzed, the vehicular delay threshold applies to the intersection as a whole, not to individual approaches or turning movements in the intersection. Similarly, if a network of multiple intersections is analyzed, the vehicular delay threshold applies to the network as a whole, not to individual intersections within the network. The focus on average delay is intended to help facilitate a focus on management and operations strategies; as the County builds out its roadway network the emphasis is less on constructing additional automobile capacity and more on finding more efficient means for operating the current network to accommodate changing travel demands through techniques such as signal timing, signing and marking, and vehicle progression.

The derivation of the policy area average vehicular delay thresholds applies a Level of Service (LOS) equivalency between Critical Lane Volume (CLV) and delay, using LOS/delay thresholds in the Highway Capacity Manual shown in **Table 2**.

**Table 2. Equivalency Between CLV, LOS, and Average Vehicle Delay**

| HCM LOS Threshold / Boundary | Corresponding Average Vehicle Delay per HCM (seconds) | Corresponding CLV Value |
|---|---|---|
| A / B | 10 | 1000 |
| B / C | 20 | 1150 |
| C / D | 35 | 1300 |
| D / E | 55 | 1450 |
| E / F | 80 | 1600 |
| n/a | 120 | 1800 |

### *2. CLV Intersection Analysis Method*

An intersection's ability to carry traffic can be expressed as CLV, the level of congestion at critical locations with conflicting vehicle movements, usually an intersection. Current CLV standards for each policy area are based on achieving approximately equivalent combined transportation roadway and transit levels of service in all areas of the County (see Map 1). Greater vehicular traffic congestion is permitted in policy areas with greater transit accessibility and use.

For a transportation study, the existing, background, and site-generated traffic for identified intersections should be measured against intersection capacity using the critical lane volume method. The analysis should be carried out for the peak hour of both the weekday morning and evening peak periods and should use traffic data for non-holiday weekdays and other non-typical occurrences.

The CLV method is generally accepted by most Maryland public agencies including SHA, MCDOT, the Cities of Rockville, Gaithersburg, Takoma Park, and M-NCPPC Planning Department. The methodology will fit most intersection configurations and can be easily varied for special situations and unusual conditions.

While some assumptions, for example lane use factors (see Step 3 below), may vary between jurisdictions and agencies, the general CLV methodology is consistent. An excellent reference source is SHA's web site: http://marylandroads.com/Index.aspx?PageId=461.

The CLV method can be used at signalized or unsignalized intersections. For unsignalized intersections, a two-phase operation should be assumed. The traffic volumes should be those approaching the intersection as determined in each step of the transportation study (existing, existing plus background, and existing plus background plus site).

Applicants should use the following steps to determine the congestion level of an intersection with a simple two-phase signal operation.

Step 1: Determine the signal phasing, number of lanes, and the total volume of entering turning movements on all intersection approaches and the traffic movements permitted in each lane.

Step 2: Subtract from the total approach volume any right-turn volume that operates continuously throughout the signal cycle (a free-flow right-turn bypass). Also, subtract the left-turn volume if it has an exclusive lane. An exclusive turning lane must be long enough to store all of the turning vehicles in a typical signal cycle without overflowing into the adjacent through lanes. Otherwise, none or only percentage of the turning volume may be subtracted from the total approach volume.

Step 3: Determine the maximum volume per lane for each approach by multiplying the volume calculated in Step 2 by the appropriate lane-use factor selected from Table ?. (Note: Do not count lanes established for exclusive use such as right- or left-turn storage lanes. The lane use factor for a single exclusive use lane is 1.00. Consult with Planning Department staff and MCDOT regarding any overlap signal phasing.)

Table ?: Montgomery County Lane Use Factors

| Number of Approach Lanes | Lane Use Factor* |
|---|---|
| 1 | 1.00 |
| 2 | 0.53 |
| 3 | 0.37 |
| 4 | 0.30 |
| 5 | 0.25 |

* Based on local observed data and the 2010 Edition of the *Highway Capacity Manual*

Step 4: Select the maximum volume per lane in one direction (e.g., northbound) and add it to the opposing (e.g., southbound) left turn volume.

Step 5: Repeat Step 4 by selecting the maximum volume per lane in the opposite direction (e.g., southbound) and the opposing (e.g., northbound) left-turn volume.

Step 6: The higher total of Step 4 or Step 5 is the critical volume for phase one (e.g., north-south).

Step 7: Repeat Steps 4 through 6 for phase two (e.g., east-west).

Step 8: Sum the critical lane volumes for the two phases to determine the CLV for the intersection. At some intersections, two opposing flows may move on separate phases. For these cases, each opposing phase becomes a part of the intersection's CLV (see Table ?).

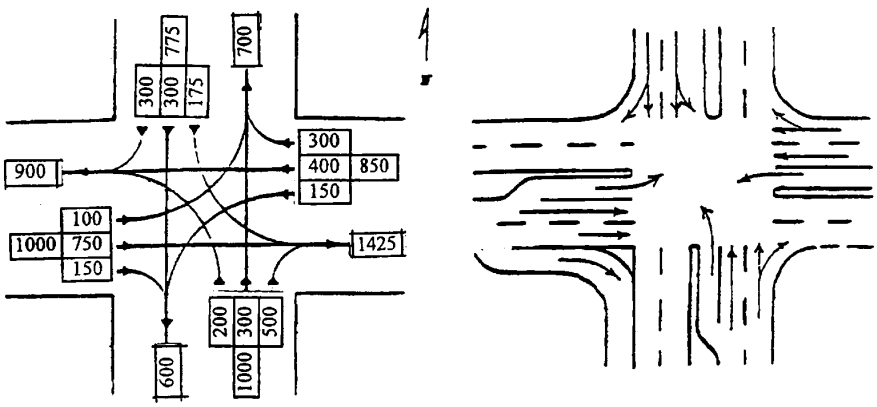
Step 9: Compare the resultant CLV for the intersection with the congestion standards in Map ?.

An example of a CLV calculation for a hypothetical intersection is provided in Table ?.

Table ?: Critical Lane Volume Calculations

| direction from the | lane approach volume | | critical lane use factor | | approach volume | | opposing lefts | | lane volume per approach |
|---|---|---|---|---|---|---|---|---|---|
| north | 775[1] | x | 0.53 | = | 411 | + | 200 | = | 611 |
| south | 800[2] | x | 0.53 | = | 424 | + | 175 | = | 599 |
| | 500 | x | 1.00 | = | 500 | + | 175 | = | 675[5] |
| east | 700[3] | x | 0.53 | = | 371 | + | 100 | = | 471 |
| west | 750[4] | x | 0.53 | = | 398 | + | 150 | = | 548[5] |

[1] Approach volumes are the sum of through, right, and left turn movements in two lanes.
[2] For a heavy right turn, evaluate worst of rights in one lane or through and rights in two lanes
[3] Approach volumes are the sum of through and right turn movements in two lanes.
[4] Approach volumes are through only because of free right and separate left.
[5] Intersection Critical Lane Volume = higher sum = 675 + 548 = 1,223.




**TURNING MOVEMENT VOLUMES** **LANE CONFIGURATIONS**

The following conditions should be observed where applicable.

- Right turn overlaps can be assumed where an exclusive right turn lane exists, except in cases when an approach is signed for a "no turn on red" condition.
- The CLV for five-leg intersections should be addressed according to the individual signal phases identified in the field.
- In cases where pedestrian crossing time criteria are not met, applicants must inform MCDOT, request that they revise the signal timing, and include this in the pedestrian statement.
- Crossing distances are to be measured from the curb to the edge of the far travel lane (not curb to curb).
- "Desired times" are to be determined by dividing the crossing distance by 3.5 ft/sec and then subtracting the total clearance time for that associated phase, as per the Manual on Uniform Traffic Control Devices.
- The CLV calculation for roundabouts should calculate the sum of the approach flow and circulating flows, as defined by the Highway Capacity Manual, for each approach and comparing the highest sum to the LATR standards.

***3. Isolated Intersection Delay***

For study intersections with a CLV over 1350, vehicular delay is considered where the intersection operations can fairly be assessed independent of upstream or downstream traffic flow conditions. In such cases, the adequacy of the transportation system for intersections is based on the correlation between intersection level of service and vehicular delay as described in the *2010 Highway Capacity Manual* and shown in Table ?. Adequacy is achieved when the average vehicle delay in the total future with mitigation condition does not exceed either the

congestion standard shown in Table ? or the average vehicle delay in the background condition, whichever is higher.

***4. Network Delay***

For study intersections located within Red and Orange policy areas where either:

(a) the intersection is located on a congested roadway with a travel time index greater than 2.0 as documented by monitoring reports[2] or
(b) the intersection is located in close proximity, within 600 feet, of another traffic signal

a more robust network operations analysis approach should be applied using micro-simulation tools (such as Synchro, SimTraffic, CORSIM and VISSIM). Additional guidance on micro-simulation parameters is available from Planning Department staff.

## B. DETERMINING BASELINE AND FUTURE TOTAL CONDITIONS

Applicants should use the following general criteria and analytical techniques to demonstrate the expected impact on public roadway intersections by the proposed development. The analysis should consider existing traffic, background traffic generated by developments approved and not yet built, and projected traffic generated by the applicant's project. Planning Department staff may require that traffic from nearby pending applications is included in the transportation study if those applications are likely to be approved by the Planning Board before the subject application's projected Planning Board hearing date. Otherwise, the transportation study would have to be updated to include the pending applications that were approved between the transportation study's scoping and the Planning Board hearing date. Traffic studies should also reflect any traffic improvements that will be made by nearby projects.

**Intersections**

The number of intersections included will be based on the projected trips generated by the development under consideration. As shown in Table ?, the number of signalized intersections and significant non-signalized intersections in each direction is based on the maximum number of total weekday peak hour trips generated by the proposed land uses, unless Planning Department staff in consultation with MCDOT, SHA, and municipalities if appropriate, finds that special circumstances warrant a more limited study.

Planning Department staff, in cooperation with the applicant, will use judgment and experience in deciding the significant intersections to be studied. For example, the ramps and termini of future interchanges will be treated as signalized intersections. The County's central business

[2] Relevant monitoring reports include the latest edition of the MWCOG Congestion Management Report, MDSHA State Highway Mobility Report and the Montgomery County Mobility Assessment Report.

districts (CBDs) and Metro Station Policy Areas (MSPAs) have more closely-spaced intersections. Accordingly, not every signalized intersection should be studied and as a result, the study may cover a larger area. Site access driveways are not included in the first ring of intersections.

Table 1: Intersections to be Included in a Transportation study

| Weekday Peak Hour Site Trips | Minimum Number of Intersections in Each Direction |
|---|---|
| 30 – 249 | 1 |
| 250 – 749 | 2 |
| 750 – 1,249 | 3 |
| 1,250 – 1,749 | 4 |
| 1,750 – 2,249 | 5 |
| 2,250 – 2,749 | 6 |
| >2,750 | 7 |

The term "each direction" applies to every study intersection. For example, in a hypothetical grid, the first ring from the site access point or off site PLD garage, if applicable, would include four intersections. The second ring would include not only the next four intersections along the streets serving the site, but also the four intersections with cross streets encountered in the first ring. As the number of intersections in each direction grows linearly from one to five, the number of total study area intersections grows at a greater rate.

When determining the intersections to be studied, Planning Department staff will also consider:

- geographic boundaries such as rivers, major streams, parks, interstate routes, railroads
- political boundaries, although intersections located within the Cities of Rockville and Gaithersburg, where the Planning Board does not have subdivision authority, will be included in the transportation study and the studies will be shared with nearby incorporated cities[3]
- contiguous land under common ownership
- the type of trip generated: existing, new, diverted, or pass-by
- the functional classification of roadways, for example six-lane major highway.

If a site located in a Yellow or Green policy area generates a number of peak hour vehicle trips that is projected to increase the critical lane volume through an intersection by fewer than five CLV and the applicant is required to improve another intersection for the same project and/or is participating in a traffic mitigation program, that intersection does not need to be analyzed in the transportation study, even if it would otherwise be identified as appropriate to study.

Applicants may develop a trip distribution and assignment pattern before the study scoping process and work with Planning Department staff to determine which intersections don't require full study. This process will be documented in the scoping correspondence.

#### CONTENTS REQUIRED FOR COMPLETENESS

A vehicular transportation study must consider the following elements:

[3] In such cases, the coordination of any new proposed intersection improvements shall be in accordance with the memorandum of understanding provided in Appendix ?.

1. Average vehicle delay or CLV at intersections[4]
2. Approved but unbuilt development
3. Existing intersection turning movement counts
4. Trip generation, directional distribution, and trip assignment
5. Mode split assumptions
6. CIP and CTP improvements
7. Circulation and Safety for High Transportation impact venues, including gap analysis
8. Land use and size
9. Queuing/delay analysis (if applicable)
10. Pedestrian and bicycle impacts
11. Improvement and mitigation options
12. Traffic mitigation agreement (if needed)

Elements 1 through 4 are described below.

***1. Average Vehicle Delay or CLV at Intersections***

See the discussion above provided in Section IV.A.

***2. Approved but Unbuilt Development***

As a general guideline, background traffic from approved but unbuilt developments will be in the same geographic area as the intersections to be studied if that background development is estimated to contribute at least 5 CLV. If the background traffic is generated from a large, staged development, the transportation study and its review will also be staged. As noted above, background traffic data should also include effective trip mitigation programs or uncompleted physical improvements that have been required of nearby developments. In appropriate cases, Planning Department staff may require that traffic from nearby unapproved applications also be included in the transportation study.

***3. Existing Intersection Turning Movement Counts***

Generally, intersection turning movement counts less than one year old when a transportation

[4] For intersections located within policy areas categorized as Red or Orange, Highway Capacity Manual (HCM) delay-based level of service standard applies to all study intersections. For intersections located within policy areas categorized as Yellow or Green, the Critical Lane Volume (CLV) level of service standard applies to study intersections with a CLV of 1,350 or less and the HCM delay-based level-of-service standard applies to study intersections with a CLV of more than 1,350.

study is submitted are acceptable. Traffic counts should not be conducted:

- on a Monday or Friday
- during summer months or when public schools are not in session
- on federal, state, or county holidays
- on the day before or after federal holidays
- during the last two weeks of December and the first week of January or when a major incident or event results in significantly different traffic volumes and patterns
- when weather or other conditions have disrupted normal daily traffic.
- When federal, state, or county governments have options to telework due to weather conditions

For special circumstances such as summer camps, non-summer or summer traffic counts, whichever is higher, will be used in the study.

### *4. Trip Generation, Directional Distribution, Directional Split, and Trip Assignment*

#### Trip Generation

Trips projected to be generated by the proposed development and background traffic should be determined in accordance with the latest edition of Institute of Transportation Engineers (ITE) Trip Generation Manual Guidelines. Equations for calculating trips from land uses[5] or zoning classifications can be obtained from this document, as can guidance regarding pass-by, diverted, and internal trip capture rates.

These trip generation rates are adjusted using context-sensitive adjustment factors provided in Appendix ?. Developments that generate less than five peak hour background vehicle trips (i.e., subdivisions of four or fewer single-family detached houses) are not generally included unless located at a critical analyzed intersection, since tracking those trips is not pragmatic.

Planning Department staff is authorized to make minor technical changes to Appendix ? to reflect new information or to correct errors. Applicants should check with staff to ensure they are using the latest version of this Appendix.

Another special case is retail sites over 200,000 square feet of gross leasable area. Their trip generation rates will be set after discussion with staff and the applicant's analysis of data for one or more similar-sized retail sites within the County. In lieu of data collection, a trip rate set

[5] Typical land uses include general office, retail, residential, fast food restaurants, child day care centers, private schools/educational institutions, senior/elderly housing, mini-warehouse, and automobile filling stations with or without ancillary uses.

at two times the rate in the latest edition of ITE's Trip Generation Manual may be used.

In some cases, adjusting the trips from the trip generation rates and equations in the Appendix may be appropriate. For example, the effect of pass by and diverted trips for retail, including fast food restaurants, child day care centers, and automobile filling stations; and the total trips from mixed uses such as office and retail will be considered on a case-by-case basis, using the best available information. Deviations may also be appropriate for a particular site. Appropriate rates for these sites could be based on traffic counts of comparable facilities on vehicles both entering and leaving those sites, preferably in the County, and will be considered by staff.

**Directional Distribution**

Planning Department staff provides applicants with guidance pertaining to the directional distribution of background and site traffic generated by office and residential uses from the latest edition of the Trip Distribution and Traffic Assignment Guidelines (see Appendix ?). The distribution of trips entering and leaving the proposed development will be determined based on the relative location of other traffic generators, including background development, employment centers, commercial centers, regional or area shopping centers, transportation terminals, or other trip table information provided by staff. For land uses not covered in the Appendix, distribution should be developed in consultation with Planning Department staff.

**Directional Split**

The directional split is the percentage of the trips entering or leaving the site during the peak hour and the direction in which those trips are traveling. Appendix ? contains the directional split for general land uses and Appendix ? contains directional split assumptions for the Bethesda, Friendship Heights, and Silver Spring CBDs. For all other uses, refer to the latest edition of ITE's Trip Generation Manual. If data are not available, staff and the applicant will determine an appropriate in-out directional split.

**Trip Assignment**

Trip assignment is an estimate of the impact of future traffic on the nearby road network. It tends to be less accurate farther from the origin or destination of travel. The assignment factors shall be determined in consultation with Planning Department staff and applied to the generated trips. The resulting volumes will be assigned to the nearby road network. Generated trips, background traffic, and existing traffic will be combined to determine the adequacy of transportation facilities. Trip assignment will be extended to the nearest major intersection, or intersections, in consultation with Planning Department staff (see Table ?).

Once an intersection assignment exceeds a CLV of 2,000 or average vehicle delay of 150 seconds, diverting estimated traffic to alternate routes may be considered. Diversions will be based on feasible alternatives and should create a balance that reflects the project's traffic

impacts on both primary and alternate routes, and without excessively burdening local residential streets. Impacts on primary and alternate intersections must be mitigated in accordance with the policy area congestion standards. Staff, in consultation with the applicant, SHA, and MCDOT, will resolve these cases individually before presentation to the Planning Board.

### C. MITIGATION OBJECTIVES AND APPROACHES

See the discussion provided in **Section II.F Mitigation Priorities**.

# V. Pedestrian System Adequacy

### A. ANALYSIS PROCEDURES AND TOOLS

Pedestrian system adequacy is defined as providing level of service (LOS) D capacity or better in any crosswalk. Any site that generates more than 50 pedestrian peak hour trips (including trips to transit) must:

- Fix (or fund) Americans with Disabilities Act (ADA) non-compliance issues within a 500' radius of site boundaries, and
- Ensure LOS D for crosswalk pedestrian delay (or no more delay than existing) at LATR study intersections within 500' of site boundaries or within a Road Code Urban Area/Bicycle Pedestrian Priority Area (RCUA/BPPA).

Each of these elements of pedestrian system is described below.

**ADA Compliance**

In the context of a pedestrian transportation study, ADA non-compliance issues identified within 500' of a development site boundary as part of a quantitative pedestrian analysis must be fixed or funded by the applicant.

The best way to determine if a curb ramp is accessible is to survey it to determine the extent to which it complies with ADA accessibility requirements. Instruction on how to conduct these surveys are provided in the ADA Tool Kit[6]. This Tool Kit includes instructions on how to survey curb ramps for compliance with the ADA Standards and a Curb Ramps survey form for use in conducting your surveys. The instructions, which are located in Appendix 1, are keyed to the Curb Ramps survey form, which is located in Appendix 2, and provides an explanation of how to obtain the information needed to answer each question on the survey form. The instructions will also include photographs and illustrations showing how and where to take measurements. The Curb Ramps survey form and instructions will help applicants identify the most common accessibility problems with curb ramps, but they will not necessarily identify all problems.

**Pedestrian Crosswalk Delay**

Regardless of the development size and location, if an intersection operational analysis is triggered for any intersections within a RCUA/BPPA, mitigation must not increase average

[6] https://www.**ada**.gov/pca**toolkit**/**toolkit**main.htm

pedestrian crossing time at the intersection.

The adequacy standards for pedestrians apply to crosswalks at study area intersections for sites that generate more than 50 non-motorized trips. The basis for this recommendation is the Highway Capacity Manual approach to defining crosswalk performance. Chapter 18 of the 2010 Highway Capacity Manual actually takes the concept of intersection performance for pedestrians to a more detailed level, combining crosswalk performance and delay into a unitless value that translates to LOS. Given the level of complexity with intersection signal timing and phasing in the areas of the County likely to generate significant pedestrian trips requiring analysis and constituent concerns about the unitless values associated with the CLV approach to vehicle performance, the approach to defining adequacy considers pedestrian delay only.

- Regardless of the number of site generated pedestrian trips, improvements considered at any signalized intersection in a Road Code Urban Area (RCUA) or Bicycle Pedestrian Priority Area (BPPA) must not cause the total amount of pedestrian travel time (waiting for a signalized crossing and completing that crossing) to increase from the background (also called "total future") condition.

The methodology for evaluating pedestrians at signalized intersections is described in the 2010 HCM beginning on Chapter 18 Page 59. It includes a series of steps and several equations. Specifically, Step 2 starting on page 65 describes the procedure for evaluating the performance of a crosswalk.

### B. DETERMINING BASELINE AND FUTURE TOTAL CONDITIONS

The determination of pedestrian signalized crosswalk delay depends on the existing pedestrian volumes at the intersection and the average delay per pedestrian following 2000 HCM procedures for baseline and total future conditions. In short, the existing pedestrian delay at each crosswalk assumes random arrivals and is therefore equal to half the duration of the time between the end of one signal cycle's walk phase and the beginning of the next cycle walk phase. The average delay per pedestrian for the intersection is the average of all crosswalks, weighted by volume. Given the analytic challenges associated with pedestrian distribution and path assignments, the existing pedestrian volumes suffice as demand values for all intersection conditions unless the applicant chooses to work with M-NCPPC to make explicit assumptions (as might be the case where the logical pedestrian path between the development site and a nearby destination such as a transit station or retail center would be meaningful in considering adequacy. The standard of pedestrian adequacy is an average signal delay of less than 40 seconds per pedestrian, or no worse than the background (or total future) condition.

### C. MITIGATION OBJECTIVES AND APPROACHES

For pedestrian delay, mitigation is required to achieve either the 40 seconds per delay per pedestrian or no more delay than in the background (or total future) condition. Expected types of mitigation include signal timing changes to increase the amount of green time provided to the pedestrian crossing (thereby reducing the number of pedestrians queued at the start of the walk signal). The applicant is responsible for identifying a revised signal time for consideration but is not required to obtain MCDOT or SHA approval, nor is the operating agency required to implement it.

# VI. Bicycle System Adequacy

### A. ANALYSIS PROCEDURES AND TOOLS

The adequacy standards for bicyclists are designed to be synchronized with the development and implementation of the Bicycle Master Plan. The concept of Level of Traffic Stress for bicyclists elegantly evaluates network connectivity for bicyclists, recognizing that different roadways will be, or can be redesigned to be, comfortable for bicyclists of varying skill levels and that not all roadways will necessarily accommodate all levels of bicyclists with a high degree of comfort. By considering a network approach to bicycling, an appropriate level of accommodation for bicyclists can be established. The LTS process is still in development in Montgomery County and the Department is not aware that is has yet been applied by any jurisdiction in a truly regulatory application as an adequacy standard. Therefore, the proposal for bicycle system adequacy is to seek LTS-2 (low levels of traffic stress) for access to all parcels within 1,500 feet of a development site boundary if that development site generates at least 100 peak hour non-motorized trips (including transit access trips) and is likely to include a significant bicycling population as indicated by ¼ mile proximity to an educational institution or an existing or planned bikeshare station. However, the adequacy standard would be met by the applicant identifying and estimating the cost of feasible improvements to achieve the LTS-2 adequacy standard but the applicant would not be required to contribute to bicycle system implementation.

More information on the LTS approach can be found here:

http://www.mcatlas.org/bikestress/

### B. DETERMINING BASELINE AND FUTURE TOTAL CONDITIONS

The assessment of bicycle Level of Traffic Stress does not require identifying or forecasting any bicycle travel demand beyond the extent of defining the need for a bicycle system adequacy determination. The assessment of adequacy is made fully on the degree to which the site is connected to a low Level of Traffic Stress network based on existing conditions and bicycle system improvements funded for construction within the six-year CIP or CTP.

## C. MITIGATION OBJECTIVES AND APPROACHES

Bicycle system adequacy is defined as providing a low Level of Traffic Stress (LTS) for bicyclists. For any proposed development generating at least 50 peak hour non-motorized trips and located within a quarter mile of an educational institution or existing/planned bikeshare station, the applicant must make improvements needed to provide low Level of Traffic Stress (LTS-2) conditions that link the site to or otherwise extend an LTS-2 facility within 750 feet of a development site boundary or implement a master-planned improvement that provides an equivalent improvement in LTS.

# VII. Transit System Adequacy

### A. ANALYSIS PROCEDURES AND TOOLS

Transit system adequacy for LATR is defined as providing a peak load of LOS D for bus transit service routes (1.25 transit riders per seat) during the peak period (in the peak direction). For any development generating at least 50 peak hour transit riders the applicant must inventory bus routes at stations/stops within 1,000 feet of the site and identify the peak load at that station for each route. The applicant must coordinate with the transit service provider to identify and implement (or fund) improvements that would be needed to address conditions worse than LOS D due to additional patrons generated by the development.

The adequacy standard for transit riders considers the capacity of bus transit service in the vicinity of the site. This definition reflects the concern that while the County has focused on addressing transportation system capacity concerns by incentivizing modal shifts from autos to transit, some transit routes are now themselves congested and need to be considered for adequacy. The proposed standard is LOS D for peak load conditions on buses during the weekday peak hour and is based on a quality of service measure from the Second Edition of the *Transit Capacity and Quality of Service Manual* (TCQSM) which is generally considered a comfortable standee load for the purposes of transit facility design. As is the case with the proposed pedestrian adequacy standard, the most recent (Third) edition of the TCQSM has combined several independent quality of service measures into a single transit score that is more complex and unitless and therefore more difficult both to measure and to understand. The basic concept of peak load factors with the thresholds and commentary from the Second Edition has been retained as Exhibit 5-16 in the Third Edition but without the LOS designation.

*Transit Capacity and Quality of Service Manual—2nd Edition*

**Exhibit 3-26**
Fixed-Route Passenger Load LOS

| LOS | Load Factor (p/seat) | Standing Passenger Area ($ft^2$/p) | Standing Passenger Area ($m^2$/p) | Comments |
|---|---|---|---|---|
| A | 0.00-0.50 | >10.8† | >1.00† | No passenger need sit next to another |
| B | 0.51-0.75 | 8.2-10.8† | 0.76-1.00† | Passengers can choose where to sit |
| C | 0.76-1.00 | 5.5-8.1† | 0.51-0.75† | All passengers can sit |
| D | *1.01-1.25** | 3.9-5.4 | 0.36-0.50 | Comfortable standee load for design |
| E | *1.26-1.50** | 2.2-3.8 | 0.20-0.35 | Maximum schedule load |
| F | *>1.50** | <2.2 | <0.20 | Crush load |

*Approximate value for comparison, for vehicles designed to have most passengers seated. LOS is based on area.
†Used for vehicles designed to have most passengers standing.

### B. DETERMINING BASELINE AND FUTURE TOTAL CONDITIONS

In the context of the LATR approach, an application for any site generating 50 peak hour transit users is required to consider the following elements of transit system adequacy:

- Identify bus stops within 1,000 feet of the site boundary and inventory the number of riders that board, alight, and remain on the bus for all buses serving each stop during the weekday AM and PM peak periods.

- Calculate the peak hour passenger load for each route based on the buses that serve the route and the higher of the passenger loads for buses arriving or departing at each station and gauge the passengers per seat (in the peak direction) against the TCQSM standard of less than 1.25 persons/seat.

This measure is designed to reflect transit capacity for local area conditions where the County has a role in addressing transit system adequacy associated with local development. Therefore, the focus is on the bus system (whether operated by the Washington Metropolitan Area Transit Authority (WMATA) or the Montgomery County Ride-On) as contrasted with the more regional focus of Metrorail or MARC system capacity (similar to the fact that LATR for autos does not consider freeway conditions). It also focuses on the "peak load" from a temporal perspective, but only regarding the bus while at the local stop, as contrasted with the more common transit system planning practice of considering the "peak load point". This is because it is likely that for longer routes, particularly within the WMATA system the peak load point may be miles from a development site (for instance, the experience of the Y2 between Wheaton and Silver Spring is not germane to the local effect of a development along the Y2 in Olney).

### C. MITIGATION OBJECTIVES AND APPROACHES

An adverse effect would be a bus route with a peak load above 1.25 at the subject station and mitigation would include provisions for capital improvements to reduce that peak load below 1.25 (or the background condition if already higher than 1.25). Mitigation would need to be developed in close coordination with M-NCPPC staff and the transit system operators using simplified calculations. As an example, consider a case with a bus route running on 30-minute headways. In the peak hour, two buses, each with 40 seats, provide 80 seats of capacity serving the stop and carry 70 passengers in the peak direction for a peak load of 0.875. The site generates 60 transit passengers with 75 percent (or 45 passengers) traveling in the peak direction. The total passenger load is increased to 115 and the peak load factor increases to 115/80 = 1.44. To reduce the peak load to 1.25, there would need to be 92 seats if capacity, which would equal another 0.3 of a bus. The applicant would work with the interagency staff to define capital improvements with the same functional or cost value of 0.3 of an additional bus.

# VIII. Appendices

## PERSON TRIP GENERATION TABLES

**Note:** Trip generation factor and mode split information for the new policy areas incorporated in the 2016-2020 SSP (Clarksburg TC, and expanded Germantown TC policy areas) is under development.

Table 1a. ITE Vehicle Trip Generation Rate Adjustment Factors

| | | ITE Vehicle Trip Adjustment Factors | | | |
|---|---|---|---|---|---|
| Policy Area # | | Residential | Office | Retail | Other |
| 2 | Aspen Hill | 97% | 98% | 99% | 97% |
| 3 | Bethesda CBD | 79% | 63% | 61% | 62% |
| 4 | Bethesda/Chevy Chase | 87% | 81% | 85% | 79% |
| 6 | Cloverly | 99% | 100% | 100% | 100% |
| 7 | Damascus | 100% | 100% | 100% | 100% |
| 8 | Derwood | 94% | 94% | 87% | 94% |
| 11 | Gaithersburg City | 88% | 86% | 74% | 85% |
| 12 | Germantown East | 95% | 90% | 95% | 91% |
| 14 | Germantown West | 93% | 87% | 92% | 88% |
| 13 | Germantown Town Center | 85% | 89% | 77% | 88% |
| 17 | Kensington/Wheaton | 91% | 92% | 96% | 92% |
| 18 | Montgomery Village/Airpark | 93% | 100% | 93% | 100% |
| 19 | North Bethesda | 83% | 87% | 71% | 82% |
| 20 | North Potomac | 97% | 100% | 100% | 100% |
| 21 | Olney | 99% | 100% | 99% | 100% |
| 22 | Potomac | 97% | 98% | 96% | 98% |
| 23 | R&D Village | 89% | 88% | 80% | 90% |
| 24 | Rockville City | 88% | 94% | 87% | 98% |
| 29 | Silver Spring CBD | 77% | 65% | 58% | 65% |
| 30 | Silver Spring/Takoma Park | 83% | 83% | 82% | 84% |
| 32 | Wheaton CBD | 85% | 85% | 76% | 84% |
| 16 | Grosvenor | 81% | 84% | 75% | 80% |
| 31 | Twinbrook | 81% | 80% | 74% | 79% |
| 33 | White Flint | 79% | 78% | 72% | 78% |
| 15 | Glenmont | 90% | 91% | 96% | 91% |
| 5 | Clarksburg | 100% | 100% | 100% | 100% |
| 28 | Shady Grove Metro Station | 89% | 88% | 77% | 88% |
| 10 | Friendship Heights | 78% | 70% | 73% | 70% |
| 25 | Rockville Town Center | 79% | 80% | 70% | 79% |
| 27 | Rural West | 100% | 100% | 100% | 100% |
| 26 | Rural East | 99% | 99% | 98% | 100% |
| 34 | White Oak | 89% | 90% | 91% | 88% |
| 9 | Fairland/Colesville | 96% | 96% | 99% | 97% |

Table 1b. Mode Split Assumptions by Policy Area

| Policy Area # | | Development Type | Auto Driver | Auto Passenger | Transit | Non-Motorized | Total |
|---|---|---|---|---|---|---|---|
| 2 | Aspen Hill | Residential | 62.5% | 25.8% | 5.3% | 6.4% | 100.0% |
| | | Office | 74.2% | 18.2% | 2.9% | 4.7% | 100.0% |
| | | Retail | 72.1% | 23.4% | 1.3% | 3.2% | 100.0% |
| | | Other | 74.0% | 18.2% | 2.5% | 5.2% | 100.0% |
| 3 | Bethesda CBD | Residential | 50.9% | 20.8% | 11.7% | 16.6% | 100.0% |
| | | Office | 47.9% | 12.6% | 23.8% | 15.7% | 100.0% |
| | | Retail | 44.2% | 16.9% | 10.9% | 27.9% | 100.0% |
| | | Other | 47.3% | 13.2% | 23.0% | 16.5% | 100.0% |
| 4 | Bethesda/Chevy Chase | Residential | 56.1% | 23.6% | 7.6% | 12.6% | 100.0% |
| | | Office | 61.8% | 17.4% | 11.5% | 9.3% | 100.0% |
| | | Retail | 61.6% | 24.7% | 3.2% | 10.5% | 100.0% |
| | | Other | 60.5% | 17.1% | 12.6% | 9.9% | 100.0% |
| 6 | Cloverly | Residential | 64.1% | 26.4% | 3.5% | 5.9% | 99.9% |
| | | Office | 76.8% | 19.0% | 0.7% | 3.5% | 100.0% |
| | | Retail | 72.8% | 25.1% | 0.2% | 2.0% | 100.0% |
| | | Other | 76.5% | 19.2% | 0.8% | 3.4% | 100.0% |
| 7 | Damascus | Residential | 65.4% | 26.6% | 2.2% | 5.8% | 100.0% |
| | | Office | 76.1% | 20.3% | 0.1% | 3.5% | 100.0% |
| | | Retail | 72.5% | 25.5% | 0.0% | 1.9% | 100.0% |
| | | Other | 76.1% | 20.4% | 0.1% | 3.5% | 100.0% |
| 8 | Derwood | Residential | 61.0% | 26.6% | 5.6% | 6.8% | 100.0% |
| | | Office | 71.4% | 20.4% | 3.6% | 4.5% | 100.0% |
| | | Retail | 63.4% | 28.7% | 2.2% | 5.7% | 100.0% |
| | | Other | 71.3% | 20.4% | 3.7% | 4.6% | 100.0% |
| 11 | Gaithersburg City | Residential | 56.7% | 26.8% | 5.4% | 11.1% | 100.0% |
| | | Office | 65.4% | 23.5% | 4.1% | 7.1% | 100.0% |
| | | Retail | 53.5% | 32.7% | 2.4% | 10.0% | 98.6% |
| | | Other | 64.4% | 24.5% | 3.8% | 7.3% | 100.0% |
| 12 | Germantown East | Residential | 61.5% | 26.9% | 4.3% | 7.3% | 100.0% |
| | | Office | 68.0% | 24.3% | 2.8% | 4.9% | 100.0% |
| | | Retail | 69.1% | 26.7% | 1.3% | 3.0% | 100.0% |
| | | Other | 69.1% | 23.4% | 2.7% | 4.8% | 100.0% |
| 14 | Germantown West | Residential | 60.4% | 26.9% | 4.1% | 8.6% | 100.0% |
| | | Office | 66.1% | 24.9% | 3.1% | 5.8% | 100.0% |
| | | Retail | 66.4% | 27.6% | 1.2% | 4.8% | 100.0% |
| | | Other | 66.9% | 23.6% | 3.3% | 6.2% | 100.0% |
| 13 | Germantown Town Center | Residential | 55.3% | 27.2% | 5.7% | 11.8% | 100.0% |
| | | Office | 67.6% | 19.9% | 5.4% | 7.1% | 100.0% |
| | | Retail | 56.2% | 30.1% | 3.3% | 10.4% | 100.0% |
| | | Other | 67.0% | 20.5% | 5.7% | 6.9% | 100.0% |
| 17 | Kensington/Wheaton | Residential | 59.1% | 25.4% | 8.1% | 7.4% | 100.0% |
| | | Office | 69.6% | 18.6% | 6.1% | 5.7% | 100.0% |
| | | Retail | 69.8% | 23.8% | 2.1% | 4.3% | 100.0% |
| | | Other | 69.8% | 18.7% | 5.6% | 5.9% | 100.0% |
| 18 | Montgomery Village/Airpark | Residential | 59.9% | 26.8% | 4.6% | 8.6% | 100.0% |
| | | Office | 77.7% | 15.1% | 2.9% | 4.3% | 100.0% |
| | | Retail | 67.7% | 25.1% | 1.7% | 5.4% | 100.0% |
| | | Other | 77.4% | 15.1% | 2.8% | 4.7% | 100.0% |
| 19 | North Bethesda | Residential | 53.8% | 25.9% | 8.0% | 12.3% | 100.0% |
| | | Office | 65.8% | 18.4% | 8.6% | 7.3% | 100.0% |
| | | Retail | 51.6% | 28.4% | 6.1% | 14.0% | 100.0% |
| | | Other | 62.4% | 19.5% | 9.4% | 8.7% | 100.0% |
| 20 | North Potomac | Residential | 63.0% | 27.1% | 3.0% | 7.0% | 100.0% |
| | | Office | 75.7% | 18.6% | 0.8% | 4.8% | 100.0% |
| | | Retail | 72.4% | 24.1% | 0.6% | 2.9% | 100.0% |
| | | Other | 75.8% | 18.8% | 1.0% | 4.4% | 100.0% |

Table 1b. Mode Split Assumptions by Policy Area

| Policy Area # | | Development Type | Auto Driver | Auto Passenger | Transit | Non-Motorized | Total |
|---|---|---|---|---|---|---|---|
| 21 | Olney | Residential | 64.3% | 26.4% | 3.3% | 6.1% | 100.0% |
| | | Office | 76.3% | 19.4% | 0.7% | 3.6% | 100.0% |
| | | Retail | 72.1% | 24.8% | 0.5% | 2.6% | 100.0% |
| | | Other | 76.3% | 19.5% | 0.7% | 3.5% | 100.0% |
| 22 | Potomac | Residential | 62.6% | 26.8% | 4.1% | 6.5% | 100.0% |
| | | Office | 74.4% | 19.3% | 2.2% | 4.1% | 100.0% |
| | | Retail | 69.8% | 25.7% | 1.8% | 2.7% | 100.0% |
| | | Other | 74.8% | 19.5% | 2.1% | 3.7% | 100.0% |
| 23 | R&D Village | Residential | 57.3% | 27.3% | 5.7% | 9.7% | 100.0% |
| | | Office | 66.7% | 23.5% | 4.4% | 5.4% | 100.0% |
| | | Retail | 58.0% | 34.1% | 2.0% | 6.0% | 100.0% |
| | | Other | 68.8% | 22.4% | 3.8% | 5.1% | 100.0% |
| 24 | Rockville City | Residential | 56.8% | 26.6% | 6.3% | 10.2% | 100.0% |
| | | Office | 71.7% | 17.4% | 5.4% | 5.5% | 100.0% |
| | | Retail | 62.8% | 25.6% | 3.3% | 8.2% | 100.0% |
| | | Other | 74.7% | 15.3% | 4.8% | 5.1% | 100.0% |
| 29 | Silver Spring CBD | Residential | 50.1% | 18.8% | 13.6% | 17.5% | 100.0% |
| | | Office | 49.6% | 9.0% | 26.6% | 14.9% | 100.0% |
| | | Retail | 42.4% | 12.6% | 20.9% | 24.0% | 100.0% |
| | | Other | 49.2% | 8.7% | 26.8% | 15.2% | 100.0% |
| 30 | Silver Spring/Takoma Park | Residential | 54.0% | 21.0% | 10.1% | 14.9% | 100.0% |
| | | Office | 63.0% | 10.7% | 15.1% | 11.2% | 100.0% |
| | | Retail | 59.5% | 17.2% | 6.9% | 16.4% | 100.0% |
| | | Other | 63.8% | 10.5% | 14.0% | 11.6% | 100.0% |
| 32 | Wheaton CBD | Residential | 55.3% | 24.9% | 11.6% | 8.2% | 100.0% |
| | | Office | 64.3% | 15.0% | 13.1% | 7.5% | 100.0% |
| | | Retail | 54.8% | 25.2% | 7.6% | 12.4% | 100.0% |
| | | Other | 64.2% | 15.1% | 13.1% | 7.6% | 100.0% |
| 16 | Grosvenor | Residential | 52.3% | 25.8% | 11.9% | 10.0% | 100.0% |
| | | Office | 63.4% | 16.5% | 13.3% | 6.8% | 100.0% |
| | | Retail | 54.7% | 27.5% | 8.4% | 9.5% | 100.0% |
| | | Other | 61.0% | 17.2% | 15.4% | 6.3% | 100.0% |
| 31 | Twinbrook | Residential | 52.3% | 26.2% | 9.7% | 11.8% | 100.0% |
| | | Office | 60.8% | 17.2% | 13.7% | 8.3% | 100.0% |
| | | Retail | 53.6% | 27.8% | 7.2% | 11.4% | 100.0% |
| | | Other | 60.2% | 17.5% | 13.9% | 8.5% | 100.0% |
| 33 | White Flint | Residential | 51.4% | 26.3% | 10.7% | 11.6% | 100.0% |
| | | Office | 59.2% | 17.8% | 14.4% | 8.5% | 100.0% |
| | | Retail | 52.2% | 28.3% | 8.2% | 11.3% | 100.0% |
| | | Other | 59.5% | 17.9% | 14.0% | 8.6% | 100.0% |
| 15 | Glenmont | Residential | 58.4% | 24.8% | 10.0% | 6.8% | 100.0% |
| | | Office | 69.5% | 16.8% | 8.2% | 5.6% | 100.0% |
| | | Retail | 69.5% | 22.7% | 4.0% | 3.9% | 100.0% |
| | | Other | 69.1% | 16.9% | 8.4% | 5.6% | 100.0% |
| 5 | Clarksburg | Residential | 64.5% | 27.1% | 2.5% | 5.9% | 100.0% |
| | | Office | 76.5% | 20.0% | 0.0% | 3.5% | 100.0% |
| | | Retail | 72.3% | 25.7% | 0.0% | 2.0% | 100.0% |
| | | Other | 76.2% | 20.3% | 0.0% | 3.5% | 100.0% |
| 28 | Shady Grove Metro Station | Residential | 57.7% | 26.4% | 8.7% | 7.1% | 100.0% |
| | | Office | 67.0% | 20.6% | 6.8% | 5.5% | 100.0% |
| | | Retail | 55.9% | 29.2% | 3.8% | 11.1% | 100.0% |
| | | Other | 66.9% | 20.6% | 7.2% | 5.2% | 100.0% |
| 10 | Friendship Heights | Residential | 50.3% | 19.4% | 15.4% | 14.8% | 100.0% |
| | | Office | 53.0% | 9.9% | 24.5% | 12.6% | 100.0% |
| | | Retail | 52.8% | 15.4% | 11.8% | 19.9% | 100.0% |
| | | Other | 53.4% | 9.7% | 23.9% | 13.0% | 100.0% |

Table 1b. Mode Split Assumptions by Policy Area

| Policy Area # | | Development Type | Auto Driver | Auto Passenger | Transit | Non-Motorized | Total |
|---|---|---|---|---|---|---|---|
| 25 | Rockville Town Center | Residential | 51.3% | 25.3% | 8.9% | 14.5% | 100.0% |
| | | Office | 60.5% | 16.7% | 12.3% | 10.5% | 100.0% |
| | | Retail | 51.0% | 26.5% | 6.8% | 15.6% | 100.0% |
| | | Other | 59.9% | 16.9% | 12.4% | 10.8% | 100.0% |
| 27 | Rural West | Residential | 64.8% | 28.2% | 1.8% | 5.2% | 100.0% |
| | | Office | 76.0% | 20.4% | 0.0% | 3.6% | 100.0% |
| | | Retail | 72.6% | 25.7% | 0.0% | 1.7% | 100.0% |
| | | Other | 76.1% | 20.3% | 0.1% | 3.5% | 100.0% |
| 26 | Rural East | Residential | 64.0% | 28.2% | 2.6% | 5.3% | 100.0% |
| | | Office | 75.4% | 20.6% | 0.3% | 3.7% | 100.0% |
| | | Retail | 71.2% | 26.8% | 0.1% | 1.9% | 100.0% |
| | | Other | 75.8% | 20.2% | 0.5% | 3.6% | 100.0% |
| 34 | White Oak | Residential | 57.9% | 25.8% | 7.8% | 8.5% | 99.9% |
| | | Office | 68.7% | 22.6% | 3.3% | 5.4% | 100.0% |
| | | Retail | 65.7% | 28.0% | 2.0% | 4.3% | 100.0% |
| | | Other | 66.9% | 23.9% | 3.4% | 5.8% | 100.0% |
| 9 | Fairland/Colesville | Residential | 62.3% | 25.9% | 4.9% | 6.9% | 100.0% |
| | | Office | 73.0% | 19.8% | 2.8% | 4.3% | 100.0% |
| | | Retail | 71.6% | 24.3% | 1.0% | 3.1% | 100.0% |
| | | Other | 73.9% | 19.4% | 2.5% | 4.2% | 100.0% |

**VEHICLE TRIP DISTRIBUTION**

APPENDIX ? Trip Distribution and Traffic Assignment Guidelines

Source of Copies

The Maryland-National Capital Park and Planning Commission
8787 Georgia Avenue
Silver Spring, MD 20910-3760

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